DICHOPETALA AND NEW RELATED NORTH AMERICAN GENERA: A STUDY IN GENITALIC SIMILARITY IN SYMPATRY AND GENITALIC DIFFERENCES IN ALLOPATRY (TETTIGONIIDAE: PHANEROPTERINAE: ODONTURINI)

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ABSTRACT

The genus *Dichopetala* Brunner von Wattenwyl, 1878 sensu Rehn and Hebard, 1914 is revised, with the description of 6 new genera and 14 new species: *Obolopteryx* (NEW GENUS), *Planipollex* (NEW GENUS), *Rhabdocerca* (NEW GENUS), *Gymnocerca* (NEW GENUS), *Mactruchus* (NEW GENUS), *Acanthorintes* (NEW GENUS), *Rhabdocerca zanclophora* (NEW SPECIES), *Gymnocerca cycloprista* (NEW SPECIES), *Gymnocerca enaulites* (NEW SPECIES), *Mactruchus ischnodus* (NEW SPECIES), *Mactruchus cryothermastris* (NEW SPECIES), *Mactruchus megasynactor* (NEW SPECIES), *Acanthorintes xanthephaptor* (NEW SPECIES), *Acanthorintes erythrephaptor* (NEW SPECIES), *Acanthorintes thenarocercus* (NEW SPECIES), *Acanthorintes zeuglaius* (NEW SPECIES), *Pterodichopetala strepsidactyla* (NEW SPECIES), *Pterodichopetala hypsibates* (NEW SPECIES), *Pterodichopetala padrisima* (NEW SPECIES), and *Pterodichopetala pityophila* (NEW SPECIES). The following two species are synonymized: *Dichopetala acambarensis* Marquez Mayaudon, 1958 is designated a junior synonym of *Dichopetala serrifera* Rehn and Hebard, 1914 (NEW SYNONYMY), and *Dichopetala chirura* Strohecker, 1945 is designated a junior synonym of *Dichopetala pollicifera* Rehn and Hebard, 1914 (NEW SYNONYMY). Sixteen North and Central American species are transferred from *Dichopetala* into newly-erected genera: *Obolopteryx emarginatus* (Rehn and Hebard, 1914) (NEW COMBINATION), *Obolopteryx seeversi* (Strohecker, 1941) (NEW COMBINATION), *Obolopteryx gladiator* (Rehn and Hebard, 1914) (NEW COMBINATION), *Obolopteryx brevihastatus* (Morse, 1902) (NEW COMBINATION), *Obolopteryx castaneus* (Rehn and Hebard, 1914) (NEW COMBINATION), *Obolopteryx poecilus* (Hebard, 1932) (NEW COMBINATION), *Obolopteryx catinatus* (Rehn and Hebard, 1914) (NEW COMBINATION), *Obolopteryx oreoecus* (Rehn and Hebard, 1914) (NEW COMBINATION), *Planipollex polliciferus* (Rehn and Hebard, 1914) (NEW COMBINATION), *Rhabdocerca tridactyla* (Rehn and Hebard, 1914) (NEW COMBINATION), *Rhabdocerca caudelli* (Rehn and Hebard, 1914) (NEW COMBINATION), *Gymnocerca falcata* (Rehn and Hebard, 1914) (NEW COMBINATION), *Mactruchus durangensis* (Rehn and Hebard, 1914) (NEW COMBINATION), *Mactruchus serrifer* (Rehn and Hebard, 1914) (NEW COMBINATION), *Acanthorintes tauriformis* (Rehn and Hebard, 1914) (NEW COMBINATION), and *Pterodichopetala cultricerca* (Strohecker, 1945) (NEW COMBINATION). The final South American taxon described in the genus, *Dichopetala transfuga* (Brunner von Wattenwyl, 1878), is transferred to another genus, resulting in the combination *Cohnia transfuga* (Brunner von Wattenwyl, 1878) (NEW COMBINATION). These taxonomic acts are accompanied by various discussions concerning the new taxa herein erected, including but not limited to biogeography, phylogeny and polarity, natural history, and the problems associated with maintaining a large heterogeneous genus.

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P U B L I C A T I O N S O F T H E
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN NO. 203

The publications of the Museum of Zoology, The University of Michigan, consist primarily of two series—the *Miscellaneous Publications* and the *Occasional Papers*. Both series were founded by Dr. Bryant Walker, Mr. Bradshaw H. Swales, and Dr. W. W. Newcomb. Occasionally the Museum publishes contributions outside of these series. Beginning in 1990 these are titled *Special Publications* and *Circulars* and each are sequentially numbered. All submitted manuscripts to any of the Museum's publications receive external peer review.

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Rainboth, W.J., C. Vidthayanon & M.D. Yen. 2012. Fishes of the Greater Mekong ecosystem with species list and photographic atlas. *Misc. Publ. Mus. Zool., Univ. Michigan*, No. 201, pp. *i-xvi*, 1-294, 2576 figs.

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COVER ILLUSTRATION— *Obolopteryx catinatus,* Falls of the Pedernales, nr. Johnson City, Texas, 11 May 2002, Cohn. Painting by John Megahan, used with permission.

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DICHOPETALA AND NEW RELATED NORTH AMERICAN GENERA: A STUDY IN GENITALIC SIMILARITY IN SYMPATRY AND GENITALIC DIFFERENCES IN ALLOPATRY (TETTIGONIIDAE: PHANEROPTERINAE: ODONTURINI)

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INTRODUCTION

A thorough taxonomic revision will illustrate evidence for biological problems of broad interest that are ripe for further exploration. This revision of the katydid genus *Dichopetala* Brunner von Wattenwyl, 1878 and the related genera herein erected is no exception. In North America, these katydids, hereafter informally referred to collectively as the "dichopetalines", are distinctive in being brightly colored, often green with brownish markings or conspicuously black, with a characteristic spinose ovipositor and very short overlapping tegmina in males and females (reduced to even smaller lobes in a few genera). Only in one genus, which clearly belongs to this group, do the tegmina extend to the end of the abdomen, and in those cases, they are inflated and bright green. These speciose katydids are found from the Rio Balsas Basin (south of Cuernavaca (Morelos) and Uruapan (Michoacan)) north to central-western Texas and restricted portions of the southwestern United States. The males of these species and genera display remarkable diversity in almost all genitalic characters, which itself begs for further exploration into the causal mechanisms. In particular, there are instances of striking reversal of the pattern expected in groups with strong genitalic divergence: a remarkable degree of sympatry and even syntopy of species with similar genitalia, and close allopatry with members of other genera with very different genitalia. Curious distributional phenomena, as illustrated by our maps, reveal a number of species and genera being replaced by other species or genera with apparently no physiographic or vegetational barriers between them. There also exists a fascinating biogeographical component: the remarkable similarity in the spinose ovipositor and short tegmina between these southern U.S. and northern Mexican arid-land katydids and the barbitistine-odonturine taxa in Central Europe and Mediterranean region as well as the similarly disjunct taxa in South America. Furthermore, the complexity of the genitalia of the North American taxa contrasts the relative simplicity and uniformity of the Barbitistini-Odonturini and strongly suggests a significant difference in mating behavior. And finally, factors surrounding certain cases of syntopy may suggest evidence for visual identification of mates and the possibility of chemical identification, despite the fact that all dichopetalines have tegminal stridulatory mechanisms. The comparative nature of this and other taxonomic studies therefore might easily serve as a foundation for further investigation into the fascinating biological problems present in their focus taxa.

Thorough revisions can reveal problems of another more general taxonomic nature. In the course of this revision, we have become aware of the difficulty of using these two characters (and others) within the framework of a group in which a higher (tribal) classification scheme is virtually absent. We have reviewed in our current state of knowledge, in a section called Tribal Problems, the confusion of the tribal classification insofar as it relates to the genera herein erected and have drawn only very tentative conclusions on the relationships of the dichopetaline genera within the tribe which might be helpful to those working to solve these tribal problems.

This is a traditional morphological revision which is absolutely essential for any further biological study of these organisms. Unfortunately, taxonomy has come under attack because of poor usage and methodology (in keys, diagnoses, and descriptions as well as poor justification for phylogenies) on the part of taxonomists as well as the general misunderstanding by other biologists of how names, identifications, and phylogenies are determined by taxonomists and affect their own work. Taxonomic, especially revisionary, studies are integral to virtually all other disciplines. Names and identifications are used by essentially every branch of biology, while seeping into other disciplines in which organisms play a role, such as biochemistry, engineering, and medicine. Usage of such information renders possible the communication of discoveries or applications made in these other disciplines. Thus, as Bortolus (2008, 2012) and Vink *et al.* (2012) have suggested, how identifications are made in other disciplines, especially ecology and conservation, are vital to the reproducibility of investigation and experiment.

An additional role easily taken up by taxonomists stems from the fact that their revisions are an opportune place to include innovative methods of presentation (*e.g.,* tables of character conditions which include figures (*e.g.*, Naskrecki 2000b), new computer programs, and interactive mapping techniques), which might improve communication between taxonomists and their audience. One such innovation in this

paper, which might be useful in other revisionary studies, is the section called Promising Problems (see also Cohn and Cantrall 1974), which draws together the unanswered questions discussed in fragmentary fashion throughout the text for easy access for future researchers.

Thus, it is our hope that this contribution will not only augment the knowledge and understanding of this interesting group of insects but also provoke discussion concerning the role and responsibility of those who choose to study the classification and relationships of these and other such organisms.

History of the Genus

The genus *Dichopetala* Brunner von Wattenwyl, 1878 was erected in the Monographie der Phaneropteriden. Comprising two species, *Dichopetala mexicana* Brunner von Wattenwyl, 1878 from Cuernavaca (Morelos, Mexico) and *Dichopetala emarginata* Brunner von Wattenwyl, 1878 from Texas, the genus was separated from the other members of the Gruppe Odonturae by the split condition of the female subgenital plate. No genotype was selected at the time; *D. mexicana* was chosen later by Kirby (1906). *Dichopetala* also remained in the Odonturini following the separation of the Barbitistini (Jacobson 1905, Rehn and Hebard 1914a); it has been a part of that tribe ever since (Eades *et al.* 2013). After the description of four more species, the definitive work on the genus was conducted by Rehn and Hebard (1914a), in which 11 new species were erected and 3 of the previous species were synonymized. In that work, the single character uniting *Dichopetala* was questioned, although the genus was maintained. Only a few minor additions have come to pass since that revision. Hebard (1932) and Strohecker (1941, 1945) each added 1 and 3 new species, respectively. Marquez Mayaudon (1958) described *Dichopetala acambarensis*, and the composition of the genus in North America came to a rest for the next fifty-five years.

Ten years after the revision, Hebard (1924) added the first South American member, the Ecuadorean *Dichopetala andeana*. Rehn (1955) added a second species, *D. inca*, from Peru. Brunner von Wattenwyl (1878) described the Brazilian *Odontura transfuga* and much later, this species was tentatively transferred to *Dichopetala* by Fontana and Buzzetti (2004) as it much more closely resembled that genus. Buzzetti, and Carroti (2010) also transferred Hebard's species from *Dichopetala* into a new genus *Cohnia* with little remark as to the other South American species. Braun (2011) subsequently transferred Rehn's species out of *Dichopetala* into *Cohnia*.

Much more recently the new monotypic genus, *Pterodichopetala*, from northeastern Mexico was erected by Buzzetti, Barrientos, and Rocha (2010). Although presenting with some morphological features radically different from those found in *Dichopetala*, its close relation to that genus could not be questioned.

Breaking up *Dichopetala*

The genus *Dichopetala* Brunner von Wattenwyl, 1878, as conceived by the first revisers, Rehn and Hebard (1914a), included 14 species in the southern United States and northern Mexico. Six species were clearly related, and the remaining 8 species were essentially unrelated, except for 2 sister species. The addition of 19 species (5 more recently described, plus 14 new species added herein) clearly reveals now clusters; within each cluster, the species share highly distinctive male genitalic characters and a cohesive distribution. If these were to be included in one genus, there would be only a single character linking them: the distinctive female subgenital plate (see Characterizing the Dichopetaline Genera below). Furthermore, so diverse are the male genitalic structures (involving the cerci, ultimate tergite, epiproct, epiphalli (titillators), and subgenital plate) that no characterization, except perhaps the complexity itself, can be used to define the genus, with the possible exception of the presence of a sclerotized epiphallus in all but one species. All of these clusters also are characterized by a spinose ovipositor and short tegmina reduced to about the same extent, with the addition of Naskrecki's (2000a) pleural thoracic character; these features are highly distinctive in the North American fauna but also found in European and South American Odonturini and Barbitistini. Thus, if all the species treated here were to be retained or described within the genus, *Dichopetala* would be essentially indefinable.

We are cognizant of taxonomists' responsibility to non-specialists to provide them with reasonably obvious characters for identification of genera and species, while simultaneously preserving phylogenetic relationships. Although we are aware of informal criticism of category inflation (*e.g.*, Chaitra *et al.* 2004; Isaac *et al.* 2004, 2005; Agapow and Sluys 2005; Harris and Froufe 2005; Knapp *et al.* 2005), we think that practicality dictates the elevation of these clusters of species with distinctive male genitalia to generic rank, even at the risk of being unable to assign some females to genus. In fact, the same problem exists conversely because the males are unidentifiable as to genus if *Dichopetala* is diagnosed by this single female character; yet, the apomorphic male genitalia is more informative as to the interspecific relationships than the female subgenital plate.

It also should be noted that, in using male genitalia, we are faced with the problem of several highly distinctive species for which we could erect monobasic genera, because those species do not appear to fit clearly in any other well-defined new genus. We have avoided this problem with an unsatisfactory genus for three species and have carefully discussed the alternatives which we chose not to use. That leaves us with only one monobasic genus.

We also have chosen to indicate only informally the phyletic line (the aforementioned "dichopetalines") to which *Dichopetala* and these new genera belong (based only on the

female subgenital plate); thus, use of this term does not amount to the establishment of a tribal taxon at this time.

The preceding justification and remainder of this treatment establishes the following new genera, species, synonyms, and combinations:

- *Obolopteryx* (**NEW GENUS**), with the following species: *Obolopteryx brevihastatus* (Morse, 1902) (**NEW COMBINATION**); *Obolopteryx castaneus* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Obolopteryx catinatus* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Obolopteryx emarginatus* (Brunner von Wattenwyl, 1878) (**NEW COMBINATION**); *Obolopteryx gladiator* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Obolopteryx oreoecus* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Obolopteryx poecilus* (Hebard, 1932) (**NEW COMBINATION**); and *Obolopteryx seeversi* (Strohecker, 1941) (**NEW COMBINATION**);
- *Planipollex* (**NEW GENUS**), with the following species: *Planipollex polliciferus* (Rehn and Hebard, 1914) (**NEW COMBINATION**) (=*Dichopetala chirura* Strohecker, 1945 (**NEW SYNONYMY**));
- *Rhabdocerca* (**NEW GENUS**), with the following species: *Rhabdocerca caudelli* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Rhabdocerca tridactyla* (Rehn and Hebard, 1914) (**NEW COMBINATION**); and *Rhabdocerca zanclophora* (**NEW SPECIES**);
- *Gymnocerca* (**NEW GENUS**), with the following species: *Gymnocerca cycloprista* (**NEW SPECIES**); *Gymnocerca enaulites* (**NEW SPECIES**); and *Gymnocerca falcata* (Rehn and Hebard, 1914) (**NEW COMBINATION**);
- *Mactruchus* (**NEW GENUS**), with the following species: *Mactruchus cryothermastris* (**NEW SPECIES**); *Mactruchus durangensis* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Mactruchus ischnodus* (**NEW SPECIES**); *Mactruchus megasynactor* (**NEW SPECIES**); and *Mactruchus serrifer* (Rehn and Hebard, 1914) (**NEW COMBINATION**) (=*Dichopetala acambarensis* Marquez Mayaudon, 1958 (**NEW SYNONYMY**));
- *Acanthorintes* (**NEW GENUS**), with the following species: *Acanthorintes erythrephaptor* (**NEW SPECIES**); *Acanthorintes tauriformis* (Rehn and Hebard, 1914) (**NEW COMBINATION**); *Acanthorintes thenarocercus* (**NEW SPECIES**); *Acanthorintes xanthephaptor* (**NEW SPECIES**); and *Acanthorintes zeuglaius* (**NEW SPECIES**);
- *Pterodichopetala* Buzzetti, Barrientos, and Rocha, 2010, with the following species: *Pterodichopetala cieloi* Buzzetti, Barrientos, and Rocha, 2010; *Pterodichopetala cultricerca* (Strohecker, 1945) (**NEW COMBINATION**); *Pterodichopetala hypsibates* (**NEW SPECIES**); *Pterodichopetala padrisima* (**NEW SPECIES**); *Pterodichopetala pityophila* (**NEW SPECIES**); and *Pterodichopetala strepsidactyla* (**NEW SPECIES**).

Dichopetala Brunner von Wattenwyl, 1878 is monotypic, including only the type-species, *Dichopetala mexicana* Brunner von Wattenwyl, 1878.

All genera, except *Pterodichopetala*, contain species included in the original concept of *Dichopetala sensu* Rehn and Hebard (1914).

The final remaining South American member of the genus, *Dichopetala transfuga* (Brunner von Wattenwyl, 1878), is hereby transferred to *Cohnia* Buzzetti, Fontana, and Carotti, 2010, resulting in the name *Cohnia transfuga* (Brunner von Wattenwyl, 1878) (**NEW COMBINATION**).

Characterizing the Dichopetaline Genera

There are 3 categories of characters we have used to delineate the dichopetaline genera:

- apomorphic characters, which define the phyletic line;
- distinctive, but non-apomorphic characters, which characterize the dichopetalines but are found in other non-dichopetaline genera; and
- distinctive tendencies, characters with distinctive variation among the genera and species which conditions are found only rarely outside the dichopetalines (these may be present in most but not all dichopetaline species).

In addition, *Dichopetala* and these genera together have a cohesive distribution in the southern United States and northern and central Mexico.

Apomorphic Characters. As mentioned previously, there is only one apomorphic character we can use to relate all the dichopetaline genera here included: the "split" female subgenital plate (with a membranous midlongitudinal area separating two sclerotized lobes), judged here to be apomorphic (see also Buzzetti, Fontana, and Carotti 2010). In our brief survey of the other phaneropterine genera, we have found none which possess this character. In contrast, the other members of the Odonturini-Barbitistini generally have a simple fully-sclerotized female subgenital plate, usually triangular, occasionally with a very brief emargination in a narrow apex; we consider this to be the primitive condition.

Distinctive but Non-Apomorphic Characters. The two characters that make the dichopetalines so distinctive in North America, the "spinose" ovipositor and degree of tegminal reduction (exception in *Pterodichopetala*), are precisely those shared with the European and South American Odonturini-Barbitistini; these features are judged as synapomorphic for these tribes and cannot be used to define the dichopetaline phyletic line. Naskrecki (2000a) added one other synapomorphic condition, the metathoracic

anapimeron much smaller than the katapimeron, judged by him to be synapomorphic for the Odonturini-Barbitistini. See the Tribal Problems below for a more indepth discussion of the distribution of these two characters within the Phaneropterinae.

Distinctive Tendencies. Despite the lack of apomorphic characters uniting all the dichopetaline genera, these taxa share four highly distinctive "tendencies" in the male genitalia and one in the female, which combination is found in no other phaneropterine genus that we have examined. Such tendencies include the following variously and highly modified structures:

1. male cerci (#malesymbol)
2. presence and diverse condition of a sclerotized epiphallus (#malesymbol)
3. male epiproct (#malesymbol)
4. male subgenital plate (#malesymbol)
5. lateral lobes of the female subgenital plate (#femalesymbol)

We are very hesitant to use characters of "tendency", *i.e.*, characters which are not present uniformly in all species, but some of these are so striking, we think they may represent good characterization of the group of genera. The cercus is highly modified in almost all species; very few have simple cerci, but even these are quite different from the generally simple cerci of the European and South American Odonturini-Barbitistini. The second tendency is the presence of a sclerotized epiphallus (except in *Planipollex*), very different among and sometimes within genera. An epiphallus apparently is absent in the Odonturini-Barbitistini (Heller pers. comm. 2011), with the exception of the western South American *Cohnia* Buzzetti, Fontana, and Carotti, 2010. A sclerotized concealed structure also is scattered throughout the Phaneropterinae (*Ceraia* Brunner von Wattenwyl, 1891; *Parapelerinus* Liu and Kang, 2008; *Stictophaula* Hebard, 1922; Heller pers. comm. 2011); yet, such structures might be expected to arise *de novo* in this position if they somehow contact the female. The epiproct and subgenital plate of the male are often variously modified, although not in all species, and usually different from the often simpler Odonturini-Barbitistini. The lateral lobes of the female subgenital plate are frequently elongated in various ways (except in *Pterodichopetala*), a condition we also have not seen in other phaneropterine genera.

Within each of these tendencies, the structures are often radically different from one another between genera and often even within a single genus. Thus, we are hesitant to use these tendencies for the dichopetalines, because we cannot envision a complex ancestral condition giving rise to this diversity in any one structure nor are there simple conditions in any one genus that might give rise to the complexity seen within it; yet such diversity is not found among other Odonturini-Barbitistini. It is possible that these tendencies represent some fundamental genetic basis for a different kind of mating behavior, but this requires further investigation.

Tribal Problems

Absence of Phaneropterine Classification. Within the Phaneropterinae, we have had great difficulty in justifying placement of dichopetalines in the Odonturini because of the lack of any comprehensive tribal analysis since Brunner (1878) and to a lesser extent, Jacobson (1905). Beyond these, few tribal characters or macroscopic treatments have been offered, and notes cobbled together from recent treatments (*e.g.*, Bei-Bienko 1954; Emsley 1970; Ullrich *et al.* 2010; Cadena-Castenada 2011, 2012), while useful, do not significantly address this problem. Furthermore, it has become clear during our brief foray into this topic, that the tribal placement of genera, at least concerning the Odonturini and Barbitistini, is based on usage and preservation, most stemming from Brunner's treatment (1878). A self-reinforcing consequence of ignoring this issue throughout the last century is the large number of genera of uncertain tribal status in the Phaneropterinae (Eades *et al.* 2013). Especially in contemporary treatments, ignoring the higher relationships of a newly-described taxon only augments the problem, particularly when affinities for genera already placed in tribes or other categories are remarked on or implied (*e.g.*, *Austrodontura*, *Pterodichopetala*, *Parapelerinus*, *Paraxantia*). Even in cases where a concrete conclusion cannot be reached, hypotheses of tribal affinities or pieces of information relevant to such hypotheses should be discussed to aid subsequent workers in trying to sort out the relationships within the subfamily.

In addition to large number of unplaced genera, the elucidation of this tribal problem has not been helped by two pervasive contemporary taxonomic practices. First, the isolated description of small numbers of poorly compared new taxa, by nature, attempts to impact taxonomy of a group with minimal footprint; yet, these contributions often creating further areas for complication, particularly when the receiving group already is poorly defined. For example, many changes are based on either a male or a female but rarely both sexes are represented (a salient factor in light of the focus on the female ovipositor presented below). Secondly, transfers from, into, or between ill-defined taxa, while meant to "clean-up" by removing outliers and creating more homogeneous taxa, often are not given full consideration for how they affect taxa beyond the donor or recipient group. Furthermore, in both these instances, the "quick contribution" often yields anemic descriptions and justifications which are not particularly useful supplements for subsequent tribal analysis. Unfortunately, this has happened much within the considered South American taxa (*e.g.*, Fontana and Buzzetti 2004; Buzzetti, Fontana, and Carotti 2010; Braun 2010, 2011), and necessity has made us guilty of this as well with regards to the last South American species described in *Dichopetala*.

What is desperately needed is consideration over a broader scope of taxa, including more careful comparisons between genera and clear designations of apomorphic and

plesiomorphic characters in diagnoses. We do not think it our province to solve the problems of phaneropterine tribal classification, and it is with great anticipation that we await Naskrecki *et al.*'s (in prep.) forthcoming contribution, which will certainly provide some insight into this problem. For now, we deal with tribal obstacles only so far as they relate to the North American dichopetaline genera. Furthermore, our conclusions about intergeneric and intercontinental relationships can be considered only tentative because of these tribal issues.

Implications for the Dichopetalines. As previously alluded, we believe that the closest relatives to the dichopetalines are probably in the Odonturini-Barbitistini, but we are not aware of any recent characterizations of these tribes, let alone characters for separating them. Within the key, Brunner's (1878) "Gruppe Odonturae" was characterized by essentially two features, absence of the humeral sinus and lobiform flight organs (characters which may or may not be independent). And with so few defining features, such a broad definition will invariably invite problems. For example, Naskrecki and Bazelet (2011) have suggested that reduced flight organs have evolved multiple times as a result of adaptive value to a give niche. Yet, reduced tegmina and wings seem to be the main justification when new taxa are added or transferred to the group (*e.g.*, Ebner 1915, Braun 2011) without any further analysis of whether the new composition of the group is natural. Additionally, it is not completely apparent how some genera came to be a part of the Odonturini or Barbitistini.

There also is the problem of whether the Odonturini and Barbitistini are truly distinct assemblages. Jacobson's (1905) Barbitistini was first mentioned in a peculiar form, apparently not signifying the formal erection of a new tribe. Taken merely as a heading "Barbitistini (Odonturini)", the accompanying morphological remarks, which might have formed a diagnosis or description, apparently were copied directly from Brunner's (1878) description of the "Gruppe Odonturae", and Brunner (1878) included both *Odontura* Rambur, 1838 and *Barbitistes* Charpentier, 1825 in his this Gruppe. Jacobson (1905) may not have seen *Odontura* because he was dealing strictly with the Russian fauna, or he may have simply changed the name Odonturae to Barbitistini because the genus *Barbitistes* was described earlier than the genus *Odontura*. Since Jacobson's (1905) use of Barbitistini, our cursory review of the literature (via OSF: Eades *et al.* 2013) indicates that the tribe has been used only geographically, covering those genera found in Europe and Russia (except *Odontura*, which occurs in Portugal, Spain and Italy in addition to northern Africa). There seems to have been no definition offered by Jacobson (1905) or any other subsequent authors to differentiate the Barbitistini from the Odonturini in the restricted sense, and we have found no apparent difference morphologically between these two tribes. However, as the dichopetaline genera clearly satisfy Brunner's criteria, we formally have placed these genera, including *Pterodichopetala*, in the Odonturini. This placement preserves the Western Hemisphere cohesion (ignoring *Odontura*) as it is used today. If it is demonstrated in the future that the two tribes cannot be maintained as distinct, then Odonturini takes priority over Barbitistini because of Brunner's prior usage.

In characterizing the dichopetalines, we have placed great emphasis on two structures, type of female ovipositor and tegmina reduced to the same degree, although they are not exclusive to these genera. Yet, we think these characters are of phylogenetic significance, and the distribution of these features outside the dichopetalines is complex and discussed in detail below.

Ovipositor. The type of ovipositor found in the dichopetalines, hereafter termed "spinose", is characterized by separated spines on the dorsal and ventral margins, restricted to the apical half as well as short spines or pegs on the lateral face, most of these on a low ridge on the dorsal and ventral valve. The apex of this type of ovipositor is apically more or less blunt or rounded, contrasting many where the apex is distinctly acute, irrespective of supination (Fig. 1). This combination of

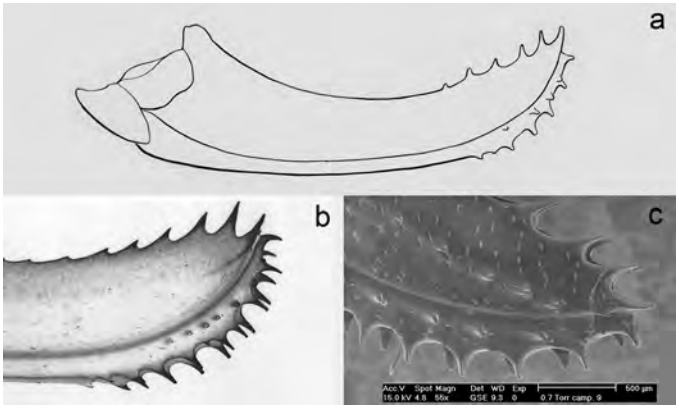


Fig. 1. The "spinose" or dichopetaline ovipositor, (a) line drawing, *Rhabdocerca tridactyla*; (b) photograph, apex, *Obolopteryx castaneus*; (c) SEM, apex, *Pterodichopetala, pityophila*.

conditions renders the ovipositor rather complex so we think that it probably indicates relationship. This ovipositor type is found in all dichopetalines as well as in some Odonturini (*i.e.*, *Cohnia* Buzzetti, Fontana, and Carotti, 2010; *Odontura* Rambur, 1838; possibly *Xenicola* Uvarov, 1940; unknown to us in *Atlasacris* Rehn, 1914; *Paraperopyrrhicia* Ebner, 1915; *Peropyrrhicia* Brunner von Wattenwyl, 1891) and most Barbitistini (*i.e.*, *Barbitistes* Charpentier, 1825; *Isoimon* Bei-Bienko, 1954; *Isophya* Brunner von Wattenwyl, 1878; *Kurdia* Uvarov, 1916; *Metaplastes* Ramme, 1939; *Orthocercodes* Bei-Bienko, 1951; *Parapoecilimon* Karabag, 1975; *Phonochorion* Uvarov, 1916; *Poecilimon* Fischer, 1853; *Polysarcus* Fieber, 1853; unknown to us in *Ancistrura* Uvarov, 1921).

Two other New World genera, the Mexican *Arachnitus* Hebard, 1932 (currently placed in the Odonturini) and the Argentinean *Burgilis* Stål, 1873 (currently in the "Gruppe Aniarae"), have ovipositors with spines, but they are rather different from the aforementioned "spinose" ovipositors. In

both genera, the dorsomarginal spines extend to the base, the lateral face is densely covered with prominent spines or tubercles, and the apex is acute. Thus, we think these genera are not closely related to the dichopetalines, although Naskrecki (2000a) did place *Arachnitus* as the sister group to *Dichopetala* in his phylogenetic analysis of the Phaneropterinae. The shared ovipositor characters might suggest a phyletic relationship between *Arachnitus* and *Burgilis*, but the enormous range disjunction between *Arachnitus* and *Burgilis* brings the relation of the two genera into question. These also share simple, triangular female subgenital plate and lack of titillators, but these conditions probably are primitive. It should be noted that *Burgilis* has well-developed, normal tegmina and wings, whereas *Arachnitus* has at most short tegmina and stubby wings. Other spiny ovipositors superficially similar to the dichopetalines are found in a few phaneropterine species (*e.g.*, *Amblycorypha insolita* Rehn and Hebard, 1914b ("Amblycoryphae"); *Austrodontura* Fontana and Buzzetti, 2004 (Tribe *incertae sedis*); *Peronura clavigera* Karsch, 1889 (Acrometopini); *Anaulacomera denticauda* Saussure and Pictet, 1897; *Enthephippion obscuripenne* Bruner, 1915; *Ligocatinus sordidus* Rehn, 1920 ("Plagiopleurae"); *Horatosphaga vicina* (Chopard, 1954); *Noia testacea* Walker, 1870 (Ducetiini); pers. obs.; Heller pers. comm. 2011). However, without an adequate tribal analysis, we cannot identify the possibilities of convergence in this structure. We also realize that this type of ovipositor may reflect a common ovipositional substrate.

Here placed in great contrast to the "spinose" ovipositor is another ovipositor type, hereafter termed "crenulate", which is scattered among the Odonturini (*i.e.*, *Angara* Brunner von Wattenwyl, 1891; *Anisophya* Karabag, 1960; *Nanoleptopoda* Braun, 2011; *Parangara* Rehn, 1945) and Barbitistini (*Andreiniimon* Capra, 1937; *Dasycercodes* Bei-Bienko, 1951; *Euconocercus*, Bei-Bienko, 1950; *Leptophyes* Fieber, 1853), as well as among other phaneropterine taxa in the New World. This ovipositor is characterized by the margins having low, rounded, dense, and usually contiguous teeth and probably all lack pegs or teeth on the lateral face. The apex may be acute or rounded apically. Because this crenulate ovipositor may occur more commonly beyond the limited sample of phaneropterines that we have examined, we think that this condition may be primitive; therefore, the crenulate genera included in the Odonturini-Barbitistini are perhaps not related to those genera with spinose ovipositors and might be removed from those two tribes, assuming ovipositors may be indicative of relationship. Beyond the Odonturini-Barbitistini, these genera are often long-winged. It should be noted that we have not made an exhaustive search for either ovipositor type among the Old World genera beyond the Odonturini-Barbitistini.

With our focus on the ovipositor, we find particularly troublesome the violation of this group containing such an uncommon and fairly uniform structure, viz. inclusion of genera in both the Odonturini and Barbitistini with several different types of ovipositors. Yet, regardless of whether the emphasis placed on the ovipositor is justified, this feature suggests that the current assemblage of the Odonturini-Barbitistini, in the very least, requires careful re-evaluation.

Tegmina. Perhaps even more problematic are the issues suggested by a survey of short tegmina within these tribes.

Male and female members of the dichopetaline genera have the tegmina reduced to the same relative length, viz. covering only the first few tergites, despite large inter- and often intraspecific differences in genitalia. The male tegmina always retain a small, heavily and conspicuously reticulated portion distad of the stridulatory area, and although we have made no measurements, visual inspection suggests very little variation in the extent of this distal portion. Only in both sexes of the genus *Pterodichopetala* and females of three other genera (*Obolopteryx*, *Planipollex*, and *Rhabdocerca*) do the tegmina deviate from this general length, being much longer in the former and more reduced in the latter. All genera have rudimentary or stub-like wings, in which perhaps a few longitudinal veins may be identified, and all also lack the humeral sinus of the pronotum. Males possess a generalized tettigoniid stridulatory file and scraper, and females possess a simple stridulatory apparatus not homologous to the males (see Morphological Notes).

Interestingly, the degree of tegminal reduction in the dichopetalines also seems comparable to the other Odonturini-Barbitistini, making the grouping of these purportedly-related genera partially understandable. Yet, many of the Odonturini-Barbitistini diverge greatly in other characters including male genitalia and type of ovipositor. For example, another odonturine species, *Anisophya schoenemanni* (Karsch, 1889) (Odonturini), has short tegmina and stub-like wings similar to the dichopetalines; yet, the ovipositor is more like the "crenulate" type, similar to most other members of *Anisophya*. Thus, some of these genera may not be closely related or may represent the primitive condition at the base of the lineage. Furthermore, we are aware that convergence may be much more difficult to identify in reductional characters.

Yet, we feel that the tegmina still may indicate phylogenetic significance, because, while the Odonturini-Barbitistini are similar in the same relative tegminal length and lack of humeral sinus, there are other ways to reduce the flight organs, as indicated by other groups of tettigoniids.

For example, in the unrelated *Anisophya biforma* Nickle, 2011 a geographic variant or sister species in a locality nearby the long-winged form has reduced the tegmina to the dichopetaline length. That form still retains wings as long as the tegmina in addition to a humeral sinus, a structure characteristic of long winged forms, which suggests the reduction process may have been very recent in *A. biforma*. Given that the dichopetalines do not possess a humeral sinus, the case might be made that the process was a one-step reduction. This would gain support in that it argues for a more ancient reduction in that group. Several genera of Insarini have reduced the tegmina and/or

wings, although different from their dichopetalines in various ways. Species of *Brachyinsara* Rehn and Hebard, 1914, have short tegmina, particularly in the males of *B. magdalenae* Rehn and Hebard, 1914. The genus *Arethaea* is brachypterous only in females of *A. brevicauda* (Scudder, 1900); *A. coyotero* Hebard, 1935; and *A. polingi* Hebard, 1935. Some species of *Insara* Walker, 1869 have wings half as long as the abdomen. Lastly, in *Arachnoscelis* Karny, 1911 (Listroscelinae) and *Arachnitus* Hebard, 1932 (Phanteropterinae: Odonturini) everything beyond the stridulatory area is lost. This may reflect the metabolic costs of producing additional part of the tegmina, which no longer serves a function in flight or a difference in song, as the former is known to be ultrasonic (Monte-alegre *et al.* 2006). See Naskrecki and Bazelet (2011) for a summary of other instances of brachyptery in Old World phaneropterines.

Granted, there are problems with this hypothesis of relatedness on short tegmina. In the first example of *Anisophya biforma*, there is little evidence to preclude the possibility that the dichopetalines also underwent a two-step process since the next step might be the great reduction of the wings and the loss of the humeral sinus. The genus *Pterodichopetala* is particularly salient in this regard, given the seemingly contradictory long tegmina but short wings; yet, it should be noted that species of *Pterodichopetala* lack a humeral sinus. Equally interesting yet problematic is the presence of the unrelated African *Altihoratosphaga nomina* (Karsch, 1896) (Acrometopini), which has full inflated tegmina with rudimentary wings (Heller pers. comm. 2011). A similar condition may exist in some species of another African acrometopine genus, *Horatosphaga* Schaum, 1853. This condition certainly is similar but likely convergent to that found in *Pterodichopetala*. The genus *Marenestha* Brunner von Wattenwyl, 1878 also is problematic, despite its suggested relationship to *Pterodichopetala* by Buzzetti, Barrientos, and Rocha (2010). Some individuals of *M. inconspicua* Brunner von Wattenwyl, 1878 (or perhaps an undescribed species) have hindwings of various lengths, some being short and concealed with others only as mere stubs (Hebard 1924). Here too there may be evidence of successive reduction in the wings in a long tegmina species. Yet, *Marenestha* possesses remnants of a humeral sinus and currently is allied to *Cosmophyllum* Blanchard, 1851, which has similar inflated tegmina to *Marenestha* and *Pterodichopetala*, but possesses full functional hindwings. For a full discussion of the *Pterodichopetala* problem, see the genus heading as well as Phylogeny & Polarity.

With all the problems of character distribution discussed above, it is clear that relationships and convergence can only be solved with a much broader dataset, including molecular characters. If it can be supported that the short tegmina and spinose ovipositor are true characters of relationship, the grouping of the genera in the Odonturini-Barbitistini presents a large biogeographical problem of intercontinental separation in both Europe and South America (see Biogeography). In the event that convergence is found to be a major factor in the appearance of these structures, the same necessary broader analysis may well indicate new hypotheses of relationship for the short-winged phaneropterines.

METHODOLOGY

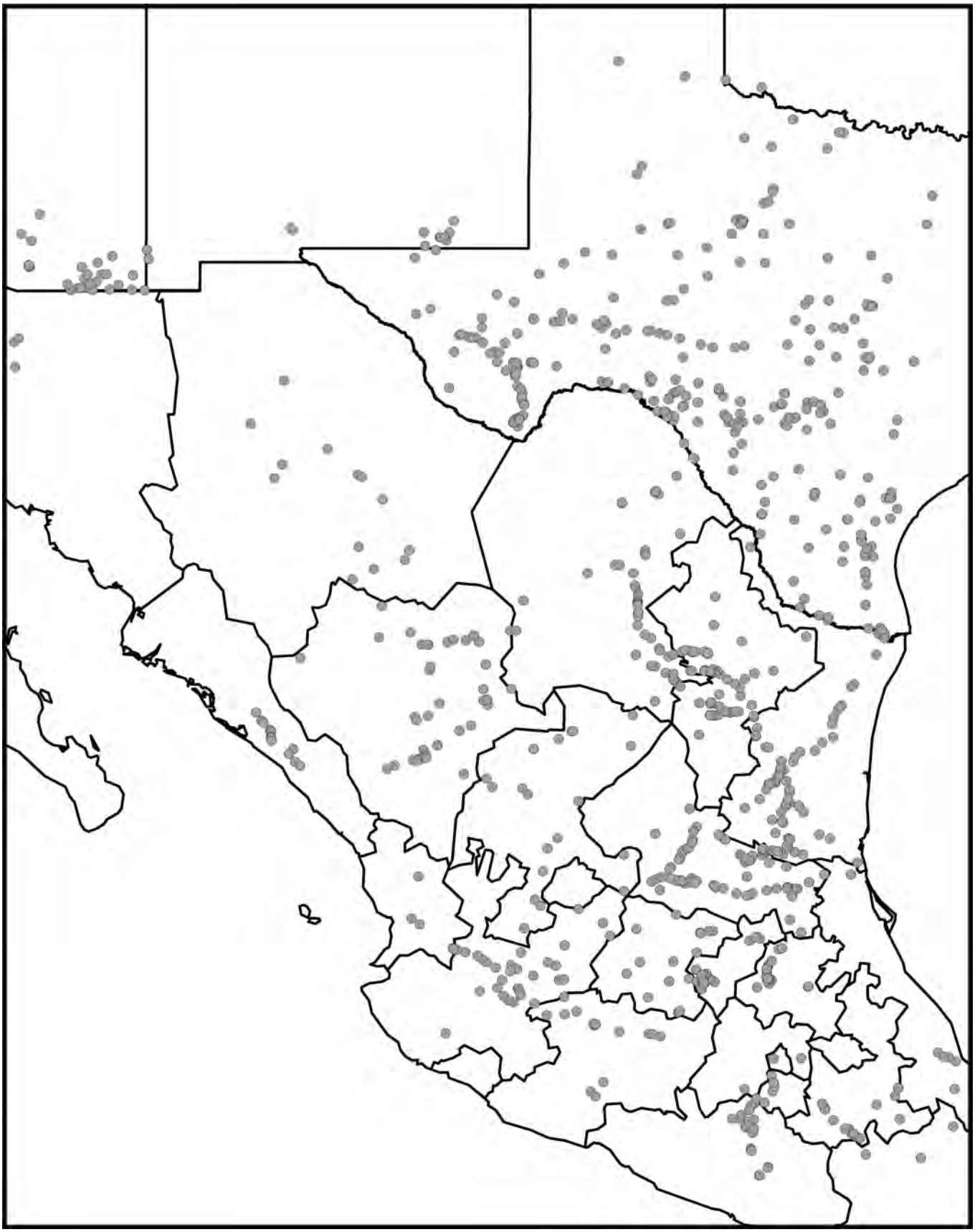
Biological and Systematic Methodology

Reliance on Genitalic Characters. We base this revision primarily on the male cercus, not because we think *a priori* that these are particularly important structures or have an especially significant role in evoluation or speciation. These were chosen rather, because quite early we realized these were complex structures and if used to define species, they showed little structural divergence and a cohesive distribution for each taxon. As the study progressed, groups based on the cerci were almost always correlated with the epiphallic characters, which were often highly distinctive. In a few cases, other genitalic characters can be used to categorize genera in which the cerci are divergent within that taxon but which cercal types do not occur outside that taxon (*e.g. Mactruchus*, *Acanthorintes*). We realize, of course, that these almost certainly play a major role in speciation and evolution but that was not our initial objective. But the pattern revealed is surely of considerable significance: great diversity in the cercus in all dichopetalines as here defined in contrast to the surprisingly little structural complexity in the other Odonturini-Barbitistini.

Species Concept. We have used the "biological species concept" in this paper with the full realization of its limitations. This concept is clearly the best one when dealing with syntopic closely similar species, as occurs frequently in the dichopetaline genera. We have many instances of syntopy and synchrony in several genera, without any evidence of introgression. In some cases, we have broad sympatry of similar species, and we assume that they are syntopic in some part of their range and have no evidence of introgression; yet often our series are too small to demonstrate this.

For allopatric populations, it is, of course, impossible to apply the "biological species concept" objectively, as it is impossible to determine the breeding relationships of geographically separated populations. Laboratory studies demonstrating incompatibility of the genomes, such as the inviability of hybrids at any level of development, are probably the best indicators of the species status of such populations. However, if only mating behavior is studied, unsuccessful copulation in the laboratory may not reflect behavior under natural conditions. And if mating in the laboratory is successful and the hybrids viable, one still does not know what will happen under normal field conditions; perhaps the hybrids, while viable, are unable to compete with the parents.

While probably all taxonomists use the degree of dissimilarity in describing allopatric species, such a concept



Map 1. General collections, includes all geo-referenced localities for dichopetaline species.

cannot be applied objectively. An example of this is to be found in the grasshopper genus *Barytettix* Scudder, 1897 (Acrididae: Melanoplinae) in which *B. cochisei* and *B. humphreysii* were peripatric (Cohn and Cantrall 1974). The two species are so different in both the male phallic and female bursa structures that we confidently predicted that they would be unable to "inseminate" eachother. Subsequent transects between the two species, however, reveals complete hybridization (Cohn, unpublished). Yet, in this study, we have generally erected or maintained allopatric species if the differences are distinctive and if their ranges come close together with no evidence of intermediates in the area of closest approach. It is reasonable to assume under these criteria that the populations are not now interbreeding, but we make no claim that they are indeed reproductively isolated. In the case of less distinctive differences, we have merely described the distribution of such characters within the species (*e.g.*, long ovipositors in *Acanthorintes tauriformis* and *Planipollex polliciferus*; see discussion under those species). We have not used the subspecies category because we have seen no evidence in any of the species, of once presumably isolated populations now coming together and interbreeding freely. We believe that describing geographic variants as subspecies in the absence of such evidence obscures what might be interesting biological problems; in this, we follow Cohn's (1965) extensive discussion of the problem of subspecies and call attention to the extensive tabulation of geographic variation in Cohn and Cantrall (1974).

Examination of Types and Bases for Identification. Bortolus (2008, 2012) and Vink *et al.* (2012) have offered a powerful case for all biologists to cite the basis for their identifications. While this is particularly important for non-taxonomists, in reviewing our own work, we have discovered that we too had failed in some cases to cite this information. Species described as new in taxonomic publications, of course, do not have this problem, but even here there may be reasons for which the basis of the compared taxa should be cited.

For previously described species, we have not examined the type, except for three species, but in all but one case, we have topotypes or material from very nearby; this is indicated under each species account. Additionally, we have used the Rehn and Hebard (1914a) outline drawings, which illustrate most of the critical structures and are unusually good for identification. We have accepted without further investigation the synonymies and type locality designations established by Rehn and Hebard (1914a) as they are known for doing a thorough job in this regard.

Nymphal identification occasionally is possible because, in at least some species, the distinctive structures used to identify adult males can be seen in underdeveloped form in later nymphal instars (*e.g.*, dorsal rod of the cercus in *Rhabdocerca*). Therefore, juvenile males, especially when accompanied by adults, were usually included. For sparingly few records, in which male juveniles were present without adults, only those clearly identifiable to species were included and treated as adult males. Juvenile females were included in counts only when accompanied by a large series of identifiable adults and were never included when the sole representative of a collecting event.

Nomenclature. Nomenclatural details, such as synonyms and etymologies, are placed in an appendix, following the lead of Otte (1981, 1984). Such details are of no direct biological importance and may be of interest to only a limited fraction of our readers; nevertheless, the information is necessary as well as important and is readily available in Appendix II. We think that there should be the least extraneous and distracting information in the text for the vast majority of our readers whom are interested in identification, relationships, or our systematic methodology, which are the major objectives of this work.

Procedural and Typographical Methods

Measurement Data. We have been reluctant to spend a great deal of time on measurements, even where we see differences because of the problem of small and non-random samples. The extensive measurements presented by Battiston in Appendix ??? were largely used to determine whether the dichopetalines nested within the Odonturini-Barbitistini, and not all dichopetaline species were measured. Conclusions drawn from this set of measurements are discussed in the appendix. With caution, these measurements might be used to distinguish some species. Unfortunately, the sample sizes were too small and represent one or few geographical areas occupied by each species. More importantly, homologous markers, necessary for morphometric analysis, seem to be rare in these insects. Thus, most statistical analyses of these data appear to be premature.

Simple Qualitative Characters. We have specifically avoided using simple, qualitative characters, like those used by Rehn and Hebard (1914a) at the species level, such as form of body, shape of eye, shape of lateral pronotal lobes, dorsal pronotal shape, and position of sulci. Such characters are hard to quantify and would require very large numbers of measurements, which would be subject to the same problems outlined above. It is not apparent that these would provide very distinctive differences, considering the resources required to make them, particularly when clearly definable genitalic characters provide such a reliable framework.

Figures and Photographs. After the clearing of sclerotized genitalic structures in warm dilute solutions of KOH, the photographs of the genitalic structures all were taken by Leica auto-montage system. These photographs were enhanced in Adobe Photoshop CS 6. The outline drawings of the male subgenital plate and epiproct in the tables and figures are filled in using a texture function in Photoshop and do not represent morphology.

Utility of Tabulation: Tables, Paragraphic Descriptions, and Keys. In this paper we have used tables for presentation of virtually all character conditions under each genus, eschewing the standard method of presenting these in paragraphs. Cohn (1994) presented an argument for tabulation, and we merely summarize these views here which are as valid now as they were then. Taxonomy operates strictly by comparison of characters and to separate them in widely scattered paragraphs renders such comparisons nigh impossible. By tabulating the character conditions, one can more readily use the same language for similar conditions and can standardize the description of different conditions. It also does not exclude or eliminate species and their character states once a selection of one or several characters is made. Although we not have coded any of these character conditions, this may be more readily done in a table than laboriously going though scattered paragraphic and non-standardized descriptions.

We have found that the greatest difficulty in constructing these tables is keeping descriptions of complex character conditions short enough to fit into the cells. Furthermore, in order to make the comparisons easier, one must have columns for each of the characters and rows for the species. If the number of species of a genus can fit onto a page, then there is no problem in the table extending over several pages, because the comparisons are being made vertically within each column. If the spaces required for all the species in a genus or subgenus is greater than a page, the tables become more difficult to use. Any further explanation or description of complex characters can always be done under the genus or species analysis. We have also grouped all tables together which allows an easier comparison for initial identification. For example, the initial decision of generic placement can immediately be checked within the species table for that genus without rummaging around the paper to find the proper table under the generic analysis. Some autapomorphic characters or structures found only in a few genera or species are not included in because they would require an additional column for essentially a single cell; thus, these are included only in the Species Account, often accompanied by text figures.

Problems with Diagnoses. The preceding discussion brings up the problem with the traditional diagnosis, in which a taxon is compared with what is believed to be its closest relative. The similarities might not include any for other taxa which may later be shown to be more closely related and might not include any that could be used at a higher level of classification (in our case, tribal), such as the wide distribution of brachyptery and special features of the ovipositor. The entire problem may be obviated with the tabulation of all characters for all species which may still not include characters that can be used for tribal analysis. On the other hand, extensive paragraphic descriptions are often without explicit designation of interspecific, intergeneric, or tribal characters.

Accent Marks. We have used and made available searchable Excel databases for all collection data in this paper, and we apologize to our Spanish-speaking readers for failing to use appropriate accent marks for place names in Mexico. But computers cannot be educated easily and have an unforgiving nature; thus, if a locality is entered in the database with proper accent marks, the computer might exclude those missing the accents (and vice versa). To promote continuity between text and data supplement, we have eschewed the use of accents in the text as well.

Mapping: Philosophy and Methodology. There are a sufficient number of records of all but two of the species to make geographic comparisons fruitful, and to this end, the mapping program, implemented entirely within this project by Abigail Alvarez using ArcGIS, has proven invaluable in this regard. All of our data have been geo-referenced, and the ability to easily plot on any digitized map (*e.g.*, outline, country, vegetation, streams and rivers) as well as the flexibility in mapping or removing single species, groups of taxa, or any combination thereof enabled us to study in detail the biogeographical restrictions (*e.g.*, physical, climatic, vegetational), interactions with other species (*e.g.*, sympatry, syntopy, allopatry), and occurences of negative distributional data. It also has been valuable in helping us identify and isolate possible instances of mislabeling or inexplicable but apparently legitimate records. In working with such a large number of localities, an additional feature, the linking of the spreadsheet information to the locality spot on the maps, allowed fast and efficient identification of specific localities. Outliers could then be checked for accuracy easily against field notebooks, specimen labels, etc. Although the maps were developed in ArcGIS, the database is converted easily for use in DIVA-GIS, an open access mapping program, and all of this locality information is tabulated in an Excel file here provided on the accompanying CD (see Use of Compact Disc below).

Symbols were constructed so as to create minimal confusion when various combinations of species are plotted. We have chosen a physiographic map as our basic map; yet, plotting on a vegetational or climatic map will be of considerable value in addressing further problems. We have carefully examined all outliers and have eliminated from the map those justifiably supported to be inaccurate or mislabeled; those questionable records which could not be confidently explained are indicated with a symbol containing a question mark and each is address in the relevant species account. In cases of a single species, we also have particularly emphasized larger series (*i.e.*, greater than 9) by a thicker line, although we realize this to be an arbitrary value. To indicate syntopic occurrence, a pie system was developed to avoid overlapping of symbols, in which the lower ones would have become invisible. These pie symbols also will indicate syntopies between species not printed on the same map (*i.e.*, intergeneric syntopies); here the color for a given species is retained throughout all maps.

Use of Compact Disc. As alluded to in the Introduction, innovative approaches are an important vehicle in taxonomic

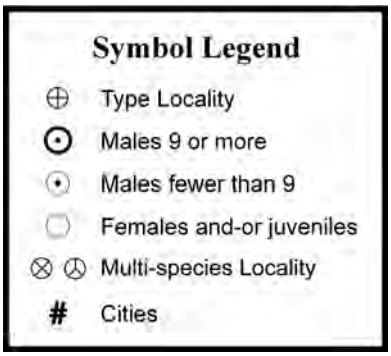


Fig. 2. Symbol legend for maps.

research to drive the advancement of research as well as created improved communication between author and reader. To this end, we have included a disc with three spreadsheets to enable readers to manipulate both distributional and morphological data. We hope that this will encourage innovative and creative use of the data, especially in areas we have not explored. In addition, while still providing transparency and reproducibility to our research, it promotes different forms of data management, which themselves may be improved upon in the future. Each file is provided in Read-Only format. In order to manipulate the data, these spreadsheets can be downloaded to the reader's computer and manipulated at will, while the original data are preserved.

Locality Database. We have included the base Excel spreadsheet used to genera the maps in our study. This enables the reader to export the data to any compatible mapping program and onto any digitized map (vegetational, climatic, physiographic etc.).

Tables for Diagnosis. We have offered readers an Excel spreadsheet of all the identification tables (excluding the figures) used in the printed version. This enables the reader to modify morphological data and will provide greater utility and flexibility if new species and characters are added or subtracted. In particular, these tables also can be used in place of dichotomous keys by sorting rows to better compare particular desired characters (see Utility of Tabulation: Tables, Paragraphic Descriptions, and Keys above).

Measurement Data. We have included an Excel spreadsheet containing measurement data made by Battiston and presented here in Appendix ???. This will allow the reader to manipulate these data, both in repetitious and novel ways. As data for many of the species are not included and measurement of other morphological structures remain potentially meaningful, such a spreadsheet will enable the reader to augment the database and perform further meristic or metrological analyses.

Rehn and Hebard (1914). We have provided a PDF copy of the free available revision by Rehn and Hebard (1914). The appropriate volume of the Proceedings of the Academy of Sciences in Philadelphia was downloaded, and the irrelevant pages were removed using Adobe Acrobat. This will allow readers to more easily compare the work of the first revisers of the genus as well as refer to particular descriptions on which we have declined to elaborate.

MATERIALS

Nature of the Collections. This study has benefited greatly from the extensive and intensive collecting by Cohn with the intention of filling in gaps, as well as specifically searching for areas of allopatry, parapatry, sympatry, and syntopy. The vast majority of the material studied here have been collected by Cohn in many trips to Texas, southwestern United States and Mexico starting with 1950, supplemented by collections made specifically for *Dichopetala* by Fontana *et al.* 2004 and Swanson 2007-2010; nearly all of this material is housed in the University of Michigan Museum of Zoology. We have borrowed very little material; most notably from the David Rockefeller Expedition 1947 and the Cazier 1950 collection, both housed in the American Museum of Natural History (AMNH). Borrowing of specific type material is indicated in the Acknowledgments where we express our gratitude to each of the curators and/or collection managers for their assistance. During the course of this revision, we examined approximatedly 5950 specimens from nearly 1110 different localities.

Material Examined. All records pertain to specimens vouchered in one of the collections listed below. Collections are designated as follows:

American Museum of Natural History, New York, New York (AMNH);

Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvanica (ANSP);

Florida State Collection of Arthropods, Gainesville, Florida (FSCA);

Mississippi Entomological Museum, Mississippi State University, Starkville, Mississippi (MEM);

Albert J. Cook Arthropod Research Collection, Michigan State University, East Lansing, Michigan (MSUC);

Oregon State Arthropod Collection, Corvallis, Oregon (OSAC);

C. A. Triplehorn Insect Collection, Ohio State University, Columbus, Ohio (OSUC);

University of Michigan Museum of Zoology Insect Collection, Ann Arbor, Michigan (UMMZ); and

Instituto de Biologia, Universidad Nacional Autonoma de Mexico, Mexico City, Mexico (UNAM).

Morphological Notes

The following structures were not studied for reasons under Simple Qualitative Characters (Methods and Methodology,

Procedural and Typographical Methods): head, including antennae, fastigium, eyes, clypeus; pronotum, including dorsal sulcation/carination and lateral lobes; legs, including spination and length, the latter particularly in comparison to other parts of the body. Many of these structures might be characterized as typically tettigonioid (or some large subgroup therein) and for indepth characterization, readers should refer to the previous revision (Rehn and Hebard 1914a). Structures mentioned here are meant to direct the reader to important morphologies with implications for characterization of the group and its members.

Somatic Structures

Clypeus. The clypeus often is bimaculate in several species (*i.e.*, *Obolopteryx emarginatus*, *O. seeversi*). Yet, the presence of these spots in juveniles of other species (*i.e.*, *O. oreoecus*, *O. brevihastatus*, *O. castaneus*) renders the utility of this character questionable. So far these spots have only been found in species of Obolopteryx.

Pronotum. This structure is typically saddle-shaped, although this seems to be more noticeable in smaller species (*e.g.*, *Obolopteryx*) and less apparent in larger species (*e.g.*, *Mactruchus*). However, there is surprising variation in general structure and constriction in *Pterodichopetala* (Fig. 203-207), with unknown biological and phylogenetic implications. The sulcation and carination of the pronotum was indicated by Buzzetti, Fontana, and Carotti (2010) and Braun (2011) as having significance for the South American *Cohnia*, of which most members were once in *Dichopetala*. We have observed no significant patterns in these morphologies, but admittedly, no more than a cursory survey has been conducted. The lateral lobes occasional yield more or less stable color patterns in a few species (*i.e.*, populations of *Rhabdocerca tridactyla*, *Mactruchus serrifer vs. Gymnocerca falcata*), although there tends to be a great variation in most species and this is much less reliable than the genitalic differences. The significance of the presence or absence of the humeral sinus on the posterior margin of the lateral lobes has been treated in section also treating the tegmina and hindwings; the following entry enumerates where those discussions may be found.

Tegmina & Wings. The condition of the tegmina and wings has implications for a number of broader topics discussed in this treatment; such discussions may be found under Tribal Problems, the genus *Pterodichopetala*, and Phylogeny and Polarity. The females in all the genera with overlapping tegmina possess a stridulatory structure resembling that of the phaneropterine genera studied by Nickle and Carlysle (1975).

First Abdominal Tergite of the Male. The striking modification of the first abdominal tergite, a swollen V-shaped posteromedial margin, of some but not all dichopetaline species poses an insoluble problem of relationship. Its presence in three unrelated genera (all species of *Rhabdocerca*, one species of *Acanthorintes*, and the single species of *Dichopetala*) strongly suggest a surprising convergence. Three other species of *Acanthorintes* (see Species Accounts) are modified in a similar way; yet, all other dichopetaline species have a normal smoothly rounded tergite with an unmodified edge which may appear to be midlongitudinally carinate which may or may not be an artifact of preservation. While these modified structures may be attractive to females in some way, we have found no irregularity in the margin of the tergite that may suggest the female is nibbling on them. Similar structures exist in the widely unrelated *Platylyra* Scudder, 1898 and *Cosmophyllum* Blanchard, 1851, but on different abdominal segments; these are almost certainly a case of convergence (Grant and Rentz 1966).

Ultimate Abdominal Tergite of the Male. This structure is typically flat, quadrate, and unmodified, although striking secondary development seems to have occurred in members of one genus, *Pterodichopetala*. Furthermore, the hypothesized polarity of these structures contrast the polarity of development with the tegmina in that genus. See under *Pterodichopetala* for an indepth discussion of this structure.

Genicular Spines. Buzzetti, Barrientos, and Rocha (2010) have used the genicular spines to characterize the differences between several phaneropterine genera, which led us to investigate the efficacy of this character in other *Pterodichopetala* as well as other dichopetaline species. While there are different tendencies among the samples we have studied, there is enough variation to indicate that the use of genicular spines is not reliable enough to delimit these taxa (Cohn and Swanson, unpublished). It should be noted that some spines may be very small and hard to see, indicating potential problems in meristic analysis of these structures.

Genitalic Structures

Male Cercus. The male cercus shows enormous variation in shape, curvature, presence of appendages, and apex specialization (see Generic and Species Tables). This far exceeds anything that we have seen in other Odonturini-Barbitistini, which generally are simple, viz. absence of appendages with incurvature confined to the terminal portion. In the dichopetalines, even the simplest cerci are quite differently shaped. In addition to the modifications of the major part of the cercus, there also are modifications of the basal part of the cercus proximad of the constriction there; this constriction surrounds the cercus and probably marks an internal ridge upon which the cercal muscles are inserted. Arising from the area proximad of this basal suture are projections and collar-like structures in a number of genera. Most distinctive of these projections is a rod-shaped structure extending over approximately half the length of the cercus in all three species of *Rhabdocerca.* There is a collar-like projection of various shapes in two species of *Mactruchus* (*durangensis* and *ischnodus*) and a reniform one in *Dichopetala mexicana*. Occasionally the color of the cerci appears more conspicuous (bright yellow in several species, orange-red in the single

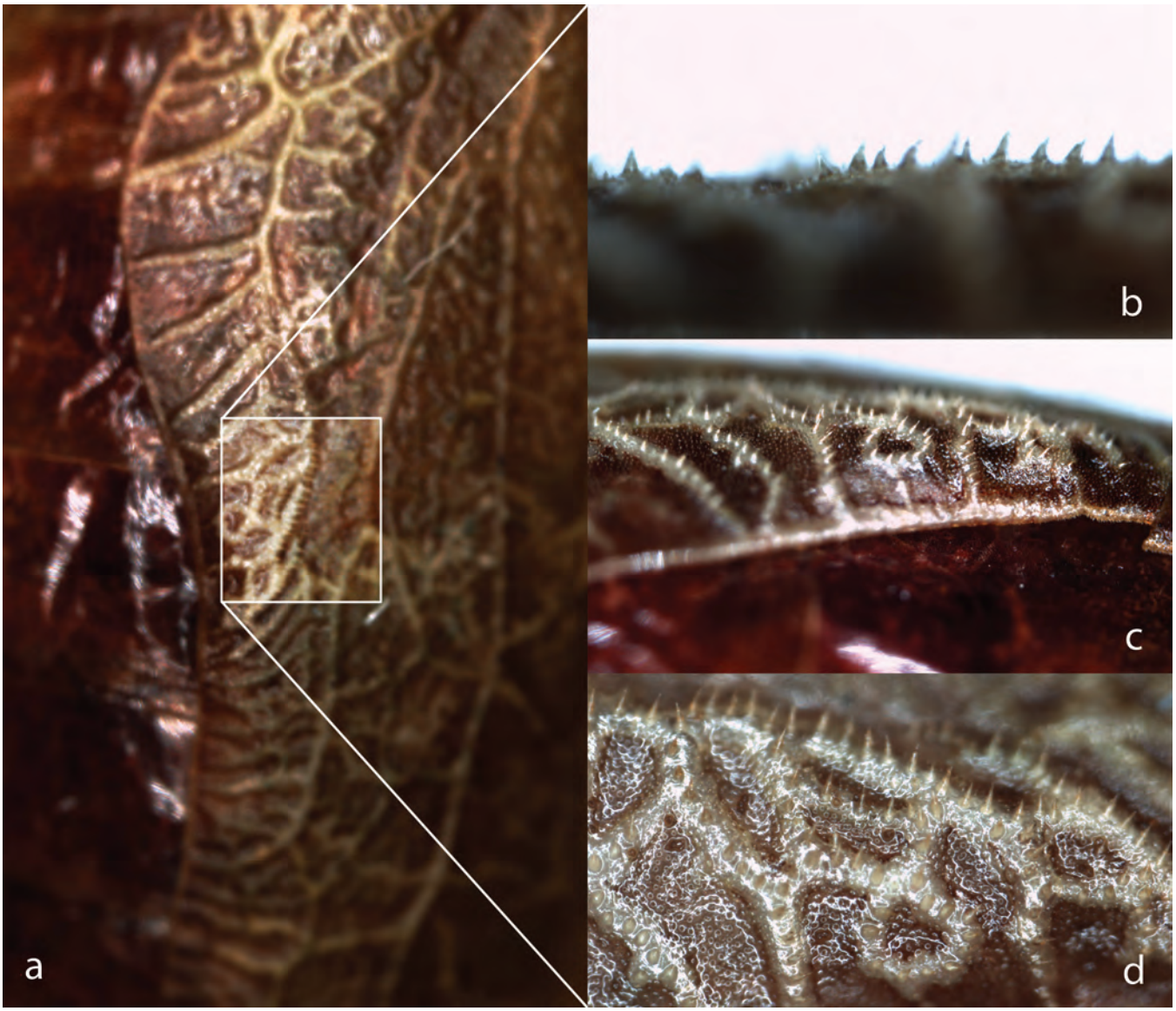


Fig. 3. Stridulatory apparatus of the female, *Pterodichopetala strepsidactyla*, (a) dorsum; (b) lateral view; (c) oblique view; (d) dorsal view.

specimen of *Acanthorintes erythrephaptor*); yet, further study is need to ascertain the significance and stability of this coloration.

Curiously, the female dichopetalines also appear comparatively much less modified in genitalic structures (see below). The implications of these contrasting structural complexities, including effect on mating behavior, are mentioned under Promising Problems as we have not been able to address this topic adequately.

Male Epiproct. In many dichopetalines, the epiproct is relatively simple, and to survey the variation the Species Tables should be consulted. Perhaps the most extreme are the few possessing furcate projecting structures (*e.g.*, *Dichopetala mexicana*, *Acanthorintes tauriformis*) and three species of *Acanthorintes* with greatly modified shield-shaped structures with a distinctive apex. Each of these structures corresponds to an epiproct in that the paraprocts are concealed beneath it.

Male Epiphallus. Among the dichopetaline genera, the male epiphallus shows surprisingly broad diversity of basic shapes, even being completely absent in one genus (*Planipollex*). These structures may be paired or fused medially, depending on the genus. Yet, within a given genus (see Generic Table), the structure remains conspicously similar between species, thereby lending support to the groups delimited by cercal shape. Such sclerotized concealed genitalic structures are apparently rare in the Phaneropterinae. Only four other genera, the South American *Cohnia* Buzzetti Fontana, and Carotti, 2011 (Odonturini), the Central and South American *Ceraia* Brunner von Wattenwyl, 1891 (Gruppe Plagiopleurae), the Southeast Asian *Stictophaula* Hebard, 1922 (Holochlorini), and the Chinese *Paraperlinus* Liu and Kang, 2008 (Holochlorini[?]), are known to us to

possess structures of this nature (Heller pers. comm. 2011); therefore, we have placed great emphasis on these structures as indicators of phylogenetic relationship (as discussed above under Characterizing the Dichopetaline Genera). Admittedly, we have not conducted an exhaustive survey within the Phaneropterinae for these structures.

Male Subgenital Plate. This structure is very variable in shape but, with few exceptions, always shows a V- or U-shaped emargination (see Generic Table). In some species of *Obolopteryx*, it has been observed that the emargination of this structure may hold the ovipositor during mating, although this may be more difficult to envision in the most extreme modifications of this structure. The most interesting examples are *Obolopteryx poecilus* and species of *Mactruchus*, in which the emargination is very shallow and broad, as well as *Gymnocerca falcata* in which the emargination is obsolete. Few of these shapes and emarginations appear to be unique to the dichopetalines, but in the dichopetalines, this structure remains more or less horizontal and never projects strongly upward between the cerci, as is found some Odonturini-Barbitistini and other phaneropterines.

Female Ovipositor. As discussed previously, all dichopetaline genera share the distinctive "spinose" ovipositor. We think that this type of ovipositor may indicate relationship, and like with the tegmina and wings, this structure has broader implications discussed elsewhere in the text (see Characterizing the Dichopetaline Genera and Tribal Problems).

The base of the ovipositor shows some surprising modifications on the dorsal margin of the ventral valve, including carinae, tubercles, or teeth (see Species Tables). It is known that other phaneropterine genera (*e.g.*, *Anisophya*) have this area modified, but to our knowledge, none of these are similar or closely-related to the dichopetalines.

The length of the ovipositor most often remains stable within a species but two striking cases (*Planipollex polliciferus* and *Acanthorintes tauriformis*) show great variation, with both short and very long forms present. Here, there are no other discernible differences or apparent geographic patterns, and one species (*Dichopetala chirura*) has been synonymized on that basis. Yet, our characterizations of the length of the ovipositor are based on visual inspection and measurements made by Rehn and Hebard (1914a) and Battiston (Appendix ???) (see philosophy under Methods and Methodology: Procedural and Typographical Methods: Measurement Data and Simple Qualitative Characters); therefore, such lengths might be more objectively defined. Still, a more targeted analysis of individuals over the entire range of the two aforementioned anomalies might elucidate other factors (*e.g.*, environmental, dietary, behavioral) affecting ovipositor length.

Female Subgenital Plate. Our use of the characteristic split of the female subgenital plate as delimiting the dichopetaline lineage remains useful but requires clarification. Our general observations without extensive dissections suggest that this structure appears as a transverse sclerotized plate with a narrow midlongitudinal membranous area (making the plate appear sulcate in dried specimens) and sclerotized distolateral extensions (lateral lobes) of varying degrees. It is the general length and width of these lateral lobes which we have used to characterize different species. The membranous area is often folded and pressed dorsad between the valves of the ovipositor, drawing the two sclerotized halves together mesad and giving the subgenital plate its characteristic "split" appearance that characterizes the dichopetalines; despite uncertainty in homology, this invaginated condition is most easily observed in *Pterodichopetala*, because the plate is the most minimally sclerotized in comparison to other genera. Other problematic, although possibly autapomorphic, exceptions are found in *Acanthorintes thenarocercus* and *A. xanthephaptor* (females of *A. erythrephaptor* unknown).

In most other odonturine and barbitistine genera (including *Cohnia*) as well as numerous other phaneropterines, it would appear that the female subgenital plate is triangular and undivided, although we have made only a cursory search of the literature and have examined only a few other genera.

Color & Color Pattern

The dichopetalines are usually brightly colored in life, sometimes distinctively so. Yet, the accompanying levels of variation are so great that it has been the most difficult to characterize and analyze. As Rehn and Hebard (1914a) early observed, the problem arises from the fact that the basic pattern is the same in all dichopetalines and that most species have both "recessive" (lighter and with weak patterns) and "intensively colored" (dark and with strongly marked patterns) individuals. These two forms are non-discrete, with individuals exhibiting varying degrees of intensity, even between members of one population. Furthermore, recessive individuals of one species tend to resemble recessive individuals of other species. An additional complicating factor, the bright coloration, most often the green tones, in the living specimens degrades to yellow-brown in our pinned, dried material. For these reasons, we have not used color pattern in most of our analyses (except most noticeably in *Pterodichopetala*). However, there is utility in emphasizing the most distinctive color patterns found in the intensively colored individuals, with the caveat that congeners or even conspecifics may not share these features. Furthermore, one should not identify specimens in hand by the colored figures we have included, without reference to the Generic Accounts for a discussion of the distinctive (and non-distinctive) patterns as well as morphologically diagnostic characters. For a general discussion of the basic dichopetaline color pattern, see Rehn and Hebard (1914a).

TABLES TO GENERA AND SPECIES

Diagnoses. The International Code of Zoological Nomenclature (ICZN 1999) recommends providing a

diagnosis in the case of newly-described taxa. Rather than succumb to the pitfalls of traditional diagnoses discussed previously (Methods and Methodology: Procedural and Typographical Methods: Utility of Tabulation and Problems with Diagnoses), we feel that the characters provided in the Genera and Species Tables serve as a complete diagnosis for each new taxon. Therefore, we have declined to provide a paragraphic or textual description or diagnosis for each species. General morphology, variation, and some interesting problems are discussed under the species heading.

Autapomorphic Characters. As previously discussed under Utility of Tabulation (Methods and Methodology, Procedural and Typographical Methods), we have included practically no singular autapomorphies in the Genera and Species Tables because this would result in many additional columns for but a single cell per character. Instead, we have opted for discussing such autapomorphies (*e.g.*, ultimate tergite in *Dichopetala mexicana*, *Acanthorintes zeuglaius*, and species of *Pterodichopetala*) under the genera or species headings, where applicable.

Exclusion of Color and Color Pattern. We have mentioned previously the variability in color and color pattern under Morphological Notes, and this difficulty in describing the variation succinctly led to the exclusion of the character in the Genera and species Tables, except in a few cases where they are especially useful owing to a lack of other characters in identification (*Pterodichopetala*) or where the stark contrast in color pattern is inadmissible (*Mactruchus*). Distinctive color patterns among the species are discussed under each Genus Account.

Identification of Females. Conspicuous and regrettable is the absence of female characters in the Generic Table, and we have found few characters that will uniquely identify females of any dichopetaline genus, except *Pterodichopetala*. However, there are two sorting characters which will help to identify a given female specimen to genus level. Once a generic assignment is obtained, species identification may follow by characters presented in the Species Table, with particular emphasis on the lateral lobes of the female subgenital plate and the base, and to a lesser extent length, of the female ovipositor.

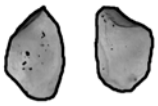
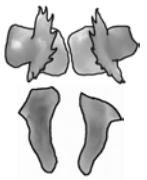
The great emphasis on collecting and biogeographic analyses by Cohn as well as cohesive distribution of each genus means that very often locality can be used to rule out all but a few species (*e.g.*, Arizona, U.S.A.; states of Durango and Sinaloa in western Mexico; near the Transverse Volcanic Belt or Rio Balsas Basin in southern Mexico). Some areas, particularly in the Mesa Central in Mexico and the Eastern Coastal Plain where several genera overlap, may prove more problematic. Yet, the maps will be of great utility for assessing the potential identities of female specimens.

Of equally great utility is the tegminal size and shape. There are three subgroups, each based on distinctively different tegmina shape and length:

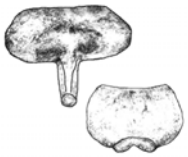
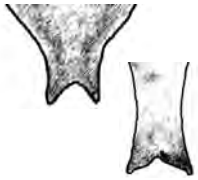
- Tegmina conspicuously elongate, ranging from the posterior margin of the third tergite to the end of the ovipositor. Oval in shape with apices variously narrowly to broadly rounded and each overlapping to some extent. Figs. 249-254. Includes only *Pterodichopetala* and here similar in general shape in both males and females. These species are restricted to high elevations in the northern Sierra Madre Oriental.
- Tegmina very short, not extending beyond first tergite, Round in shape and each distinctly separated or barely attingent. Figs. 281-290. Includes *Obolopteryx*, *Rhabdocerca*, and *Planipollex*. These species have a northern distribution including the south and southwestern United States and northernmost Mexico, particularly the northeastern Mesa Central and the eastern Coastal Plain. No other genus occurs in this area, except perhaps *Mactruchus* in the Northwest.
- Tegmina fairly short, usually extending onto second tergite. Shape quadrate with apex noticeably truncate (sinuate in two species of *Acanthorintes*) and each overlapping to some extent. Figs. 291-302. Includes the remaining genera: *Dichopetala*, *Gymnocerca*, *Mactruchus*, and *Acanthorintes*. These species occur from the western Coastal Plain through the western to the southeastern Mesa Central and extends through the Transverse Volcanic Belt and into the Balsas Basin.

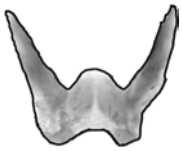
It should be noted that occasionally the appearance of separation between the tegmina may be a matter of preservational factors such as overstuffing. These instances are usually identifiable by the white stripe on the tegmen being offset from the lateral white stripes of the pronotum and the abdomen.

Genera related

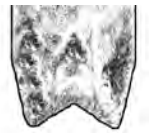
Genus	Cercus (♂)	Cercal Apex (♂)	Cercus Figure (♂)	Epiphallus (♂)	Epiphallus Figure (♂)	Subgenital Plate, Lateral Margins (♂)
Obolopteryx	with short to long, dorsolateral, ventrally concave "thumb" near base	gradually acuminate to aciculate		when cleared, W-shaped; in situ, appearing solid and often dark		1) subparallel or slightly flaring; 2) convex to near apex
Planipollex	with long, lateral, ventrally concave, flattened "thumb" near base	short, acute, hooked		absent	absent	subparallel
Rhabdocerca	with dorsal "finger" arising from base, median appendage on shaft present or absent	gradually acuminate		paired flat, broad, weakly sclerotized plates, proximal edges turned dorsad		more or less flaring
Dichopetala	simple, tapering slightly swollen basally, without appendages	gradually acuminate		paired, unspined, flattened projections with two proximolateral "arms"		flaring
Gymnocerca	simple, tapering, without appendages	acute or subapically notched or blunt with minute subapical scale		variable paired structures		convex to or near apex
Mactruchus	variable, with or without dorsal appendage	acuminate or broad with blunt teeth		paired narrow distal fingers, toothed on dorsal edge, with proximolateral flanges		trough-like, subparallel to somewhat converging, edges thickened
Acanthorintes	cleft near base, outer arm appressed to shaft or widely separated	outer arm acuminate, inner arm often with tiny "bird head" shaped apex		paired distal and erect proximal fingers, both spined, with lateral flanges		1) more or less flaring; 2) convex to near apex
Pterodichopetala	with acuminate appendage near base, shaft variably divided distally (except undivided in *P. cieloi*)	split or undivided, variously flabellate or acute		paired multispined variably-shaped distal structure with paired erect proximal spined fingers		convex to apex

to *Dichopetala*

Subgenital Plate, Apical Notch (♂)	Subgenital Plate, Apices (♂)	Subgenital Plate Figure (♂)	Epiproct (♂)	Epiproct Figure (♂)	Tegmina (♀)
1) V-shaped; 2) U-shaped or broad, shallow sinuation	1) angulate, truncate, or rounded; 2) short, laterally acute		shape variable, always simple, unarmed		short, rounded, separated to barely touching
V-shaped	rounded		broadly rounded, always simple, unarmed		short to moderate, rounded, separated to barely touching
V-shaped	angulate		broadly rounded, always simple, unarmed		short, rounded, separated to barely touching
V-shaped, deep	angulate		short with Y-shaped projection		moderate, squareish, shortly overlapping
V- or U-shaped or absent	entire or truncate or apical region narrowed with lobes rounded or angulate		unspined, with finger-like projection or with distal margin swollen		moderate, squareish, shortly overlapping
shallow, concave	small lateral projections		rounded, unspined, margin with upturned flap with finger-like projection		moderate, squareish, broadly overlapping
1) V-shaped; 2) U-shaped	1) angulate; 2) apical region narrowed with lobes rounded or angulate		elongate, reflexed, ending in paired short projections, or rounded, simple, unarmed		short to moderate, sinuate or squareish, shortly overlapping
small, V- or U-shaped	angulate or rounded		shape simple but variable, margin with short teeth, sometimes extending onto caudal face		long, covering half or more of abdomen

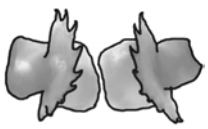
Species	Cercal Thumb (♂)	Cercal Apex (♂)	Cercus Figure (♂)	Epiphallus (♂)	Epiphallus Figure (♂)
Obolopteryx					
Obolopteryx emarginatus	long, broad, strongly bulging laterally, apex roundly angulate	long, acuminate		arms concave, apices moderately broad, rounded, notch short	
Obolopteryx seeversi	very short, quadrate	long, aciculate		arms concave, apices moderately broad, rounded, notch short	
Obolopteryx gladiator	moderately short, apex rounded	acuminate, slightly sinuate		arms concave, apices moderately broad, rounded, notch long	
Obolopteryx brevihastatus	moderately long, apex angulate	short, acuminate		arms more or less concave, apices moderately broad, rounded, notch short	
Obolopteryx castaneus	short, apex angulate	briefly aciculate, sinuate		arms convex, apices moderately narrow, notch short	
Obolopteryx poecilus	short, apex angulate	briefly aciculate, sinuate		arms convex, apices moderately narrow, notch short	
Obolopteryx oreoecus	long, broad, covering much of shaft, narrowed distad (in side view), apex rounded	long, aciculate		arms straight, apices very broad, rounded, notch short	
Obolopteryx catinatus	long, broad, covering much of shaft, not narrowed distad (in side view), apex rounded	long, aciculate		arms more or less straight, apices narrow, angulate, notch moderately long	
Planipollex					
Planipollex polliciferus	long, laterad of shaft, flattened, apex roundly angulate	short, weakly hooked		absent	absent

Obolopteryx

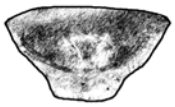
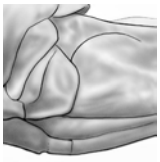
Subgenital Plate (♂)	Subgenital Plate Figure (♂)	Epiproct (♂)	Epiproct Figure (♂)	Ovipositor (♀)	Subgenital Plate, Lobes (♀)	Ovipositor Base Figure (♀)
sides subparallel, apices angulate, notch V-emarginate		roundly quadrate to tongue-shaped		medium *(see geogr. variation)	short to moderately long, apices angulate *(see geogr. variation)	
sides subparallel, apices angulate, notch V-emarginate		roundly quadrate		medium	moderately long, triangular, apices sharp	
sides subparallel, apices truncate, notch V-emarginate		roundly triangular to tongue-shaped		very long	moderately long, apices angulate	
sides subparallel, apices angulate, notch V-emarginate		trapezoidal, distal angles acute		short	short, apices roundly angulate	
sides convex, apices truncate with short lateral teeth, notch U-emarginate		trapezoidal, distal angles acute		short	short, apices roundly angulate	
sides convex, distal margin shallowly sinuate with short lateral teeth		trapezoidal, distal angles acute		short	short, apices roundly angulate	
sides subparallel, apices angulate, notch V-emarginate		trapezoidal, distal angles rounded		medium	long, apices sharply acuminate	
sides concave, flaring distally, apices sharply angulate, notch V-emarginate		short rectangulate, distal angles sharply acute		medium	moderately short, apices roundly angulate	

Planipollex

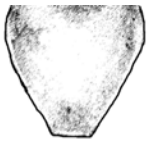
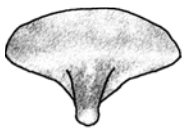
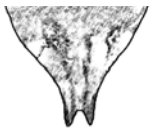
sides slightly converging, apices broadly rounded, notch rounded V-emarginate		trapezoidal, distal angles rounded		short to very long	short, roundly angulate	

Species	Cercus (♂)	Cercal Collar (♂)	Cercus Figure (♂)	Epiphallus (♂)	Epiphallus Figure (♂)
Mactruchus					
Mactruchus durangensis	dorsal tooth robust, with narrow neck, mesal margin of tooth convex, carinate, apex of shaft acuminate	long, dorsal, triangular, apex narrow, extending to dorsal appendage		"fingers" apically bent dorsolaterally, narrow, dorsally toothed, with proximolateral flanges	
Mactruchus ischnodus	dorsal tooth slender, with narrow neck, mesal margin of tooth straight, acarinate, apex of shaft acuminate	short, dorsal, triangular, apex broad, not extended to dorsal appendage		"fingers" apically bent dorsolaterally, narrow, dorsally toothed, with proximolateral flanges	
Mactruchus cryothermastris	without dorsal appendage, strongly curved, apex acuminate	inconspicuous, at most		"fingers" apically bent dorsolaterally, narrow, dorsally toothed, with proximolateral flanges	
Mactruchus megasynactor	weakly curved, slightly expanded distad, shaft with edentate ridge near apex and blunt apical teeth	inconspicuous, at most		"fingers" apically bent dorsolaterally, narrow, dorsally toothed, with proximolateral flanges	
Mactruchus serrifer	weakly curved, slightly expanded distad, shaft with serrate ridge near apex and sharp apical teeth	inconspicuous, at most		compressed "fingers" apically straight, deep, dorsally toothed, with proximolateral flanges	
Gymnocerca					
Gymnocerca falcata	shaft bent in basal half, gently curved beyond, apex bluntly angulate, ridged	inconspicuous, at most		compressed "fingers" apically straight, deep, dorsally toothed, with proximolateral flanges	
Gymnocerca enaulites	shaft bent in basal half, straight beyond, apex blunt with brief ridge and subapical notch	inconspicuous, at most		paired narrow, long, somewhat flattened processes, flanges absent	
Gymnocerca cycloprista	shaft bent at middle, straight beyond, apex flattened, with minute subapical scale	inconspicuous, at most		paired compressed erect circular plates with large spinose teeth	
Dichopetala					
Dichopetala mexicana	base swollen, shaft without appendages, straight in distal two-thirds, apex acuminate	short, dorsomesal, reniform		paired, unspined, flattened projections with two proximolateral "arms"	

Mactruchus

Subgenital Plate (♂)	Subgenital Plate Fig (♂)	Epiproct (♂)	Epiproct Figure (♂)	Ovipositor (♀)	Ovipositor Base Figure (♀)	Color Pattern
sides subparallel, apices horn-like, notch shallow, concave		with short, broad, slightly upturned flap on distal margin		medium; dorsal margin with low tubercle surrounded by shallow depression		only some black above, tegmina green or tan distad
sides subparallel, apices horn-like, notch shallow, concave		with short, broad, slightly upturned flap on distal margin		medium; dorsal margin with low tubercle surrounded by shallow depression		only some black above, tegmina green or tan distad
sides somewhat converging, apices short, blunt, notch shallow, concave		with short, broad, slightly upturned flap on distal margin		medium; dorsal margin with low tubercle surrounded by shallow depression		only some black above, tegmina green or tan distad
sides subparallel, apices horn-like, notch shallow, concave		with short, broad, slightly upturned flap on distal margin		medium; dorsal margin with sinuate ridge enclosing long low swelling separated by channel		only some black above, tegmina green or tan distad
sides subparallel, apices horn-like, notch shallow, concave		with median finger-like distal projection		medium; dorsal margin with sinuate ridge enclosing long low swelling separated by channel		nearly all jet black above, tegmina all blackish

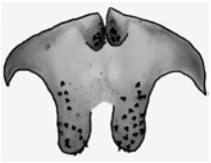
Gymnocerca

sides convex, apex truncate or very shallowly emarginate		with median finger-like distal projection		medium; dorsal margin with sinuate ridge enclosing long low swelling separated by distinctive channel		dark above, sides green, without pronotal hourglass, tegmina usually dark, rarely all green
sides convex to near apex, apices angulate, notch narrowly V-shaped		with median finger-like distal projection		medium to long; dorsal margin in proximal quarter with submarginal ridge tapering distad		bright green often with red-brown pronotal hourglass, tegmina green
sides convex to near apex, apices rounded, notch narrowly U-shaped		with swollen distal margin		medium; dorsal margin in proximal quarter with submarginal ridge tapering distad		bright green with blackish pronotal hourglass, tegmina green

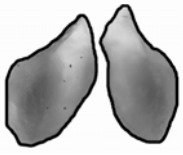
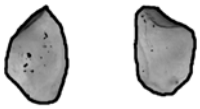
Dichopetala

sides concave, flaring distally, apices angulate, notch V-shaped, deep		with distal Y-shaped projection		medium to long; dorsal margin unarmed		green with brownish pronotal hourglass, tegmina often with dark markings (variable)

Acanthorintes

Species	Cercus (♂)	Cercus Figure (♂)	Epiphallus (♂)	Epiphallus Figure (♂)	Subgenital Plate (♂)
Acanthorintes erythrephaptor	shaft swollen, acuminate, not excised, overlying most of narrow, acuminate lateral arm		base not visible, apices, at least, with long spines, presumably similar to *A. xanthephaptor*	holotype not dissected, appearing similar to *A. xanthephaptor*	sides concave, flaring distally, apices sharply angulate, notch V-emarginate
Acanthorintes xanthephaptor	shaft barely swollen, acuminate, not excised, overlying end of narrow, acuminate lateral arm		paired long dorsocephalic and short caudal fingers, long spines on apices of both		sides concave, flaring distally, apices angulate, notch V-emarginate
Acanthorintes thenarocercus	shaft flat, excised near acuminate apex, overlying end of narrow, acuminate lateral arm		paired long dorsocephalic and short caudal fingers, long spines on apices of both		sides convex to narrow distal portion, apices angulate, notch V-emarginate
Acanthorintes tauriformis	shaft acuminate with apical "bird's head", lateral arm exposed, aciculate, curving dorsad		paired short dorsocephalic and short caudal fingers, minute teeth on apices of both		narrow, sides concave, flaring distally, apices angulate, notch U-emarginate in middle
Acanthorintes zeuglaius	shaft excised near acuminate apex, separated from acuminate, curved lateral arm		paired short dorsocephalic and short dorsocaudal fingers, minute teeth on apices of both		sides tapering to narrow lobes, apices rounded, notch deep, U-emarginate

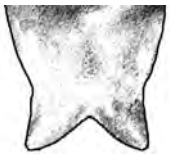
Rhabdocerca

Rhabdocerca tridactyla	shaft with long narrow dorsolateral median “finger” touching or close to dorsal rod		paired flat, broad, weakly sclerotized plates, proximal edges turned dorsad		sides concave, flaring distally, apices sharply angulate, notch V-emarginate
Rhabdocerca caudelli	shaft with short blunt dorsolateral median tooth distant from rod		paired flat, broad, weakly sclerotized plates, proximal edges turned dorsad		sides concave, flaring distally, apices sharply angulate, notch V-emarginate
Rhabdocerca zanclophora	simple, without appendage		paired flat, broad, weakly sclerotized plates, proximal edges turned dorsad		sides concave, flaring distally, apices sharply angulate, notch V-emarginate

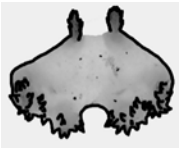
Acanthorintes

Subgenital Plate Figure (♂)	Epiproct (♂)	Epiproct Figure (♂)	Ovipositor (♀)	Subgenital Plate, Lobes (♀)	Ovipositor Base Figure (♀)
	long, broad, lateral lobes broad, rounded, distal lobes longish, narrow, notched, reflexed, blunt		females unknown	females unknown	females unknown
	long, broad, lateral lobes broad, rounded, distal lobes longish, narrow, notched, reflexed, apices blunt		medium to long; dorsal margin unarmed	bases entire, conspicuous, apical lobes short, broadly rounded, touching	
	short, broad, lateral lobes broad, distal lobes short, broad, weakly notched, reflexed, acuminate		medium to long; dorsal margin unarmed	base entire, very short, lateral lobes long, widely separated, acute	
	long, narrow, lateral lobes absent, distal lobes reflexed, T-shaped, barely notched, apices variable		"medium to very long (see geogr. variation); dorsal margin with long spinous tooth"	base separated, lateral lobes short, triangular, acute	
	simple, roundly quadrate		long; dorsal margin with laterally-pointing tubercle distad of short depression	base separated, lateral lobes long, triangular, acuminate	

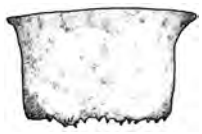
Rhabdocerca

	trapezoidal, distal angles rounded		medium; dorsal margin unarmed	elongate, somewhat parallel-sided, apex broadly rounded	
	trapezoidal, distal angles rounded		medium; dorsal margin unarmed	elongate, somewhat parallel-sided, apex blunt angulate	
	trapezoidal, distal angles rounded		medium; dorsal margin unarmed	short, broad at base, apex narrowing, blunt angulate	

Pterodichopetala

Species	Basal Cercal Projection (♂)	Cercal Shaft (♂)	Cercus Figure (♂)	Epiphallus (♂)	Epiphallus Figure (♂)
Pterodichopetala cultricerca	longer than distal fingers, strongly curved upward	with two short, separated fingers, one acuminate, one dorsal, narrowly rounded		base not visible, caudal structures, at least, compressed with long teeth	holotype not dissected, spined distally as in other *Pterodichopetala*
Pterodichopetala pityophila	longer than distal fingers, almost straight	split, with flabellate blunt appendage enclosing acuminate one		basal fingers long, narrow, caudal structures long, jaw-bone shaped with short scattered teeth	
Pterodichopetala padrisima	longer than distal fingers, almost straight	split, with flabellate blunt appendage enclosing acuminate one		basal fingers long, narrow, caudal structures short, compressed with long teeth	
Pterodichopetala hypsibates	longer than distal fingers, almost straight	split, with flabellate blunt appendage enclosing acuminate one		basal fingers long, narrow, caudal structures short, compressed with long teeth	
Pterodichopetala strepsidactyla	very short, shorter than distal fingers, almost straight	with two long, narrow fingers twisted together, one blunt, one acuminate		basal fingers short, broader, caudal structures broad with broad cluster of short teeth	
Pterodichopetala cieloi	short, shorter than distal finger, somewhat recurved	undivided, curving dorsad, narrowly rounded		basal fingers short, broader, caudal structures broad, each with narrow rows of short teeth	

Pterodichopetala

Epiproct (♂)	Epiproct Figure (♂)	Ultimate Tergite (♂)	Tegminal Apex & Length	Color of Tegmina
quadrate, distolateral margins rounded, distal margin with short median triangular projection	not figured, obscured by cerci in holotype	simple, without projecting or emarginate structure	apex rounded; extending to middle of abdomen	mostly black with costal margin yellowish (possibly preservation), caudal margin white
rectangular, distolateral margins rounded, distal margin slightly concave		relatively broad, simple, distal margins slightly emarginate	apex rounded; extending to middle of abdomen	mostly green with costal edge pale, followed by black stripe, caudal margin black
quadrate, distolateral margins angulate, distal margin slightly concave in middle		relatively broad, simple, distal margins slightly emarginate	apex rounded; extending to the end of abdomen	mostly green, margins occasionally brown or pale
quadrate, distolateral margins angulate, distal margin straight in middle		relatively broad, simple, distal margins slightly emarginate	apex rounded; extending almost to the end of abdomen	mostly green, margins occasionally brown or pale
triangular, sides converging to a broad rounded apex		narrowed, ending in short, blackish bilobed caudal structure	apex pointed; usually just surpassing tip of abdomen (usually halfway down ovipositor in female)	almost entirely green except margins narrowly brownish
trapezoidal, distolateral margins angulate		narrowed, ending in long blackish bilobed caudal structure	apex pointed; usually just surpassing tip of abdomen (usually halfway down ovipositor in female)	almost entirely green except margins narrowly brownish

GENERA AND SPECIES ACCOUNTS

Obolopteryx n. gen.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3, 9)

TYPE SPECIES. *Dichopetala emarginata* Brunner von Wattenwyl, 1878.

INCLUDED SPECIES. *Obolopteryx brevihastatus* (Morse, 1902), *Obolopteryx castaneus* (Rehn and Hebard, 1914), *Obolopteryx catinatus* (Rehn and Hebard, 1914), *Obolopteryx emarginatus* (Brunner von Wattenwyl, 1878), *Obolopteryx gladiator* (Rehn and Hebard, 1914), *Obolopteryx oreoecus* (Rehn and Hebard, 1914), *Obolopteryx poecilus* (Hebard, 1932), and *Obolopteryx seeversi* (Strohecker, 1941).

DISTINCTIVE CHARACTERS. We have erected this genus on the basis of a unique epiphallus: dissected and cleared material always possesses a W-shaped structure, sometimes with slightly deflexed lateral portions. In dried specimens, however, the sclerite appears entire across the middle but still shows the excised caudal margin. Males of the genus *Obolopteryx* may also be characterized by the presence of a dorsally convex, ventrally concave dorsolateral projection or "thumb" of the cercus; this form is unique among the dichopetalines and contrasts the flattened, laterally-positioned thumb of *Planipollex*. The semimembranous, bilobate flap folded under the distal end of the tenth tergite of the male also may be unique to the genus, although this structure appears to be absent in *O. catinatus*.

RELATIONSHIPS TO OTHER GENERA. The female tegmina of the species included here are small, rounded and widely separated; this condition also is found in *Rhabdocerca* and *Planipollex*, although in the latter genus, they may be larger and therefore appear more attingent. Yet, we think this character may indicate relationship, although we cannot be certain that this is not an unidentifiable convergence as the tegmina tegmina represent a reductional character. In all other genera, the female tegmina are overlapping at least to some extent with the caudal margin truncate or barely rounded. The similar cercal thumb in male *Planipollex* may be a synapomorphy, although it is flattened and lateral in contrast to *Obolopteryx*. Additionally, these three genera are all found in the norther part of the general dichopetaline range.

SPECIES CHARACTERS. As indicated in the Species Table, the species of *Obolopteryx* vary in the shape of the thumb and the length and sharpness of the shaft of the male cercus; other than a pair of sister species (*O. castaneus* and *O. poecilus*), each may be separated from other congenerics in those characters. There are also distinctive differences in the subgenital plate (both male and female) and epiproct but caution is warranted as they may be very similar between related species. Additionally, particular care must be exercised in using the epiphallus for species identification.

RELATIONSHIPS AMONG SPECIES. Relationships are discussed in this section but the details are found under the species. The only obvious relationship is between *O. castaneus* and *O. poecilus* based on the nigh identical male cercus, very short ovipositor, very similar male epiproct, and female subgenital plate. The apical lobes of the male subgenital plate are nearly identical in form, despite the wide separation and shallow notch in *O. poecilus*. To these two species, *O. brevihastatus* is probably related as three characters mentioned above, the short ovipositor, very similar male epiproct, and female subgenital plate, are shared with *O. brevihastatus*, and the the acute apex of the cercal thumb and larger distoventral flaps of the tenth tergite also suggest a closer relationship.

Less certain but still supported is the relationship with *O. emarginatus*, *O. seeversi*, and *O. gladiator* on the basis of the cercus, the male subgenital plate, and epiproct.

At first glance, the shape of the cercus clearly relates *O. catinatus* and *O. oreoecus*, but these species are different in every other structure. However, we have considered that this may be a primitive character as it is shared to some extent with *Planipollex* and it may be easier to envision a shortening of the thumb in other species rather than the development of the very long broad thumb.

DISTINCTIVE COLOR PATTERNS. Intensely colored individuals of four species are highly distinctive. Most intensively colored *O. catinatus* are unique in having a chain of oblong light markings on the dorsum of the abdomen surrounded by dark brown or black. Intensively colored *O. castaneus* and *O. poecilus* are also highly distinctive in having an essentially solid dark reddish-brown tergites. Intensively colored *O. oreoecus* have broad white lateral stripes, conspicuous on the prontum and tergites, although this character seems to be present only in the population in the Big Bend (Brewster County, Texas). There are no real distinctive patterns for *O. emarginatus*, *O. seeversi*, *O. gladiator*, and *O. brevihastatus*, although as mentioned previously, *O. emarginatus* and *O. seeversi* often have a pair of small dark spots on the clypeus. These may be occasionally present in other species (such as *O. brevihastatus* near Torreon, Coahuila) as well as nymphs of other species (such as *O. oreoecus* and *O. castaneus*). Occasionally, the cerci appear conspicuously bright yellow, probably most noticeably in *O. catinatus* and to a lesser extent, *O. oreoecus*; yet, it is not clear whether there is any significance or stability to this coloration.

RANGE AND GENERAL HABITAT. This genus is found from Texas to Arizona in the United States, extending briefly into Sonora and the northeastern states of Mexico, from elevations ranging near sea level on the Coast Plain to 6,500 feet. This genus comprises the only dichopetaline species to occur in the United States, except for a very brief intrusion of *Planipollex polliciferus* into southernmost Texas.

In central and southern Texas, there seems to be a confusing pattern of overlap among all species of *Obolopteryx*. However, when the individual species are plotted separately, each has cohesive distribution and appears to have somewhat different habitat or climatic restrictions. Thus, *O. emarginatus* occupies the northern part of central Texas, where it is found alone and extends into southern Oklahoma. It also is found rarely in the southern Coastal Plain and northeastern Mexico. *O. catinatus* occurs on the eastern edge of the range of *O. emarginatus* and also extends into northeastern Mexico. *O. brevihastatus* occurs on the western edge of the range of *O. emarginatus* but extends alone all the way to Arizona in the west as well as extending into northern Mexico. *O. oreoecus* also is a western species, occurring in oak-pine woodland in the mountains of west Texas extending east onto the southwestern portion of the Edwards plateau and into northern Mexico; it is replaced by *O. brevihastatus* in the adjacent deserts or drier areas. *O. castaneus* occurs on the southern edge of the main range of *O. emarginatus* on the Balcones Escarpment in Texas, extending southward through the Coastal Plain; it also extends deep into northeastern Mexico where it is replaced by *O. poecilus*. *O. gladiator* occurs extensively throughout the southern Coastal Plain of Texas and is sympatric with the more common *O. castaneus* and *O. emarginatus*. *O. seeversi* seems to be restricted to a small area at the southern edge of the Edwards Plateau near Bandera and the immediately adjacent Coastal Plain. In southern Texas, many of the species show broad sympatry but surprisingly little syntopy except with *O. castaneus*.

In this genus, species occur in a wide range of habitats, including mountains, low woodlands, shrublands and deserts. Along with *Planipollex* and species of *Pterodichopetala*, these are the only dichopetalines to extend into the moister regions of eastern Mexico.

Obolopteryx emarginatus (Brunner von Wattenwyl, 1878) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

TYPE. Syntypes, male and female, Dallas, Texas, Brunner Collection, Museum d'histoire naturelle de la Ville de Geneve (MHNG) (Eades *et al.* 2013).

We have not examined the type of this species, but we have material from nearby to the west and south. Only this species occurs in the vicinity of the type locality, and the figures and description provided by Rehn and Hebard (1914a) are adequate for identification.

IDENTIFICATION. The ovipositor has a flat ventral margin in lateral view (see Rehn and Hebard 1914a), as compared to the more rounded margin in all other *Obolopteryx* species (although this can be a difficult character to use).

Two dark clypeal spots are usually present in adults and nymphs but are sometimes absent in the same population. Such spots also are found in *O. seeversi* as well as *O. brevihastatus* from near Torreon (Coahuila). Faint clypeal spots also were found in single juveniles of *O. castaneus* from near Tilden (McMullen County) and *O. oreoecus* (nr. Panther Junction, Brewster County).

This species appears to be one of the most morphologically variable in the genus. For example, moderate variation exists in the female subgenital plate. The lateral lobes of the female subgenital plate are long and pointed in the north, whereas they are short and blunt in the south. The short form occurs in the southeastern part of the Edwards Plateau (Gillespie, Bastrop, San Saba, and Williamson). Long, short, and intermediate lobes are found in Val Verde and Coryell counties; thus, there is no clear gradation in the forms. There also exists minor variation in the length of the ovipositor as well as the male cercus, epiproct, and subgenital plate. It is possible that this taxon may actually be a complex of closely-related species, although this would be a unique scenario within the dichopetalines as most of the other species seem relatively stable. Furthermore, we were unable to correlate any of the differences between structure and geography. More detailed study is needed to elucidate the significance of this variation, and careful observations of the mating behavior also may have implications for these structures.

DISTRIBUTION. This is the only dichopetaline in northernmost Texas and southernmost Oklahoma. In the eastern part of Texas, it is sympatric with *O. catinatus*. South of the Edwards Plateau, it is apparently uncommon and becomes more or less replaced by other *Obolopteryx* species, especially the common *O. castaneus* with which it may be syntopic; it is even rarer in northeastern Mexico. This species may be found near sea level on the Coastal Plain up to 4,600 feet.

The single female from Dunlay (Medina County) mapped as questionable *O. emarginatus* may be *O. seeversi* as the female subgenital plate is very similar to *O. seeversi* and probably south of the elongate narrow lobes characteristic of *O. emarginatus* father north. On the other hand, it has the flat ventral margin of the ovipositor as in *O. emarginatus*, but this character is of questionable utility. The specimen is close to material of *O. seeversi* approximately 16 air miles east-southeast of the southernmost collection of undoubted *O. seeversi* north of Hondo. Unfortunately, it is well within the range of *O. emarginatus*, which species becomes uncommon south of the southern part of the Edwards Plateau. More collections need to be made in the large gap from Bandera (Bandera County) and Hondo (Medina County) south to Tilden (McMullen County).

Apparently less common in Mexico, this species has been found in a few localities on the northeastern Coastal Plain, near China and Linares (Nuevo Leon) and San Fernando (Tamaulipas). It probably is uncommon near the latter two localities because those two areas have been heavily collected.

The southernmost Mexican record at 15 miles south-southwest Llera is not recorded in Cohn's field notebook for that locality. It is far to the south of other Tamaulipas records and in more humid country, in areas well-collected for dichopetalines. Because Cohn collected before and after in *O. emarginatus* territory, it is probably an error in labeling.

Obolopteryx seeversi (Strohecker, 1941) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

TYPE. Holotype, male, Bexar County, Texas, 11-17 August 1940, coll. Strohecker (FSCA).

This species is known from two definite localities at the southern edge of the Balcones Escarpment (Bandera and north of Hondo) and the adjacent Coastal Plain. The type locality, as recorded, is non-specific, including only Bexar County. Cohn spoke with Strohecker whom remembered only that, while he was stationed at one of the Armed Forces bases in San Antonio, he headed northwest from that city towards a large lake, which could only have been Lake Medina.

We have examined the type of this species.

IDENTIFICATION. The cercal thumb is the shortest in the genus. The lateral margin is convex and thus, reminiscent of the cercal thumb in *O. emarginatus* but as a much shorted version. All of the limited material possesses clypeal spots, which character is shared with its apparently closest relative, *O. emarginatus*.

DISTRIBUTION. The only two precise localities (near Bandera and Hondo) are close to Lake Medina, around 1,250 feet elevation, and in the drainage of that lake. North of Hondo, *O. seeversi* is syntopic with *O. castaneus*. See also the note regarding the questionable specimen of *O. emarginatus* from Dunlay (Medina County) in the previous Species Account.

Obolopteryx gladiator (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

TYPE. Holotype, male, Lyford, Cameron [now in Willacy] County, Texas, 6-7 August 1912, coll. Rehn and Hebard, Hebard Collection (ANSP).

We have not examined the type of this species. Although we have no topotypic material, we do have material from nearby, and the figures and description by Rehn and Hebard (1914a) are entirely adequate to identify the species.

IDENTIFICATION. *Obolopteryx gladiator* is unique in having an extremely long ovipositor which, in lateral view, is very distinctively narrow (short distance from dorsal to ventral margin), much more so than in any other species. The apically sinuate shaft of the male cercus of this species is less obvious than in unrelated *O. castaneus* and *O. poecilus* probably because it is thicker than in those two species.

DISTRIBUTION. This species appears to be widely distributed on the Coastal Plain from the Rio Grande to the Gulf, from near sea level up to 700 feet. The northeasternmost record is Hochheim (DeWitt County) and the southernmost record is the type locality in Willacy County at Lyford, where it is syntopic with *Planipollex polliciferus*. It is also syntopic with *O. castaneus* in two localities. This species is unknown from the Brownsville area, where much collecting has been done as well as from Mexico.

Obolopteryx brevihastatus (Morse, 1902) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

SYNONYMS. *Dichopetala laevis* (Scudder, 1902). *Dichopetala brevicauda* Scudder and Cockerell, 1902.

TYPE. Lectotype, male, Riley's Ranch, Mesilla Valley, Dona Ana County, New Mexico, 2 August 1898, coll. Cockerell, Scudder Collection, (ANSP). Two other nearby localities were included, and the single male was chosen as the type by Rehn and Hebard (1914a). Of *Dichopetala laevis* (Scudder, 1902), holotype, female, Carr Canyon, Huachuca Mountains, Cochise County, Arizona, (ANSP) (Rehn and Hebard 1914a, Eades *et al.* 2013).

We have not examined the type of this species or its synonym, but it is the only one that occurs in southern New Mexico and Arizona, and it is unmistakable from the Rehn and Hebard (1914a) figures and description.

IDENTIFICATION. The dorsal margin of the ventral valve of the ovipositor has a conspicuous tubercle which is unique in *Obolopteryx*; all the other species have this margin smooth or with a barely visible swelling. This species rarely has clypeal spots, and then only near Torreon (Coahuila).

DISTRIBUTION. This is a species of the deserts and mesquite grasslands, occupying the southwestern portion of the Edwards Plateau and extending north into the mesquite grassland to Post (Garza County); it ranges through western Texas and southern New Mexico into southeastern Arizona and penetrating briefly into northern Sonora. We think very little collecting has been done west of the Baboquivari Mountains in Arizona, from 300 to 5,000 feet. South of the Edwards Plateau, the species extends in a narrow band along the Rio Grande but not to its mouth, where much collecting has been done around Brownsville; Rehn and Hebard's (1914a) record at Laguna del Gato (Hidalgo County) is the southeasternmost record. In Mexico, it is found commonly in eastern Coahuila south to Saltillo and Monterrey (Nuevo Leon) but not farther east along the coast road which has been intensively collected. It also occurs westward through

Coahuila to northeasternmost Durango. This species probably occurs in eastern Chihuahua, where little collecting has been done. *O. brevihastatus* certainly does not occur in the desert of central Sonora (south of Magdalena) or on the western Coastal Plain in Sonora. Although there appears to be a collecting gap in this area, in fact there has been intensive collecting done for *Barytettix* (Acrididae: Melanoplinae) and *Neobarrettia* (Tettigoniidae: Listroscelinae) by Cohn, and no dichopetalines were found north of Culiacan (Sinaloa).

The single Uvalde female collected by Rehn and Hebard (1914a) and recorded by them as *O. brevihastatus* is in error; this specimen is *O. castaneus* as it possesses the typical upturned dorsal margin of the base of the dorsal margin of the ventral valve of the ovipositor characteristic of that species and lacks the unique tubercle on the dorsal margin of the ventral valve at the base of the ovipositor found in *O. brevihastatus* (see above). Additionally, we have several collections of *O. castaneus* from this area. Similarly, the specimen recorded in the revision (Rehn and Hebard 1914a) from Gregory (San Patricio County) is not a female but instead is clearly a male *O. emarginatus* which we included on our map under that species.

The two eastern outliers on the *O. brevihastatus* map, near Mannheim (Lee County) and near San Marcos (Hays County) probably are based on mislabelled specimens. Although collected by Rehn, who was usually meticulous in this regard, they are not recorded in his field notebook, even though he recorded other "*Dichopetala*", including *O. brevihastatus*, from other locations only a few days earlier. The label of the former was hand written and thus not in the usual distinctive printed Rehn and Hebard style of the latter locality label. We have about twenty collections of other *Obolopteryx* species between San Marcos (Hays County) and the next easternmost *O. brevihastatus* locality near Sonora (Sutton Co.) (*ca.* 170 air miles). These two outlier localities are in a much moister environment (see Tharp 1952) than all of the material from the main range of *O. brevihastatus*. We therefore think that these should not be included in the range of *O. brevihastatus*, although the possibillity of small relictual colonies exist; however, generally speaking, we have essentially no significant longitudinal outliers, at least in Texas, in other species in the genus.

Material from the Sierra de Mapimi is somewhat different from those near Saltillo (Coahuila). The cercal thumb is sharper, the subgenital plates in both sexes are slightly different, and the tubercle on the dorsal margin of the ventral lobe of the ovipositor is less developed. The other two localities in the Sierra de Mapimi are represented only by nymphs whose identification is based on the nearby adults. More collections are needed from between Saltillo (Coahuila) and Torreon (Coahuila) to elucidate the status of this population. Additionally, no dichopetaline collections have been made between the Big Bend Region in Texas and Torreon (Coahuila), probably because of the lack of improved roads.

Distributional Relationships with other Species. *O. brevihastatus* shows complex distributional relationships with other species. However, in eastern Mexico, there are large collections between Saltillo (Coahuila) and Monclova (Coahuila) and from the area of Saltillo to the south without any overlap except near Monterrey where both *O. brevihastatus* and *Rhabdocerca tridactyla* reach their distributional limits at the Coastal Plain. We think, therefore, that this may be a replacement phenomenon with minimal contact. *O. brevihastatus* may have a similar relationship with *O. oreoecus* whereby *O. brevihastatus* replaces *O. oreoecus* at lower elevations around the Davis and Chisos Mountains in west Texas; this, however, is probably a matter of habitat restriction for both species, with *O. oreoecus* to oak-juniper and *O. brevihastatus* to desert conditions (see also discussion under *O. oreoecus*).

O. brevihastatus overlaps the distribution of *O. emarginatus* as well as *O. gladiator* in southern Texas to a limited extent. *O. brevihastatus* also overlaps the distribution of *O. castaneus* in southern Texas and northern Mexico north of Monclova (Coahuila) where they are sometimes syntopic but seems to replace it farther to the south. With regard to *O. castaneus*, *O. brevihastatus* is probably a species of drier conditions as it does not seem to occur on the Coastal Plain but is found farther west.

The western records of *O. brevihastatus* near Torreon suggest the range abuts the distribution of *Mactruchus ischnodus* and may be syntopic in the Sierra de Mapimi. However, they may or may not overlap farther to the northwest; this remains unknown probably because little collecting has been done in eastern Chihuahua (state).

Obolopteryx castaneus (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) 10; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 2, 3)

TYPE. Holotype, male, Laguna del Gato, three miles west of Sam Fordyce, Hidalgo County, Texas, elevation 175-200 feet, 6 August 1912, coll. Rehn and Hebard, Hebard Collection (ANSP).

We have not examined the type of this species. Although we have no topotypic material, the description and figures by Rehn and Hebard (1914a) are entirely adequate to identify the species.

IDENTIFICATION. The male subgenital plate is unique in the genus, and that of its sister species, *O. poecilus*, is clearly derived from it. This species and *O. poecilus* have a unique abdominal shape which is difficult to describe: the major part of the abdomen appears to be slightly swollen, and in the males, the last segment appears to be noticeably narrow and the end of

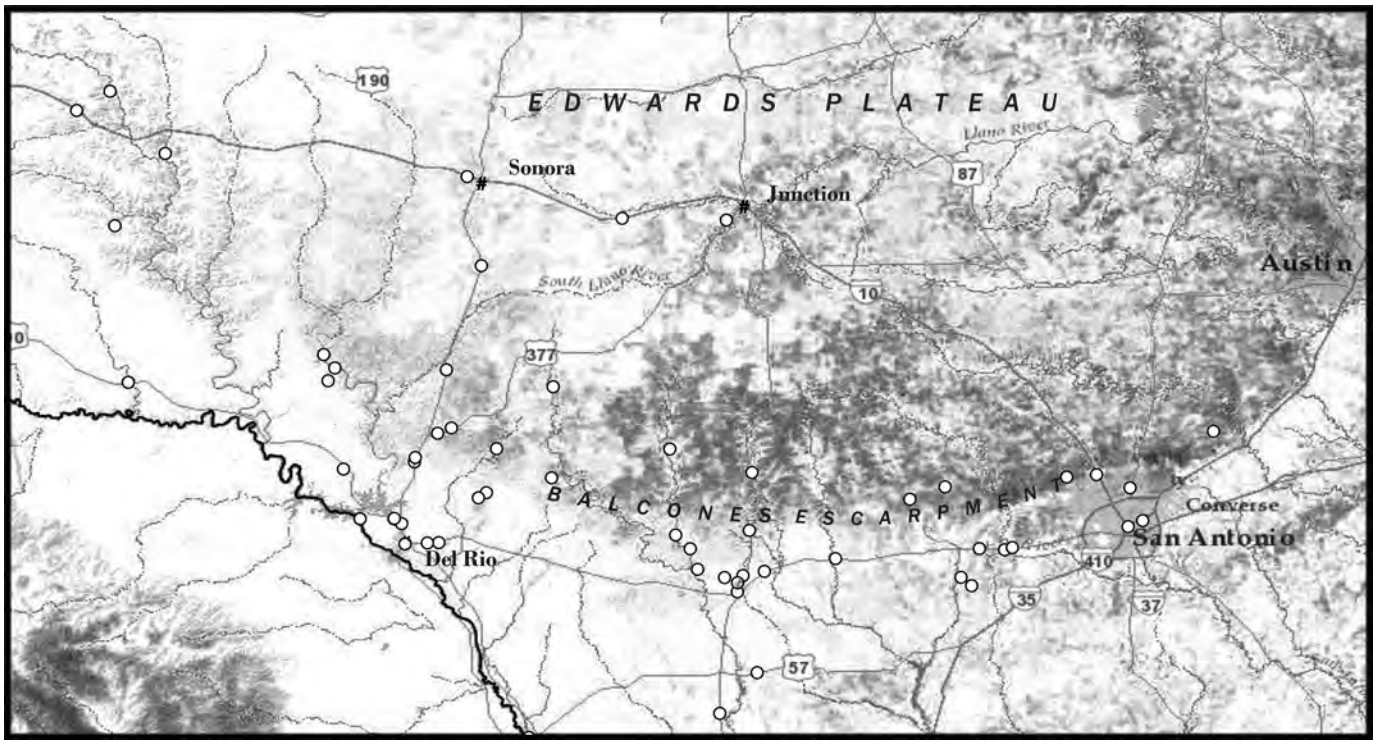
the abdomen slopes slightly but distinctively downward, such that the cerci are invisible from above (partially visible in Fig. 10). The apical sinuation in the male cercus of this species and *O. poecilus* is accentuated by its aciculate nature; the less obvious sinuation in *O. gladiator* is probably a result of the apex being thicker. This species rarely has clypeal spots**.**

DISTRIBUTION. *O. castaneus* is found widely on the Coastal Plain of southern Texas and northeastern Mexico, from near sea level up to 6,100 feet. In Texas, it is bordered in the north by the Edwards Plateau but extends to the southern part of the Pecos River in the west. We have many records in the Balcones Escarpment at the edge of the Plateau but almost all are in stream valleys that cut back into the Escarpment; these valleys and canyons probably contain some coastal plain vegetation. We have four records that are clearly on top of the Edwards Plateau: two near Sonora (Sutton Co.), one 27 miles west Junction (Sutton Co.), and one 5 miles southwest Junction (Kimble Co). When plotted on a large scale stream map (Map 2), the two Sonora records are very near streams draining southwestward into the Devil's River which joins the Rio Grande. The two Junction records on the Plateau, however, are inexplicable by this theory, as the specimens were collected near the Llano River which flows northeast, well out of the range of *O. castaneus*; yet, there is little question about the 5 miles southwest Junction record as it is represented by an adult male and several adult females and was recorded in Cohn's field notebook.

In Mexico, it extends deeply into the northeast with the western limits in eastern Coahuila on the road from Piedras Negras to Sabinas. The southernmost records are from 27 miles east-northeast Ciudad Valles (San Luis Potosi) and near Tampico (Veracruz), but the distribution of the southern sister species, *O. poecilus*, also should be consulted below.

O. castaneus overlaps with many other species of *Obolopteryx* and is often syntopic, but in Mexico, it is replaced by *O. brevihastatus* in the region south of Monclova. It would appear that, in northern Mexico, *O. castaneus* may be a species of moister conditions as it occurs east of this road and far to the south on the Coastal Plain. The two females from 34.2 miles south of Castanos (Coahuila) may be *O. brevihastatus* as the ovipositor bump is less distinctive than in other *O. brevihastatus*, but we have many surrounding collections of *O. brevihastatus* in the area.

Aberrant *O. castaneus* in the vicinity of Jaumave. In our collection, we have one male and one female from 5 miles southwest Jaumave (Tamaulipas) and three males from 19.2 air miles to the northeast (at 22 road miles southwest Ciudad Victoria, Tamaulipas) that are morphologically different from *O. castaneus* just east of the mountains. The male from Jaumave has clypeal spots not found in adults of this species, being more common in *O. emarginatus*. The cerci resemble *O. brevihastatus* more than *O. castaneus* but the subgenital plate is more or less typical of *O. castaneus*. The base of the ovipositor is that of *O. brevihastatus*. The three males of Jaumave include one in which the cercal thumb is represented only by a slight bulge and the tip lacks the slight apical twist



Map 2. Distribution of *Obolopteryx castaneus* on the Edwards Plateau.

of *O. castaneus*; the other two specimens have cercal thumbs similar to that of the Jaumave male and somewhat different from *O. castaneus* as well as having an almost straight cercal apex. However, all three have a peculiar subgenital plate differing from *O. castaneus* in having the mesal portion of the lateral lobes extending beyond the lateral horn. These populations occur in desert conditions in a low elevation pocket within the mountains, in contrast to the more moist conditions east of the mountains and farther south where *O. castaneus* is common. Whether these represent a new species or possible hybrids (but between what two species we do not know as no others occur in the area) or just population variants can be solved only with more collecting.

Distribution of *O. castaneus* and *O. poecilus* at their closest points of contact. Despite the large numbers of collections in southern Tamaulipas and easternmost San Luis Potosi, we have been unable to find the zone of contact. All we can say is that, in this area, *O. castaneus* is in full possession of Ciudad Mante (see problem of *O. poecilus* type locality under that species) with a few small collections to the southeast on the Tampico Road (27 miles east-northeast Ciudad Valles, 19 road miles from the closest *O. poecilus* at 8 miles east Valles, possibly with a low ridge intervening). Furthermore, *O. poecilus* is in full possession of Ciudad Valles with several collections north and west near Antiguo Morelos (9 air miles southwest Ciudad Mante) as well as somewhat to the east of Ciudad Valles and all points south. Because of the large collections in Valles and Mante, we are reasonably sure that the species do not overlap or hybridize at these localities; thus, the place to look for contact would be south of Mante, north of Antiguo Morelos and probably on the Tampico Road around and east of Tamuin and southwest of Tampico (Veracruz).

Distribution of *O. castaneus* and *Rhabdocerca tridactyla* in northeastern Mexico. South of the Monterrey (Nuevo Leon)-Saltillo (Coahuila) line, *O. castaneus* is sympatric with *Rhabdocerca tridactyla*, but at lower elevations in the east at Santa Catarina (near Monterrey), Montemorelos (Nuevo Leon), and east of Iturbide (Nuevo Leon), *R. tridactyla* is rare. Other than these few collections, the ranges of the two species essentially abut: *O. castaneus* at lower elevations on the Coastal Plain and *R. tridactyla* at higher elevations in the Sierra Madre Oriental.

Obolopteryx poecilus (Hebard, 1932) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

TYPE. Holotype, male, "El Mante," Tamaulipas, Mexico, elevation 80 meters, 2 June 1931, A. Dampf, Hebard Collection, Type No. 1206 (ANSP).

The type locality of "El Mante" is almost certainly not Ciudad Mante, where only *O. castaneus* is present. The city is usually designated on maps as "Ciudad Mante," but the municipio is called "El Mante." Cohn has collected series of *Obolopteryx* from the city of Ciudad Mante itself, and these are all clearly *O. castaneus* as indicated by the male subgenital plate (the only differentiating character between the sister species). As the nearest undoubted *O. poecilus* is found 9 miles north-northeast Antiguo Morelos (9 air miles southwest Ciudad Mante), it is probable that the type was collected at the southern edge of the municipio.

We have not examined the type of this species, but Hebard's (1932) figure of the male subgenital plate is entirely adequate for identification; we also have material from what is presumably the type locality (see below).

IDENTIFICATION. The male subgenital plate of *O. poecilus* is clearly unique in the genus, but it also is clearly derived from that of *O. castaneus*. Other distinctive characters of this species, which are shared with *O. castaneus*, are discussed under that species.

DISTRIBUTION. This species is found in the southern half of the Northeastern Costal Plain, between south of Ciudad Mante (Tamaulipas) and Tamazunchale (San Luis Potosi), from near sea level up to 2,000 feet. Despite our best efforts, we have not found the actual zone of contact with *O. castaneus*, either south of Ciudad Mante or northeast of Ciudad Valles (San Luis Potosi) (see under *O. castaneus*). The southernmost record near Tamazunchale is a single female which cannot be positively differentiated from *O. castaneus* but is almost surely *O. poecilus* on the basis of the distribution.

Obolopteryx catinatus (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

TYPE. Holotype, male, Brownsville, Cameron Co., Texas, 31 July 1912, coll. Hebard, Hebard Collection (ANSP).

We have not examined the type of this species, but we have topotypic material. Additionally, the figures and description provided by Rehn and Hebard (1914a) unequivocally identify this species.

IDENTIFICATION. *O. catinatus* shares with *O. oreoecus* the greatly extending thumb covering much of the dorsal portion of the cercal shaft, moreso than in any other species of the genus. This would appear to ally the two but no other characters support this relationship. Unfortunately, there is no obvious alternative relationship to other species. Yet, we cannot polarize these differences, and it is not clear whether similarities of either *O. catinatus* or *O. oreoecus* to any of the other *Obolopteryx* species may merely be primitive. Furthermore, we have considered that the greatly enlarged cercal thumb may be primitive, because it is not difficult to

envision a sequence of thumb reduction rather than thumb production.

DISTRIBUTION. This species is found in central Texas but along the eastern border of the Edwards Plateau and ranging through southern Texas into Nuevo Leon, Mexico, from near sea level up to 4,000 feet. It is sympatric with *O. emarginatus* over its entire range, being syntopic with that species in southern Texas (Olmito, Cameron County). It also is possibly syntopic near Austin (Travis County), but our sparse material is all females which are hard to differentiate. It also is syntopic with *O. castaneus* in San Antonio (Bexar County) and with *Planipollex polliciferus* in Brownsville (Cameron County). It seems to be rare south of San Antonio and in Nuevo Leon. The few collections where we have habitat data seem to indicate that *O. catinatus* occurs in oak-juniper woodlands in central Texas, designated by Tharp (1952) as oak-juniper bordering the Edwards Plateau and portions of the Blackland Prairie. Little or no collecting has been done east of these records.

South of the Edwards Plateau in Texas, we have only two localities: one at Olmito near Brownsville (Cameron County) is in dry country (mesquite-chaparral) and another near Monterrey (Nuevo Leon) in apparent desert conditions. The region between the Edwards Plateau and Brownsville has been only moderately collected, and between Brownsville and Monterrey, (Nuevo Leon), only the coast road has been intensively collected, and there it has not been found.

From its possibly closest relative *O. oreoecus* (see below), it is widely separated (approximately 75 miles) in southcentral Texas but apparently without any change in vegetation types. In Mexico, the Muzquiz (Coahuila) record of *O. oreoecus*, if correct, appears to be in desert and the Santa Catarina (Nuevo Leon) records of *O. catinatus* are in desert as well.

Obolopteryx oreoecus (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

TYPE. Holotype, male, Canyon behind Pulliam Bluff, Chisos Mountains, Brewster County, Texas, elevation 4,600-5,000 feet, 7 September 1912, coll. Rehn and Hebard, Hebard Collection (ANSP).

We have not examined the type of this species. Although we have no topotypic material, we do have material from nearby, and the figures and description provided by Rehn and Hebard (1914a) unequivocally identify this species.

IDENTIFICATION. The problematical relationship between this species and *O. catinatus* is discussed above under the latter species. The pale stripe when conspicuously broad (mostly in females and some nymphs) is unique; this condition is present in specimens from the Chisos Mountains (Brewster County), Jimenez (Chihuahua), and the Sierra de Tlahuilillo (Coahuila) but particularly less conspicuous in the Davis Mountains. Nymphs of this species sometimes have clypeal spots as in *O. brevihastatus*.

DISTRIBUTION. This species is found in the mountains of west Texas, extending to the southwestern portion of the Edwards Plateau and a few scattered localities in northern Mexico (near Torreon, Monclova, and Muzquiz in Coahuila and Jimenez and Flores Magon in Chihuahua), from 1,650 to 6,500 feet. In Texas, *O. oreoecus* occurs commonly in oak-juniper woodland in the mountains of west Texas as well as farther east at lower elevations on the southwestern part of the Edwards Plateau and also at Ozona (Crockett County), probably also in oak woodland; no where in this area has it been collected in desert.

The pattern of distribution and habitat in northern Mexico is confusing, largely because of the few and scattered collections usually of one or few individuals. Contrary to the apparent preference for juniper-oak woodland in the United States, in the one Mexican locality for which we have field notes, it occurs in desert (Ricardo Flores, Chihuahua), and the Jimenez (Chihuahua) specimen probably also was taken in desert-like conditions. It is not entirely clear what the habitat was at Muzquiz (Coahuila) nor is it clear where the precise location of the "Montelovez" (=Monclova, see Coues 1987)) specimens, which could easily have been collected in the adjacent mountains. *O. oreoecus* certainly does not occur farther to the south, because we have many collections of other dichopetalines in the Saltillo area in both high and low elevations. This lack of records and confusion probably reflects the lack of improved roads in northern Mexico south of the Big Bend Region.

Distribution *O. oreoecus* and *O. brevihastatus*. In the Chisos and Davis Mountains of west Texas, *O. oreoecus* is clearly a montane species found in the pine-oak zone. In west Texas, this species is replaced at low elevations in mesquite savanna and in mesquite-chaparral near the Rio Grande by *O. brevihastatus*, the widespread desert and desert grassland species. The zone of probable contact or overlap in the Chisos Mountains has been transected by Swanson who has narrowed the gap to 12 miles on the Persimmon Gap-Panther Junction road. It is clear from his observations and collections that *O. brevihastatus* is probably common in the desert here and *O. oreoecus* in the oak-juniper zone; yet, the reason for this restriction, whether habitat preference or competitive exclusion, remains to be determined. We can say with confidence that, at elevations above about 3,000 feet in the Chisos Mountains, there are no *O. brevihastatus* among the 90 *O. oreoecus* recorded from the Big Bend at a number of localities. The same may be true for *O. oreoecus* in the Davis Mountains where we have fewer localities and few (about 30) specimens. In Arizona, where *O. oreoecus* does not occur we have one record of *O. brevihastatus* at 5,800 feet and a small number of records of this species from around 4,500 to around 5,000 feet and many more at lower elevations, suggesting that *O. brevihastatus* has replaced *O. oreoecus* in southeast

Arizona. In the Big Bend, unfortunately, we have only a few records of *O. brevihastatus* in the adjacent desert, ranging up to 2,820 feet. Near the Davis Mountains, we have more records of *O. brevihastatus* which ranges up to 4,260 feet and at that elevation, Rehn and Hebard (1914a) recorded a single *O. oreoecus* among 30 *O. brevihastatus*. Females are included in the counts as the two species are separable. It should be noted that our reference to altitude is not meant to specify an altitudinal limitation *per se*, but merely as a convenient reference point which almost certainly delimits vegetational or climatic preferences. The two species are syntopic in only near Marathon (Brewster County). Much farther south near El Carmen (Ricardo Flores) (Chihuahua), however, *O. oreoecus* was found in creosote-ocotillo desert in a region where no *O. brevihastatus* is recorded.

Planipollex n. gen.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; (microsculpture) Z; Map 3)

TYPE SPECIES. *Dichopetala pollicifera* Rehn and Hebard, 1914.

INCLUDED SPECIES. *Planipollex polliciferus* (Rehn and Hebard, 1914).

DISTINCTIVE CHARACTERS. We are erecting this genus on the basis of a complete absence of a sclerotized epiphallus, distinctive male cercus, and dull surface of the abdominal tergites. Each of these characters pose problems in morphology and interpretation. The lack of an epiphallus is unique among dichopetaline genera and almost certainly represents a loss, although we have no direct evidence for this interpretation. On the other hand, few other phaneropterines have an epiphallus (see Morphological Notes); thus, *Planipollex* may represent the primitive condition. It may be of interest to note that the species of *Rhabdocerca* have a very weakly sclerotized epiphallus, but this is probably not an antecedent condition to a loss in *Planipollex*, because the two genera show almost no other similarities, except for the reduction in the tegmina in the females. The cercus is very similar to that in *Obolopteryx* in its possession of a thumb that is concave below, but it differs slightly in many details: the thumb in *Planipollex* is lateral (unique among the dichopetalines) rather than dorsolateral, the thumb is flattened above as opposed to being convex, and the apex of the shaft is hooked rather than gradually curved. It is possible that the thumb is a derivative of that in *Obolopteryx*. It also is entirely possible that the cercal thumb in *Obolopteryx* and *Planipollex* are products of convergence. The abdominal tergites always appear dull, possibly a result of differing integumental microsculpture. This appears to be unique to the genus, contrasting the shiny or smooth appearance of the other genera, but we have not made any high-resolution comparisons between the species.

RELATIONSHIP TO OTHER GENERA. The greatly reduced, rounded, non-overlapping tegmina of the female may indicate relationship to *Obolopteryx* and *Rhabdocerca*, although in *Planipollex* the tegmina are larger, which may cause them to appear closer together. As the tegmina represent a reductional character, we cannot be certain that this is not an unidentifiable convergence. In all other genera, the female tegmina are overlapping at least to some extent with the caudal margin truncate or barely rounded. We have argued above that the cercal thumb may or may not be a character of relationship to *Obolopteryx*; the hooked apex and lack of epiphalli are not found in *Obolopteryx*. This species along with *Obolopteryx* and *Acanthorintes* all occupy the northern part of the dichopetaline range.

SPECIES CHARACTERS. As this genus is monotypic, these details are discussed under the Species Account.

RELATIONSHIPS AMONG SPECIES. Monotypic.

DISTINCTIVE COLOR PATTERNS. The species in this genus is generally green in coloration with minimal dark patterning, other than some typical minute brown speckles. *Planipollex* seems to be unique in having a dull integument, contrasting the shinier appearance of the other dichopetalines. This is probably the result of microsculpture mentioned above which requires further investigation.

RANGE AND GENERAL HABITAT. This species occurs on the Northern Coastal Plain of Mexico barely extending into southernmost Texas near the Brownsville area (Cameron County). The southernmost record is Temascal (Oaxaca), but we have only a few scattered records in the southern limits of its range. It is apparently limited to the west by the Sierra Madre Oriental, although it penetrates that mountain range to a limited extent at low elevations, usually less than 2,000 feet (except one record southwest of Ciudad Victoria (Tamaulipas) at 3,000 feet).

Planipollex polliciferus (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 3)

SYNONYMS. *Dichopetala chirura* Strohecker, 1945. (**NEW SYNONYM**).

TYPE. Holotype, male, Brownsville, Cameron County, Texas, 31 July-5 August 1912, coll. Hebard, Hebard Collection (ANSP). Of *Dichopetala chirura*, holotype, male, [Ciudad de] Valles, San Luis Potosi, 18 June 1941, coll. Seevers and Dybas, Strohecker Collection (FSCA).

We have not examined the male holotype of this species or *Dichopetala chirura*, but we have examined topotypic series of each taxon.

IDENTIFICATION. Although Strohecker (1945) stated that there are differences between the male cerci of *D. pollicifera* and *D. chirura*, we can find no reliable differences between topotypic material of *P. polliciferus* (Brownsville, Texas) and

P. chirurus (Ciudad Valles, San Luis Potosi), nor among our much more extensive series. We have presented figures of the northernmost and almost southernmost localities, drawn independently, to demonstrate that there are no more than minor differences (see Fig. 4).

Strohecker also (1945) stated there were differences in the ovipositor without explicit details, but presumably referring to the ovipositor length. There is a large difference in the

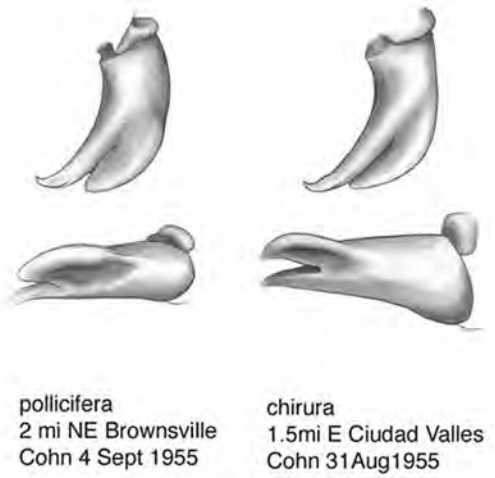


Fig. 4. Comparison of the male cercus of *Dichopetala pollicifera* and *Dichopetala chirura*.

length of the ovipositor between northernmost specimens (*D. pollicifera*) and most southern ones (*D. chirura*) (see Appendix???). Three distributional phenomena call their legitimacy into question: (1) there are a few short ovipositors in the Ciudad Valles collections as well as a little farther north, (2) the longest ones are in the middle near Padilla (Tamaulipas) and (3) both long and short specimens exist north of Ciudad Victoria (Tamaulipas). While curious, this scattered distribution makes us believe that these two taxa are conspecific. A rigorous study in which many more ovipositor measurements are made and molecular characters are used should be conducted. This phenomenon occurs in another species, *Acanthorintes tauriformis*, in which exists very long and short ovipositors, but with a different pattern of distribution.

DISTRIBUTION. This species occurs on the Northern Coastal Plain in northeastern Mexico and southernmost Texas from near sea level up to 3,000 feet. At Lyford (Willacy County) in southern Texas, this species is syntopic with *Obolopteryx gladiator*. Elsewhere in Texas, it occurs with *O. emarginatus* and *O. catinatus*, and in Mexico, it is syntopic with *O. castaneus* and its southern sister species, *O. poecilus*, throughout much of its range.

Rhabdocerca n. gen.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 4, 9, 10)

TYPE SPECIES. *Dichopetala tridactyla* Rehn and Hebard, 1914.

INCLUDED SPECIES. *Rhabdocerca caudelli* (Rehn and Hebard, 1914), *Rhabdocerca tridactyla* (Rehn and Hebard, 1914), and *Rhabdocerca zanclophora* n. sp.

DISTINCTIVE CHARACTERS. This genus is based on the unique rod-shaped projection arising proximad of the basal constriction of the male cercus. This rod appears in the small juveniles (but not in minute nymphs that cannot be sexed), at least enabling one to identify juveniles of *Rhabdocerca.* The male epiphallus also is unique, composed of paired roundly quadrate weakly-sclerotized plates with briefly-upturned cephalic portions. Also distinctive but not restricted to this genus (also found in *Dichopetala mexicana* and *Acanthorintes tauriformis*) is the swollen, triangularly elevated modification of the posterior margin of the first abdominal tergite; this structure may have a secretory function or serve in courtship.

RELATIONSHIPS TO OTHER GENERA. The female tegmina are small, rounded, and widely-separated as in *Obolopteryx*; this occurs to a lesser extent in *Planipollex*, in which the tegmina are larger and sometimes attingent. As the tegmina represent a reductional character, we cannot be certain that this is not an unidentifiable convergence. In all other genera, the female tegmina are overlapping at least to some extent with the caudal margin truncate or barely rounded. Surprisingly, the modification of the first tergite also occurs in the *Dichopetala mexicana* and *Acanthorintes tauriformis*, which we think are not related because they share no other characters with *Rhabdocerca.* Two other genera (*Dichopetala* and *Mactruchus*) have extensions at the base of the cercus proximad of the basal constriction of the male cercus but these are always short and often broad; we also do not think these indicate relationship as they also do not share any other characters.

SPECIES CHARACTERS. The genus comprises three closely-related species, distinguished primarily by the condition of the small appendage on the male cercus. The males differ in the development of the dorsolateral median appendage and small differences in the degree of curvature and length of the dorsal rod; two of the species are similar and the third merely lacks the appendage of the cercus. There are also small differences in the male and female subgenital plate, particularly in *R. zanclophora*. We would be hesitant to designate these as species were it not for the fact that each species is geographically cohesive (without geographic barriers) and their ranges either come very close to one another (*R. zanclophora*) or are syntopic and distinctive there in their color pattern, clearly indicating that they represent different species (*R. caudelli* and *R. tridactyla*).

RELATIONSHIPS AMONG SPECIES. This may be a morphological sequence going from an elongate median

tooth to a short one to none at all but we cannot polarize this sequence. On the other hand, the shape of the male cercus and the female subgenital plate of *R. tridactyla* and *R. caudelli* are more similar to each other, such that these are probably sister species.

DISTINCTIVE COLOR PATTERNS. While two species lack any distinctive color pattern, *R. tridactyla* varies greatly in color pattern over its enormous range. Near its western limits and in the area of overlap with *R. caudelli*, individuals of *R. tridactyla* are often blackish with a bright white spot on the lower margin of the lateral lobes of the pronotum. This phenomenon is discussed in greater detail below. The northeastern populations of *R. tridactyla* appear similar to its congeners.

RANGE AND GENERAL HABITAT. This genus has the most interesting distribution of any dichopetaline species, owing to an enormous distribution in northern central Mexico, a great altitudinal range, and its geographic relationships with other genera and species. This situation is almost entirely encompassed by one species, *R. tridactyla*, and is detailed under that species. The species in this genus occur in the central part of the Mesa Central and in the northern Sierra Madre Oriental to the eastern edge of the state of Durango, from 2,000 to 7,800 feet.

Rhabdocerca tridactyla (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 4, 9, 10)

TYPE. Holotype, male, Camacho, Zacatecas, Mexico, November 1877, coll. Lawrence Bruner, Hebard Collection (ANSP).

We have not examined the type of this species, but we have material from 1.2 miles east of Camacho. The figures and description provided by Rehn and Hebard (1914a) also unequivocally identify this species.

IDENTIFICATION. *R. tridactyla* is very similar to *R. caudelli* in the male genitalia but primarily differs from that species in having a much longer medial cercal projection which nearly touches the dorsal rod. The only other differences are in the slightly less flaring male subgenital plate and slightly narrower lateral lobes of the female subgenital plate. However, these differences in the lateral lobes of the female subgenital plate are small and levels of variation may overlap between this species and *R. caudelli*.

DISTRIBUTION. This species has the most interesting geography of any genus or species of dichopetaline and has almost the widest range (except perhaps *Obolopteryx brevihastatus*) and the greatest altitudinal distribution. It is found in the northern part of the Mesa Central, as well as in the Northern Sierra Madre Oriental and extends on to the adjacent portions of the Northern Coastal Plain, from 2,000-7,800 feet.

The northern limits of *R. tridactyla* are somewhat difficult to ascertain. Our northern records are in the vicinity of Monterrey (=Santa Catarina) (Nuevo Leon), Saltillo (Coahuila), and Cuencame (Durango). The problem with the northern limits results from the habitat range of the species. In its northwestern distribution, this species occurs in desert conditions at around 4,300 feet but in the vicinity of Saltillo, it is found in open forested conditions around 8,000 feet. Unfortunately, north of Saltillo there has been no collecting in the mountains where it might occur. On the other hand, north of the Saltillo-Santa Catarina specimens at lower elevations somewhat east of the mountains, we have large collections from there to the Texas border of *Obolopteryx castaneus* and *O. brevihastatus* but no *R. tridactyla*. Nearby to the west we have only a single dichopetaline (*O. brevihastatus*); north and northeast of Torreon, there appear to be no collections of dichopetalines at all, probably because of the very poor road network there. It is most probable that *R. tridactyla* does not get into the Big Bend Region of Texas or southern New Mexico or Arizona where numerous and some relatively large collections of other species have been made.

The southern end of its range is around San Luis Potosi, and it doesn't occur on the road to Ciudad Valles where we have a number of collections of *R. caudelli* and *Acanthorintes* species. However, there is exactly one record south of the Valles road. This southernmost record of *R. tridactyla* (29 miles north Queretaro, *ca.* 90 air miles southeast San Luis Potosi) may be that of a mislabeled specimen as Cohn's field notes for that locality indicate only *Acanthorintes tauriformis*. The number of males in this collection for *tauriformis* (as indicated in Cohn's field notebook) is 5, of which all are accounted for if the male *R. tridactyla* is included; this specimen is similar in color to the *A. tauriformis* and so could have been confused with that species. Seven females were recorded from this locality and are all *A. tauriformis*. Additionally, no *R. tridactyla* are found in the several collections made in the *ca.* 90 air miles between 29 miles north Queretaro and San Luis Potosi. On the other hand, collections of *R. tridactyla* approximately 160 miles to the west (19 miles south Ojo Caliente, Zacatecas) of this questionable southern limital record are not far above the latitude of 29 miles north Queretaro. More significantly, this individual lacks the conspicuous white pronotal spot and agrees in all of its characters with the northeastern populations and none of the distinctive characters found in the Villa Hidalgo specimens (see below).

In the west, this species is almost entirely replaced in the state of Durango by species of *Mactruchus* for which we have many collections; it is syntopic with *M. ischnodus* at Cuencame in easternmost Durango.

This species also is synoptic with three species of *Pterodichopetala*: *Pterodichopetala hypsibates* at 7,780 feet elevation on Cerro Potosi near Galeana (Nuevo Leon) but not occurring higher with that species at 9,000 feet; *P. padrisima*

at 4,850 feet elevation near San Juan Bautista (Nuevo Leon); and *P. pityophila* near Los Lirios (Coahuila), 11 miles south of Arteaga (Coahuila), and probably 15 miles west Galeana (Nuevo Leon) (represented by a single penultimate juvenile male). It also may occur with *P. cultricerca*, the type locality of which is obscure; yet, *P. cultricerca* occurs near Villa de Santiago (Tamaulipas) and thus, probably not far from *R. tridactyla* at lower elevations.

See also the puzzling nymphal record of *R. tridactyla* under Natural History.

Distribution of *R. tridactyla* and *Obolopteryx castaneus* in northeastern Mexico. This species is sympatric with *Oblopteryx castaneus* on the eastern Coastal Plain of Mexico but is very rare at low elevations at Santa Catarina (near Monterrey, Nuevo Leon), Montemorelos (Nuevo Leon), and east of Iturbide. These rare and scattered localities in different habitat rather than their otherwise apparent preference for mountains and desert are surprising because the area between Brownsville (Cameron County, Texas) and Ciudad Mante (Tamaulipas) has been well collected; surely these scattered collections were once connected.

Narrow syntopy in the overlap zone with *R. caudelli*. Although *R. tridactyla* is very similar to *R. caudelli*, there is strong support that they are separate species as indicated by the association of characters in the extensive but narrow area of syntopy northeast of San Luis Potosi. Here, individuals which are undoubted *R. tridactlyla* on the basis of the cercal projection have a highly conspicuous large white spot on the lateral pronotal lobes, an overall blackish color, shorter male tegmina, a greater projection of the stridulatory vein, and less distinctively a smaller size. These are never associated with the cercal condition of *R. caudelli* (on the basis of a very short median cercal tooth). At first glance, this looks like a clear case of character displacement but in fact, *R. caudelli* remains the same in this area as in the rest of its area of distribution. Furthermore, the distinctive color characters of *R. tridactyla* occur in populations that extend west to the edge of the range at Cuencame (Durango) (except for extremely small size near Alaquines and Rioverde (San Luis Potosi)).

What is even more striking is the lack of penetration of one species into the range of the other, despite the fact that both are common near Villa Hidalgo (San Luis Potosi). Although we have not made east-west transects across this area of syntopy, we have a fair number of populations of both *R. caudelli* and *Acanthorintes tauriformis*, just to the south on the road from San Luis Potosi to Rioverde, to indicate that *R. tridactyla* almost surely does not occur there. Similarly, a little bit farther north of the syntopic zone, we have several collections on the road to Ciudad del Maiz (San Luis Potosi) which do not contain any *R. tridactyla*. Unfortunately, to the west, we have too few collections near Villa Hidalgo to be sure that *R. tridactyla* and *R. caudelli* do not overlap more extensively, but a little farther west near Salinas (Zacatecas), there are no *R. caudelli* in a big series of *R. tridactyla*.

The color conditions in *R. tridactyla* where it is syntopic with *R. caudelli* strongly suggest that one or the other or both species are identifying each other visually. This is the only species in the dichopetaline genera which is uniform in this contrasting pattern, whereas in others with distinctive color, it is found in other related species of the genus (*Mactruchus*) or the distinctive pattern is found in only some of the members of that particular species (*Obolopteryx castaneus, poecilus, catinatus, oreoecus*). Thus, the call may be different between these northeastern populations than those farther south and west, but we have not recorded the call of either species.

The northeasternmost populations (Galeana and Iturbide (Nuevo Leon) and north) of *R. tridactyla* (again, as identified by the cercal tooth) around Saltillo (Coahuila) and Iturbide (Nuevo Leon) lack most of these distinctive features, most noticeably the white pronotal spot (but some have narrow white ventral margins) and blackish coloration and are variable in the length of the tegmina, being short at Iturbide and Galeana but long in Puerto Flores/Arteaga. The stridulatory vein of *R. tridactlya* in these northeastern populations are shorter than in the syntopic zone, and there are slight differences in the epiproct.

The northern populations of *R. tridactyla* well beyond the zone of syntopy may represent a different species because of the difference in color pattern (brown-green rather than blackish and without the conspicuous white spot), but there do not seem to be any morphological differences. It should be noted, however, that the individuals near Matehuala and El Refugio (57 miles northeast Matehuala) do possess the white pronotal spot but otherwise have the light coloration of the northern populations.

The two southwestern populations agree with those in the zone of syntopy but the color is greenish or brownish, and the females sometimes lack the white spots. The single male from Ojo Caliente has the white spot reduced to a thin marginal stripe; it also has a slightly different epiproct which we have not extensively studied.

Rhabdocerca caudelli (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 4, 9, 10)

TYPE. Holotype, male, San Luis Potosi, state of San Luis Potosi, Mexico, coll. Palmer, Scudder Collection (ANSP).

We have not examined the type of this species nor topotypic material. The type locality may be imprecise, but our other collections are close enough, and often syntopic with *R. tridactyla*, to make identification of this species highly probable. Additionally, the figures and description provided by Rehn and Hebard (1914a) unequivocally identify this species.

IDENTIFICATION. *R. caudelli* differs from *R. tridactyla*

essentially only in small differences in the cercal tooth, but the differences are surprising uniform. The differences in the lobes of the female subgenital plate are small and variable and would be difficult to quantify between this species and *R. tridactyla*. Similarly, there are small differences in the male subgenital plate but again these would be difficult to measure. The size and color of *R. tridactyla* is radically different from *R. caudelli* where the two are syntopic (see discussion of the syntopic zone under *R. tridactyla*).

DISTRIBUTION. *Rhabdocerca caudelli* occurs on the eastern half of the Mesa Central, from 3,400 to 6,700 feet, and it may be limited by the oak woodland to the northeast in which only a little collecting has been done. This species occurs at the southeastern edge of the enormous range of *R. tridactyla*, except in the area of Villa Hidalgo (San Luis Potosi) where they occur syntopically; neither species extends into the range of the other (see discussion of range under *R. tridactyla*). The southern limits seem to be on the San Luis Potosi-Rioverde road; on this road and south of it, we have scattered collections of *Acanthorintes* species. In the southeast, it is probably limited by the Sierra Madre Oriental woodlands.

The two females from 21 miles east San Luis Potosi recorded with question marks on the map have longer ovipositors than other *R. caudelli*. This might be a new species, but males are needed to confirm. The subgenital plate fits *R. caudelli*, and this locality is within the range of that species.

Rhabdocerca zanclophora n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 4, 9, 10)

TYPE. Holotype, male (plus allotype), 12 miles northwest Ciudad del Maiz, San Luis Potosi, Mexico, [22.505033 -99.753058], 28 August 1955, 1,100-1,200 meters, coll. T. J. Cohn (UMMZ).

IDENTIFICATION. This species differs from its congeners in the absence of the cercal tooth and in a slightly more incurved cercal shaft. The broad, bluntly triangular female subgenital plate easily differentiates females from the other two *Rhabdocerca* species. There are small differences in the male subgenital, but as with other members of the genus, these are hard to quantify.

This may be the beginning or end of a morphological series with the other two species. This species has a very limited range at the eastern edge of *R. caudelli*, compared with the broader range of *R. caudelli* and the extensive range of *R. tridactyla* farther west; this may suggest that the toothless condition in *R. zanclophora* is the derived state.

DISTRIBUTION. This species occurs in the middle of the eastern edge of the Mesa Central, from 3,400 to 4,500 feet. It may be limited by the oak woodland to the northeast in which only a little collecting has been done. Additionally, few collections have been made in northwestern San Luis Potosi and southern Nuevo Leon where *R. zanclophora* may occur. The range of this species is quite small, essentially enclosed within the range of *R. caudelli*, and although it occurs not far from collections of *R. tridactyla* and *R. caudelli*, it is never syntopic. *R. zanclophora*, is located only approximately 22 miles to the northwest and 25 miles to the southeast away from the nearest *R. caudelli* with no obvious barriers between them; two of the collections may be sufficiently large to suggest that the lack of sympatry with its congeners is real. Furthermore, *Acanthorintes zeuglaius* (and *A. tauriformis*) occur nearby at Ciudad del Maiz (approximately 12 miles away) but have not been found syntopic with it; both are represented by a small series.

Dichopetala Brunner von Wattenwyl, 1878

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 5, 11)

TYPE SPECIES. *Dichopetala mexicana* Brunner von Wattenwyl, 1878. By subsequent designation.

INCLUDED SPECIES. *Dichopetala mexicana* Brunner von Wattenwyl, 1878.

DISTINCTIVE CHARACTERS. It is both amusing and unfortunate that *D. mexicana* was selected as the type species rather than *D. emarginata* (Kirby 1906), because it is unique in almost every structure and therefore, we cannot relate it to any other dichopetaline genus.

We are aware of the dangers of basing a genus on a single species, in that if the description of a monotypic genus serves as a diagnosis, the addition of more species will probably eliminate one or more characters from the diagnosis. Furthermore, attributing certain characters as being of generic significance cannot be properly justified. We are, therefore, reversing our normal practice here and discussing the distinctive morphology of this species under the Species Account.

RELATIONSHIPS TO OTHER GENERA. As previously mentioned, the single species is distinctive in so many characters (see below) that it is difficult for us to relate it to any other dichopetaline genus. The swollen, triangularly elevated modification of the posterior margin of the first abdominal tergite (probably serves a secretory function in courtship), which is very similar, if not identical, to all species of *Rhabdocerca* and *Acanthorintes tauriformis*; yet, as there are no other similarities, we think these two genera are not related to *Dichopetala mexicana*. This species may be more closely related to *Gymnocerca enaulites* based on the simple cercus; the geographic proximity also may lend support to this hypothesis. There are affinities to species of *Mactruchus* in

aspects of the cercus, particularly in possessing a cercal collar, but these have sufficient differences to make relationship between these genera tenuous at best.

SPECIES CHARACTERS. Given the monotypy and reasons provided above, these details are discussed under the Species Account.

RELATIONSHIPS AMONG SPECIES. Monotypic.

DISTINCTIVE COLOR PATTERNS. Overall, there is little in the color pattern to visually signify this species. In males of this species, the tenth abdominal tergite usually is conspicuously yellow and the subgenital plate is very often margined with black on the mesal and distolateral margins of the excision. The hourglass marking on the pronotum is variably developed, but when present, is similar to the sympatric *Gymnocerca enaulites* but less conspicuous than in the allopatric *G. cycloprista*. The tegmina usually have dark lateral markings which often extend around the stridulatory area, and in some females, the tegmina are completely blackish. Although dark tegminal markings are found in many other dichopetaline species, it may aid in separating females of *D. mexicana* and the sympatric *Gymnocerca enaulites*, which tegmina usually are entirely green, even though the female subgenital plate will readily separate the two species.

RANGE AND GENERAL HABITAT. See Species Account below.

Dichopetala mexicana Brunner von Wattenwyl, 1878

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 5, 11)

SYNONYMS. *Dichopetala pulchra* Rehn, 1901.

TYPE. Syntypes, male and female, Cuernavaca, Morelos, Mexico, Brunner Collection (NHMW) (Eades *et al*. 2013). Of *Dichopetala pulchra*, holotype, female, Rio Cocula, Guerrero, Mexico, 12 May 1898, coll. Otis W. Barrett (ANSP).

We have not examined the type. Despite the early date of this description (and the lack of any other material included in the genus), *D. mexicana* can be identified by two unique colored characters (male tenth tergite and subgenital plate), mentioned by Brunner (1878) in the original description. Although the type locality may be imprecise, we have examined three male topotypes from Cuernavaca and have material from the surrounding area. With regard to the junior synomyn *Dichopetala pulchra* Rehn, 1901, which Rehn synonymized under *D. mexicana*, we have not been able to identify the precise type locality "Rio Cocula" but it is presumably very close to nearby Iguala (Guerrero), where we have several collections of both *D. mexicana* and the new species, *Gymnocerca enaulites*. A cursory examination of the photograph of the female holotype of the Orthoptera Species File (Eades *et al.* 2013) strongly suggests that this is *D. mexicana* on the basis of the color pattern.

IDENTIFICATION. As mentioned above, *D. mexicana* is unique among the dichopetalines in a number of characters:

- *Male cercus.* The basal portion of the male cercus of *D. mexicana* is more complex than in other simpler cerci. The base is somewhat swollen, roughened and weakly demarcated from the smoother remainder of the shaft, a unique feature in the dichopetalines. The shaft is fairly sharply bent mediad after this basal portion, here the shaft is more or less straight in distal 2/3s with apical quarter slightly incurved; while distinct this curvature is somewhat similar to some species of *Mactruchus*. The male cercus also has a dorsal flange arising proximad of the basal constriction and projecting over the base of the cercus (called the cercal collar in the Tables), again similar to some species of *Mactruchus* but of a distinctive reniform shape, projecting further mesally than laterally as opposed to the triangular flange in *Mactruchus* which is symmetrical over the base of the cercus.
- *Male epiphallus.* The proximolateral arms are weakly sclerotized and non-dentate, very unlike the proximolateral structures or flanges of *Mactruchus*, *Acanthorintes*, and *Gymnocerca falcata*. The flattish medial projections have a reflexed or folded margin (indicated by darker sclerotin) which turns cephalad and attaches to the arms.
- *Male subgenital plate.* The long acuminate lobes with their distinct black marginal stripes are unique among the dichopetalines.
- *Male epiproct.* This structure has a unique bifurcate Y-shaped projection, which apparently rises from the disc of the plate.
- *Male tenth tergite.* The tenth tergite of the male is unique in being enlarged caudad, that is subquadrate with caudolateral apices distinctly produced, partially covering the base of the cercus. This plate is yellow to orange, sometimes conspicuously so, although this also may be present in two more northern genera (*Obolopteryx* and *Acanthorintes*).
- *Female subgenital plate.* This species is unique among the dichopetalines in having the mesal margin of the female subgenital plate straight across the middle between the very short, apparently quadrate lateral projections. In this species, there is a distinct midlongitudinal line of weakness as in all the dichopetalines, in contrast to Rehn and Hebard's (1914a) observation. In some specimens of this species, the median longitudinal membrane of the female subgenital plate can be seen extending dorsad between the ovipositor valves as in the very weakly developed subgenital plate in *Pterodichopetala*; although not always readily apparent, we think it exists in this way in other dichopetalines species.

DISTRIBUTION. Essentially restricted to the Rio Balsas Basin, this species has been collected from Tehuacan (Puebla)

to the vicinity of Iguala (Guerrero), from 2,000 to 6,500 feet. Limited but sufficient sampling for tettigoniids has been made south of the range of this species to indicate it does not occur in the mountain systems of the Sierra Madre del Sur and of Oaxaca or on the Pacific slopes and coast in Nayarit, Colima and Michoacan. It is sympatric with *Gymnocerca enaulites* in almost its entire range and syntopic with that species in a number of localities. Reliable records (coll. H. R. Roberts) of *D. mexicana* from Cuernavaca (Morelos) may make it sympatric, if not syntopic, with *Mactruchus serrifer* at the southeasternmost record (coll. R. R. Dreisbach) of the latter species.

Gymnocerca n. gen.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 5, 11)

TYPE SPECIES. *Gymnocerca enaulites* n. sp.

INCLUDED SPECIES. *Gymnocerca cycloprista* n. sp., *Gymnocerca enaulites* n. sp., and *Gymnocerca falcata* (Rehn and Hebard, 1914).

The particularly weak status of this new genus necessitates assignment of a type species based on a process of de-selection. Given the fact that *G. cycloprista* shares no genitalic characters with its congeners and is isolated on the western coast from the other dichopetalines, it remains the strongest candidate for separation into a new monotypic genus. Therefore, we have decided that *G. cycloprista* should not be selected as the type species. As noted above, *G. falcata* has substantial evidence that it may belong in the genus *Mactruchus* (particularly given the male epiphallus) and in the event that future evidence, molecular or not, may require its transfer to that genus, we have chosen to not select this species as the type species in lieu of the requirement of sinking another generic name. Thus, it has come that the third species, *G. enaulites*, must be selected as the type species. The epiphallus bears some similarity to that of *D. mexicana* (although not as strongly as between *G. falcata* and *Mactruchus* species), but no other characters are shared; thus, the distinctive genitalic morphology means that *G. enaulites* is the most stable candidate for the type species.

DISTINCTIVE CHARACTERS. We erect this genus with considerable hesitation for three species which share only a few distinctive cercal characters, none of which are unique (mentioned in the following paragraph). However, each of the three species included in this genus shares distinctive characters with one other in the genus, suggesting a closer relationship among all three (discussed below under Relationships Among Species). It is true that none of the species clearly belong in another dichopetaline genus without violating other more distinctive features of these possibly related genera, except perhaps *G. falcata* (but see discussion below). It also is true that we have considered erecting monotypic genera for each of the three species (as alluded to in the above justification of the type species as well as Breaking Up *Dichopetala*), but then the similarities between pairs of these three might be obscured. Thus, for the time being, we have opted for this undesirable assemblage of species, of which true relationships might be better elucidated with a molecular phylogeny.

Used in combination, the following cercal characters will identify this genus: (1) shaft of cercus slender in distal half with almost parallel margins; (2) shaft of cercus without large appendages (tiny scale in *G. cycloprista*); (3) cercus with blunt or briefly acute apices (briefly indented subapically in *G. enaulites*); and (4) cercus without distinct collar. Other characters found in the genus are typically autapomorphic (see Species Characters).

RELATIONSHIPS TO OTHER GENERA. It should be noted that other dichopetaline species which might be considered to have a simple cercal shaft differ in various ways. The sympatric *Dichopetala mexicana* has a somewhat similar cercus but has a reniform cercal collar and an acuminate apex. Three species in *Mactruchus* lack appendages on the cercus, but *M. cryothermastris* has the shaft strongly incurved and an acuminate apex, whereas *M. serrifer* and *M. megasynactor* are quite different in their toothed margins. *Rhabdocerca zanclophora*, like *M. cryothermastris*, has the shaft strongly incurved with an acuminate apex. Because of these differences as well as the obvious relationship of these species to other taxa, we do not think they are closely related to those species here included in *Gymnocerca.*

One of the most significant problems with this genus is the fairly strong evidence for relationship between *G. falcata* and *Mactruchus serrifer*. Most convincingly, *G. falcata* shares a nigh identical epiphallus with *M. serrifer*, a structure which we have found to be of great significance because of its uniformity within each of the genera here recognized. Yet, *G. falcata* also shares three other characters which may be of significance with *M. serrifer*. The first is the curved ridge on the dorsal face of the ventral valve at the base of the ovipositor; this feature is found elsewhere only in *Mactruchus megasynactor*, which is closely related to *M. serrifer*. *G. falcata* also shares a median finger-like projection on the epiproct with *M. serrifer*; a somewhat similar projection is also found in *G. enaulites*, which shares no other characters with *M. serrifer*. Third, *G. falcata* shares with *M. serrifer* and the other *Mactruchus* species and some *Acanthorintes*, conspicuously square, truncate female tegmina, and this is noticeably different from the more rounded tegminal apex of its current congeners in *Gymnocerca.* *G. falcata* and *M. serrifer* also show parallel pattern and variation in color, which may also suggest common ancestry. Both are usually dark above (blackish in *M. serrifer*) with bright green sides, which contrasts the almost uniformly bright green *G. enaulites* and *G. cycloprista*; however, it should be noted that some "recessive" individuals are known in *G. falcata* and *M. serrifer*, but these individuals still lack the dark dorsal pronotal hourglass of the other two *Gymnocerca*

species.

In constrast, there are two conspicuous problems opposing relationship between *G. falcata* and *M. serrifer*. First, the autapomorphic male subgenital plate shows not even a tendency towards the distinctive male subgenital plate found almost uniformly throughout all species of *Mactruchus*. Second, the cercus of *G. falcata*, with its slender form and complete lack of teeth, is widely different from that of *M. serrifer*.

If it is assumed that the detailed similarities of the epiphallus and ovipositor base of *M. serrifer* and *G. falcata* are phyletically related, then there are only three possible scenarios relating to their evolutionary interpretation. To begin, we assume ancestors with the same characteristics as the current day species because to use modified ancestors would be arbitrary and in so doing, one can evolve each species from virtually any related species. First scenario has the two species residing in the same genus, but this would require the convergent evolution of each of the characters that ally them to other species in *Mactruchus* or *Gymnocerca.* We could include both species in *Mactruchus* but as indicated above this species shares neither the distinctive male subgenital plate nor a cercus like those found in any *Mactruchus*. As the subgenital plate of *Mactruchus* comprises three possibly independent characters, viz., (1) lateral margins straight, swollen, elevated, (2) ending in short horns, and (3) a shallow rounded excision distad, the possibility for convergence in the shared characters seems remote. Alternatively, we could include *M. serrifer* in *Gymnocerca*, but the male subgenital plate and black coloration clearly ally *M. serrifer* to the other species included in *Mactruchus*. Both the second scenario, one gave rise to the other, and third scenario, each were derived from a common ancestor, involve the development of multiple characters of one or the other, including convergence with those found in either *Mactruchus* or *Gymnocerca.* Each scenario would involve too many assumptions for which we have virtually no evidence. Therefore, we think that such an exercise would not be particularly productive. It is thus easier to envision the convergence in the characters shared between *G. falcata* and *M. serrifer*, however unlikely, to be the least complex explanation, as it preserves the relationships among *Mactruchus* as equitably as between *G. falcata* and those other species here included in *Gymnocerca.*

SPECIES CHARACTERS. In a survey of specific characters, there are other problems. Perhaps most importantly, each of the three species of *Gymnocerca* possesses such different epiphalli that we cannot even envision a common ancestor for the genus. In the other dichopetaline genera, the epiphalli are uniform (*i.e.*, *Obolopteryx, Rhabdocerca*, *Mactruchus*) or with modifications that can be derived from ancestors shared with other congeners (*i.e.*, *Acanthorintes*; *Pterodichopetala*). Additionally, a few characters of *Gymnocerca* are autapomorphic (*i.e.*, subgenital plate of *G. falcata*, epiphallus and epiproct of *G. cycloprista*). Other characters shared between two of the three members of *Gymnocerca* may indicate relationship but also are found in other dichopetaline genera. The possession of a subgenital plate with a narrow elongate deeply-incised apical region by *G. cycloprista* and *G. enaulites* also is found in some species of *Acanthorintes*, particularly *A. thenarocercus*. The essentially uniform green coloration in intensively colored individuals also characteristic of *G. cycloprista* and *G. enaulites* is found in *Planipollex polliciferus* (although different integumental sculpture and the resulting dullness or brightness may make this convergent; see *Planipollex*). Another color character, the dark, strongly-constricted hourglass-shaped marking of the prontum found in *G. cycloprista* and *G. enaulites*, also is present in *Dichopetala mexicana*, but being more similar to *G. enaulites*. Lastly, the narrow, projecting, digitate process of the epiproct of *G. enaulites* and *G. falcata* also is found in *Mactruchus serrifer*. Yet, little do these combinations argue for relationships with other genera any more than with each other; therefore, we again have opted to group these species together for the time being in this unsatisfactory genus.

RELATIONSHIPS AMONG SPECIES. Given the problems discussed above, there are no obvious relationships between species of this genus. With the evidence of ties to *Mactruchus* for *G. falcata* as well as the few characters similar between *G. enaulites* and *G. cycloprista*, it might be tempting to suggest relationship between the latter two species; yet, even this, because of the uniqueness and isolation of *G. cycloprista*, would be tenuous at best.

DISTINCTIVE COLOR PATTERNS. Two of the species, *G. cycloprista* and *G. enaulites*, are almost completely bright green, other than a variably developed dark hourglass spot on the pronotum. The hourglass, while perhaps more conspicuous in these species, is not unique among the dichopetalines. The third species, *G. falcata*, most often has a moderately dark brownish dorsum with sharply demarcated green sides; this latter feature may help separate females from *Mactruchus serrifer*, which usually has conspicuous black mottling on the lateral faces.

RANGE AND GENERAL HABITAT. This genus occupies the southwestern and southern edge of the range of the dichopetalines, from central Sinaloa through Nayarit and Jalisco as well as in the Balsas Basin and the eastern portion of the Tepalcatepec Basin (no collecting has been done in the western part of the latter basin). It ranges from near sea level (*G. cycloprista*) to 4,500 feet (*G. falcata*) in a variety of habitats, such as thorn forest, pine-oak woodland, and arid tropical scrub.

Gymnocerca cycloprista n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first

tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 5, 11)

TYPE. Holotype, male (plus allotype), 31.5 miles southeast Culiacan Cathedral [on Highway 15], (0.6 miles north Rio San Lorenzo), Sinaloa, Mexico, [24.436789 -107.094531], 27 August 1971, [235 feet], coll. T. J. & J. W. Cohn #10 (UMMZ).

IDENTIFICATION. Virtually, every genitalic structure in this species has no likeness among the other dichopetalines. The minute subapical scale and blunt flattened apex of the male cercus are unique among the dichopetalines. Also, the structure of the epiphallus is unique as are the small transverse rectangular bases from which the erect plates arise. The broad, rounded epiproct has a small swollen portion on the caudal margin; while not very conspicuous, it is unique among the dichopetalines. The male subgenital plate is similar to *G. enaulites*, but a similar condition is found in *Acanthorintes thenarocercus*. The body is always bright green with a dark hourglass mark on the dorsum of the pronotum; the hourglass marking is usually black or dark brown with a midlongitudinal brownish stripe, sometimes pale, always strongly constricted.

DISTRIBUTION. This species is restricted to the northwestern coast of Mexico, between Culiacan and Mazatlan (Sinaloa), from low elevations on the Coastal Plain up to 1,400 feet (summit Cerro Tule). The northwestern and southeastern limits appear to be well established, because much collecting for Orthoptera has been done beyond both limits. Why this species stops to the north and south is not clear, because there appear to be simple gradients toward dryness to the north and more moist conditions to the south. However, no collecting has been done in the Sierra Madre Occidental, adjacent to the range of this species. In the mountains well to the south of the range of the species, Cohn collected on the road from Mazatlan (Sinaloa) to Durango at El Palmito (24 air miles northeast Concordia (Sinaloa)) at 6,700 feet and Santa Lucia (17 air miles northeast Concordia (Sinaloa)) at 3,500 feet and has not found this species here. It is possible that this species was isolated by the uplift of the Sierra Madre Occidental as is the possibility of isolation of *Gymnocerca enaulites* and *Dichopetala mexicana* by the Tranverse Volcanic Belt (see Biogeography).

Gymnocerca enaulites n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 5, 11)

TYPE. Holotype, male (plus allotype), 11 miles south Iguala, Guerrero, Mexico, [18.213603 -99.536236], 9 December 1958, 2,800 feet, coll. T. J. Cohn #364 (UMMZ).

IDENTIFICATION. Although essentially simple, the male cercus possess an inconspicuous subdistal notch. *Gymnocerca enaulites* shares a finger-like projection on the male epiproct with *G. falcata* and *Mactruchus serrifer*, but they are slightly different (see under *M. serrifer* for a comparison); however, these structures are unique in the dichopetalines. The hourglass on the pronotum in this species is variable, often only slightly constricted, usually red-brown, all in contrast to the hourglass in *G. cycloprista*. The tegmina, in both sexes, are almost always bright green, similar but usually more distinct than in *G. cycloprista*; this also will aid in separation between females of this species and *D. mexicana*, which have conspicuous dark tegminal markings, in the basin systems of southern Mexico. The terminal portion of the male tegmina is uniquely longer than in other dichopetalines, but not in the same way or nearly as long as the tegmina in *Pterodichopetala* (Fig. 32).

DISTRIBUTION. This species is restricted to the Rio Balsas Basin and the easternmost Rio Tepalcatepec Basin, from Petlalcingo (Puebla) to Nueva Italia (Michoacan), from 550 to 5,750 feet, but no collecting has been done west of Nueva Italia. It apparently does not penetrate northward into the Transverse Volcanic Belt, although little collecting has been done there. Limited but sufficient sampling for tettigoniids has been made south of the range of this species to indicate it does not occur in the mountain systems of the Sierra Madre del Sur and of Oaxaca or on the Pacific slopes and coast in Nayarit, Colima and Michoacan. In the eastern part of its range, it is sympatric, and in several localities syntopic, with *Dichopetala mexicana*.

Gymnocerca falcata (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 5, 11)

TYPE. Holotype, male, Tepic, Mexico, coll. Eisen, Hebard Collection (ANSP).

We have not examined the type of this species, but figure of the cercus and description of the subgenital plate provided by Rehn and Hebard (1914a) unmistakably identify this species, and we have material from 12 miles southeast of the type locality. No other dichopetalines occurs in this region, other than the highly distinctive *Mactruchus serrifer*, identified by Hebard (1932) from farther north in the Sierra de Nayarit (Nayarit).

IDENTIFICATION. This species is unique in the male subgenital plate, which in most specimens is slightly rounded to truncate apically and in a few, weakly emarginate without distolateral projections. The epiphallus is unique in *Gymnocerca* in having two slightly compressed, spinose projections, but this condition is almost identical to that of *M. serrifer*. *Gymnocerca falcata* also shares a finger on the epiproct with *G. enaulites* and *Mactruchus serrifer*, but they are slightly different (see under *M. serrifer* for a comparison);

these epiproct fingers are unique in the dichopetalines.

Because females of this species have the base of the ovipositor so similar to *M. serrifer*, females of these two species may be difficult to tell apart. However, *G. falcata* usually has the lateral lobe of the pronotum and lateral tergites sharply demarcated from the dark dorsum and without the numerous black spots, which are present in *M. serrifer*. Furthermore, the dorsum of *G. falcata* probably is never black as in *M. serrifer*, although "recessive" individuals of both species exist.

The complicated and tenuous relationships between G. falcata and its congeners as well as with Mactruchus serrifer are discussed above under the generic heading.

DISTRIBUTION. *Gymnocerca falcata* occupies the southwestern edge of the Mesa Central in the the low area between the Sierra Madre Occidental and the Transverse Volcanic Belt in the region of Ixtlan del Rio (Nayarit), from 3,380-4,500 feet. The eastern edge of the main range of this species comes very close to the western edge of the widespread *Mactruchus serrifer*. There is an eastern isolate, one undoubted adult male of *G. falcata* from 14.3 road miles south Ixtlahuacan del Rio (Jalisco), 28 miles east from the nearest *G. falcata* to the west at Amatitan (Jalisco). Only five miles to the northwest of that *G. falcata* specimen, we have 8 males and 8 females of *M. serrifer*, indicating that *G. falcata* probably does not occur, at least, at this *M. serrifer* locality. Unfortunately, there has been no collecting done between Guadalajara and Amatitan. Nor does *G. falcata* occur farther south of Guadalajara, where we have scattered records and one reasonably-sized series of *M. serrifer*. Thus, within a small area, *G. falcata* might be either syntopic or parapatric with *M. serrifer*. The western limit of the *G. falcata* is Tepic (Nayarit). It should be noted that no collections have been made north or south of Ixtlan del Rio (Nayarit), except near Autlan (Jalisco). Cohn has collected Orthoptera south of Tepic, both somewhat inland and along the coast east to Playa Azul (Michoacan), without finding *G. falcata*.

Mactruchus n. gen.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 6, 11)

TYPE SPECIES. *Mactruchus ischnodus* n. sp.

INCLUDED SPECIES. *Mactruchus cryothermastris* n. sp., *Mactruchus durangensis* (Rehn and Hebard, 1914), *Mactruchus ischnodus* n. sp., *Mactruchus megasynactor* n. sp., and *Mactruchus serrifer* (Rehn and Hebard, 1914).

DISTINCTIVE CHARACTERS. We base this genus especially on the unique and complex male subgenital plate with elevated thickened lateral margins ending in two distal horns with a very shallow broad emargination between them. The shallowness and broadness of the apical emargination of the male subgenital plate is in contrast to the almost universal U- or V-shaped emargination among the dichopetaline genera (except in the autapomorphic conditions in *Obolopteryx poecilus* and *Gymnocerca falcata*), and if the emargination in the other dichopetaline genera is used to hold the ovipositor during mating, it is not clear how this function is accomplished in *Mactruchus*. Another distinctive character of this genus is the unique epiphallus in four species with elongate slender fingers, narrowed in the distal third and usually bent slightly dorsolaterally; the fifth species, *M. serrifer*, has a similarly constructed epiphallus but appears slightly different, being more compressed rather than rounded and barely divergent distally (see also *Gymnocerca falcata*). In addition, all the species have considerable black coloring, at least on the dorsal abdominal tergites, which is found otherwise only in *Rhabdocerca tridactyla* in part of its range. The species of *Mactruchus* also appear more robust in comparison to most other dichopetalines (visual inspection only but see Appendix ???).

It should be noted that color degradation in dried, pinned material is particularly troublesome in this genus, although perhaps the contrast is merely heightened by the blackish color. Regardless, nearly all of the pinned material appears dull yellowish or brown where once the specimen was bright green (as indicated in photographs).

RELATIONSHIPS TO OTHER GENERA. There are few obvious characteristics relating *Mactruchus* species to any other genus. The possible but problematical relationship of *Gymnocerca falcata* is discussed under that genus. The paired, armed nature of the epiphallus recalls the general structure of *Acanthorintes* and less distinctly, *Pterodichopetala*. The male cercus of *Rhabdocerca* and *Dichopetala* each possess some structure proximad of the basal constriction, but it is so different in *Rhabdocerca* (finger-like rod as opposed to short collar) and the reniform collar of *Dichopetala* is only weakly similar; thus, we think they are no more than positional homologues, rather than phylogenetic ones. The shape of the male cercal shaft of *Dichopetala mexicana* is vaguely similar to that of *M. durangensis* and *M. ischnodus* in the basal bulge, the straight middle portion and the briefly incurved apex, but it lacks any trace of appendages; this similarity seems only of a superficial nature.

SPECIES CHARACTERS. The genus comprises species with widely divergent cercal types, so divergent that we are unable to identify any common generic character in the cercus, but these are very useful for determining species relationships. The genus can easily be divided into three groups on the basis of the cercus alone: *M. durangensis* and *M. ischnodus* possess a highly distinctive dorsal projection and acuminate apex, *M. cryothermastris* without any projections and with an acuminate and more strongly mesally curved apex, and *M. megasynactor* and *M. serrifer* which expands distally with several apical teeth and a distinctive longitudinal subdistal ridge (strongly serrate in *M. serrifer* and entire in *M. megasynactor*). The

cercus in these last two species is highly complex, but that of *M. megasynactor* is simpler. *Mactruchus durangensis* and *M. ischnodus* also share a distinctive collar arising proximad of the basal constriction, found in none of the other *Mactruchus* species. The male epiproct of four of the five species is unique in having a slightly broadened, slightly upturned flattened apex; *M. serrifer*, on the other hand, has a highly apomorphic finger-like projection (also present in *Gymnocerca* in slightly different form) (see Species Account). The ovipositor of three species (*M. durangensis*, *M. ischnodus*, and *M. cryothermastris*) possess a low tubercle surrounded by a shallow depression on the dorsal margin of the ventral valve; *M. megasynactor* and *M. serrifer* have a sinuate ridge enclosing a long low swelling separated by a distinctive channel.

RELATIONSHIPS AMONG SPECIES. *M. durangensis* and *M. ischnodus* possess the highly modified cercus both in appendages and collar. To this pair can be appended *M. cryothermastris* with a cercus lacking appenages but still with an acuminate apex and with a similar and distinctive ovipositor base. These three species share a simply modified epiproct, although we think this may be primitive in the genus as it also is found in *M. megasynactor* (the simple modification, however, is not found in other dichopetalines). *M. serrifer* and *M. megasynactor* are certainly related on the basis of the highly complex apical portion of the male cercus and the shape of the shaft as well as the specialization at the base of the ovipositor. However, these two differ in what may be considered the primitive condition of the epiproct in *M. megasynactor* and the autapomorphic epiproct finger in *M. serrifer* as well as the color pattern; in coloration, *M. megasynactor* is essentially identical to *M. durangensis*, *M. ischnodus*, and *M. cryothermastris*. The epiphallus in *M. serrifer* is somewhat different from the other four species (as discussed above, similar to *Gymnocerca falcata*). To summarize, *M. durangensis* and *M. ischnodus* are sister species to which may be added the more primitive *M. cryothermastris*. From the base of this line, we would place *M. megasynactor* and *M. serrifer* but in an admittedly unknown arrangement. However, *Gymnocerca falcata* may somehow be related to *Mactruchus* and this problem is discussed under the Genus Account for *Gymnocerca.*

DISTINCTIVE COLOR PATTERNS. The species of this genus are conspicuous for their "black" coloration, and this dark appearance is unique to the genus, except perhaps some individuals of *Rhabdocerca tridactyla*. The most intensively colored individuals of each *Mactruchus* species have the abdominal tergites mostly black with pale posterior spots and midlongitudinal stripe. In living specimens, as illustrated by Fontana's photographs, the pale coloration may, in fact, be green. Most specimens also seem to have blackish speckling on the lateral faces of the pronotum and tergites. An apparently unique color character in the genus is the pale blotches (probably green in

RANGE AND GENERAL HABITAT. This genus occurs on the western part of the Mesa Central from central Chihuahua (state) south to the Transverse Volcanic Belt and the southern edge of the Mesa Central, from near Guadalajara (Jalisco) eastward to the vicinity of Cuernavaca (Morelos). The southern half of the distribution is occupied only by *M. serrifer*. It ranges from 4,300 to 8,500 feet, in desert-grassland at the lower elevations and pine-oak forest at the higher.

Mactruchus durangensis (Rehn and Hebard, 1914)

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 6, 11)

TYPE. Holotype, female, Durango, Mexico, coll. Palmer, Scudder Collection (ANSP).

We have examined the female type, but the only distinctive character, the base of the ovipositor, is shared with *M. ischnodus* and *M. cryothermastris*. However, we have topotypes from Durango city itself as well as the surrounding area upon which we base comparison.

IDENTIFICATION. *M. durangensis* shares with *M. ischnodus* a dorsal projection ("tooth") with a narrow neck and an elongate dorsal portion along the main axis of the cercal shaft which arises from near the base of the shaft; this structure is unique in the dichopetaline genera. In *M. durangensis*, the dorsal "tooth" is more robust with a carinate convex mesal margin, whereas in *M. ischnodus* the dorsal "tooth" is slender with an acarinate, straight mesal margin. The cercal collar in *M. durangensis* is elongate distad with a narrow apex, which almost reaches beyond the proximal portion of the dorsal "tooth", whereas in *M. ischnodus*, it is short with a broad apex which does not reach the "tooth"; these collars are unique within the genus. Females of *M. durangensis* and *M. ischnodus* are indistinguishable.

DISTRIBUTION. This species is found in the northwestern part of the Mesa Central of Mexico, in the vicinity of Durango (city), penetrating well into the eastern part of the Sierra Madre Occidental near El Salto, from 6,100 feet to 7,500 feet. No dichopetalines have been collected directly south of Durango; thus, the southern limits are not known. The range of this species abuts the range of *M. ischnodus*, but in our collections, *M. durangensis* is nowhere syntopic with its sister species.

Mactruchus ischnodus n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 6, 11)

TYPE. Holotype, male (plus allotype), 15 miles northeast Yerbanis on Highway 40, Durango, Mexico, [24.917916

-103.765350], 24 August 1961, elevation 6,000 feet, coll. [I. J.] Cantrall, [T. J.] Cohn, [T. H.] Hubbell #36 (UMMZ).

IDENTIFICATION. *M. ischnodus* is very similar to its sister species, and all the relevant characters are discussed under that Species Account.

DISTRIBUTION. This species occurs in the northwestern part of the Mesa Central in Mexico. The species has a moderately wide distribution from near Chihuahua (city) east to La Zarca (Durango) and south to Nombre de Dios (Durango), from 4,600 feet in desert-grasslands and penetrates the Sierra Madre Occidental west of Cuauhtemoc (Chihuahua) at 7,250 feet in oak-juniper woodland. To the east of *M. durangensis*, it abuts the range of that species, but nowhere are they syntopic. *M. ischnodus* overlaps the range of *M. cryothermastris* but apparently is not found syntopically with that species. We are mapping with a question mark the locality of three adult females from 34.8 miles east La Zarca (Durango). Although females cannot be identified reliably as to species in the group, the locality is well within the range of *M. ischnodus*. The southernmost record of *M. ischnodus* at Nombre de Dios (Durango) (7 males, 4 females) seems to be isolated by collections of *M. durangensis* and *M. cryothermastris* to the north, but there has been no collecting done west of this locality.

The western records of *Obolopteryx brevihastatus* near Torreon (Coahuila) abuts the distribution of *Mactruchus ischnodus* and may or may not be syntopic in the Sierra de Mapimi. However, they also is potential for overlap farther to the northwest; yet, little collecting has been done in eastern Chihuahua (state). *M. ischnodus* is, however, syntopic with *Rhabdocerca tridactyla* near Cuencame (Durango) on the western edge of its range.

Mactruchus cryothermastris n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 6, 11)

TYPE. Holotype, male (plus allotype), 5.6 miles [northwest] Sombrerete, west of road junction (on Highway 45), Zacatecas, Mexico, [23.694589 -103.715036], 25 October 1974, elevation 7,850 feet, coll. T. J. Cohn & J. W. Cohn #96 (UMMZ). The label erroneously indicates "SW." of Sombrerete.

IDENTIFICATION. The species is unique within the dichopetaline genera in having a strongly and evenly incurved cercus, except perhaps in *Rhabdocerca zanclophora* but that species has the rod-shaped projection characteristic of that genus as well as a more slender shaft. *M. cryothermastris* shares with all other *Mactruchus* species, except *M. serrifer*, the (possibly primitive) epiphallus and the distally reflexed epiproct.

DISTRIBUTION. This species occurs on the west-central portion of the Mesa Central but east of Durango (city) from Guadalupe Victoria (Durango) to Nieves (Zacatecas) and south to Sombrerete (Zacatecas), from 6,400 to 7,850 feet. *M. cryothermastris* seems to invade the range of *M. ischnodus* to the northwest but occurs alone to the southeast; no where are the two species syntopic. We have single females from 41.6 miles southeast Sombrerete (Zacatecas) as well as near Victor Rosales (Zacatecas), which probably represent the southeasternmost records of this species. Despite the fact that females of *M. cryothermastris* cannot be distinguished from *M. ischnodus*, it is more likely to be *M. cryothermastris* as *M. ischnodus* does not occur in this area; nevertheless, we are recording these as questionable *M. cryothermastris*. *M. cryothermastris* is syntopic with *Rhabdocerca tridactyla* at 14 miles northeast of Nieves (Zacatecas) at the edge of both their ranges. No dichopetalines have been collected in westernmost Zacatecas and adjacent Durango.

Mactruchus megasynactor n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 6, 11)

TYPE. Holotype, male (plus allotype), La Quebrada [probably=Junta de La Quebrada del Valle, 117.7 air mi. E. La Zarca], Durango, Mexico, 20 July 1947, coll. Cazier (UMMZ).

The precise location of this place is somewhat in doubt because it is not more accurately specified on the specimen labels and is not mentioned in the Reports of the Rockefeller 1947 Expedition on which it was collected (Spieth 1950). However, Abigail Alvarez has made a careful study of the report and the accompanying map (Spieth 1950, pg. 65). The expedition was reported to be in Santa Barbara in southern Chihuahua (which is indicated on Spieth's small scale map) the day before and the day after the date recorded on the label. As the state recorded on the label is Durango, the collectors must have traveled in a southerly direction on roads that are still poor, and probably were no more than 50 miles from Santa Barbara and in the northernmost part of the state of Durango. In this general area of Durango, there are several villages called La Quebrada. One of these is now known for its white-water rafting, and may have been known for that sport in 1947. We have chosen this locality as the likely one. Its coordinates were taken from the Board of Geographical Names (CITE???), and this has been plotted on our map of *Mactruchus*.

IDENTIFICATION. The male cercus is structurally very similar to *M. serrifer*, differing only in the lack of serration of the mesal subapical margin and the blunter apical teeth. Females of *M. megasynactor* seem to have the specialization of the base of the ovipositor found in *M. serrifer* and *Gymnocerca falcata*, but the specimens are so poorly preserved that it

is difficult to be confident in the degree of similarity. Also differing from *M. serrifer* is the male epiproct which lacks the narrow finger and instead has the slightly deflexed apex as in the other *Mactruchus* species.

DISTRIBUTION. This species is known from one collection well within the Sierra Madre Occidental, elevation unknown but may be relatively low (2,800 feet) if it was on the river. This river apparently drains westward through the Sierra Madre Occidental, but this species is clearly related to *M. serrifer* which is far to the east and the south. This species shows no relationship to *Gymnocerca cycloprista* on the western Coastal Plain. No other collections have been made in the region around this locality.

Mactruchus serrifer (Rehn and Hebard, 1914)

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 6, 11)

SYNONYMS. *Dichopetala acambarensis* Marquez Mayaudon, 1958.

TYPE. "[Male], Barranca, twelve kilometers north of Guadalajara, state of Jalisco, Mexico. Altitude not less than 3,500 feet. September 13, 1903. (W. L. Tower.) [American Museum Natural History.]" (Rehn and Hebard 1914).

Although the label data for the type clearly indicates the general locality where the specimen was collected, we can add a few more details. This was undoubtedly the Barranca de Oblatos, because on the same date Hancock collected from "La Barranca de los Obletos, Jalisco" (Hebard, 1925, pg. 259); we think it likely that both W. L. Tower and J. L. Hancock were collecting together. The mileage on the Tower label is almost precisely in this canyon. In 1959, when Cohn collected at this locality, there was a road leading to the bottom of the canyon which passed by a "hot baths establishment now in ruins" and we think the road to the hot springs was probably well-maintained but beyond them was probably poor. As there is a turnaround place at the ruins, it may be that this is where Tower collected, but we have no means of being certain. Rehn and Hebard (1914a) gave the altitude as not lower than 3,500 feet but this is at the bottom of the Barranca; therefore, we think the most likely elevation to be near the baths at 4,650 feet. This canyon may also be known as the Barranca Huentitan, and what we consider to be topotypes are labeled "0.4 mi. S. Huentitan del Bajo," 5 miles north of Guadalajara (from Mercado San Juan), which is not far (about 1 mile south) from the southern rim of the Barranca de los Oblatos.

We have not examined the type of this species, but Rehn and Hebard's figures and description unequivocally identify this species. Although the precise locality is in doubt, we have material from very close by as indicated above.

Of *Dichopetala acambarensis* Marquez Mayaudon, 1958, holotype, female, Acambaro, Guanajuato, coll. C. C. Hoffmann (UNAM) (**NEW SYNONYMY**). We here synonymize *Dichopetala acambarensis* Marquez, 1958, although we have not examined the type. Marquez's very good drawing clearly indicates the characteristic ridge on the ventral valve of the ovipositor base which is identical to *Dichopetala serrifera* Rehn and Hebard, 1914 (this ridge also is found in *G. falcata* but that species is found far to the west). The description matches that of *D. serrifera*, and we have topotypes from Acambaro, which is well within the southern distribution of *D. serrifera*; our Acambaro topotypes agree in all particulars with near topotypes of *Mactrachus serrifer*. Unfortunately, Marquez did not compare his new species with *Dichopetala serrifera*, although he did compare it with *D. durangensis*, *D. falcata*, and *D. tauriformis*.

IDENTIFICATION. As previously mentioned, the male cercus is structurally very similar to *M. megasynactor*, and strongly developed teeth on the subdistal ridge of the male cercus is a unique feature among the dichopetalines. The epiphallus matches well for the genus; yet, slight differences between *M. serrifer* and the other members of *Mactruchus* are described above under the Distinctive Characters in the Genus Account. The projection on the epiproct is unique in the genus but also similar to *Gymnocerca enaulites* and *G. falcata*; yet, there are small differences among the epiproct of these three species. *M. serrifer* is slightly bulbous at its apex and appears to arise subdistally. In *M. serrifer* and *G. falcata* the projection arises from a triangular base, whereas in *G. enaulites* the finger appears to arise smoothly from the distal margin of the epiproct. No other dichopetaline species, besides these three, have such a finger-like structure. The dorsal margin of the ventral valve of the ovipositor possesses a highly distinctive, sinuate ridge enclosing a small bulge. *Gymnocerca falcata* also possesses a similar structure on the female ovipositor, and this may be present in *M. megasynactor* but the specimens are so poorly preserved that it is difficult to be certain. This structure is not found in any other dichopetaline species.

As noted in many previous instances, there is strong support that this species may be closely related to *Gymnocerca falcata* and readers should consult the discussion under the Genus Account of *Gymnocerca* for this problematic relationship.

DISTRIBUTION. *M. serrifer* has an enormous distribution across much of the western and southern part of the Mesa Central as well as the Transverse Volcanic Belt, from 4,300 to 8,500 feet. It ranges from the "Sierra de Nayarit" (northern Nayarit) and southern Zacatecas near Villanueva, south to Jocotepec (Jalisco) and east to Cuernavaca (Morelos) and Rio Frio (Mexico). The westernmost record of *M. serrifer* is in the "Sierra de Nayarit", again isolated from collections to the east, but it probably does not occur on the nearby Pacific slope. In the western part of its main range, *M. serrifer* does not occur much farther south of Jocotepec (Jalisco), but we have few collections from that region. Although found in the Transverse Volcanic Belt, it does not extend south into the Tepalcatepec

Basin from Carapan-Uruapan (Michoacan) or into the Balsas Basin via Cuernavaca (Morelos).

The specimens from Quiroga (Michoacan) differ slightly in the structure of the male cerci, male subgenital plate, and ovipositor, and the dorsum lacks the characteristic black color of this species. Thus, it is possible that these may represent an aberrant population or perhaps a new species, but more material is needed to adequately compare and characterize these differences.

This species is certainly sympatric, if not syntopic, with *Gymnocerca falcata* north of Guadaljara (Jalisco) near Ixtlahuacan del Rio (Jaliso), where it surrounds that species represented by a single male. Near Queretaro, adult males are found unquestionably syntopic with most *Acanthorintes* species. The southeasternmost record near Cuernavaca (Morelos) is represented by a small series, but the precise location is not indicated. Cuernavaca also is the type locality of *Dichopetala mexicana*, but it is not clear whether the species exist there syntopically as both species are at the limit of their ranges in the area.

Acanthorintes n. gen.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 7, 10)

TYPE SPECIES. *Acanthorintes thenarocercus* n. sp.

INCLUDED SPECIES. *Acanthorintes erythrephaptor* n. sp., *Acanthorintes tauriformis* (Rehn and Hebard, 1914), *Acanthorintes thenarocercus* n. sp., *Acanthorintes xanthephaptor* n. sp., and *Acanthorintes zeuglaius* n. sp.

DISTINCTIVE CHARACTERS. We have great difficulty in characterizing this genus, although the evidence the strongly indicates that all five species are related to one another. This difficulty arises from the fact that no one distinctive character occurs in all five species. The most distinctive feature in this genus is the strikingly modified epiproct found in four of the five species and unique within the dichopetalines; modification of this kind, however, is absent in *A. zeuglaius* (see Species Characters below). A second feature, unique to this genus, is the split of the cercus to near its base, producing a narrow elongate outer arm and a much larger inner arm. This may be confused with *Obolopteryx* in the split of the cercus, but in *Obolopteryx* the lateral "thumb" always arises more distally and only in *O. oreoecus* and *O. catinatus* does the thumb extend to near the tip of the shaft, and in contrast to the narrow lateral arms of *Acanthorintes*, these dorsolateral "thumbs" are very broad. Yet, even in *Acanthorintes*, this feature is expressed in several very different forms (see Species Characters below). In addition to this character, all species have the tip of the cercal shaft acuminate and slightly hooked to bent mesad close to the tip. All five species share, but not uniquely, the paired appressed spined proximal fingers of the epiphallus, found elsewhere only in *Pterodichopetala*. The paired caudally projecting fingers are moderately distinctive in their spinose armature, including the minutely spined condition in *A. zeuglaius*. Members of the genus, except *A. zeuglaius*, show striking modifications of the first abdominal tergite, despite small interspecific differences (Figs. 210-213); these are not included in the Species Table but are described under each Species Account.

RELATIONSHIPS TO OTHER GENERA. This genus may be related to *Pterodichopetala* on the basis of the proximal fingers of the epiphallus. As we have indicated previously, we do not think the modification of the first tergite, while apparently identical in *Acanthorintes tauriformis* to all three species of *Rhabdocerca* and *Dichopetala mexicana* and similar to other species of *Acanthorintes*, indicates relationship between these three genera. Unfortunately, no other features ally *Acanthorintes* to any other dichopetaline genus.

SPECIES CHARACTERS. As mentioned above, the differences in the expression of the cercal split is conspicuous among these species. The two arms are more or less equal in width and widely separated in *A. zeuglaius*, whereas they are still strongly separated but at different angles and of contrasting thickness in *A. tauriformis*; in the remaining three species, the inner arm overlays the outer arm.

The epiphallus of all species *Acanthorintes* has the same basic structure (paired erect proximal projections plus paired distal projections), although other genera also have paired caudally-directed structures (*Dichopetala*, *Gymnocerca*, *Mactruchus*, and *Pterodichopetala*). In each of these four species, the more robust projections are positioned caudally, a condition similar to that found in the epiphallus of *Pterodichopetala*. Within *Acanthorintes*, however, length of the appendages varies considerably, although each is consistent in having some degree of supination, and like in the cercal arms, three conspicuous forms are present, with *A. zeuglaius*, *A. tauriformis*, and the remaining three species again dividing the distribution of this character.

The male epiproct is distinct in each of the *Acanthorintes* species, except with one form essentially shared by a pair of sister species. It should be noted that we have encountered a problem in whether the entire structure as illustrated actually represents the epiproct as it appears that the apical structures lie ventral to the anal opening; in spite of this difficulty, we have referred to the entire structure as the epiproct. This structure, which is highly distinctive in four of the five species of *Acanthorintes*, has been extremely difficult to interpret morphologically and shows considerable inter- and intraspecific variation in the apical structures; therefore, in examining single specimens, these structures should be viewed in a variety of orientations. The three-dimensionality and construction of parts have made it difficult to summarize in the Species Table, and each of the Species Accounts should be consulted to amplify the tabular description. Nevertheless,

some species can be readily identified on the basis of the epiproct alone, and three species are clearly related by similarities in this (and other) morphologies.

Particularly troublesome is the extremely different conditions of the female subgenital plate, these having equal or greater differences than in the male subgenital plate. However, each shares a suture separating the basal and distal portions of the plate, either of which may or may not be completely divided. Yet, the distal portions are very different among the species.

RELATIONSHIPS AMONG SPECIES. Three species are very similar in a number of characters: the male cercus, epiphallus, epiproct, and modification of the first tergite; therefore, we think these species are related, with *A. thenarocercus* being related to the sister species, *A. erythrephaptor* and *A. erythrephaptor*. *A. tauriformis* can be appended to these three, because of a similarly constructed epiproct and a different but still modified first tergite. *A. zeuglaius,* which lacks any modification of the epiproct or first tergite and possesses the most aberrant cercal type, may be the most primitive of the genus. *A. zeuglaius* and *A. tauriformis* also might be more closely related, because they share a more similar epiphallus (smaller appendages and only spicules).

DISTINCTIVE COLOR PATTERNS. In this genus, the color pattern is the least variable and therefore the least useful. Most individuals have the dorsum brownish or dull green, often with concolorous lateral lobes of the pronotum. However, it remains to be seen if the color differences of the male cercus in *A. erythrephaptor* (orange-red) and *A. xanthephaptor* (usually bright yellow) are constant and/or useful.

RANGE AND GENERAL HABITAT. The species of *Acanthorintes* occupies the southeastern portion of the Mesa Central in the desert, barely penetrating the western edge of the Sierra Madre Oriental north of Ciudad del Maiz (San Luis Potosi) in southwestern Tamaulipas and the Transverse Volcanic Belt near Carapan (Michoacan) within the pine-oak zone, from 3,250 to 8,100 feet. The northwestern and northeastern limits of the genus are not definitely known as little collecting has been done beyond (see Maps 1, 7 and Species Account of *A. tauriformis* below). There is a narrow zone of overlap between *Acanthorintes* and *Rhabdocerca* slightly north of the road connecting San Luis Potosi and Rioverde, *Acanthorintes* replaces that genus south of this zone (Map 10).

Acanthorintes xanthephaptor n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 7, 10)

TYPE. Holotype, male (plus allotype), 11 miles east San Luis de la Paz, Guanajuato, Mexico, [20.278119 -100.377046], 29 August 1959, elevation 6,900 feet, coll. I. J. Cantrall & T. J. Cohn #46 (UMMZ).

IDENTIFICATION. In the male cercus, this is one of the three species with the larger inner arm overlaying the outer arm, being similar to *A. erythrephaptor* and *A. thenarocercus*. The apices of the lateral cercal arm are identical to *A. erythrephaptor,* although the drawings do not show the apex of this arm in *A. xanthephaptor*. It should be noted that almost all *A. xanthephaptor* have yellow cerci, but a few specimens have an inconspicuous orange-ish suffusion near base and apex.

The structure of the epiphallus in this species is unusual within *Acanthorintes* and among dichopetalines in having very short thick distal spined projections but very long narrow spined proximal erect projections. The spines on the proximal fingers are long and curved mesad and caudad, which suggest a specialized function for these structures. This epiphallus also is essentially identical to that of *A. thenarocercus* and probably *A. erythrephaptor*.

The epiproct is moderately long and narrow in form, constrasting the shorter and wider epiproct of *A. thenarocercus* and the very narrow, more projecting form in *A. tauriformis*. The terminal portion is narrower and gently reflexed, with the apices variable (from rounded to somewhat angulate) and notch narrowly U-shaped to broadly emarginated, particularly in comparison with *A. thenarocercus*. There seems to be some but minimal geographic variation in the distal lobes and notch. Care must be used in observing this terminal structure in specimens: it is strongly reflexed, which is obscured when photographed from a caudal perspective, but the line drawings show that terminal structure as slightly flattened (Fig. ???).

The first abdominal tergite of the male has the caudal margin with a median rounded discrete swelling; this is probably identical to *A. erythrephaptor* (in which the structure is partially obscured) and somewhat similar to *A. thenarocercus*. These may be primitive antecedents to the more radical modification found in *A. tauriformis*.

The female subgenital plate is unique in lacking the median excision over the greater part of the distal lobes characteristic of the dichopetaline genera, although a median sulcus is variably present here. Besides the uniqueness of this structure, it contrasts the deeply U-emarginate subgenital plate of *A. thenarocercus* and the deeply divided and acute lobes of *A. tauriformis* and *A. zeuglaius*. Also, see note regarding identification of females at the syntopic locality with *A. erythrephaptor* under that Species Account.

DISTRIBUTION. This species is known from the southeastern part of the Mesa Central in desert or bush-savannah, from near San Luis Potosi south to 9 miles southeast Queretaro, from 4,300 to 7,160 feet. Little or no collecting was done to the west or the southeast of Queretaro where *A. xanthephaptor* might occur. However, collections made near Ixmiquilpan (Hidalgo) farther to the east contain *A. tauriformis* and *A. thenarocercus* but no *A. xanthephaptor*; even farther east, a small collection at Atotonilco El Grande

(Hidalgo) contains only *A. tauriformis*. It is syntopic with its sister-species, *A. erythrephaptor* and may be syntopic with *A. thenarocercus* at 9 miles southeast Queretaro; here *A. tauriformis* and *Mactruchus serrifer* also occur. The range of *A. xanthephaptor* is completely enclosed by that of *A. tauriformis*, and *A. xanthephaptor* is frequently syntopic with that species.

Acanthorintes erythrephaptor n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 7, 10)

TYPE. Holotype, male, 9 miles southeast Queretaro, Queretaro, Mexico, [20.497319 -100.319281], 15 October 1958, elevation 6,300 feet, coll. T. J. Cohn #191 (UMMZ).

IDENTIFICATION. This species can be differentiated from its sister species, *A. xanthephaptor*, only on the basis of small structural differences (see above Species Account) and red coloration in the male cercus. However, while the red color of the cerci is obvious in the single male, we do not know whether this will be a stable characteristic of the species. It also should be noted that some *A. xanthephaptor* have inconspicuous orange-ish suffusion in the male cerci. The type and only male specimen of *A. erythrephaptor* has not been dissected, but the apices of the distal projections of the epiphallus can be clearly seen and appear to be essentially identical to *A. xanthephaptor* and *A. thenarocercus*. The epiproct also appears to be extremely similar to *A. xanthephaptor*, and both species differ conspicuously from but are similar to *A. thenarocercus* in this feature. What can be seen of the first tergite of the male is identical to *A. xanthephaptor* and similar to *A. thenarocercus*.

While females are not known in *A. erythrephaptor*, we are reasonably confident that they will be similar to *A. xanthephaptor*, which this species closely resembles in several characters. It should be noted that at the only locality where this species occurs syntopically with *A. erythrephaptor* (9 miles southeast Queretaro), all 12 females are virtually identical. As we have 7 males of *A. xanthephaptor* and only 1 male of *A. erythrephaptor*, it is reasonable to assume that all the females belong to the former species. Furthermore, females from other localities further to the north, where we have not found *A. erythrephaptor*, are virtually identical to those from the Queretaro locality. However, it remains a possibility that some of those females belong to A. erythrephaptor and that females of the two species are indistinguishable.

DISTRIBUTION. This species is known from the southeastern part of the Mesa Central at a single locality, 9 miles southeast Queretaro, at elevation 6,300 feet at the foot of a small isolated hill. Only a single male was collected among a large series of dichopetalines at this locality. The females which we have identified above from this locality as *A. xanthephaptor* are almost certainly that species, rather than *A. erythrephaptor* (see argument above). The range, syntopies, and limitations discussed above under *A. xanthephaptor* apply to this species.

Acanthorintes thenarocercus n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 7, 10)

TYPE. Holotype, male (plus allotype), 21 rd. mi. NW. Ixmiquilpan (7 rd. mi. N. Tula R.), Hidalgo, Mexico, [20.686949 -99.335590], 15 October 1958, elevation 6,800 feet, coll. T. J. Cohn #189 (UMMZ).

IDENTIFICATION. In the male cercus, this is one of the three species with the larger inner arm overlaying the outer arm, being similar to the sister species *A. erythrephaptor* and *A. xanthephaptor*. However, the broad and flat nature of the inner appendage renders this species distinct from the latter two and the rest of the dichopetalines, perhaps finding most similarity with *A. tauriformis*. The subdistal incision of the cercal shaft also is similar to that found in *A. zeuglaius*. The epiphallus is essentially identical to *A. erythrephaptor* and probably *A. xanthephaptor*. The shorter, wider shield-like portion of the epiproct remains distinct from the longer, narrower condition in both *A. erythrephaptor* and *A. xanthephaptor* as well as the much narrowed form in *A. tauriformis*. Furthermore, the tightly reflexed apical region with sharply acuminate lateral apices is unique within the genus. The male subgenital plate is distinctive with its narrowed apical region (similar to perhaps two species of *Gymnocerca* and to a lesser extent, *A. zeuglaius*). The female subgenital plate has the lobes deeply divided by a large U-shaped emargination; this is unique among the dichopetaline females. Although not included in the Species Table, a swollen modification of the male first abdominal tergite is present, appearing similar other species of *Acanthorintes* but with a depression at the anterior end of the swelling. There is the slight possibly that this reflects an artifact of preservation, but it appears fairly uniform in several specimens.

DISTRIBUTION. This species occurs in a restricted area on the southeastern part of the Central Mexican Plateau in a small area around Ixmiquilpan, Hidalgo, from 5,500 to 6,800 feet. Little or no collecting was done south of this locality but a little farther east at Atotonilco El Grande (Hidalgo), only *A. tauriformis* was found.

This species may also occur at 9 miles southeast Queretaro, but there are conflicting issues between labels and field notebook counts in the case of both specimens. The female here recorded with a question mark bears the 9 miles southeast Queretaro (FN#191) label, but all female specimens are accounted for under other species in the field notebook from

that locality. The male specimen bears no printed label but a note indicating that it came from the specimens from #191 or nearby field numbers. From #191, we have one less male of *A. tauriformis* than the number recorded so that this *A. thenarocercus* may be that missing male, although it is hard to see how Cohn could have confused the two species as they are distinct genitalically. Both collections were made on the same date and probably mounted at the same time.

Acanthorintes tauriformis (Rehn and Hebard, 1914) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 7, 10)

TYPE. Holotype, male, Mountains twelve leagues east of San Luis Potosi, Mexico, coll. Palmer, Scudder Collection, (ANSP).

We have not examined the type, but the figures and description provided by Rehn and Hebard (1914a) unequivocally identify this species. Although the type locality may not be precise, we have studied material from several nearby localities.

IDENTIFICATION. This male cercus of this species can be readily identified by the highly distinctive and unique strongly upturned lateral arm, which makes it conspicuous in collections. The drawing of the cercus, although still representative, distorts the lateral arm, because it is viewed from a dorsal perspective. The epiphallus is unique, although clearly belonging to this genus. The proximal projections are much shorter compared to *A. thenarocercus*, *A. erythrephaptor*, and *A. xanthephaptor* and the distal projections are slightly longer. Additionally, the spines are much shorter, being reduced to mere spicules; this characteristic is shared with the more minimally spined *A. zeuglaius*. The male subgenital plate is unique in its long concave lateral margins and the "doubly-emarginate" apex, viz. the inner margins of the apical notch of the male subgenital plate are distinctive in the slightly convex before the U-shaped medial portion. The epiproct is very much narrowed in this species as compared to the broader shield-like structures of *A. thenarocercus*, *A. erythrephaptor*, and *A. xanthephaptor*, and the projecting T-shaped structure is unique among the dichopetalines. There also is instraspecific variation in this T-shaped structure, both in the stem (thick to thin) and the apical lobes in shape (narrow and rounded to thick and acute) and emargination (shallow but distinct to absent). These differences could not be correlated geographically and various combinations even arise in a single population (Fig. 5).

The swollen, triangularly elevated modification of the posterior margin of the first abdominal tergite is unique in the genus, but it also is found in all three species of *Rhabdocerca* as well as *Dichopetala mexicana*; as previously mentioned, we think these similarities have arisen convergently. Similar although slightly different modifications are found in *A. xanthephaptor*, *A. erythrephaptor*, and *A. thenarocercus*. Females of this species are unique in having a tooth near the base of the ovipositor, and the female subgenital plate has the lobes deeply divided, similar to but much short than in *A. zeuglaius*; these two structures will readily distinguish females of this species from congeners.

Females of this species vary greatly in the length of the ovipositor, from very long to moderately short. The longest ovipositors (with some small variation in length) are found in a population (27 females) around Queretaro, and these females are surrounded on all sides, except to the south (where we have no members of this group), by individuals with shorter ovipositors. However, all of these females have the tooth near the base of the ventral valve, an invariable characteristic of the species. Additionally, none of the associated males show any correlated differences in the genitalia, especially in the complex cercus, when compared to males from the surrounding region or even farther north. There also are no appreciable differences in other morphological structures such as the tegmina. Furthermore, north of this region, there seems to be some variation in ovipositor length but without evidence of a cline. An analogous situation occurs in *Planipollex pollicifera*, in which very long ovipositors exist (previously described as a separate species, *Dichopetala chirura*), but the long and short ovipositors form no distinct geographic pattern (see under *Planipollex*). Given these issues, we believe that these represent merely a population variant of *A. tauriformis* and that the length of the ovipositor varies within this species.

DISTRIBUTION. This species occurs widely in the southeastern portion of the Mesa Central, ranging from 3,250-8,100 feet and essentially encompasses the entire range of the genus. It occurs generally in high desert, but to the south, it penetrates the Transverse Volcanic Belt at 6,800 feet near Carapan (Michoacan) within the pine-oak zone. It seems to be limited by the oak zone to the northeast in the Sierra Madre Oriental where Cohn made several collections of Orthoptera, but in the westernmost ridge of the Sierra Madre east of San Luis Potosi, it does occur in oak woodland. Little collecting has been done northwest of San Luis Potosi; therefore, the northwestern limits in this area are uncertain. It clearly does not occur north of of Villa Hidalgo (San Luis Potosi) and is rare south of that city, where large collections of *Rhabdocerca tridactyla* and *R. caudelli* have been made. Many collections have been made of other dichopetaline genera in central Jalisco; thus, it seems likely that *A. tauriformis* does not occur there.

This species occurs syntopically with each of the other *Acanthorintes* species throughout its range. It is syntopic with several other dichopetaline genera: *Mactruchus serrifer* in the southern and western edges of its range, *Rhabdocerca caudelli* in the north near Villa Hidalgo (San Luis Potosi), and *Pterodichopetala strepsidactyla* east of San Luis Potosi.

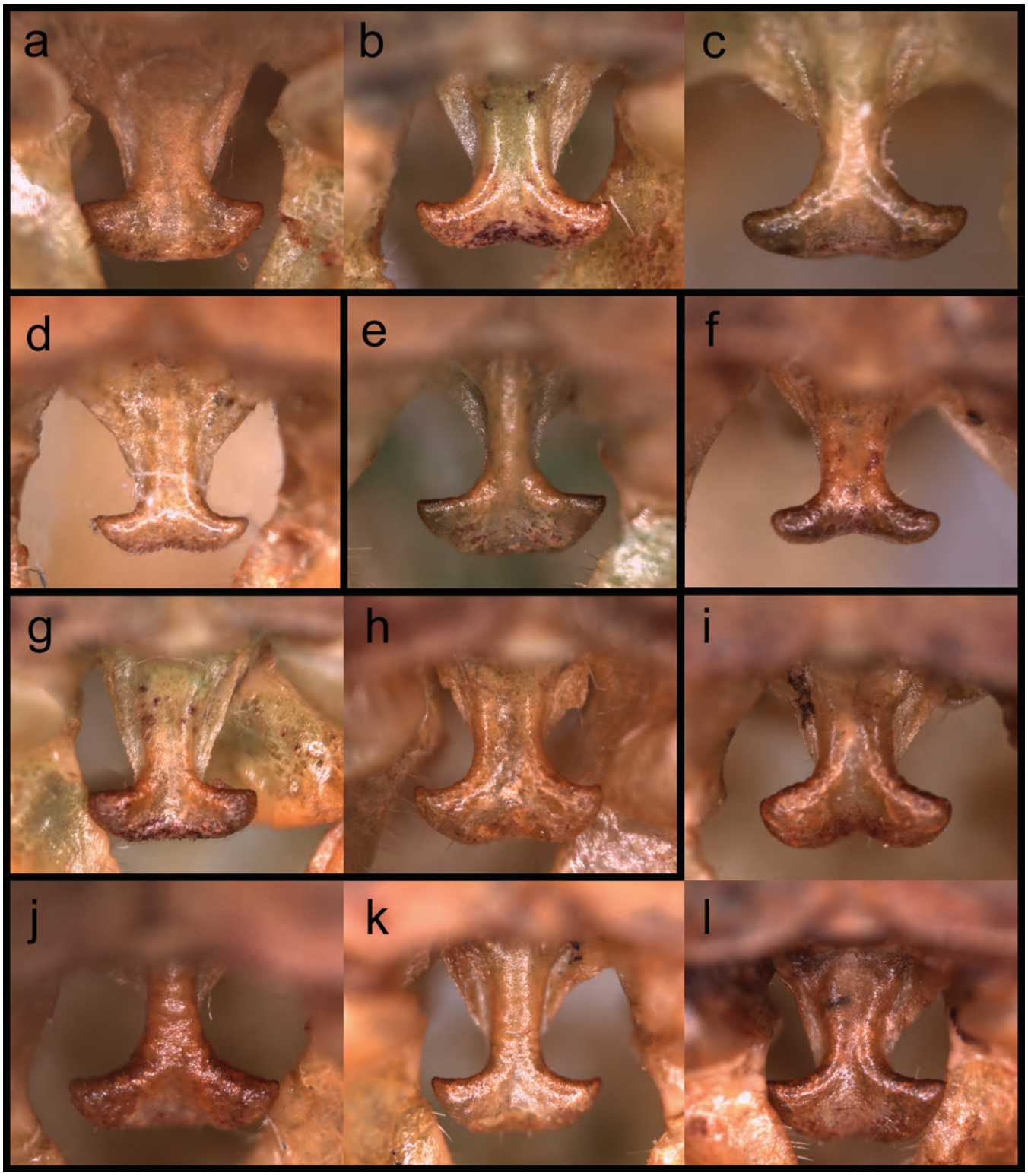


Fig. 5. Variation in the male epiproct of *Acanthorintes tauriformis*; (a-c) GUANAJUATO: 15 rd. mi. W. Xichu, Cantrall & Cohn 1959 #42; (d) QUERETARO: 5.4 mi. SW. Jalpan [de Serra] (on Hwy. 120), Cohn & Cohn 1970 #107; (e) SAN LUIS POTOSI: San Luis Potosi, Fontana, Battiston, Agatibi, Garcia 2004 #16; (f) SAN LUIS POTOSI: 19.8 rd. mi. E. San Luis Potosi, Cohn & Hubbell 1961 #203; (g-h) GUANAJUATO: 11 rd. mi. E. San Luis de la Paz, Cantrall & Cohn 1959 #46; (i-l) SAN LUIS POTOSI: 50 mi. SE. San Luis Potosi, Cohn 1958 #194.

Acanthorintes zeuglaius n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 7, 10)

TYPE. Holotype, male (plus allotype), 4 road miles northeast Ciudad del Maiz, San Luis Potosi, Mexico, [22.446219 -99.573633], 21 August 1959, elevation 4,550 feet, coll. I. J. Cantrall & T. J. Cohn #10 (UMMZ).

IDENTIFICATION. This species is unique in both the genus and among other dichopetaline genera in the male cercus (two arms are more or less equal in width and widely separated), extended bilobed tenth tergite in the male (not included in the table, see Fig. 221), and female subgenital plate (unique in their length and acuminate form, although appearing completely divided like in *A. tauriformis*). Males also differ from all other members of the genus in the lack of modification of two structures, the epiproct (not shield-like, only short and roundly quadrate) and the first abdominal tergite (without swollen structure). The male subgenital plate also differs from its congeners in its shape and darkening of the distal lobes. A tubercle is present at the base of the ovipositor, although this structure is weakly developed and frequently covered by the long lobes of subgenital plate. Despite all these apparently unique structures, we are reasonably confident that this species belongs in *Acanthorintes*, based essentially on two characters. First, the basic structure of the male cercus, viz., split to near the base and the subdistal mesal excision of the inner arm, suggest relationship to *A. tauriformis* and *A. thenarocercus*, respectively. Second, the epiphallus, although small and minimally spined, still retains the proximal and distal projections, which fits well in the genus (somewhat similar to *A. tauriformis*) and may represent the primitive condition.

DISTRIBUTION. This species is found on the eastern edge of the middle of the Mesa Central in a restricted area around Ciudad del Maiz (San Luis Potosi) and 60 miles north of that town, from 3,900 to 5,850 feet. Both localities are at the very western edge of the Sierra Madre Oriental. Not far to the northwest and south of Ciudad del Maiz, only *Rhabdocerca* species have been found as is the case with the numerous collections north of San Luis Potosi. To the east of San Luis Potosi, other *Acanthorintes* as well as *Rhabdocerca* species have been found but no *A. zeuglaius*. It is almost certainly limited farther east by the oak forests in which Cohn has made a few collections.

We have sufficient material from the few localities of this species around Ciudad del Maiz to suggest that it does not occur syntopically with *Rhabdocerca zanclophora*, which is found farther to the northwest. However, the northwestern record of *A. zeuglaius* in this area was apparently collected at the same place but by a different collecter as the southeastern record *R. zanclophora*; both are represented by single males. This species is syntopic with *A. tauriformis* at Ciudad del Maiz and with *A. tauriformis* and *Rhabdocerca caudelli* at Alaquines (San Luis Potosi), not far to the south.

Pterodichopetala Buzzetti, Barrientos, and Rocha, 2010

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

TYPE SPECIES. *Pterodichopetala cieloi* Buzzetti, Barrientos, and Rocha, 2010. By original designation.

INCLUDED SPECIES. *Pterodichopetala cieloi* Buzzetti, Barrientos, and Rocha, 2010, *Pterodichopetala cultricerca* (Strohecker, 1945), *Pterodichopetala hypsibates* n. sp., *Pterodichopetala padrisima* n. sp., *Pterodichopetala pityophila* n. sp., and *Pterodichopetala strepsidactyla* n. sp.

DISTINCTIVE CHARACTERS. With the transfer of one long-tegmina species and addition of four new species, the definition of *Pterodichopetala* must be greatly modified. *Pterodichopetala* may now be characterized by a mesally-directed basal projection of the male cercus, an apically dentate male epiproct, tegmina considerably longer than the pronotum in both sexes (at least extending to or beyond the third tergite, some extending to the end of the abdomen), and the female subgenital plate largely unsclerotized. In addition to these characters, there is one other that is shared with *Acanthorintes* and can be used for defining but not identifying the genus: the epiphallus with dorsoproximal paired appressed spined fingers in addition to spines on the complex robust paired distal projections.

The character of long tegmina remains valid for the genus. Despite great diversity in the form of the male cercus, all species possess a medially-directed basal arm, although this structure is greatly modified in *P. cultricerca.* The epiproct is unique among the dichopetalines in being toothed, and all species of *Pterodichopetala* have this armature to some degree (dentation small in *P. cultricerca*). The general form of the epiphallus is cohesive within the genus as is the geographic distribution in higher elevation areas. The female subgenital plate so characteristic of other dichopetaline genera seems present only in greatly reduced form in all members of the genus. Examination of pinned material of all species and some alcoholic material reveals a very thin, short, almost membranous flap usually with its median apical portion inserted between the bases of the ovipositor valves. There are, however, no identifiable sclerotized lateral lobes extending along the sides of the base of the ovipositor valves, which are always present in the other dichopetaline genera, sometimes very short but often more elongate (see also Morphological Notes). It is possible that these may be shrunken or obscured in dry specimens. Still, this condition is uniform throughout the species examined, and we think it may be of phylogenetic

significance in the dichopetalines.

RELATIONSHIPS TO OTHER GENERA. The relationships of *Pterodichopetala* are obscure; the condition of the wings and tegmina admittedly remains a puzzle, and it is intriguing that, in contrast to some of the dichopetalines, the female tegmina are equal in size and shape to the males with the hindwings also reduced to the same degree between sexes. We have analyzed this problem in greater detail under Tribal Problems and Phylogeny and Polarity.

Relationship with *Marenestha*. The proposed relationship between *Pterodichopetala* and *Marenestha* by the Buzzetti, Barrientos, and Rocha (2010) requires further dissection. *Pterodichopetala* was erected when its single species was thought to be related to but could not be placed in two other phaneropterine genera, *Dichopetala* and *Marenestha*. Because it shared characteristics of the female ovipositor and to a lesser extent, the male cercus with *Dichopetala* and shared characteristics of the tegmina and pronotum with *Marenestha*, it was regarded as annectant between the two taxa. There is little doubt in our minds that *Pterodichopetala* is more closely related to the dichopetalines. *Pterodichopetala* shares with the dichopetalines a spinose female ovipositor, complex male cerci, and a sclerotized male epiphallus; these three characters appear to be uncommon among the phaneropterines (see Characterizing the Dichopetaline Genera).

However, relationship with *Marenestha* is greatly problematic, and while we can appreciate the probable reasons for Buzzetti, Barrientos, and Rocha (2010) comparing *Pterodichopetala* with *Marenestha*, we are disappointed that the comparison was not carried further. When Brunner (1878) described the single species of *Marenestha*, he placed it within his Gruppe Cosmophylla, which otherwise included the genera *Engonia* Brunner von Wattenwyl, 1878, *Stenophyllia* Brunner von Wattenwyl, 1878, and *Cosmophyllum* Blanchard, 1851; yet, these were not included in the comparison with *Pterodichopetala* by Buzzetti, Barrientos, and Rocha (2010). This grouping was characterized mostly by similar conditions of the tegmina, wings, and humeral sinus, and in fact, it is this condition that widely separates *Marenestha* and *Dichopetala* in Brunner's key. Admittedly, Brunner's arrangement remains rather superficial as in many places it seems to be based on characters which may be convergent rather than indicate relationship. For example, the presence of a humeral sinus may not be truly independent from the condition of the wings, and wing polymorphism is known to occur among other phaneropterine genera (*e.g.*, *Arethaea*, *Insara*, *Brachyinsara*); thus, this character seems not a favorable predictor for the establishment of relationship. As the authors imply the basis for comparison with this Chilean species as the combined large tegmina and abortive hind wings alone, this hypothesis falls apart when other more telling morphological characters are examined.

As mentioned above, several very distinctive and uncommon characters present in *Pterodichopetala* are shared with the dichopetalines. In contrast, *Marenestha* possesses small blunt crenulations rather than distinct teeth on the female ovipositor, the former being found extensively among the New World phaneropterine genera. *Marenestha* also possesses simple cerci, another condition not difficult to find among the phaneropterines. The sclerotized epiphallus is an admittedly understudied element, but no homologous structure could be located in the specimens we examined of either *Marenestha* or *Cosmophyllum*. Although described as unique by Buzzetti, Barrientos, and Rocha (2010), the lateral pronotal carination viz., angular insertion between dorsal and lateral faces, in *Pterodichopetala*, similar to that of *Marenestha*, is found all over the Phaneropterinae (*e.g.*, various species of *Scudderia*, *Cosmophyllum*, *Arantia*, *Holochlora*, *Amblycorypha*). The convexity or inflated appearance of the tegmina, again similar between the two, also may be found in sundry phaneropterine genera (many of the same listed above). In another character of dichopetaline importance, *Marenestha* has a solid triangular midlongitudinally carinate female subgenital plate, which seems to be the condition in the majority of the Phaneropterinae. While the condition of this structure in *Pterodichopetala* is different from the other dichopetalines, it is not inconsistent with the dichopetaline line (see above). Lastly, the huge biogeographical disjunction, viz., Tamaulipas, Mexico to Chile, while not precluding relationship between the two taxa, does make it less likely, and the implications involved are not even discussed by the authors. While *Marenestha* shares a few superficial features with *Pterodichopetala*, it seems completely premature to suggest any relationship, let alone an annectant one, between *Marenestha* and any of the dichopetaline genera.

Within the dichopetalines, the similarity of the epiphalli in the proximal fingers and spination suggests a relationship with *Acanthorintes*. However, no other characters are shared with that genus, and we cannot derive one from the other using other characters.

SPECIES CHARACTERS. The shaft of the male cercus displays extraordinary interspecific variation in form and appendages, and this structure will help to differentiate several species. Two complicating factors should be noted. First, with the higher incidence of bifurcation in this genus, we have no direct evidence for which might be homologous to the main shaft in other dichopetalines with cercal appendages; it is tempting to assume that the acuminate appendage of those with split apices represents the distal end of the main shaft or that the medially-projecting basal arm is not the homologous structure but these would be guesses at best. Second, the orientation of the distal portion of the cercus is very difficult to determine, resulting in part from differences in preservation, and this difficulty, particularly in artistically rendering them in a comparable way, should be noted when examining the figures. Difficulties aside, three species (*P. pityophila*, *P. hypsibates*, and *P. padrisima*) are very similar in the male cercus, with the smaller acuminate inner terminal finger enclosed by the broad flabellate outer one; these distal fingers are so similar between

the species that we have not endeavoured to differentiate them. The other three species have significant differences in their cercal morphologies.

The epiphalli of these species, although difficult to describe, all follow the same basic pattern of spined or toothed paired structures with smaller proximal fingers and more robust distal projections. Three subsets might be characterized as the epiphallus of *P. cieloi* and *P. strepsidactyla* appear very similar as do those of *P. hypsibates* and *P. padrisima* (*P. cultricerca* has not been dissected but the exposed apices of the distal projections appear to have elongate teeth like those species). *P. pityophila*, while clearly, fitting within the genus, is more unique in its epiphallic structure.

The teeth of the epiproct suggest relationship between all the species, and there are minor differences between the taxa. The small teeth are restricted to the distal margin in *P. hypsibates* and *P. padrisima*, extend up the lateral margins in *P. cieloi* (the teeth are coarse and irregular in this species) and *P. strepsidactyla*, and extend onto the caudal face in *P. pityophila* and *P. cultricerca.*

The male subgenital plate is nearly identical in general structure but not generically unique; however, it varies intraspecifically such that this structure is not reliable for differentiation of species. We also could find essentially no specific differences in the female genitalic characters, including the base of the ovipositor and the subgenital plate.

There appears to be a clear graded morphological sequence in length of the tegmina, with the longest being found in *P. cieloi* and *P. strepsidactyla* (which extend to the end of the ovipositor in the former) through *P. hypsibates* and *P. padrisima* and ending in the genus with *P. pityophila* and *P. cultricerca* (which extend to about the middle of the abdomen). Implications for the dichopetaline phyletic line of the elongate tegmina as well as their graded sequence within the genus are discussed under Phylogeny & Polarity. The ultimate tergite also shows a morphological sequence from highly modified in *P. cieloi* and *P. strepsidactyla* (fused and extending considerably caudad) through *P. pityophila*, *P. hypsibates*, and *P. padrisima* (bilobate plates barely projecting) to *P. cultricerca* (no discernible modification or structure). It has been posed also under Phylogeny & Polarity how this might be the reverse of the sequence interpreted for the wings and therefore affect hypotheses of relationship within and without *Pterodichopetala*.

RELATIONSHIPS AMONG SPECIES. Few conclusive relationships can be drawn between species of *Pterodichopetala*. *P. strepsidactyla* appears to be unequivocally related to *P. cieloi* by the square-cut pronotum, short basal tooth of the cercus, similar epiphallus, converging margins of the epiproct, more elongate and apically pointed tegmina, and the median elongation of the ultimate tergite; however, these species differ greatly in the distal fingers of the male cercus as well as the form of the epiproct. *P. hypsibates* and *P. padrisima* probably are sister species based on the more similar male cerci and epiphallus, quadrate and marginally spined epiproct, saddle-shaped pronotum, and moderate length and broadly rounded apex of the tegmina, although at least similarities in the cercus and pronotum are shared with *P. pityophila*. *P. cultricerca*, an otherwise aberrant and unique member of the genus, has tegmina similar to P. pityolphila in length and presence of black markings. However, three structures, the distinctive cercus with its strongly curved basal arm and two simple divergent apical fingers, longer constricted pronotum, and non-projecting ultimate tergite, are without obvious relationship in the genus. The range of diversity in the morphological characters of this genus make it difficult to confidently polarize some of the apparent sequences and thus establish relationships within the genus.

DISTINCTIVE COLOR PATTERNS. Four species of the genus are essentially all green, with variable inconspicuous markings along the margins of the tegmina. However, the presence of dark markings in two species renders them distinct within the genus. In *P. pityophila*, the tegmina possess a well-developed white costal stripe more extensive and conspicuous than in the other species and a distinctive black area extending along each margin to the base of the wing. The abdomen has three distinct longitudinal pale stripes; these are obsoletely developed in the other species. The single male and single female of *P. cultricerca*, both collected by Hoogstral, share an identical color pattern. The specimens are overall light brown or ashen, except for the pronotum which is deeper brown. The tegmina are concolorous with the body in the anterior portion, white-ish on the posterior margin, and with a broad black region in the middle from near the radial vein to the posteromarginal white stripe. The male has dark lateral stripes on the visible tergites. These two specimens were collected by the same team, if not by Hoogstral himself, in different years but in the same area. This ashen coloration is odd and unique in the dichopetalines, and we think it possible that factors of preservation may have influenced the overall coloration in that lighter areas may be green in life, judging from all other examples in *Pterodichopetala*. They may have been originally collected in alcohol, although neither shows the shrunken aspect of specimens dried directly from alcohol. Still, the color patterns match so well between them that it remains possible that this palette is representative of this unique element of the dichopetaline species.

RANGE AND GENERAL HABITAT. These species are found in the northern half of the Sierra Madre Oriental, often at high elevations in the pine zone, usually higher than 4,800 feet, from the regions around Saltillo (Coahuila) south to the mountains east of San Luis Potosi. Three of the six species of *Pterodichopetala* have been found syntopically with *Rhabdocerca tridactyla*.

Pterodichopetala cieloi Buzzetti, Barrientos, and Rocha, 2010

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male

subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

TYPE. "Mexico, Tamaulipas, Gomez Farias, Reserva de la Biosfera El Cielo, Ejido La Gloria, [6.7 air mi. WNW. Gomez Farias, probably the old Rancho del Cielo], 1629 m., lat 23 degrees 2'51.7"N, long 99 degrees 15'2.9"W" (Buzzetti et. al 2010). Male, holotype (UNAM).

We have not examined the type of this species, but we have studied a male paratopotype, which agrees with Buzzetti Buzzetti, Barrientos, and Rocha's (2010) description and photograph.

IDENTIFICATION. The males are unique in the genus in having the apex of the cercal shaft undivided, the extension of the ultimate tergite into an elongate narrow fused medial projection, and the more heavily toothed epiproct. *Pterodichopetala cieloi* shares with *P. strepsidactyla* the following features unique in the genus: the carinate lateral lobes of the pronotum, the pointed apex of the tegmina (which extend to the end of the abdomen), the short mesally-directed basal tooth of the male cercus, and the epiphallus with thicker proximal fingers and broad clusters of short spinose teeth on the apical lobes. The apex of the shaft of the male cercus is very different from that of *P. strepsidactyla* which possess two elongate appressed appendages, one of which is blunt, the other terminally acuminate (structurally similar to most other members of the genus); *P. strepsidactyla* also differs in the more weakly toothed epiproct. Yet, we have examined, through the courtesy of L. Barrientos-Lozano, only one male and one female each of *P. cieloi* so we are uncertain of the minor variation in individual morphological features, such as the epiphallus, male subgenital plate, and epiproct.

DISTRIBUTION. This species is known only from the region around the type locality, from 4,600 to 9,800 feet (presumably in the vicinity of the Ejido). Although the authors do not cite any vegetational types, the lower elevations are probably in cloud forest and the higher elevations in coniferous forests (up to 9,800 feet). They occur in grasses and forbs at the type locality and have been observed feeding on these plants (Buzzetti, Barrientos, and Rocha (2010). Other members of the genus are found in the pine zone and may be feeding on pines and junipers but presumably those trees were not found at the type locality of *P. cieloi*.

No other dichopetaline species were reported by Buzzetti *et al.* (2010) from this Biosphere Reserve, although it may be within the altitudinal range of *Acanthorintes zeuglaius* (35 air miles west) as well as *Rhabdocerca caudelli*, *R. zanclophora*, and *Acanthorintes tauriformis* (50 air miles southwest). However, there have been no investigations for dichopetalines in the main mountains south of Ciudad Victoria (Tamaulipas). It is almost surely above the altitudinal range of *Obolopteryx castaneus*, which occurs nearby to the east on the Coastal Plain.

Pterodichopetala strepsidactyla n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

TYPE. Holotype, male, 21.3 miles east San Luis Potosi on Rio Verde Rd. – Highway 86, San Luis Potosi, Mexico, [22.084178 -100.646231], 24 August 1965, coll. T. J. Cohn #66 (UMMZ); allotype, female, 32 rd. mi. E. San Luis Potosi (from main plaza) (12 rd. mi. W. Santa Catarina), San Luis Potosi, Mexico, [22.071331 -100.530000], 26 August 1959, 6050 ft., I. J. Cantrall & T. J. Cohn #31 (UMMZ).

IDENTIFICATION. This species is related to *P. cieloi* and shares several characters with that taxon (see previous Species Account). Among its congeners with the distal portion of the male cercal shaft split, *P. strepsidactyla* is unique in having these appendages narrow, much more elongate, twisted, and non-flabellate. Also unique is the short, less conspicuously divided projection of the ultimate tergite, which is also structurally similar to that of *P. cieloi*.

DISTRIBUTION. This species has been found at only three localities between 19.8 and 32 road miles east of San Luis Potosi on the road between that city and Rioverde (San Luis Potosi), from elevations of 5,600 to 8,000 feet. These three localities are on a western ridge of the Sierra Madre Oriental. According to field notes, the habitat is oak woodland but this is probably in or near the pine zone. There have been no investigations for dichopetalines in the main mountains south of Ciudad Victoria (Tamaulipas).

Pterodichopetala hypsibates n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

TYPE. Holotype, male (plus allotype), Cerro Potosi, 17 rd.mi. NW. Galeana, 5.2 rd. mi. from Radio Sta., Km. 11.5, Nuevo Leon, Mexico, 21 October 1974, elevation 9,000 feet, coll. T. J. & J. W. Cohn #90A (UMMZ).

IDENTIFICATION. This species is most similar to *P. padrisima* and to a lesser extent, *P. pityophila*, although the form and color of the tegmina will separate the latter species. *P. hypsibates* and *P. padrisima* are separated by only about 40 miles in the Sierra Madre Oriental, and it was considered that they may represent only geographic variants. Yet, the differences in the epiproct between the two species are slight but apparently consistent, with the distal margin straight in *P. hypsibates* and concave in *P. padrisima*. The cercal shaft and outer appendage seem to be slightly wider in *P. hypsibates* as

well. Furthermore, *P. hypsibates* occurs on the western edge of the Sierra and *P. padrisima* is found within the eastern edge, and no collections have been made in the mountains between them. There appear to be no consistent differences in the epiphallus between these species.

DISTRIBUTION. This species is known from two collections on the same road leading to the Microondas station on Cerro Potosi near Galeana (Nuevo Leon) from 7,780 to 9,000 feet. It occurs in the pine-*Abies* zone with oak, although field notes indicate the species may have been taken on *Buddleja cordata* M. E. Jones, *Ceanothus* sp., and *Arctostaphylos* sp. *P. hypsibates* occurs syntopically with *Rhabdocerca tridactyla* at 7,780 feet, but higher at 9,000 feet, *P. hypsibates* appears to be alone.

Pterodichopetala padrisima n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

TYPE. Holotype, male (plus allotype), Rd. fr. (Villa de) Santiago-Los Lirios; Cany. San Isidro, 2.1 km. S. San Juan Batista (18.23 air km W. (Villa de) Santiago), Nuevo Leon, Mexico, 25.378444 -100.311417, 6 October 2004, elevation 1,480 meters, Fontana, Battiston, Agatibi, Garcia #45 (UMMZ).

IDENTIFICATION. This species is closely related to *P. hypsibates*; characters relevant to these species are discussed in the previous Species Account. The figure of the cercus (Fig. ???) shows the basal projection directed ventrad; this is likely an artifact of the problem of orienting the cercus for drawing and is probably similar to that of the other species.

DISTRIBUTION. This species is known only from the type locality within the eastern edge of the Sierra Madre Oriental, around 4,850 feet, where it is syntopic with *Rhabdocerca tridactyla*. Field notes do not specify the vegetation zone, but the crop contents of individuals dissected in the field were dark green and smelled like pine.

Pterodichopetala pityophila n. sp.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

TYPE. Holotype, male (plus allotype), 11 road miles southeast Arteaga (Puerto Flores), Coahuila, Mexico, [25.322961 -100.800155], 10 August 1959, elevation 6,800 feet, coll. T. J. Cohn #161 (UMMZ).

IDENTIFICATION. The epiphallus of this species is comparatively unique in the genus. The shape and length of the tegmina most resemble *P. cultricerca*, but form of the black tegminal markings and pronotal shape will easily separate them. The flabellate outer appendage of the male cercus is smaller than in *P. hypsibates* and *P. padrisima*. The epiproct has teeth which extend onto the caudal face, a feature shared only with *P. cultricerca*, but that species has short broad convexity (obscured in the holotype and not figured), whereas *P. pityophila* has a concave distal margin.

DISTRIBUTION. This species is restricted to two populations in the western edge of the Sierra Madre Oriental, not far distant from one another, both in the pine zone (but see the discussion of Galeana female below). Near Arteaga (6,700 to 7,050 feet), individuals were taken on pinyon pine near the lower edge of the pine-juniper zone. At Los Lirios (7,100 feet), they were found feeding on junipers at the edge of pinyon pine forests. The single female from nearby Galeana (6,500 feet) as with the Los Lirios population, also was on juniper. No *P. pityophila* were found in the desert, about 6 to 8 miles south of Puerto Flores (Nuevo Leon), where only *Rhabdocerca tridactyla* was found. The single female from 18.5 miles southwest Galeana (Nuevo Leon) resembles *P. pityophila* in tegminal shape and color pattern but seems to be too far to the south of the other southern *P. pityophila* (approximately 50 air miles) to be that species; a male will be necessary to confirm this species identification as diagnostic females characters, other than the tegmina, are lacking in the genus. *P. pityophila* occurs syntopically with *Rhabdocerca tridactyla* near Los Lirios (Coahuila), 11 miles south of Arteaga (Coahuila), and probably 15 miles west Galeana (Nuevo Leon) (*P. pityophila* here represented by a single penultimate juvenile male).

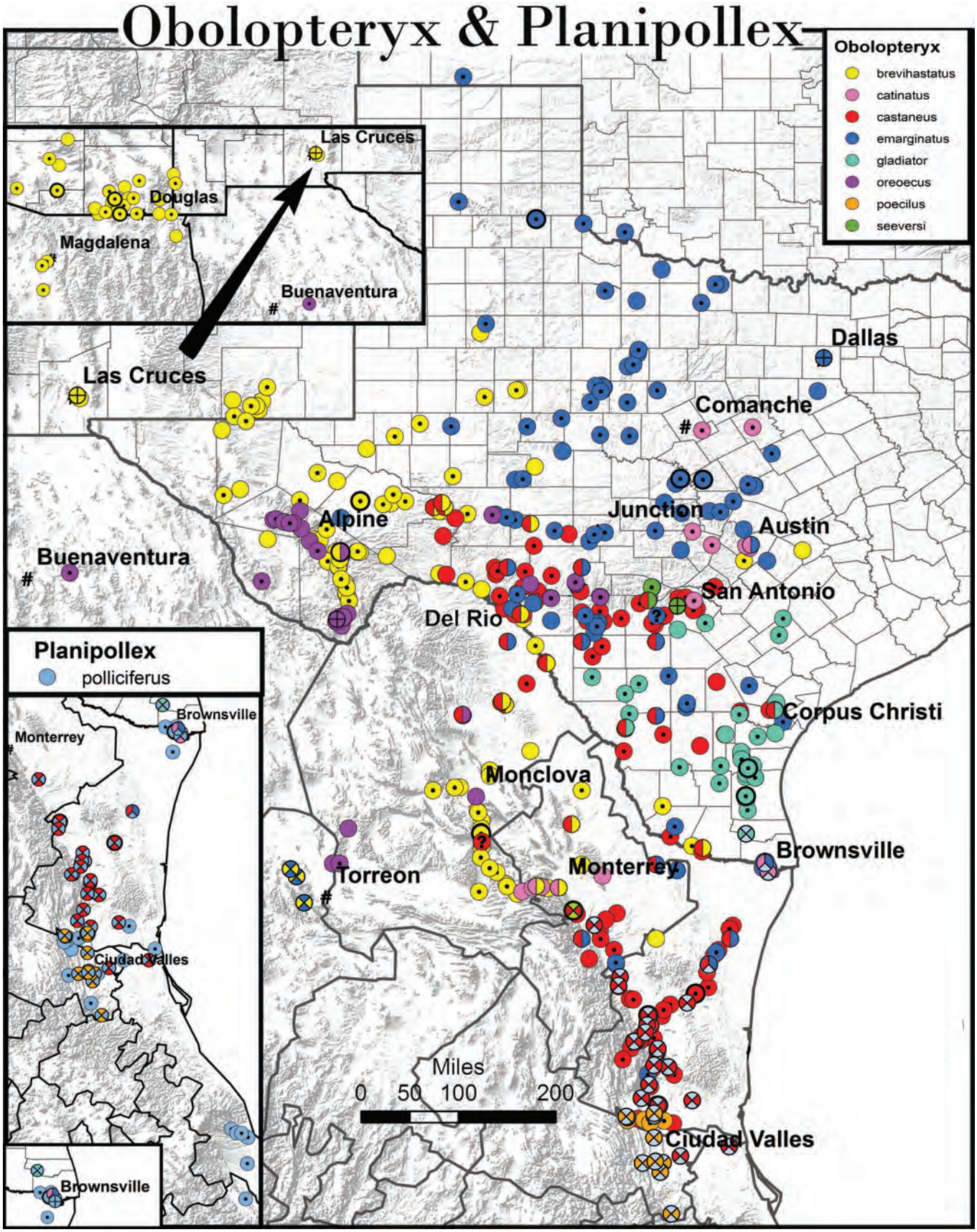
Pterodichopetala cultricerca (Strohecker, 1945) n. comb.

(Figs. (habitus) X-Y; (cerci) X-Y; (epiphalli) Y-Z; (male subgenital plate) X-Y; (epiproct) X-Y; (pronotum) X-Y; (first tergite) X-Y; (ultimate tergite) X-Y; (male tegmina) X-Y; (female ovipositor base) X-Y; (female tegmina) X-Y; Map 8, 9)

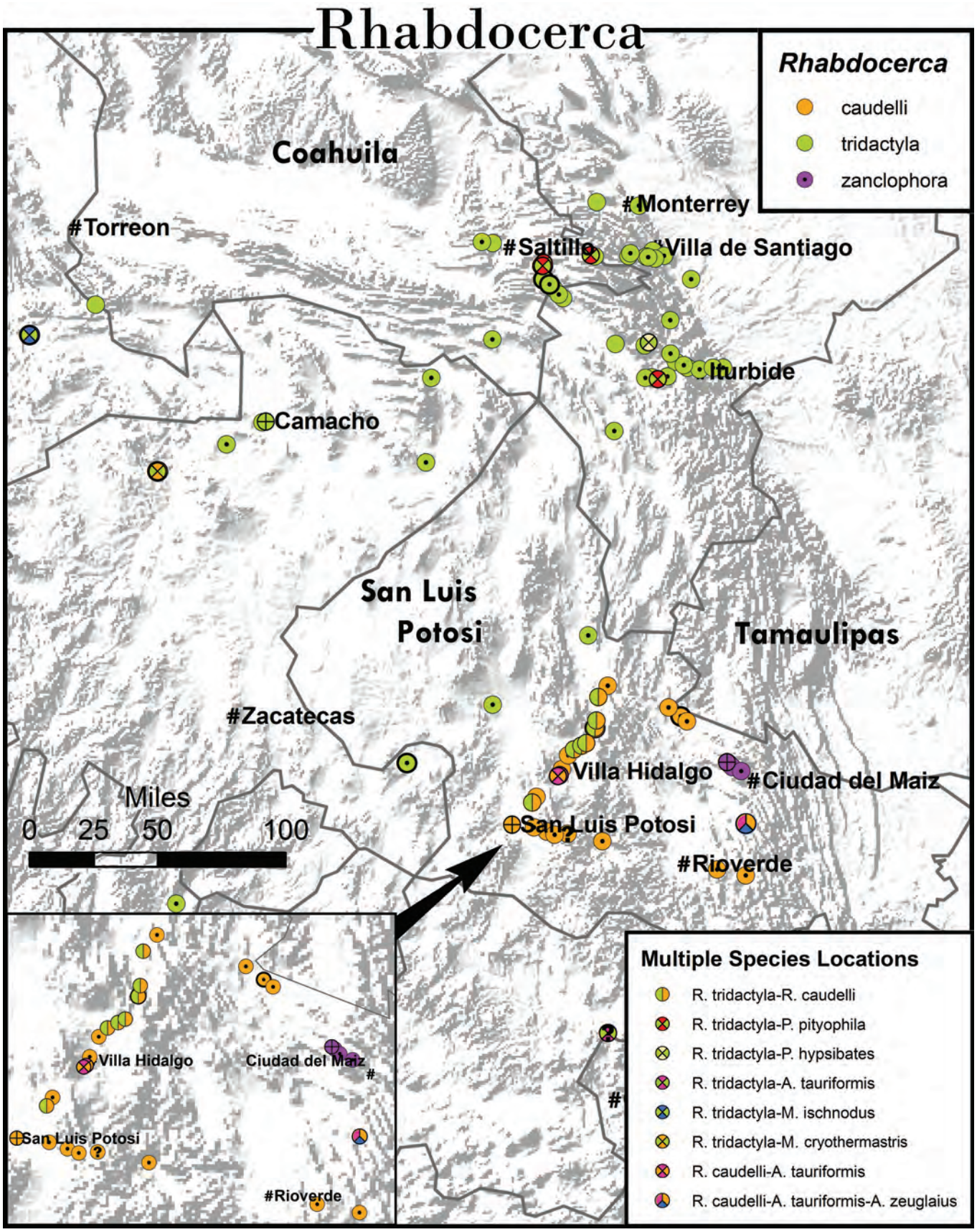
TYPE. Holotype, male, "Villa Santiago" [prob. S, or W. of Cola del Caballo Falls in mountains.], Nuevo Leon, Mexico, 19 June 1940, coll. Hoogstraal and Knight (FSCA) (Strohecker 1945).

We have examined the type of this species.

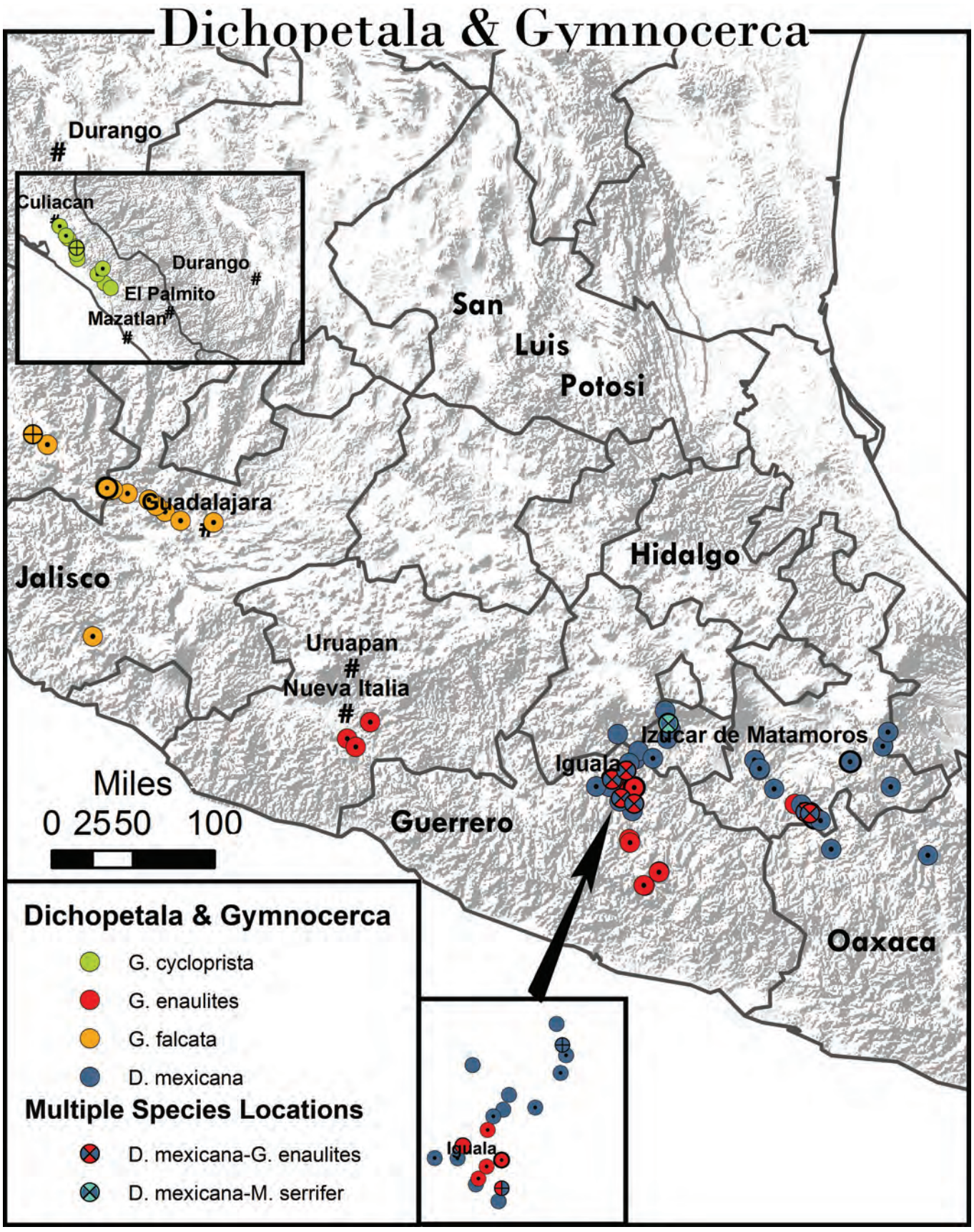
Because the five other species in the genus are all found above 4,500 ft. (and usually much higher), it is highly unlikely that the type of *P. cultricerca* was collected at the precise locality indicated on the label. Neither this species nor any of its congeners have been found at low elevations around Villa de Santiago by Cohn or the Fontana expedition (who collected *R. tridactyla* in the vicinity), although a close relative (*P. padrisima*) was found by the former in the mountains, only 18.23 air kilometers to the west at 4,850 feet. In addition, a female (UMMZ collection) of this species could have come



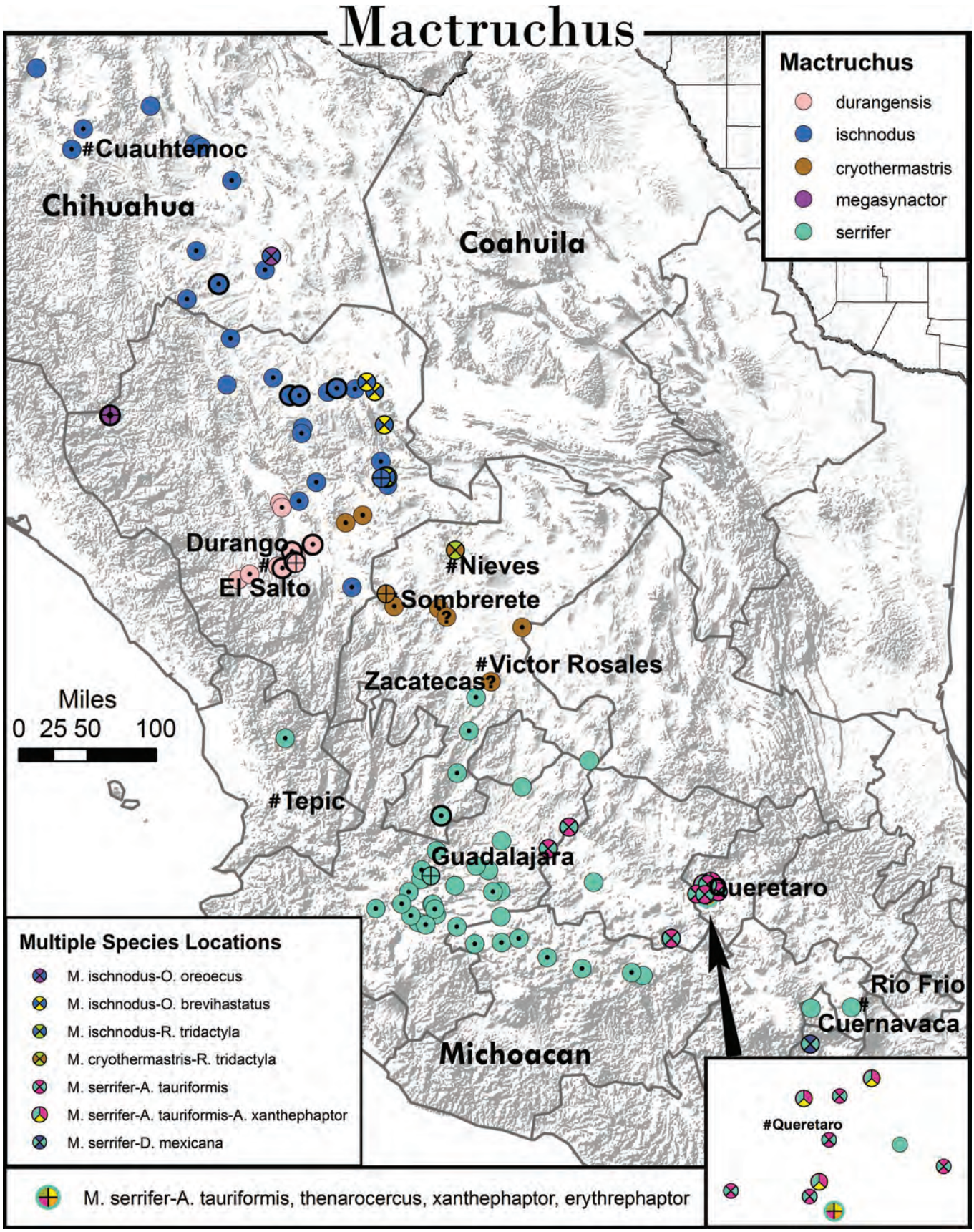
Map 3. Distribution of species of *Obolopteryx* and *Planipollex*.



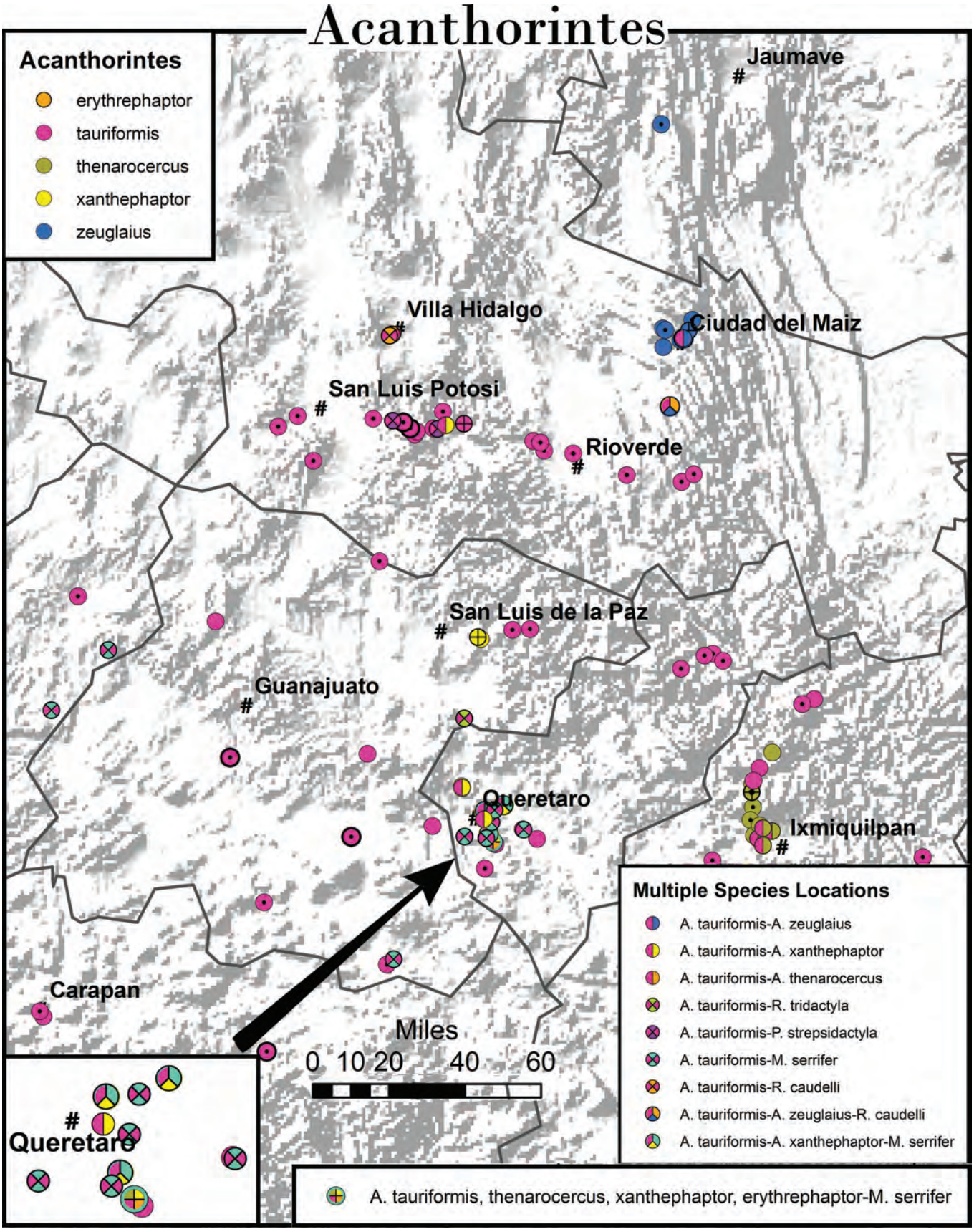
Map 4. Distribution of species of *Rhabdocerca*.



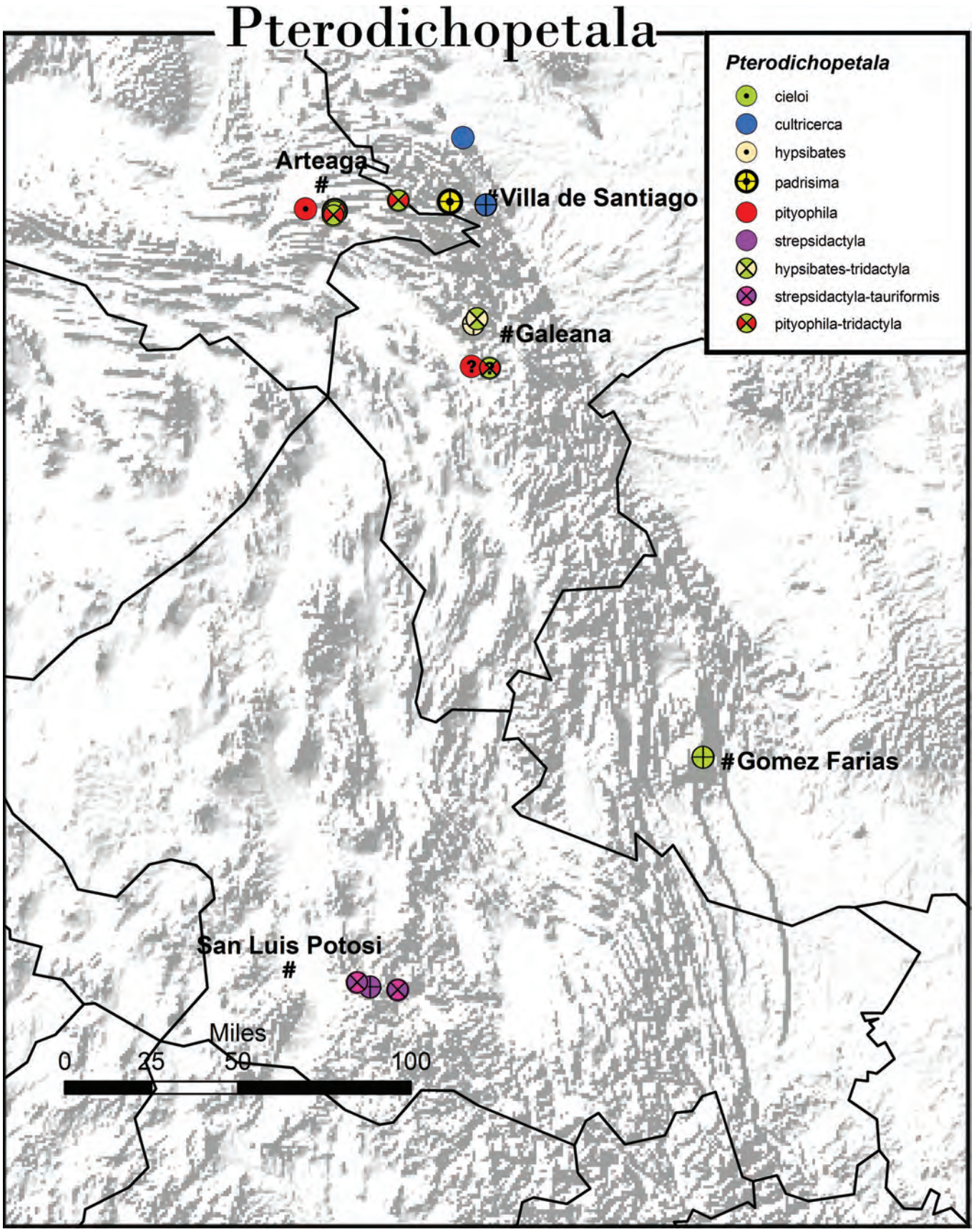
Map 5. Distribution of species of *Dichopetala* and *Gymnocerca*.



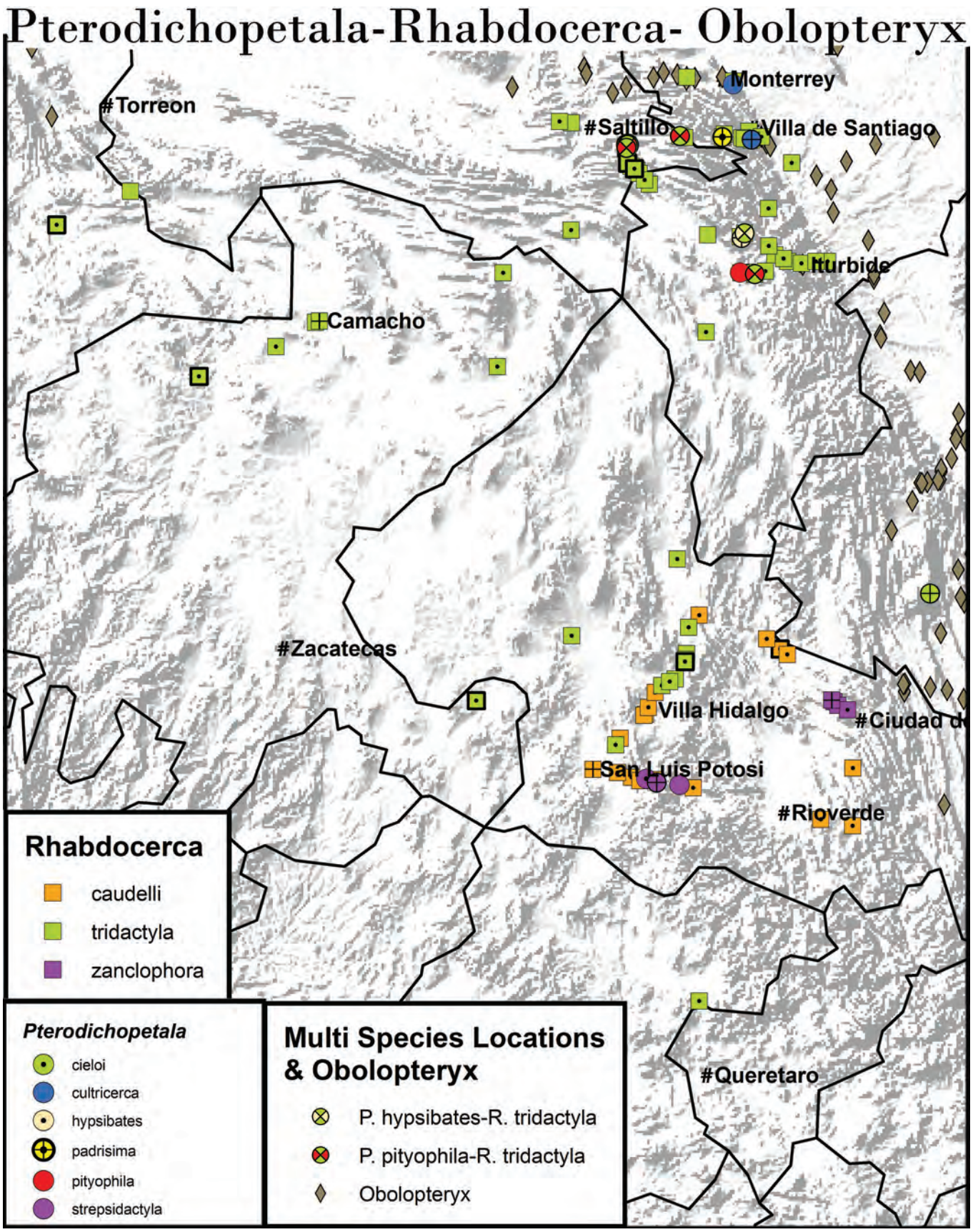
Map 6. Distribution of species of *Mactruchus*.



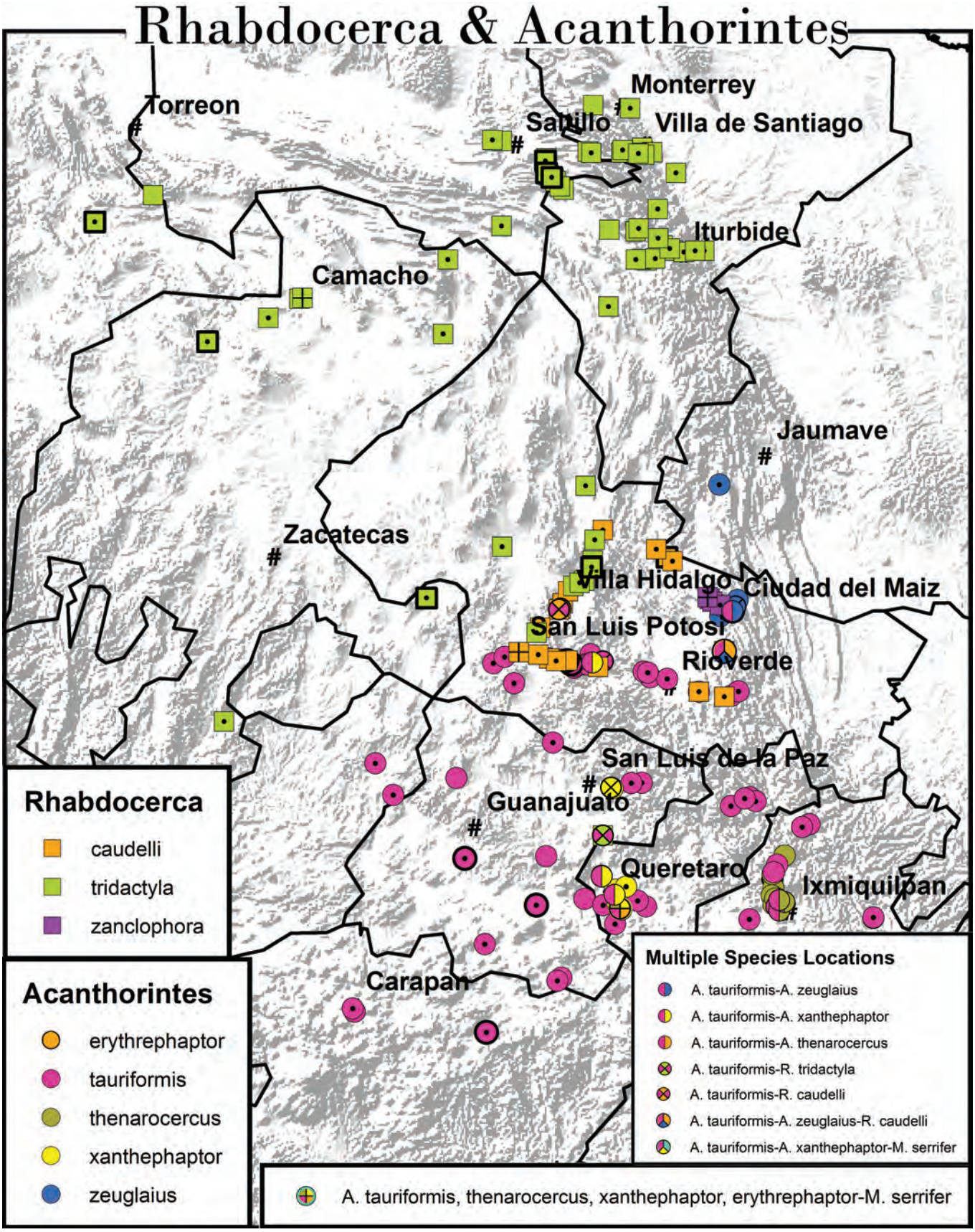
Map 7. Distribution of species of *Acanthorintes*.



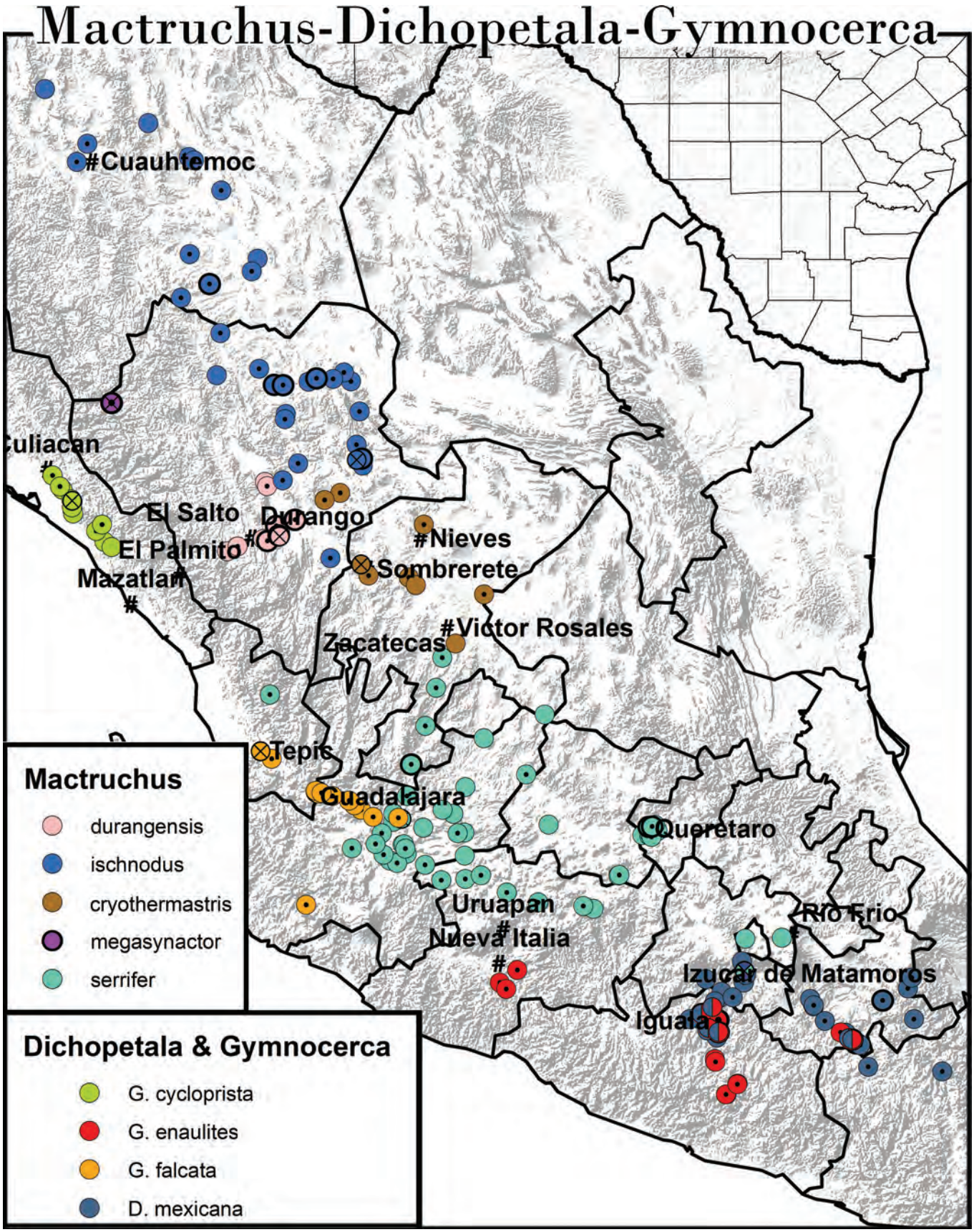
Map 8. Distribution of species of *Pterodichopetala*.



Map 9. Distribution of species of *Obolopteryx*, *Rhabdocerca*, and *Pterodichopetala*.



Map 10. Distribution of species of *Rhabdocerca* and *Acanthorintes*.



Map 11. Distribution of species of *Dichopetala*, *Gymnocerca*, and *Mactruchus*.

from much higher elevations south or west of the Cola del Caballo Falls. One of the collectors (Hoogstraal) told Cohn that the falls were their headquarters on several field trips. Unfortunately, this female was in a box of specimens "stirred up by customs officials" (see Hubbell Cat. B3, UMMZ Cat. 114), and the three labels mixed up. These labels read "Canyon de Huajoca near Villa de Santiago" (around 1,500 feet), "Las Adjuntas, sweeping in light pine woods" (probably high elevation as suggested by "pine woods"), and "meadow above Villa de Santiago, 9,000 ft." Hoogstraal indicated that Huajuco Canyon was the designation for the falls, that the trip to Las Adjuntas was by foot, and that they climbed to high elevations just for fun. There are no high mountains in the immediate vicinity of Villa de Santiago, but between that town and Las Adjuntas about 10 miles to the south (approximately 11.5 air miles south-southwest Villa de Santiago), there is at least one ridge that reaches close to 9,000 feet. We therefore think that *P. cultricerca* occurs at high elevations some place to the south or west of Villa de Santiago. Nevertheless, the coordinates in our spreadsheet for the holotype are those of the published type locality. The coordinates for the female are based on one of the three possible labels, and Hubbell guessed on assigning the female to Huajuco Canyon.

IDENTIFICATION. In addition to the highly distinctive and unique cercus and the moderately distinctive black tegminal markings, this species also has an elongate more mesally-constricted pronotum. The type and only male specimen of *P. cultricerca* has not been dissected and the interlocked basal arms of the cercus make rehydration and subsequent manipulation without damaging the holotype a difficult task. Still, the apices of the distal projections of the epiphallus can be clearly seen and appear to be most similar to *P. hypsibates* and *P. padrisima*, and the partial view of the epiproct reveals an armed condition comparable to its congeners. Since we have only examined one male and one female each of this species, we are uncertain of the minor variation in individual morphological features, such as the epiphallus, male subgenital plate, and epiproct.

DISTRIBUTION. The species certainly occurs in the vicinity of (Villa de) Santiago (Nuevo Leon) but as indicated above, the type may be mislabeled and a definite locality is not known for the other specimen.

PHYLOGENY AND POLARITY

We have had great difficulty in establishing relationships among the genera erected from *Dichopetala sensu* Rehn and Hebard, 1914 + *Pterodichopetala* Buzzetti, Barrientos, and Rocha 2010. While the general habitus remains the same between the groups, the genera of this phyletic line are so distinctive that it is hard to identify characters that indicate relationships between any two. Although the genera were erected solely on the basis of male genitalic characters, these comprise four discrete components that we have studied, which usually show correlation within any one genus.

The Paradox of *Pterodichopetala* Tegminal Development. At the center of this problem are the tegmina. As mentioned under Morphological Notes, the dichopetalines all possess greatly shortened tegmina with extremely shortened hindwings, which rarely exceed the posterior margin of the first tergite.

Pterodichopetala remains the exception, in which both sexes of the species possess the same shorted hindwings but have long tegmina, similar to other non-odonturine-barbitistine phaneropterines. Thus, the relationships within and without *Pterodichopetala* are of particular interest. There can be no question that the members of *Pterodichopetala* are dichopetalines; they possess the same morphologies as the other dichopetaline genera in all characters other than the tegmina, including the four male genitalic tendencies (see Genus Account of *Pterodichopetala* as well as Breaking Up *Dichopetala*, Characterizing the Dichopetaline Genera, and Tribal Problems). Thus, given the presence of reduced hindwings in all the genera, it would appear that such wing reduction either succeeds or accompanies tegminal reduction.

And so accepting the close relationship of *Pterodichopetala* with the other genera, brings up the question of where that genus might fall on the phyletic line. With such a marked difference from and an identical development in the other genera, it only makes senses to place *Pterodichopetala* at either end of the phylogeny. Therefore, we have two opposing hypotheses: (1) *Pterodichopetala* is the most primitive dichopetaline genus, meaning the long tegmina represent retention of a long-winged ancestor; or (2) *Pterodichopetala* is the more derived taxon within the dichopetalines, meaning the long tegmina redeveloped from short-tegmina ancestors.

Scenario 1: Primitive Retention. Ordinarily, the long tegmina would be considered primitive on the basis of the hypothesis that, once reduced, insect wings are not redeveloped. This also would make sense because the majority of the phaneropterines possess long tegmina. Following this idea, one would expect that primitively retained wings and tegmina would have relatively normal longitudinal venation in the tegmina. This is the case in *Pterodichopetala* as the tegmina have fully developed venation, with at least the main veins homologous to other phaneropterines (Heads, pers. comm.). However, this does not prove anything on its own, since we do not know whether normal venation would be present in a redeveloped tegmen. This primitive retention hypothesis also more readily allows for the graded degree of tegmina length among the species of *Pterodichopetala*.

This primitive retention hypothesis, however, has three major problems. First, the hind wings are greatly reduced in a manner similar to most other dichopetalines, and it is hard to understand such wing reduction with retention of long tegmina. Instead, one would expect the wings to be long and functional. Analogously in *Neobarrettia*, as the tegmina get shorter, the hindwings become equivalently shorter; they are reduced to nubs as in *Neobarrettia imperfecta*. However, in

this genus, the wings are brightly colored and serve a display function and such is not the case in the dichopetalines. In all the Phaneropterinae, we are aware of only one other example with long tegmina and short wings (*i.e.*, *Altihoratosphaga*, Hemp, Voje, Heller, Warchalowska-Sliwa, and Hemp, 2010; Heller, pers. comm., 2011). Such wing reduction may have an acoustical function, especially considering the inflation of the tegmina (like *Cosmophyllum* and *Marenestha*; see Genus Account of *Pterodichopetala*), but we are aware of no such explanation. Furthermore, if this is the case, the other genera might be expected to show the same pattern of long tegmina and greatly reduced wings; we have no hypothesis to account for a subsequent reduction of tegmina to the average dichopetaline variety. There also exists the problem of opposing polarities of morphology. Under this scenario the species with the longest tegmina (primitive condition) has the most complex tenth tergite (derived condition) and vice versa. The third problem concerns the ancestral condition and the purported relationships to the other Odonturini-Barbitistini. If the tegmina are taken to be primitive retentions, then the position of *Pterodichopetala* must be basal to the other dichopetalines. But this requires that other Odonturini-Barbitistini (taken to be more primitive because of the the simple male cercus, the lack of an epiphallus, and the triangular female subgenital plate) must be placed more basally in the phylogeny than *Pterodichopetala*. Therefore, the ancestor of the Odonturini-Barbitistini must have reduced their tegmina and wings (to the same extent as the dichopetalines) independently of the dichopetalines.

These problems render the primitive rentention hypothesis a little difficult to accept.

Scenario 2: Redevelopment. The only alternative to primitive retention of long tegmina is that these structures redeveloped from a condition similar to the dichopetalines and Odonturini-Barbitistini. This would eliminate all three problems with primitive retention hypothesis, *i.e.*, reducing wings without reducing tegmina, opposing polarity of the tenth tergite, and need for indepedent reduction of tegmina in the Odonturini-Barbitistini. Also supporting this hypothesis is the absence of the humeral sinus in all species of *Pterodichopetala*. The humeral sinus always seems to accompany long tegmina and long wings; thus, we have taken its absence to indicate an ancient loss of wings. Reinforcing this idea of ancient loss is what appears to be a recent reduction of tegmina and wings in a short-tegmina isolate of *Anisophya biforma* Nickle, 2011, very close geographically to the long-winged form; the humeral sinus is retained in both forms, and the wings in the brachypterous form are nearly as long as the tegmina (Nickle 2011).

However, each of the supporting factors for the primitive retention hypothesis become strikes against the redevelopment hypothesis. The relatively normal venation might argue against this hypothesis, although it is conceivable that suppressed genes be reactivated and produce perfectly normal ancestral tegmina. It also makes difficult to understand the existence of graded degrees of long tegmina in *Pterodichopetala*, *i.e.*, successive stages of elongation, especially if dormant genes simply have been "turned on" again, although relicts of the redevelopment process are not inconceivable. Still, an additional problematic point is that, under the redevelopment hypothesis, *Pterodichopetala* could have arisen at any point on the dichopetaline phylogeny.

So here we have a paradox. With all of these uncertainties, we are unable to provide a polarized, substantiated phylogeny for the dichopetaline genera. Additionally, these problems directly affect the tribal classifications, viz. with which genera are the dichopetalines more closely allied (see Tribal Problems, specifically those dealing with *Cosmophyllum*, *Marenestha*, and *Arachnitus*).

Greater Reduction of Tegmina. We are tempted to see relationship in the extreme reduction of the female tegmina in three genera (*Obolopteryx*, *Rhabdocerca*, and *Planipollex*). These tegmina are reduced to small pads of the same size and shape that are clearly separated (pinning may produce an apparent difference in position, but dissected tegmina look very similar). In addition, these tegmina have the same color pattern as the adjacent pronotum and abdominal tergites.

While reductions are only weak characters because of the impossibility of identifying convergence in reduction, the rounded condition, the general size, and the similar coloration of the tegmina in these three genera may indicate true relationship, viz. the apomorphic condition, and might be a synapomorphy for the three genera as there are other shapes, sizes, and colors that are possible in reducing the tegmina (*e.g.*, short, wide truncate condition in two species of *Acanthorintes*). In most other genera, the female tegmina are longer (generally similar to the length in the males) and usually conspicuously overlapping.

Yet, none of these three genera are obviously related to each other, especially on the extremely diverse epiphallic characters (elongate and medially fused in *Obolopteryx*; rounded and separate in *Rhabdocera*; absent in *Planipollex*). However, when compared with the paired, three-dimensional, usually spined epiphalli of the other dichopetalines, it is perhaps significant that these three genera have less scleratized, less robust epiphalli (*i.e.*, flatter plate-like or absent). The lack of sclerotized epiphalli in *Planipollex* may be a derived loss or primitive retention with the dichopetalines, but we have no evidence to support either of these two hypotheses. Also, the male cerci of *Obolopteryx* and *Planipollex* appear similar in their possession of a "thumb". It is worth noting that all three genera are found in the northern extent of the greater dichopetaline distribution. Yet, the reductionary nature of this structure means this condition could have arisen at any point in the phylogeny.

Other Suggestions of Relationship. There are, however, several other weaker cases of suggested relationships, based on morphological structures:

- spinose epiphalli suggests a weak relationship among the four of the remaining genera: *Pterodichopetala*, *Acanthorintes*, *Mactruchus* and *Gymnocerca* (with a loss in *G. enaulites*).
- *Acanthorintes* shares with *Pterodichopetala* highly distinctive epiphallic morphology in the paired spined proximal fingers as well as multispinous apical regions. These genera, however, share no other features, other than perhaps a tendency toward modified (although dissimilar) epiprocts.
- the already-discussed problematical relationship between *Mactruchus serrifer* and *Gymnocerca falcata*, based on the identical epiphallus as well as the similar epiproct and base of the ovipositor. However, the male cerci and subgenital plate are radically different, although the latter is probably autapomorphic.

One of the conundrums of character distribution is that the modification of the first tergite which is found uniformly in *Rhabdocerca* but appears in identical form in *Acanthorintes tauriformis* and *Dichopetala mexicana*, we can find no practical way of relating these genera.

Two obvious obstacles are (1) the intractable problem of relationships among the three species of *Gymnocerca* (see under that genus) and (2) the apparent lack of any suggested relationship between any other genus and *Dichopetala mexicana*. For the latter, one might in desperation consider the unarmed male cercus, flattened paired unspined epiphalli, and southerly distribution in the Balsas Basin to suggest relationship with *Gymnocerca enaulites*.

Part of our problem stems from the difficulty of polarizing almost any genitalic character because of the lack of obviously related outgroups, which would clearly indicate either ancestral conditions or a phyletic line of long duration, allowing for the development of many autapomorphic tendencies (such as complex cerci, well-developed epiphalli, relatively complex male subgenital plate, etc.).

BIOGEOGRAPHY

General Distribution of Dichopetaline Genera

The northern limits are set by *Obolopteryx* in southernmost Oklahoma. As it has already crossed the Red River and there are no geographic barriers farther north, the restriction to its northward distribution is probably climatic (Kensinger, pers. comm., 2012). To the west of Texas, only one species occurs and it is restricted to the arid southern portions of New Mexico and Arizona. To the east, the dichopetalines are absent from humid eastern Texas and the entire eastern United States. *Obolopteryx* penetrates northern Mexico but to the east skirts the Sierra Madre Oriental and two species extend far south into the Coastal Plain, where it is accompanied by *Planipollex polliciferus* (restricted to the Coastal Plain). The main part of the Mesa Central is occupied by three genera: *Mactruchus* to the west, *Rhabdocerca* to the north and east, and *Acanthorintes* to the south. In the Sierra Madre Oriental, another genus (*Pterodichopetala*) occurs at high elevations. To the west and the south, the dichopetaline genera are bordered by a band of widely separated species of the genus *Gymnocerca*: on the west coast and south of the Sierra Madre Occidental as well as in the Rio Balsas Basin in Guerrero, where it is accompanied by the monotypic genus *Dichopetala*.

Influences of Negative Data

Equally worthy of consideration is the presence of negative data (see Map 1). In many situations, we have carefully examined especially distributional limits with consideration for areas where (1) we have either no collections or (2) areas where a particular species was expected but not found (*i.e.*, where intensive collections have been made for other orthopterans which surely would have revealed the presence of that particular species).

We have commented extensively on such negative distributional phenomena, because, in a well-collected genus, such data (or lack thereof) is of considerable significance. The absence of a particular taxon may reveal different conclusions. For example, the precise northern limits of *Rhabdocera tridactyla* in the region of Torreon are not well known because there has been no collecting of Orthoptera done in this area. Contrastingly, the lack of dichopetalines in coastal Sonora is real, because intensive collecting for other orthopteran has been done between Nogales and Culiacan by Cohn who surely would have collected dichopetalines if they had occurred there. Negative data also may have interesting implications for the phylogeny of the group. It is perhaps significant that, despite lack of barriers, the dichopetalines have not extended farther into the United States. Also significant is the single restricted species occurring on the west coast of Mexico. Although several species occur at moderate to high elevations in Northern Mexico, the group has not extended into the mountain systems of the Sierra Madre del Sur and of Oaxaca or to the southern coast of Mexico. This is known because some intensive sampling for tettigoniids has been made in coastal Nayarit, coastal Colima and coastal Michoacan and at several localities in southern Mexico and Central America without finding any of these genera.

Geographic relationships between and within genera, with especial reference to similarities and differences of genitalia

The members of this phyletic line (dichopetaline genera) generally show a surprising pattern of geographic relationships. Since we have large collections made over a period of years looking for gaps, allopatry, parapatry, etc., we have devoted a great effort to summarize the details of sympatry, allopatry, and syntopy. We have done this genus by genus (see also the Genus and Species Accounts for more information) because

we think that knowledge of the precise distribution and range limits as well as the apparent interactions with other species will be most useful in unraveling the complicated geographic phenomena present in these taxa.

To begin, it is important to note that each of the dichopetaline genera (except *Gymnocerca*) has a cohesive distribution.

In general, there are three interesting distributional phenomena worthy of examination (brackets in the section below refer to these phenomena):

1. Syntopy (and/or close sympatry) of species, especially with similar genitalia (unexpected under traditional speciation theory)
2. Replacement and close allopatry without geographic barriers among species with different genitalia
3. Sympatry of unrelated genera and species with different genitalia (expected under traditional speciation theory).

Obolopteryx. In a genus in which all species have similar genitalia, there is a remarkably high incidence of sympatry and syntopy [1]. Interestingly, much of this overlap involves *Obolopteryx castaneus*, which has a very different subgenital plate from the species with which it overlaps (except *O. poecilus*). Yet, even ignoring *O. castaneus*, the general sympatry and syntopy remains among the other species. *Obolopteryx oreoecus*, a species with an apparent preference for montane habitats, does not appear to overlap with any other species, despite the close proximity of *O. brevihastatus*.

Planipollex. *Planipollex polliciferus* is syntopic with *O. poecilus* and *O. castaneus* over a fairly extensive area in the southern part of the range of both genera, but the differences in the genitalia are such as to render this less unsurprising.

Rhabdocer*ca.* *Rhabdocerca caudelli* overlaps only briefly with *R. tridactyla* at the western limits of its range; yet, these species share a very closely similar cerci, epiphalli, and both male and female subgenital plates [1]. These details are discussed extensively under the Species Account for *R. tridactya*. The third species, *R. zanclophora*, differs from both and occupies a small apparently-isolated range to the northeast of *R. caudelli*. None of the species appear to be separated by obvious barriers.

Obolopteryx overlaps *Rhabdocerca* (and only with *R. tridactyla*) near Monterrey but only at the very edge of their ranges, and the overlapping species possess very different genitalia. To the west, *R. tridactyla* does not appear to penetrate into the range of the several *Mactruchus* species, despite the apparent lack of geographic barriers between them [2]. *R. tridactyla* does contact and apparently is syntopic with *M. ischnodus* at one point (Cuencame, Durango) and *M. cryothermastris* at another point (Nieves, Zacatecas); the two genera have very different genitalia. The widespread *R. tridactyla* occurs syntopically with the northern species of *Pterodichopetala*, also with very different genitalia.

Acanthorintes. Members of *Acanthorintes* show a similar pattern of considerable overlap and syntopy of several closely similar species (such as *A. xanthephaptor*, *A. erythrephaptor*, and *A. thenarocercus* near Queretaro, Queretaro) [1]. However, all species are sympatric as well as syntopic with *A. tauriformis*, which has very different genitalia, especially in its cercus.

Acanthorintes overlaps the southern portion of the range of the the genitalically very different *Rhabdocerca* where there are a few cases of syntopy; it apparently replaces *Rhabdocerca* south of the San Luis Potosi-Rioverde Road without obvious geographic barriers [2].

Mactruchus. In contrast to the examples of syntopy described above, all species of *Mactruchus* are generally separated from one another, although *M. cryothermastris* with a distinctive cercus falls within the range of *M. ischnodus* northeast of Durango. There does not appear to be obvious barriers between these species. *M. ischnodus* also may be syntopic with the very different *Obolopteryx brevihastatus* near the Sierra Mapimi [3].

M. serrifer occurs with and is sometimes syntopic with several other genera. It is most extensively sympatric with *Acanthorintes tauriformis*; the two species occur together, often syntopically, in the southern portion of the Mesa Central. South of Queretaro, *M. serrifer* also is occasionally syntopic with three other species of *Acanthorintes*. Yet, *M. serrifer* is very different genitalically from the species of *Acanthorintes* [3].

Mactruchus serrifer also is sympatric with *Gymnocerca falcata*, a species with a similar epiphallus but different in other genitalic features, at a locality somewhat removed from the main distribution of *G. falcata*, (see discussion under Species Accounts) [2]. *M. serrifer* and *Dichopetala mexicana* may overlap in Cuernavaca but the latter occurs throughout that area at lower elevations in the Balsas Basin where we have never found *M. serrifer* [3].

Gymnocer*ca.* *Gymnocerca cycloprista* is completely isolated on the west coast of Mexico in Sinaloa by the Sierra Madre Occidental where no dichopetalines occur. This suggests a vicariance event with the uplift of the Sierra Madre Occidental or an unusual dispersal for a short winged species. *Gymnocerca enaulites* appears to be completely sympatric and often syntopic with *Dichopetala mexicana* in the western part of its range, a situation not unexpected on the basis of the different male genitalia [3].

Pterodichopetala. All species of *Pterodichopetala* are isolated from each other. Our current collections suggest that they are higher elevation species but the mountains between them have not been investigated. All species of *Pterodichopetala* (except *P. cieloi*) are syntopic with the very different *Rhabdocerca tridactyla* or in one case, *Acanthorintes tauriformis* [3].

Possible Geologic Influences on Dichopetaline Distribution

Without a well-supported phylogeny or established sister taxon, it is difficult to hypothesize a history of the dichopetaline

genera. Nevertheless, we can point out a few patterns in their distribution:

- the northern distribution (limits represented by *Obolopteryx* in southernmost Oklahoma) contains those three genera (*Obolopteryx*, *Planipollex*, and *Rhabdocerca*) with small separated female tegmina, probably a derived character. Therefore, this area likely represents an area of dispersal rather than an origin of diversity.
- species with simple cerci are found in a westernmost and southernmost arc around the other genera. These include members of *Gymnocerca* and *Dichopetala*.
- *Mactruchus* and *Acanthorintes* seem to replace *Rhabdocerca* in the west and south, respectively, on the Mesa Central. Furthermore, *Obolopteryx* may replace *Rhabdocerca* in the north.
- restriction of long-tegmina members in *Pterodichopetala* to montane areas of the northern Sierra Madre Oriental.

It also seems that the geologic history of Mexico, particularly the uplift of the various mountain systems, contributed to the evolution of the group. The uplift of the mountains may have had either a vicariance or a restrictive effect on several species:

- Sierra Madre Occidental: the uplift of this system clearly isolated one species, *Gymnocerca cycloprista*. Unfortunately, we see no (or only very weak) relationship to any of the species or genera east of those mountains.
- Transverse Volcanic Belt: the uplift of this system probably isolated *Gymnocerca enaulites* and *Dichopetala mexicana*; yet, we have no clear indication of related species to the north of the Transverse Volcanic Belt (although *Gymnocerca falcata* share the essentially simple male cercus).
- Sierra Madre Occidental: this uplift probably restricted *Mactruchus* from spreading west to the coastal plain.
- Sierra Madre Oriental: this uplift seems to have restricted both *Rhabdocerca* and *Acanthorintes* to the Mesa Central, with *Rhabdocerca tridactyla* subsequently moving through the Saltillo pass to a restricted area on the edge of the Coastal Plain. It also seems to have affected the distribution of *Obolopteryx* and *Planipollex*, diverting some species to the west onto the Mesa Central (*e.g.*, *O. brevihastatus*, *O. oreoecus*) and some east onto the Coast Plain (*e.g.*, *O. poecilus*, *P. polliciferus*). Therefore, we would expect that *Obolopteryx* and *Planipollex* developed after that event and spread either north or south. The cross range between Torreon and Saltillo, although now not very high, also may have formed a barrier in the past to the southern extension of two species of *Obolopteryx* and restricted the northern extension of one species of *Rhabdocerca*, although our collections in and near these mountains are few. These same mountains allowed the evolution of the high elevation *Pterodichopetala* species.

Despite these patterns, it is difficult to envision a widespread ancestor being fragmented by these geologic events; yet, by the same token, neither can we identify any migration events. For example, if the spread was from south to north, there is no real evidence that *D. mexicana* or *G. enaulites* are relicts of that spread. Contrastingly, if the spread was from north to south, we are faced with a paradox that the northernmost genera all have the presumably derived conditions.

Intercontinental Relationships and Associated Geographic Problems

As discussed under Tribal Problems and alluded to in Phylogeny and Polarity, the dichopetalines may be related to the European and South American Odonturini-Barbitistini. We are aware, however, of the serious biogeographic problem that these relationships would involve.

Certainly one problems that arises is a climatic one, namely the restriction of the dichopetaline genera to the dry regions of the southern United States and Mexico. In the United States, the dichopetalines do not occur in humid eastern Texas and occur only in the arid southern portions of New Mexico and Arizona; there are no relatives in eastern North Ameri*ca.* In Mexico, only a few species penetrate the humid regions of the eastern coastal plain. To the south, the dichopetalines barely penetrate, if at all, the northern mountains of Oaxaca and, therefore, do not occur in the more humid areas of Central Ameri*ca.* This greatly contrasts the Mediterranean climate of the region where many of the barbitistine species occur.

Additionally, it is hard to envision how the New World dichopetalines became separated from the Old World Odonturini-Barbitistini. If the relationship across the Atlantic resulted from a dispersal event of an unknown long-winged ancestor, we can provide no hypothesis for when that event occurred as such events are not objectively dateable. If it was a migration event, there is the problem of the very early separation of Africa and South America and somewhat later separation of North America and Europe. At the time of separation of North America (Eocene), at least North America was relatively humid, requiring some ancestor of the dichopetaline lineage to adapt to increasingly drier conditions. If the connection was across North America and Asia, we have no relic populations in northern and western North America, and there are no Odonturini-Barbitistini in eastern Asia (excepting *Paraperopyrrhicia* Ebner, 1915 in Papua-New Guinea) (Eades *et al.* 2013). It should be noted that we have not studied in detail the occurrence and distribution of Spanish and western African Odonturini-Barbitistini.

However, the few South American odonturines also are very widely separated from their possible dichopetaline relatives. Again, it is difficult to envision any kind of terrestrial connection between the two prior to the closure of the Panamanian portal in the Pliocene (*ca.* 4 MYA) (Iturralde-

Vinent and MacPhee 1999), and there apparently are no relicts in Central America south of Oaxaca and north of Ecuador.

The alternative is to conclude that there are no relationships with these taxa and they represent convergence or incidental offshoots from the more ancestral phyletic line; in this scenario, they offer little value for understanding the evolution of the dichopetalines. This hypothesis of convergence may find support in the comparatively simple male cerci and lack of epiphalli as well as the undivided subgenital plate of the female. This would mean there are multiple origins for two rather restricted (and one apparently complex) characters (*i.e.*, short tegmina with stub-like wings, spiny female ovipositor) in the Phaneropterinae.

NATURAL HISTORY

Habitat. We have surprisingly little information on the natural habitat of any of the dichopetaline species. Most of our collections come from roadside weeds and bushes with little notation of the surrounding habitat. In the Species Accounts, we have, therefore, designated habitat only when it can obviously be defined (*e.g.*, woodland, desert). Yet, there has been little focus on transecting across physiographic or vegetative transition zones and habitat data is lacking in instances where we have nearby collections which do not contain dichopetalines.

Perhaps, only in western Texas, do we have sufficient data on *Obolopteryx oreoecus* and *O. brevihastatus* to indicate strong habitat preferences (see those Species Accounts). We also know most species of *Pterodichopetala* occur only in the mountains and in some instances, the surrounding lowland has been investigated carefully. One such example is *Pterodichopetala cieloi*, which has a large upper altitudinal range and which the type locality has apparently been investigated extensively (Buzzetti *et al.* 2010a) and where none of the dichopetalines common in the lowlands to the east have been found.

Especially in Mexico, a number of species and genera seem to replace each other without apparent differences in habitat; these may be cases of competitive exclusion. Examples of these may be found in the discussion of Biogeography and also are highlighted under Promising Problems.

For more detailed information on vegetation in Texas, see Tharp (1952) and in more general terms for Mexico, see Rzedowski (1978).

Seasonality. We know very little about the life history of the dichopetaline species. Buzzetti *et al.* (2010a) reported *Pterodichopetala cieloi* overwintering as eggs. From our large collection, we can determine that all have been collected during the summer and early fall, which may be an artifact of when academicians can do distant field work. Adult males and females of several species have been collected in May as well as late December; we have seen no material from January through April. This broad seasonal distribution may suggest the possibilty of two generations per year, but our records are too sparse to make a strong case for bivoltinism. There is no information available, to our knowledge, on the duration of the nymphal instars.

We do have intriguing collections made by Swanson within a few days after sudden rains during a severe drought year (September 2009) in southern Texas. Minute *Obolopteryx* nymphs (first or second instar) were collected at three different localities: south of Tilden (McMullen County), at Armstrong (Kenedy County), and in Bentsen-Rio Grande Valley State Park (Mission, Hidalgo County). The nymphs were identified by association with adults (from other years) in the first two localities. If these survived the winter, it may indicate a second generation for some species. This might also suggest that the hatching time of other dichopetaline species may be dependent upon rains.

Additionally, in northern Mexico, adults of *Rhabdocerca tridactyla* have been collected between June and December. But a large series at Ojo de Agua near Galeana (Nuevo Leon) at 6000 feet on 12 August contains only three adult males and one adult female amid a large number of juveniles ranging from large to very small, with more in the small range for both sexes. In August, in this region, at this elevation, one would expect more adults, and the presence of such a high proportion of small juveniles suggests either a winter maturation, which is not seen in our admittedly small winter samples, or an overwintering stage, which is belied by the scarce adults in the late summer (August) in this collection. With these issues it is important to consider collector bias; yet, this collection by Hoogstraal is likely to be less biased than the collections of Cohn who concentrated on obtaining adults. Nevertheless, a collection by Cohn from south of Arteaga on 10 August also contains a surprisingly large number of small juveniles but in a large collection of adults.

Mating and Oviposition. Little is known about the mating habits of these katydids, and it is for this reason that a photograph of the two individuals *in copulo* is included (Fig. 49). There have been no observations of courtship or pre-mating behavior for the dichopetalines, although some taxa in the Odonturini-Barbitstini have been studies (*e.g.*, von Helverson and von Helverson 1991). However, during copulation, the female (here observed in *Obolopteryx* spp.) faces away from the male and raises the ovipositor. The male, positioned behind the female, may grip the female's abdominal dorsum or hind legs or the surrounding vegetation with his front two pair of legs. He then curls his abdomen ventrally around to come in contact with the proximoventral area of the ovipositor. It appears that the ventral margin of the ovipositor fits into the emargination of the male subgenital plate. However, it is unknown whether the male cerci grip the lateral sclerites of the female terminalia (and if so, where) or what role the sclerotized portion of the epiphalli or "titillators" play in copulation. During this union, the insects are free to move about in tandem; in our examined material, one pair have been killed and pinned *in copulo*. No

information is known to us regarding duration of copulation or frequency of mating. It would be of particular interest to study the mating habits in greater detail, both in a comparative intergeneric light as well as in comparion to the Odonturini-Barbitistini with more simple genitalia.

We are aware of only two literature records of oviposition in the dichopetalines, both reporting egg-laying in the soil (*Pterodichopetala cieloi*, Buzzetti, Barrientos, and Rocha 2010; *Obolopteryx emarginatus*, Isley 1941). This is corroborated by our observations as we have frequently examined females in which the ovipositor teeth are worn down or blunted. It certainly would be of interest to compare the ovipositional site and behavior of the dichopetalines, other odonturine-barbitistine genera with spinose ovipositors, and odonturine-barbitistine genera with crenulate ovipositors; this might strengthen or refute the hypothesis that the complex spinose ovipositor is an indicator of relationship.

Defensive Tactics. Like many orthopterans, the dichopetalines frequently employ the all-too-familiar defense mechanism of leaping down into [often thorny] vegetation when presented with perceived danger. Yet, Swanson witnessed an fascinating tactic of escape by one of these katydids in southern Texas. Having caught an adult female bare-handed, he gripped one of the front legs by the tibia and genicular region in order to better view the insect without his fingers obscuring abdomen and caudal region. The insect began gnawing on the femur of the gripped leg, nearer the coxa. Before Swanson realized what was happening, the katydid had chewed through her femur and dropped into the tall grasses, thereby escaping and leaving the dumbfounded collector holding the remaining portion of the front leg. Admittedly, this behavior may not have frequent utility when considering the more natural potential predators facing the dichopetalines (*e.g.*, solitary aculeate hymenopterans, solenophages like asilids and predatory heteropterans, web-building spiders, larger vertebrate insectivores). Nevertheless, this behavior is interesting when one considers the questions of how such a behavior arose and whether it might be utilized by other tettigoniids.

Food Habits. Isley (1941) reported *Obolopteryx emarginatus* as a flower-feeder in northeastern Texas; Swanson (pers. obs.) corroborates this observation as he witnessed *Obolopteryx oreoecus* with its face deep in a flower, presumably feeding on pollen, in the Davis Mountains (Jeff Davis County) of western Texas. Buzzetti, Barrientos, and Rocha (2010) give several plants records for *Pterodichopetala cieloi*.

Nocturnal Behavior and Phototaxis. While it is not uncommon to find dichopetalines out on the foliage during the day, they seem to be more abundant and less wary (*i.e.*, less likely to jump) in the evening or at night (Swanson, pers. obs., on *Obolopteryx brevihastatus* in southeastern Arizona).

Some dichopetalines, like many tettigoniids, exhibit nocturnal phototaxis. Swanson observed on several occasions the presence of two species of *Obolopteryx* coming to lights at night in western Texas. One male of *Obolopteryx oreoecus* was observed and collected at the light of a convenience store in Fort Davis (Jeff Davis County). In Big Bend National Park (Brewster County), Swanson also observed about a half-dozen specimens of the same species in and around the [lighted] campground bathroom in the Basin of the Chisos Mountains as well as a similar number of *Obolopteryx brevihastatus* around the [lighted] Welcome Center at Persimmon Gap. In these latter two instances, none were collected as permits were not obtained for the park that year. However, the non-functional hind wings, and therefore decreased mobility, probably result in their lower representation at night lights than other phaneropterines (*e.g.*, *Scudderia*, *Insara*), except where appropriate habitat is in close proximity to a strong light source (*i.e.*, in the Chisos Basin).

PROMISING PROBLEMS

For this study, Cohn has spent many weeks over a long period of years specifically investigating puzzling distributional gaps and phenomena, which have revealed biological situations crying out for further study with behavioral, ecological, and molecular techniques. While it becomes necessary to draw the current study to a close, there are a multitude of these fascinating scenarios for which we have barely broke the surface. We do not think it our province to solve these kind of problems. Yet, in order to facilitate future progress, we feel is is our duty rather to clearly outline situations and localities for which such studies might be carried out.

Therefore, we summarize here those interesting problems scattered throughout the text, which provide opportunities for further study, but which might be lost to the casual reader[1]. Many of these problems are illustrated or become apparent when manipulating the maps. We have selected those problem which can be readily solved using methods beyond the purview of this study; some may be resolved by more intensive collecting, others with more observational methods. However, each of these problems addresses a worthwhile dichopetaline mystery which will provide insight into the relationships and natural history of these interesting organisms.

Geographic Problems.

- Syntopy among congeneric species. This is perhaps the most puzzling, because, as discussed under Biogeography, species with similar genitalia would be expected to be allopatric, whereas those with different genitalia would be sympatric. Yet, the reverse seems to be true within several dichopetaline genera, especially *Obolopteryx* and *Rhabdocerca* and to a lesser extent, *Acanthorintes*. The syntopy, in some cases, should be confirmed by additional collections and field observations. Experimental iden-

[1]For a more detailed discussion of each problem, refer to the generic and species accounts of the taxa involved.

tification of the isolating mechanisms, such as call and/or pheromone secretion and detailed observation of the mechanics of copulation (discussed here as Behavioral or Morphological Problems), might elucidate each of these situations. Two conspicuous examples include:

- Overlap of *Rhabdocerca tridactyla* and *R. caudelli*. Despite several syntopic localities, neither seems to penetrate into the range of the other. In the zone of overlap, there is a striking difference in the color of the two species (discussed under Behavioral Problems).
- Overlap of several species of *Acanthorintes* south of Queretaro. We know that *A. erythrephaptor* does not occur north and northeast of this locality where *A. xanthephaptor* occurs, but south of that locality we have no collections to demonstrate how limited or how extensive the zone of contact is. The difference in color of the male cerci between these species may represent another example of visual cues (discussed under Behavioral Problems). Two other congenerics found syntopically but with diminishing similarities in male genitalia are *A. thenarocercus* and *A. tauriformis*.

• Limited overlap and close allopatry (with possible replacement). There are two apparent cases of intergeneric replacement without apparent environmental barriers. Furthermore, the intrageneric syntopies mentioned above may have implications for replacement effects as well.

- *Acanthorintes* largely replaces *Rhabdocerca* in central San Luis Potosi. There is minimal overlap between these genera (near Villa Hidalgo north of Queretaro and on the road east of San Luis Potosi to Rioverde and Alaquines south of Ciudad del Maiz). But south of the Rioverde road, *Rhabdocerca* virtually disappears.
- *Mactruchus ischnodus* and *M. cryothermastris* are each syntopic at the edge of their ranges with *Rhabdocerca tridactyla*, the former at Cuencame and the latter at Nieves. In each case, neither species appears to penetrate farther into the other's territory, but our collections are too scattered to adequately address this problem. Similarly, *Mactruchus ischnodus* and *Obolopteryx brevihastatus* also overlap, in this case in the Sierra de Mapimi, but we do not have enough collections to demonstrate lack of invasion into the territory of the other or to suggest a difference in microhabitat. These problems would be clarified with more careful transects across the boundaries of both genera. If they are indeed replacing eachother, the factors that might maintain this separation, such as vegetation or climate, should be investigated.
- There are several other intergeneric syntopies and sympatries, all between species with widely different genitalia, which might be interesting to investigate:
  - *Planipollex polliciferus* and several species of *Obolopteryx* in southern Texas
  - *Rhabdocerca tridactyla* and several species of *Pterodichopetala* in the northern Sierra Madre Oriental (this may be altitudinal overlap as the *Pterodichopetala* are likely to occur at higher elevations; thus, these overlaps may occur only at the lower edge of their ranges)
  - *Acanthorintes tauriformis* and *Pterodichopetala strepsidactyla* east of San Luis Potosi
  - *Mactruchus serrifer* and several species of *Acanthorintes* near Queretaro
  - *Dichopetala mexicana* and *Gymnocerca enaulites* in the eastern part of the Balsas Basin
  - *Mactruchus serrifer* and *Dichopetala mexicana* at Cuernavaca

• Peripatric Populations and the search for the elusive zone of contact. In antithesis to the intrageneric syntopies, there are several cases in which species closely approach the distribution of other species for which we have not been able to find the zone of contact, often taking place in an area without obvious environmental barriers and some times with very different genitalia. Transecting should reveal whether they overlap or remain separate. Once the contact zones are identified, more focused studies may reveal differences in vegetation, food habits, etc. From our current data it does not appear to be seasonal differences, but this should be confirmed.

- In the case of *Obolopteryx castaneus* and its very closely related sisters species, *O. poecilus* in which the only difference is found in the male subgenital plate. We have searched along two roads and have worked the two species to within a few miles of each other; it may be easy to cover this distance. It would be particularly interesting to cage the two species to see if they will hybridize or refuse to copulate and to identify the isolating mechanism, if any.
- We have not made a special effort to find the contact zones of the three species of *Mactruchus* (*durangensis*, *ischnodus*, and *cryothermastris*), but we have a fair number of collections in the areas where they might make contact without finding any hybridization or syntopy. Again, collections among these species should be easy to make and might be experimentally studied.
- *Mactruchus serrifer* and *Gymnocerca falcata* apparently do not overlap but are only 15 miles apart between the many collections made near Guadalajara and the few near Tequila without obvious physiographic barriers. South and west of these two cities they may be in contact but we have too few collections to demonstrate this. The situation is made more interesting by the genitalic similarities between *G. falcata* and *M. serrifer*, although the male cerci and subgenital plate are quite different.

• Isolated or Restricted Taxa. These might well be

investigated, because comparatively little is known about these restricted species. In each case, our collections are much smaller in number and in abundance of individuals than in the other dichopetalines.

◦ *Rhabdocerca zanclophora* occurs only in the near vicinity of Ciudad del Maiz (San Luis Potosi) with the more widely distributed *R. caudelli* approaching but never sympatric or syntopic with it. Unfortuntely, our collections are too few and too small to confirm this situation, but the area should be easy to transect. It also should be noted that the most restricted member of *Acanthorintes*, *A. zeuglaius* occurs in the area, similarly isolated from most congenerics, but it has a slightly wider distribution.

◦ The isolated population of *Mactruchus megasynactor* from a single possibly imprecise locality needs further investigation, because it occurs in montane areas, where little collecting has been done. Furthermore, it is widely separated from its obvious relative, *M. serrifer*. The area between but much farther east has been well collected for species of *Mactruchus*, and *M. megasynactor* does not occur there.

◦ Each species of *Pterodichopetala* (excepting perhaps *P. pityophila*) is known from a few collections in a particular high elevation zone.

• Case of Competitive Exclusion or Habitat Specialization. In west Texas, *O. brevihastatus* seems to occupy the desert, whereas *O. oreoecus* occurs at higher elevations in the pine-oak zone; only one specimen of the former has been taken syntopically with the latter (at Marathon). In Arizona, where *O. oreoecus* does not occur, *O. brevihastatus* occurs at higher elevations normally occupied by *O. oreoecus*. Transects during seasons of abundant Orthoptera should resolve this problem as have been initiated in the Big Bend Region by Swanson and Kensinger (pers. comm.).

Behavioral and Physiological Problems.

• For a group of genera so speciose and so common, it is surprising that virtually no studies have been published on the behavior or physiology of any of the species. There are four general problems in this area, most having implications for mating behavior: song, possible pheromone use, compatibility between sexes of highly divergent genitalic structures, and visual identification involving color and color pattern. For each of these, there are geographical components (mentioned above), which if studied in tandem might contribute to the elucidations of these problems.

◦ Song. Some, if not all, of the dichopetaline species produce an audible call, but we have not studied these songs. We know of only two published records of dichopetaline songs (Buzzetti, Barrientos, and Rocha 2010: *Pterodichopetala cieloi*; Buzzetti and Barrientos-Lozano 2011: 3 species), but without a larger set of songs and greater generic sampling for comparison, it is not clear how useful this information might be other than a purely acoustical sense. Modern records of all or most of the species would be of interest perhaps in determining relationships; Kensinger (pers. comm.) has begun such a study of the *Obolopteryx* species in Texas. There are three more targeted areas which might have interesting implications for our understanding of the acoustical behavior of these animals:

▪ In most genera with several species, there are species with distributions outside of the overlap zone with congeners, *e.g.*, *O. brevihastatus* occurs in New Mexico and Arizona alone but overlaps its congeners in southern Texas; *O. emarginatus* occurs alone in the northern part of its range but overlaps most of its congeners farther south. Comparing these allopatric populations with sympatric populations might reveal interesting geographic problems of variation in song and mating behavior.

▪ The varying tegminal length in the species of *Pterodichopetala* as well as the greater length in comparison to the dichopetalines are curious considering the relatively uniformity of length in the other dichopetaline genera. It may be of particular interest to compare the acoustical characteristics of the long-tegmina species with conspecifics whose tegminal length has been modified (*i.e.*, clipped short) or the other brachypterous dichopetalines.

▪ A stridulatory apparatus has been discovered by Swanson (at low magnification) in the females in all the genera with overlapping tegmina; this structure resembles that of the phaneropterine genera studied by Nickle and Carlysle (1975). Yet, tegmina do not overlap in *Obolopteryx*, *Rhabdocerca*, and *Planipollex*. A comprehensive study of the sound production of female dichopetalines and corresponding male behavior would be integral to understanding the acoustical behavior of these taxa.

◦ Pheromone Use. The distinctive structure on the first tergite of all three species of *Rhabdocerca*, as well as the unrelated *Dichopetala mexicana* and *Acanthorintes tauriformis* (with similar structures in other species of *Acanthorintes*) suggests the possibility of chemical attraction or identification. It is only our guess that these structures secrete pheromones as we have made no observations on how this structure is used or even whether the female crawls on the top of the male to access this structure. These structures are whole in all specimens we have examined and have not been bitten or nibbled as often is the case in other ensiferans with dorsal secretory modifications. We see no immediate relationships between *Rhabdocerca*, *Acanthorintes*, and *Dichopetala* so these structures may be a surprising case of convergence, although some abdominal modifications occur in other phaneropterines (*e.g.*, *Metaplastes*, *Platylyra*). A more

robust phylogeny might reveal a closer relationship between the genera possessing these modifications. Additionally, semiochemical detection methods or high magnification of these structures might be applied to reveal the presence of pheromones or secretory organs.

◦ Compatibility of Highly Divergent Genitalic Structures. The very large inter- and intrageneric difference in the male cercus poses a problem of the function of these differences, especially in an apparent absence of comparable female modification. Detailed observations several important factors might contribute pieces to solving this puzzle:

▪ position of the ovipositor during copulation as well as the point of contact, if any, of the male cerci might

▪ observing mating in species with extreme or aberrant modifications (*e.g.*, shield-like epiprocts in *Acanthorintes*, shallowly-notched subgenital plates in *Mactruchus* and *Obolopteryx poecilus*, large and spiny epiphalli in *Pterodichopetala* and *Acanthorintes*)

▪ specimens preserved *in copulo*. Woller (pers. comm.) has suggested the use of micro-CT techniques to better study the epiphallic fit. Yet, better methods must be developed to preserve mating individuals at a more successful rate so that the actual fit of genitalic structures can be discovered.

▪ attraction between non-conspecific males and females, whether natural or induced, and reaction to a misfit

▪ contrasting mating habits of comparatively simple members of the Old and New World Odonturini-Barbitistini. See how analogous structures are used in these taxa may have implications for they are used in apparently more derived species.

◦ Visual Identification Involving Color and Color Pattern. There are two striking scenarios, which might suggest a visual component to recognition of conspecifics:

▪ *Rhabdocerca tridactyla* possesses a strikingly conspicuous pattern (blackish with the sides of the pronotum a conspicuous bright white spot) over the part of its range near the overlap zone with its sister species, *R. caudelli*. This hypothesis might be tested by painting over the white spot of dark *R. tridactyla*, or conversely, blackening and/or painting a white spot on *R. caudelli* or northern *R. tridactyla*. Mating experiements between *R. caudelli* and the similarly-colored northern *R. tridactyla* may have implications for this phenomenon, if demonstrated.

▪ The similar cercal morphology of *Acanthorintes xanthephaptor* and *A. erythrephaptor* belie the sharp contrast in coloration, which gives the species their namesakes. These structures also might provide a basis for visual identification and similar manipulations to those described above might be imposed on individuals of these species.

Morphological Problems.

• The nature and homology of the female subgenital plate vexed Rehn and Hebard (1914a) and to a point, it still remains unresolved, especially in *Pterodichopetala* and two species of *Acanthorintes*. Furthermore, great emphasis is placed on this structure as it separates the phyletic line from the other Odonturini-Barbitistini. Better preserved material and more careful dissections might elucidate the origins and nature of this structure in each genus. For a detailed discussion of this problem, see the generic headings for the taxa mentioned above as well as Morphological Notes.

• While most species tend to exhibit little variation in the length ovipositor, there is marked intraspecific variation in at least two species (*Planipollex polliciferus* and *Acanthorintes tauriformis*), and possibly a third (*Obolopteryx emarginatus*). It would instructive to measure a large series of female ovipositors from across the range of each species and compare this with subsets of other characters, either morphological, behavioral, ecological, etc. to see if any pattern exists which might indicate the presence of a distinct species or affirms the status of a geographic variant. Crosses between long and short ovipositor populations might also yield information on this problem.

• The problematic composition of *Gymnocerca*, especially regarding the inclusion of *G. falcata* with its morphological affinities to species of *Mactruchus*, might easily be solved with a cladistic analysis focusing on molecular characters.

Tribal Problems.

◦ As we have discussed under the similarly-titled section of this manuscript, tribal problems abound in the group to which the genera here discussed belong. In particular, the great difficulty we have had in assigning a tribal placement to the dichopetaline genera underscores this gap in our knowledge. Pertaining to the relationships of the dichopetalines, there are perhaps two distinct facets to the problem:

▪ defining tribes within the Phaneropterinae

▪ finding the sister taxon of the dichopetalines, whether in the New or Old World.

Cladistic analyses, both morphologically and molecularly based, will aid in further elucidation of these relationships. Furthermore, greater taxon sampling and a search for additional novel characters will increase the scope of such a study as well as the subsequent understanding of this group.

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APPENDIX I. Figures.

Habitus
(Figs. 6–49)

Figure 6. *Obolopteryx emarginatus*, female, NUEVO LEON: 20 km. S. Linares, 3 October 2004, Fontana, Battiston, Agatibi, and Garcia #36.

Figure 7. *Obolopteryx seeversi*, male, TEXAS: Bandera Co., 1 mi. E. Bandera, 14 June 1997, John Stidham.

Figure 8. *Obolopteryx gladiator*, female, TEXAS: 0.2 mi. N. Armstrong, 5 September 2010, D. R. Swanson #43.

Figure 9. *Obolopteryx brevihastatus*, male, COAHUILA: 36 km. N. Saltillo, 8 October 2004, Fontana, Battiston, Agatibi, and Garcia #49.

Figure 10. *Obolopteryx castaneus*, female, TEXAS: Starr Co., Rancho Lomitas, 21 October 2006, Patrick Coin. Image used with permission © Patrick Coin.

Figure 11. *Obolopteryx poecilus*, male, SAN LUIS POTOSI: 15.7 mi. E. Tamasopo, 11-12 July 1964, T. J. Cohn #20.

Figure 12. *Obolopteryx catinatus*, male, NUEVO LEON: 5.16 km. W. Santa Catarina, 8 October 2004, Fontana, Battiston, Agatibi, and Garcia #48.

Figure 13. *Obolopteryx oreoecus*, male, TEXAS: Brewster Co., Panther Junction, Big Bend N.P., 28 July 2010, B. Kensinger. Image used with permission © Bart Kensinger.

Figure 14. *Obolopteryx oreoecus*, female, TEXAS: Brewster Co., Panther Junction, Big Bend N.P., 28 July 2010, B. Kensinger. Image used with permission © Bart Kensinger.

Figure 15. *Planipollex polliciferus*, male, TAMAULIPAS: 30 km. SSE. Ciudad Victoria, 4 October 2004, Fontana, Battiston, Agatibi, and Garcia #39.

Figure 16. *Planipollex polliciferus*, female, TAMAULIPAS: 11.6 km. NE. Ciudad Victoria, 4 October 2004, Fontana, Battiston, Agatibi, and Garcia #38.

Figure 17. *Planipollex polliciferus*, female, TAMAULIPAS: 30 km. SSE. Ciudad Victoria, 4 October 2004, Fontana, Battiston, Agatibi, and Garcia #39.

Figure 18. *Rhabdocerca tridactyla*, female, SAN LUIS POTOSI: 44.3 km. NE. Villa Hidalgo, 28 September 2004, Fontana, Battiston, Agatibi, and Garcia #22.

Figure 19. *Rhabdocerca tridactyla*, male, SAN LUIS POTOSI: 44.3 km. NE. Villa Hidalgo, 28 September 2004, Fontana, Battiston, Agatibi, and Garcia #22.

Figure 20. *Rhabdocerca tridactyla*, female, SAN LUIS POTOSI: 44.3 km. NE. Villa Hidalgo, 28 September 2004, Fontana, Battiston, Agatibi, and Garcia #22.

Figure 21. *Rhabdocerca zanclophora*, male, SAN LUIS POTOSI: 17 km. NW. Ciudad del Maiz, 29 September 2004, Fontana, Battiston, Agatibi, and Garcia #24.

Figure 22. *Rhabdocerca caudelli*, female, SAN LUIS POTOSI: 19.49 km. ESE. San Luis Potosi, 30 September 2004, Fontana, Battiston, Agatibi, and Garcia #29.

Figure 23. *Rhabdocerca caudelli*, male, SAN LUIS POTOSI: 19.49 km. ESE. San Luis Potosi, 30 September 2004, Fontana, Battiston, Agatibi, and Garcia #29.

Figure 24. *Acanthorintes xanthephaptor*, male, QUERETARO: Queretaro (.5 km E. Jct. Hwy. 45 & Bernardo Quintana), 25 September 2004, Fontana, Battiston, Agatibi, and Garcia #12.

Figure 25. *Acanthorintes erythrephaptor*, male (holotype), QUERETARO: 9 mi. SE. Queretero, 15 October 1958, T. J. Cohn #191.

Figure 26. *Acanthorintes thenarocercus*, male, HIDALGO: 11.3 km. W. Tula R. at Ixmiquilpan, 23 September 2004, Fontana, Battiston, Agatibi, and Garcia #7.

Figure 27. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 1 km. NE. Ciudad del Maiz, 29 September 2004, Fontana, Battiston, Agatibi, and Garcia #23.

Figure 28. *Acanthorintes tauriformis*, male, QUERETARO: La Canada off Queretaro-Tequisquiapan Rd., 24 September 2004, Fontana, Battiston, Agatibi, and Garcia #9.

Figure 29. *Acanthorintes tauriformis*, female, QUERETARO: Queretaro (.5 km E. Jct. Hwy. 45 & Bernardo Quintana), 25 September 2004, Fontana, Battiston, Agatibi, and Garcia #12.

Figure 30. *Dichopetala mexicana*, male, MORELOS: 3 km. N. Amacuzac, 21 September 2004, Fontana, Battiston, Agatibi, and Garcia #3.

Figure 31. *Dichopetala mexicana*, female, PUEBLA: 11 km. SE. Izucar de Matamoros, 16 October 2004, Fontana, Battiston, Agatibi, and Garcia #67.

Figure 32. *Gymnocerca enaulites*, male, PUEBLA: 10 km. SE. Acatlan, 16 October 2004, Fontana, Battiston, Agatibi, and Garcia #68.

Figure 33. *Gymnocerca cycloprista*, female, SINALOA: 2 km. S. Tabala, 11 October 2004, Fontana, Battiston, Agatibi, and Garcia #61.

Figure 34. *Gymnocerca cycloprista*, male, SINALOA: 2 km. S. Tabala, 11 October 2004, Fontana, Battiston, Agatibi, and Garcia #61.

Figure 35. *Gymnocerca falcata*, male, JALISCO: 14 km. E. Ixtlan Del Rio, 13 October 2004, Fontana, Battiston, Agatibi, and Garcia #62.

Figure 36. *Mactruchus durangensis*, male, DURANGO: 7 km. N. Durango (center), 10 October 2004, Fontana, Battiston, Agatibi, and Garcia #58.

Figure 37. *Mactruchus ischnodus*, female, DURANGO: 1.5 km. S. Cuencame, 10 October 2004, Fontana, Battiston, Agatibi, and Garcia #55.

Figure 38. *Mactruchus cryothermastris*, male, DURANGO: 2.2 km. W. Guadalupe Victoria, 10 October 2004, Fontana, Battiston, Agatibi, and Garcia #57.

Figure 39. *Mactruchus megasynactor*, male, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 40. *Mactruchus serrifer*, male, MICHOACAN:

20 km. NW. Quiroga, 14 October 2004, Fontana, Battiston, Agatibi, and Garcia #65.

Figure 41. *Mactruchus serrifer*, male, QUERETARO: La Canada off Queretaro-Tequisquiapan Rd., 24 September 2004, Fontana, Battiston, Agatibi, and Garcia #9.

Figure 42. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

Figure 43. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

Figure 44. *Pterodichopetala hypsibates*, female, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

Figure 45. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

Figure 46. *Pterodichopetala pityophila*, female, COAHUILA: Arteaga, 17 km. SSE., [Puerto Flores], 5 October 2004, Fontana, Battiston, Agatibi, and Garcia #44.

Figure 47. *Pterodichopetala cultricerca*, male (holotype), NUEVO LEON: "Villa Santiago" [=Santiago], 19 June 1940, Hoogstraal & Knight.

Figure 48. *Pterodichopetala cultricerca*, female, NUEVO LEON: "Villa de Santiago" [Mislabeled], 20-22 June 1938, H. Hoogstraal.

Figure 49. *Obolopteryx brevihastatus*, mating male and female, ARIZONA: Cochise Co., Miller Canyon, Huachuca Mtns., 30 August 2010, C. W. Melton. Image used with permission © Charles W. Melton (www.nearfamous.com).

Obolopteryx emarginatus Fig. 6

NUEVO LEON: 20 km. S. Linares

Obolopteryx seeversi Fig. 7

TEXAS: 1 mi. E. Bandera

Obolopteryx gladiator Fig. 8

TEXAS: 0.2 mi. N. Armstrong

Obolopteryx brevihastatus Fig. 9

COAHUILA: 36 km. N. Saltillo

Obolopteryx poecilus Fig. 10

SAN LUIS POTOSI: 15.7 mi. E. Tamasopo

Obolopteryx castaneus Fig. 11

TEXAS: Rancho Lomitas

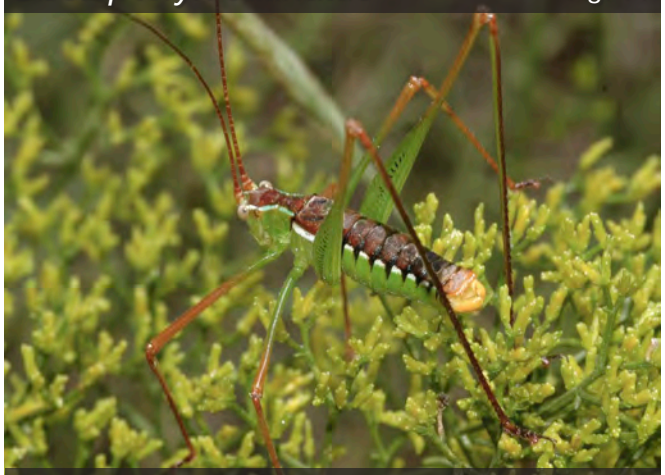
Obolopteryx oreoecus Fig. 12

TEXAS: Panther Junction, Big Bend N.P.

Obolopteryx oreoecus Fig. 13

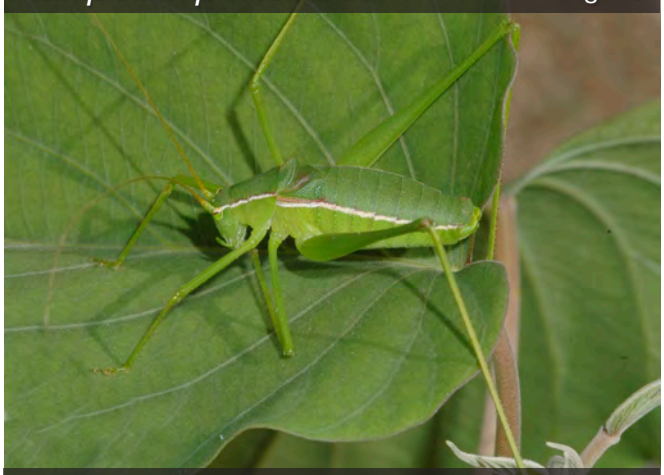
TEXAS: Panther Junction, Big Bend N.P.

Obolopteryx catinatus Fig. 14



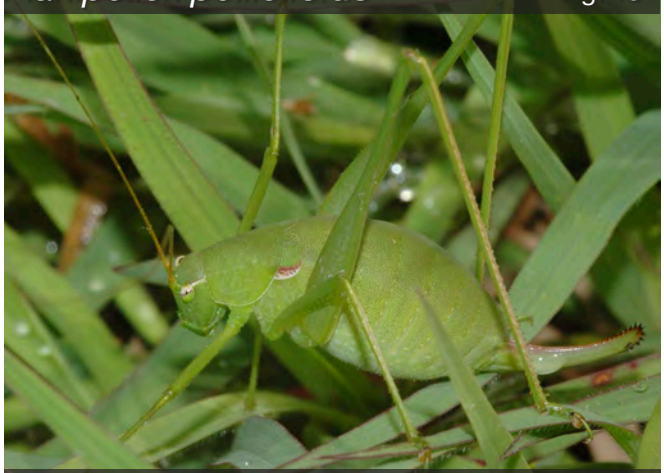
NUEVO LEON: 5.16 km. W. Santa Catarina

Planipollex polliciferus Fig. 15



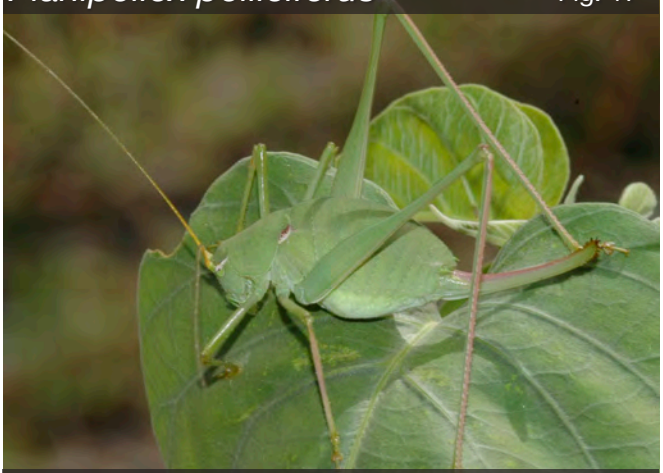
(male) – TAMAULIPAS: 30 km. SSE. Ciudad Victoria

Planipollex polliciferus Fig. 16



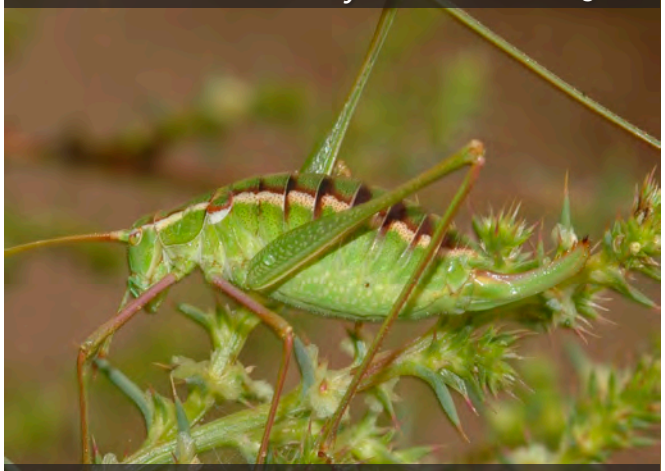
TAMAULIPAS: 11.6 km. NE. Ciudad Victoria

Planipollex polliciferus Fig. 17



TAMAULIPAS: 30 km. SSE. Ciudad Victoria

Rhabdocerca tridactyla Fig. 18



SAN LUIS POTOSI: 44.3 km. NE. Villa Hidalgo

Rhabdocerca tridactyla Fig. 19

SAN LUIS POTOSI: 44.3 km. NE. Villa Hidalgo

Rhabdocerca tridactyla Fig. 20

SAN LUIS POTOSI: 44.3 km. NE. Villa Hidalgo

Rhabdocerca zanclophora Fig. 21

SAN LUIS POTOSI: 17 km. NW. Ciudad del Maiz

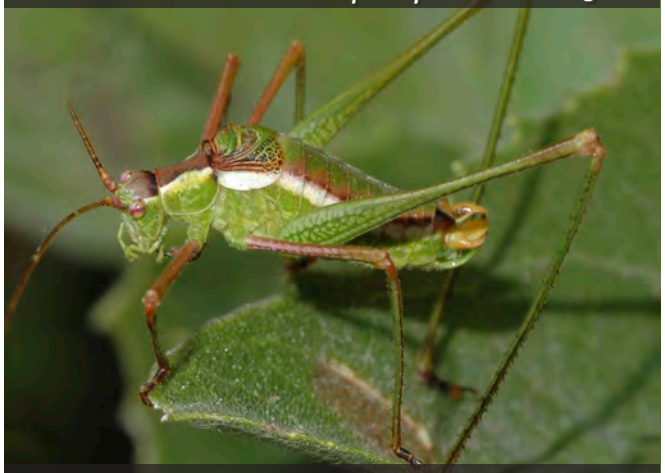
Rhabdocerca caudelli Fig. 22

SAN LUIS POTOSI 19.49 km. ESE. San Luis Potosi

Rhabdocerca caudelli Fig. 23

SAN LUIS POTOSI: 19.49 km. ESE. San Luis Potosi

Acanthorintes xanthephaptor Fig. 24



QUERETARO: Queretaro

Acanthorintes erythrephaptor Fig. 25

QUERETARO: 9 mi. SE. Queretero

Acanthorintes thenarocercus Fig. 26

HIDALGO: 11.3 km. W. Tula R. at Ixmiquilpan

Acanthorintes zeuglais Fig. 27

SAN LUIS POTOSI: 1 km. NE. Ciudad del Maiz

Acanthorintes tauriformis Fig. 28

QUERETARO: La Canada off Queretaro-Tequisquiapan Rd.

Acanthorintes tauriformis Fig. 29

QUERETARO: Queretaro

Dichopetala mexicana Fig. 30

MORELOS: 3 km. N. Amacuzac

Dichopetala mexicana Fig. 31

PUEBLA: 11 km. SE. Izucar de Matamoros

Gymnocerca cycloprista Fig. 32

SINALOA: 2 km. S. Tabala

Gymnocerca cycloprista Fig. 33

SINALOA: 2 km. S. Tabala

Gymnocerca enaulites Fig. 34

PUEBLA: 10 km. SE. Acatlan

Gymnocerca falcata Fig. 35

JALISCO: 14 km. E. Ixtlan del Rio

Mactruchus durangensis Fig. 36

DURANGO: 7 km. N. Durango (center)

Mactruchus ischnodus Fig. 37

????

Mactruchus cryothermastris Fig. 38

DURANGO: 2.2 km. W. Guadalupe Victoria

Mactruchus megasynactor Fig. 39

DURANGO: La Quebrada [117.7 air mi. W. La Zarca]

Mactruchus serrifer Fig. 40

MICHOACAN: 20 km. NW. Quiroga

Mactruchus serrifer Fig. 41

QUERETARO: La Canada off Queretaro-Tequisquiapan Rd.

Pterodichopetala cieloi Fig. 42

TAMAULIPAS: Biosphere Reserve El Cielo
[6.7 air mi. WNW. Gomez Farias]

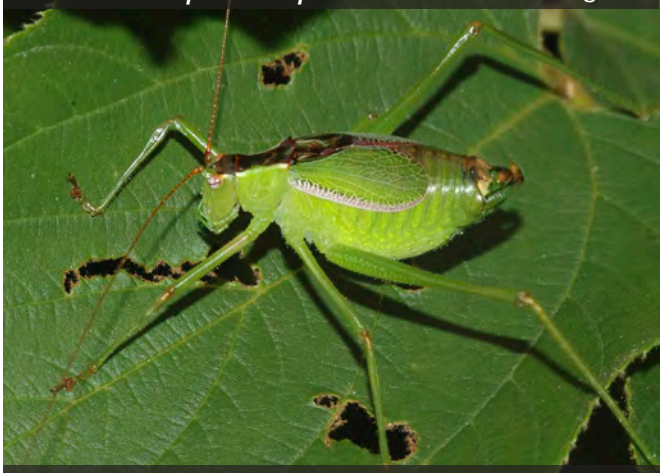
Pterodichopetala strepsidactyla Fig. 43

SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi

Pterodichopetala hypsibates Fig. 44

NUEVO LEON: Cerro Potosi [Fontana specimen]

Pterodichopetala padrisima Fig. 45



NUEVO LEON: 18.23 air km. W. (Villa de) Santiago

Pterodichopetala pityophila Fig. 46

COAHUILA: Arteaga, 17 km. SSE., [Puerto Flores]

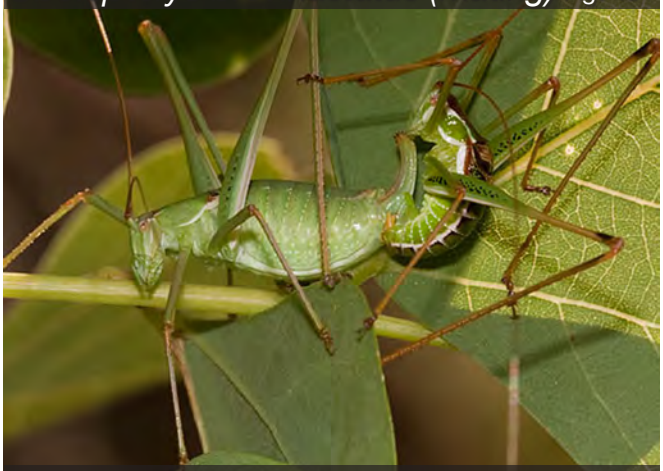
Pterodichopetala cultricerca Fig. 47

NUEVO LEON: "Villa Santiago" [=Santiago]

Pterodichopetala cultricerca Fig. 48

NUEVO LEON: "Villa de Santiago" [Mislabeled]

Oboloptery brevihastatus (mating) Fig. 49



ARIZONA: Miller Canyon, Huachuca Mtns.

Male Cercus
(Figs. 50–81)

Figure 50. *Obolopteryx emarginatus*, male, TEXAS: Shackleford Co., Ft. Griffin State Park, 16 mi. N. Albany, 8 July 1956, T.J. Cohn & *E.g.* Matthews #104B.

Figure 51. *Obolopteryx seeversi*, male, TEXAS: Medina Co., 1 mi. E. Bandera, 14 June 1997, John Stidham.

Figure 52. *Obolopteryx gladiator*, male, TEXAS: Kenedy Co., Armstrong, 30 mi. N. Raymondville [=Katherine], 5-6 September 1955, T.J. Cohn.

Figure 53. *Obolopteryx brevihastatus*, male, ARIZONA: Cochise Co., Rodeo, 1969 Cohn #27.

Figure 54. *Obolopteryx poecilus*, male, SAN LUIS POTOSI: 8 mi. E. Valles, 13 August 1959, T.J. Cohn #176.

Figure 55. *Obolopteryx castaneus*, male, TEXAS: Jim Wells Co., 1 mi. NE. Sandia (Wade Creek), 23 July 1955, T.J. Cohn.

Figure 56. *Obolopteryx oreoecus*, male, TEXAS: Brewster Co., Chisos Mts., Juniper Canyon, 27 July 1928, F.M. Gaige #257.

Figure 57. *Obolopteryx catinatus*, male, TEXAS: Bexar Co., San Antonio (north edge), 2.5 mi. N. Hwy. 410 on Hwy. 281, 8 June 1977, T.J. Cohn #21.

Figure 58. *Planipollex polliciferus*, male, TEXAS: Cameron Co., 2 mi. NE. Brownsville Post Office, 4 September 1955, T.J. Cohn.

Figure 59. *Rhabdocerca tridactyla*, male, ZACATECAS: 35.6 mi. S. Concepcion del Oro (1.4 mi. N. turn to San Tiburcio), 22 August 1965, T.J. Cohn #60.

Figure 60. *Rhabdocerca caudelli*, male, SAN LUIS POTOSI: 17 mi. NE. Villa Hidalgo, 20 August 1959, I.J. Cantrall & T.J. Cohn #5.

Figure 61. *Rhabdocerca zanclophora*, male, SAN LUIS POTOSI: 12 mi. NW. Ciudad del Maiz, 28 August 1955, T.J. Cohn.

Figure 62. *Dichopetala mexicana*, male, GUERRERO: 9 mi. NE. Taxco (1.7 rd. mi. SW Acuitlapan), 16 September 1959, 5700 ft., I.J. Cantrall & T.J. Cohn #136.

Figure 63. *Gymnocerca cycloprista*, male, SINALOA: 66 mi. SE. Culiacan, (2 mi. SE. Abuya), 6 November 1958, T.J. Cohn #258.

Figure 64. *Gymnocerca enaulites*, male, GUERRERO: 11 mi. S. Iguala, 9 December 1958, T.J. Cohn #364.

Figure 65. *Gymnocerca falcata*, male, NAYARIT: 8.8 mi. E. Ixtlan del Rio [prob. On Hwy. 15], 23 September 1961, I.J. Cantrall, T.J. Cohn, S.P. Hubbell #69.

Figure 66. *Mactruchus durangensis*, male, DURANGO: 8 mi. SW. Durango on Hwy. 40 [from northern glorieta] (4.4 mi. NE. Las Mangas) [55.3 mi. SE. El Salto], 26 August 1974, T.J. & J.W. Cohn #98.

Figure 67. *Mactruchus ischnodus*, male, DURANGO: 2 mi. E. La Zarca, (60 mi. W. Mapimi), 11 September 1958, T.J. Cohn #113.

Figure 68. *Mactruchus cryothermastris*, male, ZACATECAS: 5.6 mi. [NW.] SW. Sombrerete, W. rd. jct. (on Hwy.45), 25 October 1974, T.J. & J.W. Cohn #96.

Figure 69. *Mactruchus megasynactor*, female, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 70. *Mactruchus serrifer*, male, JALISCO: 0.4 mi. S. Huentitan del Bajo [or Juentitan], (5 mi. N. Guadalajara (Mercado San Juan)), 30 September 1959, T.J. Cohn #199.

Figure 71. *Acanthorintes xanthephaptor*, male, GUANAJUATO: 11 mi. E. San Luis de La Paz, 29 August 1959, I.J. Cantrall & T.J. Cohn #46.

Figure 72. *Acanthorintes erythrephaptor*, male (holotype), QUERETARO: 9 mi. SE. Queretero, 15 October 1958, T. J. Cohn #191.

Figure 73. *Acanthorintes thenarocercus*, male, HIDALGO: 21 rd. mi. NW. Ixmiquilpan, (7 rd. mi. N. Tula R.), 15 October 1958, T.J. Cohn #189.

Figure 74. *Acanthorintes tauriformis*, male, SAN LUIS POTOSI: Alvarez (27.9 rd. mi. E. San Luis Potosi [from Juarez Glorieta]) [2.3 rd. mi. SW. San Francisco], 16 November 1961, T.J. Cohn & S.P Hubbell #205.

Figure 75. *Acanthorintes zeuglaius*, SAN LUIS POTOSI: 4 rd. mi. NE. Ciudad del Maiz, 21 August 1959, I.J. Cantrall & T.J. Cohn #10.

Figure 76. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

Figure 77. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

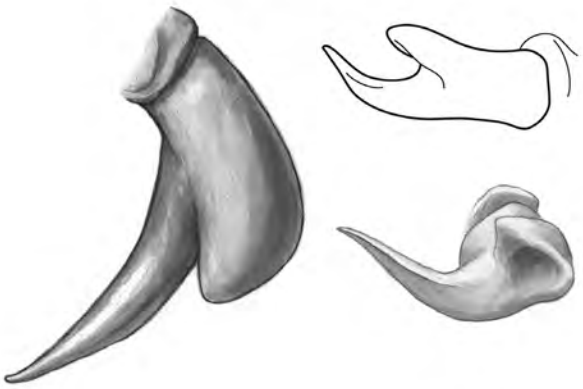
Figure 78. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

Figure 79. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

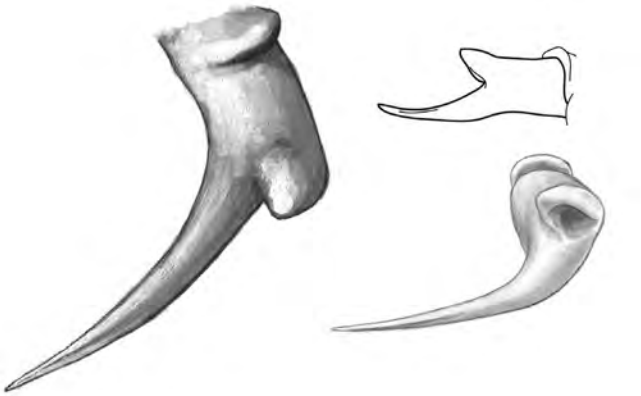
Figure 80. *Pterodichopetala pityophila*, male, COAHUILA: 11 rd. mi. SE. Arteaga, 4 August 1959, T.J. Cohn #140.

Figure 81. *Pterodichopetala cultricerca*, male (holotype), NUEVO LEON: "Villa Santiago" [=Santiago], 19 June 1940, Hoogstraal & Knight.

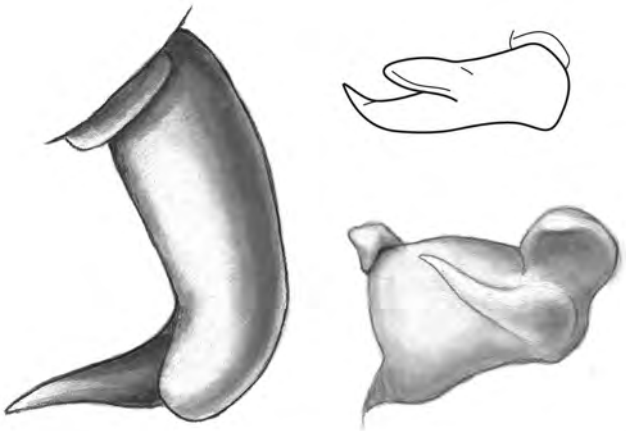
Obolopteryx emarginatus Fig. 50



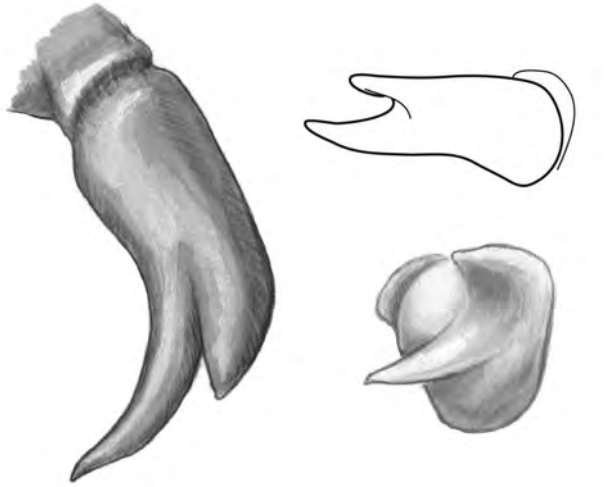
Obolopteryx seeversi Fig. 51



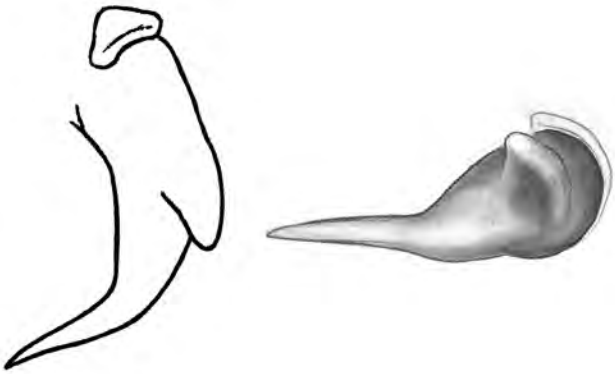
Obolopteryx gladiator Fig. 52



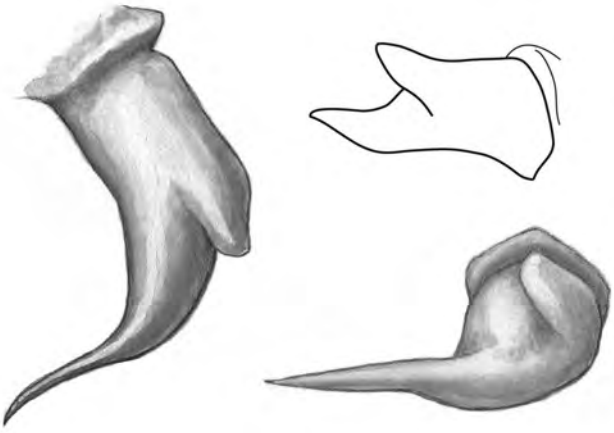
Obolopteryx brevihastatus Fig. 53



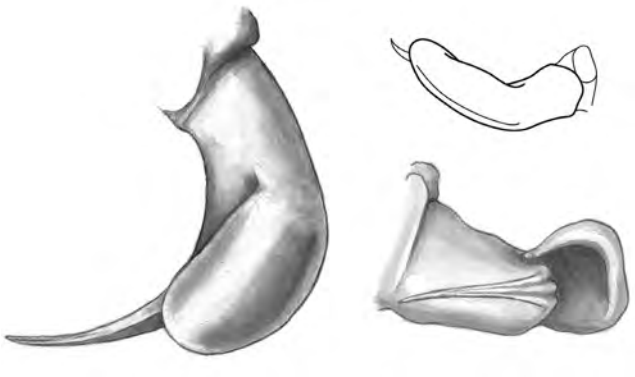
Obolopteryx poecilus Fig. 54



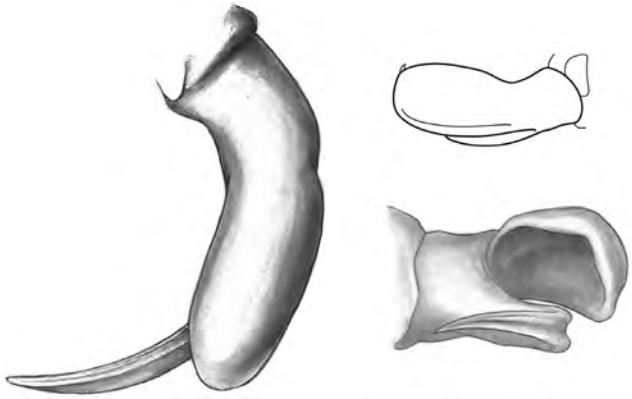
Obolopteryx castaneus Fig. 55



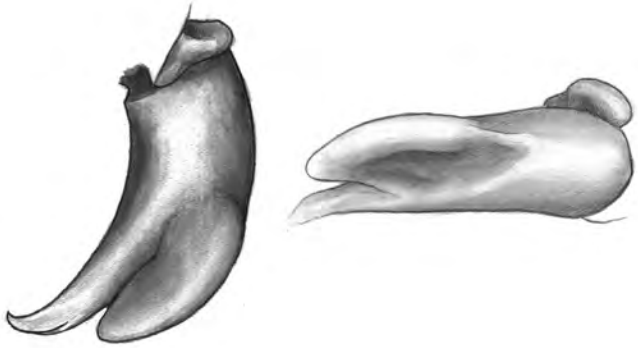
Obolopteryx oreoecus Fig. 56



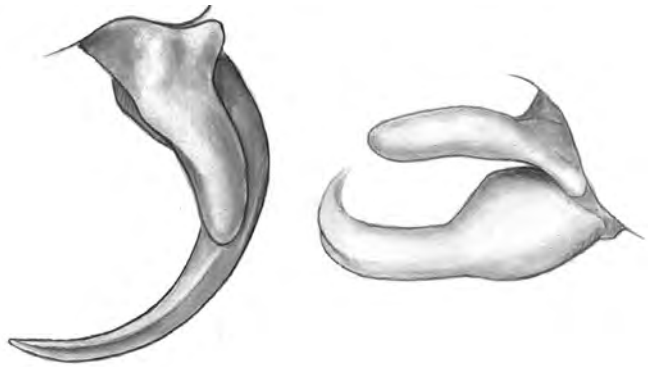
Obolopteryx catinatus Fig. 57



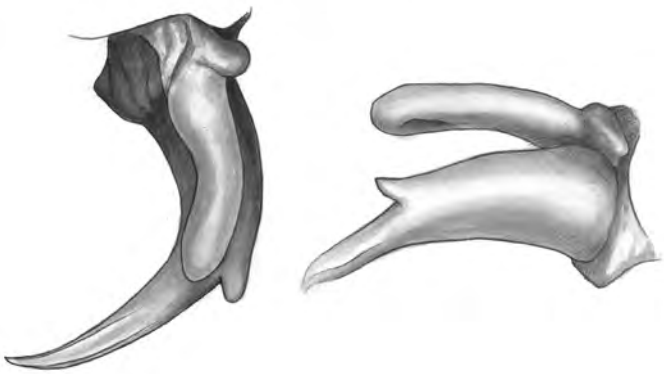
Planipollex polliciferus Fig. 58



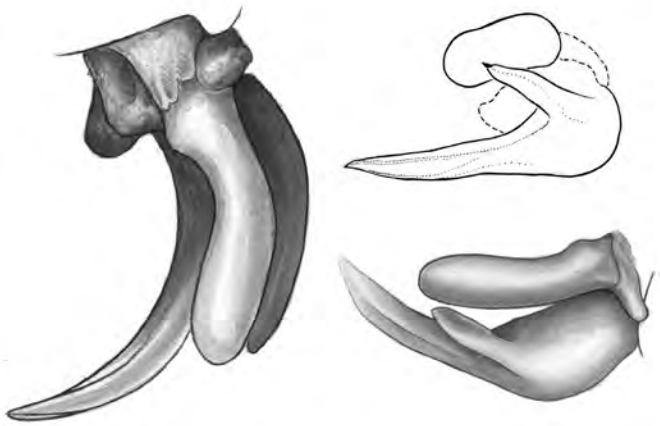
Rhabdocerca zandophora Fig. 59



Rhabdocerca caudelli Fig. 60



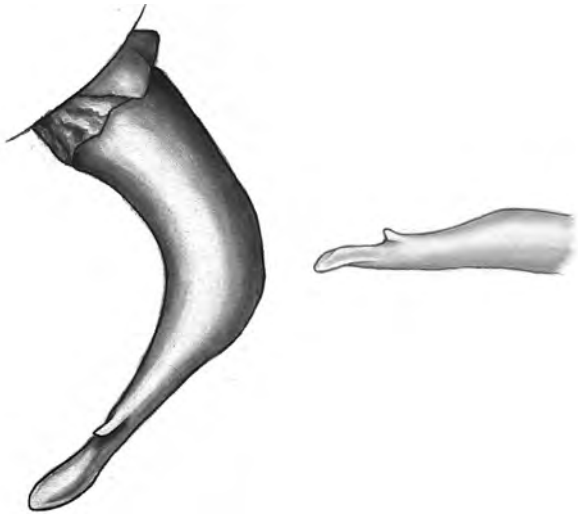
Rhabdocerca tridactyla Fig. 61



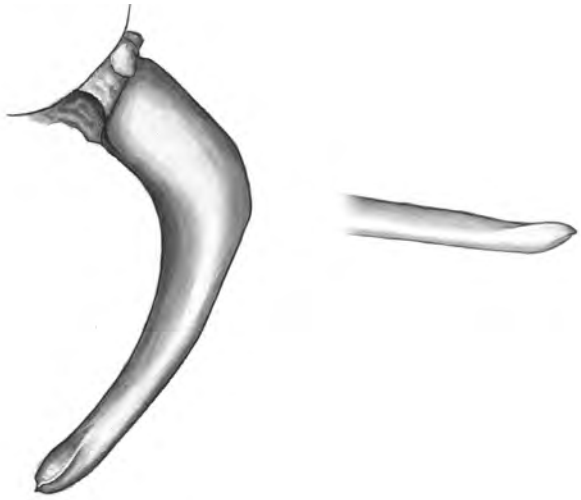
Dichopetala mexicana Fig. 62

Gymnocerca enaulites Fig. 63

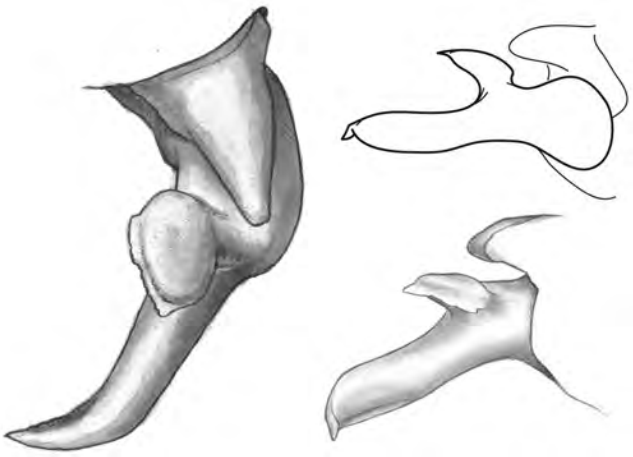
Gymnocerca cycloprista Fig. 64



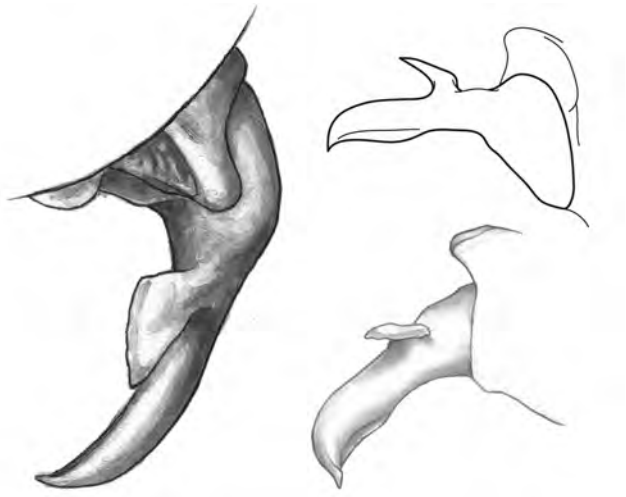
Gymnocerca falcata Fig. 65



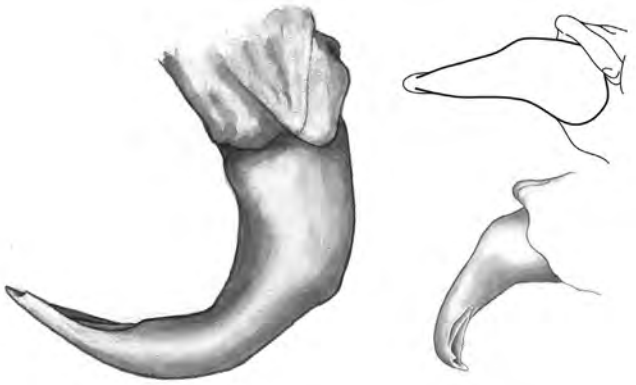
Mactruchus durangensis Fig. 66



Mactruchus ischnodus Fig. 67

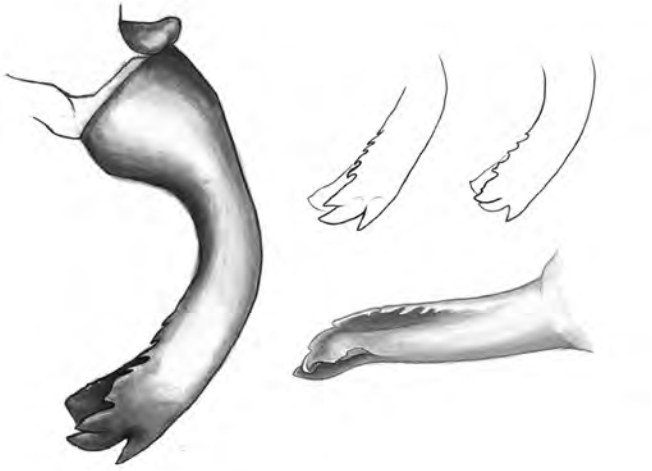


Mactruchus kyrothemastris Fig. 68

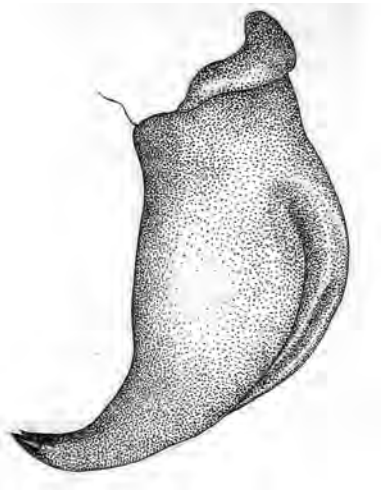


Mactruchus megasynactor Fig. 69

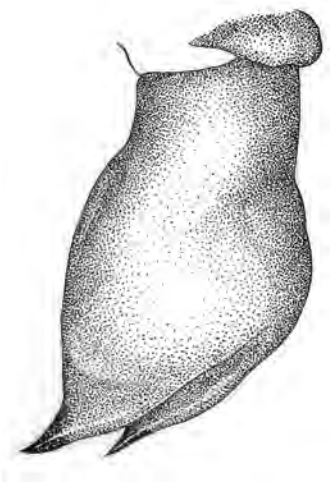
Mactruchus serrifer Fig. 70



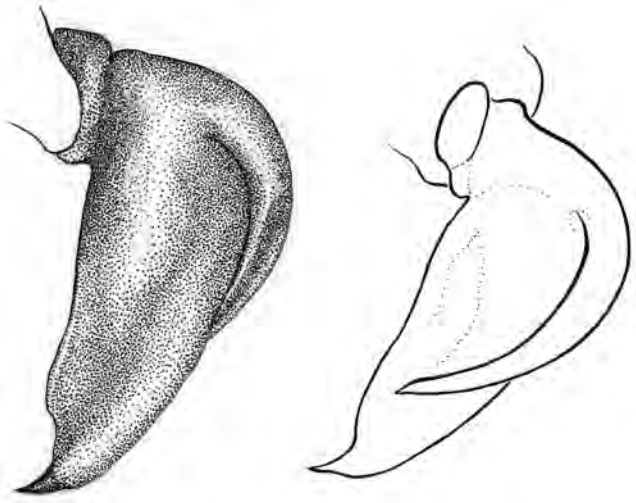
Acanthorintes xanthephaptor Fig. 71



Acanthorintes erythrephaptor Fig. 72



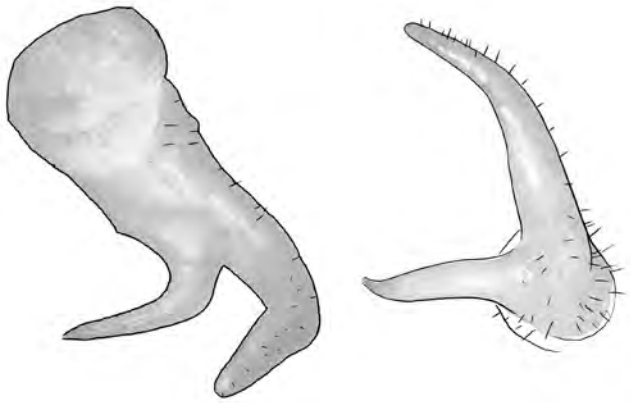
Acanthorintes thenasocescus Fig. 73



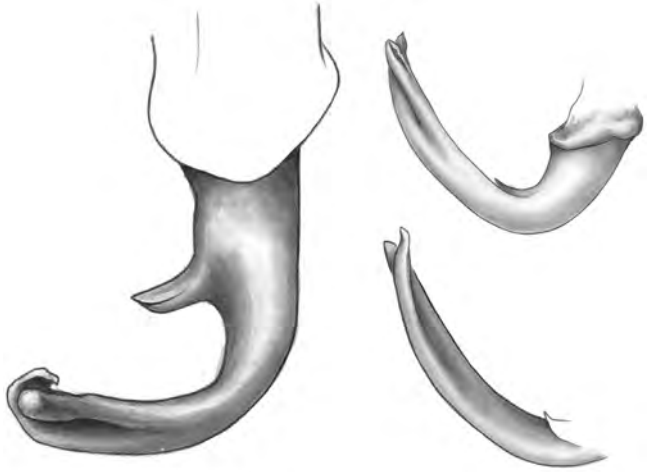
Acanthorintes tauriformis Fig. 74

Acanthorintes zeuglaius Fig. 75

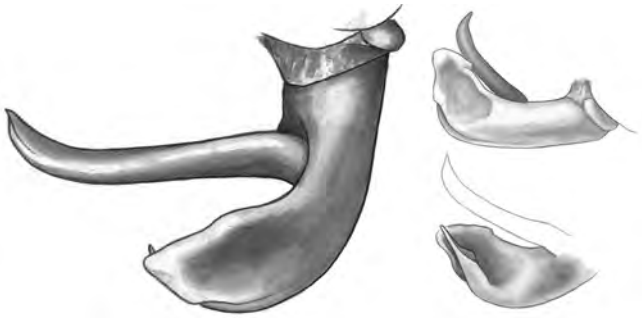
Pterodichopetala cieloi Fig. 76



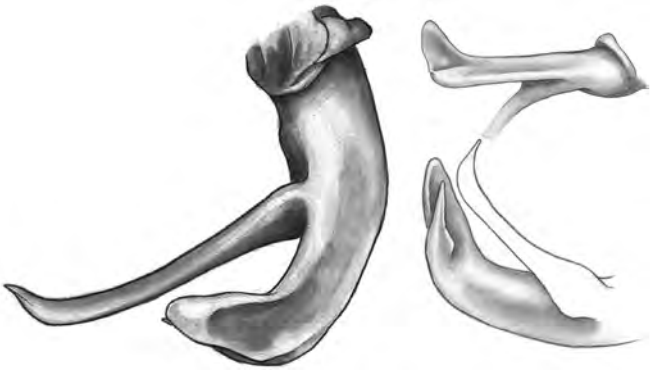
Pterodichopetala strepsidactyla Fig. 77



Pterodichopetala hypsibates Fig. 78

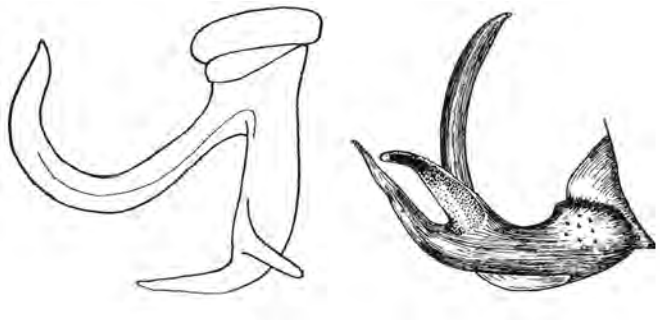


Pterodichopetala padrisima Fig. 79



Pterodichopetala pityophila Fig. 80

Pterodichopetala cultricerca Fig. 81



Male Epiphallus
(Figs. 82–139)

Figure 82-83. *Obolopteryx emarginatus*, TEXAS: Hall Co., 5 mi. W. [SW?] Memphis, 13 July 1950, M. Cazier, P. Boone, T.J. Cohn.

Figure 84-85. *Obolopteryx seeversi*, male, TEXAS: Medina Co., 1 mi. E. Bandera, 14 June 1997, John Stidham.

Figure 86-87. *Obolopteryx gladiator*, male, TEXAS: Kleberg Co., 6 mi. E. Riviera, 22 October 1978, J.E. Gillaspy #55.

Figure 88-89. *Obolopteryx brevihastatus*, male, ARIZONA: Cochise Co., 17.5 air mi. W. McNeal, 0.6 mi. SW. Gap Tank (SW. Davis Rd.), 4 September 1977, T.J. & J.W. Cohn #51.

Figure 90-91. *Obolopteryx castaneus*, male, TEXAS: Val Verde Co., 14.6 mi. NW. Uvalde P.O. on Texas Hwy. 55, 13 October 1974, T.J. & J.W. Cohn #79.

Figure 92-93. *Obolopteryx poecilus*, male, SAN LUIS POTOSI: 18 mi. S. Antiguo Morelos, 14 August 1959, T.J. Cohn #178.

Figure 94-95. *Obolopteryx oreoecus*, male, TEXAS: Brewster Co., Chisos Mts.: The Basin to Panther Pass, 9 August 1955, T.J. Cohn.

Figure 96-97. *Obolopteryx catinatus*, male, TEXAS: Cameron Co., Olmito (10 mi. NW. Brownsville P.O.), 20 August 1955, T.J. Cohn.

Figure 98-99. *Dichopetala mexicana*, male, PUEBLA: 7.7 mi. SE. Izucar de Matamoros, 8 September 1961, Hubbell, Cantrall, Cohn #84.

Figure 100-101. *Rhabdocerca tridactyla*, male, COAHUILA: 6.6 mi. S. Puerto Flores (16.8 mi. S. Arteaga), 21 August 1961, I.J. Cantrall & T.J. Cohn #26.

Figure 102-103. *Rhabdocerca caudelli*, male, SAN LUIS POTOSI: 15 mi. NE Villa Hidalgo, 20 August 1959, T.J. Cohn & I.J. Cantrall #4.

Figure 104-105. *Rhabdocerca zanclophora*, male, SAN LUIS POTOSI: 11 mi. NW. Ciudad del Maiz, 28 August 1955, T.J. Cohn.

Figure 106-107. *Gymnocerca cycloprista*, male, SINALOA: Summit Cerro Tule, 7 mi. SE. Culiacan, 14 October 1970, T.J. & J.W. Cohn #57.

Figure 108-109. *Gymnocerca enaulites*, male, PUEBLA: 6 mi. NW. Petlalcingo on Hwy. 190, 15 September 1959, I.J. Cantrall & T.J. Cohn #127.

Figure 110-111. *Gymnocerca falcata*, male, JALISCO: 11.1 mi. E. Extlan del Rio [Nayarit], 4 October 1970, T.J. & J.W. Cohn #47.

Figure 112-113. *Mactruchus cryothermastris*, male, ZACATECAS: 14.8 mi. NE. Nieves (42.8 mi. SW. Camacho), 10 November 19070, T.J. & J.W. Cohn #85.

Figure 114-115. *Mactruchus megasynactor*, male, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 116-117. *Mactruchus serrifer*, male, QUERETARO: Cuesta China, 4.2 mi. E. Queretaro (s. plaza; on old Hwy. 45), 12 November 1970, T.J. & J.W. Cohn #88.

Figure 118-119. *Mactruchus durangensis*, male, DURANGO: 2 mi. S. Morcillo (9.1 mi. N. edge Durango), 8 November 1970, T.J. & J.W. Cohn #79.

Figure 120-121. *Mactruchus ischnodus*, male, CHIHUAHUA: 11 mi. W. Cuauhtemoc, 9 September 1958, T.J. Cohn #108.

Figure 122-123. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 4 rd. mi. NE. Ciudad del Maiz, 21 August 1959, I.J. Cantrall & T.J. Cohn #10.

Figure 124-125. *Acanthorintes xanthephaptor*, male, QUERETARO: 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), 13 November 1970, T.J. & J.W. Cohn #89.

Figure 126-127. *Acanthorintes thenarocercus*, male, HIDALGO: Km. 176 CN1, Tasquillo, (desert scrub), [0.5 km. S. of Tula River], 29 August 1948, T.H. Hubbell #249.

Figure 128-129. *Acanthorintes tauriformis*, male, JALISCO: 10.5 mi. NW. Leon (center) (ridge summit), 11 November 1970, T.J. & J.W. Cohn #87.

Figure 130-131. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos. Image used with permission © Ludivina Barrientos-Lozano.

Figure 132-133. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

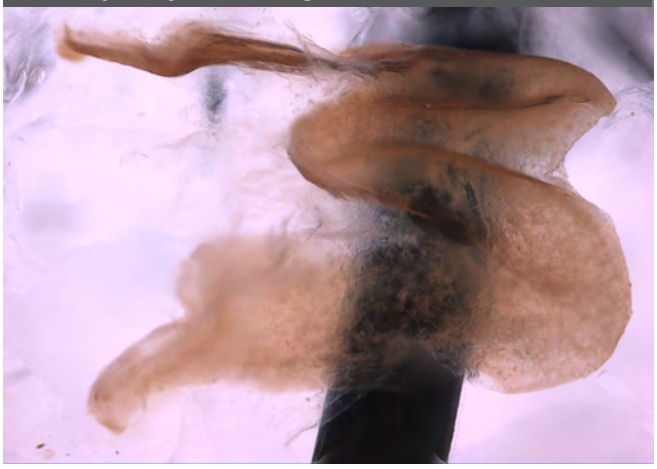
Figure 134-135. *Pterodichopetala pityophila*, male, COAHUILA: 11.2 mi. SE. Arteaga (Puerto Flores), 18 November 1970, T.J. & J.W. Cohn, #95.

Figure 136-137. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

Figure 138-139. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

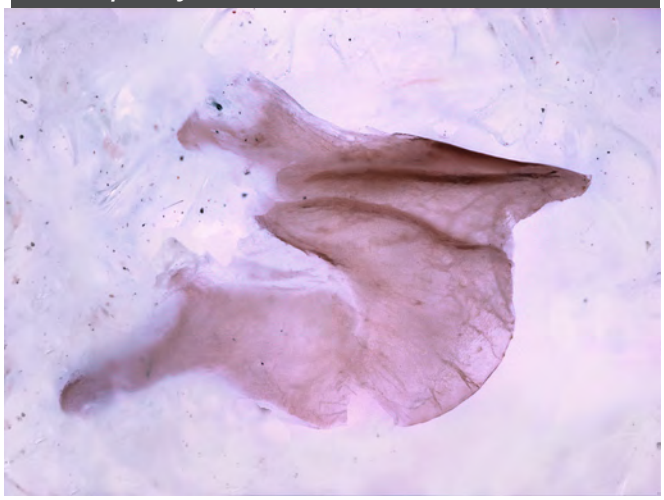
Obolopteryx emarginatus Fig. 82

Obolopteryx emarginatus Fig. 83

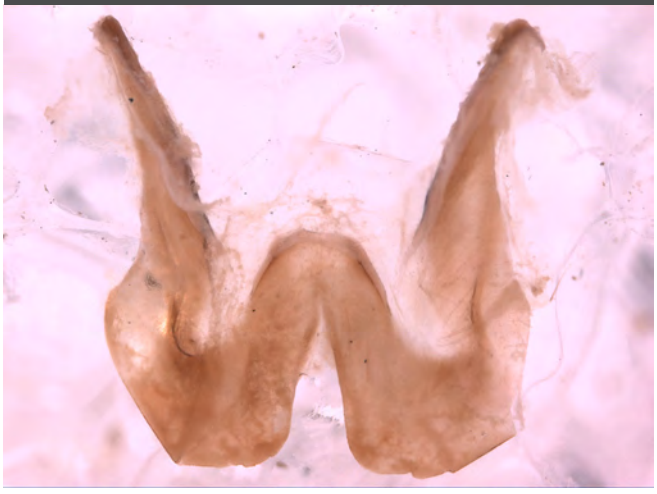


Obolopteryx seeversi Fig. 84

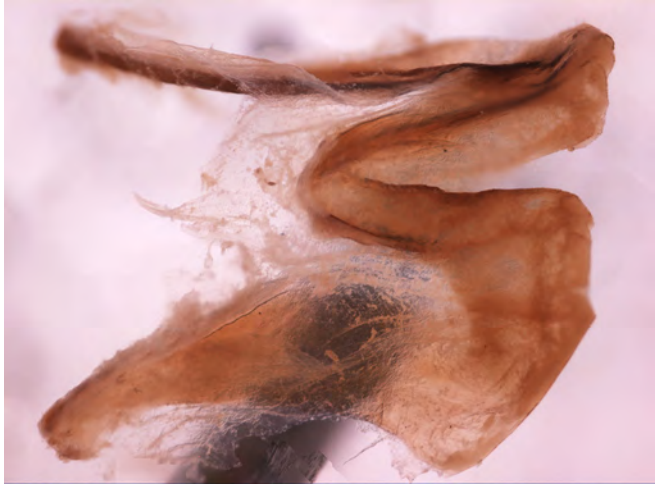
Obolopteryx seeversi Fig. 85



Obolopteryx gladiator Fig. 86



Obolopteryx gladiator Fig. 87

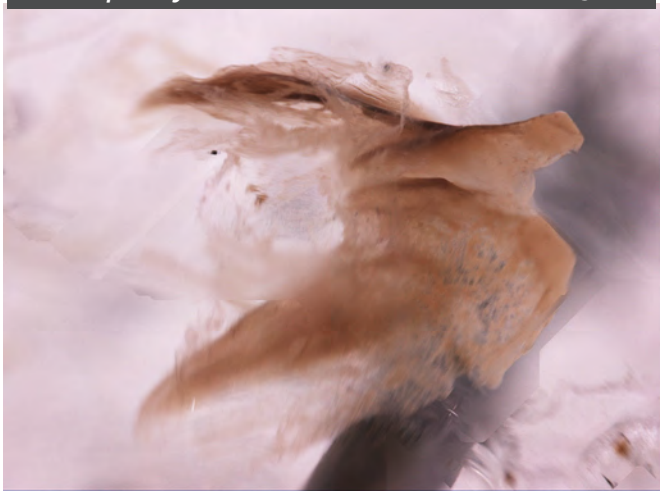


Obolopteryx brevihastatus Fig. 88

Obolopteryx brevihastatus Fig. 89

Obolopteryx castaneus Fig. 90

Obolopteryx castaneus Fig. 91



Obolopteryx poecilus Fig. 92

Obolopteryx poecilus Fig. 93

Obolopteryx oreoecus Fig. 94

Obolopteryx oreoecus Fig. 95

Obolopteryx catinatus Fig. 96

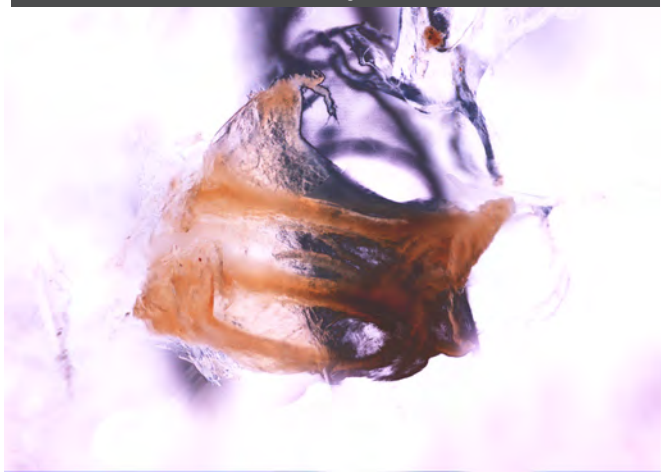
Obolopteryx catinatus Fig. 97

Dichopetala mexicana Fig. 98

Dichopetala mexicana Fig. 99

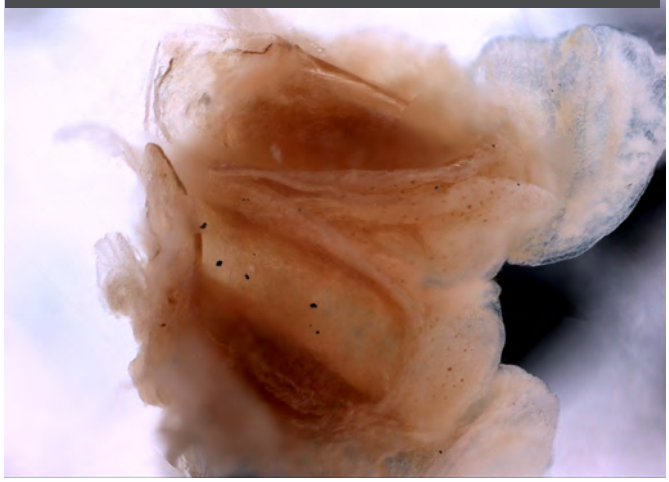
Rhabdocerca tridactyla Fig. 100

Rhabdocerca tridactyla Fig. 101



Rhabdocerca caudelli Fig. 102

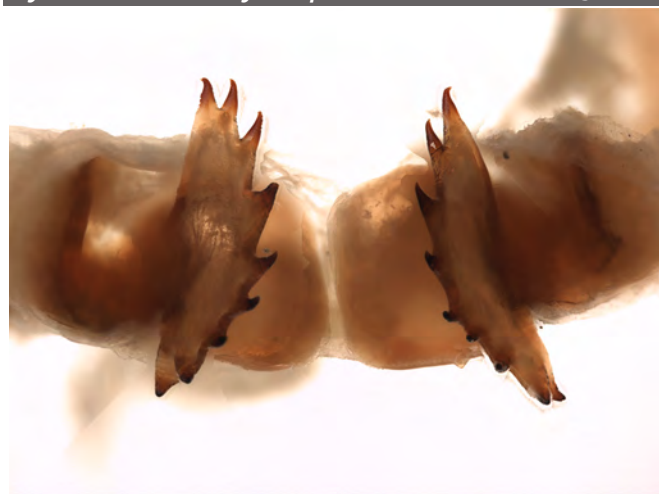
Rhabdocerca caudelli Fig. 103



Rhabdocerca zanclophora Fig. 104

Rhabdocerca zanclophora Fig. 105

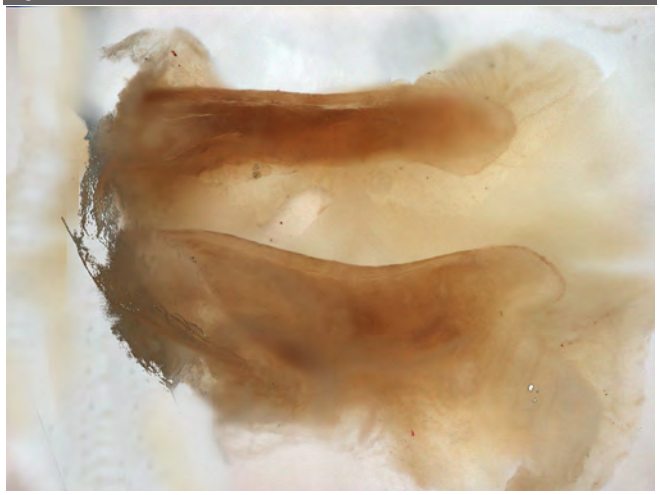
Gymnocerca cycloprista Fig. 106



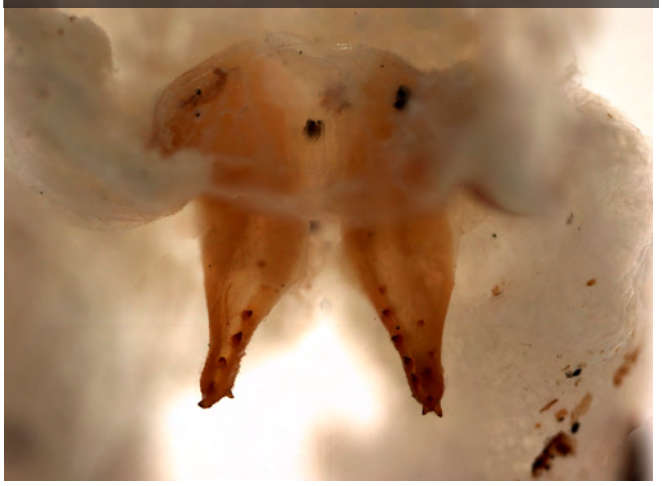
Gymnocerca cycloprista Fig. 107

Gymnocerca enaulites Fig. 108

Gymnocerca enaulites Fig. 109



Gymnocerca falcata Fig. 110

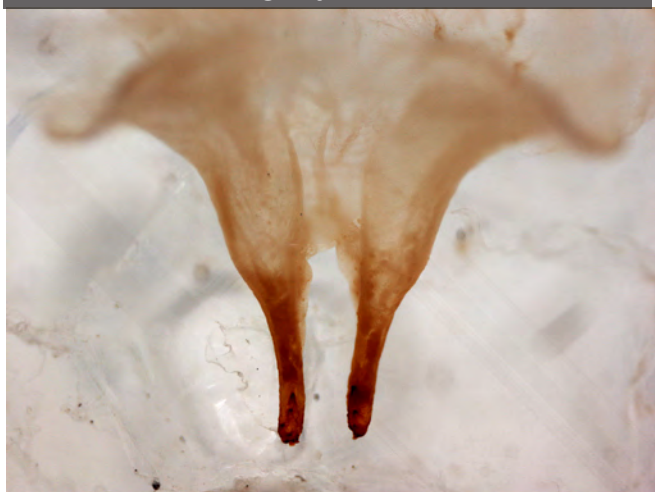


Gymnocerca falcata Fig. 111

Mactruchus cryothermastris Fig. 112

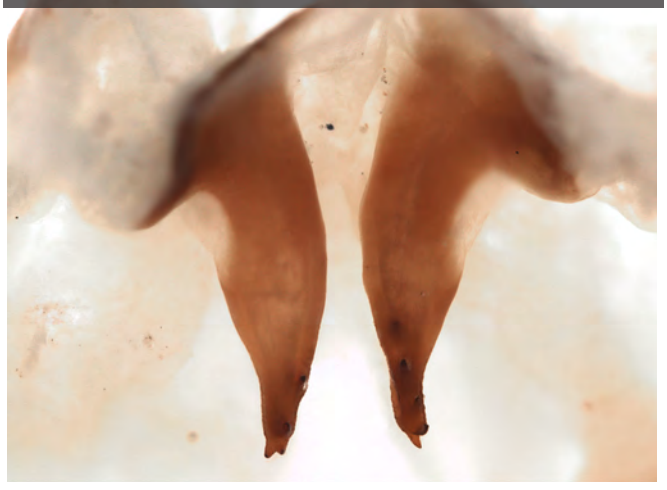
Mactruchus cryothermastris Fig. 113

Mactruchus megasynactor Fig. 114

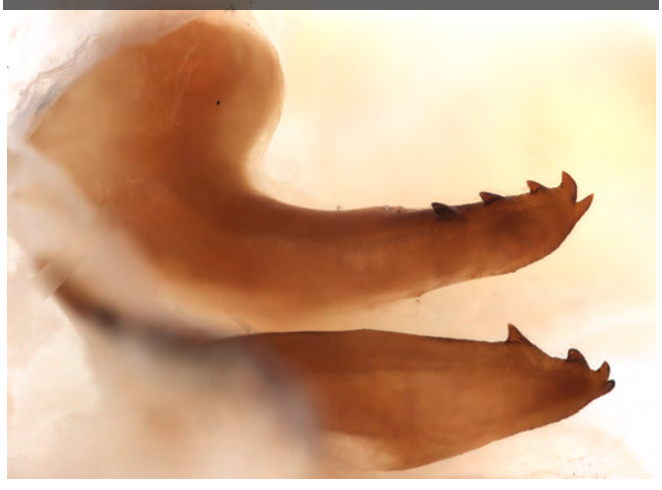


Mactruchus megasynactor Fig. 115

Mactruchus serrifer Fig. 116



Mactruchus serrifer Fig. 117



Mactruchus durangensis Fig. 118

Mactruchus durangensis Fig. 119

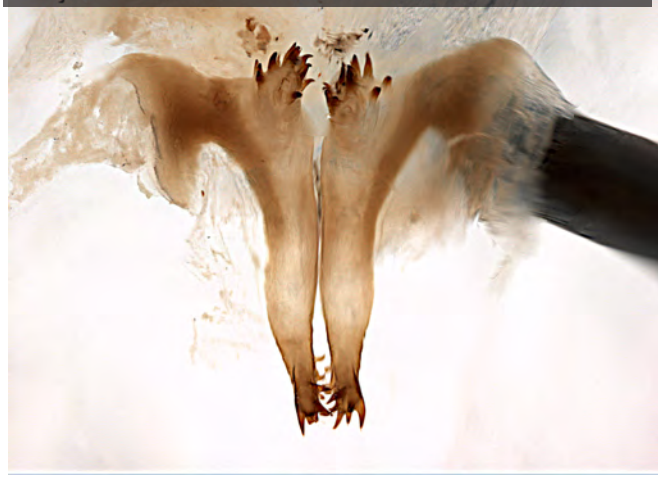
Mactruchus ischnodus Fig. 120

Mactruchus ischnodus Fig. 121

Acanthorintes zeuglaius Fig. 122

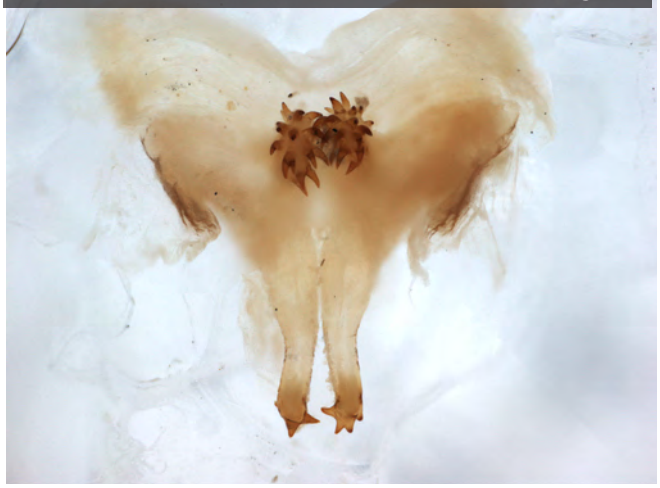
Acanthorintes zeuglaius Fig. 123

Acanthorintes xanthorintes Fig. 124



Acanthorintes xanthorintes Fig. 125

Acanthorintes thenarocercus Fig. 126



Acanthorintes thenarocercus Fig. 127

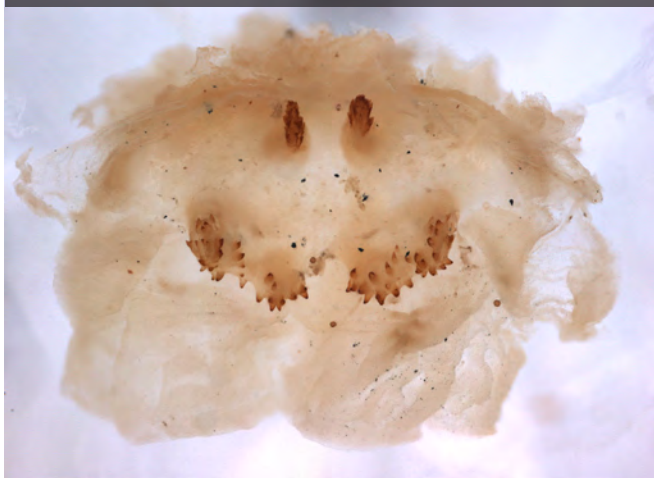
Acanthorintes tauriformis Fig. 128

Acanthorintes tauriformis Fig. 129

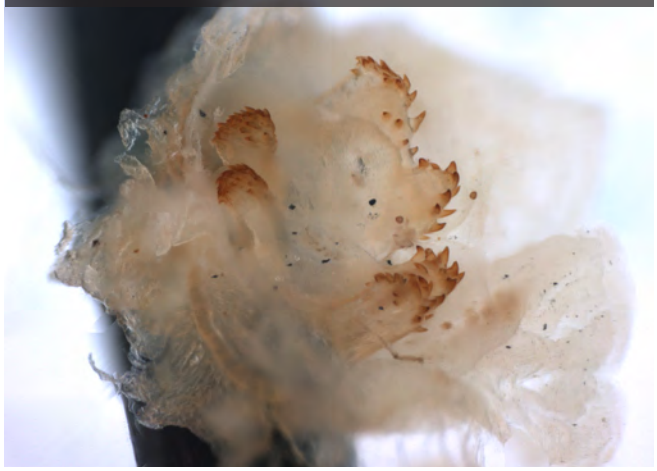
Pterodichopetala cieloi Fig. 130

Pterodichopetala cieloi Fig. 131

Pterodichopetala strepsidactyla Fig. 132

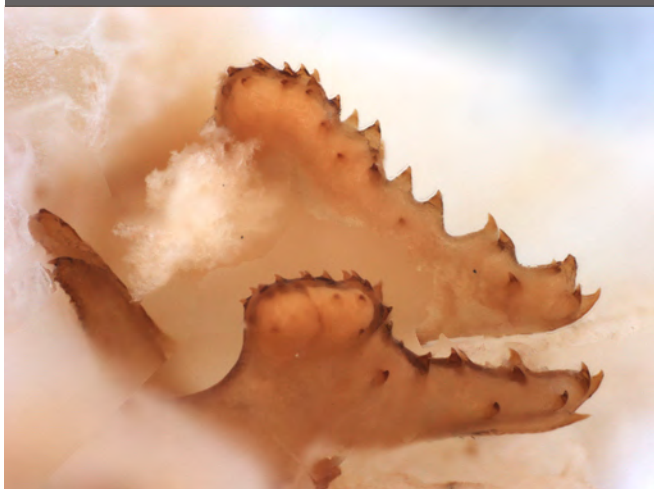


Pterodichopetala strepsidactyla Fig. 133

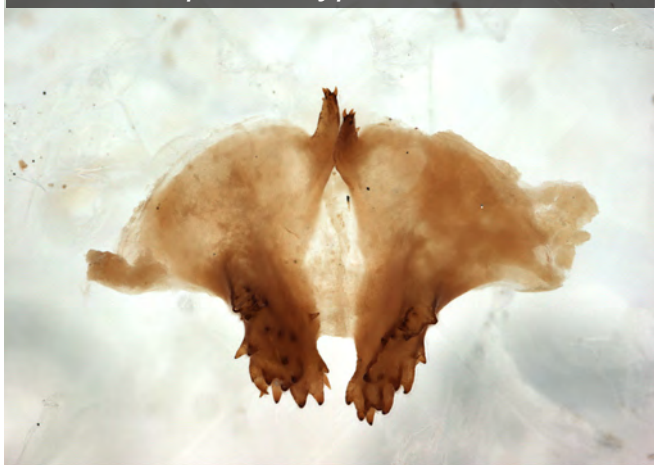


Pterodichopetala pityophila Fig. 134

Pterodichopetala pityophila Fig. 135



Pterodichopetala hypsibates Fig. 136



Pterodichopetala hypsibates Fig. 137

Pterodichopetala padrisima Fig. 138

Pterodichopetala padrisima Fig. 139

Male Subgenital Plate
(Figs. 140–171)

Figure 140. *Obolopteryx emarginatus*, male, TEXAS: Hall Co., 5 mi. W. [SW?] Memphis, 13 July 1950, M. Cazier, P. Boone, T.J. Cohn.

Figure 141. *Obolopteryx seeversi*, male (holotype), TEXAS: Bexar Co., 11 August 1940, Strohecker.

Figure 142. *Obolopteryx gladiator*, male, TEXAS: Kleberg Co., 6 mi. E. Riviera, 22 October 1978, J.E. Gillaspy #55.

Figure 143. *Obolopteryx brevihastatus*, male, ARIZONA: Cochise Co., 22.5 mi. SW. Rodeo (N. M.) (2 mi. SW. Chiricahua RR. Siding), 6 September 1971, T.J. & J.W. Cohn #21.

Figure 144. *Obolopteryx poecilus*, male, SAN LUIS POTOSI: 18 mi. S. Antiguo Morelos, 14 August 1959, T.J. Cohn #178.

Figure 145. *Obolopteryx castaneus*, male, TEXAS: Val Verde Co., 14.6 mi. NW. Uvalde P.O. on Texas Hwy. 55, 13 October 1974, T.J. & J.W. Cohn #79.

Figure 146. *Obolopteryx oreoecus*, male, TEXAS: Brewster Co., Chisos Mts.: The Basin to Panther Pass, 9 August 1955, T.J. Cohn.

Figure 147. *Obolopteryx catinatus*, male, TEXAS: Cameron Co., Olmito (10 mi. NW. Brownsville P.O.), 20 August 1955, T.J. Cohn.

Figure 148. *Planipollex polliciferus*, male, TAMAULIPAS: 0.6 mi N. Villagran, 11 October 1977, T.J. & J.W. Cohn #107.

Figure 149. *Rhabdocerca zanclophora*, male, SAN LUIS POTOSI: 12 rd. mi. NW. Ciudad del Maiz (1 mi. S. Montebello), 22 August 1959, I.J. Cantrall & T.J. Cohn #18.

Figure 150. *Rhabdocerca caudelli*, male, SAN LUIS POTOSI: 10 mi. NW. El Tepeyac (37 mi. NW. Cd. del Maiz), 22 August 1959, I.J. Cantrall & T.J. Cohn #17.

Figure 151. *Rhabdocerca tridactyla*, male, ZACATECAS: 14.8 mi. NE. Nieves (42.8 mi. SW. Camacho), 10 November 1970, T.J. & J.W. Cohn #85.

Figure 152. *Dichopetala mexicana*, male, GUERRERO: 11 mi. S. Iguala, 9 December 1958, T.J. Cohn #364.

Figure 153. *Gymnocerca enaulites*, male, PUEBLA: 6 mi. NW. Petlalcingo on Hwy. 190, 15 September 1959, I.J. Cantrall & T.J. Cohn #127.

Figure 154. *Gymnocerca cycloprista*, male, SINALOA: Summit Cerro Tule, 7 mi. SE. Culiacan, 14 October 1970, T.J. & J.W. Cohn #57.

Figure 155. *Gymnocerca falcata*, male, JALISCO: 11.1 mi. E. Extlan del Rio [Nayarit], 4 October 1970, T.J. & J.W. Cohn #47.

Figure 156. *Mactruchus durangensis*, male, DURANGO: 2 mi. S. Morcillo (9.1 mi. N. edge Durango), 8 November 1970, T.J. & J.W. Cohn #79.

Figure 157. *Mactruchus ischnodus*, male, CHIHUAHUA: 11 mi. W. Cuauhtemoc, 9 September 1958, T.J. Cohn #108.

Figure 158. *Mactruchus cryothermastris*, male, ZACATECAS: 14.8 mi. NE. Nieves (42.8 mi. SW. Camacho), 10 November 19070, T.J. & J.W. Cohn #85.

Figure 159. *Mactruchus megasynactor*, male, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure _160. *Mactruchus serrifer*, male, QUERETARO: Cuesta China, 4.2 mi. E. Queretaro (s. plaza; on old Hwy. 45), 12 November 1970, T.J. & J.W. Cohn #88.

Figure 161. *Acanthorintes xanthephaptor*, male, QUERETARO: 9.5 mi. N. Queretaro, 25 August 1965, T.J. Cohn #70.

Figure 162. *Acanthorintes erythrephaptor*, male (holotype), QUERETARO: 9 mi. SE. Queretero, 15 October 1958, T. J. Cohn #191.

Figure 163. *Acanthorintes thenarocercus*, male, HIDALGO: Km. 176 CN1, Tasquillo, (desert scrub), [0.5 km. S. of Tula River], 29 August 1948, T.H. Hubbell #249.

Figure 164. *Acanthorintes tauriformis*, male, QUERETARO: 5.4 mi. SW. Jalpan [de Serra] (on Hwy. 120), 22 November 1970, T.J. & J.W. Cohn #107.

Figure 165. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 1 km. NE. Ciudad del Maiz, 29 September 2004, Fontana, Battiston, Agatibi, and Garcia #23.

Figure 166. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

Figure 167. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

Figure 168. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

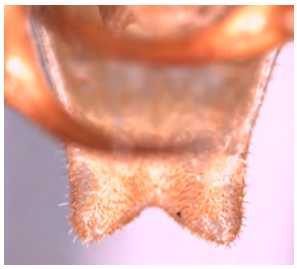
Figure 169. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

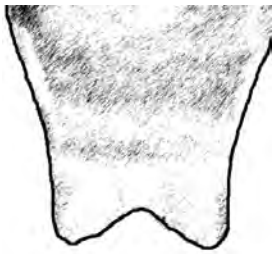
Figure 170. *Pterodichopetala pityophila*, male, COAHUILA: 11.2 mi. SE. Arteaga (Puerto Flores), 18 November 1970, T.J. & J.W. Cohn, #95.

Figure 171. *Pterodichopetala cultricerca*, male (holotype), NUEVO LEON: "Villa Santiago" [=Santiago], 19 June 1940, Hoogstraal & Knight.

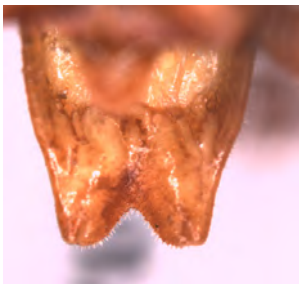
Obolopteryx emartinatus Fig. 140

Obolopteryx seeversi Fig. 141

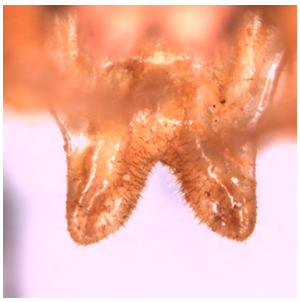




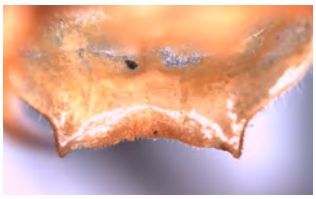
Obolopteryx gladiator Fig. 142



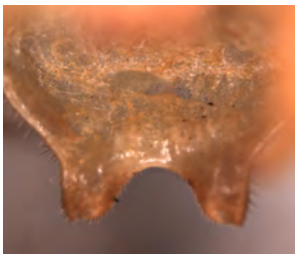
Obolopteryx brevihastatus Fig. 143



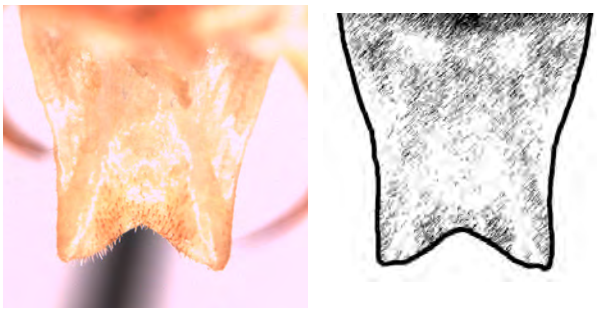
Dichopetala poecilus Fig. 144



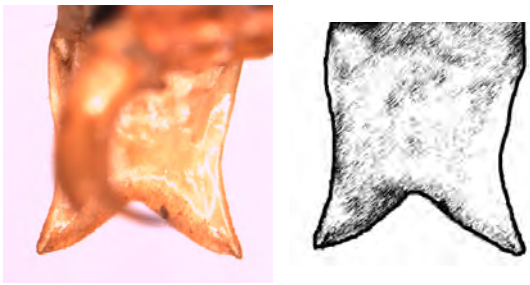
Dichopetala castaneus Fig. 145



Obolopteryx oreoecus Fig. 146

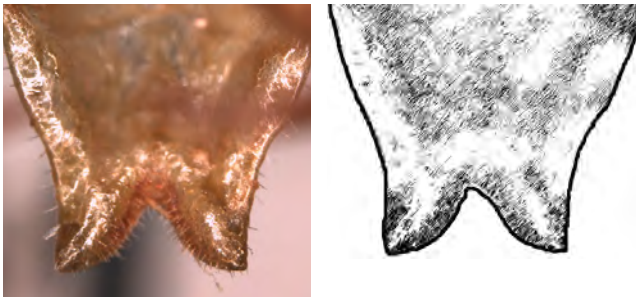


Obolopteryx catinatus Fig. 147



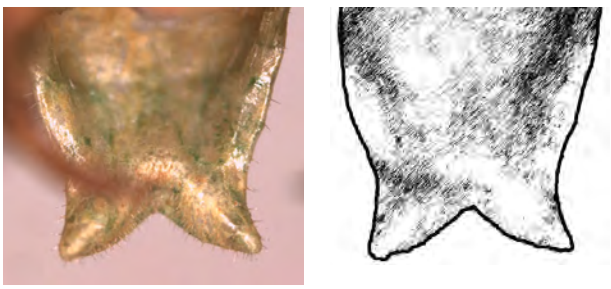
Planipollex polliciferus Fig. 148

Rhabdocerca zanclophora Fig. 149



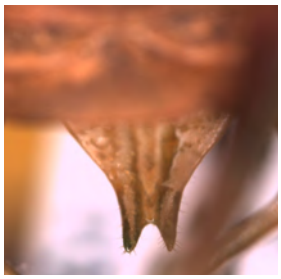
Rhabdocerca caudelli Fig. 150

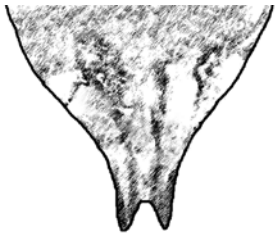
Rhabdocerca tridactyla Fig. 151



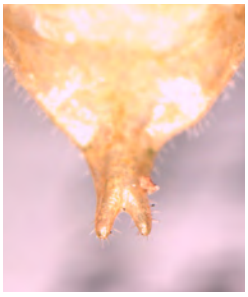
Dichopetala mexicana Fig. 152

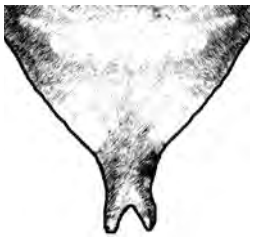
Gymnocerca enaulites Fig. 153



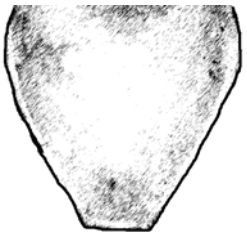


Gymnocerca cycloprista Fig. 154





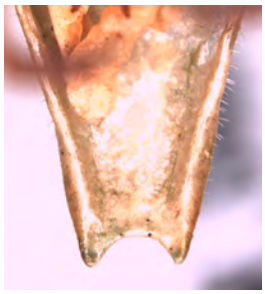
Gymnocerca falcata Fig. 155



Mactruchus durangensis Fig. 156

Mactruchus ischnodus Fig. 157

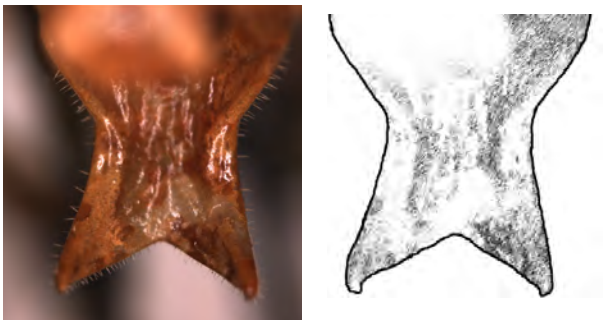
Mactruchus kyrothemastris Fig. 158



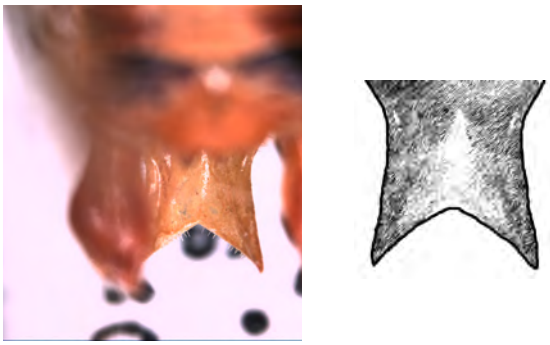
Mactruchus megasynactor Fig. 159

Mactruchus serrifer Fig. 160

Acanthorintes xanthephaptor Fig. 161

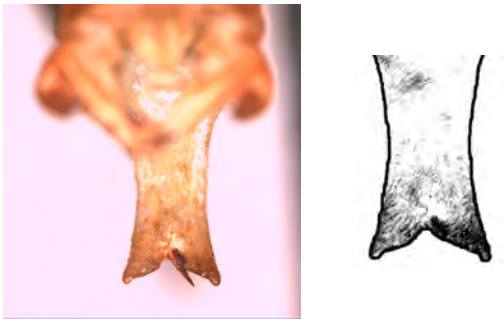


Acanthorintes erythrephaptor Fig. 162

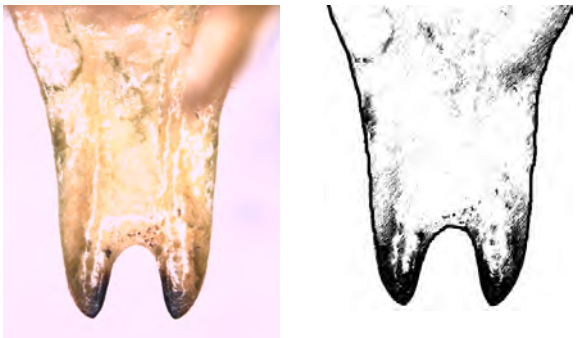


Acanthorintes thenasocescus Fig. 163

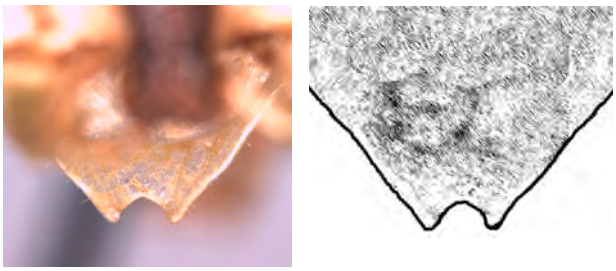
Acanthorintes tauriformis Fig. 164



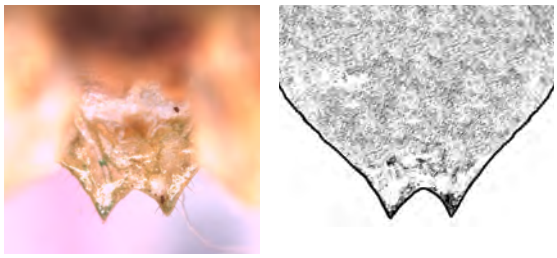
Acanthorintes zeuglaius Fig. 165



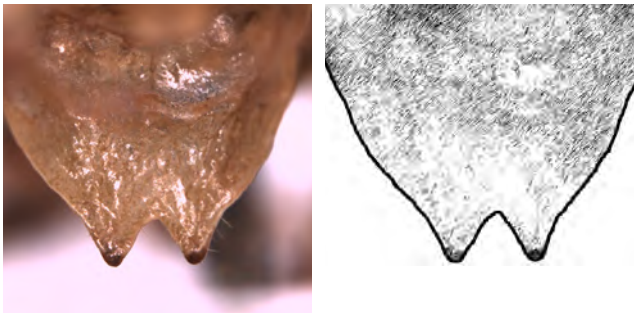
Pterodichopetala cieloi Fig. 166



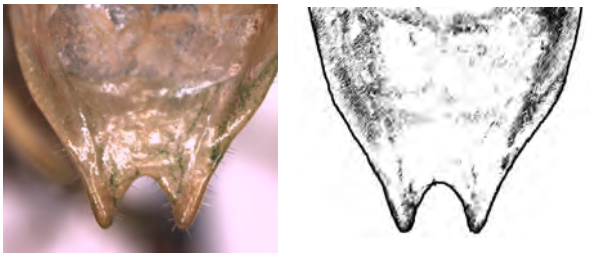
Pterodichopetala strepsidactyla Fig. 167



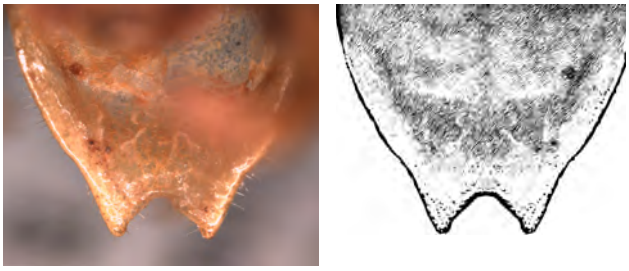
Pterodichopetala hypsibates Fig. 168



Pterodichopetala padrisima Fig. 169



Pterodichopetala pityophila Fig. 170



Pterodichopetala cultricerca Fig. 171

Male Epiproct
(Figs. 172–202)

Figure 172. *Obolopteryx emarginatus*, male, TEXAS: Hall Co., 5 mi. W. [SW?] Memphis, 13 July 1950, M. Cazier, P. Boone, T.J. Cohn.

Figure 173. *Obolopteryx seeversi*, male (holotype), TEXAS: Bexar Co., 11 August 1940, Strohecker.

Figure 174. *Obolopteryx gladiator*, male, TEXAS: Kleberg Co., 6 mi. E. Riviera, 22 October 1978, J.E. Gillaspy #55.

Figure 175. *Obolopteryx brevihastatus*, male, ARIZONA: Cochise Co., 22.5 mi. SW. Rodeo (N. M.) (2 mi. SW. Chiricahua RR. Siding), 6 September 1971, T.J. & J.W. Cohn #21.

Figure 176. *Obolopteryx poecilus*, male, SAN LUIS POTOSI: 18 mi. S. Antiguo Morelos, 14 August 1959, T.J. Cohn #178.

Figure 177. *Obolopteryx castaneus*, male, TEXAS: Val Verde Co., 14.6 mi. NW. Uvalde P.O. on Texas Hwy. 55, 13 October 1974, T.J. & J.W. Cohn #79.

Figure 178. *Obolopteryx oreoecus*, male, TEXAS: Brewster Co., Chisos Mts.: The Basin to Panther Pass, 9 August 1955, T.J. Cohn.

Figure 179. *Obolopteryx catinatus*, male, TEXAS: Cameron Co., Olmito (10 mi. NW. Brownsville P.O.), 20 August 1955, T.J. Cohn.

Figure 180. *Planipollex polliciferus*, male, TAMAULIPAS: 30 mi. NE. Padilla to Padilla, 24 August 1955, T.J. Cohn.

Figure 181. *Rhabdocerca zanclophora*, male, SAN LUIS POTOSI: 12 rd. mi. NW. Ciudad del Maiz (1 mi. S. Montebello), 22 August 1959, I.J. Cantrall & T.J. Cohn #18.

Figure 182. *Rhabdocerca caudelli*, male, SAN LUIS POTOSI: 0.8 mi. N. Nunez school (on Hwy. 57-80), 13 November 1970, T.J. & J.W. Cohn #90.

Figure 183. *Rhabdocerca tridactyla*, male, ZACATECAS: 14.8 mi. NE. Nieves (42.8 mi. SW. Camacho), 10 November 1970, T.J. & J.W. Cohn #85.

Figure 184. *Dichopetala mexicana*, male, PUEBLA: 1.2 mi. NW. Petlalcingo, 9 September 1961, Hubbell, Cantrall, Cohn #86.

Figure 185. *Gymnocerca enaulites*, male, GUERRERO: 11 mi. S. Iguala, 9 December 1958, T.J. Cohn #364.

Figure 186. *Gymnocerca cycloprista*, male, SINALOA: Summit Cerro Tule, 7 mi. SE. Culiacan, 14 October 1970, T.J. & J.W. Cohn #57.

Figure 187. *Gymnocerca falcata*, male, JALISCO: 6.2 mi. SW. Autlan Plaza, 5 October 1970, T.J. & J.W. Cohn #41.

Figure 188. *Mactruchus durangensis*, male, DURANGO: 2 mi. S. Morcillo (9.1 mi. N. edge Durango), 8 November 1970, T.J. & J.W. Cohn #79.

Figure 189. *Mactruchus ischnodus*, male, DURANGO: 13 mi. SE. Cathedral in Nombre de Dios, on Hwy. 45, 25 October 1974, T.J. & J.W. Cohn #97.

Figure 190. *Mactruchus cryothermastris*, male, ZACATECAS: 5.6 mi. [NW.] SW. Sombrerete, W. rd. jct. (on Hwy.45), 25 October 1974, T.J. & J.W. Cohn #96.

Figure 191. *Mactruchus megasynactor*, male, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 192. *Mactruchus serrifer*, male, QUERETARO: Cuesta China, 4.2 mi. E. Queretaro (s. plaza; on old Hwy. 45), 12 November 1970, T.J. & J.W. Cohn #88.

Figure 193. *Acanthorintes xanthephaptor*, male, QUERETARO: 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), 13 November 1970, T.J. & J.W. Cohn #89.

Figure 194. *Acanthorintes erythrephaptor*, male (holotype), QUERETARO: 9 mi. SE. Queretero, 15 October 1958, T. J. Cohn #191.

Figure 195. *Acanthorintes thenarocercus*, male, HIDALGO: Km. 176 CN1, Tasquillo, (desert scrub), [0.5 km. S. of Tula River], 29 August 1948, T.H. Hubbell #249.

Figure 196. *Acanthorintes tauriformis*, male, QUERETARO: 5.4 mi. SW. Jalpan [de Serra] (on Hwy. 120), 22 November 1970, T.J. & J.W. Cohn #107.

Figure 197. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 1 km. NE. Ciudad del Maiz, 29 September 2004, Fontana, Battiston, Agatibi, and Garcia #23.

Figure 198. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

Figure 199. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

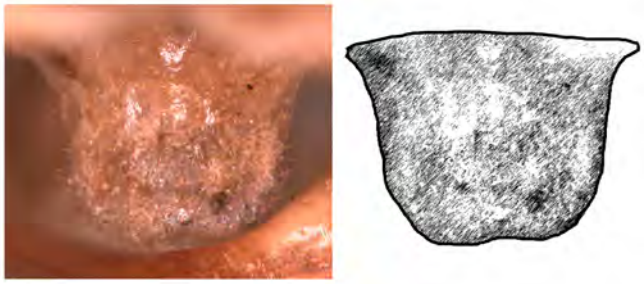
Figure 200. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

Figure 201. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

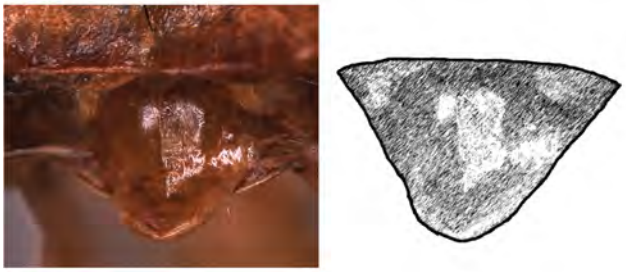
Figure 202. *Pterodichopetala pityophila*, male, COAHUILA: 11.2 mi. SE. Arteaga (Puerto Flores), 18 November 1970, T.J. & J.W. Cohn, #95.

Obolopteryx emartinatus Fig. 172

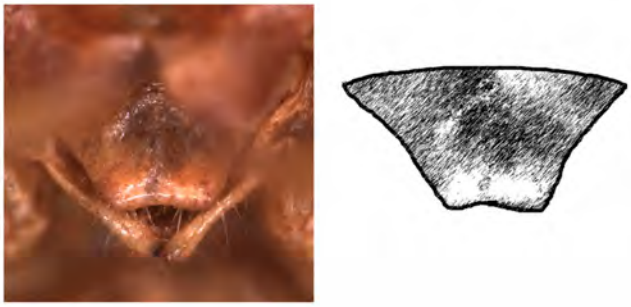
Obolopteryx seeversi Fig. 173



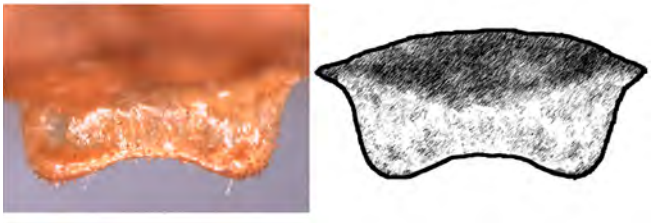
Obolopteryx gladiator Fig. 174



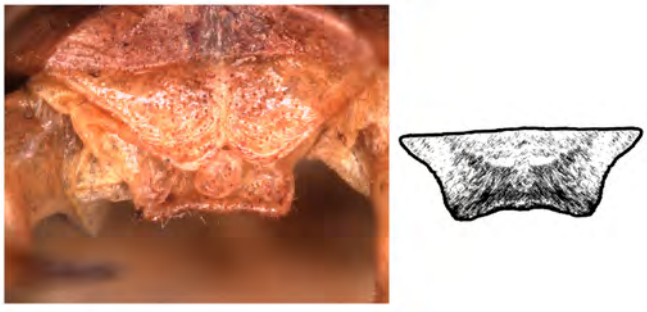
Obolopteryx brevihastatus Fig. 175



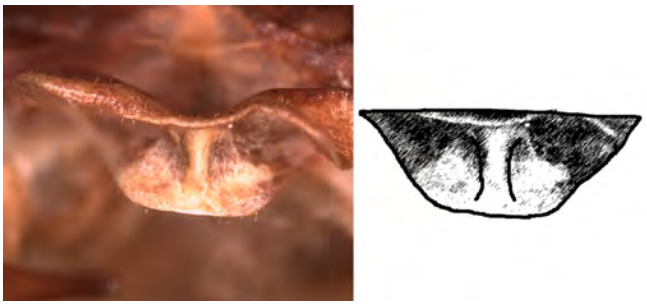
Dichopetala poecilus Fig. 176



Dichopetala castaneus Fig. 177



Obolopteryx oreoecus Fig. 178



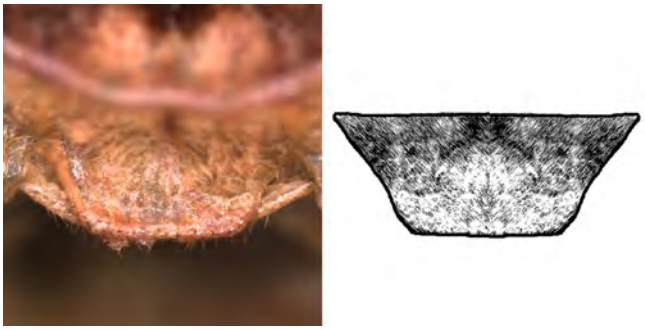
Obolopteryx catinatus Fig. 179

Planipollex polliciferus Fig. 180

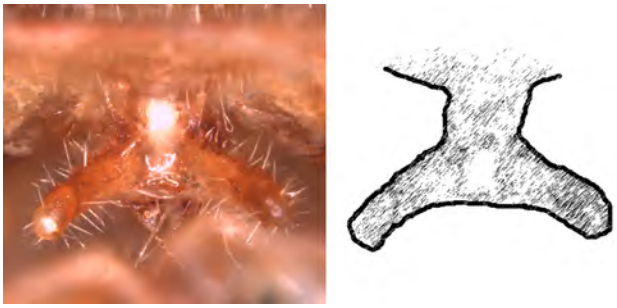
Rhabdocerca zanclophora Fig. 181

Rhabdocerca caudelli Fig. 182

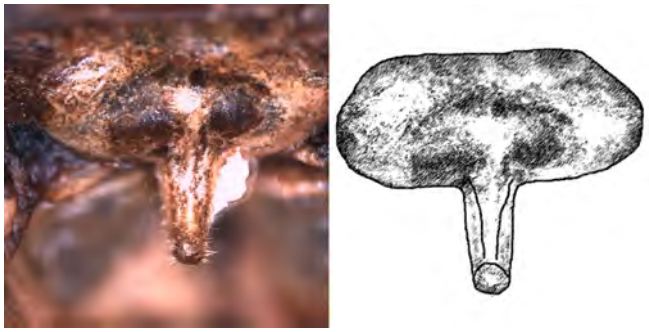
Rhabdocerca tridactyla Fig. 183



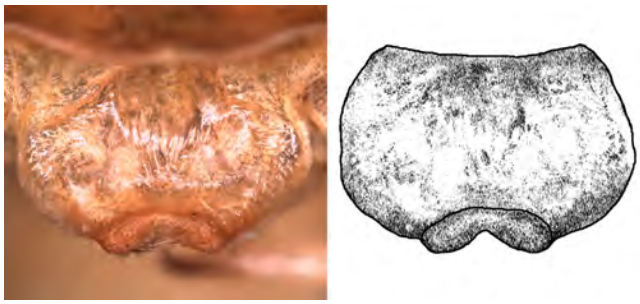
Dichopetala mexicana Fig. 184



Gymnocerca enaulites Fig. 185



Gymnocerca cycloprista Fig. 186

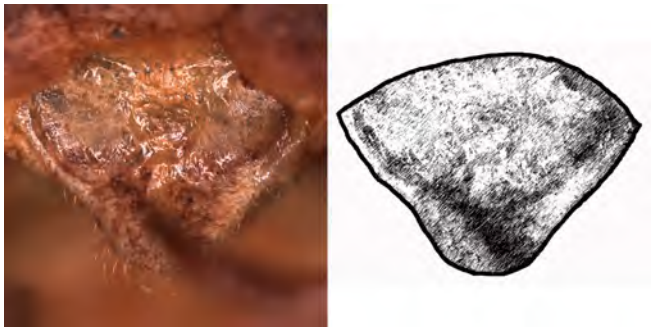


Gymnocerca falcata Fig. 187

Mactruchus durangensis Fig. 188

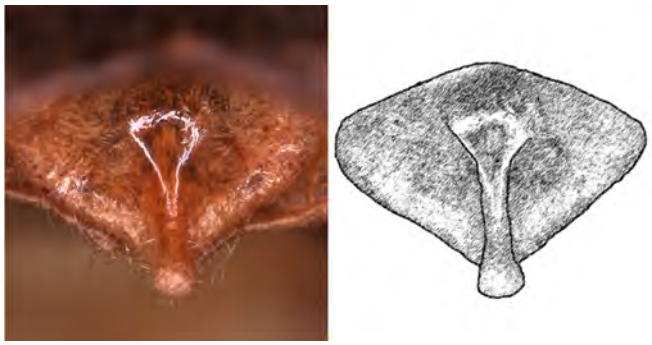
Mactruchus ischnodus Fig. 189

Mactruchus kyrothemastris Fig. 190



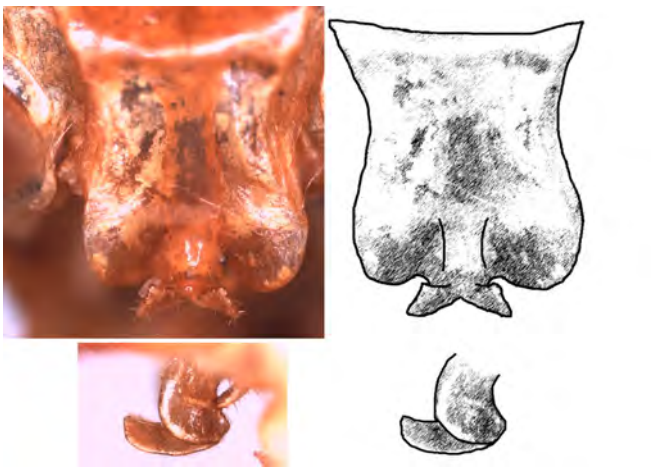
Mactruchus megasynactor Fig. 191

Mactruchus serrifer Fig. 192

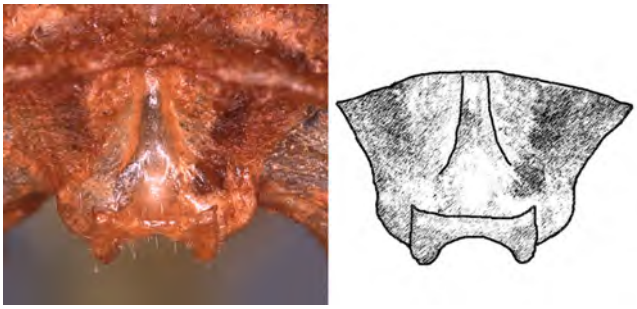


Acanthorintes xanthephaptor Fig. 193

Acanthorintes erythrephaptor Fig. 194



Acanthorintes thenasocescus Fig. 195



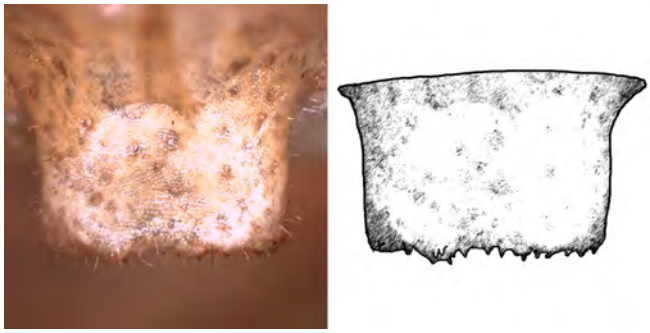
Acanthorintes tauriformis Fig. 196

Acanthorintes zeuglaius Fig. 197

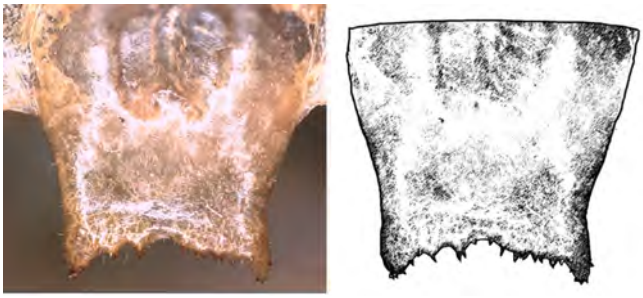
Pterodichopetala cieloi Fig. 198

Pterodichopetala strepsidactyla Fig. 199

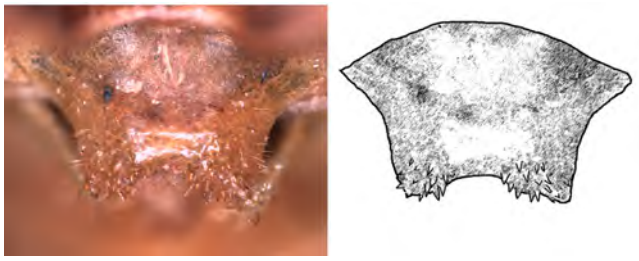
Pterodichopetala hypsibates Fig. 200



Pterodichopetala padrisima Fig. 201



Pterodichopetala pityophila Fig. 202



Pronotum
(Figs. 203–207)

Figure 203. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

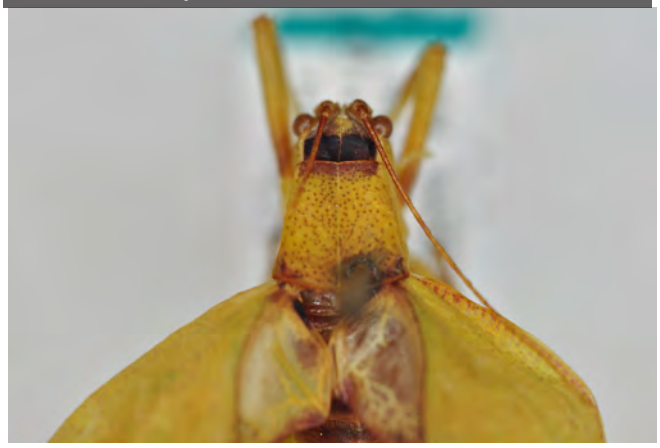
Figure 204. *Pterodichopetala pityophila*, male, COAHUILA: Arteaga, 17 km. SSE., [Puerto Flores], 5 October 2004, Fontana, Battiston, Agatibi, and Garcia #44.

Figure 205. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

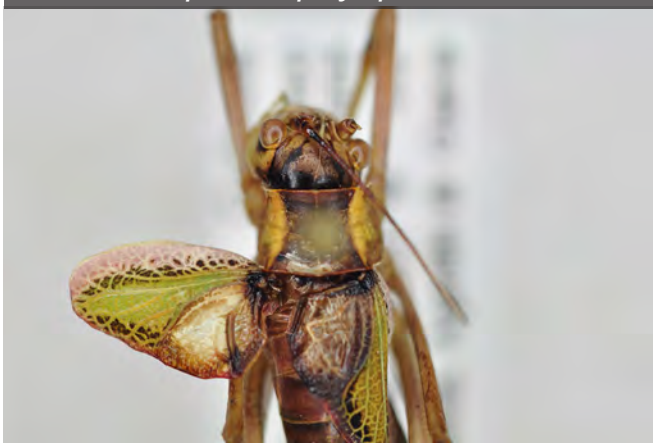
Figure 206. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

Figure 207. *Pterodichopetala cultricerca*, male (holotype), NUEVO LEON: "Villa Santiago" [=Santiago], 19 June 1940, Hoogstraal & Knight.

Pterodichopetala cieloi Fig. 203

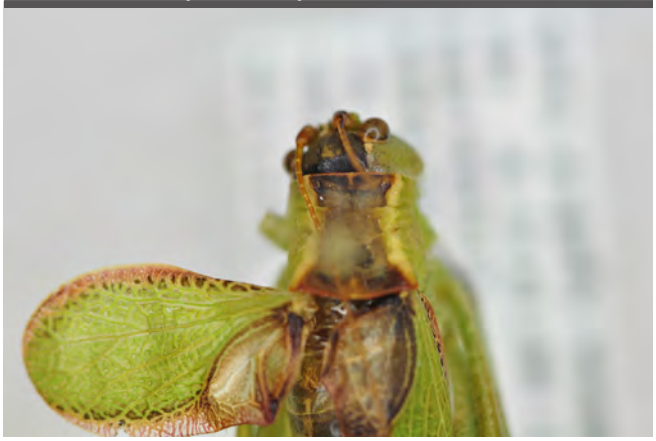


Pterodichopetala pityophila Fig. 204

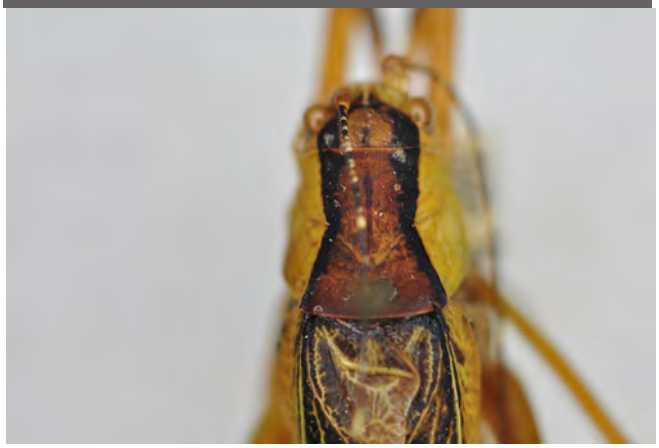


Pterodichopetala hypsibates Fig. 205

Pterodichopetala padrisima Fig. 206



Pterodichopetala cultricerca Fig. 207



Male First Tergite
(Figs. 208–213)

Figure 208. *Rhabdocerca tridactyla*, male, COAHUILA: 0.6 mi. S. Puerto Flores (11.1 rd. mi. S. Arteaga), 21 August 1961, I.J. Cantrall & T. J. Cohn #25.

Figure 209. *Dichopetala mexicana*, male, GUERRERO: 11 mi. S. Iguala, 9 December 1958, T.J. Cohn #364.

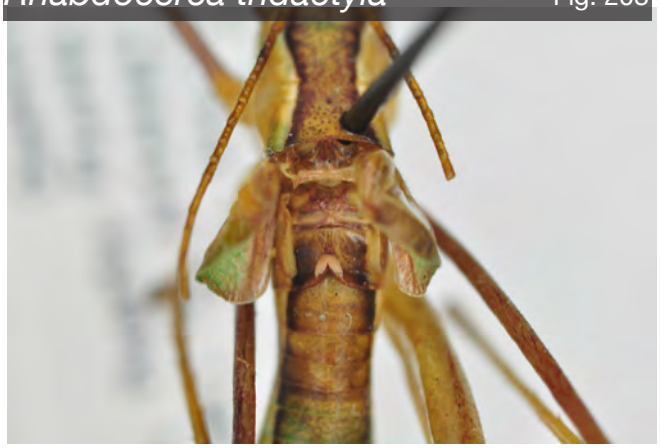
Figure 210. *Acanthorintes xanthephaptor*, male, QUERETARO: 9 mi. SE. Queretaro, 15 October 1958, T.J. Cohn #191.

Figure 211. *Acanthorintes tauriformis*, male, MICHOACAN: 3 mi. S. Carapan (on Hwy. 39), 24 September 1959, I.J. Cantrall & T.J. Cohn #172.

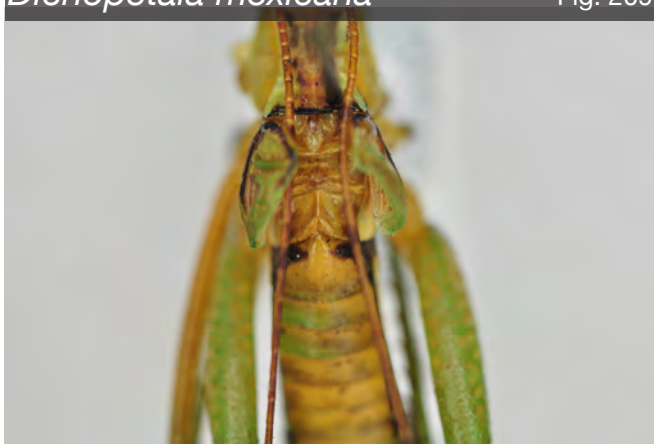
Figure 212. *Acanthorintes thenarocercus*, male, HIDALGO: 21 rd. mi. NW. Ixmiquilpan, (7 rd. mi. N. Tula R.), 15 October 1958, T.J. Cohn #189.

Figure 213. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 5 mi. NW. Ciudad del Maiz, 22 August 1959, T.J. Cohn & I.J. Cantrall #15.

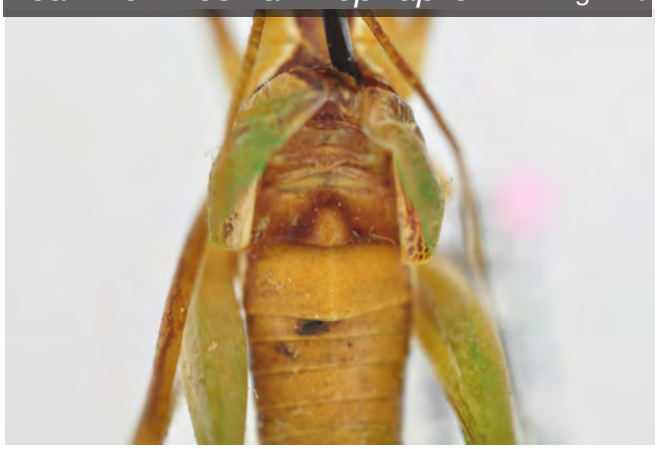
Rhabdocerca tridactyla Fig. 208



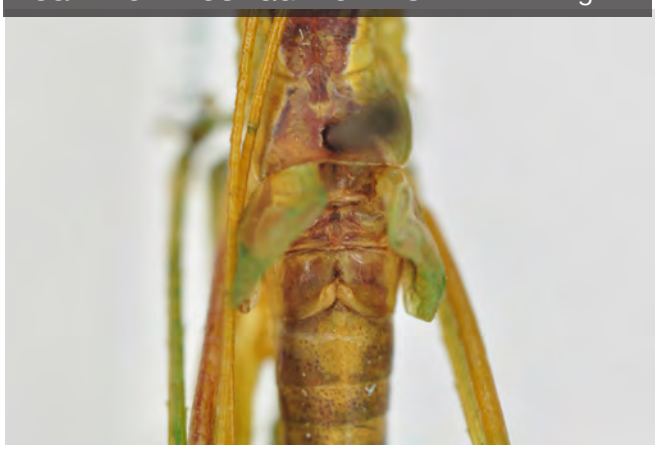
Dichopetala mexicana Fig. 209



Acanthorintes xanthephaptor Fig. 210



Acanthorintes tauriformis Fig. 211



Acanthorintes thenasocercus Fig. 212

Acanthorintes zeuglaius Fig. 213

Male Ultimate Tergite
(Figs. 214–222)

Figure 214. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

Figure 215. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

Figure 216. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

Figure 217. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

Figure 218. *Pterodichopetala pityophila*, male, COAHUILA: Arteaga, 17 km. SSE., [Puerto Flores], 5 October 2004, Fontana, Battiston, Agatibi, and Garcia #44.

Figure 219. *Pterodichopetala cultricerca*, male (holotype), NUEVO LEON: "Villa Santiago" [=Santiago], 19 June 1940, Hoogstraal & Knight.

Figure 220. *Dichopetala mexicana*, male, MORELOS: 9 mi. S. Cuernavaca (on Hwy. 95), 16 September 1959, I.J. Cantrall & T.J. Cohn #134 [Lackey stipple drawing].

Figure 221. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 7 rd. mi. NE. Ciudad del Maiz, 21 August 1959, I.J. Cantrall & T.J. Cohn #11 [Lacky stipple drawing].

Figure 222. *Obolopteryx emarginatus*, male, TEXAS: McMullen Co., 20.7 rd. mi. S. Tilden on Hwy. 16, 19.4 rd. mi. N. Hwy. 59 jct. in Freer, 4 September 2010, D. R. Swanson #39.

Pterodichopetala cieloi Fig. 214

Pterodichopetala strepsidactyla Fig. 215

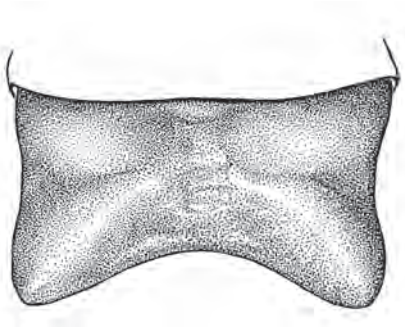
Pterodichopetala hypsibates Fig. 216

Pterodichopetala padrisima Fig. 217

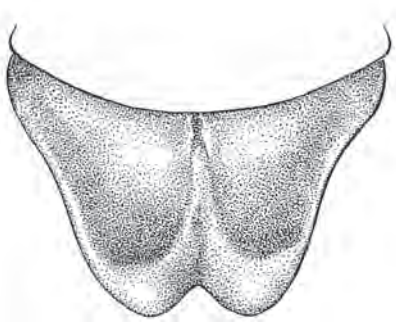
Pterodichopetala pityophila Fig. 218

Pterodichopetala cultricerca Fig. 219

Dichopetala mexicana Fig. 220



Acanthorintes zeuglaius Fig. 221



Obolopteryx emarginatus Fig. 222

Male Tegmina
(Figs. 223–254)

Figure 223. *Obolopteryx emarginatus*, male, TEXAS: Clay Co., 3 mi. E. Windthorst, 23 June 1959, T.J. Cohn #17.

Figure 224. *Obolopteryx seeversi*, male, TEXAS: Bandera Co., 1 mi. E. Bandera, 14 June 1999, John Stidham.

Figure 225. *Obolopteryx gladiator*, male, TEXAS: DeWitt Co., Hochheim, 8 October 1955, J.R. Hilliard.

Figure 226. *Obolopteryx brevihastatus*, male, ARIZONA: Cochise Co., Rodeo, 1969 Cohn #27.

Figure 227. *Obolopteryx poecilus*, male, SAN LUIS POTOSI: 1.5 mi. E. Ciudad Valles on Tampico Rd., 31 August 1955, T.J. Cohn.

Figure 228. *Obolopteryx castaneus*, male, TEXAS: Jim Wells Co., 1 mi. NE. Sandia (Wade Creek), 23 July 1955, T.J. Cohn.

Figure 229. *Obolopteryx oreoecus*, male, TEXAS: Brewster Co., Chisos Mts., Juniper Canyon, 27 July 1928, F.M. Gaige #257.

Figure 230. *Obolopteryx catinatus*, male, TEXAS: Bexar Co., San Antonio (north edge), 2.5 mi. N. Hwy. 410 on Hwy. 281, 8 June 1977, T.J. Cohn #21.

Figure 231. *Planipollex polliciferus*, male, TEXAS: Cameron Co., 8 mi. W. Brownsville, 13 August 1955, Rehn.

Figure 232. *Rhabdocerca zanclophora*, male, SAN LUIS POTOSI: 12 rd. mi. NW. Ciudad del Maiz (1 mi. S. Montebello), 22 August 1959, I.J. Cantrall & T.J. Cohn #18.

Figure 233. *Rhabdocerca caudelli*, male, SAN LUIS POTOSI: 15 mi. NE. Villa Hidalgo, 20 August 1959, T.J. Cohn & I.J. Cantrall #4.

Figure 234. *Rhabdocerca tridactyla*, male, ZACATECAS: 17 mi. SW. Camacho, 10 November 1970, T.J. & J.W. Cohn #83.

Figure 235. *Dichopetala mexicana*, male, GUERRERO: 9 rd. mi. NE. Taxco (1.7 rd. mi. SW. Acuitlapan), 17 September 1959, I.J. Cantrall & T.J. Cohn #137.

Figure 236. *Gymnocerca enaulites*, male, GUERRERO: 4 mi. SE. Chilpancingo, 12 December 1958, T.J. Cohn #372.

Figure 237. *Gymnocerca cycloprista*, male, SINALOA: Summit Cerro Tule, 7 mi. SE. Culiacan, 14 October 1970, T.J. & J.W. Cohn #57.

Figure 238. *Gymnocerca falcata*, male, JALISCO: 3.1 mi. NW. Tequila, 3 September 1961, I.J. Cantrall & T.J. Cohn #74.

Figure 239. *Mactruchus durangensis*, male, DURANGO: 8 mi. SW. Durango on Hwy. 40 [from northern glorieta] (4.4 mi. NE. Las Mangas) [55.3 mi. SE. El Salto], 26 August 1974, T.J. & J.W. Cohn #98.

Figure 240. *Mactruchus ischnodus*, male, DURANGO: 2 mi. E. La Zarca, (60 mi. W. Mapimi), 11 September 1958, T.J. Cohn #113.

Figure 241. *Mactruchus cryothermastris*, male, ZACATECAS: 5.6 mi. [NW.] SW. Sombrerete, W. rd. jct. (on Hwy.45), 25 October 1974, T.J. & J.W. Cohn #96.

Figure 242. *Mactruchus megasynactor*, male, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 243. *Mactruchus serrifer*, male, JALISCO: 12 mi. SW. Guadalajara (4 mi. NW. Santa Cruz), 24 November 1958, T.J. Cohn #310.

Figure 244. *Acanthorintes xanthephaptor*, male, QUERETARO: Cuesta China, 4.2 mi. E. Queretaro (s. plaza; on old Hwy. 45), 12 November 1970, T.J. & J.W. Cohn #88.

Figure 245. *Acanthorintes erythrephaptor*, male (holotype), QUERETARO: 9 mi. SE. Queretero, 15 October 1958, T. J. Cohn #191.

Figure 246. *Acanthorintes thenarocercus*, male, HIDALGO: 9 mi. NW. Ixmiquilpan, 15 October 1958, T.J. Cohn #190.

Figure 247. *Acanthorintes tauriformis*, male, SAN LUIS POTOSI: Alvarez (27.9 rd. mi. E. San Luis Potosi [from Juarez Glorieta]) [2.3 rd. mi. SW. San Francisco], 16 November 1961, T.J. Cohn & S.P Hubbell #205.

Figure 248. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 1 km. NE. Ciudad del Maiz, 29 September 2004, Fontana, Battiston, Agatibi, and Garcia #23.

Figure 249. *Pterodichopetala cieloi*, male, TAMAULIPAS: Biosphere Reserve El Cielo [6.7 air mi. WNW. Gomez Farias], 7 November 2009, L. Barrientos.

Figure 250. *Pterodichopetala strepsidactyla*, male, SAN LUIS POTOSI: 21.3 mi. E. San Luis Potosi, 24 August 1965, T. J. Cohn #66.

Figure 251. *Pterodichopetala hypsibates*, male, NUEVO LEON: Cerro Potosi, 17 rd. mi. NW. Galeana, (5.2 rd. mi. from Radio Sta., Km. 11.5), 21 October 1974, T.J. & J.W. Cohn #90A.

Figure 252. *Pterodichopetala padrisima*, male, NUEVO LEON: 18.23 air km. W. (Villa de) Santiago, 6 October 2004, Fontana, Battiston, Agatibi, and Garcia #45.

Figure 253. *Pterodichopetala pityophila*, male, COAHUILA: Arteaga, 17 km. SSE., [Puerto Flores], 5 October 2004, Fontana, Battiston, Agatibi, and Garcia #44.

Figure 254. *Pterodichopetala cultricerca*, male (holotype), NUEVO LEON: "Villa Santiago" [=Santiago], 19 June 1940, Hoogstraal & Knight.

Obolopteryx emartinatus Fig. 223

Obolopteryx seeversi Fig. 224

Obolopteryx gladiator Fig. 225

Obolopteryx brevihastatus Fig. 226

Dichopetala poecilus Fig. 227

Dichopetala castaneus Fig. 228

Obolopteryx oreoecus Fig. 229

Obolopteryx catinatus Fig. 230

Planipollex polliciferus Fig. 231

Rhabdocerca zanclophora Fig. 232

Rhabdocerca caudelli Fig. 233

Rhabdocerca tridactyla Fig. 234

Dichopetala mexicana Fig. 235

Gymnocerca enaulites Fig. 236

Gymnocerca cycloprista Fig. 237

Gymnocerca falcata Fig. 238

Mactruchus durangensis Fig. 239

Mactruchus ischnodus Fig. 240

Mactruchus kyrothemastris Fig. 241

Mactruchus megasynactor Fig. 242

Mactruchus serrifer Fig. 243

Acanthorintes xanthephaptor Fig. 244

Acanthorintes erythrephaptor Fig. 245

Acanthorintes thenasocescus Fig. 246

Acanthorintes tauriformis Fig. 247

Acanthorintes zeuglaius Fig. 248

Pterodichopetala cieloi Fig. 249

Pterodichopetala strepsidactyla Fig. 250

Pterodichopetala hypsibates Fig. 251

Pterodichopetala padrisima Fig. 252

Pterodichopetala pityophila Fig. 253

Pterodichopetala cultricerca Fig. 254

Female Ovipositor Base
(Figs. 255–280)

Figure 255. *Obolopteryx emarginatus*, female, TEXAS: Callahan Co., 15 mi. NW. Cross Plains, 29 June 1959, T.J. Cohn #34.

Figure 256. *Obolopteryx seeversi*, female, TEXAS: Bandera Co., 1 mi. E. Bandera, 14 June 1999, John Stidham.

Figure 257. *Obolopteryx gladiator*, female, TEXAS: DeWitt Co., Hochheim, 8 October 1955, J.R. Hilliard.

Figure 258. *Obolopteryx brevihastatus*, female, ARIZONA: Cochise Co., Rodeo, 1969 Cohn #27.

Figure 259. *Obolopteryx poecilus*, female, SAN LUIS POTOSI: 1.5 mi. E. Ciudad Valles on Tampico Rd., 31 August 1955, T.J. Cohn.

Figure 260. *Obolopteryx castaneus*, female, TEXAS: Jim Wells Co., 1 mi. NE. Sandia (Wade Creek), 23 July 1955, T.J. Cohn.

Figure 261. *Obolopteryx oreoecus*, female, TEXAS: Brewster Co., The Basin to ridge E. of Basin, Big Bend Nat'l. Park, 9 September 1951, T.J. Cohn.

Figure 262. *Obolopteryx catinatus*, female, TEXAS: Bexar Co., San Antonio (north edge), 2.5 mi. N. Hwy. 410 on Hwy. 281, 8 June 1977, T.J. Cohn #21.

Figure 263. *Planipollex polliciferus*, female, TEXAS: Cameron Co., 2 mi. NE. Brownsville Post Office, 4 September 1955, T.J. Cohn.

Figure 264. *Rhabdocerca zanclophora*, female, SAN LUIS POTOSI: 12 rd. mi. NW. Ciudad del Maiz (1 mi. S. Montebello), 22 August 1959, I.J. Cantrall & T.J. Cohn #18.

Figure 265. *Rhabdocerca caudelli*, female, SAN LUIS POTOSI: 10 mi. NW. El Tepeyac (37 mi. NW. Cd. del Maiz), 22 August 1959, I.J. Cantrall & T.J. Cohn #17.

Figure 266. *Rhabdocerca tridactyla*, female, COAHUILA: 9 mi. N. Concepcion del Oro, 6 August 1959, T.J. Cohn #147.

Figure 267. *Dichopetala mexicana*, female, GUERRERO 11 mi. S. Iguala, 9 December 1958, T.J. Cohn #364.

Figure 268. *Gymnocerca enaulites*, female, GUERRERO 11 mi. S. Iguala, 9 December 1958, T.J. Cohn #364.

Figure 269. *Gymnocerca cycloprista*, female, SINALOA: 66 mi. SE. Culiacan, (2 mi. SE. Abuya), 6 November 1958, T.J. Cohn #258.

Figure 270. *Gymnocerca falcata*, female, JALISCO: 3 mi. SE. Tequila, 22-23 November 1958, T.J. Cohn #307.

Figure 271. *Mactruchus durangensis*, female, DURANGO: 8 mi. SW. Durango on Hwy. 40 [from northern glorieta] (4.4 mi. NE. Las Mangas) [55.3 mi. SE. El Salto], 26 August 1974, T.J. & J.W. Cohn #98.

Figure 272. *Mactruchus ischnodus*, female, DURANGO: 2 mi. E. La Zarca, (60 mi. W. Mapimi), 11 September 1958, T.J. Cohn #113.

Figure 273. *Mactruchus cryothermastris*, female, ZACATECAS: 5.6 mi. [NW.] SW. Sombrerete, W. rd. jct. (on Hwy.45), 25 October 1974, T.J. & J.W. Cohn #96.

Figure 274. *Mactruchus megasynactor*, female, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 275. *Mactruchus serrifer*, female, JALISCO: 0.4 mi. S. Huentitan del Bajo [or Juentitan], (5 mi. N. Guadalajara (Mercado San Juan)), 30 September 1959, T.J. Cohn #199.

Figure 276. *Acanthorintes xanthephaptor*, female, QUERETARO: 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), 13 November 1970, T.J. & J.W. Cohn #89.

Figure 277. *Acanthorintes thenarocercus*, male, HIDALGO: 11.3 km. W. Tula R. at Ixmiquilpan, 23 September 2004, Fontana, Battiston, Agatibi, and Garcia #7.

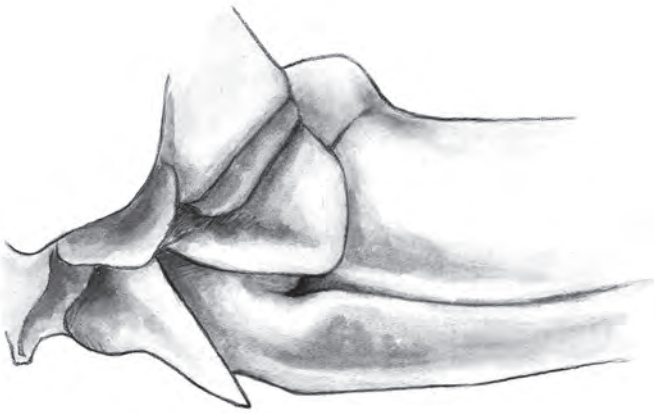
Figure 278. *Acanthorintes tauriformis*, female, SAN LUIS POTOSI: Alvarez (27.9 rd. mi. E. San Luis Potosi [from Juarez Glorieta]) [2.3 rd. mi. SW. San Francisco], 16 November 1961, T.J. Cohn & S.P Hubbell #205.

Figure 279. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 7 rd. mi. NE. Ciudad del Maiz, 21 August 1959, I.J. Cantrall & T.J. Cohn #11.

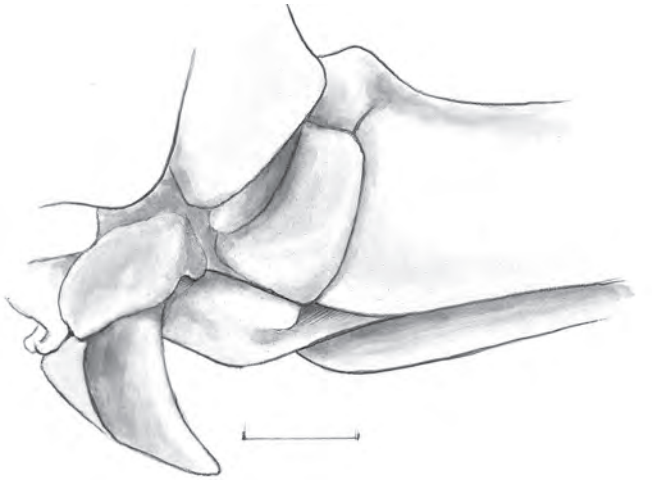
Figure 280. *Pterodichopetala pityophila*, female, COAHUILA: Arteaga, 17 km. SSE., [Puerto Flores], 5 October 2004, Fontana, Battiston, Agatibi, and Garcia #44.

Obolopteryx emartinatus Fig. 255

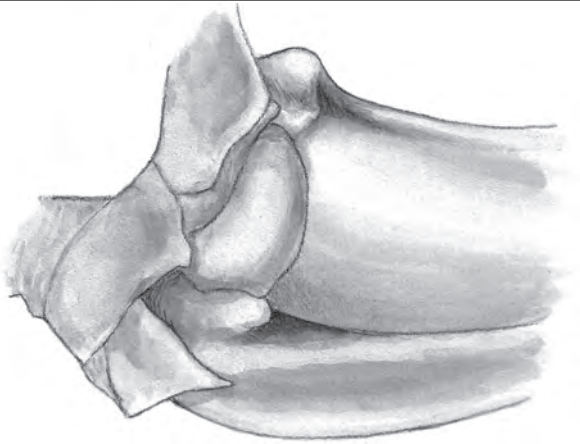
Obolopteryx seeversi Fig. 256



Obolopteryx gladiator Fig. 257

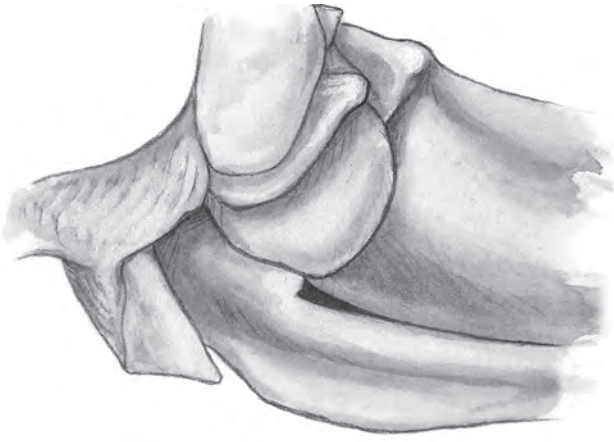


Obolopteryx brevihastatus Fig. 258

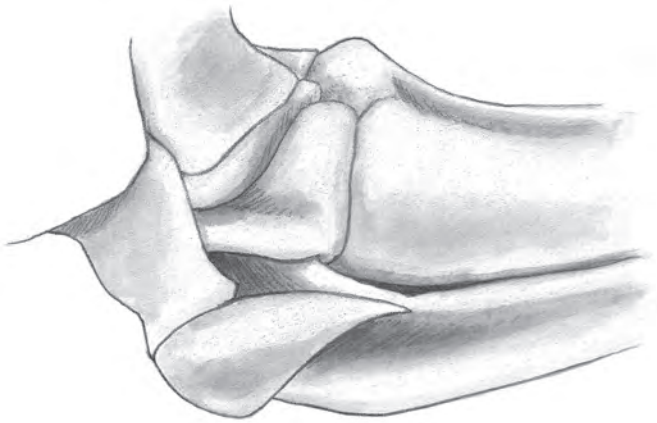


Dichopetala poecilus Fig. 259

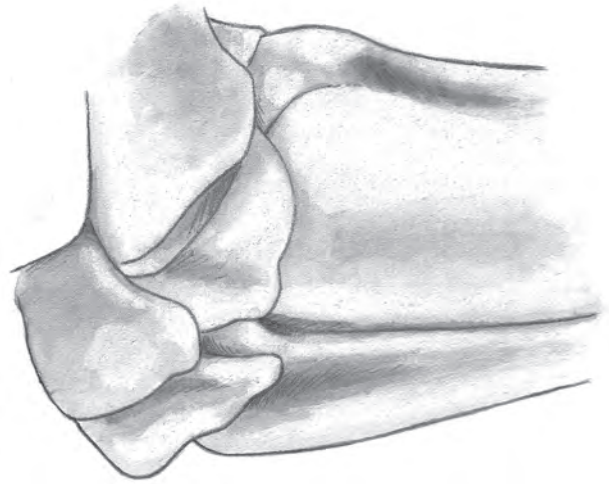
Dichopetala castaneus Fig. 260



Obolopteryx oreoecus Fig. 261



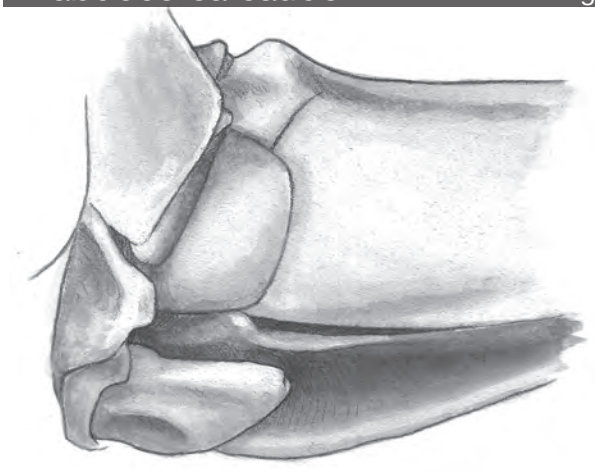
Obolopteryx catinatus Fig. 262



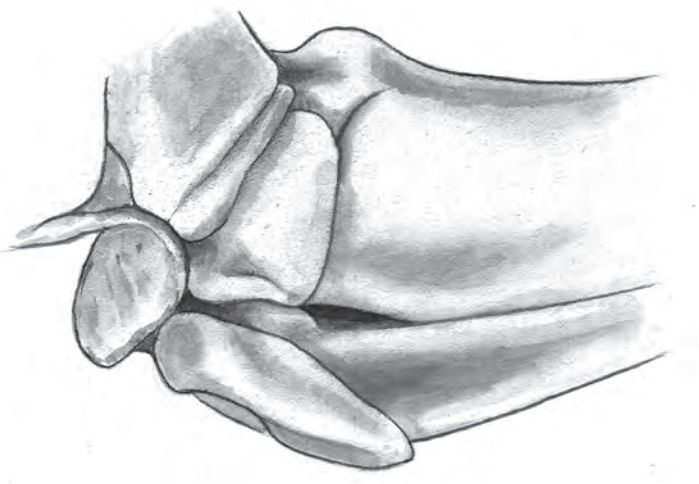
Planipollex polliciferus Fig. 263

Rhabdocerca zanclophora Fig. 264

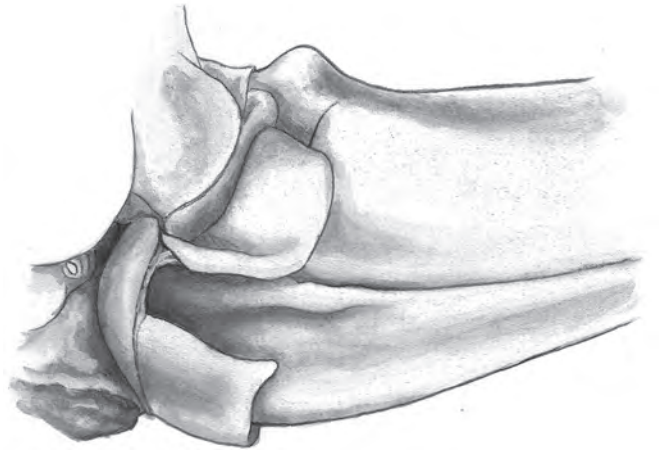
Rhabdocerca caudelli Fig. 265



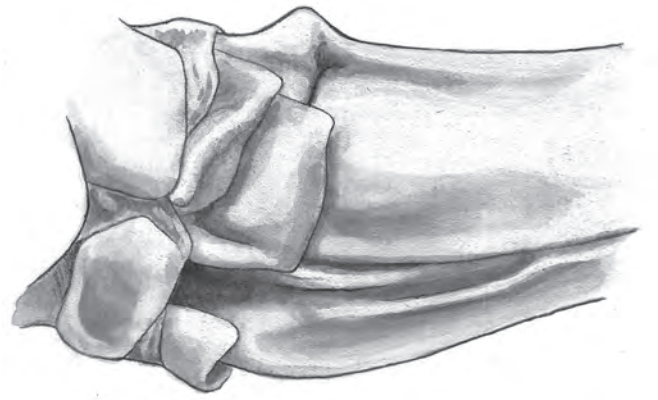
Rhabdocerca tridactyla Fig. 266



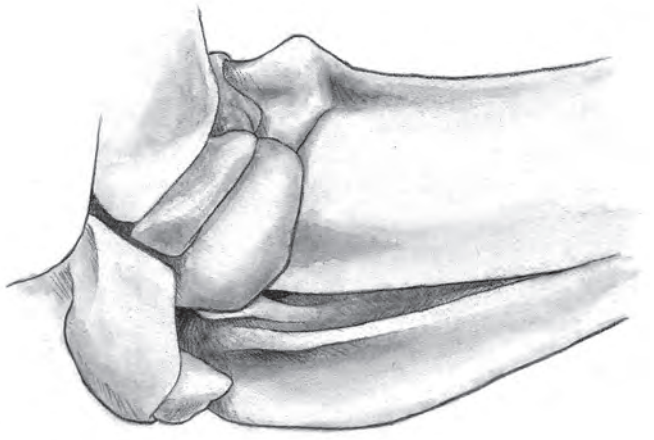
Dichopetala mexicana Fig. 267



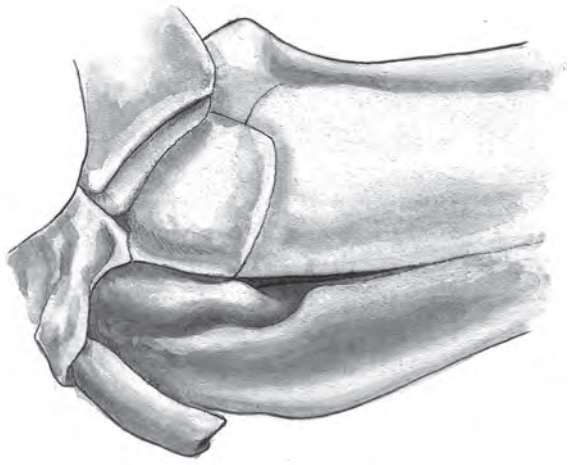
Gymnocerca enaulites Fig. 268



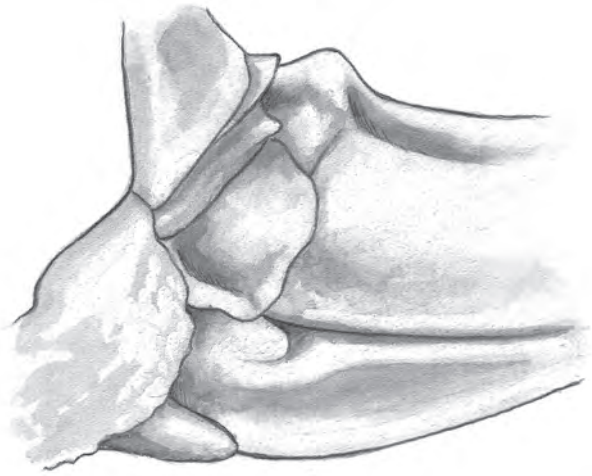
Gymnocerca cycloprista Fig. 269



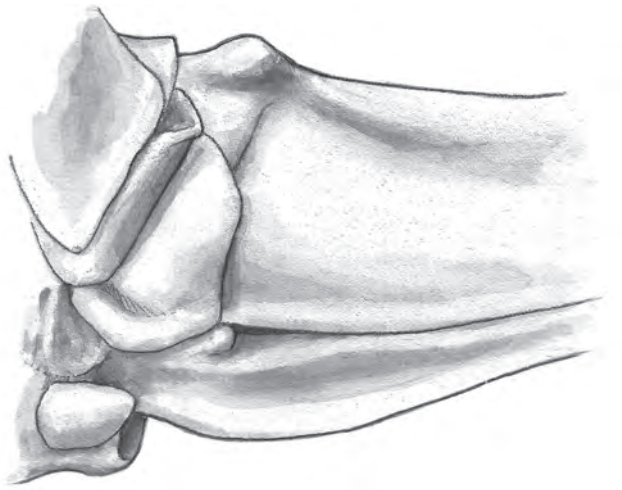
Gymnocerca falcata Fig. 270



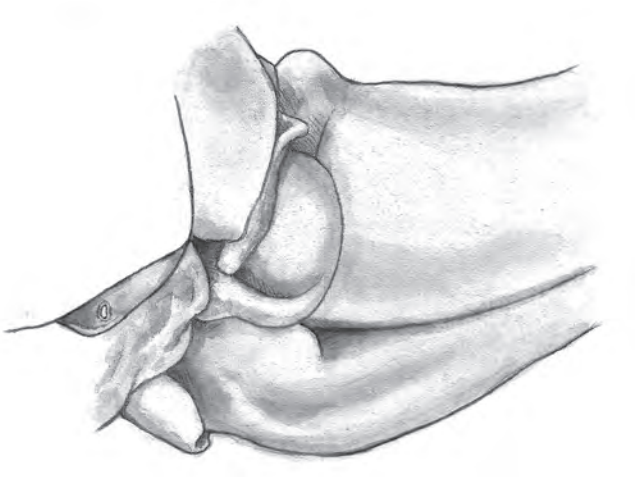
Mactruchus durangensis Fig. 271



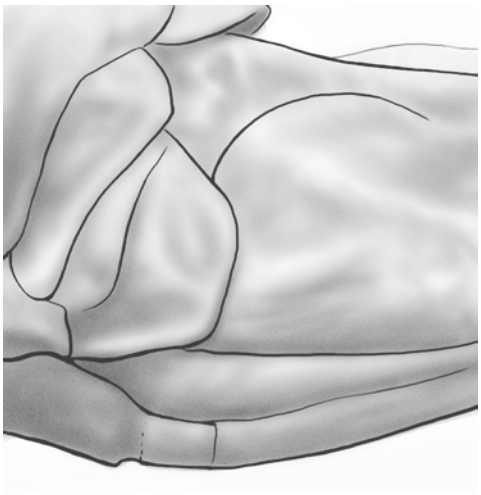
Mactruchus ischnodus Fig. 272



Mactruchus kyrothemastris Fig. 273



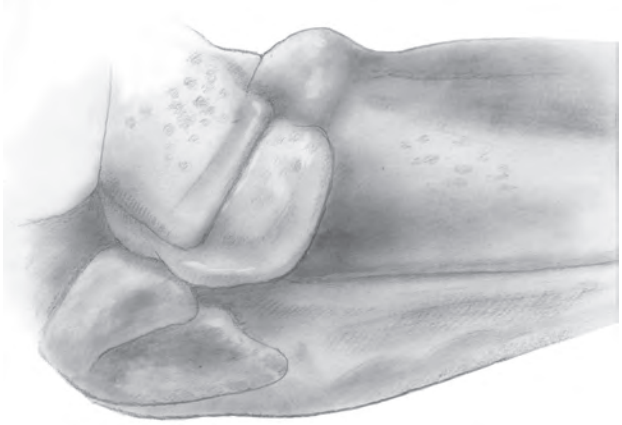
Mactruchus megasynactor Fig. 274



Mactruchus serrifer Fig. 275

Acanthorintes xanthephaptor Fig. 276

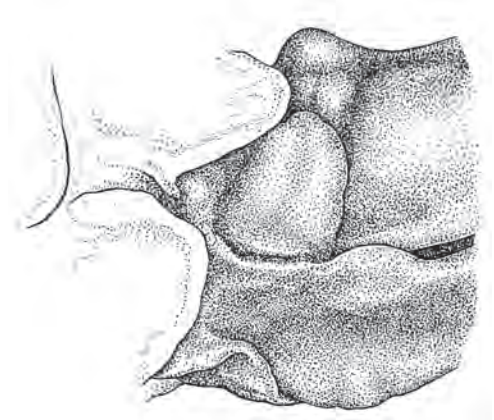
Acanthorintes erythrephaptor Fig. 277



Acanthorintes thenasocescus Fig. 278

Acanthorintes tauriformis Fig. 279

Acanthorintes zeuglaius Fig. 280



Female Tegmina
(Figs. 281–303)

Figure 281. *Obolopteryx emarginatus*, female, TEXAS: Bell Co., 1 mi. SSW. Killeen, 26 July 1955, T.J. Cohn.

Figure 282. *Obolopteryx gladiator*, female, TEXAS: Kenedy Co., Armstrong, 30 mi. N. Raymondville, 6 September 1955, T.J. Cohn.

Figure 283. *Obolopteryx poecilus*, female, SAN LUIS POTOSI: 1.5 mi. E. Ciudad Valles on Tampico rd., 31 August 1955, T.J. Cohn.

Figure 284. *Obolopteryx castaneus*, female, TEXAS: Val Verde Co., 20 mi. NE. Del Rio P.O. on Ranch Rd. 2524 (16.5 mi. NE. jct. Hwy. 90), 11 October 1974, T.J. & J.W. Cohn #75.

Figure 285. *Obolopteryx brevihastatus*, female, ARIZONA: Cochise Co., 17.5 air mi. W. McNeal, 0.6 mi. SW. Gap Tank (SW. Davis Rd.), 4 September 1977, T.J. & J.W. Cohn #51.

Figure 286. *Obolopteryx oreoecus*, female, TEXAS: Brewster Co., Big Bend National Park, 0.1 mi. S. Basin Junction on Basin Road, 3 September 2008, D. R. Swanson #37.

Figure 287. *Obolopteryx catinatus*, female, TEXAS: Bexar Co., San Antonio (north edge), 2.5 mi. N. Hwy. 410 on Hwy. 281, 8 June 1977, T.J. Cohn #21.

Figure 288. *Rhabdocerca caudelli*, female, SAN LUIS POTOSI: 15 mi. NE. Villa Hidalgo, 20 August 1959, T.J. Cohn & I.J. Cantrall #4.

Figure 289. *Rhabdocerca tridactyla*, female, ZACATECAS: 17 mi. SW. Camacho, 10 November 1970, T.J. & J.W. Cohn #83.

Figure 290. *Planipollex polliciferus*, female, TAMAULIPAS: 17 mi. SSw. Matamoros, 23 August 1955, T.J. Cohn.

Figure 291. *Dichopetala mexicana*, female, PUEBLA: 1.2 mi. NW. Petlalcingo, 9 September 1961, Hubbell, Cantrall, Cohn #86.

Figure 292. *Gymnocerca enaulites*, female, GUERRERO: 1.6 mi. NE. Cocula, 21 September 1959, I.J. Cantrall & T.J. Cohn #159.

Figure 293. *Gymnocerca cycloprista*, female, SINALOA: 30 mi. S. Culiacan on Hwy. 15, 30 August 1965, T.J. Cohn #85.

Figure 294. *Gymnocerca falcata*, female, JALISCO: 1.4 rd. mi. SE. Amatitlan, 2 October 1959, T.J. Cohn #202.

Figure 295. *Mactruchus durangensis*, female, DURANGO: 2 mi. S. Morcillo (9.1 mi. N. edge Durango), 8 November 1970, T.J. & J.W. Cohn #79.

Figure 296. *Mactruchus ischnodus*, female, DURANGO: 34.8 MI. e. La Zarca (on Hwy. 30), 30 November 1972, J.C. Lee #43.

Figure 297. *Mactruchus cryothermastris*, female, DURANGO: 12 MI. ne. Guadalupe Victoria on Hwy. 40, 24 August 1961, I.J. Cantrall & T.J. Cohn #38.

Figure 298. *Mactruchus megasynactor*, female, DURANGO: La Quebrada [117.7 air mi. W. La Zarca], 20 July 1947, M. Cazier.

Figure 299. *Mactruchus serrifer*, female, QUERETARO: Cuesta China, 4.2 mi. E. Queretaro (s. plaza; on old Hwy. 45), 12 November 1970, T.J. & J.W. Cohn #88.

Figure 300. *Acanthorintes xanthephaptor*, female, QUERETARO: 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), 13 November 1970, T.J. & J.W. Cohn #89.

Figure 301. *Acanthorintes thenarocercus*, female, HIDALGO: 9 mi. NW. Ixmiquilpan, 15 October 1958, T.J. Cohn #190.

Figure 302. *Acanthorintes tauriformis*, female, JALISCO: 10.5 mi. NW. Leon (center) (ridge summit), 11 November 1970, T.J. & J.W. Cohn #87.

Figure 303. *Acanthorintes zeuglaius*, male, SAN LUIS POTOSI: 7 rd. mi. NE. Ciudad del Maiz, 21 August 1959, I.J. Cantrall & T.J. Cohn #11.

Obolopteryx emartinatus Fig. 281

Obolopteryx gladiator Fig. 282

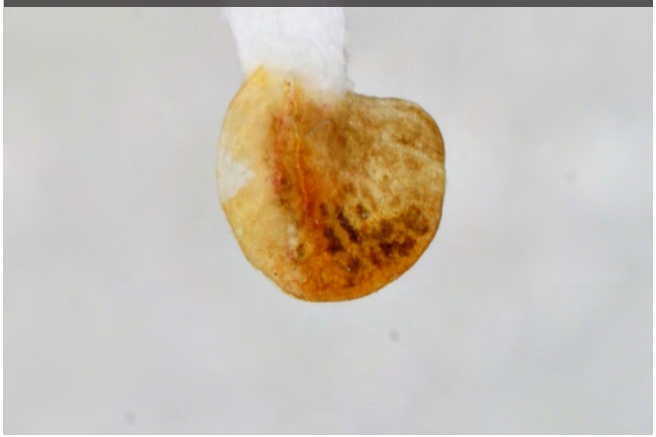
Obolopteryx poecilus Fig. 283

Obolopteryx castaneus Fig. 284

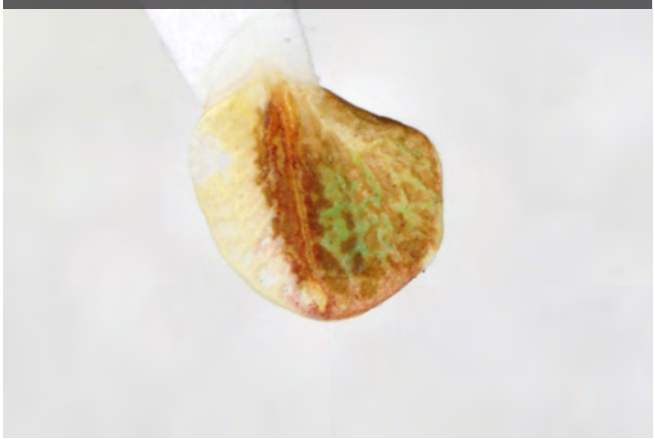
Dichopetala brevihastatus Fig. 285

Obolopteryx oreoecus Fig. 286

Obolopteryx catinatus Fig. 287



Rhabdocerca caudelli Fig. 288



Rhabdocerca tridactyla Fig. 289

Planipollex pelliciferus Fig. 290

Dichopetala mexicana Fig. 291

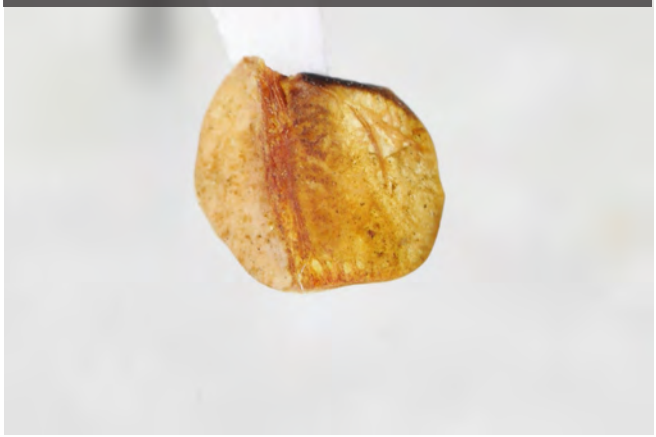
Gymnocerca enaulites Fig. 292

Gymnocerca cycloprista Fig. 293

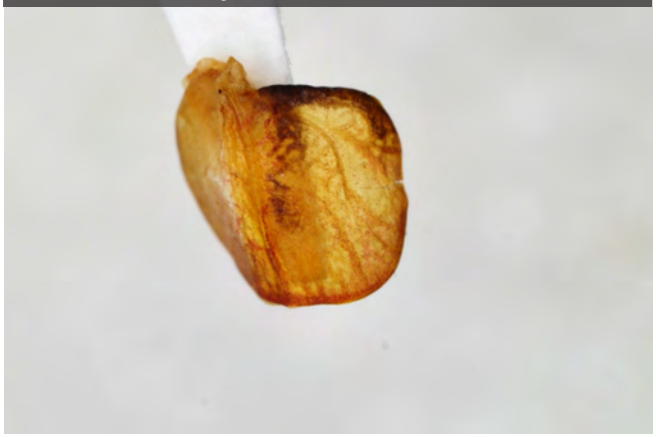
Gymnocerca falcata Fig. 294

Mactruchus durangensis Fig. 295

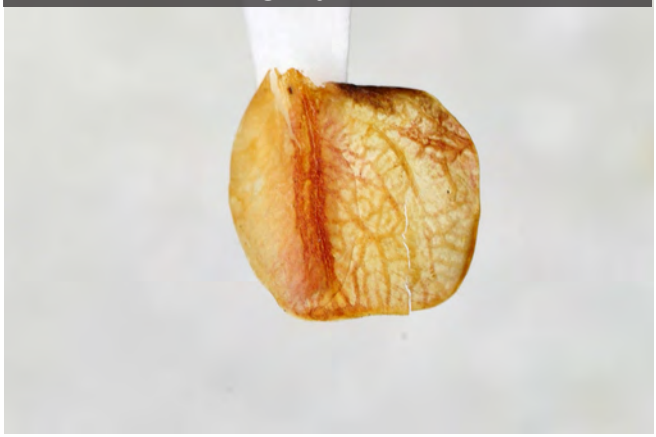
Mactruchus ischnodus Fig. 296



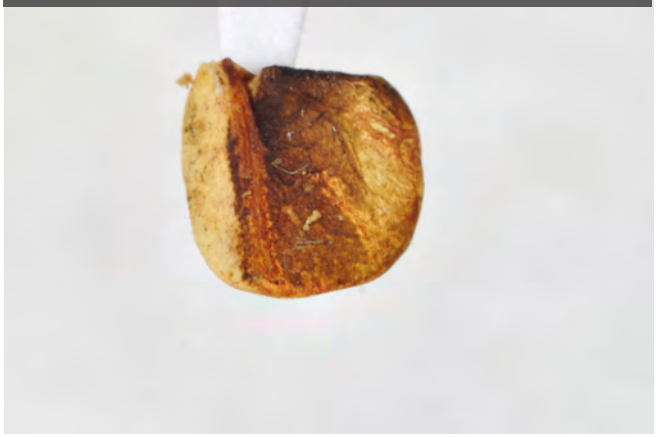
Mactruchus kyrothemastris Fig. 297



Mactruchus megasynactor Fig. 298



Mactruchus serrifer Fig. 299

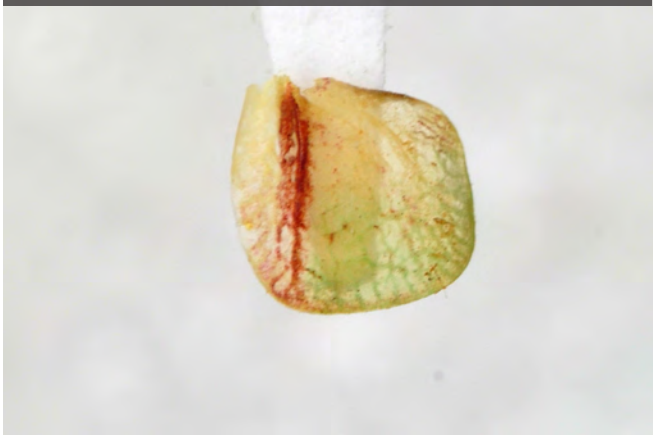


Acanthorintes xanthephaptor Fig. 300

Acanthorintes thenasocescus Fig. 301

Acanthorintes tauriformis Fig. 302

Acanthorintes zeuglaius Fig. 303



APPENDIX II. Etymologies.

In keeping with the recommendations of the International Code of Zoological Nomenclature (ICZN; 1999), we have provided the derivation for our new names. Yet, rather than place them under the species entry, we have gathered them here with an expanded treatment to include all names associated with the dichopetaline species. We have provided justification for this action previously (see Methods and Methodology: Nomenclature), but it also is our hope that the sequestration of this information into one place will lead our readers to spend a little more time here roaming leisurely among the syllables.

It is unfortunate that studies of the Classical languages have declined in the last century, and a very palpable consequence is the lack of creativity in the names of newly described taxa. In a time rife with unwieldy locatives and innumerable patronymics, we have endeavoured to return to the forefathers' concept of the specific epithet, classically-rooted and descriptively-relevant, without bludgeoning our readers with the obvious, boring, and equally uncreative (*e.g.*, *nigra*, *annulatus*, *pallidipennis*). In allowing us to do so, we wish to acknowledge H. Don Cameron, University of Michigan, for his gracious assistance in the (proper) composition of each new name as well as reviewing the etymological entries presented in this Appendix. We are sure that our insistence for targeted and obscure but rigorous classical compositional elements was trying at times, but if we wore on him, he hid it well, with a smile and another interesting etymological tidbit.

Genus- as well as species-level names are treated. New taxa described herein are marked with an asterisk (*), and synonyms are marked with a superscript double dagger (‡). Entries for species level names are followed by previous and/or current generic assignments in brackets. Original descriptions were consulted for all previously described taxa; although they are not listed in the Selected References below, the citations for these may be found in the Bibliography of the manuscript proper. Those works here cited are restricted to those of etymological assistance.

‡*acambarensis*, [*Dichopetala*] – Type locality, Acambaro, Guanajuato, Mexico + Latin, *-ensis*, locative suffix, *i.e.*, from, belonging to. No explicit derivation was given in the original description (Marquez Mayaudon 1958). Synonym of *Mactruchus serrifer*.

**Acanthorintes* – Greek, ἄkanqa, *acantha*, thorn, spine; Greek, ὸrínthV, *orintes*, exciter. This generic name references the armature of the titillators (epiphallus) in members of this genus. Masculine.

‡*brevicauda*, [*Dichopetala*] – Latin, *brevis*, short; Latin, *cauda*, tail, appendage. "The female is remarkable for the brevity of the fore femora and ovipositor" (Scudder and Cockerell 1902). This epithet, like its replacement (see subsequent entry), mostly references the short ovipositor of the female. Synonymy discussed in detail by Rehn and Hebard (1914). Synonym of *Obolopteryx brevihastatus*.

brevihastatus, [*Dichopetala*, *Obolopteryx*] – Latin, *brevis*, short; Latin, *hastatus*, sword. The epithet, as mentioned above, references the short ovipositor of the female. "Scudder… applied to [this species] the same name…that he had given two years previously to a species now known to belong to the genus *Arethaea*, as explained by Morse who renamed the present form" (Rehn and Hebard 1914). This species commonly has been referred to as the common short-winged katydid.

castaneus, [*Dichopetala*, *Obolopteryx*] – Latin, *castaneus*, chestnut. Although no explanation was given in the original description (Rehn and Hebard 1914), the epithet probably references the usually prominent brown coloring of the dorsum, and "bright chestnut" is described of some portion of the male tegmina (Rehn and Hebard, 1914). This species commonly has been referred to as the chestnut short-winged katydid.

catinatus, [*Dichopetala*, *Obolopteryx*] – Latin, *catinus*, deep vessel, pot, bowl, dish, cup. No explanation was given in the original description by Rehn and Hebard (1914), although the epithet most likely references the concave cup-like thumb of the male cercus.

caudelli, [*Dichopetala*, *Rhabdocerca*] – Patronym of Andrew Nelson Caudell, American orthopterologist (1872-1936). "We take pleasure in dedicating this species to Mr. A. N. Caudell, of the United States Museum, who called our attention to the peculiar cerci of the male sex" (Rehn and Hebard 1914).

‡*chirurus*, [*Dichopetala*] – Greek, ceír, *cheir*, hand; Greek, oὐrά, *ura*, tail. No etymology was given in the original description (Strohecker 1945). This epithet likely refers to the thumb-like appendage of the cercus giving the structure an overall hand-like appearance. This epithet also parallels the hand metaphor of *Dichopetala pollicifera*, which Strohecker (1945) indicated was clearly related to his new species. Described in *Dichopetala*, synonym of *Planipollex polliciferus*.

cieloi, [*Pterodichopetala*] – Patronym, Reserva de la Biosfera El Cielo, Tamaulipas, Mexico. "*Pterodichopetala cieloi* n. sp. is named after the Reserva de la Biosfera El Cielo, the protected natural area of Tamaulipas where this new species was collected" (Buzzetti *et al.* 2010).

cultricerca, [*Dichopetala*, *Pterodichopetala*] – Latin, *culter*, *cultri*, plough-share; Greek, kέrkoV, *cercos*, tail (of an animal). No explanation was given in the original description (Strohecker 1945). The epithet references the complex structure of the male cercus, probably more specifically the long, curved, and acute basal arm.

**cycloprista*, [*Gymnocerca*] – Greek, kúkloV, *cyclos*, circular; Greek, pristóV, *pristos*, saw. Noun in apposition. This species is named for the unique male epiphallus.

Dichopetala – Greek, dicῶV, *dichos*, split, doubly, in two; Greek, pέtalon, *petalon*, petal, leaf. "dicῶV = dupliciter pέtalon = folium, lamina" (Brunner 1878). This generic

name probably references the split female subgenital used to characterize the genus.

durangensis, [*Dichopetala*, *Mactruchus*] – Type locality, Durango + Latin, *-ensis*, locative suffix, *i.e.* from, belonging to. It is presumably named for the type locality. No explanation was given in the original description (Rehn and Hebard 1914). As Rehn and Hebard often named their new species based on the male cercus, it comes of no surprise that this species was originally based on a single female.

emarginatus, [*Dichopetala*, *Obolopteryx*] – Latin, *emarginatus*, emarginate. No explanation was given in the original description (Brunner 1878) but in the key to species, the male subgenital plate is described as "triangulariter emarginata" to contrast the same structure "in lobos duos acuminatos extensa" of *Dichopetala mexicana*.

**enaulites*, [*Gymnocerca*] – Greek, ἔnauloV, *enaulos*, bed of a stream; Greek, – íthV, *–ites*, inhabitant. This epithet references the distributional restriction of this species to the basins of southern Mexico.

**erythrephaptor*, [*Acanthorintes*] – Greek, ἐruqróV, *erythros*, red; Greek, ἐfάptwr, *ephaptor*, laying hold of, seizing, one who caresses or strokes, "grabber". Noun in apposition. This epithet references the conspicuous color of the cercus of the holotype, particularly in contrast to its sister species.

falcata, [*Dichopetala*, *Gymnocerca*] – Latin, *falx*, sickle. Although no explanation was given in the original description (Rehn and Hebard 1914), the epithet undoubtedly refers to the shape of the cercus.

gladiator, [*Dichopetala*, *Obolopteryx*] – Latin, *gladiator*, swordsman. No explanation was given in the original description (Rehn and Hebard 1914). The epithet is probably based on the long distinct shape of the female ovipositor.

**Gymnocerca* – Greek, gumnóV, *gymnos*, naked, unclad; Greek, kέrkoV, *cercos*, tail (of an animal). This assemblage of species possesses cerci in the male with appendages absent or minute. Feminine.

**hypsibates*, [*Pterodichopetala*] – Greek, ὑyí-batoV, *hysibatos*, set on high, high-placed. This epithet references the habitat of the new species, being found only at high elevations.

**ischnodus*, [*Mactruchus*] – Greek, ἰscnóV, *ischnos*, weak, slender, withered; Greek, ὁdoύV, *odous*, tooth. This epithet references the more slender dorsal tooth of the male cercus, particularly in comparison to its sister species, *M. durangensis*.

**cryothermastris*, [*Mactruchus*] – Greek, krúoV, *cryos*, ice; Greek, qermastriV, *thermastris*, tongs. Noun in apposition. The epithet references the shape of the male cercus, particularly when viewed in tandem.

‡*laevis*, [*Dichopetala*] – Latin, *lēvis*, smooth. This epipthet refers to the smooth margins of the ovipositor in what Rehn thought was a unique new species. "Allied to *D. brevihastata* Scudder, but differing in the shorter ovipositor, which is also slightly thicker distad than mesad and proximad, and has the margins unarmed, and also in the smaller general size and shorter, more robust limbs" (Rehn 1907). An apt enumeration of the differences between an adult and a late instar nymph, the latter being what Rehn had described. Synonym of *Obolopteryx brevihastatus*.

**Mactruchus* – Greek, mάktra, *maktra*, kneading trough; Greek, -oῦcoV, *-uchus*, suffix meaning bearer. The name references the trough-shaped subgenital plate of the male, a feature that readily separated this genus from all other dichopetaline genera. Masculine.

**megasynactor*, [*Mactruchus*] – Greek, megasunάktwr, *megasynactor*, great collector. Noun in apposition. We abandoned the typical form of nomenclatural honorific in favor of a new approach. Dedicated to a great collector, indeed, this species honors Mont A. Cazier (1911-1995), long-time curator of the American Museum of Natural History (see also Douglas 1996), and an inspiration to a young entomologist. It is likely that, without Dr. Cazier, this revision might never have been started.

mexicana, [*Dichopetala*] –Type locality, Mexico + Latin, *-anus*, from, belonging to. No explanation was given in the original description (Brunner v. W. 1878); yet, the epithet is clearly chosen for the type locality.

**Obolopteryx* – Greek, ὀbolóV, *obolos*, small coin; Greek, ptέrux, *pteryx*, wing. The name references the small, round shape of the female tegmina. Masculine.

oreoecus, [*Dichopetala*, *Obolopteryx*] – Greek, ὀreíoikoV, dwelling in the mountains. "OreioikoV, mountain-dwelling" (Rehn and Hebard 1914). This epithet references the high elevations where this species is typically found. This species commonly has been referred to as the mountain-dwelling short-winged katydid.

**padrisima*, [*Pterodichopetala*] – Spanish (Mexican), *padrisima*, colloquial term meaning fantastic, great, beautiful.

**pityophila*, [*Pterodichopetala*] – Greek, pítuV, *pitys*, pine (tree); Greek, fίloV, *philos*, loving. The epithet references the habitat of the species.

**Planipollex* – From Latin, *planus*, flat; Latin, *pollex*, thumb. Continuing the hand metaphor used in naming its species, this name refers to the flattened lateral appendage of the male cercus. Masculine.

poecilus, [*Dichopetala*, *Obolopteryx*] – Greek, poikίloV, *poikilos*, varicolored, pied, mottle, spotted. No explanation was given in the original description (Hebard 1932). The epithet probably references the vibrant coloration of live specimens.

polliciferus, [*Dichopetala*, *Planipollex*] – Latin, *pollex*, *pollicis*, thumb; Latin, *-fer*, suffix meaning bearing. No explanation was given in the original description (Rehn and Hebard 1914). This epithet probably refers to the thumb-like appendage of the cercus.

Pterodichopetala – Greek, ptέrux, *pteryx*, wing + genus *Dichopetala* Brunner von Wattenwyl, 1878. "The generic name derives from the greek *pterón* = wing and *dichopetala*,

recalling the superficial similarity with the genus *Dichopetala*" (Buzzetti, Barrientos, and Rocha 2010).

‡*pulchra*, [*Dichopetala*] – Latin, *pulcher*, beautiful. Never explicitly stated in the original description other than "differing mainly in the color pattern" (Rehn 1901), this epipthet references the apparently striking coloration of the specimen. Synonym of *Dichopetala mexicana*.

**Rhabdocerca* – From Greek, ῥάbdoV, *rhabdos*, rod; Greek, kέrkoV, *cercos*, tail (of an animal). The name refers to the dorsal rod-like appendage of the male cercus. Feminine.

seeversi, [*Dichopetala*, *Obolopteryx*] – "Named for Dr. Charles H. Seevers" (Strohecker 1941). Strohecker does not explicitly state the reason for this endowment.

serrifer, [*Dichopetala*, *Mactruchus*] – Latin, *serratus*, saw; Latin, *-fer*, suffix meaning bearing. No explanation was given in the original description (Rehn and Hebard 1914). The epithet was surely chosen to reference the teeth present on the dorsal ridge of the male cercus.

**strepsidactyla*, [*Pterodichopetala*] – Greek, streptóV, adj. of stréyw, *streptos*, *strepsi-*, twisted; Greek, dάktυloV, *daktylos*, finger. This epithet references the condition of the apical appendages of the male cercus, particularly when compared to other species of *Pterodichopetala*.

tauriformis, [*Dichopetala*, *Acanthorintes*] – Latin, *taurus*, bull; Latin, *formis*, shape, form, appearance. Although not explicitly given in the original description (Rehn and Hebard 1914), the epithet probably references the widely separated arms of the male cercus as Rehn and Hebard often named their new species based on this structure.

**thenarocercus*, [*Acanthorintes*] – Greek, qénar, *thenar*, palm of the hand, Greek, kέrkoV, *cercos*, tail (of an animal). The epithet references the conspicuous, flattened shape of the main shaft of the male cercus, particularly in view of the hand metaphor used to denote its various sections.

tridactyla, [*Dichopetala*, *Rhabdocerca*] – Greek, trῖ-, *tri-*, three; Greek, dάktυloV, *daktylos*, finger. No explanation is given in the original description (Rehn and Hebard 1914). The epithet clearly references the three appendages of the male cercus: the dorsal rod, lateral finger, and apex of the main shaft.

**xanthephaptor*, [*Acanthorintes*] – Greek, xanqόV, *xanthos*, yellow; Greek, ἐfάptwr, *ephaptor*, laying hold of, seizing, one who caresses or strokes, "grabber". Noun in apposition. This epithet references the color of the male cercus, particularly in comparison to that of the sister species which is known from only a single male specimen.

**zanclophora*, [*Rhabdocerca*] – Greek, zάgklon, *zanklon*, sickle; Greek, foróV, *phoros*, bearing. The epithet references the unmodified main shaft of the male cercus, with especial reference to the greater curvature compared to its congeners.

**zeuglaius*, [*Acanthorintes*] – Greek, zεύglh, *zeugle*, loop of a yoke, oxbow. Noun in apposition. The epithet references the shape of the male cercus.

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APPENDIX III. Material Examined.

The material enumerated below refers only to those specimens physically examined by the authors; literature records, although included in the database and on the maps, are not listed among the following material. Label data were not copied verbatim, although all locality information provided was included. Any additions, changes, or interpretive elements provided by the authors are shown in brackets, including GPS coordinates not originally taken by the collector. Additionally, only adult specimens are included in these counts except in instances where only juveniles compose the collection; this is indicated in each instance. Genera are ordered as in the Accounts, and species are listed alphabetically.

Obolopteryx brevihastatus (Morse, 1902)

MATERIAL EXAMINED [290 males, 302 females]: **MEXICO**: *Coahuila*: 1 mi. W. Hermanas [*ca.* 24 mi. NE. Monclova], [27.221018 -101.240871], 18 September 1958, 1300 ft., T. J. Cohn, #125 [1 female] (UMMZ); 14.3 mi. S. Castanos at Km. 1028, [26.583502 -101.348149], 19 August 1961, [3150 ft.], Cantrall, Cohn, Hubbell, #13 [6 males, 3 females] (UMMZ); 17 mi. SW. Allende on Hwy. 57, 5.4 mi. NE. Cuesta de Codornices, [28.149103 -101.029439], 17 October 1974, 1670 ft., T. J. & J. W. Cohn, #82 [7 males, 5 females] (UMMZ); 19 mi. NE. Nueva Rosita, [28.183139 -101.084525], 31 July 1959, 1600 ft., T. J. Cohn, #125 [6 males, 3 males] (UMMZ); 2 mi. NW. Hermanas [*ca.* 28 mi. NE. Monclova], [27.266388 -101.237640], 19 September 1958, 13-1400 ft., T. J. Cohn, #128 [2 males, 1 female] (UMMZ); 21 mi. S. Castanos, [26.486188 -101.353186], 3 August 1959, 3200 ft., T. J. Cohn, #135 [3 males, 1 female] (UMMZ); 22.6 mi. S. Castanos (11.2 mi. N. San Lazaro), [26.462899 -101.354450], 19 August 1961, 3300 ft., Cantrall, Cohn, Hubbell, #14 [6 males, 4 females] (UMMZ); 24.2 mi. N. Saltillo [plaza], [25.733797 -101.016197], 20 August 1961, 3680 ft., Cantrall, Cohn, Hubbell, #19 [3 males, 1 female] (UMMZ); 25 mi. S. Castanos, [26.438300 -101.356858], 3 August 1959, 3150 ft., T. J. Cohn, #136 [3 males] (UMMZ); 25 mi. S. Castanos, [26.438300 -101.356858], 3 August 1959, 3150 ft., T. J. Cohn, #139 [1 male] (UMMZ); 25.5 mi. S. Castanos (8.3 mi. N. San Lazaro), [26.420797 -101.356327], 19 August 1961, 3300 ft., Cantrall, Cohn, Hubbell, #15 [1 male, 2 females] (UMMZ); 26 mi. E. Cuatro Cienegas, [27.036005 -101.706280], 2 August 1959, 1850 ft., T. J. Cohn, #131 [1 male] (UMMZ); 26 mi. S. Castanos Plaza (11 mi. N. San Lazaro), [26.416583 -101.356669], 19 October 1974, 3040 ft., T. J. & J. W. Cohn, #84 [9 males, 6 females] (UMMZ); 28.5 mi. N. Sabinas (9.5 mi. S. Allende) on Hwy. 57, [28.197588 -101.069133], 19 August 1961, [1750 ft.], Cantrall, Cohn, Hubbell, #11 [3 males] (UMMZ); 34.5 +/- mi. S. Castanos (0.7 +/- mi. S. San Lazaro), [26.299919 -101.345369], 19 August 1961, 4100 ft., Cantrall, Cohn, Hubbell, #16 [3 males] (UMMZ); 35 mi. S. Castanos, [26.295452 -101.347741], 25 September 1958, 4000 ft., T. J. Cohn, #139 [2 males, 4 females] (UMMZ); 36 km. N. of Saltillo on Hwy. 57, 25.703139 -101.005667, 8 October 2004, 1113 m., Fontana, Battiston, Agatibi, Garcia, #49 [2 males] (UMMZ); 38 mi. N. Saltillo Plaza (on Hwy. 57) [11.5 mi. N. Rancho Nuevo], [25.893336 -101.144700], 21 August 1964, [2950 ft.], T. J. Cohn, #67 [1 male] (UMMZ); 39 mi. S. Castanos Plaza, (1.7 mi. S. San Lazaro), [26.235692 -101.349203], 17 October 1974, 3600 ft., T. J. & J. W. Cohn, #83 [4 females] (UMMZ); 4.4 km WNW. of Nadadores on Hwy 30, 27.037528 -101.636028, 9 October 2004, 523 m., Fontana, Battiston, Agatibi, Garcia, #52 [4 males, 1 female] (UMMZ); 46.6 mi. N. [NW.] Saltillo Plaza (on Hwy. 57), [25.949802 -101.238661], 21 August 1964, [3050 ft.], T. J. Cohn, #69 [1 male, 3 females] (UMMZ); 5 mi. NE. Ramos Arizpe, [25.604383 -100.870422], 27 September 1958, 4200 ft., T. J. Cohn, #147 [1 female] (UMMZ); 5.8 mi. S. Castanos, [26.698904 -101.389177], 20 August 1965, 2700 ft., T. J. Cohn, #55 [2 males] (UMMZ); 51.1 mi. S. Castanos, (14 mi. S. San Lazaro), [26.092250 -101.357600], 3 July 1964, [3450 ft.], T. J. Cohn, #3 [1 male] (UMMZ); *ca.* 7.2 mi. SSW. of Cuatro Cienegas, [26.912596 -102.140743], 24 October 1978, C. E. Dunn, D. J. Bereza [3 males, 2 females] (ANSP); Guadalupe [4.3 mi. S. Castanos, w. jct. Hwy. 57], [26.719283 -101.398925], 23 August 1947, [2675 ft.], D. Rockefeller Exp., M. Cazier [6 males, 14 females] (UMMZ); Lago de Don Martin at Juarez, 43 mi. SE. Sabinas, [27.526210 -100.690228], 14 September 1958, *ca.* 1000 ft., T. J. Cohn, #121 [1 female] (UMMZ); Rio Salado 1 mi. S. Hermanas [ca 23 mi. NE. Monclova], [27.196456 -101.234884], 18 September 1958, 1300 ft., T. J. Cohn, #124 [1 male] (UMMZ); *Durango*: San Jacinto [*ca.* 20 mi. WSW. Torreon], [25.483300 -103.733300], August-September 1935, L. B. Kellum [1 juv. male] (UMMZ); Sierra de Mapimi, [25.835891 -103.835183], July-September 1933, L. B. Kellum [3 males, 3 females] (UMMZ); Sierra de Mapimi, W. Side; N. End, [25.937281 -103.918897], July-September 1934, L. B. Kellum [3 juv. males, 1 juv. female] (UMMZ); *Nuevo Leon*: 1.7 mi. W. Santa Catarina, [25.684364 -100.492856], 8 August 1959, 2380 ft., T. J. Cohn, #155 [1 male, 2 females] (UMMZ); 10 mi. W. Monterey [Monterrey], brushland, [25.671214 -100.494354], 14 September 1981, Otte, #78 [2 males, 2 females] (ANSP); 4 mi. NE. Sabinas Hidalgo, [26.542003 -100.139389], 12 September 1958, 1050 ft., T. J. Cohn, #118 [1 male, 2 females] (UMMZ); 5.16 km. W. Santa Catarina fr. Jct. Arco Vial, 0.6 km N. Hwy. 40, 25.707833 -100.611639, 8 October 2004, 1025 m., Fontana, Battiston, Agatibi, Garcia, #48 [3 males, 2 females] (UMMZ); La Gloria, [25.380239 -99.230007], 9 July 1936, 500 ft., H. R. Roberts [1 female] (ANSP); Mamulique Pass, [26.096928 -100.162492], 10 July 1936, 1800 ft., H. R. Roberts [4 males] (ANSP); Mamulique Pass, [26.096928 -100.162492], 11 July 1936, 1800 ft., H. R. Roberts [3 females] (ANSP); Monterrey, [25.685536 -100.311147], 24 November 1953, D. C. Eades,

#310 [1 female] (UMMZ); Santa Catarina, 25.680333 -100.450833, 8 October 2004, 667 m., Fontana, Battiston, Agatibia, Garcia, #47 [3 males] (UMMZ); *Sonora*: 12 mi. SW. Magdalena on Mex. 15, [30.530267 -111.118119], 31 August 1957, 680 m., T. J. Cohn & E. G. Matthews, #85 [1 male] (UMMZ); 39 mi. SSW. Magdalena on Mex. 15, [30.144704 -111.097116], 31 August 1957, 720 m., T. J. Cohn & E. G. Matthews, #86 [1 male] (UMMZ); 5.5 mi. SW. Magdalena on Hwy. 15, [30.596992 -111.041421], 6 September 1965, [2370 ft.], T. J. Cohn, #103 [2 males, 1 female] (UMMZ); *Tamaulipas*: 12 mi. S. Nuevo Laredo, [27.321739 -99.587017], 9 July 1936, 400 ft., H. R. Roberts [2 males, 2 females] (ANSP); **ARIZONA**: *Cochise County*: [8.8 air mi. S. Pearce] 4.2 mi. N. Gleeson Rd. on Ghosttown Trl., 31.777000 -109.809000, 15 September 2009, 4760 ft., D. R. Swanson, #72 [1 female] (UMMZ); 0.9 mi. WSW. Don Luis, 11.7 mi. ENE. Palominas (on Hwy. 92), 31.394450 -109.933450, 17 October 2007, 4950 ft., D. R. Swanson [1 male, 2 females] (UMMZ); 1 mi. S. Tombstone (in City Park), [31.708157 -110.054791], 28 September 1971, 4600 ft., G. Forbes, #7 [1 female] (UMMZ); 1.2 mi. S. Tombstone (City Park), [31.706183 -110.052836], 20 August 1975, 4600 ft., T. J. & J. W. Cohn, #32 [8 males, 1 female] (UMMZ); 11.7 mi. WSW. Don Luis, 0.9 mi. ENE. Palominas (on Hwy. 92), 31.380000 -110.109183, 17 October 2007, 4250 ft., D. R. Swanson [1 male, 2 females] (UMMZ); 12 mi. WSW. Don Luis, 0.6 mi. ENE. Palominas (on Hwy. 92), 31.380017 -110.113383, 17 October 2007, 4225 ft., D. R. Swanson [1 male] (UMMZ); 14.5 mi. S. Tombstone postoffice on Hwy 80, [31.528540 -110.012894], 9 September 1971, 4800 ft., T. J. & J. W. Cohn, #30 [1 male] (UMMZ); 14.9 N. Elfrida, 7.2 mi. E. old Pearce store, [31.876778 -109.580594], 22 August 1975, 4320 ft., T. J. Cohn, #40 [1 male] (UMMZ); 17.5 air mi. W. McNeal, 0.6 mi. SW. of Gap Tank (SW. Davis Rd.), [31.587750 -109.965083], 4 September 1977, 4780 ft., T. J. & J. W. Cohn, #51 [14 males, 13 females] (UMMZ); 22.5 mi. SW. Rodeo (N. M.) (2 mi. SW. Chiricahua RR. Siding), [31.581392 -109.256631], 6 September 1971, 4260 ft., T. J. & J. W. Cohn, #21 [5 males, 1 female] (UMMZ); 3.7 mi. SW. Don Luis (S. Bisbee) on Hwy. 92, [31.382801 -109.955968], 7 September 1971, 4700 ft., T. J. & J. W. Cohn, #23 [1 male] (UMMZ); 4.4 mi. W. Douglas Postoffice on Hwy. 80, [31.356535 -109.619714], 9 September 1971, 4000 ft., T. J. & J. W. Cohn, #26 [1 male] (UMMZ); 4.8 mi. W. McNeal (on Davis Rd. to Tombstone), [31.596294 -109.752536], 8 September 1974, 4100 ft., T. J. & J. W. Cohn, #42 [2 males, 2 females] (UMMZ); 5 mi. E. Montezuma Pass Huachuca Mtns., [31.349111 -110.226859], 7 September 1950, W. Gertsch, M. Cazier [1 female] (UMMZ); 6.3 mi. E. Bisbee (2.5 mi. N. on High Lonesome Rd.), [31.478436 -109.823097], 9 September 1971, 4500 ft., T. J. & J. W. Cohn, #28 [2 males] (UMMZ); 8.8 mi. W. Don Luis (S. Bisbee) (4 mi. E. Palominas), [31.379730 -110.071113], 11 September 1974, 4350 ft., T. J. & J. W. Cohn, #51 [2 males] (UMMZ); Bisbee Junction (4 mi. S. Warren), [31.351348 -109.887749], 10 September 1974, T. J. & J. W. Cohn, #45 [17 males, 11 females] (UMMZ); Bisbee Junction 4 mi. S. Warren, [31.351348 -109.887749], 22 August 1973, 4700 ft., T. J. & J. W. Cohn, #23 [4 males, 4 females] (UMMZ); Guadelupe [Guadalupe] Canyon entr., 33 rd. mi. E. Douglas, [31.344652 -109.072339], 6-7 September 1974, [4250 ft.], T. J. & J. W. Cohn, #39 [1 male] (UMMZ); Huachuca Mts.: above Carr Canyon, [31.439014 -110.279498], 26 August 1950, 5800 ft., M. Cazier, P. Boone, T. Cohn [1 female] (UMMZ); McNeal (24 mi. NW. Douglas), [31.599050 -109.670272], 8 September 1971, 4170 ft., T. J. & J. W. Cohn, #25 [2 males, 3 females] (UMMZ); Mule Pass Gulch below Lowell Mule Mts. [Coordinates Approximate], [31.446277 -109.927159], 26 August 1937, 4560 ft., Rehn, Pate, Rehn [2 females] (UMMZ); Nr. Silver Creek, ab. 13 ms. N. E. of Douglas, [31.426830 -109.483116], 12 Augustd 1961, 4500 ft., [no collector] [1 juv. female] (ANSP); San Bernardino Ranch, 17 mi. E. Douglas, [31.354239 -109.268433], 9 September 1950, 3800 ft., W. Gertsch, M. Cazier [2 females] (UMMZ); *Pima County*: "Baboquivari Mountains" [probably vicinity Brown Canyon] [coordinates *ca.*], [31.756670 -111.519170], August 1923, 4000 ft., O. C. Poling [1 female] (UMMZ); "Baboquivari Mountains" [probably vicinity Brown Canyon] [coordinates *ca.*], [31.756670 -111.519170], 1-15 November 1923, 4000 ft., O. C. Poling [2 females] (UMMZ); "Baboquivari Mountains" [probably vicinity Brown Canyon] [coordinates *ca.*], [31.756670 -111.519170], 10-20 October 1923, 4000 ft., O. C. Poling [2 males, 1 female] (UMMZ); "Baboquivari Mountains" [probably vicinity Brown Canyon] [coordinates *ca.*], [31.756670 -111.519170], 15-30 June 1924, 4000 ft., O. C. Poling [1 male] (UMMZ); "Baboquivari Mountains" [probably vicinity Brown Canyon] [coordinates *ca.*], [31.756670 -111.519170], 1-15 September 1924, 4000 ft., O. C. Poling [1 female] (UMMZ); "Baboquivari Mountains" [probably vicinity Brown Canyon] [coordinates *ca.*], [31.756670 -111.519170], 15-30 July 1928, 4000 ft., O. C. Poling [2 females] (UMMZ); Mouth Madera Canyon, 11 mi. SE. Continental, [31.739044 -110.884644], 30-31 August 1957, 4400 ft., T. J. Cohn, E. R. Tinkham, #84 [2 females] (UMMZ); Santa Rita Mts.: Lower Madera Canyon, [31.712108 -110.874911], 24 August 1950, 5000 ft., M. Cazier, P. Boone, T. Cohn [5 males, 1 female] (UMMZ); Santa Rita Mts.: mouth of Madera Canyon, [31.723333 -110.880169], 24 August 1950, 4500 ft., M. Cazier, P. Boone, T. Cohn [20 males, 15 females] (UMMZ); Santa Rosita [Rita] Mountains, Madera Canyon, [31.719442 -110.878544], 21 August 1959, G. H. Nelson [1 female] (UMMZ); Wilmot, 7 mi. S.E. Tuscon [Tucson], [32.122220 -110.843890], 25 August 1937, 2600 ft., Rehn, Pate, Rehn [1 juv. male] (UMMZ); *Pinal County*: [6.4 air mi. SE. Oracle] 1.0 rd. mi. SE. Peppersauce Camp, 32.533000 -110.711000, 16 September 2009, 4930 ft., D. R. Swanson [1 female] (UMMZ); *Santa Cruz or Pima County*: Madera Canyon (Coordinates Approximate), [31.737008 -110.882795], 1-28 August 1954, W. A. McDonald [2 males] (UMMZ); **NEW MEXICO**: *Eddy County*: 7 mi. NE. White's

City, [32.246872 -104.300558], 24 September 1950, 3400 ft., W. Gertsch, M. Cazier [2 females] (UMMZ); Carlsbad (Coordinates Approximate), [32.430875 -104.232231], 8 June 1936, E. D. Ball [2 males, 1 female] (UMMZ); Carlsbad Caverns Nat'l Park, Walnut Canyon, [32.127347 -104.349707], 20 August 1961, 4500 ft., F. R. Gehlbach [1 female] (UMMZ); Carlsbad Caverns, [32.176010 -104.450006], 16 August 1935, T. H. & G. G. Hubbell [1 male, 5 females] (UMMZ); Carlsbad Caverns Nat. Park, Hq. area, [32.175053 -104.444497], 25 August 1960, T. E. Moore [1 female] (UMMZ); Carlsbad Pk. N., [32.039092 -104.677494], 22 August 1945, [no collector] [1 male] (UMMZ); Sitting Bull Falls Campground, Guadalupe Mts., [32.256619 -104.698306], 22 August 1970, Ellis, Shields, Toliver [1 female] (UMMZ); White's City, [32.177269 -104.374858], 24 September 1950, 3600 ft., W. Gertsch, M. Cazier [7 males, 30 females] (UMMZ); *Hidalgo County*: 1.3 mi. E. Rodeo (cemetery), [31.833380 -109.009413], 12 September 1969, 4200 ft., T. J. Cohn, #27 [2 males, 1 female] (UMMZ); 10 mi. N. Rodeo, San Simon Valley, [31.979311 -109.035895], 27 August 1937, 4000 ft., Rehn, Pate, Rehn [1 female] (UMMZ); **TEXAS**: *Brewster County*: [17 air mi. SW. Marathon] Travis Roberts Ranch, 30.087000 -103.415000, 11 September 2009, 3850 ft., D. R. Swanson, #57 [1 male] (UMMZ); 1 m. N. of Persimmon Gap, Santiago Mts., [29.670264 -103.170436], 10 September 1951, 2830 ft., James A. G. Rehn [1 female] (UMMZ); 1 m. S. of Double Mills, [29.730425 -103.157408], 8 September 1951, 2850 ft., James A. G. Rehn [1 male, 3 females] (UMMZ); 13 ms. E. of Marathon, [30.214659 -103.027706], 11 September 1951, 4260 ft., James A. G. Rehn [2 males] (UMMZ); 14 mi. E. Marathon, [30.217869 -103.011344], 11 September 1951, 4260 ft., T. J. Cohn [1 male] (UMMZ); 14 ms. S. of Marathon, [30.014293 -103.273621], 10 September 1951, 3850 ft., James A. G. Rehn [1 female] (ANSP); 14 ms. S. of Marathon, [30.014293 -103.273621], 10 September 1951, 3850 ft., James A. G. Rehn [1 male, 2 females] (UMMZ); 15 ms. S of Marathon, [29.999946 -103.271118], 16 August 1955, *ca.* 3400 ft., James A. G. Rehn [2 males, 1 female] (UMMZ); 16 mi. E. Marathon, [30.207836 -102.983431], 14 August 1955, *ca.* 4000 ft., T. J. Cohn [1 juv. female] (UMMZ); 17 mi. N. Panther Springs Jct., Big Bend Nat'l. Park, [29.549461 -103.130678], 27-28 July 1956, T. J. Cohn & E. G. Matthews, #155 [3 juv. females] (UMMZ); 20 mi. N. Panther Jct., Big Bend Nat'l. Park, [29.589892 -103.141356], 13 August 1955, 2600 ft., T. J. Cohn [4 juv. females] (UMMZ); 27 mi. S. Marathon, [29.846700 -103.235000], 13 August 1955, 3000-3500 ft., T. J. Cohn [1 male, 1 female] (UMMZ); 31 ms. SW of junction US 290 and 67. (5 ms. S. of Hovey side road), [30.516307 -103.432929], 19 August 1955, 4750 ft., James A. G. Rehn [1 male] (UMMZ); 4 mi. E. Alpine, [30.382750 -103.599900], 8 September 1951, 4100 ft., T. J. Cohn [1 juv. female] (UMMZ); 4 mi. S. Marathon, [30.151144 -103.236492], 13 August 1955, 4000 ft., T. J. Cohn [1 juv. female] (UMMZ); 4 ms. N. of Double Mills, [29.795837 -103.186995], 10 September 1951, 2960 ft., James A. G. Rehn [3 females] (UMMZ); 4 ms. W. of Marathon, [30.216330 -103.303270], 7 September 1951, 4100 ft., James A. G. Rehn [1 juv. male] (UMMZ); 5 mi. SSW. Marathon [from field notebook: county park], [30.139176 -103.238927], 14 August 1955, 3880 ft., T. J. Cohn [2 males, 4 females] (UMMZ); 5 ms. S. of Marathon, [30.135579 -103.239664], 8 September 1951, 3850 ft., James A. G. Rehn [1 male, 3 females] (UMMZ); 6 mi. S. Marathon, [30.122537 -103.246317], 8 September 1951, 3850 ft., T. J. Cohn [1 male] (UMMZ); 7 ms. S of Marathon, [30.108915 -103.252866], 19 August 1955, *ca.* 4100 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); 9 mi. E. Alpine, [30.371228 -103.523486], 8 September 1951, 4475 ft., T. J. Cohn [1 female] (UMMZ); Marathon, [30.206639 -103.246458], 8 August 1936, E. D. Ball [2 females] (UMMZ); Marathon, [30.206639 -103.246458], 26 September 1950, 4000 ft., W. Gertsch, M. Cazier [1 juv. male] (UMMZ); Big Bend National Park, 0.1 mi. S. Persimmon Gap on Hwy. 385, 29.650000 -103.172000, 10 September 2009, 2790 ft., D. R. Swanson [1 female] (UMMZ); Big Bend National Park, 8.4 mi. S. Persimmon Gap on Hwy. 385, 29.549000 -103.130000, 10 September 2009, 2820 ft., D. R. Swanson [2 males, 2 females] (UMMZ); Big Bend National Park, 1 mi. N. Persimmon Gap, base of Santiago Mts., [29.670264 -103.170436], 10 September 1951, 2750 ft., T. J. Cohn [1 female] (UMMZ); *Crockett County*: 21 mi. E. Sheffield, [30.722266 -101.533885], 1 September 1937, 2000 ft., Rehn, Pate, Rehn [1 male] (UMMZ); *Culberson County*: 14 ms. E. of Van Horn, [31.054685 -104.595469], 21 August 1955, 3950 ft., James A. G. Rehn [1 juv. male] (UMMZ); 20 mi. ENE. Pine Springs [2.2 mi. S.] on Tex. 1108, [31.974864 -104.516347], 12 July 1956, 3900-4000 ft., T. J. Cohn & E. G. Matthews, #114 [7 males] (UMMZ); 5 mi. S. Van Horn, [30.976814 -104.819803], 7 September 1951, 4650 ft., T. J. Cohn [1 male] (UMMZ); Guadalupe Mts. 5 rd. mi. S. Pine Springs (on U.S. 180)[on U.S. 62], [31.851619 -104.842719], 3 September 1958, 5040 ft., T. J. Cohn, #93 [1 female] (UMMZ); *Ector County*: 10 mi. South West of Odessa on U.S. Hwy. 80 roadside & railroad right of way, [31.767769 -102.513019], 12 August 1955, [3100 ft.], T. J. Cohn [1 male, 4 females] (UMMZ); *Garza County*: 2 air mi. S. Post, [33.162682 -101.367034], 23 June 1967, 2500 ft., T. J. Cohn, #14 [2 females] (UMMZ); *Hays County*: [erroneously indicated as Caldwell County], 16 ms. NE. of San Marcos [Location is in question], [30.093663 -97.815754], 26 August 1955, *ca.* 560 ft., James A. G. Rehn [1 male] (UMMZ); *Hidalgo County*: Laguna del Gato, 3 mi. W. Sam Fordyce [=Mission], [26.221853 -98.373786], 6 August 1912, Rehn & Hebard [2 males] (UMMZ); Nr. Los Ebanos (W. of Mission ab. 12 ms.), [26.250869 -98.514221], 13 August 1955, 300 ft., James A. G. Rehn [1 male, 2 females] (UMMZ); *Howard County*: Coahoma, [32.298367 -101.306583], 21 July 1935, I. J. Cantrall, #109 [4 males, 8 females] (UMMZ); *Lee County*: Manheim, [30.231248 -97.030792], 26 August 1955, James

A. G. Rehn [1 female] (UMMZ); *Maverick County*: 1.8 mi. E. Eagle Pass, [28.709106 -100.469619], 18 August 1961, Cantrall, Cohn, Hubbell, #8 [2 males] (UMMZ); Quemado, [28.948211 -100.623844], 25 May 1952, M. Cazier, W. Gertsch & R. Schrammel [1 male, 1 female] (UMMZ); *Midland County*: 6.9 South West of Midland US Hwy. 80 roadside, [31.940472 -102.175994], 12 August 1955, [2880 ft.], T. J. Cohn [1 male] (UMMZ); *Mitchell County*: 1 mi. W. Colorado City, [32.389852 -100.882092], 9 July 1956, 2100 ft., T. J. Cohn & E. G. Matthews, #106 [5 males, 4 females] (UMMZ); Colorado, [32.399178 -100.850000], 21 July 1935, I. J. Cantrall, #108 [1 female] (UMMZ); *Pecos County*: [9.0 air mi. SW. Iraan] I-10 W., exit 314, frontage road, NW. of interchange, [30.810000 -101.990000], 7 September 2010, 2440 ft., D. R. Swanson, #56 [1 female] (UMMZ); 1 mi. E. Longfellow, [30.157142 -102.623631], 11 September 1951, 3715 ft., T. J. Cohn [1 female] (UMMZ); 10 mi. NW. Sheffield, [30.814785 -101.842109], 7 August 1955, 2400 ft., T. J. Cohn & J. R. Hilliard [5 males, 5 females] (UMMZ); 2 ms. SW. of Junction of US 290 and 67, [30.851430 -102.670052], 19 August 1955, 4075 ft., James A. G. Rehn [3 males, 1 female] (UMMZ); 4.5 ms. W. of Bakersfield, [30.894052 -102.373370], 18 August 1955, 3260 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); 47 mi. W. Sheffield, [30.861456 -102.567325], 10 July 1936, W. D. Field [1 female] (UMMZ); 6.5 ms W. of Fort Stockton, [30.896681 -102.988446], 19 August 1955, 3900 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); 9 ms. W. of Sheffield, [30.756755 -101.915523], 18 August 1955, 2875 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); On US 67, 10 ms. E. of junction US 290 and 67 E. of Fort Stockton, [30.982984 -102.536356], 22 August 1955, 2450 ft., James A. G. Rehn [1 male] (UMMZ); 6 mi. W. Ft. Stockton, [30.896169 -102.979838], 8 August 1955, *ca.* 3000 ft., T. J. Cohn & J. R. Hilliard [9 males, 11 females] (UMMZ); *Presidio County*: 13 mi. NNW. Marfa, [30.379528 -104.226672], 24 July 1956, T. J. Cohn & E. G. Matthews, #139 [2 juv. females] (UMMZ); *Reagan County*: 12.5 ms. E. of Rankin, [31.230622 -101.731353], 22 August 1955, 2550 ft., James A. G. Rehn [1 male, 2 females] (UMMZ); *Reeves County*: [6.0 air mi. SSW. Balmorhea] 2.3 mi. S. jct. Hwy. 3078 in Toyahvale on Hwy. 17, 30.907000 -103.791000, 8 September 2010, 3520 ft., D. R. Swanson, #61 [2 males, 1 female] (UMMZ); 10 ms. S. of Pecos, [31.276629 -103.556398], 21 August 1955, 2460 ft., James A. G. Rehn [1 male, 6 females] (UMMZ); 22 ms. SE. of Pecos, [31.163485 -103.289409], 21 August 1955, 2725 ft., James A. G. Rehn [1 female] (UMMZ); *Starr County*: 28 mi. NE. Roma, [26.784783 -98.912670], 17 August 1955, 400 ft., T. J. Cohn [1 male, 1 female] (UMMZ); *Sutton County*: 3.5 ms. W. of Sonora, [30.590001 -100.691799], 18 August 1955, 2950 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); *Terrell County*: 35.5 mi. SE. Sanderson (on Hwy. 90), 29.916917 -101.914517, 14 October 2007, D. R. Swanson [1 female] (UMMZ); *Tom Green County*: 1 m. ENE. of Tankersley, [31.362219 -100.632363], 22 August 1955, 1800 ft., James A. G. Rehn [1 female] (UMMZ); *Val Verde County*: 4 mi. E. Del Rio, [29.370125 -100.823869], 27 August 1958, 1050 ft., T. J. Cohn, #70 [1 female] (UMMZ); 8 mi. SE. Del Rio, [29.306175 -100.792064], 23 August 1958, 1080 ft., T. J. Cohn, #57 [2 males] (UMMZ); Langtry, [29.808330 -101.558330], 23 June 1949, W. C. Stehr [1 male, 2 females] (OSUC); 11 mi. W. Comstock, [29.706683 -101.349175], 14 August 1955, 1400 ft., T. J. Cohn [1 female] (UMMZ); *Ward County*: Monahans, [31.600714 -102.893300], 21 July 1935, I. J. Cantrall, #110 [2 females] (UMMZ); Webb County: 15 mi. SSW. Encinal, [27.830407 -99.411290], 5 August 1955, 700 ft., T. J. Cohn [1 male, 1 female] (UMMZ).

Obolopteryx castaneus (Rehn and Hebard, 1914)

MATERIAL EXAMINED [312 males, 445 females]: **MEXICO**: *Coahuila*: 1.7 mi. NE. Nava, [28.436742 -100.742684], 19 August 1965, [1035 ft.], T. J. Cohn, #53 [1 male] (UMMZ); 11 mi. NW. Muzquiz, [28.017547 -101.601361], 31 July 1959, 1550 ft., T. J. Cohn, #126 [1 male] (UMMZ); 17 mi. SW. Allende on Hwy. 57, 5.4 mi. NE. Cuesta de Codornices, [28.149103 -101.029439], 17 October 1974, 1670 ft., T. J. & J. W. Cohn, #82 [1 male] (UMMZ); 19 mi. NE. Nueva Rosita, [28.1831388 -101.084525], 31 July 1959, 1600 ft., T. J. Cohn, #125 [2 males] (UMMZ); 28.5 mi. N. Sabinas (9.5 mi. S. Allende) on Hwy. 57, [28.197588 -101.069133], 19 August 1961, I. J. Cantrall & T. J. Cohn, #11 [1 male] (UMMZ); 34.2 mi. S. Castanos (2.7 mi. N. San Lazaro), [26.306389 -101.346532], 20 August 1965, T. J. Cohn, #56 [2 females] (UMMZ); 9.9 mi. N. Musquiz [Muzquiz] on Hwy. 93 [20], [28.007072 -101.597170], 15 October 1978, C. E. Dunn, D. J. Bereza [1 male, 4 females] (ANSP); *Nuevo Leon*: Linares, Rio Camacho, [24.849921 -99.566715], 21-22 June 1965, O. S. Flint [1 male] (ANSP); 14 mi. S. Linares, [24.661342 -99.538419], 3 September 1955, 300-500 m., T. J. Cohn [1 male, 2 females] (UMMZ); 14.2 mi. S. Linares, [24.657022 -99.537553], 22 June 1957, A. Starrett & party, #3 [7 males, 7 females] (UMMZ); 15 mi. SE. Montemorelos on Hwy. 85 [measured from bridge over Rio Pilon], [24.993839 -99.745131], 21 November 1961, [1530 ft.], T. J. Cohn, #221 [1 male, 1 female] (UMMZ); 20 km. S. of Linares Hwy. 85, 24.676278 -99.537278, 3 October 2004, 372 m., Fontana, Battiston, Agatibi, Garcia, #36 [7 males, 7 females] (UMMZ); 24 mi. NW. Montemorelos, [25.379561 -100.111844], 3 September 1955, 500-800 m., T. J. Cohn [9 males, 5 females] (UMMZ); 32 +/- km. W. Linares, [Iturbide] [San Pedro Iturbide], [24.725847 -99.901286], 5 October 1962, H. & M. Townes [1 female] (UMMZ); 33 mi. SW. China, [25.341928 -99.528308], 4 September 1955, [800 ft.], T. J. Cohn [1 female] (UMMZ); 38 mi. E. China, [25.920203 -98.717242], 4 September 1955, 100 m., T. J. Cohn [2 females] (UMMZ); 4 mi. NE. Sabinas Hidalgo, [26.542003 -100.139389], 12 September 1958, 1050 ft., T. J. Cohn, #118 [1 female] (UMMZ); 4 mi. S.E. Villa Santiago,

[25.345794 -100.085322], 29 September 1958, 1650 ft., T. J. Cohn, #150 [1 female] (UMMZ); 6 mi. SE. Villa Santiago, [25.331011 -100.066506], 29 September 1958, 1550 ft., T. J. Cohn, #149 [1 female] (UMMZ); 6 mi. SE. Villa Santiago, [25.331011 -100.066506], 29 September 1958, 1550 ft., T. J. Cohn, #153 [1 male] (UMMZ); 8 mi. SE. Montemorelos, [25.110844 -99.756181], 30 September 1958, 1600 ft., T. J. Cohn, #157 [1 female] (UMMZ); La Mesa, 18 July 1954, R. R. Dreisbach [1 male, 1 female] (UMMZ); Montemorelos, [25.182386 -99.830423], 23 May 1952, W. J. Gertsch, R. Schrammel [1 female] (UMMZ); Rio Moreles at Gen. [General] Teran, [25.255033 -99.677719], 4 September 1955, [1005 ft.], Ted Cohn [1 female] (UMMZ); *San Luis Potosi*: 27 mi. ENE. Ciudad Valles, [22.068062 -98.670014], 31 August 1955, 50-100 m., T. J. Cohn [1 male, 1 female] (UMMZ); *Tamaulipas*: [Rancho?] Santa Cruz, [24.186618 -99.350723], 22 May 1952, W. J. Gertsch, R. Schrammel [3 juv. males, 4 juv. females] (UMMZ); 0.6 mi. N. Villagran, [24.482058 -99.485528], 11 October 1977, 1380 ft., T. J. & J. W. Cohn, #107 [1 female] (UMMZ); 1.6 mi. E. highway bridge at Llera, [23.313367 -98.978033], 26 August 1955, 200 m., T. J. Cohn [2 males, 1 female] (UMMZ); 10 mi. N. river at Ciudad Victoria, [23.865511 -99.113286], 2 September 1955, 100-200 m., T. J. Cohn [3 males, 5 females] (UMMZ); 10 mi. SE. Ciudad Victoria (river), [23.658031 -99.02915], 25 August 1955, 6100 ft., T. J. Cohn [1 female] (UMMZ); 10 mi. SE. Ciudad Victoria, [23.658031 -99.029150], 25 August 1955, 300-400 m., T. J. Cohn [3 males, 4 females] (UMMZ); 10 mi. SW. Santa Teresa, [30? mi. NE. San Fernando], [25.173146 -97.965424], 7 June 1958, 100 ft., J. Tulecke, J. Wellman & W. E. Duellman [1 female] (UMMZ); 10 mi. WSW. Padilla, Rio Corona, [23.956572 -98.920711], 26 August 1955, 100-500 m., T. J. Cohn [2 females] (UMMZ); 11.6 km. NE. Ciudad Victoria (center) Hwy. 101, 23.828917 -99.069333, 4 October 2004, 224 m., Fontana, Battiston, Agatibi, Garcia, #38 [5 males, 2 females] (UMMZ); 12 mi. NW. El Limon, (4 mi. E. Chamal), [23.002300 -99.077128], 6 October 1958, 600 ft., T. J. Cohn, #169 [1 female] (UMMZ); 13 mi. E. Llera, 1 mi. S. Hacienda La Clementina, [23.253283 -98.822931], 1 October 1958, 650 ft., T. J. Cohn, #159 [1 male] (UMMZ); 13 mi. ESE. Llera, Hacienda La Clementina, [23.269867 -98.834900], 25 August 1955, 150-200 m., T. J. Cohn [1 male, 7 females] (UMMZ); 13 S. 18 SE. Matamoros, [22.760124 -98.997337], 28 May 1978, J. E. Gillaspy & party [4 females[(UMMZ); 14 mi. N. highway bridge at Llera, [23.485044 -98.977533], 2 September 1955, 3-500 m., T. J. Cohn [1 male, 1 female] (UMMZ); 15.4 mi. N. highway bridge at Llera, [23.503797 -98.980589], 2 September 1955, [1000 ft.], T. J. Cohn [1 male, 1 female] (UMMZ); 16 mi. SSW. San Fernando, [24.652456 -98.285953], 24 August 1955, 100 m., T. J. Cohn [5 males, 8 females] (UMMZ); 17 mi. N. Victoria, Rio Santa Engracia, [23.968300 -99.105378], 17 December 1941, I. J. Cantrall & J. Friauf, #12 [12 males, 53 females] (UMMZ); 17 mi. N. Victoria, Rio Santa Engracia, [23.968300 -99.105378], 28 December 1941, I. J. Cantrall & J. Friauf, #53 [1 female] (UMMZ); 18 mi. NE. Victoria, Rio Corona, [23.967458 -99.105347], 17 December 1941, I. J. Cantrall & J. Friauf, #14 [1 male, 4 females] (UMMZ); 18 rd. mi. SW. Ciudad Victoria, [23.617536 -99.26501], 16 August 1959, *ca.* 2950 ft., T. J. Cohn, #185 [1 female] (UMMZ); 2 mi. SE. Hacienda La Clementina, 13 mi. E. Llera, [23.269867 -98.834900], 3 October 1958, 1500 ft., T. J. Cohn, #160 [4 males, 7 females] (UMMZ); 2.5 mi. N. highway bridge at Llera, [23.346744 -99.001081], 2 September 1955, 200-300 m., T. J. Cohn [2 males, 2 females] (UMMZ); 20 mi. SSE. Mante, [22.507226 -98.767753], 25 December 1958, 900 ft., T. J. Cohn, #389 [1 female] (UMMZ); 22 mi. NNE. San Fernando, [25.130683 -98.009203], 23 August 1955, 0-100 m., T. J. Cohn [3 males, 3 females] (UMMZ); 22 mi. NNW. Rio Mante, at Ciudad Mante, [22.845836 -99.195950], 26 August 1955, 100-200 m., T. J. Cohn [6 males, 5 females] (UMMZ); 22 rd. mi. SW. Ciudad Victoria, [23.614575 -99.302322], 16 August 1959, 2900 ft., T. J. Cohn, #186 [3 males] (UMMZ); 25 mi. S. Llera, [23.028667 -99.094267], 2 September 1955, 100-200 m., T. J. Cohn [1 male, 1 female] (UMMZ); 3 mi. SW. San Fernando, [24.812775 -98.186664], 23 August 1955, 100 m., T. J. Cohn [3 females] (UMMZ); 3.3 mi NW. of Nuevo Morelos, [22.569526 -99.250635], 4 September 1962, 1000 ft., Marston, Ordway and Naumann [1 female] (ANSP); 30 km SSE. Cuidad [Ciudad] Victoria (center) Hwy. 85, 23.515750 -98.977278, 4 October 2004, 289 m., Fontana, Battiston, Agatibi, Garcia, #39 [2 males] (UMMZ); 3.4 km SW of Hwy Bridge at Llera Hwy. 85, 23.294444 -99.027250, 4 October 2004, 299 m., Fontana, Battiston, Agatibi, Garcia, #40 [1 male, 1 female] (UMMZ); 30 mi. NE. Padilla to Padilla [*ca.* 15 mi. NE. Padilla], [24.132483 -98.578036], 24 August 1955, 100-400 m., T. J. Cohn [1 male, 3 females] (UMMZ); 31 mi. E. Ciudad Mante, [22.815289 -98.510247], 10 October 1958, 300 ft., T. J. Cohn, #180 [1 male, 1 female] (UMMZ); 37 mi. NNW. river at Cuidad Victoria, [24.179643 -99.304014], 3 September 1955, 200-300 m., T. J. Cohn [3 males, 1 female] (UMMZ); 37 mi. S. Linares, [24.366667 -99.505058], 3 September 1955, 300-500 m., T. J. Cohn [1 female] (UMMZ); 4 mi. S.W. C. Victoria, [23.676074 -99.194803], 10 July 1963, 1100 ft., Duckworth & Davis [1 female] (ANSP); 46 mi. SSW. San Fernando, [24.258944 -98.467325], 24 August 1955, 100-300 m., T. J. Cohn [9 males, 5 females] (UMMZ); 5 mi. SW. Jaumave, [23.371025 -99.448133], 16 August 1959, 2900 ft., T. J. Cohn, #187 [1 male, 1 female] (UMMZ); 6 mi. N. Ciudad Victoria, [23.836964 -99.119178], 14 August 1959, 1000 ft., T. J. Cohn, #179 [1 male] (UMMZ); 6 mi. SSW. Llera, [23.250350 -99.042900], 26 August 1955, 300-400 m., T. J. Cohn [1 male] (UMMZ); 6 mi. SSW. San Fernando, [24.778147 -98.220089], 24 August 1955, 100 m., T. J. Cohn [5 male, 9 female] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 19 December 1941, I. J. Cantrall & J. Friauf, #20 [4 males, 8 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 20 December

1941, I. J. Cantrall & J. Friauf, #22 [3 males, 11 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 21 December 1941, I. J. Cantrall & J. Friauf, #26 [5 males, 8 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 21 December 1941, I. J. Cantrall & J. Friauf, #28 [5 males, 8 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 22 December 1941, I. J. Cantrall & J. Friauf, #31 [6 males, 9 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 22 December 1941, I. J. Cantrall & J. Friauf, #32 [5 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 22 December 1941, I. J. Cantrall & J. Friauf, #35 [5 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 24 December 1941, I. J. Cantrall & J. Friauf, #39 [5 females] (UMMZ); 8 mi. E. Padilla, Rancho Sta. Ana, [24.111294 -98.810867], 26 December 1941, I. J. Cantrall & J. Friauf, #44 [3 males, 4 females] (UMMZ); 8 mi. NE. Jaumave (on Hwy. 101), [23.520930 -99.342048], 14 November 1970, [2380 ft.], T. J. & J. W. Cohn, #92 [2 males, 2 females] (UMMZ); 8 mi. SW. Cuidad [Ciudad] Victoria (on new Juamave [Jaumave] Rd.), [23.670644 -99.195131], 5 October 1958, 1500-2000 ft., T. J. Cohn, #166 [1 female] (UMMZ); 8 rd. mi. SW. Ciudad Victoria, [23.630878 -99.199465], 15 August 1959, 2000 ft., T. J. Cohn, #183 [2 females] (UMMZ); 9 mi SE. jct 101-180, dense thorn scrub on 180, [24.345092 -98.295674], 20 October 1981, Otte, Azuma, Newlin, #1 [1 male] (ANSP); Ciudad Mante, [22.746631 -98.970953], 26 August 1955, 90 m., T. J. Cohn [9 males, 19 females] (UMMZ); El Canon del Novillo, hwy. 101, 4.17 km. SW. Cd. Victoria, 23.685056 -99.195556, 28 June 2006, 481 m., Fontana, Battiston, Agatibi, Garcia, #3 [4 males, 1 female] (UMMZ); El Tomaseno, [24.354251 -99.502108], 31 August 1947, 650 ft., Chas. Hodge, 4th [1 male, 2 females] (ANSP); Km 16+/- hairpin turn on Juamave [Jaumave] Rd., SW Victoria, [23.627303 -99.210143], 30 October 1967, 3000 ft., W. H. Cross, #197 [1 male, 1 female] (MEM); Mesa de Llera, [23.612858 -99.293695], 1 August 1938, 2000 ft., H. R. Roberts [1 female] (ANSP); Mesa de Llera (46 mi. N. of Mante), [23.612858 -99.293695], 5 July 1958, Fred B. Turner [1 male, 5 females] (UMMZ); Padilla, Rio Purificacion, [24.038749 -98.898529], 24 August 1956, 150 m., T. Cohn [3 males, 3 females] (UMMZ); Rio Mante at Mante, [22.752111 -98.981997], 26 August 1955, 90 m., T. J. Cohn [1 male, 2 females] (UMMZ); Rio San Fernando at San Fernando, [24.845403 -98.159981], 23 August 1955, 55 m., T. J. Cohn [1 male, 4 females] (UMMZ); Tres Palos, [24.545931 -98.309930], 15 May 1952, W. J. Gertsch, R. Schrammel [1 male] (UMMZ); Victoria, [23.738653 -99.140507], 18 July 1956, W. J. Gertsch [1 male, 3 females] (UMMZ); Victoria, [23.738653 -99.140507], 22 May 1952, M. Cazier, W. J. Gertsch, R. Schrammel [1 female] (UMMZ); Zaragosa, 21 mi. ESE. Llera, [23.164950 -98.756744], 9 October 1958, 600 ft., T. J. Cohn, #178 [2 males, 2 females] (UMMZ); *Veracruz*: 12 mi. W. Tampico plaza, [22.194362 -98.014581], 31 August 1955, 0-50 m., T. J. Cohn [2 males, 3 females] (UMMZ); **TEXAS**: *Bexar County*: 1 mi. NW. Halotes, [29.589985 -98.698207], 24 July 1959, 1100 ft., T. J. Cohn, #98 [1 male] (UMMZ); 5 mi. S. Leon Springs [on Hwy. 87], [29.597922 -98.599944], 28 June 1961, [1025 ft.], T. J. Cohn, #48 [1 male] (UMMZ); Salado Cr., Ft. Sam Houston, San Antonio (Coordinates Approximate), [29.444691 -98.445809], 31 August 1942, H. R. Roberts [3 males, 1 female] (UMMZ); San Antonio, [29.424489 -98.494628], 22 November 1953, D. C. Eades, #259-260 [1 male, 1 female] (UMMZ); San Antonio, [29.424489 -98.494628], 25 August 1938, R. H. Beamer [1 female] (UMMZ); San Antonio (north edge), 2.5 mi. N. Hwy. 410, on Hwy. 281 [0.5 mi. N. northern edge of Int. Airport] [Salado Cr.?], [29.553675 -98.488097], 8 June 1977, 850 ft., T. J. Cohn, #21 [3 females] (UMMZ); *Comal County*: 6 mi. NW. New Braunfels, [29.741903 -98.210778], 21 July 1959, 1000 ft., T. J. Cohn, #89 [4 males, 1 female] (UMMZ); *Crockett County*: Fort Lancaster ruins, 8 mi. SE. Sheffield, [30.66719 -101.696073], 10 October 1974, 2100 ft., T. J & J. W. Cohn, #71 [1 female] (UMMZ); *Duval County*: Benavides, [27.597441 -98.405637], 7 September 1975, J. E. Gillaspy [1 female] (UMMZ); *Edwards County*: 16 mi. SW. Rocksprings, [29.890082 -100.406500], 29 July 1959, 2000 ft., T. J. Cohn, #116 [1 male, 2 females] (UMMZ); 33 mi. NE. Del Rio P.O. on Texas Ranch Rd. 2523, [29.684481 -100.594220], 12 October 1974, 1300 ft., T. J. & J. W. Cohn, #77 [4 males, 5 females] (UMMZ); *Hidalgo County*: Bentsen-Rio Grand Valley State Park, 2 mi. SW Mission, [26.175180 -98.380721], 19 August 1955, 100 ft., T. J. Cohn [4 males, 1 female] (UMMZ); *Jim Wells County*: 1 mi. NE. Sandia (Wade Creek), [28.031117 -97.867469], 23 July 1955, 80 ft., T. J. Cohn [1 male, 1 female] (UMMZ); Alice, [27.750593 -98.075457], 17 July 1954, R. R. Dreisbach [1 female] (UMMZ); *Kimble County*: 5 mi. SW. Junction, [30.445391 -99.830094], 6 August 1955, 1750 ft., T. J. Cohn [1 male, 5 females] (UMMZ); *Kinney County*: 16 mi. N. Brackettville, [29.587025 -100.411794], 29 July 1959, 1600 ft., T. J. Cohn, #120 [3 males, 3 females] (UMMZ); [erroneously indicated as Val Verde County], 23.6 mi. NE. Del Rio P.O. on Texas Ranch Rd. 2523 (1 mi. NE. Jct. Rd. 3008), [29.537996 -100.627365], 11 October 1974, 1300 ft., T. J. & J. W. Cohn, #76 [4 males, 5 females] (UMMZ); *Kleberg County*: Kingsville (Caliche Pits), [27.440372 -97.847598], 24 October 1974, J. E. Gillaspy [1 female] (UMMZ); Kingsville (South Pasture), [27.442125 -97.855383], 9 August 1976, J. E. Gillaspy [1 female] (UMMZ); *Live Oak County*: Three Rivers, [28.459475 -98.182431], 25 June 1938, R. H. Beamer [1 female] (UMMZ); *Maverick County*: 1.8 mi. E. Eagle Pass, [28.709106 -100.469619], 18 August 1961, I. J. Cantrall & T. J. Cohn, #8 [2 males, 1 female] (UMMZ); Eagle Pass, [28.722133 -100.486467], 30 May 1964, T. E. Moore *et al.* [1 male] (UMMZ); *McMullen County*: 20.7 mi. S. Tilden on Hwy. 16, 28.162000 -98.583000, 30 August 2008, 350 ft., D. R.

Swanson, #20 [1 male] (UMMZ); 20.7 rd. mi. S. Tilden on Hwy. 16, 19.4 rd. mi. N. Hwy. 59 jct. in Freer, 28.162000 -98.583000, 4 September 2010, 360 ft., D. R. Swanson, #39 [1 male] (UMMZ); *Medina County*: 1 mi west Castroville, [29.347539 -98.904831], 18 August 1961, I. J. Cantrall & T. J. Cohn, #7 [4 males, 2 females] (UMMZ); 11. 6 rd. mi. NW. Hwy. 132, Jct. in Devine on Hwy. 173, 29.256000 -99.050000, 4 September 2009, 800 ft., D. R. Swanson, #23 [1 male] (UMMZ); 15 mi. NW. Hondo, [29.516147 -99.220003], 27 July 1959, 1100 ft., T. J. Cohn, #109 [1 male] (UMMZ); 15.6 mi. N. Hondo on Hwy. 173, 29.557000 -99.103000, 29 August 2008, 1250 ft., D. R. Swanson, #16 [3 males, 1 female] (UMMZ); 8.8 rd. mi. NW. Devine Hwy 132 Jct. on Hwy. 173, 29.228000 -99.015000, 4 September 2009, 770 ft., D. R. Swanson, #24 [1 female] (UMMZ); Castroville, [29.354686 -98.879211], 5 July 1936, R. H. Beamer [1 male] (UMMZ); Dunlay, [29.351853 -98.989044], 16 August 1935, T. H. & G. G. Hubbell, #9 [1 female] (UMMZ); *Pecos County*: [9.0 air mi. SW. Iraan] I-10 W., exit 314, frontage road, NW. of interchange, 30.810000 -101.990000, 7 September 2010, 2440 ft., D. R. Swanson, #56 [1 female] (UMMZ); 10 mi. NW. Sheffield, [30.873806 -101.879392], 7 August 1955, 2400 ft., T. J. Cohn & J. R. Hilliard [8 males, 7 females] (UMMZ); Road saddle in hills 15 ms. SW. of junction of US 290 and 67, 19 August 1955, 4600 ft., James A. G. Rehn [3 females] (UMMZ); *Real County*: 1 m. N. of Campwood, [29.682668 -100.017688], 17 August 1955, 1760 ft., James A. G. Rehn [2 females] (UMMZ); *San Patricio County*: 2.8 rd. mi. NE. jct. Hwy. 89 in Sinton on Hwy. 77, roadside weeds, 28.084000 -97.475000, 6 September 2010, 50 ft., D. R. Swanson, #52 [2 males] (UMMZ); Lake Corpus Christi St. Pk. 4 mi. SW. Mathis, [28.063725 -97.870358], 30 July 1955, 100 ft., T. J. Cohn [1 female] (UMMZ); R&B Welder Refuge, [28.102246 -97.379625], 31 July 1976, J. E. Gillaspy & party [1 male] (UMMZ); Welder Wildlife Refuge (7.5 mi. N. Sinton), [28.080048 -97.407033], 15 July 1964, W. L Thompson [1 male, 1 female] (UMMZ); *Sutton County*: 21 ms. S. of Sonora, [30.293431 -100.644499], 17 August 1955, 2775 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); 27 mi. W. Junction, [30.450982 -100.177052], 7 August 1955, 2100 ft., T. J. Cohn [1 female] (UMMZ); 3.5 ms. W. of Sonora, [30.590001 -100.691799], 18 August 1955, 2950 ft., James A. G. Rehn [1 male] (UMMZ); *Terrell County*: 32.8 mi. NE. Dryden (on Texas Hwy. 349 to Sheffield), [30.426419 -101.863700], 30 August 1964, [2150 ft.], T. J. Cohn, #73 [1 female] (UMMZ); 41.4 mi. SE. Sanderson (on Hwy. 90), 29.905317 -101.819000, 14 October 2007, D. R. Swanson [2 females] (UMMZ); 41.4 mi. SE. Sanderson on Hwy. 90, 29.905317 -101.819000, 1 September 2008, 1550 ft., D. R. Swanson, #31 [1 female] (UMMZ); *Uvalde County*: [8.6 air mi. S. Leakey (Real Co.)] Garner State Park entrance, 29.605000 -99.745000, 6 September 2010, 1425 ft., D. R. Swanson, #55 [1 male] (UMMZ); 15 mi. N. Uvalde, [29.412353 -99.753797], 19 August 1958, *ca.* 1200 ft., T. J. Cohn, #37 [1 male, 3 females] (UMMZ); 15 mi. NW. Uvalde, [29.397084 -99.998294], 28 July 1959, 1100 ft., T. J. Cohn, #111 [1 female] (UMMZ); 15 mi. W. Sabinal, [29.275561 -99.703750], 16 August 1955, 1000 ft., T. J. Cohn [2 males, 9 females] (UMMZ); 2 mi. N. Uvalde, [29.238169 -99.792994], 15 August 1955, 1000 ft., T. J. Cohn [2 males, 2 females] (UMMZ); 4 mi. N. Uvalde, [29.261736 -99.774858], 15 August 1955, 1000 ft., T. J. Cohn [7 males, 3 females] (UMMZ); 5 ms. NW. of Uvalde, [29.255322 -99.836506], 17 August 1955, 1200 ft., James A. G. Rehn [5 females] (UMMZ); Fred Mason Ranch near Picture Cave #1, [29.282297 -99.926261], 3 November 1962, J. E. Raddell [1 female] (UMMZ); Uvalde, [29.207311 -99.793839], 21-22 August 1912, 1000-1100 ft., Rehn & Hebard [1 female] (UMMZ); Sabinal, [29.318475 -99.466708], 7 June 1936, J. D. Beamer [1 male] (UMMZ); [erroneously indicated as Val Verde County], 14.6 mi. N. Uvalde P.O. on Texas Hwy. 55, [29.351183 -99.950306], 11 October 1974, 1050 ft., T. J. & J. W. Cohn, #79 [6 males, 2 females] (UMMZ); *Val Verde County*: 16.8 mi. N. Comstock (on Hwy. 163), [29.910250 -101.154422], 10 October 1974, 1600 ft., T. J. & J. W. Cohn, #74 [4 males, 4 females] (UMMZ); 20 mi. NE. Del Rio P.O. on Ranch Rd. 2524 [2523] (16.5 mi. NE. jct. Hwy. 90), [29.520300 -100.654031], 11 October 1974, 1250 ft., T. J. & J. W. Cohn, #75 [3 males, 5 females] (UMMZ); 10 mi. SW. Carta Valley [Edwards], [29.735361 -100.790286], 12 September 1951, [1820 ft.], T. J. Cohn [1 male] (UMMZ); 16 mi. N. Del Rio (on Hydrostation rd.), [29.45062 -101.047937], 26 August 1958, 1150 ft., T. J. Cohn, #66 [1 female] (UMMZ); 20 mi. N. Del Rio, [29.640231 -100.866867], 24 August 1958, *ca.* 1500 ft., T. J. Cohn, #59 [3 males, 3 females] (UMMZ); 21 ms. N. of Del Rio, [29.654717 -100.864143], 12 September 1951, *ca.* 1600 ft., James A. G. Rehn [2 males] (UMMZ); 32 mi. NNE. Del Rio, [29.753201 -100.744051], 24 August 1958, 1650 ft., T. J. Cohn, #60 [1 female] (UMMZ); 4 mi. E. Del Rio, [29.370125 -100.823869], 27 August 1958, 1050 ft., T. J. Cohn, #70 [4 males, 2 females] (UMMZ); 44 mi. NNE. Del Rio (2.5 mi. N. Loma Alta), [29.947146 -100.760725], 31 August 1958, 1770 ft., T. J. Cohn, #78 [1 male] (UMMZ); 5 mi. N. Del Rio, [29.434994 -100.909436], 24 August 1958, 1100 ft., T. J. Cohn, #58 [2 males, 1 female] (UMMZ); 6.5 mi. SE. Comstock, [29.616461 -101.102944], 23 August 1958, 1400 ft., T. J. Cohn, #56 [2 males, 1 female] (UMMZ); 7 mi. E. Del Rio, [29.371417 -100.786242], 15 August 1955, 1100 ft., T. J. Cohn [2 females] (UMMZ); 7 mi. NNW. Del Rio, [29.450683 -100.935197], 14 August 1955, 1100 ft., T. J. Cohn [7 males, 6 females] (UMMZ); 7 mi. NW. Del Rio, [29.452116 -100.934569], 27 August 1958, 1150 ft., T. J. Cohn, #69 [1 male, 1 female] (UMMZ); Del Rio, [29.366767 -100.898625], 17 August 1935, T. H. & G. G. Hubbell, #12 [2 females] (UMMZ); Del Rio, [29.366767 -100.898625], 22 June 1949, W. C. Stehr [3 males] (OSUC); Del Rio, [29.366767 -100.898625], 28 June 1949, W. C. Stehr [1 male] (OSUC); Fawcett Ranch, 22 mi. (by rd.) NW. Loma Alta, 45 air mi. N. Del Rio, [29.997470 -101.169286], 31 August 1958, 1700 ft.,

T. J. Cohn, #74 [1 male] (UMMZ); Fern Cave, 20 mi. N. Comstock, [29.95275 -101.131711], 19 July 1968, [no collector] [1 male] (UMMZ); *Webb County*: 1 mi. SSW. Encinal, [28.027125 -99.359573], 18 August 1955, 530 ft., T. J. Cohn [5 males, 2 females] (UMMZ); 14 mi. SSW. Encinal, [27.844622 -99.407200], 18 August 1955, *ca.* 700 ft., T. J. Cohn [2 males, 2 females] (UMMZ); 15 mi. SSW. Encinal, [27.830407 -99.411290], 5 August 1955, *ca.* 700 ft., T. J. Cohn [1 male, 7 females] (UMMZ); 15 mi. SSW. Encinal, [27.830407 -99.411290], 18 August 1955, *ca.* 700 ft., T. J. Cohn [4 males, 1 female] (UMMZ); 20 mi. W. Freer, [27.751016 -98.901052], 27 September 1974, J. E. Gillaspy & party [1 male, 1 female] (UMMZ); 4.5 mi. NE. Laredo, [27.523647 -99.434119], 4 June 1947, T. H. Hubbell, #1 [4 males, 8 females] (UMMZ); *Zavala County*: 19.9 mi. N. Carrizo Springs jct. Hwy. 277 on Hwy. 83, 28.802000 -99.852000, 31 August 2008, 620 ft., D. R. Swanson, #26 [4 males, 2 females] (UMMZ); 7.8 mi. E. jct. Hwy. 83 on Hwy. 57, [28.938000 -99.728000], 31 August 2008, 770 ft., D. R. Swanson, #27 [4 males, 1 female] (UMMZ).

Obolopteryx catinatus (Rehn and Hebard, 1914)

MATERIAL EXAMINED [22 males, 21 females]: **MEXICO**: *Coahuila*: Higueros, bet. Monterrey & Saltillo, [25.633738 -100.801974], 13 September 1936, 4000 ft., H. R. Roberts [1 female] (ANSP); *Nuevo Leon*: 12.8 mi. W. Santa Catarina, [25.682928 -100.661694], 8 August 1959, 3520 ft., T. J. Cohn, #151 [2 males] (UMMZ); 15 mi. W. Monterrey, [25.697265 -100.541597], 16 July 1936, 3000 ft., H. R. Roberts [1 male, 1 female] (ANSP); 5.16 km W. Santa Catarina fr. Jct. Arco Vial, 0.6 km. N. Hwy 40, 25.707833 -100.611639, 8 October 2004, 1025 m., Fontana, Battiston, Agatibi, Garcia, #48 [1 male] (UMMZ); Monterrey, [25.685536 -100.311147], 24 November 1953, D. C. Eades, #308-309 [2 females] (UMMZ); Sierra de Picachos (Coordinates Approximate), [25.844765 -99.722952], 22 June 1975, J. E. Gillaspy [2 females] (UMMZ); **TEXAS**: *Bexar County*: San Antonio (N. edge), 2.5 mi. N. Hwy 410, on Hwy 281 [0.5 mi. N. northern edge of Int. Airport] [Salado Cr.?], [29.553675 -98.488097], 8 June 1977, 850 ft., T. J. Cohn, #21 [2 males, 5 females] (UMMZ); *Blanco County*: *ca.* 16 air mi. N. Johnson City, R. Arvesen Lost Springs Ranch, 863 Big Mountain Trail, [30.486264 -98.507686], 22 May 2005, 1200 ft., T. J. & J. W. Cohn, #2 [3 males] (UMMZ); *ca.* 5 [8] mi. NE. Johnson City, Falls of the Pedernales St. Park, [30.303153 -98.246378], 12 May 2002, [950 ft.], T. J. & J. W. Cohn, #2 [1 male] (UMMZ); *Bosque County* [erroneously as Meridian County]: Meridian State Park, 4 mi. SW. Meridian, [31.891136 -97.702277], 28 June 1959, 1100 ft., T. J. Cohn, #31 [2 males, 1 female] (UMMZ); *Cameron County*: 2 mi. NE. Brownsville Post Office, [25.951053 -97.487222], 4 September 1955, 30 ft., T. J. Cohn [1 male, 2 females] (UMMZ); Olmito (10 mi. NW. Brownsville P.O.), [26.021595 -97.534112], 20 August 1955, 30 ft., T. J. Cohn [3 males] (UMMZ); Olmito, behind Brownsville Sports Park, end Old Alice Road, 26.000400 -97.514900, 5 September 2010, 10 ft., D. R. Swanson, #48 [3 males, 3 females] (UMMZ); *Comanche County*: 14 mi. ESE. Comanche, [31.847774 -98.379929], 29 June 1959, 1100 ft., T. J. Cohn, #32 [3 males, 1 female] (UMMZ); *Travis County*: 5 mi. NE. Austin (W. Blair's), [30.306071 -97.724393], 15 July 1955, 600-700 ft., T. J. Cohn [1 female] (UMMZ); Bee Cr. Park, Austin, [30.293326 -97.790044], 12 June 1955, J. R. Hilliard [1 juv. female] (UMMZ); Austin, [30.267542 -97.743233], [no further information] [1 juv. female] (UMMZ).

Obolopteryx emarginatus (Rehn and Hebard, 1914)

MATERIAL EXAMINED [158 males, 202 females]: **MEXICO**: *Nuevo Leon*: 14.2 mi. S. Linares, [24.657022 -99.537553], 22 June 1957, A. Starrett & party, #3 [1 male] (UMMZ); 20 km S. of Linares Hwy. 85, 24.676278 -99.537278, 3 October 2004, 372 m., Fontana, Battiston, Agatibi, Garcia, #36 [3 males] (UMMZ); 38 mi. E. China, [25.920203 -98.717242], 4 September 1955, 100 m., T. J. Cohn [1 male] (UMMZ); *Tamaulipas*: 15 mi. SSW. Llera, [23.169694 -99.106875], 2 September 1955, 200-300 m., T. J. Cohn [1 male] (UMMZ); 16 mi. SSW. San Fernando, [24.652456 -98.285953], 24 August 1955, 100 m., T. J. Cohn [4 males] (UMMZ); 3 mi. SW. San Fernando, [24.815406 -98.185372], 23 August 1955, 100 m., T. J. Cohn [1 male] (UMMZ); **OKLAHOMA**: *Harmon County*: 7 mi. SW. Hollis, [34.638361 -99.975042], 22 June 1926, T. H. Hubbell, #11 [2 males] (UMMZ); 7 mi. SW. Hollis, [34.638361 -99.975042], 22 June 1926, T. H. Hubbell, #31 [4 males] (UMMZ); *Jackson County*: Red rd. , S. Olustee, [34.524347 -99.414867], 3 June 1938, W. Frank Blair, #2 [1 male] (UMMZ); *Texas County*: 8 mi. SE. Guymon, [36.617725 -101.591033], 21 June 1926, T. H Hubbell, #31 [1 male] (UMMZ); **TEXAS**: *Bastrop County*: 12 mi. W. Bastrop, [30.088414 -97.507447], 21 July 1955, 500 ft., T. J. Cohn [1 female] (UMMZ); *Baylor County*: Seymour, [33.593311 -99.258989], 10 June 1986, M. B. Jackson [1 female] (UMMZ); *Bee County*: Beeville, [28.409044 -97.750367], 28 July 1912, Rehn & Hebard [1 male] (ANSP); *Bell County*: 1 mi. SSW. Killeen, [31.091726 -97.753872], 26 July 1955, 950 ft., T. J. Cohn [12 females] (UMMZ); 2 mi. W. Killeen, [31.123261 -97.761972], 26 July 1955, 900 ft., T. J. Cohn [5 males, 8 females] (UMMZ); 2 mi. W. Killeen: Ft. Hood, [31.123261 -97.761972], 6 July 1955, 920 ft., T. J. Cohn [1 male, 2 females] (UMMZ); 2 mi. W. Killeen: Ft. Hood, [31.123261 -97.761972], 12 July 1955, 920 ft., T. J. Cohn [4 males, 2 females] (UMMZ); 3 mi. E. Killeen, [31.102953 -97.678061], 12 July 1955, 850 ft., T. J. Cohn [5 females] (UMMZ); *Burnet County*: 3 mi. W. Burnet, [30.761933 -98.280294], 11 July 1959, 1250 ft., T. J. Cohn, #62 [1 female] (UMMZ); 6 mi. E. Burnet, [30.749625 -98.131383], 10 July 1959, 1400 ft., T. J. Cohn, #60 [1 female] (UMMZ); 6 mi. E. Burnet, [30.749625 -98.131383], 9 July

1959, 1400 ft., T. J. Cohn, #59A [1 male, 1 female] (UMMZ); 2 mi. NW. Briggs, [30.892259 -97.958315], 8 July 1955, 100 ft., T. J. Cohn [1 male, 2 females] (UMMZ); *Callahan County*: 15 mi. NW. Cross Plains, [32.226269 -99.386588], 29 June 1959, 1800 ft., T. J. Cohn, #34 [6 males, 5 females] (UMMZ); *Cameron County*: 3 ms. E. of El Jardin, NW. of Brownsville, [25.955883 -97.566332], 12 August 1955, 30 ft., James A. G. Rehn [1 male] (UMMZ); Olmito (10 mi. NW. Brownsville P.O.), [26.021595 -97.534112], 20 August 1955, 30 ft., T. J. Cohn [13 males, 11 females] (UMMZ); *Clay County*: 3 mi. E. Windthorst, [33.567100 -98.388890], 23 June 1959, 1000 ft., T. J. Cohn, #17 [2 males, 1 female] (UMMZ); 4 mi. E. Henrietta [on Hwy. 82], [33.815602 -98.131219], 6 August 1958, 900 ft., T. J. Cohn, #9 [1 female] (UMMZ); Henrietta, [33.817842 -98.198489], 18 August 1951, 900 ft., T. J. Cohn [1 male] (UMMZ); Henrietta, [33.817842 -98.198489], 12 July 1950, 900-1000 ft., [no collector] [1 female] (UMMZ); *Coke County*: 16.4 mi. W. Robert Lee, [31.898328 -100.733997], 27 June 1965, [2300 ft.], T. J. Cohn, #47 [3 males, 5 females] (UMMZ); 9 mi. N. Bronte, [32.012641 -100.275418], 1 August 1956, T. J. Cohn & E. G. Matthews, #169 [1 male] (ANSP); *Coleman County*: 5 ms. SE. of Coleman, [31.775742 -99.356748], 23 August 1955, 1550 ft., James A. G. Rehn [1 male, 6 females] (UMMZ); *Coryell County*: Ft. Hood, (Hood Village), [31.096625 -97.684911], 4 June 1955, E. G. Matthews [4 males, 4 females] (UMMZ); *Crockett County*: 3 mi. E. Ozona, [30.711683 -101.154394], 7 August 1955, *ca.* 2400 ft., T. J. Cohn & J. R. Hilliard [1 male, 1 female] (UMMZ); [erroneously indicated as Sutton County], 23 ms. W. of Sonora, [30.674597 - 101.012617], 18 August 1955, 2850 ft., James A. G. Rehn [1 male, 1 female] (UMMZ); *Eastland County*: Cisco, [32.387160 -98.982178], 19 June 1947, H. S. Wallace [2 males, 1 female] (UMMZ); Cisco, [32.387160 -98.982178], 19 June 1947, R. H. Beamer [1 female] (UMMZ); *Edwards County*: 5 ms. N. of Barksdale, [29.779632 -100.080936], 17 August 1955, 2000 ft., James A. G. Rehn [1 female] (UMMZ); *Ellis County*: McWhorter's Ranch, Waxahachie (Coordinates Approximate), [32.376439 -96.827675], 5 July 1936, H. R. Roberts [1 female] (UMMZ); Mo.[?], 19 June 1934, F. B. Isley [1 male] (ANSP); *Garza County*: 8 miles NE. Post, [33.287307 -101.290863], 23 June 1967, 2600 ft., T. J. Cohn, #15 [4 males] (UMMZ); *Gillespie County*: 1 mi. NW. Cherry Spring, 18 mi. NW. Fredericksburg, [30.496250 -99.011206], 4 July 1959, 1700 ft., T. J. Cohn, #54 [1 male, 1 female] (UMMZ); 14 mi. E. Fredericksburg, [30.235883 - 98.666810], 6 August 1955, 1400 ft., T. J. Cohn & J. R. Hilliard [1 juv. female] (UMMZ); *Glasscock County*: Rt. 158 20 mi. SE. Midland, [31.904164 -101.755131], 13 July 1986, [no collector] [1 male] (UMMZ); *Hall County*: 5 mi. W. [SW?] Memphis, [34.699520 -100.614014], 13 July 1950, 2000 ft., M. Cazier, P. Boone, T. Cohn [9 males, 4 females] (UMMZ); *Irion County*: 17 ms. ENE. of Barnhart, [31.185980 -100.896322], 22 August 1955, 2150 ft., James A. G. Rehn [5 juv. males, 1 juv. female] (UMMZ); 6 mi. S. Mertzon (on Tex. 915), [31.191108 -100.791791], 2 September 1958, 2300 ft., T. J. Cohn, #89 [1 male, 6 females] (UMMZ); *Kimble County*: 4 mi. N. Segovia, [30.473414 -99.687159], 2 September 1937, 1100 ft., Rehn, Pate, & Rehn [1 male, 1 female] (UMMZ); 5 mi. SW. Junction, [30.445391 -99.830094], 6 August 1955, 1750 ft., T. J. Cohn [1 male] (UMMZ); *Kinney County*: 16 mi. N. Brackettville, [29.587025 -100.411794], 29 July 1959, 1600 ft., T. J. Cohn, #120 [1 male, 3 females] (UMMZ); 2 mi. S. Brackettville, [29.285417 -100.412680], 30 July 1959, 1100 ft., T. J. Cohn, #124 [1 female] (UMMZ); *Knox County*: Gilliland, [33.7314783 -99.6834223], 21 June 1964, George E. Klee [1 male] (MSUC); Gilliland, [33.7314783 -99.6834223], 24 June 1964, George E. Klee [1 female] (MSUC); *Lampasas County*: 3 mi. SE. Lometa, [31.183583 -98.365180], 12 July 1955, 4000 ft., T. J. Cohn [10 males, 14 females] (UMMZ); *Llano County*: 16 mi. NW. Llano (Farm Rd. 734 [= TX 71]), [30.876128 -98.886256], 3 July 1959, 1500 ft., T. J. Cohn, #49 [1 female] (UMMZ); 2 mi. SE. Llano, [30.733153 -98.655514], 17 August 1958, 1100 ft., T. J. Cohn, #31 [1 male] (UMMZ); *McLennan County*: Crawford, [31.536117 -97.442278], 19 June 1954, [no collector] [1 male] (UMMZ); *McMullen County*: 3.6 mi. S. Tilden on Hwy. 16, 28.539000 -98.831000, 30 August 2008, 310 ft., D. R. Swanson, #19 [1 male] (UMMZ); 20.1 mi. S. Tilden on Hwy. 16, 28.172000 - 98.580000, 30 August 2008, 330 ft., D. R. Swanson, #22 [4 males] (UMMZ); 20.7 mi. S. Tilden on Hwy. 16, 28.162000 -98.583000, 30 August 2008, 350 ft., D. R. Swanson, #20 [3 males] (UMMZ); 20.7 rd. mi. S. Tilden on Hwy. 16, 19.4 rd. mi. N. Hwy. 59 jct. in Freer, 28.162000 -98.583000, 4 September 2010, 360 ft., D. R. Swanson, #39 [4 males] (UMMZ); 23.7 mi. S. Tilden on Hwy. 16, 28.118000 -98.591000, 30 August 2008, 360 ft., D. R. Swanson, #21 [1 male] (UMMZ); 23.7 rd. mi. S. Tilden on Hwy. 16, 16.4 rd. mi. N. Hwy. 59 jct. in Freer, 28.118000 -98.591000, 4 September 2010, 350 ft., D. R. Swanson, #40 [2 males] (UMMZ); *Medina County*: Dunlay, [29.351853 -98.989044], 16 August 1935, T. H. & G. G. Hubbell [1 female] (UMMZ); *Pecos County*: Road saddle in hills 15 ms. SW. of junction of US 290 and 67[377], [30.353119 -99.896554], 19 August 1955, 4600 ft., James A. G. Rehn [2 males] (UMMZ); *Randall County*: Floor of Palo Duro Canyon, [34.933924 -101.653651], 17 August 1939, 2700 ft., Rehn & Rehn [1 male] (UMMZ); *Runnels County*: 4/5 m. E. of Benoit (R.) [Coordinates at 5 mi.], [31.787509 -99.751532], 23 August 1955, 1500 ft., James A. G. Rehn [2 males, 6 females] (UMMZ); *San Saba County*: 3 mi. E. San Saba, [31.197736 -98.669247], 7 July 1955, 1200 ft., T. J. Cohn [9 males, 9 females] (UMMZ); 5 mi. S. San Saba, [31.129028 -98.736142], 13 July 1955, 1450 ft., T. J. Cohn [1 male] (UMMZ); *Shackelford County*: Ft. Griffin State Park, 16 mi. N. Albany, [32.934694 -99.232602], 8 July 1956, 1250 ft., T. J. Cohn & E. G. Matthews, #140A [5 females] (ANSP); Ft. Griffin State Park, 16 mi. N. Albany, [32.934694 -99.232602], 8 July 1956, 1250 ft., T. J. Cohn & E. G. Matthews, #140B [1

male] (UMMZ); 12 mi. N. of Albany, [32.887531 -99.244033], 1 August 1956, T. J. & E. G. Matthews, #170 [1 juv. female] (UMMZ); 5 mi. W. Albany on Hwy. US 180, [32.708075 -99.379106], 16 June 1956, H. S. Wallace, #2120 [2 females] (UMMZ); Albany, [32.736522 -99.305947], 20 July 1935, I. J. Cantrall, #106 [3 males, 19 females] (UMMZ); *Starr County*: [no further information], [26.510339 -98.746436], 5 June 1958, L. W. Hepner [1 male, 1 female] (UMMZ); *Sutton County*: 19 mi. E. Ozona, [30.642386 -100.894315], 1 September 1937, 1775 ft., Rehn, Pate, & Rehn [1 male, 1 female] (UMMZ); 19 mi. ESE. Sonora, [30.496161 -100.364056], 7 August 1955, 2100 ft., T. J. Cohn [3 males, 12 females] (UMMZ); *Taylor County*: Abell, [32.447278 -99.812700], 17 June 1954, [no collector] [1 male, 1 female] (UMMZ); Abilene, [32.452052 -99.734783], 20 July 1935, I. J. Cantrall, #107 [1 female] (UMMZ); Abilene Dam, [32.385674 -99.727932], 30 June 1954, Donna Cade [1 female] (UMMZ); Abilene St. Pk., 18 mi. SSW. Abilene, [32.228211 -99.882728], 2 July 1959, 1900 ft., T. J. Cohn, #42 [5 males, 11 females] (UMMZ); E. Carr, 17 June 1954, [no collector] [1 female] (UMMZ); Kirby Lake, [32.374117 -99.743211], 21 June 1952, J. Hilliard [1 male, 1 female] (UMMZ); E. side Lyttle Lake, [32.428683 -99.701088], 22 June 1954, Dinah C., [1 female] (UMMZ); Lyttle Lake, [32.430501 -99.712307], 22 June 1954, Donna Cade [1 female] (UMMZ); Lyttle Lake, [32.430501 -99.712307], 20 June 1954, Pat Robinson [1 female] (UMMZ); *Tom Green County*: 3 ms. ENE. of Harriet, [31.566655 -100.261152], 23 August 1955, 1640 ft., James A. G. Rehn [1 female] (UMMZ); *Travis County*: 5 mi. NE. Austin P.O. (W.F. Blair's), [30.306071 -97.724393], 29 July 1955, 600-700 ft., T. J. Cohn [4 females] (UMMZ); *Uvalde County*: 4 mi. N. Uvalde, [29.261736 -99.774858], 15 August 1955, 1000 ft., T. J. Cohn [1 male] (UMMZ); 5 ms. NW. of Uvalde, [29.255322 -99.836506], 17 August 1955, 1200 ft., James A. G. Rehn, [1 male] (UMMZ); 6.9 mi. S. Uvalde P.O. on Hwy. 83, 29.121000 -99.831000, 31 August 2008, 900 ft., D. R. Swanson, #29 [2 males, 3 females] (UMMZ); [erroneously indicated as Val Verde County], 14.6 mi. NW. Uvalde P.O. on Texas Hwy. 55, [29.351183 -99.950306], 11 October 1974, 1050 ft., T. J. & J. W. Cohn, #79 [1 male] (UMMZ); *Val Verde County*: 20 mi. NE. Del Rio P.O. on Ranch Rd. 2524 [2523] (16.5 mi. NE. jct. Hwy. 90), [29.520300 -100.654031], 11 October 1974, 1259 ft., T. J. & J. W. Cohn, #75 [5 females] (UMMZ); 20 mi. N.Del Rio, [29.640231 -100.866867], 24 August 1958, 1500 ft., T. J. Cohn, #59 [1 male] (UMMZ); 7 mi. NW. Del Rio, [29.452116 -100.934569], 27 August 1958, 1150 ft., T. J. Cohn, #69 [1 female] (UMMZ); *Wichita County*: 1 mi. S. Electra, [34.018100 -98.924525], 1 July 1964, [1220 ft.], T. J. Cohn, #2 [1 female] (UMMZ); *Williamson County*: 5 mi. SSE. Leander, [30.511828 -97.823828], 11 July 1955, 900 ft., T. J. Cohn [1 female] (UMMZ).

Obolopteryx gladiator (Rehn and Hebard, 1914)

MATERIAL EXAMINED [83 males, 50 females]: **TEXAS**: *Bexar County*: 7 mi. S.W. Somerset (Carrizo Sands) (Coordinates Approximate), [29.164233 -98.708403], 22 September 1942, H. R. Roberts [2 females] (UMMZ); Elmendorf, [29.253956 -98.334856], 3 July 1930, D. R. Lindsay, [1 male] (UMMZ); *Brooks County*: 1 m. N. of Barroso, [27.092852 -98.145724], 14 August 1955, 140 ft., James. A. G. Rehn [2 males, 2 females] (UMMZ); *DeWitt County*: 3 mi. W. Cuero, [29.089667 -97.345156], 19 July 1959, 200 ft., T. J. Cohn [1 male] (UMMZ); Hochheim, [29.312750 -97.291364], 8 October 1955, J. R. Hilliard [6 males, 3 females] (UMMZ); *Jim Wells County*: 7 ms. N. of Falfurrias, [27.327120 -98.127942], 14 August 1955, 175 ft., James A. G. Rehn [3 males, 1 female] (UMMZ); *Kenedy County*: 0.2 mi. N. Armstrong on Hwy. 77N, 26.928600 -97.791500, 7 September 2009, 25 ft., D. R. Swanson [1 female] (UMMZ); 0.2 rd. mi. N. Armstrong P.O. on Hwy. 77N, roadside weeds, 26.928600 -97.791500, 5 September 2010, 30 ft., D. R. Swanson, #43 [6 males, 4 females] (UMMZ); 17.2 rd. mi. N. Raymondville [Willacy Co.] on Hwy. 77N, roadside weeds, 26.731500 -97.769700, 5 September 2010, 10 ft., D. R. Swanson, #44 [1 male] (UMMZ); 27degrees 10'N; 97 degrees 40' W, [27.166667 -97.666667], 4 August 1976, J. E. Gillaspy & party [1 male] (UMMZ); 27degrees 10'N; 97 degrees 40' W (El Paistle), [27.166667 -97.666667], 10 October 1978, J. E. Gillaspy [4 males, 3 females] (UMMZ); 27degrees 10'N; 97 degrees 40' W (Riskin Ranch), [27.166667 -97.666667], 18 September 1976, J. E. Gillaspy [2 females] (UMMZ); 27degrees 10'N; 97 degrees 40' W (Riskin Ranch), [27.166667 -97.666667], 28 August 1976, J. E. Gillaspy [2 males] (UMMZ); 3 mi. S. Sarita, [27.178513 -97.793056], 19 October 1978, J. E. Gillaspy [2 females] (UMMZ); 4 ms. S. of Armstrong, [26.866364 -97.787277], 11 August 1955, 25 ft., James A. G. Rehn [2 females] (UMMZ); Armstrong, 30 mi. N. Raymondville [=Katherine], [26.919850 -97.791403], 6 September 1955, 30 ft., T. J. Cohn [14 males, 10 females] (UMMZ); Armstrong, 30 mi. N. Raymondville [=Katherine], [26.919850 -97.791403], 5 September 1955, 30 ft., T. J. Cohn [1 male] (UMMZ); Sarita, [27.222133 -97.789940], 15 September 1975, J. E. Gillaspy [4 males, 2 females] (UMMZ); Sarita, [27.222133 -97.789940], 20 July 1977, J. E. Gillaspy [1 female] (UMMZ); *Kleberg County*: 6 mi. E. Riviera, [27.295126 -97.763557], 22 October 1978, J. E. Gillaspy [24 males] (UMMZ); 7 ms. S of Kingsville, [27.415881 -97.849513], 11 August 1955, 50 ft., James A. G. Rehn [1 male] (UMMZ); Kingsville, [27.515766 -97.855982], 28 October 1971, J. E. Gillaspy [1 female] (UMMZ); Kingsville, [27.515766 -97.855982], 9 October 1973, J. E. Gillaspy [1 female] (UMMZ); Kingsville, [27.515766 -97.855982], 22 October 1974, J. E. Gillaspy [1 female] (UMMZ); Kingsville, [27.515766 -97.855982], 20 September 1970, J. E. Gillaspy [1 female] (UMMZ); Loyola Beach, [27.333653 -97.694716],

6 June 1977, J. E. Gillaspy & party [2 males, 3 females] (UMMZ); Site 55 6 mi. E. Riviera, [27.295126 -97.763557], 21 October 1978, J. E. Gillaspy [1 male] (UMMZ); Site 55 6 mi. E. Riviera, [27.295126 -97.763557], 15 October 1978, J. E. Gillaspy [2 males] (UMMZ); *La Salle County*: 8 m. W. Artesia Wells, [28.298764 -99.415554], 19 September 1975, J. E. Gillaspy [1 male, 1 female] (UMMZ); 8 m. W. Artesia Wells, [28.298764 -99.415554], 20 September 1975, J. E. Gillaspy [1 female] (UMMZ); *Nueces County*: [Coordinates Approximate-Center of County], [27.724942 -97.634128], 16 October 1972, A. D. Parks [2 males] (UMMZ); Corpus Christi, [27.767725 -97.399053], 29 July 1912, F. C. Pratt [2 females] (ANSP); *Refugio County*: 5.5 ms. SW. of Woodsboro, [28.179682 -97.383590], 10 August 1955, 25 ft., [no collector] [1 female] (UMMZ); *San Patricio County*: Welder Wildlife Refuge (7.5 mi. N. Sinton), [28.080048 -97.407033], 15 July 1964, W. L. Thompson [2 females] (UMMZ); Welder Wildlife Refuge (8 mi. NE. Sinton), [28.083465 -97.401151], 13 May 1985, N. Bedwell [3 males] (MEM); *Webb County*: 1 mi. SSW. Encinal, [28.027125 -99.359573], 18 August 1955, 530 ft., T. J. Cohn [1 male] (UMMZ); 14 mi. SSW. Encinal, [27.844622 -99.407200], 18 August 1955, *ca.* 700 ft., T. J. Cohn [1 female] (UMMZ).

Obolopteryx oreoecus (Rehn and Hebard, 1914)

MATERIAL EXAMINED [60 males, 46 females]: **MEXICO**: *Chihuahua*: 10 N. Jimenez, [27.269534 -104.930029], 10 September 1950, Ray F. Smith [1 female] (UMMZ); 6 mi. E. El Carmen [*ca.* 6 mi. E. Ricardo Flores Magon], [29.929158 -106.888319], 5 September 1958, [5060 ft.], T. J. Cohn, #97 [2 males, 1 female] (UMMZ); *Coahuila*: 11 mi. NW. Muzquiz, [28.017547 -101.601361], 31 July 1959, 1550 ft., T. J. Cohn, #126 [1 female] (UMMZ); 8 mi. W. Acatita [valley?], E. side Sierra de Tlahualillo, [26.483080 -103.141537], August 1935, [4325 ft.], L. B. Kellum [1 juv. male] (UMMZ); Sierra de Tlahualillo, Ojo de Agua, near Durango line, [26.012026 -103.346911], 12 August 1952, C. C. Kersting, #15 [1 juv. male] (UMMZ); Sierra Tlahualillo, [26.010933 -103.258408], summer 1935, Bill Robinson [1 male] (UMMZ); **TEXAS**: *Brewster County*: 1.2 mi. NE. Panther Pass, east of The Basin, Chisos Mts.,Big Bend Nat'l. Park, [29.274583 -103.283722], 27-28 July 1956, 5840 ft., T. J. Cohn & E. G. Matthews, #154 [1 male] (UMMZ); 3.0 mi. N. Panther Junction on Hwy. 385, 29.363000 -103.18000, 10 September 2009, 3240 ft., D. R. Swanson [2 females] (UMMZ); 5.0 mi. N. Panther Jct. on Hwy. 385, 29.382000 -103.151000, 9 September 2009, 2980 ft., D. R. Swanson [1 male] (UMMZ); 5.0 mi. N. Panther Jct. on Hwy. 385, 29.382000 -103.151000, 10 September 2009, 2980 ft., D. R. Swanson [1 male] (UMMZ); Big Bend National Park, 0.1 mi. S. Basin Junction on Basin Road, 29.332000 -103.258000, 3 September 2008, 4090 ft., D. R. Swanson [6 males, 3 females] (UMMZ); Big Bend National Park, Panther Junction, 29.329000 -103.206000, 10 September 2009, 3720 ft., D. R. Swanson [1 male, 2 females] (UMMZ); Big Bend Nat'l Pk., [29.273472 -103.303039], 27 November 1950, 3-4000 ft., W. J. Gertsch, M. Cazier [1 female] (UMMZ); Chisos Mts,: The Basin to Panther Pass, [29.274583 -103.283722], 9 August 1955, 5500 ft., T. J. Cohn [3 males] (UMMZ); Chisos Mts. Juniper Canyon, [29.214125 -103.230320], 27 July 1928, F. M. Gaige, #257 [1 male] (UMMZ); Chisos Mts., betw. Basin Jct. & The Basin [Big Bend Nat'l. Park], [29.273455 -103.265222], 12 August 1955, *ca.* 5800 ft., T. J. Cohn [6 juv. males, 6 juv. females] (UMMZ); Chisos Mts., between Basin Junction and The Basin, [29.326756 -103.207656], 10 August 1955, 5720 ft., T. J. Cohn & J. R. Hilliard [2 males, 1 female] (UMMZ); Chisos Mts.,: 0.3 mi. E. Panther Pass, [29.274979 -103.292672], 9 August 1955, 5600 ft., T. J. Cohn [1 male] (UMMZ); E. Basin draw, Big Bend National Park, [29.323067 -103.204737], 9 September 1951, 5500 ft., T. J. Cohn [1 female] (UMMZ); Moss Well Chisos Mtn., [29.303827 -103.299684], 5-8 September 1912, 4500-5000 ft., Rehn & Hebard [6 males] (ANSP); Big Bend Nat'l. Park, Chisos Mts., 3 mi. NE. The Basin, [29.333086 -103.253786], 10 September 1951, 5200 ft., T. J. Cohn [1 male] (UMMZ); Big Bend Nat'l. Park, Chisos Mts., The Basin, [29.320758 -103.210450], 27-28 September 1950, 5200 ft., M. Cazier, W. Gertsch [1 male] (UMMZ); Big Bend Nat'l. Park, Chisos Mts., The Basin, [29.320758 -103.210450], 8 September 1951, 5700 ft., T. J. Cohn [3 males] (UMMZ); The Basin, Big Bend Nat'l. Park, Chisos Mts., [29.320758 -103.210450], 27-28 September 1950, 5720 ft., M. Cazier, W. Gertsch [8 females] (UMMZ); The Basin to ridge E. of Basin, Big Bend Nat'l. Park, [29.330458 - 103.208928], 9 September 1951, 5800 ft., T. J. Cohn [1 male, 2 females] (UMMZ); Hills W. of Ord Mts. (Coordinates Approximate), [30.225089 -103.553211], 1-15 July 1926, O. C. Poling [4 males] (UMMZ); Alpine, [30.356219 -103.661028], 8 August 1936, E. D. Ball [1 female] (UMMZ); Marathon, [30.206639 -103.246458], 8 August 1936, E. D. Ball [1 male] (UMMZ); Marathon, [30.206639 -103.246458], 2-13 September 1912, 3900-4160 ft., Rehn & Hebard [1 female] (ANSP); *Crockett County*: Ozona, [30.708889 -101.204167], 30 September 1950, M. Cazier, W. Gertsch [1 male] (UMMZ); *Edwards County*: 10 mi. NW. Camp Wood, [29.787597 -100.081497], 28 July 1959, 1650 ft., T. J. Cohn, #112 [1 male] (UMMZ); 11 mi. NW. Camp Wood, [29.805769 -100.083333], 28 July 1959, 1650 ft., T. J. Cohn, #113 [1 male] (UMMZ); *Jeff Davis County*: 3.4 rd. mi. NW. Fort Davis P.O., Davis Mtns. SP., 30.599000 -103.929000, 8 September 2009, 5020 ft., D. R. Swanson, #50 [2 males] (UMMZ); 0.4 mi. N. Fort Davis P.O. on Hwy. 118, 30.602000 -103.886000, 8 September 2009, 4915 ft., D. R. Swanson, #51 [1 male] (UMMZ); [6.7 air mi. NW. Ft. Davis] 5 rd. mi. NW. Davis Mtns. SP., 30.614000 -104.003000, 11 September 2009, 5160 ft., D. R. Swanson, #59 [2 males, 2 females] (UMMZ); [6.7 air mi. NW. Ft. Davis] 5 rd. mi. NW. Davis Mtns. SP., 30.614000 -104.003000, 23 September 2009, 5160 ft., D. R. Swanson, #93 [2 females]

(UMMZ); [6.7 air mi. NW. Ft. Davis] 5 rd. mi. NW. Davis Mtns. SP., 30.614000 -104.003000, 7 September 2010, 5160 ft., D. R. Swanson, #58 [2 males, 7 females] (UMMZ); [13.4 air mi. NW. Alpine] 10.3 rd. mi. S. Fort Davis P. O. on Hwy. 118, 30.526000 -103.777000, 8 September 2010, 4560 ft., D. R. Swanson, #63 [1 female] (UMMZ); 3.4 rd. mi. NW. Fort Davis P.O., Davis Mountains State Park entrance, 30.599000 -103.929000, 8 September 2010, 5020 ft., D. R. Swanson, #65 [1 male, 1 female] (UMMZ); *Kinney County*: 20 mi. N. Brackettville, [29.589567 -100.413200], 29 July 1959, 1750 ft., T. J. Cohn, #122 [1 male] (UMMZ); *Presidio County*: Shafter, [29.816663 -104.306101], 30 September 1928, E. R. Tinkham [1 male] (UMMZ); *Uvalde County*: 31 mi. N. Uvalde (on US 83), [29.602592 -99.747131], 20 August 1958, 1500 ft., T. J. Cohn, #42 [1 male] (UMMZ); *Val Verde County*: 35 mi. NNE. Del Rio, [29.777654 -100.693993], 25 August 1958, 1650 ft., T. J. Cohn [1 female] (UMMZ).

Obolopteryx poecilus (Hebard, 1932)

MATERIAL EXAMINED [35 males, 36 females]: **MEXICO**: *San Luis Potosi*: 3 rd. mi. N. Tamazunchale, [21.285439 -98.792983], 29 August 1955, 300-400 m., T. J. Cohn [1 female] (UMMZ); El Salto [Cascadas El Salto], R. Naranjo valley [20 air mi. WNW. Antiguo Morelos], [22.587420 -99.378933], 3 September 1948, 2000 ft., P. P. Dowling, #47 [1 male] (UMMZ); Valles, [21.990811 -99.011106], 25 November 1953, D. C. Eades, #222 [1 male] (UMMZ); Valles, [21.990811 -99.011106], 25 November 1953, D. C. Eades, #223 [2 males] (UMMZ); Valles, [21.990811 -99.011106], 25 November 1953, D. C. Eades, #224 [1 male] (UMMZ); Valles, [21.990811 -99.011106], 8 August 1954, R. R. Dreisbach [1 male] (UMMZ); 3 mi. SE. Salto del Agua, 17 air mi. WNW. Antiguo Morelos, [22.547286 -99.382500], 27 August 1955, 500-600 m., T. J. Cohn [1 male, 1 female] (UMMZ); 8 mi. E. Valles, [21.974075 -98.904314], 13 August 1959, 500 ft., T. J. Cohn, #176 [1 male] (UMMZ); 1.5 mi. E. Ciudad Valles on Tampico Rd., [21.976692 -98.974808], 31 August 1955, 100 m., T. J. Cohn [6 males, 8 females] (UMMZ); 15.7 mi. E. Tamasopo on rd. to Valles, [21.971053 -99.178544], 11-12 July 1964, 1200 ft., T. J. Cohn, #20 [2 males, 1 female] (UMMZ); 18 mi. S. Antiguo Morelos, [22.315608 -99.025828], 14 August 1959, 700 ft., T. J. Cohn, #178 [4 males] (UMMZ); Ciudad Valles, [21.990811 -99.011106], 25 December 1958, 300 ft., T. J. Cohn, #388 [1 male, 1 female] (UMMZ); Ciudad Valles on Tampico Rd., [21.996936 -99.006622], 31 August 1955, 100 m., T. J. Cohn [1 male, 1 female] (UMMZ); El Pujal [18 km. SSE. Cd. Valles], [21.848364 -98.940250], 18 July 1948, 100 ft., Ralph Haag [1 female] (UMMZ); Pujal [1 km. E. Alvaro Obregon, 18 km. SSE. Cd. Valles], [21.848364 -98.940250], 12-13 June 1948, H. O. Wagner, #1 [1 male, 1 female] (UMMZ); Salto del Agua, 20 air mi. WNW. Antiguo Morelo, [22.584814 -99.387369], 26-27 August 1955, 629 m., T. J. Cohn [2 males, 4 females] (UMMZ); *Tamaulipas*: 20 mi. SSW. Mante, [22.542669 -98.891618], 25 December 1958, 900 ft., T. J. Cohn, #389 [1 male, 2 females] (UMMZ); 3.5 mi. S. Antiguo Morelos, [22.509875 -99.078589], 3 August 1963, J. D. Donahue [3 males, 6 females] (UMMZ); 6.3 mi. NE. Antiguo Morelos (on Mante Rd.), [22.607633 -99.023786], 6 July 1964, [805 ft.], T. J. Cohn, #10 [1 male, 1 female] (UMMZ); 9 mi. NNE. Antiguo Morelos, [22.620761 -99.003300], 26 August 1955, 100-200 m., T. J. Cohn [4 males, 5 females] (UMMZ); Top of 1st ridge betw. Antiguo Morelos and Nuevo Morelos on Hwy. 80, [22.555984 -99.163804], 7 July 1958, T. H. Hubbell, #4 [1 male, 3 females] (UMMZ).

Obolopteryx seeversi (Strohecker, 1941)

MATERIAL EXAMINED [5 males, 5 females]: **TEXAS**: *Banderas County*: *ca.* 1.5 mi. E. Bandera on Hwy. 16, [29.732025 -99.050467], 11 May 2002, [1225 ft.], T. J. & J. W. Cohn, #1 [2 females] (UMMZ); Rt. 16, 1 m. E. Bandera, [29.732021 -99.057626], 14 June 1997, John Stidham [1 male, 1 female] (UMMZ); Rt. 16, 1 m. E. Bandera, [29.732021 -99.057626], 15 June 1999, John Stidham [1 male, 1 female] (UMMZ); *Bexar County*: (Coordinates Approximate), [29.484367 -98.709661], 11 August 1940, Stohecker [1 male, 1 female] (FSCA); *Medina County*: 16.5 mi. N. Hondo on Hwy. 173, Verde Creek, 29.569000 - 99.097000, 29 August 2008, 1250 ft., D. R. Swanson, #15 [1 juv. male] (UMMZ); 15.6 mi. N. Hondo on Hwy. 173, 29.557000 -99.103000, 29 August 2008, 1250 ft., D. R. Swanson, #16 [1 male] (UMMZ).

Planipollex polliciferus (Rehn and Hebard, 1914)

MATERIAL EXAMINED [_ male, _ female]: **TEXAS**: *Cameron County*: 1/2 m. SE. of Los Indios, [26.045834 -97.740502], 13 August 1955, 110 ft., J. A. G. Rehn [6 males, 1 female] (UMMZ); 2 mi. NE. Brownsville Post Office, [25.951053 -97.487222], 4 September 1955, 30 ft., T. J. Cohn [1 male, 3 females] (UMMZ); 6 mi. N. Brownsville, [26.053100 -97.559208], 20 August 1955, T. J. Cohn [2 females] (UMMZ); 8 ms. W. [NW.] of Brownsville, [25.968443 -97.588797], 13 August 1955, 125 ft., J. A. G. Rehn [10 males, 6 females] (UMMZ); Brownsville, [25.901747 -97.497484], 22 August 1955, 30 ft., T. J. Cohn [1 female] (UMMZ); Olmito (10 mi. NW Brownsville P.O.), [26.021595 -97.534112], 20 August 1955, 30 ft., T. J. Cohn [1 male, 3 females] (UMMZ); **MEXICO**: *Nuevo Leon*: Montemorelos, [25.182386 -99.830423], 23 May 1952, W. J. Gertsch, R. Schrammel [1 male, 1 female] (UMMZ); *Oaxaca*: Temascal, [18.248611 -96.414444], D. H. Janzen [2 males, 1 female] (UMMZ); *San Luis Potosi*: (*ca.* 10 km. S. Valles), *ca.* 4 km. NE. Los Sabinos, 1 km. N. Sotano del Arroyo, 25 November 1963, J. E. Raddell, [1 female] (UMMZ); 26 mi. N. Cd. Valles, 28 November 1964, J. E. Raddell, [1 female] (UMMZ); 8 mi. NE. Valles near Taninul, Cueva de Taninul #4 (E. flank Sierra Abra), 1 June 1964, Bill Bell & Terry Raines [1 female] (UMMZ); 10 mi. W.

[El Naranjo] Naranjos, [22.495646 -99.407730], 31 August 1940, 2500 ft., H. R. Roberts [1 male] (ANSP); 3 rd. mi. N. Tamazunchale, [21.285439 -98.792983], 29 August 1955, 300-400 m., T. J. Cohn [2 males, 1 female] (UMMZ); 5 mi. W. [El Naranjo] Naranjos on R. Salto, [22.570071 -99.348859], 30 August 1940, 500 ft., H. R. Roberts [1 female] (ANSP); 6 mi. E. Tamasopo (on rd. to Valles), [21.943674 -99.336017], 11 July 1964, 1300 ft., T. J. Cohn, #19 [4 males, 3 females] (UMMZ); Canon Galeana, Redadasen Hierbas[?], 27 September 1956, Wm. W. Gibson [1 female] (ANSP); El Salto, [22.374154 -99.293667], 3 September 1962, 1000 ft., Roberts, [1 female] (ANSP); Huichihuyan, 20 mi. N. Tamazunchale, [21.483331 -98.967796], 19 May 1952, W. J. Gertsch, R. Schrammel [1 male] (UMMZ); Valles, [21.990811 -99.011106], 26 November 1953, D. C. Eades, #459 [1 male] (UMMZ); Valles, [21.990811 -99.011106], 25 November 1953, D. C. Eades, #226 [1 female] (UMMZ); Valles, [21.990811 -99.011106], 26 November 1953, D. C. Eades, #158 [1 male, 1 female] (UMMZ); Valles, [21.990811 -99.011106], 8 August 1954, R. R. Dreisbach [3 males, 2 females] (UMMZ); Valles, [21.990811 -99.011106], 21 July 1954, R. R. Dreisbach [1 male, 1 female] (UMMZ); Valles, [21.990811 -99.011106], 19 July 1956, W. J. Gertsch [2 males, 3 females] (UMMZ); 3 mi. SE. Salto del Agua, 17 air mi. WNW. Antiguo Morelos, [22.547286 -99.382500], 27 August 1955, 500-600 m., T. J. Cohn [1 female] (UMMZ); 8 mi. E. Valles, [21.974075 -98.904314], 13 August 1959, 500 ft., T. J. Cohn, #176 [1 male, 1 female] (UMMZ); Salto del Agua, 20 air mi. WNW. Antiguo Morelo, [22.600000 -99.400000], 26-27 August 1955, 629 m., T. J. Cohn [6 males, 3 females] (UMMZ); (1.5 mi. E. Church in Chupaderos), (4.7 mi. W. El Naranjo), [22.520487 -99.360412], 7 July 1964, [1130 ft.], T. J. Cohn, #12 [3 males, 3 females] (UMMZ); 1.5 mi. E. Ciudad Valles on Tampico Rd., [21.976692 -98.974808], 31 August 1955, 100 m., T. J. Cohn [9 males, 9 females] (UMMZ); 15.7 mi. E. Tamasopo (on rd. to Valles), [21.971053 -99.178544], 11-12 July 1964, 1200 ft., T. J. Cohn, #20, [3 males, 3 females] (UMMZ); 18 mi. S. Antiguo Morelos, [22.315608 -99.025828], 14 August 1959, 700 ft., T. J. Cohn, #178 [4 males, 2 females] (UMMZ); 27 mi. ENE. Ciudad Valles, [22.068062 -98.670014], 31 August 1955, 50-150 m., T. J. Cohn [6 males, 5 females] (UMMZ); 5-9 mi. W. Tamuin [E. of Valles], [21.968000 -98.855478], 13 August 1959, 200-300 ft., T. J. Cohn, #175 [1 female] (UMMZ); Ciudad Valles on Tampico Road, [21.996936 -99.006622], 31 August 1955, 100 m., T. J. Cohn [12 males, 9 females] (UMMZ); El Pujal, [21.848364 -98.940250], 18 July 1939, 100 ft., Ralph Haag [1 male] (UMMZ); El Salto [Cascadas El Salto], R. Naranjo valley [20 air mi. WNW. Antiguo Morelos], [22.587420 -99.378933], 3 September 1947, 2000 ft., P. P. Dowling, #47 [1 male, 1 female] (UMMZ); El Salto de Agua, R. Naranjo valley [20 air mi. WNW. Antiguo Morelos], [22.583168 -99.399784], 20 June 1948, 2000 ft., T. H. Hubbell, #47 [1 female] (UMMZ); Pujal, [21.848364 -98.940250], 12-13 June 1948, H. O. Wagner [1 male, 1 female] (UMMZ); *San Luis Potosi* or *Tamaulipas*: Vicinity of Llera or Xilitin, 2 September 1955, T. J. Cohn, [2 females] (UMMZ); *Tamaulipas*: 6.6 mi. W. of Antigua[o] Morelos, [22.555495 -99.167546], 3 September 1962, 1400 ft., Naumann and Ordway [1 male, 1 female] (ANSP); 0.6 mi. N. Villagran, [24.482058 -99.485528], 11 October 1977, 1380 ft., T. J. & J. W. Cohn, #107 [13 males, 6 females] (UMMZ); 1.6 mi. E. highway bridge at Llera, [23.313367, -98.978033}, 26 August 1955, [830 ft.], T. J. Cohn [2 males, 2 females] (UMMZ); 10 mi. N. river at Ciudad Victoria, [23.865511 -99.113286], 2 September 1955, 100-200 m., T. J. Cohn [1 female] (UMMZ); 11.64 km. NE. Ciudad Victoria (center) Hwy. 101, 23.828917 -99.069333, 4 October 2004, 224 m., Fontana, Battiston, Agatibi, Garcia, #38 [7 males, 3 females] (UMMZ); 14 mi. N. highway bridge at Llera, [23.485044 -98.977533], 2 September 1955, 3-500 m., T. J. Cohn [2 females] (UMMZ); 16 mi. SSW. San Fernando, [24.652456 -98.285953], 24 August 1955, 100 m., T. J. Cohn [2 males, 1 female] (UMMZ); 17 mi. N. Victoria, Rio Santa Engracia, [23.968300 -99.105378], 17 July 1941, I. J. Cantrall & J. Friauf, #12 [3 males, 1 female] (UMMZ); 17 mi. SSW. Matamoros, [25.633622 -97.620492], 23 August 1955, 0-100 m., T. J. Cohn [8 males, 5 females] (UMMZ); 18 rd. mi. SW. Ciudad Victoria, [23.617536 -99.265010], 16 August 1959, *ca.* 2950 ft., T. J. Cohn, #185 [1 male] (UMMZ); 2 mi. N. Ciudad Victoria, [23.782897 -99.136906], 10 August 1958, T. H. Hubbell, #9 [1 female] (UMMZ); 2 mi. SE. Hacienda La Clementina, 13 mi. E. Llera, [23.269867 -98.834900], 3 October 1958, 1500 ft., T. J. Cohn, #160 [2 males, 1 female] (UMMZ); 2 mi.+/- SE. Altamira, [22.380461 -97.912664], 10 October 1958, 100 ft., T. J. Cohn, #182 [4 males, 4 females] (UMMZ); 22 mi. NNW. Rio Mante, at Ciudad Mante, [22.845836 -99.195950], 26 August 1955, 100-200 m., T. J. Cohn [2 males, 3 females] (UMMZ); 25 mi. S. Llera, [23.028667 -99.094267], 2 September 1955, 100-200 m., T. J. Cohn [1 male, 1 female] (UMMZ); 3.4 km SW of Hwy Bridge at Llera Hwy. 85, 23.294444 -99.02725, 4 October 2004, 299 m., Fontana, Battiston, Agatibi, Garcia, #40 [3 males, 2 females] (UMMZ); 30 km SSE. Cuidad [Ciudad] Victoria (center) Hwy. 85, 23.515750 -98.977278, 4 October 2004, 289 m., Fontana, Battiston, Agatibi, Garcia, #39 [3 males, 3 females] (UMMZ); 30 mi. NE. Padilla to Padilla [*ca.* 15 mi. NE. Padilla], [24.132483 -98.578036], 24 August 1955, 100-400 m., T. J. Cohn [11 males, 4 females] (UMMZ); 31 mi. E. Ciudad Mante, [22.815289 -98.510247], 10 October 1958, 300 ft., T. J. Cohn, #180 [2 males, 3 females] (UMMZ); 37 mi. S. Linares, [24.366667 -99.505058], 3 September 1955, 300-500 m., T. J. Cohn [1 female] (UMMZ); 47 mi. E. Ciudad Mante (3 mi. NW. Manuel), [22.756961 -98.340886], 10 October 1958, 350 ft., T. J. Cohn, #181 [1 male] (UMMZ); 5 road mi. N. Rio Guayalejo at Llera, [23.371128 -99.004175], 9 October 1958, 1300 ft., T. J. Cohn, #176 [1 female] (UMMZ); 6 mi. N. Ciudad Victoria, [23.836964 -99.119178], 14 August 1959, *ca.* 100, T. J. Cohn, #179 [1 female] (UMMZ); 6.3 mi.

NE. Antiguo Morelos (on Mante Rd.), [22.607633 -99.023786], 6 July 1964, [805 ft.], T. J. Cohn, #10 [2 males, 2 females] (UMMZ); 9 mi. NNE. Antiguo Morelos, [22.643193 -99.022868], 26 August 1955, 100-200 m., T. J. Cohn [9 males, 5 females] (UMMZ); Bet. Villa Juarez & 35 mi. S., 24 July 1936, 1000-4000 ft., H. R. Roberts [5 males, 5 females] (ANSP); Ciudad Mante, [22.746631 -98.970953], 26 August 1955, 90 m., T. J. Cohn [6 males, 3 females] (UMMZ); Mesa de Llera, [23.612858 -99.293695], 1 August 1938, 2000 ft., H. R. Roberts [1 male, 1 female] (ANSP); Victoria, [23.738653 -99.140507], 18 July 1956, W. J. Gertsch [2 males] (UMMZ); Victoria, [23.738653 -99.140507], 22 May 1952, W. J. Gertsch, R. Schrammel [1 female] (UMMZ); *Veracruz*: 12 mi. W. Tampico plaza, [22.194362 -98.014581], 31 August 1955, 0-50 m., T. J. Cohn [5 males, 1 female] (UMMZ); 21.9 mi. W. Vera Cruz [Veracruz] on CN. 2, [19.265420 -96.378076], 8 August 1948, 600 ft., P. P. Dowling, #29 [3 males, 1 female] (UMMZ); 24 mi. WSW. Tampico plaza, [22.192450 -98.433514], 31 August 1955, 50 m., T. J. Cohn [4 males, 6 females] (UMMZ); Plan de Rio, [19.402811 -96.652383], 26 July 1956, W. J. Gertsch [3 males, 2 females] (UMMZ); Puente Nationale [12 km. W. Jose Cardel, just S. of Hwy. 140], [19.332914 -96.485219], 9 August 1961, R. K. Dreisbach [2 males, 5 females] (UMMZ); Tolome near Rinconada [*ca.* 42 mi. NW. Vera Cruz], [19.339276 -96.565851], 27 July 1955, P. & C. Vaurie [2 males] (UMMZ); Cotaxtla Exp. Sta., Cotaxtla, [18.834421 -96.390422], 30 July 1962, D. H. Janzen [1 male] (ANSP).

Rhabdocerca caudelli (Rehn and Hebard, 1914)

MATERIAL EXAMINED [84 males, 80 females]: **MEXICO**: *San Luis Potosi*: 0.8 mi. N. Nunez school (on Hwy 57-80), [22.700731 -100.502198], 13 November 1970, [4835 ft.], T. J. & J. W. Cohn, #90 [5 males, 3 females] (UMMZ); 10 mi. NE. San Luis Potosi [0.5 mi. E. Enrique Estrada], [22.276340 -100.856466], 22 August 1954, 6200 ft., R. R. Dreisbach [3 males, 3 females] (UMMZ); 10 mi. NW. El Tepeyac (37 mi. NW. Cd. del Maiz), [22.765200 -100.016792], 22 August 1959, 3400 ft., I. J. Cantrall & T. J. Cohn, #17 [13 males, 11 females] (UMMZ); 12 mi. NE. Villa Hidalgo, [22.577850 -100.620972], 20 August 1959, *ca.* 5000 ft., I. J. Cantrall & T. J. Cohn, #3 [2 males, 2 females] (UMMZ); 12.5 mi. E. Rioverde (on Hwy. 70), [21.895373 -99.809832], 20 November 1970, [4025 ft.], T. J. & J. W. Cohn, #102 [1 male, 5 females] (UMMZ); 15 mi. NE. Villa Hidalgo, [22.598614 -100.580264], 20 August 1959, *ca.* 5000 ft., I. J. Cantrall & T. J. Cohn, #4 [5 males, 7 females] (UMMZ); 15 mi. SW. Villa Hidalgo, [22.308875 -100.833422], 20 August 1959, 6100 ft., I. J. Cantrall & T. J. Cohn, #1 [4 males, 3 females] (UMMZ); 17 mi. E. San Luis Potosi (main plaza), [22.093450 -100.731531], 24 August 1959, 6700 ft., I. J. Cantrall & T. J. Cohn, #23 [1 male, 3 females] (UMMZ); 17 mi. NE. Villa Hidalgo, [22.612767 -100.552319], 20 August 1959, 4950 ft., I. J. Cantrall & T. J. Cohn, #5 [2 males, 6 females] (UMMZ); 19.49 km. ESE. of San Luis Potosi Hwy. 70, 22.110444 -100.775639], 20 September 2004, 1944 m., Fontana, Battiston, Agatibi, Garcia, #29 [6 males, 4 females] (UMMZ); 2 mi. E. Jct. Hwy. 80 & 57, 40 mi. NE. Villa Hidalgo, [22.938283 -100.429578], 21 August 1959, 4550 ft., I. J. Cantrall & T. J. Cohn, #8 [2 males, 1 female] (UMMZ); 2 mi. SW. Villa Hidalgo, [22.432514 -100.703311], 20 August 1959, 5700 ft., I. J. Cantrall & T. J. Cohn, #2 [2 females] (UMMZ); 2.2 air kilometers NW. of Villa Hidalgo on Hwy. 57, 22.466472 -100.689528, 30 September 2004, 1687 m., Fontana, Battiston, Agatibi, Garcia, #30 [7 males, 2 females] (UMMZ); 2.7 mi. SW. Villa Hidalgo, [22.426906 -100.712608], 17 November 1961, [5775 ft.], T. J. Cohn, #211 [5 females] (UMMZ); 21 road mi. E. San Luis Potosi (central plaza), [22.097783 -100.658644], 24 August 1959, 7200 ft., I. J. Cantrall & T. J. Cohn, #24 [2 females] (UMMZ); 38 mi. NE. Villa Hidalgo [0.5 m. W. jct. Hwy. 80 & 57], [22.875242 -100.482944], 20 August 1959, 4700 ft., I. J. Cantrall & T. J. Cohn, #7 [1 female] (UMMZ); 43.1 mi. NW. Ciudad del Maiz, [22.816114 -100.085639], 3 September 1948, P. P. Dowling, #45 [1 male] (UMMZ); 44.3 km. NE. of Villa Hidalgo on Hwy 57, 22.741861 -100.494361, 28 September 2004, 1450 m., Fontana, Battiston, Agatibi, Garcia, #22 [8 males, 8 females] (UMMZ); 6.5 km. NW. of Alaquines, 22.157972 -99.645694, 29 September 2004, 1184 m., Fontana, Battiston, Agatibi, Garcia, #25 [10 males, 4 females] (UMMZ); 7 mi. NW. El Tepeyac (34 mi. NW. Ciudad Maiz) (jct. Tule-Jaumave Rd.), [22.737389 -99.980564], 22 August 1959, 3400 ft., I. J. Cantrall & T. J. Cohn, #16 [3 males, 4 females] (UMMZ); 7.1 mi. N. Villa Hidalgo, CN 170, [22.543958 -100.654244], 3 September 1948, *ca.* 5000 ft., P. P. Dowling, #44 [1 male] (UMMZ); 8 mi. E. San Luis Potosi (Main plaza), [22.135025 -100.846792], 26 August 1959, 6150 ft., I. J. Cantrall & T. J. Cohn, #34 [1 male] (UMMZ); km. 160 E. San Luis Potosi, [21.862777 -99.646608], 8 September 1940, 4000 ft., H. R. Roberts [1 male, 1 female] (ANSP); km. 60-75 [68] E. San Luis Potosi, [22.056176 -100.460551], 6 September 1940, 5-6000 ft., H. R. Roberts [7 males, 2 females] (ANSP); Nunez, 22 mi. NE. Villa Hidalgo [0.8 mi. E. Nunez?], [22.700731 -100.502198], 27 August 1959, 4900 ft., I. J. Cantrall & T. J. Cohn, #37 [1 male, 1 female] (UMMZ).

Rhabdocerca tridactyla (Rehn and Hebard, 1914)

MATERIAL EXAMINED [250 males, 288 females]: **MEXICO**: *Coahuila*: 0.6 mi. S. Puerto Flores, (11.1 rd. mi. SE. Arteaga), [25.321805 -100.800472], 21 August 1961, 7040 ft., Cantrall, Cohn, Hubbell, #25 [5 males, 5 females] (UMMZ); 10 mi. SE. Arteaga (Puerto Flores), [25.336980 -100.795366], 5 August 1959, 6800 ft., T. J. Cohn, #142 [2 males] (UMMZ); 11 rd. mi. SE. Arteaga [mixed with #141 (21 rd. mi. SE. Arteaga)], [25.322961 -100.800155], 4 August 1959, 6700 ft., T. J. Cohn, #140 [5 males, 3 females] (UMMZ);

11 rd. mi. SE. Arteaga [mixed with #162 (20 rd. mi. SE. Arteaga)], [25.322961 -100.800155], 10 August 1959, 6800 ft., T. J. Cohn, #161 [10 males, 10 females] (UMMZ); 18.6 road mi. S. Arteaga, [25.229305 -100.777968], 20 August 1961, 6850 ft., Cantrall, Cohn, Hubbell, #21 [7 males, 3 females] (UMMZ); 20 rd. mi. SE. Arteaga, [25.217886 -100.760169], 10 August 1959, 6400 ft., T. J. Cohn, #162 [9 males, 9 females] (UMMZ); 20 rd. mi. SE. Arteaga (San Luis Potosi rd.), [25.217886 -100.760169], 26 September 1958, 6200 ft., T. J. Cohn, #141 [21 males, 17 females] (UMMZ); 21 rd. mi. SE. Arteaga [mixed with #140, (11 rd. mi. SE. Arteaga)], [25.208204 -100.747274], 4 August 1959, 6550 ft., T. J. Cohn, #141 [4 males, 3 females] (UMMZ); 22 rd. mi. SE. Arteaga, (San Luis Potosi road), [25.192466 -100.73589], 27 September 1958, 6200 ft., T. J. Cohn, #144 [2 males, 2 females] (UMMZ); 27 rd. mi. SE. Arteaga, [25.159566 -100.708027], 10 August 1959, 6200 ft., T. J. Cohn, #163 [1 male, 2 females] (UMMZ); 29 rd. mi. SE. Arteaga, [25.138461 -100.684013], 10 August 1959, 6150 ft., T. J. Cohn, #164 [4 males, 2 females] (UMMZ); 4 mi. E. Los Lirios, (Derramadero), [25.384207 -100.527123], 19 October 1974, 7100 ft., T. J. & J. W. Cohn, #86 [1 female] (UMMZ); 40 rd. mi. SW. Saltillo, [24.904188 -101.083658], 5 August 1959, 5700 ft., T. J. Cohn, #143 [2 males] (UMMZ); 5.5 mi. E. Los Lirios, [25.376502 -100.504207], 19 October 1974, 7760 ft., T. J. & J. W. Cohn, #85 [6 males, 8 females] (UMMZ); 6 mi. W. Saltillo, [25.451956 -101.081908], 15 July 1936, 5000 ft., H. R. Roberts [1 male, 1 female] (ANSP); 6.6 mi. S. Puerto Flores (16.8 mi. S. Arteaga), [25.246180 -100.794915], 21 August 1961, 6740 ft., Cantrall Cohn, Hubbell, #26 [10 males, 5 females] (UMMZ); 9 mi. N. Concepcion del Oro, [24.686533 -101.430064], 6 August 1959, 4950 ft., T. J. Cohn, #147 [2 males, 1 female] (UMMZ); 9 mi. W. Saltillo (18 mi. E La Rosa), [25.458550 -101.142333], 22 August 1961, 5500 ft., Cantrall, Cohn, Hubbell, #29 [2 males] (UMMZ); Arteaga, 17 km. SSE., [Puerto Flores], 25.338667 -100.795111, 5 October 2004, 2126 m., Fontana, Battiston, Agatibi, Garcia, #44 [1 female] (UMMZ); *Durango*: 5 mi N. Cuencame, Mex. 40, [24.930753 -103.708984], 30 August 1964, 5200 ft., Rentz, Rentz, Grant [14 males, 31 females] (ANSP); Durango: 5 mi N. Cuencame on Hwy. 40, [24.930753 -103.708984], 30 August 1964, 5200 ft., D. C. & K. A. Rentz, H. J. Grant [5 males, 8 females] (UMMZ); *Nuevo Leon*: 6 km. S. Galeana, [24.777358 -100.043835], 4 June 1966, J. E. Raddell [1 female] (UMMZ); Ojo de Agua, Galeana; in cornfield, [24.823897 -100.074272], 18 August 1938, H. Hoogstral [3 males, 1 female] (UMMZ); 0.5 mi. W. Iturbide, [24.734658 -99.908225], 11 August 1959, 5000 ft., T. J. Cohn, #168 [2 males] (UMMZ); 1.7 mi. W. Santa Catarina, [25.684364 -100.492856], 8 August 1959, 2380 ft., T. J. Cohn, #155 [1 female] (UMMZ); 10 mi. NW. Montemorelos, [25.246856 -99.957217], 29 September 1958, 2000 ft., T. J. Cohn, #155 [2 males] (UMMZ); 10 rd. mi. E. Iturbide, [24.744189 -99.774986], 11 August 1959, 2700 ft., T. J. Cohn, #171 [1 male, 1 female] (UMMZ); 15.3 mi. W. Galeana, [24.679807 -100.146364], 21 August 1961, 6850 ft., Cantrall, Cohn, Hubbell, #28 [1 female]; 16.1 km E. Tokio on Hwy. 31 (124.5 air km SE Saltillo), 24.693528 -100.091528, 1 October 2004, 1896 m., Fontana, Battiston, Agatibi, Garcia, #32 [6 males, 1 female] (UMMZ); 17.3 air km. W. (Villa de) Santiago road Santiago to Los Lirios, San Juan Batista (17.26 air km. W. (Villa de) Santiago), 25.393750 -100.302333, 7 October 2004, 1474 m., Fontana, Battiston, Agatibi, Garcia, #46 [1 male] (UMMZ); 18 mi. W. Galeana (on Hwy. 60), [24.689406 -100.182124], 20 August 1964, [6780 ft.], T. J. Cohn, #63 [8 males, 3 females] (UMMZ); 18.2 air km. W. (Villa de) Santiago Road Santiago-Los Lirios; Cany. San Isidro, 2.1 km. S. San Juan Batista, 25.378444 -100.311417, 6 October 2004, 1480 m., Fontana, Battiston, Agatibi, Garcia, #45 [6 males, 3 females] (UMMZ); 24 mi. NW. Montemorelos, [25.379561 -100.111844], 3 September 1955, 500-800 m., T. J. Cohn [7 males, 8 females] (UMMZ); 4.2 mi. S. El Refugio [de los Ibarra]. 57. 4 mi. N. Matehuala, [24.383843 -100.394015], 19 August 1964, [6050 ft.], T. J. Cohn, #62 [3 males, 3 females] (UMMZ); 4.9 rd. mi. E. Iturbide, [24.744261 -99.833856], 11 August 1959, 4250 ft., T. J. Cohn, #169 [1 male, 2 females] (UMMZ); 5.4 rd. mi. NW. Iturbide, [24.743861 -99.977436], 11 August 1959, 5850 ft., T. J. Cohn, #167 [1 female] (UMMZ); 7 mi. SE. La Paz (70 rd. mi. SE. Saltillo), [24.879164 -100.386528], 26 December 1958, 5900 ft., T. J. Cohn, #393 [1 female] (UMMZ); 7 rd. mi. SE. Galeana, [24.758218 -99.998615], 11 August 1959, 5350 ft., T. J. Cohn, #166 [2 males, 2 females] (UMMZ); 7.0 km. E. of San Roberto Hwy 31, 113.17 air km SE Saltillo, 24.685917 -100.216500, 1 October 2004, 1932 m., Fontana, Battiston, Agatibia, Garcia, #31 [1 male, 3 females] (UMMZ); Cerro Potosi, 12.6 rd. mi. NW. Galeana (3.3 rd. mi. NW. 18 Marzo, km. 5), [24.869978 -100.219597], 22 October 1974, 7700 ft., T. J. & J. W. Cohn, #90B [1 male, 4 females] (UMMZ); Cerro Potosi, NE. slope (14.22 air km. NW. Galeana), 24.888222 -100.198167, 1 October 2004, 2371 m., Fontana, Battiston, Agatibi, Garcia, #33 [3 males, 2 females] (UMMZ); Hac. Vista Hermosa [3 mi. W. El Cercado], Villa de Santiago, [25.408491 -100.174827], 9 August 1939, Hoogstraal [1 female] (UMMZ); Horse Tail Falls, 5 mi. SW. Villa Santiago, [25.362617 -100.163100], 29 September 1958, 2300 ft., T. J. Cohn, #151 [2 males, 2 females] (UMMZ); near Rayones, [25.013747 -100.076178], 17 July 1938, H. Hoogstraal [1 male, 1 female] (UMMZ); nr. Monterrey, [25.663803 -100.254091], 17-20 June 1934, H. A. Pilsbry [1 male] (ANSP); Ojo de Agua, Galeana, [24.823897 -100.074272], 21 August 1938, H. Hoogstraal [1 male, 1 female] (UMMZ); Rd. Santiago to Los Lirios, Cola del Caballo W., 25.370889 -100.200194, 30 June 2005, 1508 m., Fontana, Battiston, Agatibi, Garcia [1 male, 2 females] (UMMZ); Road from (Villa de) Santiago to Los Lirios (8.9 air km. WSW. Villa de Santiago), 25.375194 -100.211861, 5 October 2004, 1350 m., Fontana, Battiston, Agatibi, Garcia, #42 [2 males, 6 females] (UMMZ); Cola de Caballo Falls, (5.4 rd. mi. S. Villa de Santiago), [25.362617 -100.163100], 21 November 1961,

[2300 ft.], T. J. Cohn, #222 [1 female] (UMMZ); *Queretaro*: 29 mi. N. Queretero [Queretaro], [20.968383 -100.429461], 15 October 1958, 6750 ft., T. J. Cohn, #193 [1 male] (UMMZ); *San Luis Potosi*: 46 mi. N. San Luis Potosi, [22.832204 -101.081128], 1 September 1958, H. Howden [2 males, 1 female] (UMMZ); 0.8 mi. N. Nunez school (on Hwy 57-80), [22.700731 -100.502198], 13 November 1970, [4835 ft.], T. J. & J. W. Cohn, #90 [9 males, 2 females] (UMMZ); 10 mi. NE. San Luis Potosi [0.5 mi. E. Enrique Estrada], [22.276340 -100.856466], 22 August 1954, 6200 ft., R. R. Dreisbach [1 male) (UMMZ); 38 mi. NE. Villa Hidalgo [0.5 m. W. jct. Hwy. 80 & 57], [22.875242 -100.482944], 20 August 1959, 4700 ft., I. J. Cantrall & T. J. Cohn, #7 [1 male, 1 female] (UMMZ); 44.3 km. NE. of Villa Hidalgo on Hwy 57, 22.741861 -100.494361, 28 September 2004, 1450 m., Fontana, Battiston, Agatibi, Garcia, #22 [2 females] (UMMZ); Carr. 57 entre Matehuala y el Huizache, 23.223889 -100.541102, 13 September 2009, 1341 m., Barrientos & Ramirez [1 male, 1 female] (UMMZ); 12 mi. NE. Villa Hidalgo, [22.577850 -100.620972], 20 August 1959, *ca.* 5000 ft., I. J Cantrall & T. J. Cohn, #3 [5 males, 5 females] (UMMZ); 15 mi. NE. Villa Hidalgo, [22.598614 -100.580264], 20 August 1959, *ca.* 5000 ft., I. J. Cantrall & T. J. Cohn, #4 [3 males, 4 females] (UMMZ); 17 mi. NE. Villa Hidalgo, [22.612767 -100.552319], 20 August 1959, 4950 ft., I. J. Cantrall & T. J. Cohn, #5 [8 males, 13 females] (UMMZ); 25 mi. NE. Villa Hidalgo, [22.711419 -100.499031], 18 October 1958, 5100 ft., T. J. Cohn, #207 [4 males, 4 females] (UMMZ); Nunez [0.8 mi. E. Nunez?], 22 mi. NE. Villa Hidalgo, [22.700731 -100.502198], 27 August 1959, 4900 ft., I. J. Cantrall & T. J. Cohn, #37 [7 males, 5 females] (UMMZ); Nunez [0.8 mi. E. Nunez], 22 mi. NE. Villa Hidalgo, [22.700731 - 100.502198], 20 August 1959, 4900 ft., I. J. Cantrall & T. J. Cohn, #6 [6 males, 5 females] (UMMZ); *Zacatecas*: 1.2 mi. W. Camacho, [24.433658 -102.387877], 10 November 1970, 1700 m., T. J. & J. W. Cohn, #84 [5 males, 27 females] (UMMZ); 14.3 E. Salinas (S.L.P.) on Hwy. 49 (4.8 mi. E. El Tecomate), [22.501631 -101.56795], 24 October 1974, 7500 ft., T. J. & J. W. Cohn, #94, [12 males, 32 females] (UMMZ); 14.8 mi. NE. Nieves (42.8 mi SW Camacho), [24.156933 -102.981724], 10 November 1970, [6050 ft.], T. J. & J. W. Cohn, #85 [10 males, 9 females] (UMMZ); 17 mi. SW. Camacho, [24.309779 -102.589687], 10 November 1970, 1900 m., T. J. & J. W. Cohn, #83 [5 males, 13 females] (UMMZ); 35.6 mi. S. Concepcion del Oro (1.4 mi. N. turn to San Tiburcio), [24.207159 -101.460274], 22 August 1965, 6100 ft., T. J. Cohn, #60 [2 males] (UMMZ); 19 mi. S. Ojo Caliente [Aguascalientes], [21.702643 -102.875424], 20 October 1958, 6600 ft., T. J. Cohn, #213 [1 male] (UMMZ).

Rhabdocerca zanclophora n. sp.

MATERIAL EXAMINED [12 males, 9 females]: **MEXICO**: *San Luis Potosi*: 17 km. NW. Ciudad Maiz on Hwy 80 (1.7 km. NW. Puerto Rinconada), 22.477583 -22.477583, 29 September 2004, 1176 m., Fontana, Battiston, Agatibi, Garcia, #24 [1 male, 1 female] (UMMZ); 6 mi. [N.] W. Ciudad Maiz, [22.454331 -99.672775], 9 September 1940, 4500 ft., H. R. Roberts [1 male] (ANSP); 11 mi. NW. Ciudad del Maiz, [22.495983 -99.741651], 28 August 1955, 1100-1200 m., T. J. Cohn [1 male] (UMMZ); 12 mi. NW. Ciudad del Maiz, [22.505033 -99.753058], 28 August 1955, 1100-1200 m., T. J. Cohn [8 males, 3 females, including holotype and allotype] (UMMZ); 12 rd. mi. NW. Ciudad del Maiz (1 mi. S. Montebello), [22.505033 -99.753058], 22 August 1959, 3450 ft., I. J. Cantrall & T. J. Cohn, #18 [1 male, 2 females] (UMMZ).

Dichopetala mexicana Brunner, 1878

MATERIAL EXAMINED [123 male, 70 female]: **MEXICO**: *Guerrero*: (19 mi. W. Iguala on Arcelia Rd.), [18.426938 -99.731922], 21 September 1959, 4250 ft., I. J. Cantrall & T. J. Cohn, #157, [23 males, 15 females] (UMMZ); 1.6 mi. NE. Cocula, [18.262172 -99.654242], 21 September 1959, 2150 ft., I. J. Cantrall & T. J. Cohn, #159, [4 males, 3 females] (UMMZ); 11 mi. S. Iguala, [18.213603 -99.536236], 9 December 1958, 2800 ft., T. J. Cohn, #364 [7 males, 3 females] (UMMZ); 12 rd. mi. NW. Iguala [6.7 rd. mi. NW. Naranjo], [18.506897 -99.607778], 7 December 1958, 3750 ft., T. J. Cohn, #358 [1 female] (UMMZ); 16 rd. mi. ENE. Taxco (4.7 rd. mi. NW. [NE.} Acuitlapan) on Hwy. 95, [18.60927 -99.528768], 16 September 1959, 4000 ft., I. J. Cantrall & T. J. Cohn, #135 [2 males, 1 female] (UMMZ); 21 me. W. Iguala, [18.364272 -99.758919], 21 September 1959, 4100 ft., I. J. Cantrall & T. J. Cohn, #156 [1 male] (UMMZ); 9 mi. NE. Taxco (1.7 rd. mi. SW Acuitlapan), 18.575300 -99.578672], 16 September 1959, 5700 ft., I. J. Cantrall & T. J. Cohn, #136 [5 males] (UMMZ); 9 mi. NE. Taxco (1.7 rd. mi. SW Acuitlapan), [18.575300 -99.578672], 16 September 1959, 5700 ft., I. J. Cantrall & T. J. Cohn, #137 [5 males, 1 female] (UMMZ); Cachuamilpa, [18.683300 -99.500000], 5 October 1958, 3800 [ft.], F. G. Matthews [1 female] (UMMZ); Cocula, [18.233333 -99.666667], 30 October 1947, *ca.* 600 m., H. O. Wagner [2 males] (UMMZ); Km. 215 btw. Iguala & R. Balsas, [18.148140 -99.552708], 13 September 1940, 2500 [ft.], H. R. Roberts [1 female] (ANSP); Teloloapan, [18.365636 -99.873858], 3-7 November 1947, *ca.* 1200 m., H. O. Wagner [1 male, 4 females] (UMMZ); *Morelos*: 10 mi. N. Cuernavaca, [19.040562 -99.261261], 23 December 1950, Ray F. Smith, [1 female] (UMMZ); 3 km. N. of Amacuzac, [18.619306 -99.368861], 21 September 2004, 988 m., Fontana, Battiston, Agatibi, Garcia, #3 [3 males] (UMMZ); 9 mi. S. Cuernavac, (on Hwy. 95), [18.793728 -99.240658], 16 September 1959, 3950 ft., I. J. Cantrall & T. J. Cohn, #134 [2 males, 1 female] (UMMZ); Cuernavaca, [18.882100 -99.213687], 12 September 1940, 4500 [ft.], H. R. Roberts [2 males] (ANSP); Cuernavaca, [18.882100 -99.213687], 1 September 1936, 4500 [ft.], H. R.

Roberts [1 male] (ANSP); *Oaxaca*: Huajuapan [de Leon?], [17.806503 -97.781681], 13 September 1948, 1597 m., H. O. Wagner, #12-16 [6 males, 1 female] (UMMZ); Valerio Trujano, [17.753401 -96.921136], 27 July 1937, 3800 [ft.], A. R. Mead [1 male] (ANSP); *Puebla*: 1.2 mi. NW. Petlalcingo, [18.085033 -97.932061], 9 September 1961, 5220 ft., Hubbell, Cantrall, Cohn, #86 [9 males, 8 female] (UMMZ); 1.2 mi. NW> Tehuitzingo, on Hwy. 190, [18.344303 -98.289617], 16 September 1959, 3550 ft., I. J. Cantrall & T. J. Cohn, #129 [3 males, 1 female] (UMMZ); 10 km. SE. Acatlan on Hwy. 190, 18.140778 -98.011528, 16 October 2004, 1350 m., Fontana, Battiston, Agatibi, Garcia, #68 [2 males, 4 females] (UMMZ); 11 km. SE. Izucar de Matamoros on Hwy. 190, 18.537417 -98.430861, 16 October 2004, 1330 m., Fontana, Battiston, Agatibi, Garcia, #67 [6 males, 7 females] (UMMZ); 3 km. W. Cacaloapan at Km. 226 (11 km. SE. Tlacotepec), [18.585794 -97.614256], 1 September 1959, 6250 ft., I. J. Cantrall & T. J. Cohn, #60 [9 males, 2 females] (UMMZ); 3 mi. SE. Petlalcingo [mislabelled? prob. from 31 SE. Nochixtlan,7650 ft.,Cantrall Cohn #124], [18.063744 -97.877239], 15 September 1959, 4900 ft., I. J. Cantrall & T. J. Cohn, #126 [2 males] (UMMZ); 6 mi. NW. Petlalcingo, [18.128361 -97.971408], 15 September 1959, 5750 ft., I. J. Cantrall & T. J. Cohn, #127 [2 males, 2 females] (UMMZ); 6 mi. SE. Izucar de Matamoros (on Hwy. 190), [18.526992 -98.419206], 16 September 1961, 4550 ft., I. Cantrall, T. J. Cohn, #131 [1 male] (UMMZ); 6.3 mi. SE. Acatlan, [18.140451 -98.006152], 9 September 1961, 5160 ft., Hubbell, Cantrall, Cohn, #85 [2 males] (UMMZ); 7.7 mi. SE. Izucar de Matamoros, [18.512764 -98.418783], 8 September 1961, 5120 ft., Hubbell, Cantrall, Cohn, #84 [4 males] (UMMZ); Ixtapan de la Sal, [18.833300 -99.683300], 8 October 1958, 6000 ft., F. G. Matthews [1 female] (UMMZ); Matamoros, [18.603394 -98.464903], 8-9 September 1948, H. O. Wagner, #3 [2 males, 2 females] (UMMZ); 0.6 mi. S. Ajalpan, [18.364598 -97.251625], 1 September 1959, 4100 ft., I. J. Cantrall & T. J. Cohn, #61 [1 male, 1 female] (UMMZ); Acatlan, [18.204922 -98.049081], 11 September 1948, H. O. Wagner, #7 [4 males, 1 female] (UMMZ); Acatlan, [18.204922 -98.049081], 11 September 1948, H. O. Wagner, #8 [2 females] (UMMZ); Acatlan, [18.204922 -98.049081], 11 September 1948, H. O. Wagner, #9 [1 male] (UMMZ); *Veracruz*: Rd. N. Tehuacan, Pbla. to Orizaba, [18.852334 -97.275725], 1 September 1936, 5500 ft., H. R. Roberts [1 male] (UMMZ); Km. 226 NW. Tehuacan, Pbla., [18.851261 -97.274275], 23 August 1936, 6500 ft., H. R. Roberts [6 males, 5 females] (ANSP, UMMZ); Km. 226 NW. Tehuacan, Pbla., [18.851261 -97.274275], 25 August 1936, 6500 ft., H. R. Roberts [1 male] (ANSP); Km. 226 NW. Tehuacan, Pbla., [18.851261 -97.274275], 16 August 1938, 6500 ft., H. R. Roberts [1 male] (ANSP); La Cumbre above Acultzingo, [18.726065 -97.323078], 1 September 1936, 6000 ft., H. R. Roberts [1 male, 1 female] (ANSP, UMMZ).

Gymnocerca cycloprista n. sp.

MATERIAL EXAMINED [48 male, 30 female]: **MEXICO**: *Sinaloa*: 13 mi. SSE. Culiacan, [24.604561 -107.239563], 4 September 1957, 0-100 m., T. J. Cohn & E. R. Tinkham, #104 [1 male] (UMMZ); 19.9 mi. SE. Culiacan [from plaza] on Hwy. 15, [24.567108 -107.209106], 31 August 1961, 280 ft., Cantrall, Cohn, Hubbell, #59 [2 females] (UMMZ); 2 km. S. of Tabala on Hwy. 15 Libre, 24.427611 -107.092528, 11 October 2004, 96 m., Fontana, Battiston, Agatibi, Garcia, #61 [6 males, 1 female] (UMMZ); 24 rd. mi. SW. Cosala Church, [24.157035 -106.744035], 22 November 1972, Julian C. Lee, #33 [1 male] (UMMZ); 30 mi. S. Culiacan on Hwy. 15, [24.454225 -107.106389], 30 August 1965, [256 ft.], T. J. Cohn, #85 [8 males, 4 females] (UMMZ); 31.5 mi. SE. Culiacan Cathedr. [on Hwy. 15] (0.6 mi. N. Rio San Lorenzo), [24.436789 -107.094531], 27 August 1971, [235 ft.], T. J. & J. W. Cohn, #10 [7 males, 7 females, including holotype and allotype] (UMMZ); 33 mi. SE. Culiacan, (1.5 mi. S. Rio Tabala), [24.416219 -107.093261], 6 November 1958, 200 ft., T. J. Cohn, #260, [2 males] (UMMZ); 37 mi. SE. Culiacan, [24.357884 -107.097452], 28 October 1958, 100 ft., T. J. Cohn, #233 [1 male] (UMMZ); 38 mi. SSE. Culiacan, [24.343703 -107.094675], 4 September 1957, 0-100 m., T. J. Cohn & E. R. Tinkham, #103 [7 males, 1 female] (UMMZ); 39.9 mi. SE. Culiacan on Hwy. 15, [24.330769 -107.090222], 31 August 1961, 230 ft., Cantrall, Cohn, Hubbell, #60 [7 males, 6 females] (UMMZ); 44 mi. S. Culiacan Cathedr. on Hwy. 15 (11.4 mi. S. Rio San Lorenzo), [24.285894 -107.083072], 25 November 1974, T. J. & J. W. Cohn, #143 [2 males, 3 females] (UMMZ); 66 mi. SE. Culiacan, (2 mi. SE. Abuya), [24.080961 -106.813103], 6 November 1958, [350 ft.], T. J. Cohn, #258 [2 males, 3 females] (UMMZ); 7.2 mi. SE. Culiacan (Cerro Tule rd.); [24.731934 -107.325556], 5 September 1966, [1415 ft.], T. J. Cohn, #38, [1 male] (UMMZ); 75 mi. SE. Culiacan (3.5 mi. N. Rio Elota on Hwy. 15), [23.957797 -106.715911], 22 November 1974, 250 ft., T. J. & J. W. Cohn, #141 [1 female] (UMMZ); 84 mi. SE. Culiacan, [23.894133 -106.635458], 31 October 1958, 200 ft., T. J. Cohn, #244 [1 female] (UMMZ); Summit Cerro Tule, 7 mi. SE. Culiacan, [24.731934 -107.325556], 14 October 1970, [1415 ft.], T. J. & J. W. Cohn, #57 [3 males, 1 female] (UMMZ).

Gymnocerca enaulites n. sp.

MATERIAL EXAMINED [57 male, 21 female]: **MEXICO**: *Guerrero*: (19 mi. W. Iguala on Arcelia Rd.), [18.426938 -99.731922], 21 September 1959, 4250 ft., I. J. Cantrall & T. J. Cohn, #157 [1 male] (UMMZ); (2 mi. S. Rio de las Balsas), 36 mi. S. Iguala, [17.895981 -99.579219], 9 December 1958, 1550 ft., T. J. Cohn, #365 [1 male] (UMMZ); 0.5 mi. E. Petaquillas, [17.484382 -99.450546], 19 September 1959, 4100 ft., I. J. Cantrall & T. J. Cohn, #151 [1 male] (UMMZ); 1.6 mi. NE. Cocula, [18.262172 -99.654242], 21

September 1959, 2150 ft., I. J. Cantrall & T. J. Cohn, #159 [2 males, 1 female] (UMMZ); 11 mi. S. Iguala, [18.213603 -99.536236], 9 December 1958, 2800 ft., T. J. Cohn, #264 [12 males, 9 females, including holotype and allotype] (UMMZ); 12 rd. mi. NW. Iguala [6.7 rd. mi. NW. Naranjo], [18.506897 -99.607778], 7 December 1958, 3750 ft., T. J. Cohn, #358 [4 males] (UMMZ); 2.4 mi. SW. Almolonga (9.4 mi.NE. Tixtla), [17.609750 -99.311580], 18 September 1959, 5700 ft., I. J. Cantrall & T. J. Cohn, #143 [1 male, 1 female] (UMMZ); 3 rd. mi. SW. Almolonga (8 mi. NE. Tixtla), [17.601636 -99.316276], 18 September 1959, 5400 ft., I. J. Cantrall & T. J. Cohn, #144 [1 male] (UMMZ); 36.7 mi. S. Iguala (on CN. 3), [17.889492 -99.577514], 15 August 1948, P. P. Dowling, #34 [females] (UMMZ); 4 mi. SE. Chilpancingo, [17.482725 -99.442383], 12 December 1958, 3750 ft., T. J. Cohn, #372 [3 males, 2 females] (UMMZ); 5.5 mi. S. Rio de las Balsas on Hwy. 95, (28 mi. N. Chilpancingo), [17.865009 -99.573074], 17 September 1959, 2400 ft., I. J. Cantrall & T. J. Cohn, #139 [1 male, 1 female] (UMMZ); 6 mi. W. Iguala, [18.322817 -99.612642], 7 December 1958, 2350 ft., T. J. Cohn, #359 [1 male] (UMMZ); Iguala, [18.355867 -99.537217], 27-29 October 1947, 730 m., H. O. Wagner [11 males, 4 females] (UMMZ); *Michoacan*: 20 mi. E. Nueva Italia (on La Huacana Rd.), [18.939944 -101.890114], 25 September 1959, 700 ft., I. J. Cantrall & T. J. Cohn, #174 [1 male] (UMMZ); 19.2 mi. S. Nueva Italia (on Arteaga Rd.), [18.794155 -102.092411], 26 September 1959, 1000 ft., I. J. Cantrall & T. J. Cohn, #184 [2 males] (UMMZ); 31 mi. S. Nueva Italia (on Arteaga Rd.), [18.717688 -102.017733], 26 September 1959, 550 ft., I. J. Cantrall & T. J. Cohn, #182 [2 males] (UMMZ); *Puebla*: 10 km. SE. Acatlan on Hwy. 190, 18.140778 -98.011528, 16 October 2004, 1350 m., Fontana, Battiston, Agatibi, Garcia, #68 [2 males] (UMMZ); 6 mi. NW. Acatlan, [18.211109 -98.106659], 18 December 1958, 4050 ft., T. J. Cohn, #379 [1 male] (UMMZ); 6 mi. NW. Petlalcingo on Hwy. 190, [18.128361 -97.971408], 15 September 1959, 5750 ft., I. J. Cantrall & T. J. Cohn, #127 [10 males, 1 female] (UMMZ).

Gymnocerca falcata (Rehn and Hebard, 1914)

MATERIAL EXAMINED [62 male, 32 female]: **MEXICO**: *Jalisco*: 1.4 mi. SE. Amatitan, [20.815025 -103.716019], 2 October 1959, 4500 ft., T. J. Cohn, #202 [4 males, 2 females] (UMMZ); 11.1 mi. E. Ixtlan del Rio (Nayarit), [21.005269 -104.214175], 4 October 1970, [3770 ft.], T. J. & J. W. Cohn, #47 [8 males, 11 females] (UMMZ); 11.7 rd. mi. E. Bridge at Plan de Barrancas, [20.977507 -104.050742], 27 August 1965, T. J. Cohn, #74 [2 males] (UMMZ); 12.4 rd. mi. E. Ixtlan del Rio on Hwy 15, [21.006876 -104.201671], 2 September 1961, 2900 ft., Cantrall, Cohn, Hubbell, #70 [1 female] (UMMZ); 14 km. E. Ixtlan Del Rio on Hwy. 15 Libre, "Puente El Portezuelo", 21.038694 -104.249194, 13 October 2004, 1287 m., Fontana, Battiston, Agatibi, Garcia, #62 [5 males, 4 females] (UMMZ); 14.3 rd. mi. S. Ixtlahuacan del Rio (1.3 rd. mi. S. Rio Verde Bridge), [20.720867 -103.281714], 1 November1974, 3380 ft., Cohn & Cohn, #119 [1 male] (UMMZ); 14.7 mi. E. Ixtlan Del Rio [Nayarit], [21.014668 -104.180920], 29 August 1968, [3550 ft.], T. J. Cohn, #23 [2 males] (UMMZ); 21.6 mi. SE. Tequila (8.2 mi.SE. Arenal), [20.733631 -103.57695], 27 August 1965, T. J. Cohn, #71 [4 males] (UMMZ); 3 mi. SE. Tequila, [20.870017 -103.794508], 22-23 November 1958, 4100 ft., T. J. Cohn, #307 [3 males, 4 females] (UMMZ); 3.1 mi. NW. Tequila, [20.922594 -103.85795], 3 September 1961, 4120 ft., Cantrall, Cohn, Hubbell, #74 [3 males, 1 female] (UMMZ); 6.2 mi. SW. Autlan Plaza, [19.703650 -104.358603], 5 October 1970, [3125 ft.], T. J. & J. W. Cohn, #41 [7 males, 4 females] (UMMZ); *Nayarit*: 12 mi. SE. Tepic, [21.413132 -104.763963], 7 October 1970, T. J. & J. W. Cohn, #48 [1 male, 1 female] (UMMZ); 8.8 mi. E. Ixtlan del Rio [prob. on Hwy. 15], [21.026832 -104.232525], [2]23 September 1961, I. J. Cantrall, T. J. Cohn, S. P. Hubbell, #69 [22 males, 4 females] (UMMZ).

Mactruchus durangensis (Rehn and Hebard, 1914)

MATERIAL EXAMINED [89 males, 71 females]: **MEXICO**: *Durango*: 12 mi. NW. Canatlan, [24.657168 -104.841296], 19 October 1977, T. J. & J. W. Cohn, #118 [1 female] (UMMZ); 137 mi. NE. Villa Union (Sinaloa) [16 mi. E. El Salto], [23.902055 -105.159388], 29 August 1964, 7000 ft., D. C. & K. A. Rentz, H. J. Grant [2 males, 1 female] (UMMZ); 17 mi. SW. F.I. Madero, [24.216461 -104.490008], 5 September 1968, [6100 ft.], T. J. Cohn, #35 [10 males, 22 females] (UMMZ); 17.1 SW. F.I. Madero (on Hwy. 40), [24.215658 -104.493404], 9 November 1970, 1880 m., T. J. & J. W. Cohn, #82 [13 males, 6 females] (UMMZ); 2 mi. S. Morcillo (9.1 mi. N. edge Durango), [24.143018 -104.710202], 8 November 1970, 1950 m., T. J. & J. W. Cohn, #79 [17 males, 25 females] (UMMZ); 37.0 mi. NE. El Salto, [23.986961 -104.865728], 26 October 1977, [5100 ft.], T. J. & J. W. Cohn, #136 [1 males, 1 females] (UMMZ); 43 mi. NE. [ENE.] El Salto [20 mi. WSW. Durango, on Hwy. 40], [24.002382 -104.776937], 24-25 October 1958, 7500 ft., T. J. Cohn, #224 [4 males] (UMMZ); 6.4 mi. NW. Canatlan, [24.609170 -104.818379], 19 October 1977, [6575 ft.], T. J. & J. W. Cohn, #119 [2 males] (UMMZ); 7 km. N. Durango (center) on Hwy. 40 Bypass, 24.069028 -104.666139, 10 October 2004, 1935 m., Fontana, Battiston, Agatibi, Garcia, #58 [3 males, 1 female] (UMMZ); 8 mi. SW. Durango on Hwy. 40 [from northern glorieta] (4.4 mi. NE. Las Mangas) [55.3 mi. SE. El Salto], [23.991656 -104.775628], 26 October 1974, 6800 ft., T. J. & J. W. Cohn, #98 [4 males, 5 females] (UMMZ); 8.4 mi. NE. El Salto on Hwy #40, [23.844839 -105.280776], 25 August 1961, 8200 ft., I. J. Cantrall & T. J. Cohn, #41 [1 male] (UMMZ); Durango (W. edge at art school), [24.033156 -104.681998], 8 November 1970, 1900 m., T. J. & J. W. Cohn, #80 [10 males, 3 females] (UMMZ); Las Mangas (10.4 mi. SW. Durango on Hwy. 40), [23.966807

-104.812882], 8 November 1970, [7600 ft.], T. J. & J. W. Cohn, #81A [22 males, 6 females] (UMMZ).

Mactruchus ischnodus n. sp.

MATERIAL EXAMINED [172 males, 134 females]: **MEXICO**: *Chihuahua*: 10 N. Jimenez, [27.269534 -104.930029], 10 September 1950, Ray F. Smith [2 females] (UMMZ); 11 mi. W. Cuauhtemoc, [28.402063 -107.040108], 9 September 1958, 7250 ft., T. J. Cohn, #108 [1 male] (UMMZ); 12 mi. N. Hidalgo del Parral, Hwy. 45, [26.973940 -105.484883], 3 September 1964, 5500 ft., Rentz, Rentz, Grant [14 males, 6 females] (ANSP); 17 mi. N. Chihuahua, Mex. Hwy. 45, [28.858004 -106.206991], 4 September 1964, 5300 ft., Rentz, Rentz, Grant [1 female] (ANSP); 27 mi. SE. of Chihuahua, [28.459316 -105.730758], 23 August 1960, D. C. Rentz [1 male] (ANSP); 29.3 mi. NE. Hidalgo del Parral, [27.323753 -105.721059], 14-16 October 1977, [5550 ft.], T. J. Cohn & J. W. Cohn, #111 [3 males, 5 females] (UMMZ); 31 mi. N. Camargo, Mex. Hwy. 45, [28.068722 -105.348468], 4 September 1964, 4400 ft., Rentz, Rentz, Grant [2 males, 5 females] (ANSP); 5.9 mi. WSW. Jimenez (on Hwy. 45), [27.120661 -104.996459], 7 November 1970, 1420 m., T. J. & J. W. Cohn, #77 [1 male, 2 females] (UMMZ); 6 mi. N. [El] Terrero, [29.257699 -107.413424], 31 August 1950, Ray F. Smith [1 female] (UMMZ); Cyn. De Bachimba, 27 mi. S. Chihuahua, [28.421737 -105.670185], 7 September 1950, Ray F. Smith [2 males] (UMMZ); Kilo .36 Sta. Barbara--Ojito, [26.813289 -105.820036], 29 September 1947, 6900 ft., G. M Bradt [1 male] (UMMZ); San Juan, 17 mi. SE. [NW.] Cuauhtemoc, [28.615737 -106.917743], 8 September 1958, 6300 ft., T. J. Cohn, #107 [1 male, 1 female] (UMMZ); *Durango*: 1.5 km. S. of Cuencame on Hwy 49, 24.847167 -103.697966, 10 October 2004, 1631 m., Fontana, Battiston, Agatibi, Garcia, #55 [4 males, 3 females] (UMMZ); 10 mi. N. Entroque, 5 September 1952, R. K. Selander [1 male] (ANSP); 13 mi. SE. Cathedral in Nombre de Dios, on Hwy. 45, [23.765880 -104.075674], 25 October 1974, 6540 ft., T. J. Cohn & J. W. Cohn, #97 [7 males, 4 females] (UMMZ); 15 mi. NE. Yerbanis on Hwy. 40, [24.917916 -103.76535], 24 August 1961, 6000 ft., Cantrall, Cohn, Hubbell, #36 [14 males, 3 females, including holotype and allotype] (UMMZ); 17.4 mi. N. Rodeo (Church), [25.393350 -104.609357], 7 November 1970, 1470 m., T. J. & J. W. Cohn, #78 [2 males, 1 female] (UMMZ); 2 mi. E. La Zarca, (60 mi. W. Mapimi), [25.794886 -104.733411], 11 September 1958, 6100 ft., T. J. Cohn, #113 [30 males, 15 females] (UMMZ); 2 mi. S. Menores de Arciba, [24.874519 -104.453606], 14 September 1950, Ray F. Smith [1 male] (UMMZ); 22.6 rd. mi. N. Rodeo, [25.453683 -104.596387], 18 October 1977, [5900 ft.], T. J. & J. W. Cohn, #116 [1 female] (UMMZ); 27 mi. W. of jct. Hwy. 49 and 30, [25.862181 -104.044463], 2 September 1964, 5000 ft., Rentz, Rentz, Grant [1 male, 2 females] (ANSP); 34 mi. SE. Villa Matamoros [Chichuahua], [26.397881 -105.361094], 10 September 1958, 5650 ft., T. J. Cohn, #111 [2 males, 2 females] (UMMZ); 34.8 mi. E. La Zarca (on Hwy. 30), [25.830772 -104.332727], 30 November 1972, Julian C. Lee, #43 [1 male, 2 females] (UMMZ); 37 mi. NE. El Vergel, [25.906456 -105.402240], 15 October 1977, 5185 ft., T. J. & J. W. Cohn, #112 [1 female] (UMMZ); 4.3 mi. N. Donata Guerra, [24.676625 -104.635539], 18 October 1977, [7575 ft.], T. J. Cohn & J. W. Cohn, #117 [4 males, 2 females] (UMMZ); 40 mi. W. Bermejillo on Mex. Hwy. 30, [25.868922 -104.237292], September 1964, 5500 ft., Rentz, Rentz, Grant [15 males, 11 females] (ANSP); 5 mi. N. Cuencame on Hwy. 40, [24.930753 -103.708984], 30 August 1964, 5200 ft., D. C. & K. A. Rentz, H. J. Grant [3 males, 3 females] (ANSP); 5 mi. N. Cuencame, Mex. 40, [24.930753 -103.708984], 30 August 1964, 5200 ft., Rentz, Rentz, Grant [26 males, 37 females] (ANSP); 66 mi. W. Bermejillo on Mex. Hwy. 30, [25.791049 -104.631382], 3 September 1964, 5900 ft., Rentz, Rentz, Grant [16 males, 13 females] (ANSP); 67 mi. W. Bermejillo on Mex. Hwy. 30, [25.792581 -104.644623], 3 September 1964, 6000 ft., Rentz, Rentz, Grant [2 males] (ANSP); 76 mi. SE. Villa Matamoros, [25.982658 -104.910086], 10 September 1958, 6000 ft., T. J. Cohn, #112 [7 males] (UMMZ); Pedricena, [25.094461 -103.770057], 19 August 1947, W. J. Gertsch [1 male] (UMMZ); San Jacinto [*ca.* 20 mi. WSW. Torreon], [25.483300 -103.733300], August-September 1935, L. B. Kellum [1 male, 2 females] (UMMZ); Sierra de Mapimi, [25.835891 -103.835183], July- September 1933, L. B. Kellum [4 males, 5 females] (UMMZ); Sierra de Mapimi, W. Side; N. End, [25.937281 -103.918897], July-September 1934, L. B. Kellum [4 males, 4 females] (UMMZ).

Mactruchus cryothermastris n. sp.

MATERIAL EXAMINED [26 males, 15 females]: **MEXICO**: *Durango*: 12 mi. NE. Guadalupe Victoria on Hwy. 40, [24.527997 -103.961364], 24 August 1961, 6400 ft., Cantrall, Cohn, Hubbell, #38 [6 males, 4 females] (UMMZ); 2.2 km. W. Guadalupe Victoria on Hwy. 40, 24.446222 -104.143389, 10 October 2004, Fontana, Battiston, Agatibi, Garcia, #57 [4 males, 2 females] (UMMZ); *Zacatecas*: 14.8 mi. NE. Nieves (42.8 mi. SE. Camacho), [24.156933 -102.981724], 10 November 1970, [6050 ft.], T. J. & J. W. Cohn, #85 [1 male] (UMMZ); 15 mi. SE. Victor Rosales [=Calera de Victor Rosales], [22.764842 -102.609947], 20 October 1958, 8000 ft., T. J. Cohn, #215 [1 female] (UMMZ); 33 mi. SE. Sombrerete on Hwy. 45 (3.3 mi. SE. El Sauz), [23.539894 -103.158728], 31 October 1974, 7000 ft., T. J. & J. W. Cohn, #113 [1 male, 3 females] (UMMZ); 41.6 mi. SE. Sombrerete on Hwy. 45 (11.8 mi. SE. El Sauz), [23.449031 -103.074708], 25 October 1974, 7200 ft., T. J. & J. W. Cohn, #95 [1 female] (UMMZ); 5.6 mi. [NW.] SW. Sombrerete, W. rd. jct. (on Hwy.45), [23.694589 -103.715036], 25 October 1974, 7850 ft., T. J. & J. W. Cohn, #96 [7 males, 3 females, including holotype and allotype] (UMMZ); 6.1 mi. SW.

Sombrerete Cathedral, [23.561860 -103.629045], 29 October 1977, [7300 ft.], T. J. & J. W. Cohn, #137 [6 males, 1 female] (UMMZ); 65 km. NE. jct. 54-45 (NE. Zacatecas) thorn scrub with Larrea, [23.341565 -102.277454], 13 September 1981, [no collector], #76 [1 male] (ANSP).

Mactruchus megasynactor n. sp.

MATERIAL EXAMINED [14 males, 4 females]: **MEXICO**: *Durango*: La Quebrada [probably =Junta de La Quebrada del Valle, 117.7 air mi. E. La Zarca], [25.583333 - 106.633331], 20 July 1947, Cazier [14 males, 4 females, including holotype and allotype] (UMMZ).

Mactruchus serrifer (Rehn and Hebard, 1914)

MATERIAL EXAMINED [210 males, 176 females]: **MEXICO**: *Distrito Federal*: Tlalpam, [19.308197 -99.222157], 5 September 1936, 7500 ft., H. R. Roberts [2 males] (ANSP); *Guanajuato*: 1.7 mi. NE. Acambaro Cathedral, [20.044952 -100.709532], 23 November 1970, [6125 ft.], T. J. & J. W. Cohn, #110A [4 males, 10 females] (UMMZ); 2.0 km. NE. Acambaro (center) on Hwy. 120, 20.051306 -100.697694, 15 October 2004, 1783 m., Fontana, Battiston, Agatibi, Garcia, #66 [6 males, 5 females] (UMMZ); 8 mi. W. [N.] Irapuato on Mex. 110, [20.643306 -101.522624], 23 August 1963, Grant and Howard [2 females] (ANSP); *Jalisco*: 0.4 mi. S. Huentitan del Bajo [or Juentitan], (5 mi. N. Guadalajara (Mercado San Juan)), [20.771292 -103.338061], 20 September 1959, 5100 ft., T. J. Cohn, #199 [8 males, 8 females] (UMMZ); 0.7 mi. E. San Luis Soyatlan, [20.194143 -103.295158], 25 November 1970, [5050 ft.], T. J. & J. W. Cohn, #111 [4 males, 4 females] (UMMZ); 1.0 km. NW. Jocotepec on Hwy. 35, 20.289472 -103.454611, 14 October 2004, 1585 m., Fontana, Battiston, Agatibi, Garcia, #64 [6 males, 2 females] (UMMZ); 10 mi. N. Chapala, [20.407228 -103.229697], 21 August 1947, 6000 ft., Chas. Hodge, 4th [1 female] (ANSP); 10.5 mi. NW. Leon (center) (ridge summit), [21.229095 -101.783236], 11 November 1970, [6700 ft.], T. J. & J. W. Cohn, #87 [5 males, 6 females] (UMMZ); 13 mi. SW. Guadalajara (4 mi. NW. Santa Cruz), [20.540186 -103.473783], 24 November 1958, 5300 ft., T. J. Cohn, #310 [2 males, 1 females] (UMMZ); 15 mi. E. Guadalajara on Mex. 110, [20.607237 -102.988360], 23 August 1963, Grant and Howard [5 males, 4 females] (ANSP); 21 mi. S.E. of Guadalajara, [20.410655 -103.217821], 27 September 1957, H. A. Scullen [1 male] (OSAC); 24 mi. NW. San Luis Soyatlan [on Hwy. 15], [20.416525 -103.548872], 4 September 1961, *ca.* 5000 ft., Cantrall, Cohn, Hubbell, #75 [1 male] (UMMZ); 24 mi. W. Tizapan, [20.220186 -103.376414], 24 November 1958, 5100 ft., T. J. Cohn, #311 [1 female] (UMMZ); 28 mi. NE. of Tepatitlan on Mex. 80, [21.080313 -102.496300], 24 August 1963, Grant and Howard [6 males, 3 females] (ANSP); 53 mi. E. Guadalajara, [20.542022 -102.587789], 28 September 1957, 6400 ft., H. A. Scullen [6 males, 3 females] (OSAC); 58 mi. E. Guadalajara, [20.548182 -102.508886], 28 September 1957, 6200 ft., H. A. Scullen [2 females] (OSAC); 6.3 mi. E. Tizapan, [20.172177 -102.966615], 4 September 1961, 4800 ft., Cantrall, Cohn, Hubbell, #76 [4 males, 1 female] (UMMZ); 8.8 mi. E. Tepatitlan, [20.769256 -102.636586], 1 September 1948, 6200 ft., P. P. Dowling, #40 [1 female] (UMMZ); 8.8 mi. E. Tepatitlan, [20.769256 -102.636586], 1 September 1948, 6200 ft., P. P. Dowling, #39 [2 males, 4 females] (UMMZ); 9 mi. N. Encarnacion de Diaz (on Hwy. 45), [21.652802 -102.281714], 11 November 1970, [6220 ft.], T. J. & J. W. Cohn, #86 [1 female] (UMMZ); 9 mi. S. of Guadalajara, [20.360090 -103.199480], 27 September 1957, H. A. Scullen [1 male] (OSAC); 9.5 mi. NE. Ixtlahuacan del Rio, [20.975259 -103.180779], 30-31 October 1977, [6450 ft.], T. J. & J. W. Cohn, #140 [1 male, 1 female] (UMMZ); Chapala, [20.301404 -103.185436], 24 August 1947, 5500 ft., Chas. Hodge, 4th [3 males, 1 female] (ANSP); Cocula, [20.364433 -103.823591], 27 September 1957, 4450 ft., H. A. Scullen [1 male] (OSAC); Lepatillan [Tepatitlan], [20.816838 -102.762331], 20 August 1954, 6200 ft., R. R. Dreisbach [1 female] (UMMZ); *Mexico*: 12.8 mi. W. Rio Frio on Hwy. 190, [19.316572 -98.795231], 8 September 1961, 8460 ft., Hubbell, Cantrall, Cohn, #82 [7 males, 2 females] (UMMZ); *Michoacan*: 15 mi. W. Jacona, [20.003866 -102.497120], 1 December 1958, 5900 ft., T. J. Cohn, #336 [3 males] (UMMZ); 2.1 mi. E. Carapan, Highway 15, [19.847697 -102.012381], 24 September 1959, 6700 ft., I. J. Cantrall & T. J. Cohn, #171 [2 males] (UMMZ); 20 km. NW. Quiroga on Hwy. 15 Libre, 19.730861 -101.643750, 14 October 2004, 2060 m., Fontana, Battiston, Agatibi, Garcia, #65 [6 males, 1 female] (UMMZ); 22.2 mi. SE. Brisenas Plaza [on Hwy. 35] (4.3 mi. SE. El Salitre)[*ca.* 5 mi. N. Zamora], [20.048510 -102.312653], 9 November 1974, 5000 ft., T. J. Cohn & J. W. Cohn, #125 [2 males, 5 females] (UMMZ); 28 mi. E. [NE.] Jiquilpan, [20.280801 -102.503897], 31 August 1948, 5000 ft., P. P. Dowling, #37 [1 male] (UMMZ); 4 rd. mi. W. Jiquilpan, [19.990561 -102.776281], 25 November 1958, 6100 ft., T. J. Cohn, #312 [3 males, 4 females] (UMMZ); 4.2 mi. E. Morelia (on Hwy. 15), [19.688847 -101.120025], 24 September 1959, 6450 ft., I. J. Cantrall & T. J. Cohn, #170 [2 males, 1 females] (UMMZ); Morelia 14 E., [19.656214 -100.998178], 27 December 1931, McKeever [1 female] (UMMZ); *Morelos*: Cuernavaca, [18.928972 -99.231022], 20 October 1957, R. R. Dreisbach [3 males, 2 females] (UMMZ); *Queretaro*: 2 mi. S. of Queretaro on Mex. 57, [20.572876 -100.324780], 22 August 1963, Grant and Howard [45 males, 59 females] (ANSP); 6 km. NW. of El Milagro (Villa Corregidora), 20.518583 -100.428806, 24 September 2004, 1911 m., Fontana, Battiston, Agatibi, Garcia, #10 [8 males, 1 female] (UMMZ); 7 mi. S. of Queretaro on Mex. 57, [20.567878 -100.249757], 22 August 1963, Grant and Howard [7 males, 4 females] (ANSP); 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), [20.638159 -100.279679], 13 November 1970, [6220 ft.], T. J. & J. W. Cohn, #89 [5 males,

4 females] (UMMZ); La Canada off Queretaro-Tequisquiapan Rd., 20.619528 -100.313583, 24 September 2004, 907 m., Fontana, Battiston, Agatibi, Garcia, #9 [9 males, 3 females] (UMMZ); La Noria, 8 mi. SE. Queretaro, [20.512727 -100.345289], 25 August 1965, [6580 ft.], T. J. Cohn, #68 [2 males, 1 females] (UMMZ); Parque Nat. El Cimatario [5.34 km. S. Jct. Huimilpan-Amealco Rd. & Bernardo Quintana] (8.13 air km SE of Queretaro), 20.528278 -100.335222, 25 September 2004, 2183 m., Fontana, Battiston, Agatibi, Garcia, #13 [2 males] (UMMZ); Questa China, 4.2 mi. E. Queretaro (s. plaza on old Hwy 45), [20.616758 -100.351458], 12 November 1970, [6510 ft.], T. J. & J. W. Cohn, #88 [14 males, 12 females] (UMMZ); 9 mi. SE. Queretero [Queretaro], [20.497319 -100.319281], 15 October 1958, 6300 ft., T. J. Cohn, #191 [1 male, 2 females] (UMMZ); *San Luis Potosi*: 46 mi. N. of Lagos de Moreno, [21.932220 -101.568579], 24 August 1963, Grant and Howard [1 juv. male] (ANSP); *Zacatecas*: 11.1 rd. mi. S. Villanueva (road summit on Hwy. 54), [22.243931 -102.837836], 31 October 1974, 7000 ft., T. J. Cohn & J. W. Cohn, #115 [2 males] (UMMZ); 18.4 mi. NE. Villanueva on Hwy. 54 (3.6 mi. NE. Felipe Angeles), [22.601153 -102.764606], 31 October 1974, [7000 ft.], T. J. Cohn & J. W. Cohn, #114 [4 males, 3 females] (UMMZ); 3.7 rd. mi. N. Santa Rosa on Hw. 54 (26.3 rd. mi. SW. Jalpa), [21.348818 -103.131346], 31 October 1974, 4300 ft., T. J. Cohn & J. W. Cohn, #117 [9 males, 6 females] (UMMZ); 6.2 mi. SW. Tabasco on Hwy. 54 [1.9 mi. W. Huanusco], [21.797983 -102.963711], 31 October 1974, 5280 ft., T. J. Cohn & J. W. Cohn, #116 [4 males, 3 females] (UMMZ).

Acanthorintes erythrephaptor n. sp.

MATERIAL EXAMINED [1 male]: **MEXICO**: *Queretaro*: 9 mi. SE. Queretero [Queretaro], [20.497319 -20.497319], 15 October 1958, 6300 ft., T. J. Cohn, #191 [1 male, holotype] (UMMZ).

Acanthorintes tauriformis (Rehn and Hebard, 1914)

MATERIAL EXAMINED [187 males, 175 females]: **MEXICO**: *Guanajuato*: 10 mi. S. Valle de Santiago, at pass, thorn and cactus scrub, [20.267152 -101.191443], 7 September 1981, Otte, #55 [1 male, 1 female] (ANSP); 11 rd. mi. E. San Luis de la Paz, [21.278119 -100.377046], 29 August 1959, 6900 ft., I. J. Cantrall & T. J. Cohn, #46 [4 males] (UMMZ); 15 rd. mi. W. Xichu, [21.308881 -100.178781], 29 August 1959, 7450-7750 ft., I. J. Cantrall & T. J. Cohn, #42 [3 males] (UMMZ); 2 km. NE. Acambaro (center) on Hwy 120, 20.051306 -100.697694, 15 October 2004, 1783 m., Fontana, Battiston, Agatibi, Garcia, #66 [1 male, 1 female] (UMMZ); 21 rd. mi. W. Xichu, [21.305272 -100.245723], 29 August 1959, 8000 ft., I. J. Cantrall & T. J. Cohn, #44 [2 males] (UMMZ); 3 mi. W. Celaya on Mex. 45, [20.517900 -100.858981], 22 August 1963, Grant and Howard [11 males, 4 females] (ANSP); 8 mi. W. [N.] Irapuato on Mex. 110, [20.820107 -101.320260], 23 August 1963, Grant and Howard [12 males, 4 females] (ANSP); Acambaro, [20.030867 -100.723773], October 1924, C. C. Hoffman [1 male] (UMMZ); on Rt. 49 S. San Miguel de Allende at jct. road to Guanajuato, short grassland and shrubbery, [20.833544 -100.796761], 7 September 1981, Otte, #54 [4 females] (ANSP); San Felipe 19 mi. SW., [21.338078 -101.375811], 7 December 1931, McKeever [1 female] (UMMZ); *Hidalgo*: 11.3 km. W. Tula R. at Ixmiquilpan on Hwy 85, 20.510639 -99.310611, 23 September 2004, 844 m., Fontana, Battiston, Agatibi, Garcia, #7 [2 females] (UMMZ); 12.7 rd. mi. N. Atotonilco El Grande (N. of Pachuca), [20.434825 -98.684552], 17 August 1964, [5500 ft.], T. J. Cohn, #59 [5 males, 1 females] (UMMZ); 13 mi. N. of Atotonilco, rocky, shrubby, rim desert vally, [20.440315 -98.683651], 3 September 1951, J. E. Mosimann, #34 [1 male, 1 female] (UMMZ); 29 mi. N. Ixmiquilpan, [20.779025 -99.306138], 15 October 1958, 6300 ft., T. J. Cohn, #188 [2 females] (UMMZ); 3-8 mi. N. Jacala [5 mi.], [21.022934 -99.142908], 30 July 1936, 5-6000 ft., H. R. Roberts [3 males, 2 females] (ANSP); 3-8 mi. N. Jacala [5 mi.], [21.022934 -99.142908], 10 September 1936, 5-6000 ft., H. R. Roberts [1 female] (ANSP); 6 km. E. Jonacapa (on Hwy. 45 at Km 24), 20.426833 -99.484194, 23 September 2004, 2265 m., Fontana, Battiston, Agatibi, Garcia, #8 [5 males, 7 females] (UMMZ); 7.36 km. W. Tula R. at Ixmiquilpan on Hwy 85, 20.484028 -99.292028, 23 September 2004, 760 m., Fontana, Battiston, Agatibi, Garcia, #6 [3 females] (UMMZ); Km. 176 CN1, Tasquillo, (desert scrub), [0.5 km. S. of Tula River], [20.539140 -99.258317], 29 August 1948, 5700 ft., T. H. Hubbell, #249 [3 males, 4 females] (UMMZ); Km. 181, CN 1 Tasquillo Br. Rio Tula, [20.550321 -99.292094], 29 August 1948, 5600 ft., T. H. Hubbell, #250 [1 male, 2 females] (UMMZ); Km. 196 bet. Zimapan & Ixmiquilpan, [20.731342 -99.328918], 2 August 1936, 6000 ft., H. R. Roberts [1 juv. male] (ANSP); Km. 196 bet. Zimapan & Ixmiquilpan, [20.731342 -99.328918], 3 August 1936, 6000 ft., H. R. Roberts [1 juv. male] (ANSP); Km. 196 bet. Zimapan & Ixmiquilpan, [20.731342 -99.328918], 18 September 1938, 6000 ft., H. R. Roberts [8 females] (ANSP); N. Jacala, km. 285, [21.041849 -99.097385], 21 July 1940, 6000 ft., H. R. Roberts [1 female] (ANSP); N. Jacala, km. 285, [21.041849 -99.097385], 28 August 1940, 6000 ft., H. R. Roberts [1 female] (ANSP); *Jalisco*: 10.5 mi. NW. Leon (center) (ridge summit), [21.229095 -101.783236], 11 November 1970, [6700 ft.], T. J. & J. W. Cohn, #87 [8 males, 11 females] (UMMZ); 4 mi. N. Lagos de Moreno on Mex. 15?, [21.433852 -101.898584], 24 August 1963, Grant and Howard [1 male, 2 females] (ANSP); *Michoacan*: 3 mi. S. Carapan, [19.832603 -102.031408], 24 September 1959, 6800 ft., I. J. Cantrall & T. J. Cohn, #172 [6 males, 5 females] (UMMZ); 3 mi. S. Carapan, [19.832603 -102.031408], 1 December 1958, 7300 ft., T. J. Cohn, #337 [1 female] (UMMZ); betw. Zacapu & Zamora (Coordinates Approximate),

[19.852863 -102.045179], 6 September 1938, 7500 ft., H. R. Roberts [1 male] (ANSP); Morelia, [19.698627 -101.180900], 4-5 September 1938, 6-8000 ft., H. R. Roberts [10 males] (ANSP); *Queretaro*: 1 mi. SW. Jalpan [de Serra] (on Hwy 120), [21.214641 -99.482393], 22 November 1970, [2850 ft.], T. J. & J. W. Cohn, #106 [2 males, 1 female] (UMMZ); 11 mi. W. Queretaro, [20.558382 -100.549383], 18 August 1954, 6300 ft., R. R. Dreisbach [1 female] (UMMZ); 2 mi. S. of Queretaro on Mex. 57, [20.572876 -100.324780], 22 August 1963, Grant and Howard [1 male, 2 females] (ANSP); 2.2 mi. E. Jalpan [de Serra] (on Hwy 120), [21.187817 -99.443011], 21 November 1970, [2750 ft.], T. J. & J. W. Cohn, #105 [1 male, 2 females] (UMMZ); 3.6 rd. mi. NE. Pinal de Amoles (on Hwy 120), [21.157516 -99.603653], 22 November 1970, [6780 ft.], T. J. & J. W. Cohn, #108 [2 males, 4 females] (UMMZ); 5.4 rd. mi. SW. Jalpan [de Serra] (on Hwy 120), [21.207500 -99.514613], 22 November 1970, [4050 ft.], T. J. & J.W. Cohn, #107 [1 male, 1 female] (UMMZ); 6 km. NW. of El Milagro (Villa Corregidora), 20.518583 -100.428806, 24 September 2004, 1911 m., Fontana, Battiston, Agatibi, Garcia, #10 [5 males, 2 females] (UMMZ); 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), [20.638159 -100.279679], 13 November 1970, [6385 ft.], T. J. & J. W. Cohn, #89 [1 male, 5 females] (UMMZ); 9.4 mi. N. Queretaro, [20.702304 -100.437221], 25 August 1965, [6300 ft.], T. J. Cohn, #69 [2 males, 2 females] (UMMZ); 9.5 mi. N. Queretaro, [20.704610 -100.437567], 25 August 1965, [6325 ft.], T. J. Cohn, #70 [2 males, 4 females] (UMMZ); 9.8 mi. SE. Queretaro, [20.489364 -100.310481], 25 August 1965, 6400 ft., T. J. Cohn, #67 [1 male, 1 female] (UMMZ); about 6 miles So. Of Queretaro on Mex. Hwy. 57, [20.509589 -100.151885], 26 July 1963, Grant and Howard [1 female] (ANSP); La Canada off Queretaro-Tequisquiapan Rd., 20.619528 -100.313583, 24 September 2004, 907 m., Fontana, Battiston, Agatibi, Garcia, #9 [4 males, 3 females] (UMMZ); LaNoria, 8 mi. SE. Queretaro, [20.512727 -100.345289], 25 August 1965, 6400 ft., T. J. Cohn, #68 [1 female] (UMMZ); N. of El Milagro [? Coord. = 8.5 air km. S.?] (21 air km. S. Queretaro), 20.397028 -100.351056, 24 September 2004, 2014 m., Fontana, Battiston, Agatibi, Garcia, #11 [6 males] (UMMZ); Parque Nat. El Cimatario [5.34 km. S. Jct. Huimilpan-Amealco Rd. & Bernardo Quintana] (8.13 air km SE of Queretaro), 20.528278 -100.335222, 25 September 2004, 2183 m., Fontana, Battiston, Agatibi, Garcia, #13 [1 male, 1 female] (UMMZ); Queretaro (.5 km. E. Jct. Hwy. 45 & Bernardo Quintana), [20.584750 -100.354417], 25 September 2004, 1817 m., Fontana, Battiston, Agatibi, Garcia, #12 [5 males, 4 females] (UMMZ); Questa China, 4.2 mi. E. Queretaro (s. plaza on old Hwy. 45), [20.616758 -100.351458], 12 November 1970, [6510 ft.], T. J. & J. W. Cohn, #88 [1 male, 6 females] (UMMZ); 2.4 mi. NW. Pedro Escobedo (15 mi. NW. San Juan del Rio), [20.545775 -100.205983], 30 August 1959, 6200 ft., I. J. Cantrall & T. J. Cohn, #48 [1 male, 1 female] (UMMZ); 29 mi. N. Queretero [Queretaro], [20.968383 -100.429461], 15 October 1958, 6750 ft., T. J. Cohn, #193 [4 males, 7 females] (UMMZ); 9 mi. SE. Queretero [Queretaro], [20.497319 -100.319281], 15 October 1958, 6300 ft., T. J. Cohn, #191 [1 male, 2 females] (UMMZ); *San Luis Potosi*: 1 km. NE. Ciudad del Maiz Hwy. 80, 22.416278 -99.594417, 29 September 2004, 1305 m., Fontana, Battiston, Agatibi, Garcia, #23 [4 males] (UMMZ); 12.5 mi. E. Rioverde (on Hwy. 70), [21.895373 -99.809832], 20 November 1970, [4025 ft.], T. J. & J. W. Cohn, #102 [3 males, 5 females] (UMMZ); 19 km. W. Santa Catarina (on Hwy. 70) (46 air km. SE. San Luis Potosi), 22.072056 -100.545778, 30 September 2004, 1777 m., Fontana, Battiston, Agatibi, Garcia, #26 [1 male, 1 female] (UMMZ); 2.9 km NE. San Martin de Abajo, 22.137111 -100.509611, 27 September 2004, 1487 m., Fontana, Battiston, Agatibi, Garcia, #20 [2 males, 1 female] (UMMZ); 23.5 rd. mi. E. San Luis Potosi (Juarez Glorieta) on Hwy. 70, [22.061134 -100.609393], 23 October 1974, 8100 ft., T. J. & J. W. Cohn, #92 [1 male, 3 females] (UMMZ); 27.6 mi. E. Rioverde (on Hwy 70 at Km. 89), [21.869207 -99.601706], 20 November 1970, [3400 ft.], T. J. & J. W. Cohn, #99 [1 male, 1 female] (UMMZ); 3.5 mi. E. San Jose de Gallinas (13 mi. WNW. Rioverde), [22.024325 -100.167100], 25 August 1959, 3450 ft., I. J. Cantrall & T. J. Cohn, #28 [1 male] (UMMZ); 32 rd. mi. E. San Luis Potosi (Main plaza) (12 rd. mi. W. Santa Catarina), [22.071331 -100.530000], 26 August 1959, 6050 ft., I. J. Cantrall & T. J. Cohn, #31 [1 male, 1 female] (UMMZ); 33.25 air km. ESE. San Luis Potosi Puerto de la Huerta (on Hwy. 70), 22.096278 -100.660472, 27 September 2004, 2341 m., Fontana, Battiston, Agatibi, Garcia, #18 [10 males, 9 females] (UMMZ); 6 mi. E. San Jose de Gallinas (22 mi. WNW. Rioverde), [22.019480 -100.139756], 25 August 1959, 3800 ft., I. J. Cantrall & T. J. Cohn, #27 [1 male] (UMMZ); 6.47 km. NW. of Alaquines, 22.157972 -99.645694, 29 September 2004, 1184 m., Fontana, Battiston, Agatibi, Garcia, #25 [2 males] (UMMZ); Alvarez (27.9 rd. mi. E. San Luis Potosi [from Juarez Glorieta]) [2.3 rd. mi. SW. San Francisco], [22.050000 -100.616700], 16 November 1961, T. J. Cohn & S. P. Hubbell, #205 [4 males, 4 females] (UMMZ); San Luis Potosi [16.5 km. W. Jct. Antonio Rocha Cordero on Hwy. 85], 22.079750 -101.136694, 26 September 2004, 2260 m., Fontana, Battiston, Agatibi, Garcia, #16 [4 males, 4 females] (UMMZ); San Luis Potosi [5 km. W. Jct. Antonio Rocha Cordero on Hwy 85], 22.120139 -101.063278, 26 September 2004, 1952 m., Fontana, Battiston, Agatibi, Garcia, #15 [2 males, 3 females] (UMMZ); 13 mi. SW. San Luis Potosi (Main Plaza), [22.109861 -100.775772], 28 August 1959, 7400 ft., I. J. Cantrall & T. J. Cohn, #38 [1 male] (UMMZ); 19.8 rd. mi. E. San Luis Potosi [from Juarez Glorieta], [22.102753 -100.700019], 14-16 November 1961, T. J. Cohn & S. P. Hubbell, #203 [1 male, 4 female] (UMMZ); 2 mi. SW. Villa Hidalgo, [22.432514 -100.703311], 20 August 1959, 5700 ft., I. J. Cantrall & T. J. Cohn, #2 [1 female] (UMMZ); 2.7 mi. SW. Villa Hidalgo, [22.426906 -100.712608], 17 November 1961, [5775 ft.], T. J. Cohn, #211 [5 males, 10 females]

(UMMZ); 26 rd mi. E. San Luis Potosi (Main plaza) [24.3 E. Juarez Glorieta](19 rd. mi.W. Santa Catarina), [22.073330 -100.635001], 26 August 1959, 7700 ft., I. J. Cantrall & T. J. Cohn, #32 [9 males, 1 female] (UMMZ); 3.8 mi. N. Rioverde, [21.977897 -100.014600], 25 August 1959, 3250 ft., I. J. Cantrall & T. J. Cohn, #29 [2 males, 1 female] (UMMZ); 4.3 rd. mi. W. Santa Catarina (42 rd. mi. E. San Luis Potosi *ca.* fr. central plaza) (42 rd. mi. WNW. RioVerde), [22.085061 -100.497894], 24 August 1959, 4300 ft., I. J. Cantrall & T. J. Cohn, #26 [3 females] (UMMZ); 50 mi. SE. San Luis Potosi, [21.566942 -100.751428], 16 October 1958, 6400 ft., T. J. Cohn, #194 [6 males, 2 females] (UMMZ); 6.8 rd. mi. E. Rayon (rd. to Valles) [32 mi. E. Rioverde], [21.897967 -99.555031], 11 July 1964, 4300 ft., T. J. Cohn, #17 [1 male] (UMMZ); 10 mi. NW. Rioverde, [21.987869 -100.125149], 25 August 1959, 3550 ft., I. J. Cantrall & T. J. Cohn, #30, [3 males, 1 female] (UMMZ).

Acanthorintes thenarocercus n. sp.

MATERIAL EXAMINED [30 males, 65 females]: **MEXICO**: *Hidalgo*: 10 rd. mi. SSE. Zimapan at Km 189 (N. of Tula R.), [20.630330 -99.330998], 30 August 1959, 6600 ft., I. J. Cantrall & T. J. Cohn, #53 [1 male] (UMMZ); 11.3 km. W. Tula R. at Ixmiquilpan on Hwy. 85, 20.510639 -99.310611, 23 September 2004, 844 m., Fontana, Battiston, Agatibi, Garcia, #7 [4 males, 11 females] (UMMZ); 15 rd. mi. SSE. Zimapan (N. of Tula R.), [20.581463 -99.340469], 30 August 1959, 5550 ft., I. J. Cantrall & T. J. Cohn, #54 [1 male, 2 females] (UMMZ); 21 rd. mi. NW. Ixmiquilpan (7 rd. mi. N. Tula R.), [20.686949 -99.335590], 15 October 1958, 6800 ft., T. J. Cohn, #189 [13 males, 25 females, including holotype and allotype] (UMMZ); 6 mi. SE. Zimapan at Km. 196, [20.731342 -99.328918], 30 August 1959, 6300 ft., I. J. Cantrall & T. J. Cohn, #50 [2 juv. females] (UMMZ); 7 mi. SE. Zimapan at Km. 195, [20.718670 -99.333280], 30 August 1959, 6300 ft., I. J. Cantrall & T. J. Cohn, #52 [1 male, 2 females] (UMMZ); 7.36 km. W. Tula R. at Ixmiquilpan on Hwy. 85, 20.484028 -99.292028, 23 September 2004, 760 m., Fontana, Battiston, Agatibi, Garcia, #6 [8 females] (UMMZ); 9 mi. NW. Ixmiquilpan, [20.522332 -99.327127], 15 October 1958, 6100 ft., T. J. Cohn, #190 [1 male, 3 females] (UMMZ); Km. 176 CN1, Tasquillo (desert shrub), [20.539140 -99.258317], 29 August 1948, 5700 ft., T. H. Hubbell, #249 [6 males, 7 females] (UMMZ); Km. 181 CN1 Tasquillo, Br. Rio Tula, [20.550321 -99.292094], 29 August 1948, 5600 ft., T. H. Hubbell, #250 [1 juv. male] (UMMZ); Maguey Verde, S. Jacala, [20.838954 -99.257409], 31 July 1936, 7500 ft., H. R. Roberts [1 female] (ANSP); R. Tula, Tasquillo, [20.560250 -99.305269], 28 August 1940, 5500 ft., H. R. Roberts [1 male, 1 female] (ANSP); Tula River, Tasquillo, [20.561555 -99.317107], 9 September 1936, 5500 ft., H. R. Roberts [2 females] (ANSP); *Queretaro*: 9 mi. SE. Queretero [Queretaro], [20.497319 -100.319281], 15 October 1958, 6300 ft., T. J. Cohn, #191 [1 female] (UMMZ); *Unknown*: EITHER #190 9 mi. NW. Ixmiquilpan (Hidalgo) OR #191 9 mi. SE. Queretaro (Quer.), 15 October 1958, T. J. Cohn, [1 male] (UMMZ).

Acanthorintes xanthephaptor n. sp.

MATERIAL EXAMINED [45 males, 47 females]: **MEXICO**: *Guanajuato*: 11 mi. E. San Luis de La Paz, [21.278119 -100.377046], 29 August 1959, 6900 ft., I. J. Cantrall & T. J. Cohn, #46 [4 males, 3 females, including holotype and allotype] (UMMZ); 12 mi. E. San Luis de La Paz, [21.271418 -100.366360], 28 August 1959, 6750 ft., I. J. Cantrall & T. J. Cohn, #39 [2 males, 3 females] (UMMZ); *Queretaro*: 9 mi. E. Queretaro (s. plaza on old Hwy. 45 at Griega turnoff), [20.638159 -100.279679], 13 November 1970, [6200 ft.], T. J. & J. W. Cohn, #89 [4 males, 10 females] (UMMZ); 9.5 mi. N. Queretaro, [20.704610 -100.437567], 25 August 1965, [6550 ft.], T. J. Cohn, #70 [3 males, 2 females] (UMMZ); Parque Nat. El Cimatario [5.34 km. S. Jct. Huimilpan-Amealco Rd. & Bernardo Quintana] (8.13 air km SE of Queretaro), 20.528278 -100.335222, 25 September 2004, 2183 m., Fontana, Battiston, Agatibi, Garcia, #13 [4 males, 1 female] (UMMZ); Queretaro (.5 km E. Jct. Hwy. 45 & Bernardo Quintana), 20.584750 -100.354417, 25 September 2004, 1817 m., Fontana, Battiston, Agatiba, Garcia, #12 [8 males, 6 females] (UMMZ); Questa China, 4.2 mi. E. Queretaro (s. plaza on old Hwy. 45), [20.616758 -100.351458], 12 November 1970, [6500 ft.], T. J. & J. W. Cohn, #88 [8 males, 7 females] (UMMZ); 10 mi. N. Queretero [Queretaro], [20.708842 -100.438353], 15 October 1958, 6100 ft., T. J. Cohn, #192 [3 males] (UMMZ); 9 mi. SE. Queretero [Queretaro], [20.497319 -100.319281], 15 October 1958, 6300 ft., T. J. Cohn, #191 [6 males, 12 females] (UMMZ); San Luis Potosi: 4.3 rd. mi. W. Santa Catarina (42 rd. mi. WNW. Rio Verde), [22.085061 -100.497894], 24 August 1959, 4300 ft., I. J. Cantrall & T. J. Cohn, #26 [3 males, 3 females] (UMMZ).

Acanthorintes zeuglaius n. sp.

MATERIAL EXAMINED [34 males, 21 females]: **MEXICO**: *San Luis Potosi*: 1 km NE. Ciudad del Maiz Hwy. 80, 22.416278 -99.594417, 29 September 2004, 1305 m., Fontana, Battiston, Agatibi, Garcia, #23 [14 males, 1 female] (UMMZ); 4 rd. mi. NE. Ciudad del Maiz, [22.446219 -99.573633], 21 August 1959, 4550 ft., I. J. Cantrall & T. J. Cohn, #10 [4 males, 1 female, including holotype and allotype] (UMMZ); 5 mi. E. Ciudad Maiz, [22.382894 -99.671775], 1 September 1940, 4500 ft., H. R. Roberts [5 females] (ANSP); 6 mi. NW. Ciudad del Maiz, [22.454331 -99.672775], 28 August 1955, 1200 m., T. J. Cohn [7 juv. males, 4 juv. females] (UMMZ); 6.5 km. NW. of Alaquines, 22.157972 -99.645694, 29 September 2004, 1184 m., Fontana, Battiston, Agatibi, Garcia, #25 [1 male, 1 female] (UMMZ); 7 rd. mi.

NE. Ciudad del Maiz, [22.486456 -99.561356], 21 August 1959, 3900 ft., I. J. Cantrall & T. J. Cohn, #11 [3 males, 8 females] (UMMZ); 1.2 mi. NE. Ciudad del Maiz, [22.413642 -99.595481], 18 November 1961, [4265 ft.], T. J. Cohn, #213 [1 male] (UMMZ); 5 mi. NW. Cuidad del Maiz, [22.447669 -99.663789], 22 August 1959, 4350 ft., I. J. Cantrall & T. J. Cohn, #15 [2 males] (UMMZ); Ciudad del Maiz (N. edge), [22.409067 -99.605675], 22 August 1959, 4100 ft., I. J. Cantrall & T. J. Cohn, #14 [1 male, 1 female] (UMMZ); Tamaulipas: 28 mi. SW. Jaumave, [23.232085 -99.679244], 17 August 1959, 5850 ft., T. J. Cohn, #191 [1 male] (UMMZ).

Pterodichopetala cieloi Buzzetti, Barrientos-Lozano & Rocha-Silva, 2011

MATERIAL EXAMINED [1 male, 1 female]: **MEXICO**: *Tamaulipas*: El Cielo Biosphere Reserve-Ejido La Gloria, 23.047500 -99.250806, 7 November 2009, L. Barrientos [1 male, 1 female] (UMMZ).

Pterodichopetala strepsidactyla n. sp.

MATERIAL EXAMINED [4 males, 1 females]: **MEXICO**: *San Luis Potosi*: 32 rd. mi. E. San Luis Potosi (from main plaza) (12 rd. mi. W. Santa Catarina), [22.071331 -100.530000], 26 August 1959, 6050 ft., I. J. Cantrall & T. J. Cohn, #31 [1 female, allotype] (UMMZ); 19.8 rd. mi. E. San Luis Potosi [from Juarez Glorieta], [22.102753 -100.700019], 14-16 November 1961, T. J. Cohn & S. P. Hubbell, #203 [2 males] (UMMZ); 21.3 mi. E. San Luis Potosi on RioVerde Rd.- Hwy 86, [22.084178 -100.646231], 24 August 1965, T. J. Cohn, #66 [2 males, including holotype] (UMMZ).

Pterodichopetala padrisima n. sp.

MATERIAL EXAMINED [9 males, 2 females]: **MEXICO**: *Nuevo Leon*: Rd. fr. (Villa de) Santiago Los Lirios; Cany. San Isidro, 2.1 km. S. San Juan Batista (18.23 air km W. (Villa de) Santiago), 25.378444 -100.311417, 6 October 2004, 1480 m., Fontana, Battiston, Agatibi, Garcia, #45, [9 males, 2 females, including holotype and allotype] (UMMZ).

Pterodichopetala hypsibates n. sp.

MATERIAL EXAMINED [9 males, 2 females]: **MEXICO**: *Nuevo Leon*: Cerro Potosi, 17 rd.mi. NW. Galeana, 5.2 rd. mi. from Radio Sta., Km. 11.5), [24.863792 -100.212644], 21 October 1974, 9000 ft., T.J. & J.W.Cohn, #90A [6 males, 1 female, including holotype and allotype] (UMMZ); Cerro Potosi, NE. slope (14.22 air km NW Galeana), 24.888222 -100.198167, 1 October 2004, 2371 m., Fontana, Battiston, Agatibi, Garcia, #33 [3 males, 1 female] (UMMZ).

Pterodichopetala pityophila n. sp.

MATERIAL EXAMINED [26 males, 25 females]: **MEXICO**: *Coahuila*: 0.6 mi. S. Puerto Flores (11.1 rd. mi. SE. Arteaga), [25.3218055 -100.800472], 21 August 1961, 7040 ft., Cantrall, Cohn, Hubbell, #25 [1 female] (UMMZ); 11 rd. mi. SE. Arteaga, [25.322961 -100.800155], 4 August 1959, 6700 ft., T. J. Cohn, #140 [2 males, 3 females] (UMMZ); 11 rd. mi. SE. Arteaga (Puerto Flores), [25.322961 -100.800155], 10 August 1959, 6800 ft., T. J. Cohn, #161 [6 males, 5 females, including holotype and allotype] (UMMZ); 11.2 mi. SE. Arteaga (Puerto Flores), [25.322961 -100.801137], 18 November 1970, T. J. & J. W. Cohn, #95 [2 males, 2 females] (UMMZ); Arteaga, 17 km SSE., [Puerto Flores], 25.338667 -100.795111, 5 October 2004, 2126 m., Fontana, Battiston, Agatibi, Garcia, #44 [9 males, 10 females] (UMMZ); 12 km. SE. Saltillo, [25.348725 -100.917014], 30 October 1960, J. Matthieu [2 males, 1 female] (UMMZ); 4 mi. E. Los Lirios, (Derramadero) [25.384207 -100.527123], 19 October 1974, 7100 ft., T.J. & J.W.Cohn , #86 [4 males, 2 female] (UMMZ); *Nuevo Leon*: 15.3 mi. W. Galeana, [24.768436 -100.170750], 21 August 1961, 6850 ft., Cantrall, Cohn, Hubbell, #28 [1 male] (UMMZ); 18.5 mi. SW. Galeana on Hwy. 60, (4.9 mi. E. San Roberto Jct.), [24.686944 -100.220828], 20 October 1974, 6500 ft., T. J. & J. W. Cohn, #88, [1 female] (UMMZ).

Pterodichopetala cultricerca (Strohecker, 1945)

MATERIAL EXAMINED [1 male, 1 female]: **MEXICO**: *Nuevo Leon*: "Villa Hidalgo" [25.364678 -100.161361], 19 June 1940, Hoogstraal & Knight [holotype male] (FSAC); "Huajaco [Huajuco] Canyon , Villa de Santiago" [prob. mislabelled, prob. "Las Adjuntas…pinewoods" or "meadow above Villa de Santiago, 9000 ft." from Hubbell Cat. #114(B3) coordinates *ca.*] [25.224983 -100.172244], 20-22 June 1938, H. Hoogstraal [1 female] (UMMZ).

APPENDIX IV. History of the Project.

This projection started as a mere inkling on a spontaneous field trip some 60 years ago. In 1950 at invitation from the great Mont A. Cazier (1911-1995) of the American Museum of Natural History, the senior author (then a young and budding entomologist of age 20) undertook his first field trip. Realizing early on that the senior author was not a very adept tiger beetle collector, Cazier put him in charge of collecting Orthoptera. He was encouraged to collect in large series, a habit that continued to the present day (much to the benefit of this project). It was also here suggested to the senior author to focus his energies on the short-winged katydid genus, *Dichopetala*.

The suggestion stuck, going much further beyond the AMNH trip than initially conceived. In 1956, when his thesis topic was switched to *Neobarrettia*, he continued to collect *Dichopetala* on all subsequent field trips, in addition to acquiring material for his dissertation. Even while concentrating on his second major project, the melanopline genus *Barytettix*, with Irving Cantrall, he spent a great deal of time closing distributional gaps of *Dichopetala* throughout northern Mexico. These intensive focuses continued mainly from 1956 to 1979 and in the midst of (or perhaps in spite of) many peripheral projects, the dichopetaline material kept on accumulating. During this time, he had sorted out the species, recognizing a number of new ones and as a result, many drawings were commissioned from Martha Lackey during this period. The field focus of *Dichopetala* waned in the 1980's as attentions shifted to the west coast and the species of *Pristoceuthophilus* but the work had barely begun and the sizeable collection required attention. During collaboration on this camel cricket genus with T. H. Hubbell and at the urgings of the collections manager, the *Dichopetala* material was labeled and sorted into unit trays, making many of the complex taxonomic and biogeographical problems more apparent. And so with these problems begging for attention, intensive museum work regarding *Dichopetala* resumed in 2004.

It was at this point that a new idea emerged. A visit to the UMMZ collection by Paolo Fontana, who was very familiar with European fauna similar in appearance to *Dichopetala*, brought more biogeographical problems to light. It was at this time that Lacey Knowles suggested that a molecular analysis might solve some of the problems of intercontinental relationships. This resulted in a month-long field trip to Mexico by Fontana specifically to collect material preserved for molecular work in the fall of 2004. Shortly thereafter, again at Lacey Knowles urging, Roberto Battiston came to Ann Arbor during two summers to do a morphometric analysis to help shed light on the intercontinental problem.

In 2005, Abigail Alvarez joined the project to database and georeference the immense *Dichopetala* collections while innovating several mapping techniques. Upon completion of this portion of the project, she assisted in preparing photographs and figures of many morphological structures for publication.

In 2007, Daniel Swanson joined the team and spent the next four fall seasons (2007-2010) on collecting molecular material of the several species in Texas. In the following year after the first trip, he made a few initial attempts at constructing a molecular phylogeny but poor results hampered this endeavour. Instead, he familiarized himself with the taxa and the senior author's research and joined in the analysis of morphological, phylogenetic, and biogeographical elements of the dichopetalines. Since the deterioration of the senior author's eyes, the junior author has assumed more control within the project while conducting the literary research and dissecting and photographing morphological features for publication.

APPENDIX V. Dedication to the Senior Author[2].
by D. R. Swanson

2

INDEX

Names are listed only under their current binomial in instances where specific epithets have switched gender.