UNIVERSITY OF MICHIGAN
MUSEUM OF ZOOLOGY

Miscellaneous Publications No. 22

The Genus Oligoclada (Odonata)

BY

DONALD J. BORROR

Department of Zoology and Entomology
Ohio State University
Columbus

ANN ARBOR, MICHIGAN
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FREDERICK M. GAIGE,
Director of the Museum of Zoology,
University of Michigan.

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THE GENUS *OLIGOCLADA* (ODONATA)

By Donald J. Borror

Acknowledgments

For the opportunity to study *Oligoclada* I am indebted to Mr. F. M. Gaige, Director of the Museum of Zoology, University of Michigan, through whom I obtained the privilege of examining material in the Museum. Work was begun during the Christmas holidays of 1929, when I spent some eight or nine days at the Museum of Zoology. At the end of that time the material was brought back to Ohio State University for further study.

I wish to express my appreciation to those who have aided me in the preparation of this paper: to Mr. E. B. Williamson for suggesting the study and for assistance he has given me; to Dr. C. H. Kennedy of Ohio State University for help and valuable suggestions during the study; to Dr. F. Ris for the notes on his material incorporated in this paper; to Dr. C. L. Hubbs of the University of Michigan for assistance in selecting specific names, and to Dr. E. M. Walker of Toronto for loaning material.

This study of one libelluline genus has been made possible by the monumental work of Ris (9 and 10), which prepared the ground for such detailed investigations as this.

Source of Material

All of the material examined in the preparation of this paper, with the exception of two specimens in the collection of Ohio State University and 17 specimens loaned me by Dr. E. M. Walker, was loaned me by the Museum of Zoology, University of Michigan.

The material in the Museum of Zoology collection consists of five lots, as follows: Lot 1 from British Guiana, 1912, collected by L. A. Williamson, E. B. Williamson, and B. J. Rainey; Lot 2 from Colombia, 1917, collected by J. H. Williamson and E. B. Williamson; Lot 3 from Venezuela, 1920, collected by J. H. Williamson, E. B. Williamson, and W. H. Ditzler, and two specimens of *heliophila* from the Canal Zone collected by J. H. Williamson; Lot 4 from Peru, 1920, collected by H. S. Parish; Lot 5 from Brazil, 1922, collected by J. H. Williamson and J. W. Strohm.

The two specimens in the Ohio State University collection were collected by H. S. Parish in British Guiana in 1901. The material loaned me by Dr. Walker was collected by G. Belmontes in Trinidad in 1930. The material in Dr. Ris' collection, aside from that coming from the five lots enumerated above, was collected by A. H. Fassl along the Amazon River in Brazil, 1920–2.

LOCALITIES WHERE COLLECTIONS WERE MADE

There follows an alphabetical list of the localities in which *Oligoclada* has been taken, together in some cases with a few notes on the type of the habitat:

1. Abuná, Matto Grosso, Brazil. In the southwestern part of Brazil on the Madeira River, along the border between Brazil and Bolivia. The collecting (where the specimens of *Oligoclada* were taken) was done along "Km. 216 creek." (12)[1]

2. Angostura (Ciudad Bolivar), Venezuela. On the south bank of the Orinoco River, about 250 miles above its mouth.

3. Aracataca, Colombia. "On the Santa Marta-Fundacion railroad, near the Fundacion terminus and about 55 miles from Santa Marta. Elevation probably about 50 feet. Collected at irrigating ditch near fruit company station." (11, p. 21.)

4. Bartica, British Guiana. On the Essequibo River, about 40 or 50 miles below Rockstone.

5. Belem (Pará), Pará (Grao Pará), Brazil. The collecting was done chiefly in the grounds of the city waterworks company.

6. Carvoeiro, Amazonas, Brazil. The collecting was done along the Rio Negro.

7. Cayenne, French Guiana. Along the coast.

8. Ceara (Fortaleza), Ceara, Brazil. On the northeast coast of Brazil, about 700 miles southeast of Belem.

9. Coary, Amazonas, Brazil. On the Amazon, about 200 miles above Manáos.

10. Cristalina, Colombia. "On the railroad 28 kilometers above Puerto Berrio, the latter town a river port on the Magdalena 163¾ leagues above Barranquilla, Colombia. At an elevation of about 1,050 feet, Cristalina lies in a rolling forested country and abounds in beautiful small, clear, gravelly streams with many ripples and a very few small waterfalls. These streams vary from a foot or two to six or twelve feet in width and all flow into the Rio Diez-y-seis, a stream of varied character, 15 to 30 feet wide." (11, p. 29.)

11. Fonteboa (Fonte Boa), Amazonas, Brazil. On the Rio Solimoes.

12. Fundacion, Colombia. "At the end of the railroad from Santa Marta. Elevation about 50 feet. Rio Fundacion here is a wide, shifting, sand-bottomed river. Irrigating ditches from the river furnished the only running water (except the river itself) at that season." (11, p. 32.)

13. Gamboa, Panama Canal. The collecting was done along the canal.

14. Georgetown, British Guiana. The specimens of *Oligoclada* were collected along Pont Trench.

[1] Numbers in parentheses refer to bibliography at the end of the paper.

15. Itaituba, Pará (Grao Pará), Brazil. On the Rio Tapajoz, about 150 or 200 miles above its mouth.

16. La Fria, Venezuela. "A station on the railroad above El Guayabo. Elevation, 460 feet. La Fria lies at the edge of the hills in the valley which extends northward to Lake Maracaibo. The forest is heavy mixed growth, and north of town . . . it is nearly flat, with occasional small and very muddy, swampy spots, but with no flowing water. East of town, and crossed by a spur of the railroad, is a sandy quebrada, eight to ten feet wide, with a good flow of water, which, however, disappears in the sandy soil a few miles north or northeast of town. The old stone road south of town goes back among the hills, and about two kilometers from town it crosses the beautiful little quebrada La Fria, which in its lower course, near the stone road, is a gently flowing stream, five to ten feet wide, of sand, gravel, and boulders. Growing in the stream were many plants of a calla-like arum. About a kilometer and a half beyond the quebrada La Fria the road crosses the slightly larger quebrada Santiaquita. This quebrada, possibly a kilometer below the stone road, meets with another and slightly larger stream. These streams were very similar to the fine little streams about Cristalina, Colombia, except that possibly there were more rocks in the La Fria streams, especially in their upper courses." (11, p. 33.)

17. Leticia, Peru. On the north bank of the Rio Solimoes, just across the border from Brazil.

18. Manáos, Amazonas, Brazil. The collecting was done at Manáos itself and between the city and Flores, to which a street car line runs.

19. Moura, Amazonas, Brazil. The collecting was done from a boat on the river (Rio Negro).

20. Pará (Grao Pará), Brazil. A large state in the northeastern part of Brazil. Also another name for the city of Belem.

21. Peba, Amazonas, Brazil. On the Amazon. If not identical with Teffé, then in the same general locality.

22. Porto Alegre, Rio Gronde do Sul, Brazil. In the southern part of Brazil, at the north end of Lagos dos Patos.

23. Porto Velho, Amazonas, Brazil. , On the Madeira River below the falls. The collecting was done along the city water supply creek, and along various creeks and swamps near town.

24. Potaro Landing, British Guiana. On the Potaro River, near its mouth.

25. Potaro River, British Guiana. This empties into the Essequibo River about 100 miles above its mouth.

26. Puerto Berrio, Colombia. A river port on the Magdalena 163¾ leagues above Barranquilla, Colombia.

27. Rio Frio, Colombia. "On the railroad about 48 kilometers from Santa Marta. Elevation probably about 50 feet. A fine, clear, swift stream, the Rio Frio, 40 to 60 feet wide, crosses the tracks here. At this season it could be waded. Trees grow to the water's edge. . . . Streams were generally absent at this season in the semi-arid chaparral, but irrigating ditches to a certain extent took their place." (11, p. 38.) The collecting was done along the river (Rio Frio), along various small streams, and along the irrigating ditches.

28. Rio São Lourenco, Matto Grosso, Brazil. A river in the southern part of Matto Grosso.

29. Rio Tapajoz. A river in central Brazil emptying into the Amazon. Its headwaters are in southern Brazil.

30. Rockstone, British Guiana. "On the Essequibo River and on the Wismar-Rockstone railroad. . . . Just east of the hotel is a large log-jammed creek, 15 to 20 feet wide in low water. A short distance below the railroad station is a small, muddy creek, nearly dry, a succession of stagnant pools with no running water. On the large island in the Essequibo opposite Rockstone is a similar but drier muddy creek bed." (11, p. 39.)

31. San Antonio (São Antonio), Matto Grosso, Brazil. On the Madeira about 10 or 15 miles above Porto Velho. The collecting was done east of town along the big backwater creek which empties into the Rio Madeira just south of the railroad station. This creek was about 15 feet wide and 3 or 4 feet deep.

32. Sangre Grande, Manzanilla, Trinidad. In the northeastern part of the island, at the end of a railroad from Port of Spain.

33. Santarem, Pará (Grao Pará), Brazil. On the Amazon.

34. Surinam. Another name for Dutch Guiana.

35. Tachira, Venezuela. "Terminus of the railroad from Encontrados on the Catatumbo River. Elevation about 1,200 feet. Tachira lies on the mountains back of La Fria where the hills first begin. It is in a heavily wooded region of steep or precipitous mountain sides with many streams. In the deeper valleys are swift streams 15 to 30 feet wide, with pools and many rapids, but no waterfalls. The beds of such streams are wide and exposed, and odonate life is rare on them. Two of these streams are the Rio Uraca, which the railroad crosses about a mile below town, and the Rio Lobaterita, on the west side of town, in a deep valley. Tributary to these streams are small quebradas of various characters. Some are miry, sluggish streams with only a small flow of water. Others are rocky, with waterfalls 6 to 10 feet high. More rarely there are tributaries of an intermediate character, where the fall is about 3 to 15 feet in the hundred, with frequent little waterfalls. In such a quebrada the stream bed is usually small, rounded boulders, with some gravel." (11, pp. 43–4.)

36. Teffé, Amazonas, Brazil. On the Amazon.

37. Tumatumari, British Guiana. On the Potaro River, about 75 miles above Rockstone. "Country hilly and heavily wooded. Above town on the right bank is a small, sluggish stream, known as Cashew Creek, 2 to 6 feet wide, with a mud bed. A similar stream with less flow of water is on the left river bank below the falls in the river. A trail from Tumatumari leads back into the forest and about 4 or 5 miles from town crosses Tiger Creek, a sluggish stream almost too large to wade. Farther upstream there is a large waterfall in Tiger Creek known as Washerwoman Falls. The trail from Tumatumari to Tiger Creek crosses a few little streams from a few inches to as large as 3 feet in width. They are generally muddy and some of the smaller ones lose themselves in the forest. One of these streams, about 3 miles out from Tumatumari, was followed to its mouth in Tiger Creek." (11, pp. 45–6.)

38. Turaty. Not located.

39. Wismar, British Guiana. "On the Demerara River, 62 miles above Georgetown. . . . Some small, muddy creeks tributary to the Demerara adjacent to town, easily waded earlier in the day, are so backed up with water in the late afternoon, due to the tides, that the collector finds them impossible to work. There is a small wooded creek south of town and a smaller swamp one, rising in some low hills, just west of town. Below town the footpath to Christianburg crosses a muddy, log-filled creek. At Christianburg there is a small, muddy creek in the brush parallel to and near the bank of the canal." (11, p. 46.)

HISTORICAL

The genus *Oligoclada* was defined by Karsch in 1890 (4), who based it on two specimens, which he called *O. pachystigma.* The first of these, a female from Angostura, which bears the handwritten type label, is to be considered the type; the other, a male from Porto Alegre, was later (1911) redescribed by Ris (9) as a new species, *laetitia,* because it came from another faunal region, and because it showed apparently specific differences from a male of *pachystigma* from Surinam.

Previous to 1890, two species of libellulines had been described which were later transferred to the genus *Oligoclada.* Rambur (8) in 1842 described *Libellula abbreviata* from a female from Cayenne. This species was transferred to the genus *Mesothemis* in 1861 by Hagen (2), although he considered this classification somewhat doubtful, and to the genus *Erythrodiplax* (again doubtful) in 1875 (3). Kirby in his catalogue in 1890 (6) transferred this species to the genus *Trithemis. Abbreviata* was finally put in the genus *Oligoclada* by Ris in 1911 (9). *Sylvia* was described by Kirby in 1889 (5) as *Nannothemis sylvia.* He gave it this

name in his catalogue the following year (6). This species was transferred to the genus *Oligoclada* in 1911 by Ris (9).

Since 1890, five other species in the genus have been described: *rhea* Ris, 1911 (9); *laetitia* Ris, 1911 (9); *amphinome* Ris, 1911 (9); *raineyi* Ris, 1911 (9); and *walkeri* Geijskes, 1931 (1).

In examining the material before me, which undoubtedly contains more specimens of this genus (265) than all the other collections in the world put together, I have found 6 new species, making a total of 14 species in the genus. In this discussion the status of *O. rhea* Ris and *O. laetitia* Ris must remain somewhat doubtful, since they were not represented in the material examined. *O. rhea* is represented by but one specimen, which is in the collection of de Selys at Brussels. It was not available for examination in the present study. The single specimen of *laetitia,* in the Museum of Berlin, was likewise unavailable. The published descriptions of these two specimens are inadequate to separate them from the nearest related species; hence they are not treated as fully in this paper as the other species.

The species of the genus *Oligoclada* recognized in this paper, and the six natural groups into which they fall, are as follows:

Group I.	1. *O. sylvia* Kirby
	2. *O. monosticha,* new species
	3. *O. stenoptera,* new species
	4. *O. rhea* Ris
Group II.	5. *O. pachystigma* Karsch
	6. *O. laetitia* Ris
	7. *O. xanthopleura,* new species
Group III.	8. *O. crocogaster,* new species
	9. *O. amphinome* Ris
Group IV.	10. *O. heliophila,* new species
	11. *O. raineyi* Ris
Group V.	12. *O. walkeri* Geijskes
	13. *O. umbricola,* new species
Group VI.	14. *O. abbreviata* Rambur

CHARACTERS OF THE GENUS

GENERAL APPEARANCE AND HABITS

The dragonflies of the neotropical libelluline genus *Oligoclada* form a very clear-cut group, and can scarcely be confused with the dragonflies of any other genus occurring in the same region. They are all small, the largest being only about an inch long; the adult male is usually shining blue or black, covered with a pale bluish pruinescence on the thorax; the adult female is usually brownish or bluish, also covered with pruinescence;

the abdomen is long and spindle-shaped in the male, and thicker and more cylindrical in the female; the legs are very long and slender, with long slender bristles; and the tarsal claws are armed in most cases with only a very small tooth.

Oligocladas are stream species, and are found usually along small streams in woods or in clearings, where they alight on the ground near the stream, or on the surface of leaves overhanging the water. They are to some extent suggestive of *Megapodagrion* or a gomphine in alighting on flat surfaces. They rest with the abdomen and wings in the same plane. In the field, oligocladas are quite different from anything else.

The differences in the habits of different species of the genus are in some cases very slight; in other cases they are quite noticeable. My information on the habits of the various species is for the most part limited to the notes on the envelopes; for any general or additional information I am indebted to Mr. J. H. Williamson and Mr. E. B. Williamson.

HEAD

Eyes touching or nearly so for a very short distance behind vertex; anterior edges forming a **V** down to ventral (anterior) edge of vertex; from there to ventral side of head subparallel, slightly diverging; eyes brownish in preserved specimens, sometimes greenish in life, with an area of larger facets above, beginning at level of base of antennae.

Occiput small, in dorsal view triangular; in some species smoothly convex behind, in others posterior margin of occiput swollen, in still others a short, finger-like projection on either side of posterior margin. Occiput brown or brownish black, in some species with yellow or yellowish brown spots on posterior margin.

Vertex swollen, metallic blue or bluish green, with numerous black hairs a little longer than second antennal segment. Ocelli shining yellowish; lateral ocelli circular, median ocellus slightly elongate laterally. Lateral ocelli at sides of vertex nearly touching compound eyes; median ocellus in sunken area between vertex and frons.

Antennae short, 5-segmented; basal segment much swollen; second and third segments slender, fourth and fifth slightly more slender; first segment slightly shorter than others, except third; second, fourth, and fifth segments approximately equal in length; third segment about as long as first. Antennae arising immediately below lateral ocelli.

Frons prominent, swollen; upper half slightly bilobed; usually metallic blue with lower edge yellowish or brownish in male; metallic blue or brownish in female; with numerous hairs, especially laterally. Clypeus usually yellow or yellowish green; sometimes brownish in female. Labrum usually

yellowish with distal edge black; sometimes greenish or brownish; sometimes distal half or more black.

Labium usually yellow with a median band of black, the width of which varies between species and individuals; in some cases it may be absent altogether; in others it may cover almost the entire labium.

THORAX

Thorax metallic blue or black, occasionally tinged with reddish, purplish, or greenish; sometimes brownish in female or teneral specimens. Sides of thorax, especially in older individuals, covered with a pale bluish pruinescence; ventral side of thorax and bases of legs covered with a denser, lighter colored pruinescence. Sides of thorax sometimes with light bands. Posterior lobe of prothorax widely bilobed, with a fringe of long white hairs. Antealar ridges usually with a few spine-like teeth, and a large tooth at lateral end of ridge. Ventral side of thorax with long white hairs; lateral and dorsal sides usually covered with shorter and darker hairs.

LEGS

Legs long and slender, hind femur reaching to about middle of third abdominal segment; black or bluish black, shining, usually pruinose at base. Posterior coxae long and slender, contiguous; middle and fore coxae oval and slightly separated. Hind femur with about 15 or more close, short, (usually) gradually lengthening spines on externo-anterior angle; at end a long spine; on mesal anterior angle a row of long fine hairs; spines of middle and front femora longer and usually fewer in number than those on hind femur. Ten or more spines on both mesal anterior and externo-anterior angles of tibiae; spines in distal half of front tibia, on externo-anterior angle, short, flattened, and very close together, forming a comb-like structure. Tarsi long and slender, nearly half as long as tibiae; 3-segmented, first segment short, last two of about equal length; first segment one third to one half as long as either of two following segments; eight or more short thick hairs on mesal anterior and externo-anterior angles. Tarsal claw long; tooth on claw usually little more than a notch or indication of a notch, sometimes distinct, located at a point on claw two thirds length of claw or more distad.

WINGS

Wings hyaline; sometimes tinged with yellowish brown, especially distally; in female sometimes yellowish at base. In males of five species (*heliophila, raineyi, walkeri, umbricola,* and *abbreviata*) a darkly pigmented area of variable size at base of hind wing; this usually does not extend beyond cubital cross vein. Stigma usually dark reddish brown.

Anal membrane very small. Sectors of arculus fused for a short distance, separating between first and second antenodals. In front wing 6–11½ antenodals, 4–12 postnodals; in hind wing 5–9 antenodals, 5–13 postnodals. Last antenodal in front wing complete or incomplete (varying between species and individuals of same species); last antenodal in hind wing usually complete. Triangle in front wing free or with one cross vein (varying between species and individuals of same species); costal side of triangle usually straight, but sometimes slightly broken, with a short distal piece. Subtriangle in front wing free or composed of three cells; when free usually two cells bordering proximal side, when three celled usually three cells bordering this side. Usually no supratriangular cross veins. Triangle in hind wing free; in some species and individuals M_4 not meeting costal side of triangle, but meeting distal side slightly extended. Origin of Cu_1 in hind wing usually near posterior end of distal side of triangle. Arculus in hind wing continuous with proximal side of triangle. Usually one (rarely two) cubital cross veins in each wing; that in hind wing opposite or sometimes proximal to origin of A_3. Usually one bridge cross vein in each wing (rarely two). One row of 3–8 cells between *Rs* and *Rspl; Rspl* not always sharply formed, the number of cells between *Rs* and *Rspl* often indefinite. One or two rows of posttrigonal cells in front wing (varying between species); rarely three cells bordering the triangle, then two rows immediately following. Anal loop variable between species, usually more or less foot-shaped. One to four rows of cells (postloop cells) between posterior border of anal loop and hind margin of wing at level of arculus (varying in number between species and to a lesser extent between individuals of the same species). Stigma short, 1–1¾ cells long; somewhat longer in hind wing than in front wing.

Front wing 17–26 mm., hind wing 16–25 mm., stigma 1.3–2.5 mm. Front wing broader at nodus than at arculus; hind wing usually about as broad at arculus as at nodus. Nodus approximately midway between base and tip of wing.

ABDOMEN

Abdomen slender and somewhat spindle-shaped in male, with segments 2 and 3 widest, and 4 and 5 narrowest. Abdomen thicker and more cylindrical in female. Abdomen usually metallic bluish black in male and bluish black or brown in female; the two or three basal segments usually pruinose; each segment lighter at its posterior margin, especially on ventral side; ventral side of segments 7–10 in male of some species tinged with reddish and of some species distinctly red.

Transverse carinae on segments 2 and 3 always present and distinct in male; transverse carina on segment 4 definite and complete in some species,

in others lacking or only faintly indicated. In female transverse carinae always present and complete on segments 2, 3, and 4.

Length 13–19 mm., including appendages.

MALE GENITALIA OF THE SECOND SEGMENT

Anterior lamina flattened but somewhat projecting, but usually not extending to level of apex of hamules; free edge thin or swollen, forming in some species a **V**, in others a broad **U**, in still others nearly straight; numerous bristles projecting caudad and ventrad from free edge, those projecting caudad the longer.

Hamules short, never much higher than lobe or anterior lamina; distal end of hamule in some species a more or less spiral ridge terminating in a mesal hook or tooth directed caudad (when the term *ridge* is used in descriptions of hamules it refers to that portion of the ridge on the external face of the hamule); in others distal end rounded or more or less quadrate, with tooth on posterior side of hamule and directed cephalad.

Lobe variable; in some species large (broader than hamule), narrowed at base or with sides parallel; in other species small (as broad or narrower than hamule, and not as high). Free edges of lobe usually with numerous hairs or bristles directed ventrad.

The characters of the penis are discussed below.

PENIS

The structure of the penis differs considerably between the different groups within the genus, but does not differ a great deal between species in the same group.

The basal segment of the penis, or vesicle, varies but little. It is rather strongly chitinized and usually bears numerous short hairs or bristles. The middle segment of the penis bears a small knob-like protuberance on its anterior surface, and frequently appears to be divided transversely into two segments just distal to this protuberance. The terminal segment, which bears at its apex the various lobes, shows considerable variation.

In most species, the lateral lobes are large, extending flap-like over the other lobes, so that only portions of the other lobes protrude beyond the edges of the lateral lobes. They are rather heavily chitinized at the base, with the chitinization decreasing toward the apex. The medial lobes are also usually heavily chitinized at the base with the chitinization decreasing toward the edges. The cornua, when present, arise between the internal lobes and are usually rather slender, heavily chitinized structures. The posterior and internal lobes are lightly chitinized and covered with numerous minute tubercles or short bristles. All the lobes are paired except the posterior lobe, which is single. In some species there are lobes present the exact homologies of which are somewhat uncertain.

The structure of the penis has been very useful in arranging the species of the genus into the different groups. When other characters alone are considered the exact line of separation between some groups is rather hard to draw, but when the structure of the penis is considered the different groups stand out very sharply, as may be seen by an examination of the drawings (Plate VI).

A key to the groups of species, based on the characters of the penis, is given below to show the relationships of the groups.

1.	Cornua present, filiform; lateral lobes usually triangular, not narrowed basally. (Groups I, II, and III)	2
1′.	Cornua apparently lacking, or if present flap-like, not filiform; lateral lobes usually rounded and narrowed basally. (Groups IV, V, and VI)	4
2. (1)	Cornua and internal lobes approximately the same length	Group I
2′.	Cornua much longer than internal lobes. (Groups II and III)	3
3. (2′)	Cornua extending to apex of lateral lobes; medial lobes two thirds as long as cornua or longer	Group II
3′.	Cornua extending considerably beyond apex of lateral lobes; medial lobes one third as long as cornua or less	Group III
4. (1′)	Medial, internal, lateral, and posterior lobes present and distinct, all small; medial lobes simple, elongate, with numerous small teeth on ventral edge; posterior lobe narrowed basally	Group IV
4′.	Medial lobes developed into an arch-like process, or into a large 3-branched structure on ventral side of penis; other lobes small; usually no small teeth on ventral edge of medial lobes; internal lobes sometimes apparently lacking; posterior lobe usually not narrowed basally. (Groups V and VI)	5
5. (4′)	Medial lobes developed into an arch-like process on ventral side of penis.	Group V
5′.	Medial lobes not developed into an arch-like process on ventral side of penis.	Group VI

ABDOMINAL APPENDAGES OF THE MALE

Superior appendages about as long as segment 9; tip pointed; distal half usually more or less swollen, proximal half usually somewhat dorso-ventrally flattened; inferior angle usually definite, but sometimes rounded. Usually 1 to 8 or 9 teeth of varying size on ventral face of appendage, although sometimes none may be apparent in profile. Superior appendages broadened at base; in dorsal view separated at base by one or two times their width, and usually convergent distally.

Inferior appendage usually shorter than superiors; triangular; truncate and slightly notched at apex; apex developed into two spine-like teeth directed dorsad and cephalad.

Superiors and inferior covered with numerous short, fine hairs, which, on ventral side of inferior appendage, are longer and bristle-like. Paraprocts with numerous rather long hairs or bristles.

Valvules small, oval, contiguous.

GENITALIA AND ABDOMINAL APPENDAGES OF THE FEMALE

Vulvar lamina feebly indicated as two small flap-like thickenings of posterior margin of sternite of segment 8. Anterior gonapophyses lacking; median gonapophyses reduced to two minute finger-like projections.

Superior appendages small, about half as long as segment 9; pointed at tip, and finely pubescent.

IMMATURE STAGES

Nothing is known of the immature stages of this genus.

KEY TO THE SPECIES OF *Oligoclada*

The following key is based on material examined except in the case of both sexes of *rhea* and *laetitia,* and the females of *sylvia, stenoptera, amphinome, raineyi,* and *umbricola,* for which earlier descriptions were used when available. Females of *stenoptera, rhea, laetitia, amphinome, raineyi,* and *umbricola* are not known. The key will probably be found adequate for the separation of many if not all of these unknown females, since non-sexual characters, some noted in this paper for the first time, have been employed whenever possible.

1. Triangle and subtriangle in front wing free; last antenodal in front wing complete or incomplete; transverse carina on fourth abdominal segment in male lacking or only faintly indicated. (Groups, I, II, and III) 2

1′. Triangle in front wing free or crossed, subtriangle composed of three cells; last antenodal in front wing incomplete; transverse carina on fourth abdominal segment in male definite and complete. (Groups IV, V, and VI) 10

2. (1) Posttrigonal cells 1-rowed for a distance of four or more cells, then 2-rowed. Group I, in part) 3

2′. Posttrigonal cells 2-rowed for a distance of four or more cells, then 3-rowed. (Group I, in part, Groups II and III) 4

3. (2) Small species (hind wing less than 16.5 mm.); superior appendage without distinct teeth on ventral side; occiput of male with two yellow spots on posterior margin; upper half of frons metallic blue, lower half yellow; 5–6 postnodals in front wing. Amazonian (northern Brazil and Guiana) ..... **sylvia** Kirby, page 19.

3′. Larger species (hind wing more than 17.5 mm.); superior appendage with distinct teeth on ventral side; occiput of male uniformly brownish black; frons metallic blue with only lower edge brownish; 7–8 postnodals in front wing. Amazonian (Leticia, Peru) ..... **monosticha,** n. sp., page 20.

4. One row of postloop cells in hind wing. (Group I, in part) 5

4′. Two or more rows of postloop cells in hind wing. (Groups II and III) 6

5. (4) Superior appendage without distinct teeth on ventral side; nodus approximately midway between base and tip of wing. Amazonian (Abuná, Brazil) ..... **stenoptera,** n. sp., page 22.

5′. Superior appendage with distinct teeth on ventral side; nodus nearer base of wing than tip. Amazonian (Pará, Brazil) ..... **rhea** Ris, page 24.

6. (4′) Tarsal claw with an indefinite tooth (merely a notch) located at about two thirds the length. (Group II, in part) 7

6′. Tarsal claw with a definite tooth (more than a notch) located at three fourths the length or more. (Group II, in part, and Group III) 8

7. (6) Amazonian (northern Brazil and Guiana) ..... **pachystigma** Karsch, page 24.

7′. Southern Brazil (Porto Alegre) ..... **laetitia** Ris, page 26.

8. (6′) Six or 7 antenodals in front wing; last antenodal complete; lower half of frons yellow; abdominal segments 4–8 in male black, each with a yellowish brown area on the side, with segments 7–9 similar on ventral side to segments anterior to them; 2 rows of postloop cells in hind wing. Amazonian (northern Brazil along Amazon). (Group II, in part).

xanthopleura, n. sp., page 27.

8′. Eight or more antenodals in front wing; last antenodal usually incomplete; lower half of frons metallic blue, with only lower edge yellowish; abdominal segments 4–8 in male uniformly metallic blue or black, with segments 7–9 red or reddish yellow on ventral side; 2 or 3 rows of postloop cells in hind wing. (Group III) 9

9. (8′) Inferior appendage definitely shorter than superiors; basal half of superior appendage not swollen, appearing in profile either as thick as or thinner than distal half; thinnest point on appendage (profile) near base, or sometimes indefinitely located; inferior angle definite; 4–6 fairly large teeth on ventral surface of superiors, extending from middle of appendage to inferior angle. Amazonian (Porto Velho and Belem).

crocogaster, n. sp., page 29.

9′. Inferior appendage as long as superiors or nearly so; basal half of superior appendage somewhat swollen, appearing in profile either as thick as or thicker than distal half; thinnest point on appendage (profile) at a point about two thirds the length; distal third more or less swollen, inferior angle rounded; 4–6 small teeth on ventral surface of superiors, extending from about two thirds the length of appendage to rounded inferior angle. Amazonian (British Guiana and Manáos).

amphinome Ris, page 31.

10. (1′) Posterior margin of occiput with a short finger-like projection on either side; tooth of hamule on anterior side of hamule and directed caudad; 6 or more large teeth on ventral surface of superior appendage. (Group IV) 11

10′. Posterior margin of occiput without such projections, though posterior margin may sometimes be swollen; tooth of hamule on posterior side of hamule and directed cephalad; 6 or fewer small teeth on ventral surface of superior appendage. (Groups V and VI) 12

11. (10) Distal portion of hamule, at base of tooth, much narrower than base of hamule; vulvar lamina developed as two short triangular thickenings, between which is a V-shaped incision. Venezuela and Colombia.

heliophila, n. sp., page 32.

11′. Distal portion of hamule, at base of tooth, as broad as base of hamule; females unknown. Amazonian (northern Brazil and Guiana).

raineyi Ris, page 34.

12. (10′) Posterior margin of occiput only slightly swollen, appearing in dorsal view somewhat bilobed or with a short projection extending caudad; distal end of hamule more or less quadrate; tooth of hamule on externa-

posterior angle, a knob-like projection on externo-anterior angle and a smaller and more acute one on mesal posterior angle; mesal anterior angle rounded; no spine projecting ventrad from hollowed out portion of distal end of hamule though knob on mesal posterior angle may appear in profile to be such a spine; female with a distinct chalky white mark on basal half of mesal side of fore femur. Amazonian (northern Brazil and Guiana). (Group VI) ..... **abbreviata** Rambur, page 39.

12′. Posterior margin of occiput swollen, appearing in dorsal view to have a broad, truncate projection extending caudad, or posterior margin in dorsal view nearly straight; distal end of hamule more or less rounded, with anterior edge rounded and smooth; tooth of hamule in about center of posterior edge; distal end of hamule more or less hollowed out, with a thick, short spine projecting ventrad from hollowed out portion near base of tooth; female without a distinct chalky white mark on mesal side of fore femur. (Group V) 13

13. (12′) Posterior margin of occiput swollen, appearing in dorsal view to have a broad truncate projection extending caudad, the edge of which is straight except for a small notch or furrow in the center; distal portion of superior appendage not swollen, basal half appearing in profile either as thick as or thicker than distal half; apex usually rather truncate, with inferior angle distinct; 2–4 teeth on ventral surface of superior appendage, in a line extending cephalad from inferior angle. Amazonian (northern Brazil and Guiana) ..... **walkeri** Geijskes, page 35.

13′. Occiput smooth, convex; posterior margin in dorsal view straight or only very slightly bilobed; distal portion of superior appendage swollen, with inferior angle rounded; 2–4 small teeth in a line on ventral surface of superior appendage extending cephalad from rounded inferior angle. Colombia and Venezuela ..... **umbricola**, n. sp., page 38.

DESCRIPTIONS OF SPECIES

All descriptions, unless otherwise indicated, are based on material examined. The types of all new species are in the collection of the Museum of Zoölogy, University of Michigan.

In the enumeration of material, the names of collectors may be ascertained by referring to page 5. The figures of the ratios of the sides of the triangles are for proximal, costal, and distal sides respectively; measurements were made with camera lucida. When these figures are not given it is understood that they are similar to those in the next preceding species for which they are given.

The tabulation of venational characters given in the description of the male of each species is based on material from both sexes (except in species where only males were examined), since the differences between the venational characters of the two sexes were not found to be significant. The percentages given are based upon all the specimens listed under each species.

1. *Oligoclada sylvia* Kirby

Figures 1, 13, 27, 35, 72

Nannothemis sylvia Kirby, 1889 (5).
Oligoclada sylvia Ris, 1911 (9).

Male. Abdomen 13–13.6 mm. (average 13.25 mm.); hind wing 16–16.2 mm. (average 16.1 mm.); stigma 1.3–1.5 mm. (average 1.37 mm.).

Occiput smoothly convex, dark shining reddish brown, with two yellow spots on posterior margin. Upper half of frons metallic blue; lower half yellow, becoming grayish at sides near eyes. Labium yellow with a narrow median band of black about one-third the width of labium or less, narrowed at either end.

Thorax metallic black, crossed by four bluish gray pruinose bands: one just anterior to humeral suture on mesepisternum, extending upward almost to antealar ridge; another extending from lower end of first lateral suture upward in front of spiracle to latero-alar ridge; another extending from lower end of second lateral suture upward behind spiracle to latero-alar ridge, fusing with second band; fourth on metepimeron. Penultimate spine on externo-anterior angle of hind femur one-fourth or less the length of ultimate spine. Tooth on tarsal claw a distinct notch located at about three-fourths the length.

Venational Characters. Antenodals in front wing: 7 (100%); postnodals in front wing: 5 (88%), 6 (12%); antenodals in hind wing: 5 (100%); postnodals in hind wing: 5 (100%); last antenodal in front wing: complete (100%); cells bordering proximal side of bisector of anal loop: 3 (38%), 4 (62%); cells bordering distal side of bisector of anal loop: 3 (100%); interpolated cells in distal half of anal loop: 0 (100%); rows of postloop cells in hind wing: 1 (100%). Hind wings narrowed at base; costal side of triangle in front wing sometimes broken, with a short distal piece; ratio of sides of triangle 6–5–6. Anal loop not at all foot-shaped; cubital cross vein in hind wing proximal to origin of A_3 one-half or more the length of cell posterior to it; Cu_1 in hind wing arising from middle of distal side of triangle.

Anterior lamina not as high as hamules, free edge thin and **U**-shaped. Hamules projecting about as far as lobe; posterior edge of ridge rounded, not prominent or projecting; anterior edge spiral shaped, terminating in a mesal hook directed caudad. Lobe rounded, slightly narrowed at base, with numerous hairs or bristles extending ventrad from free edge.

Lateral lobes of penis large and roughly triangular, apex somewhat rounded. Apical portion of lateral lobes with numerous very short bristles. Medial lobes entirely hidden by lateral lobes; small and heavily chitinized basally, the chitinization decreasing distally. Internal lobes

long and slender, dorsal and ventral edges nearly parallel; apex extending beyond distal edge of lateral lobes, and covered with numerous short, thick bristles. Cornua very slender and extending slightly beyond apex of internal lobes. Posterior lobe (if correctly identified) appearing between medial and internal lobes; apparently not heavily chitinized; surface covered with short thick hairs or bristles.

Superior appendages slender, slightly swollen distally; tip pointed and gradually tapering; inferior angle rounded; 4–5 minute teeth or tubercles on externo-inferior surface, not apparent in profile. Inferior appendage slightly shorter than superiors.

Female. No females of this species were examined. From the original description (5), the female must be very similar to the male.

Material Examined. 4 males. BRITISH GUIANA: Wismar, 1912, 1 male January 30, 1 male January 31. BRAZIL: Carvoeiro, 1922, 2 males July 11.

Distribution. This species is Amazonian in its distribution. Besides the localities just mentioned, it is recorded from Rio Tapajoz (coll. Ris), Ceara (5, 9) (Kirby's type), Surinam (9), Venezuela (9), Turaty (9), and Peba (9). The status of the specimen from Peba, a female, is, however, open to question.

Sylvia is the smallest species in the genus and is easily recognized because of its size. It and *monosticha* are the only ones in the genus which have but one row of posttrigonal cells in the front wing, and a distinct thoracic pattern in the male. This pattern is more distinct in *sylvia* than in *monosticha.*

2. **Oligoclada monosticha,** new species

Figures 2, 14, 28, 36, 73

Male. Abdomen 15.1–15.5 mm. (average 15.3 mm.); hind wing 18.2–18.3 mm. (average 18.25 mm.); stigma 1.6–1.9 mm. (average 1.75 mm.).

Occiput smoothly convex, brownish black. Clypeus greenish yellow, more greenish laterally and ventrally; labrum yellowish green. Labium yellowish, with a median band of black about one-third its width, narrowed at either end.

Thorax metallic bluish black, crossed by three rather obscure, gray pruinose bands: one just anterior to ventral half of humeral suture; another extending from base of second lateral suture up across spiracle to latero-alar ridge below front wing, broadening at spiracle (area immediately around spiracle black); the other a narrow band along posterior side of second lateral suture. Penultimate spine on externo-anterior angle of hind femur, and those proximal to it, very short. Tooth on tarsal claw a distinct notch, located at about two-thirds the length.

Venational Characters. Antenodals in front wing: 7 (13%), 8 (75%), 9 (12%); postnodals in front wing: 7 (88%), 8 (12%); antenodals in hind wing: 5 (13%), 6 (75%), 7 (12%); postnodals in hind wing: 7 (88%), 8 (12%); last antenodal in front wing: complete (100%); cells bordering proximal side of bisector of anal loop: 4 (12%), 5 (88%); cells bordering distal side of bisector of anal loop: 4 (12%), 5 (88%); interpolated cells in distal half of anal loop: 0 (100%); rows of postloops cells in hind wing: 1 (50%), 2 (50%). Hind wings narrowed at base; costal side of triangle in front wing sometimes broken, with a short distal piece; ratio of sides of triangle 7–6–7. Anal loop not at all foot-shaped; cubital cross vein proximal to origin of A_3 a distance equal to one-half or more the length of cell posterior to it; Cu_1 in hind wing arising from about middle of distal side of triangle.

Anterior lamina not projecting as far as hamules; free edge thin, in ventral view forming an arc of a circle. Hamules either shorter than or as high as lobe, narrowed proximal to ridge. Anterior edge of ridge higher than posterior edge, and extended mesally into a hook projecting somewhat obliquely caudad; posterior edge rounded. Lobe large, extending slightly beyond hamule; narrowed at base; a few short hairs projecting ventrad from free edge.

Penis of this species very similar to that of *sylvia,* except lateral lobes slightly longer, apex more pointed, and ventral edge concave in profile; posterior lobe a little larger; internal lobes longer and more tapering.

Basal half of superior appendages somewhat flattened; distal half swollen, with apex more or less truncate; one large and one or two very small teeth close together on ventral surface of appendage, located cephalad from inferior angle at a point the width of appendage (profile) or more. Superior appendages diverging slightly in dorsal view; widely separated (by twice the width) at base. Inferior appendage almost as long as superiors.

Female. Abdomen 15.0–15.5 mm. (average 15.25 mm.); hind wing 19.8–19.9 mm. (average 19.85 mm.); stigma 1.7–2.1 mm. (average 1.9 mm.).

Upper part of frons metallic black; lower part reddish brown. Clypeus and labrum yellowish brown, labrum lighter. Labium yellowish, with median band of black narrower than in male. Lateral lobes of labium with an irregularly shaped gray spot.

Thorax metallic reddish brown, darker below; cross bands on thorax yellow, located as in male. Ventral side of thorax bluish gray, pruinose. Spines on externo-anterior angle of hind femur longer than in male; penultimate spine about one-third as long as ultimate.

Wings hyaline, with membrane at the base hind wing, between Sc and R, and between M and Cu, out as far as arculus, yellowish brown.

Abdomen reddish brown; ventral side black, the black a narrow band on sterna of segments 1 and 2, broadening posteriorly, covering lower half of 4 as seen from the side and about three-fourths of 5, 6, and 7, with rest of abdomen entirely black. In both females examined the posterior part of the abdomen was pressed out of shape so that the vulvar lamina was scarcely visible.

Other characters as in male.

Material Examined. 2 males, 2 females. PERU: Leticia, 1920, 2 males and 2 females June 29. Type male and allotype female selected from this series. The name refers to the single row of posttrigonal cells in the front wing, which distinguishes this species from all the others in the genus except *sylvia.*

The four specimens of this species examined, although not in very good condition, are undoubtedly specifically different from *sylvia* and *rhea,* the closest previously described species. *Monosticha* resembles *sylvia* in wing venation, it has similar thoracic cross bands, and it is only slightly larger, yet the differences in the superior appendages are certainly specific. It agrees with Ris' description of *rhea* (9), except for the single row of post-trigonal cells in the front wing. Since the number of rows of post-trigonal cells in the front wing was not found to vary in any species of the genus, this character must have specific value.

Sketches and a description of this species were sent to Dr. Ris, who says this of his material: "1 male, Fonteboa, August 1922, collected by A. H. Fassl. Agrees perfectly with diagnosis and sketches of species No. 1 (this species). I cannot confront *O. rhea,* of which the single type at Brussels remains the only known specimen. There is just a faint possibility that this type might be an aberrant specimen of species No. 1, with 2 rows in the discoidal field instead of 1."

3. **Oligoclada stenoptera,** new species

Figures 3, 15, 29, 37, 74

Male. Abdomen 15.9–17.0 mm. (average 16.57 mm.); hind wing 18.8–19.6 mm. (average 19.23 mm.); stigma 1.7–2.4 mm. (average 2.02 mm.).

Occiput smoothly convex, metallic brownish black. Clypeus greenish yellow; labrum yellow. Labium yellow, with a narrow central line black; lateral lobes with irregular grayish markings.

Thorax metallic, dark bluish black, tinged with reddish brown. Twenty-five or more spines on externo-anterior angle of hind femur, all but last one being short. Tooth on tarsal claw as in *monosticha.*

Venational Characters. Antenodals in front wing: 7 (17%), 8 (50%), 9 (33%); postnodals in front wing: 6 (17%), 7 (17%), 8 (50%), 9 (16%);

antenodals in hind wing: 6 (50%), 7 (50%); postnodals in hind wing: 6 (17%), 7 (67%), 8 (16%); last antenodal in front wing: complete (100%); cells bordering proximal side of bisector of anal loop: 4 (50%), 5 (50%); cells bordering distal side of bisector of anal loop: 4 (17%), 5 (83%); interpolated cells in distal half of anal loop: 0 (83%), 2 (17%); rows of postloop cells in hind wing: 1 (88%), 2 (12%). Hind wings narrowed at base; ratio of sides of triangle in front wing 4–3–5; anal loop very feebly foot-shaped; cubital cross vein in hind wing proximal to origin of A_3 a distance equal to about one-half the length of cell posterior to it.

Abdomen metallic black, first three segments slightly reddish brown. Posterior edge of sternum of 7, most of sternum of 8, posterior edge of sternum of 9, and ventral side of paraprocts tinged with reddish.

Anterior lamina not projecting as far as hamules; free edge slightly thickened, forming a **V** in ventral view. Hamules about as high as lobe; narrowed proximal to ridge; posterior edge of ridge rounded; anterior edge considerably higher than posterior and extended mesally into a tooth directed caudad and somewhat ventrad. Lobe rounded, narrowed at base; broader at base than base of hamule; numerous hairs or bristles projecting ventrad from free edge of lobe.

Penis very similar to those of two preceeding species, except medial lobes larger and more rounded, and posterior lobe not apparent.

Basal half of superiors somewhat flattened; distal half swollen; inferior angle rounded; three or four small teeth on externo-ventral face of appendage, not apparent in profile. Inferior appendage slightly shorter than superiors.

Material Examined. 3 males. BRAZIL: Abuná, 1922, 1 male March 9, 2 males March 21. Type male, March 9, The name refers to the fact that in this species the hind wings are narrowed at the base, while in the following species the hind wings are as broad at the arculus as at the nodus.

The two paratypes differ slightly from the holotype in that the wings are browner, the ridge of the hamule is more prominent, and the tooth of the hamule projects slightly more ventrad.

This species is very close to *rhea,* but must be specifically different because of the form of the hamules and the superior appendages. No females of this species were examined, but Dr. Ris sent me this note of a female in his collection, taken February, 1920, at Santarem by A. H. Fassl: "This might be *rhea* as well (as this species), if it were not for the proportions between antenodal and postnodal parts of the wings; postnodal part exceptionally long in *rhea* male type (9, fig. 249), regular in present specimen. A distinct feature in the somewhat immature specimen is an exceptionally deep and large golden yellow spot at the wing bases."

The field notes of Mr. J. H. Williamson (12) do not indicate definitely where these three specimens were taken. The type was taken with numerous other specimens, all of which were labelled "woods and open creek material, from Km. 216 creek." The other two specimens were taken in approximately the same place: "along creek and woods at Km. 216."

4. *Oligoclada rhea* Ris

Figure 16

Oligoclada rhea Ris, 1911 (9).

There were no specimens of this species in the material studied; the only known specimen is the type, a male in the collection of de Selys at Brussels, which was not available for examination in the preparation of this paper. From Ris' description (9) of this type specimen, which was taken at Pará (no interpolated cells in the anal loop and one row of postloop cells), and from his figure of the wing (fig. 249), it is quite evident that this species is very closely related to the three preceding species.

5. *Oligoclada pachystigma* Karsch

Figures 4, 17, 30, 38, 47, 48, 49, 50, 51, 52, 67, 75

Oligoclada pachystigma Karsch, 1890 (4); Ris, 1911 (9); 1913 (10).

Male. Abdomen 14.3–17.5 mm. (average 16.04 mm.); hind wing 17.4–21.0 mm. (average 19.6 mm.); stigma 1.5–2.3 mm. (average 1.91 mm.).

Occiput (Belem specimens) convex, dark brown, with two yellow spots and a short, finger-like projection on either side of posterior margin (see figure 49). Occiput (Georgetown specimens) similar, but without projections on posterior margin (see figure 47). Posterior margin of occiput (Porto Velho specimens) appearing in dorsal view more swollen than the two preceding forms; scarcely or not at all bilobed; dark brown or brownish black; spots on posterior margin usually brown and scarcely apparent (see figure 51). Labium yellow, with a median band of black about one-fourth the width of labium, usually narrowed at either end.

Penultimate spine on externo-anterior angle of hind femur about one-fourth or less as long as ultimate spine. Tooth on tarsal claw appearing as a distinct notch, located at about two-thirds the length.

Venational Characters. Antenodals in front wing: 8 (44%), 9 (48%), 10 (6%), 9½ (2%); postnodals in front wing: 6 (17%), 7 (60%), 8 21%), 9 (2%); antenodals in hind wing: 5 (2%), 6 (58%), 7 (40%); postnodals in hind wing: 6 (23%), 7 (56%), 8 (15%), 9 (6%); last antenodal in front wing: complete (98%), incomplete (2%); cells bordering proximal side of bisector of anal loop: 6 (30%), 7 (62%), 8 (8%); cells bordering distal side of bisector of anal loop: 6 (65%), 7 (33%), 8 (2%); inter-

polated cells in distal half of anal loop: 0 (10%), 1 (50%), 2 (38%), 3 (2%); rows of postloop cells in hind wing: 2 (92%), 3 (8%). Ratio of sides of triangle in front wing: 5–3–6; anal loop somewhat foot-shaped; cubital cross vein in hind wing usually opposite origin of A_3.

Anterior lamina projecting about as far as ridge of hamule; free edge slightly thickened; broadly **U**-shaped in ventral view. Hamules about as high as lobe; ridge of hamule approximately horizontal; posterior edge of ridge rounded, the anterior edge developed mesally into a tooth directed caudad. Lobe but slightly narrowed at base; anterior edge slightly higher than posterior edge.

Lateral lobes of penis triangular in outline. Medial lobes longer and more slender than in the species of Group I; dorsal edge heavily chitinized, ventral edge much less so; apex occasionally extending beyond ventral edge of lateral lobes. Internal lobes small and rounded, appearing at base of cornua and completely covered by lateral lobes; surface thickly covered with short, slender hairs or bristles. Cornua shorter and stouter than in the preceding species, and usually extending slightly beyond apex of lateral lobes; apex slightly swollen, with ventral side more heavily chitinized than dorsal. Posterior lobe large but not heavily chitinized; apex narrowed and extending beyond edge of lateral lobes; apex and most of ventral surface of lobe thickly covered with bristles, which are larger and longer than those on internal lobes.

End of superior appendages somewhat truncate, with a small tooth at inferior angle and 5–6 other small teeth on ventral side, arranged cephalad from it in an arc of a circle with ends of arc directed outward; usually four or five of these apparent in profile. Distal half of superior appendage somewhat flattened on ventral side. Inferior appendage nearly as long as superiors.

Female. Abdomen 15.1–16.7 mm. (average 15.75 mm.); hind wing 20.3–22.0 mm. (average 20.95 mm.); stigma 1.8–2.2 mm. (average 2.02 mm.).

Occiput yellowish brown; laterally located tubercles on posterior margin larger and more conspicuous than in Belem males (see figures 48, 50, and 52). Vertex and upper third of frons brownish blue, metallic; lower two-thirds of frons brown, shading into yellow laterally; lateral edges darker. Clypeus grayish brown; upper half of labrum yellow, lower half brownish; lower edge black.

Thorax brown, with a pale yellow stripe on mesepisternum and mesepimeron. Penultimate spine on externo-anterior angle of hind femur somewhat longer than in male. In Belem and Leticia specimens base of the hind wings yellowish.

Abdomen yellowish brown; darker, almost black, ventrally; terminal segments darker; dorsum of segments 7–9 black, the black area increasing

progressively in size posteriorly. Vulvar lamina two short, rounded, and thickened lobes.

Other characters as in male.

Material Examined. 23 males, 4 females. BRITISH GUIANA: 1901, Bartica, 1 male July 13 (in collection O. S. U.); Georgetown, 1912, 1 male and 1 female January 27, 3 males February 18. PERU: Leticia, 1920, 1 female June 29. BRAZIL: Porto Velho, 1922, 4 males February 6, 2 males February 24, 4 males April 26, 1 female April 27; Belem, 1922, 4 males August 5, 2 males and 1 female August 9, 2 males August 10.

Distribution. This species is Amazonian in distribution. Besides the above mentioned localities, it is recorded from Surinam (9), Itaituba (coll. Ris), Angostura (Karsch's type) (4, 9), and Rio São Lourenco (7).

There are two or three fairly well defined groups in the material referred to this species. The differences in the occipita of the males from three different localities have been mentioned above. Although these differences are fairly constant, they intergrade in two or three specimens, and hence apparently indicate geographic forms. There are a few minor differences in the abdominal appendages and the genitalia of the second segment, but these are very slight and intergrading. Some differences in venational characters occur: in Belem specimens there are 9–10 antenodals in the front wing, while in specimens from Porto Velho and Georgetown there are 8–9 (usually 8); in Belem specimens there are usually 7 antenodals in the hind wing, while in Porto Velho and Georgetown specimens there are usually 6; in Belem specimens there are usually 2 interpolated cells in the distal half of the anal loop, while in specimens from the other two localities there is usually one or none.

The type of this species, a female from Angostura, collected by Dr. Sachs, is in the Museum of Berlin, and was not available for examination in the preparation of this paper, but the descriptions of it by Karsch (4) and Ris (9) indicate clearly the identity of the material here described as *pachystigma*.

6. *Oligoclada laetitia* Ris

Figure 18

Oligoclada laetitia Ris, 1911 (9).

There were no specimens of *laetitia* in the material examined; the only known specimen is the type, a male in the Museum of Berlin, and this was not available for examination in the preparation of this paper.

Ris' description (9) is based on this male, which was collected by Dr. Hensel at Porto Alegre. This was originally described by Karsch (4) as *pachystigma*, but was later (1911) redescribed as *laetitia* by Ris because it showed "apparently specific differences from the Surinam male, and since it

belonged to another faunal region. . . . The main difference lies in the form of the hamules." (9, p. 404.)

Later (1913) Dr. Ris says of the status of *laetitia*: "The status of *O. laetitia,* which I have not yet been able to compare, becomes uncertain when compared with the newly defined *pachystigma.* Yet I conclude that in spite of the little differences which occur that the statement of its origin out of southern Brazil is probably correct" (10, p. 1133). He says again, in correspondence with Mr. E. B. Williamson, 1923: "The indication of a south Brazilian habitat for the mutilated (only the first five segments of the abdomen are present) single type of *laetitia* perhaps can be suspected; but since Karsch gives town, province (Santa Cruz), and collector, it may be accepted."

7. **Oligoclada xanthopleura,** new species

Figures 5, 19, 31, 39, 53, 54, 68, 76

Male. Abdomen 14.0–15.1 mm. (average 14.65 mm.); hind wing 17.0–18.0 mm. (average 17.44 mm.); stigma 1.3–1.8 mm. (average 1.47 mm.).

Occiput convex, metallic black, with a large yellow spot on posterior margin (sometimes a narrow dark line through center of spot dividing it in two). Labium yellow, tinged laterally with gray; a narrow median band of black about one-fourth width of labium, narrowed at either end.

Thorax bluish metallic, pruinose, tinged anteriorly with greenish. Legs black, posterior side of fore trochanters yellow; coxae brownish, with blue pruinescence. Penultimate spine on externo-anterior angle of hind femur about one-third as long as ultimate spine. Tarsal claw with a distinct, though short, subapical tooth, at a point about three-fourths the length or more.

Venational Characters. Antenodals in front wing: 6 (26%), 7 (74%); postnodals in front wing: 4 (6%), 5 (90%), 6 (4%); antenodals in hind wing: 5 (98%), 6 (2%); postnodals in hind wing: 5 (96%), 6 (4%); last antenodal in front wing: complete (100%); cells bordering proximal side of bisector of anal loop: 4 (2%), 5 (85%), 6 (13%); cells bordering distal side of bisector of anal loop: 4 (4%), 5 (94%), 6 (2%); interpolated cells in distal half of anal loop: 0 (96%), 1 (4%); rows of postloop cells in hind wing: 2 (100%).

Three basal segments of abdomen brownish, with bluish gray pruinescence; sternum of 3 darker; rest of abdomen black with a faint yellowish brown spot on sides of 4, an elongated bright yellowish brown spot on sides of segments 5–8, the one on 7 being widest and most yellow; no yellow on sides of 9 and 10; ventral sides of 5–10 yellowish brown, becoming more yellowish posteriorly; sternum of 9 dark reddish brown, valvules lighter. Paraprocts light yellowish brown.

Anterior lamina projecting about as far as ridge of hamule; free edge thin, broadly **U**-shaped. Hamules somewhat higher than lobe; ridge of hamule approximately horizontal; posterior edge of ridge rounded; anterior edge developed mesally into a hook directed caudad; hamule as wide at ridge as at base; height of ridge either as great as or less than width of hamule in profile. Lobe slightly or not at all narrowed at base; anterior edge slightly higher than posterior.

Penis very similar to that of *pachystigma,* except medial lobes somewhat broader at base and extending farther beyond ventral edge of lateral lobes; internal lobes broader at base; cornua somewhat shorter and stouter with apex less swollen; area of bristles on posterior lobe extending basally beyond apex on lateral and dorsal sides of lobe.

Superior appendages pointed at tip; inferior angle rounded; 6–8 small teeth of nearly uniform size on ventral side, arranged in an arc of a circle, with ends of arc directed outward; usually three or four of these teeth apparent in profile. Inferior appendage shorter than superiors, reaching usually to most posterior tooth of latter.

Female. Abdomen 14–14.6 mm. (average 14.27 mm.); hind wing 18.0–18.7 mm. (average 18.17 mm.); stigma 1.4–1.7 mm. (average 1.58 mm.).

Occiput usually colored as in male, though sometimes it may be entirely yellow; posterior margin with a short finger-like projection on either side extending obliquely caudad. Vertex and upper part of frons bluish or brown, depending on age of individual; lower part of frons yellowish. Labium entirely yellow or with a very narrow central line black.

Thorax somewhat lighter in color than in male. Wings hyaline, with a yellowish brown area at base of each wing, between Sc and R, and between M and Cu, extending sometimes nearly to level of arculus.

Abdomen colored as in male, but with brown spots wider; usually segments 2–3 entirely brown. Vulvar lamina two rounded and thickened lobes; posterior margin of sternum of 8 more deeply emarginate in this species than in *pachystigma.*

Other characters as in male.

Material Examined. 17 males, 6 females. BRAZIL: Manáos, 1922, 17 males and 6 females June 6. Type male and allotype female selected from this series. The name refers to the color of the abdominal segments.

Specimens of this species were sent to Dr. Ris, who says: "I believe this species distinct and new; color, venation, anal loop are different from *pachystigma.* Genitalia segment 2 very slightly so, superior appendages perhaps a little more."

According to the field notes of Mr. J. H. Williamson (12) for June 6, 1922, they collected from 1 to 5 P. M. that day "along bank of flood creek

basin just north of brewery. Got half a dozen species of Libellulines and 2 new Agrionines. Maybe something new in lot—not sure. Worked up bank of basin for several city squares—in lumber yards, street ends, etc., where water was up among grasses and bushes."

In addition to the locality mentioned above for the distribution of this species, Dr. Ris sends this note of his material: "1 male, 1 female, Tapajoz, June, 1920." He also adds this note: "The *Micrathyria*-like yellow spots (on the abdomen) are quite an unusual and distinctive feature in this genus."

8. **Oligoclada crocogaster,** new species

Figures 6, 20, 32, 40, 55, 69, 77

Male. Abdomen 14.0–15.9 mm. (average 14.61 mm.); hind wing 17.5–20.2 mm. (average 18.83 mm.); stigma 1.5–2.1 mm. (average 1.83 mm.).

Occiput metallic black, with two brownish spots on posterior margin, which in dorsal view is slightly bilobed. Labium yellow, with a median band of black about one-third width of labium, usually narrowed distally.

Thorax dark blue, pruinose. Penultimate spine on externo-anterior angle of hind femur about one-third or less as long as ultimate spine. Tarsal claw as in *xanthopleura*.

Venational Characters. Antenodals in front wing: 8 (13%), 9 (18%), 8½ (56%), 9½ (13%); postnodals in front wing: 6 (3%), 7 (47%), 8 (39%), 9 (11%); antenodals in hind wing: 6 (8%), 7 (89%), 8 (3%); postnodals in hind wing: 6 (3%), 7 (55%), 8 (42%); last antenodal in front wing: complete (32%), incomplete (68%); cells bordering proximal side of bisector of anal loop: 6 (10%), 7 (45%), 8 (42%), 9 (3%); cells bordering distal side of bisector of anal loop: 6 (11%), 7 (78%), 8 (11%).; interpolated cells in distal half of anal loop: 0 (7%), 1 (72%), 2 (18%), 4 (3%); rows of postloop cells in hind wing: 2 (55%), 3 (45%). Costal side of triangle in front wing usually broken, with a short distal piece; ratio of sides of triangle 17–13–20; anal loop foot-shaped; cubital cross vein opposite or slightly proximal to base of A_3.

Ventral side of segment 7 of abdomen yellow or orange; ventral side of 8 and 9 orange to reddish.

Anterior lamina about as high as ridge of hamule; free edge slightly thickened and broadly **U**-shaped. Hamule about as high as lobe; ridge of hamule projecting slightly laterad; width of hamule at ridge in profile usually less than height of ridge; ridge located at about two-thirds or more of the distance between base of hamule and apex of tooth. Tooth of hamule on mesal anterior angle, and projecting caudad; tooth rather blunt. Posterior edge of ridge rounded. Lobe broad, narrowed at base; anterior edge slightly higher than posterior edge. Only a few short hairs or bristles projecting ventrad from edge of lobe.

The penis of this species and the next (Group III) differs from those of the other species of the genus in having the cornua very long and slender, extending some distance beyond the edge of the lateral lobes. Lateral lobes of *crocogaster* broadly rounded, surface slightly roughened. Medial lobes small and extending slightly beyond ventral edge of lateral lobes; surface punctulate. Internal lobes larger than in species of Group II, extending almost to edge of lateral lobes; distal end rounded; surface covered with minute tubercles as in *xanthopleura*. Between the medial and the internal lobes there appears a lobe very similar to the structure called posterior lobe in the species of Group I. This may be a part of or a lobe of the internal lobes. Several specimens were examined and all had this lobe. Posterior lobe large, as in *xanthopleura,* except apex rounded instead of narrowed; the lobe somewhat trough-shaped.

Abdominal appendages as described in key.

Female. Abdomen 13.0–15.0 (average 14.07 mm.); hind wing 19.2–22.0 mm. (average 20.33 mm.); stigma 1.3–2.1 mm. (average 1.73 mm.).

Vertex and upper half of frons metallic blue, shading into yellowish brown on ventral half of frons. Clypeus dark brown; labrum brownish black, becoming darker distally.

Thorax metallic bluish purple, covered with a pale blue pruinescence. Penultimate spine on externo-anterior angle of hind femur about half as long as ultimate spine. Wings hyaline; anal field of hind wing usually yellowish brown.

Abdomen about the same color as thorax; three or four basal segments pruinose. Abdomen much thicker than in male, and more cylindrical; segments 4–6 appearing in profile nearly square, while same segments in male appear rectangular, nearly twice as long as wide. Ventral side of terminal segments the same color as rest of abdomen. Vulvar lamina as in *xanthopleura.*

Other characters as in male.

Material Examined. 16 males, 3 females. BRAZIL: Porto Velho, 1922, 1 male January 25, 4 males February 13, 2 males and 1 female March 3, 5 males April 24, 1 male May 14, 1 female May 24; Belem, 1922, 2 males and 1 female August 7, 1 male August 14. Type male and allotype female, Belem, August 7. The name refers to the color of the ventral side of the terminal abdominal segments, especially segment 7, which in *amphinome* is more reddish.

This species is very closely related to *amphinome,* but the differences in the superior appendages are certainly specific. Other differences are discussed in the remarks under *amphinome.*

The types were collected along the "creek beyond and to the left of the Souza car line." (12.)

9. *Oligoclada amphinome* Ris

Figures 7, 21, 33, 41, 56, 78

Oligoclada pachystigma Ris, 1911 (9), in part.
Oligoclada amphinome Ris, 1913 (10).

Male. Abdomen 13.5–15.1 mm. (average 14.49 mm.); hind wing 17.3–19.3 mm. (average 18.69 mm.); stigma 1.5–2.0 mm. (average 1.74 mm.).

Characters of head as in *crocogaster,* except posterior margin of occiput, which in dorsal view appears more swollen. Thorax and legs as in *crocogaster.* Wings also very similar to those of *crocogaster.*

Venational Characters. Antenodals in front wing: 8½ (30%), 9½ (67%), 10½ (3%); postnodals in front wing: 7 (20%), 8 (50%), 9 (30%); antenodals in hind wing: 6 (6%), 7 (94%); postnodals in hind wing: 7 (3%), 8 (67%), 9 (27%), 10 (3%); last antenodal in front wing: incomplete (100%); cells bordering proximal side of bisector of anal loop: 7 (30%), 8 (50%), 9 (20%); cells bordering distal side of bisector of anal loop: 6 (7%), 7 (80%), 8 (10%), 9 (3%); interpolated cells in distal half of anal loop: 2 (40%), 3 (47%), 4 (13%); rows of postloop cells in hind wing: 2 (10%), 3 (90%).

Abdomen metallic bluish black, two basal segments usually pruinose; ventral side of segments 7–9 red, edged with orange and black.

Anterior lamina shorter than ridge of hamule; free edge slightly thickened and broadly **U**-shaped. Hamule about as high as lobe, and usually pressed back against anterior edge of latter, so that the tooth fits over anterior ventral edge of lobe; ridge of hamule projecting somewhat laterally. Hamules otherwise as in *crocogaster.* Lobe broad; narrowed at base, especially on anterior edge; broader at base than base of hamule.

Lateral lobes of penis somewhat triangular, with apex broadly rounded. Medial lobes small and shorter than in *crocogaster.* Internal lobes rather long, extending beyond apex of lateral lobes; edges in profile appearing nearly parallel, with apex rounded. Internal lobes covered with short, thick bristles. Cornua similar to those of *crocogaster.* Between medial and internal lobes is a lobe as in *crocogaster,* but there is no lobe corresponding to posterior lobe of *crocogaster.* This lobe has been doubtfully labelled posterior lobe.

Abdominal appendages as described in key.

Material Examined. 15 males. BRITISH GUIANA: Rockstone, 1912, 3 males February 1; Tumatumari, 1912, 3 males February 11 (including type). BRAZIL: Manáos, 1922, 2 males June 9, 2 males June 12, 1 male June 15, 2 males June 16, 1 male June 30, 1 male July 17.

Distribution. In addition to the above mentioned localities, this species has been taken at Pará (9), and Santarem (1 male in Dr. Ris' collection,

collected by A. H. Fassl in March, 1920). Both of these specimens may belong here or to *crocogaster*.

Although this species and *crocogaster* are very similar, they are undoubtedly specifically different, and may be separated by the characters given in the key. Although no females of *amphinome* were examined, they are probably separated from the females of *crocogaster* by the character of the occipita (see figures 55 and 56) or by venational characters. Other differences, besides those mentioned in the key, are: in *amphinome* the last antenodal in the front wing is regularly incomplete, while in *crocogaster* it is complete in about one-third of the wings examined; in *amphinome* the ventral side of segments 7–9 is usually a brilliant red, while in *crocogaster* it is usually more orange colored or yellow, especially on segment 7 (hence the specific name *crocogaster*); in *amphinome* there are almost uniformly three rows of postloop cells in the hind wing, while in *crocogaster* there are two rows in about half the wings examined; in *amphinome* there are 2–4 interpolated cells in the anal loop, while in *crocogaster* there are 2 or less, usually 1.

The differences in the genitalia of the second segment are slight, but usually distinct. In *amphinome* the ventral portion of the anterior edge of the lobe is usually prominently bulged, and the tooth of the hamule is usually pressed against this bulging portion. In *crocogaster* this bulge is less pronounced, and the hamules are seldom pressed against the lobe. The ridge of the hamule is usually somewhat higher in *crocogaster* than in *amphinome*. These differences are shown in figures 20 and 21. The differences in the penes of these two species are quite apparent, as shown by the drawings (figures 77 and 78).

This species, as well as the preceding, is found along small streams in woods, where it rests on the flat surfaces of leaves overhanging the water, with the tip of the abdomen often extending over the edge of the leaf. Seen from below, the brilliant red on the ventral side of the terminal abdominal segments is quite conspicuous.

10. **Oligoclada heliophila,** new species

Figures 8, 22, 42, 57, 64, 70, 79

Male. Abdomen 16.0–19.1 mm. (average 17.71 mm.); hind wing 20.7–24.5 mm. (average 22.72 mm.); stigma 1.9–2.4 mm. (average 2.17 mm.).

Occiput shining brownish black; a short yellowish projection on either side of posterior margin. Clypeus yellowish; anteclypeus washed with gray; labrum yellow, lower edge black. Labium yellow with a median band of black of varying width, usually about one-third the width of labium.

Thorax bluish, pruinose. Penultimate spine on externo-anterior angle of hind femur half as long as ultimate spine. Tooth on tarsal claw reduced

to a very small, scarcely discernible notch, located at about two-thirds the length.

Venational Characters. Antenodals in front wing: 8½ (13%), 9½ (72%), 10½ (15%); postnodals in front wing: 7 (15%), 8 (65%), 9 (20%); antenodals in hind wing: 6 (3%), 7 (94%), 8 (3%); postnodals in hind wing: 7 (9%), 8 (59%), 9 (32%); triangle in front wing: free (18%), crossed (82%); cells bordering proximal side of bisector of anal loop: 6 (13%), 7 (49%), 8 (35%), 9 (3%); cells bordering distal side of bisector of anal loop: 6 (8%), 7 (80%), 8 (11%), 9 (1%); interpolated cells in distal half of anal loop: 1 (11%), 2 (55%), 3 (31%), 4 (3%); rows of postloop cells in hind wing: 3 (79%), 4 (21%). Base of hind wing, between M and Cu, out as far as cubital cross vein, and cells bordering anal membrane, darkly pigmented; usually a little less pigmentation between Sc and R. Ratio of sides of triangle in front wing: 13–6–15.

Anterior lamina not quite as high as hamules; free edge thickened, straight, with a median **U**-shaped incision. Hamules about as high as lobe, and a little higher than lamina; a little more than half as wide at base of tooth as at the base of hamule, so that hamule in profile appears to be swollen at base. Numerous long hairs or bristles projecting ventrad from anterior side of hamule dorsal to the ridge. Anterior edge of ridge of hamule extended mesally into a rather blunt tooth directed caudad. Posterior edge of ridge rounded and not prominent. Lobe about as high as hamule; slightly narrowed at base; anterior edge higher than posterior edge.

Lateral lobes of penis broadly rounded; narrowed basally; surface smooth. Medial lobes long and slender, extending out from under lateral lobes for some distance; base heavily chitinized, apex much less so; ventral edge with numerous small teeth proximal to apex. Internal lobes short, narrowed basally, broadly rounded at apex; and densely covered with short thick bristles or tubercles; extending slightly beyond ventral edge of lateral lobes. Cornua apparently lacking. Posterior lobe appearing just dorsal to internal lobes; narrowed basally and apically; often extending beyond edge of lateral lobes; surface similar to that of internal lobes.

Superior appendages with 6–9 rather large teeth on ventral surface, arranged more or less in an arc of a circle with ends of arc directed outward, extending from before midlength of appendage to inferior angle. Inferior appendage shorter than superiors, reaching approximately inferior angle of latter.

Female. Abdomen 15.1–17.1 mm. (average 16.3 mm.); hind wing 22.1–23.0 mm. (average 22.53 mm.); stigma 2.0–2.3 mm. (average 2.19 mm.).

Vertex metallic brownish blue; upper half of frons bluish black, lower half brownish; clypeus brownish gray, anteclypeus darker. Occiput as in male, except that the projections are slightly longer.

Thorax brownish blue; pruinose. Penultimate spine on externo-anterior angle of hind femur about three-fourths as long as ultimate spine. Wings hyaline, sometimes brownish between bases of Sc and R, and M and Cu in hind wing. Stigma lighter in color than in male.

Abdomen brown; lighter basally, darker distally; sides of 6 and segments posterior to it increasingly black; segments 9–10 all black; sterna 1–8 black, sterna 9–10 brown. Vulvar lamina as described in key.

Other characters as in male.

Material Examined. 56 males, 7 females. COLOMBIA: Rio Frio, 1917, 1 male January 4, 1 female January 5, 1 male January 6, 7 males January 7, 7 males and 1 female January 8; Aracataca, 1917, 5 males January 9; Fundacion, 1917, 1 male January 10, 4 males and 2 females January 11; Puerto Berrio, 1917, 2 males January 31, 1 male February 8; Cristalina, 1917, 6 males and 1 female February 13, 3 males February 14, 2 males February 17, 2 males February 18, 2 males February 19. VENEZUELA: La Fria, 1920, 9 males April 12, 1 male April 14. PANAMA CANAL: Gamboa, 1920, 2 males August 5. Type male and allotype female, Rio Frio, January 8, 1917. The name refers to the fact that this species is usually found in sunny situations.

This species is very similar to *raineyi,* but because of the difference in the hamules, as well as the fact that the two species are found in different faunal regions, they must be considered distinct species.

According to the field notes of Mr. E. B. Williamson (12), the types were "collected at irrigating ditches in woods, and at a large grassy and brushy pond made by irrigating water."

This species and *umbricola* are the only species of the genus known to occur in Colombia and Venezuela (north of the Andes), and here they occur in the same locality, but *heliophila* is found in clearings and sunny situations, while *umbricola* is found in the woods, along well shaded streams. On the envelope of two males taken in Rio Frio, January 7, is the note: "Rests usually on grass or green bush leaves near water's edge with abdomen and wings in same plane."

11. *Oligoclada raineyi* Ris

Figures 9, 23, 43, 58, 80

Oligoclada raineyi Ris, 1913 (10).

Male. Abdomen 15.0–17.5 mm. (average 16.58 mm.); hind wing 19.8–22.4 mm. (average 21.12 mm.); stigma 1.8–2.4 mm. (average 2.12 mm.).

Occiput dark brown, shining; in dorsal view triangular, with a laterally elongate, truncate, caudad-projecting ridge on posterior margin, at either end of which is a short, stubby, finger-like projection. Labium greenish

yellow, with a median band of black as wide as ligula proximally, and narrowing to a point distally.

Thorax bluish; pruinose. Penultimate spine on externo-anterior angle of hind femur about half as long as ultimate spine. Tooth on tarsal claw as in *heliophila.*

Venational Characters. Antenodals in front wing: 9½ (60%), 10½ (40%); postnodals in front wing: 7 (10%), 8 (70%), 9 (20%); antenodals in hind wing: 7 (80%), 8 (20%); postnodals in hind wing: 7 (20%), 8 (40%), 9 (40%); triangle in front wing: free (30%), crossed (70%); cells bordering proximal side of bisector of anal loop: 7 (50%), 8 (50%); cells bordering distal side of bisector of anal loop: 7 (90%), 8 (10%); interpolated cells in distal half of anal loop: 1 (10%), 2 (80%), 3 (10%); rows of postloop cells in hind wing: 3 (80%), 4 (20%). Pigmentation at base of hind wing as in *heliophila,* except pigmented area may be somewhat smaller.

Anterior lamina as in *heliophila.* Hamules about as high as lobe or lamina; ridge projecting laterad; anterior edge of ridge higher than posterior edge and sometimes developed so as to appear knob-like in profile, and projecting about as high as tooth; mesal portion of anterior edge of ridge developed into a tooth projecting obliquely caudad, which appears to arise (in profile) from about the center of mesal edge of hamule, and sometimes appears to be directed more outward than caudad. Hamule as broad at ridge as at base. Lobe rather narrow, either as broad as hamule or narrower; sides approximately parallel.

Penis similar to that of *heliophila,* except teeth on ventral edge of medial lobes larger and fewer in number, and posterior lobe smaller and less narrowed apically.

Appendages as in *heliophila,* except teeth on superiors somewhat smaller.

Material Examined. 5 males. BRITISH GUIANA: Potaro River near mouth, 1912, 1 male February 4; Tumatumari, 1912, 2 males February 9, 2 males (including type) February 11.

Distribution. This species is Amazonian in its distribution. Besides the localities mentioned above the following records are given by Ris (10): 1 male, Surinam (Museum Stockholm); 2 males, Pará (collection de Selys, Brussels).

12. *Oligoclada walkeri* Geijskes

Figures 10, 24, 44, 59, 65, 71, 81

Oligoclada walkeri Geijskes, 1931 (1).

Male. Abdomen 16.4–18.8 mm. (average 17.26 mm.); hind wing 20.3–22.4 mm. (average 21.31 mm.); stigma 1.6–2.3 mm. (average 1.9 mm.).

Occiput as described in key. Labium yellow, with a broad median band of black which widens distally, often covering entire labium.

Thorax dark blue, metallic; slightly pruinose. Penultimate spine on externo-anterior angle of hind femur about half as long as ultimate spine. Tarsal claw as in *heliophila*.

Venational Characters. Antenodals in front wing: 9½ (53%), 10½ 47%); postnodals in front wing: 8 (20%), 9 (70%), 10 (10%); antenodals in hind wing: 7 (92%), 8 (8%); postnodals in hind wing: 8 (10%), 9 (23%), 10 (62%), 11 (3%), 12 (2%); triangle in front wing: free (10%), crossed (90%); cells bordering proximal side of bisector of anal loop: 7 (25%), 8 (55%), 9 (20%); cells bordering distal side of bisector of anal loop: 6 (2%), 7 (90%), 8 (8%); interpolated cells in distal half of anal loop: 1 (13%), 2 (77%), 3 (8%), 4 (2%); rows of postloop cells in hind wing: 3 (90%), 4 (10%). Pigmentation at base of hind wing as in *raineyi*. Ratio of sides of triangle in front wing 6–3–7.

Anterior lamina about as high as hamules; free edge considerably thickened and **V**-shaped; height of hamule in profile either as great as or greater than its width at base. Hamules as described in key. Lobe rather small, usually not reaching level of ridge of hamule; about twice as high as wide; usually widened at base; base about half as wide as base of hamule.

Lateral lobes of penis broadly rounded and basally narrowed, especially on ventral edge. Medial lobes (if correctly identified) appearing as an arch-like process on ventral side of penis; base and apex connected to lateral lobes, with middle portion free, as in figure 81. Internal lobes not apparent. Cornua (if correctly identified) included in arch-like process on ventral surface of penis. Posterior lobe concealed by lateral lobes, extending only to distal edge of latter; surface covered with minute tubercles.

Superior appendages as described in key; inferior appendage reaching to inferior angle of superiors.

Female. Abdomen 16.0–17.2 mm. (average 16.33 mm.); hind wing 21.0–22.8 mm. (average 21.9 mm.); stigma 1.9–2.3 mm. (average 2.08 mm.).

Occiput as in male, though sometimes with yellow spots at base of projection more distinct. Clypeus gray, lateral edge darker, becoming black; labrum black, brownish basally; labium black, with outer basal corners of lateral lobes yellow.

Thorax dark reddish brown, darker anteriorly; slightly pruinose. A short yellowish band in front of base of humeral suture on mesepisternum; another short, narrow stripe in front of spiracle on mesepimeron; another, broader, above and behind spiracle on metepisternum; another, sometimes divided into two spots, sometimes less distinct, on upper part of metepimeron. Legs brownish black, lighter basally. Mesal side of fore trochan-

ters yellow. Penultimate spine on externo-anterior angle of hind femur nearly as long as ultimate spine. Wings hyaline or slightly brownish, especially at base of hind wing, which in male is darkly pigmented.

Abdomen reddish brown; sides of segments 6–10 increasingly black; 9–10 all black; appendages black; transverse carinae black. Vulvar lamina two short, rounded, thickened flaps, often pressed dorsad, at base of which is a semicircular ridge. The vulvar lamina may sometimes be pressed dorsad to the extent that from a ventral view only the semicircular ridge is visible; from a more posterior view, however, the vulvar lamina becomes apparent.

Other characters as in male.

Material Examined. 34 males, 5 females. BRITISH GUIANA: Bartica, 1901, 1 male July 13 (in collection O. S. U.); Wismar, 1912, 1 male January 30; Rockstone, 1912, 2 males and 1 female February 2; Tumatumari, 1912, 2 males and 1 female February 8, 1 female February 11. PERU: Leticia, 1920, 1 male June 29. BRAZIL (mostly teneral): Abuná, 1922, 1 male March 10; San Antonio, 1922, 2 males May 11, 1 male May 12; Moura, 1922, 3 males and 2 females July 11; Belem, 1922, 2 males August 7, 1 male August 8. TRINIDAD: Sangre Grande, 1930 (paratypes, collection E. M. Walker), 1 male March 4, 1 male March 24, 3 males March 25, 3 males March 26, 2 males March 29, 5 males March 30, 2 males April 7. Allotype female, Tumatumari, February 11.

Dr. Ris' collection contains material, which from his description (in correspondence with me) belongs to this species, from Teffé and Itaituba.

This species may be distinguished from any of the preceding species by the form of the hamules and the occiput. The hamules, instead of terminating in a mesally or anteriorly located tooth directed caudad, have the distal end more or less hollowed out, with the ridge on the posterior side extended into a tooth directed cephalad. The short spine projecting ventrad from the hollowed out portion of the hamule can be seen in profile or in a slightly ventral view. The size of this spine is variable. None of the preceding species in the genus have a projection on the posterior margin of the occiput as this species does. Some have tubercles laterally located on the posterior margin, but none have such a pronounced projection. This projection is described in the key.

The genitalia of the second segment, with the exception of the penis, are practically identical with those of *umbricola*. These two species, *walkeri* and *umbricola*, differ chiefly in the form of the penis and occiput, but there are other differences, which are discussed under *umbricola*.

13. **Oligoclada umbricola,** new species

Figures 11, 25, 45, 60, 82

Male. Abdomen 16.5–18.0 mm. (average 17.48 mm.); hind wing 22.0–24.0 mm. (average 22.82 mm.); stigma 1.9–2.4 mm. (average 2.09 mm.).

Occiput dark brown, metallic, convex; posterior margin as described in key. Clypeus yellowish gray; lateral edges of anteclypeus brownish; labrum yellow, lower fourth black. Labium black, with outer basal corners of lateral lobes yellow.

Thorax metallic blue, pruinose; darker anteriorly. Penultimate spine on externo-anterior angle of hind femur about three-fourths as long as ultimate spine. Tooth on tarsal claw as in *heliophila,* only slightly more definite.

Venational Characters. Antenodals in front wing: 9½ (61%), 10½ (36%), 11½ (3%); postnodals in front wing: 7 (3%), 8 (22%), 9 (47%), 10 (28%); antenodals in hind wing: 7 (64%), 8 (30%), 7½ (3%), 8½ (3%); postnodals in hind wing: 8 (28%), 9 (53%), 10 (19%); triangle in front wing: free (6%), crossed (94%); cells bordering proximal side of bisector of anal loop: 7 (3%), 8 (38%), 9 (53%), 10 (6%); cells bordering distal side of bisector of anal loop: 7 (78%), 8 (22%); interpolated cells in distal half of anal loop: 1 (6%), 2 (50%), 3 (39%), 4 (5%); rows of postloop cells in hind wing: 3 (78%), 4 (22%). Pigmented area at base of hind wing somewhat smaller than in *heliophila.*

External genitalia of second segment similar to those of *walkeri.*

Penis of this species very similar to that of *walkeri,* except arch-like process on ventral side of penis not reaching distal portion of lateral lobes, thus giving a pincer-like appearance to terminal segment. Posterior lobe of this species larger than that of *walkeri* (see figures 81 and 82).

Superior appendages as described in key; inferior appendage somewhat shorter than superiors.

Material Examined. 49 males. COLOMBIA: Cristalina, 1917, 8 males February 14, 1 male February 18, 15 males February 19, 2 males February 20. VENEZUELA: Tachira, 1920, 3 males April 6; La Fria, 1920, 6 males April 12, 8 males April 14, 4 males April 15, 2 males April 16. Type male, La Fria, April 15. The name refers to the fact that this species is usually found in shaded situations. The differences in the habitats of this species and *heliophila,* as noted in the remarks under that species, are quite noticeable in the field.

This species is very similar to *walkeri.* The most outstanding difference between the two species is in the shape of the occiput, which is quite distinct. In *walkeri* the posterior margin of the occiput is bulging, so that in dorsal view it has a broad truncate projection extending caudad; in

umbricola the posterior margin is nearly straight. This difference is shown in figures 59 and 60.

Besides the difference in the occipita of the two species, the differences in the superior appendages are almost as striking. In *walkeri* the inferior angle is very definite, and there is usually a large tooth in this position, with one or more teeth basal to it. In *umbricola,* however, the inferior angle is rounded, and all the teeth are small. This difference is shown in figures 10 and 11. In *walkeri* the basal half of the superior appendages is usually swollen, in profile as thick as or thicker than the distal half; in *umbricola* the basal half of the superior appendages is usually thinner than the distal half.

The differences in the penes of these two species are equally striking and have been discussed above.

No females of *umbricola* are known, but since the occipital structure is similar in both sexes of *walkeri,* it is probable that the females of the two species may be recognized by this character.

On the envelope of a male taken at Cristalina, February 18, 1917, in the note: "Taken from the fangs of a spider which was holding it under a leaf."

14. *Oligoclada abbreviata* Rambur

Figures 12, 26, 34, 46, 61, 62, 63, 66, 83

Libellula abbreviata Rambur, 1842 (8).
Mesothemis abbreviata Hagen, 1861 (2).
Erythrodiplax abbreviata Hagen, 1875 (3).
Trithemis abbreviata Kirby, 1890 (6).
Oligoclada abbreviata Ris, 1911 (9).

Male. Abdomen 16.7–18.5 mm. (average 17.68 mm.); hind wing 21.0–23.0 mm. (average 21.93 mm.); stigma 1.9–2.3 mm. (average 2.1 mm.).

Occiput shining brownish, with two light brown or yellow spots on posterior margin; posterior margin slightly swollen and in dorsal view somewhat bilobed. Labium yellow, with a median band of black about one-third width of labium.

Thorax bluish black, metallic, somewhat pruinose. Mesal side of fore femur, especially on basal half, chalky white pruinose. Penultimate spine on externo-anterior angle of hind femur one-half to two-thirds as long as ultimate spine. Tooth on tarsal claw as in *umbricola.*

Venational Characters. Antenodals in front wing: 9½ (50%), 10½ (25%), 11½ (25%); postnodals in front wing: 8 (11%), 9 (47%), 10 (21%), 11 (14%), 12 (7%); antenodals in hind wing: 6 (4%), 7 (50%), 8 (36%), 9 (7%), 8½ (3%); postnodals in hind wing: 8 (11%), 9 (36%), 10 (32%), 11 (17%), 13 (4%); triangle in front wing: free

(36%), crossed (64%); cells bordering proximal side of bisector of anal loop: 7 (18%), 8 (53%), 9 (17%), 10 (12%); cells bordering distal side of bisector of anal loop: 7 (75%), 8 (21%), 9 (4%); interpolated cells in distal half of anal loop: 2 (58%), 3 (25%), 4 (17%); rows of postloop cells in hind wing: 3 (40%), 4 (60%). Base of hind wings pigmented as shown in figure 34.

Anterior lamina about as high as hamules; free edge broadly flattened; in ventral view anterior edge rounded, posterior edge **V**-shaped. Hamules as described in key. Lobe small, only a little over half as high as hamule; slightly narrowed at base.

Lateral lobes of penis short and rounded, covering only dorsal half of apex of terminal segment. Medial lobes appearing on ventral half of apex of terminal segment of penis; large and three-lobed: one lobe narrow and pointed, extending ventrad; a second lobe similar but more lightly chitinized and extending distad and usually ventrad; a third lobe large and heavily chitinized, its margin irregular in outline; base of third lobe quite broad, and apex roughly rounded. Internal lobes small and entirely covered by lateral lobes; their surface covered with minute tubercles. Cornua appearing as small knob-like or flap-like structures between internal lobes. Posterior lobe small, apex rounded, and surface roughened; appearing just dorsal to internal lobes.

Superior appendages similar to those of *xanthopleura,* but apex less gradually tapering, teeth at inferior angle usually larger and more prominent, and in a more nearly straight line; usually about 4 teeth visible in profile. Inferior appendage longer than in *xanthopleura,* reaching past the most distal tooth of superiors.

Female. Abdomen 15.1–16.6 mm. (average 15.85 mm.); hind wing 22.1–22.6 mm. (average 22.35 mm.); stigma 2.0–2.3 mm. (average 2.2 mm.).

Posterior margin of occiput usually more prominent than in male. Frons metallic blue above, shading into brown ventrally; clypeus grayish yellow; labrum black, with only basal edge yellowish or brownish.

Thorax dark brown or nearly black; metallic. A trace of a yellow antehumeral stripe on mesepisternum; another similar one along lower end of first lateral suture; and a yellow stripe on metepisternum behind spiracle, extending upward from lower end of second lateral suture. A chalky white area on mesal side of fore trochanter and on basal half of mesal side of fore femur. Penultimate spine on externo-anterior angle of hind femur somewhat longer than in male.

Abdomen colored as in *walkeri.* Vulvar lamina similar to that in *walkeri,* except lobes usually not pressed dorsad, and less rounded on posterior margin.

Other characters as in male.

Material Examined. 12 males, 2 females. BRITISH GUIANA: Tumatumari, 1912, 1 female February 9, 2 males February 11; Potaro Landing, 1912, 2 males February 10. BRAZIL: Porto Velho, 1922, 1 male and 1 female (caught in tandem) April 26, 2 males May 18; Manáos, 1922, 1 male June 8, 2 males June 16; Belem, 1922, 1 male August 7, 1 male August 8.

Distribution. This species is Amazonian in its distribution. It is recorded from a few other localities: Cayenne (Rambur's type) (8); Coary, Peba, Surinam (9); but it is possible that some of these specimens may belong to *walkeri,* which has approximately the same distribution.

The nomenclature of the species in Groups V and VI (*walkeri, umbricola,* and *abbreviata*) is somewhat uncertain, because of the inadequacy of the earlier descriptions of *abbreviata. Umbricola* may at once be eliminated, since it belongs to another faunal region. Dr. Ris says this of the situation: "The original of *Lib.* (9), fig. 253, which is good, drawn by Menger, I should propose to accept as a neotype of *abbreviata.* The original type specimen of Rambur, a single female at Brussels, is not in good state, the abdomen deformed and stuffed, and may or may not belong to this species."

The males herein described as *abbreviata* agree with Menger's figure, and to them must belong the females described, since one pair was taken in tandem. If the male figured by Ris be taken as the neotype, the nomenclature is quite certain, but it should be possible, by examining the occiput and the mesal side of the fore femur of the female type at Brussels, to determine to which of the two species (*walkeri* and *abbreviata* as herein described) it really belongs. Until this examination is made, the status of these two species must remain to this extent uncertain.

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EXPLANATION OF PLATES

All drawings except those of wing venation and penes were made with camera lucida; the drawings of wing venation and penes were made with projection apparatus. All are the work of the author.

PLATE I

Abdominal Appendages of Male, as seen from left side.

FIG. 1. *O. sylvia.* Wismar, January 30, 1912.
FIG. 2. *O. monosticha.* Leticia, June 29, 1920 (type).
FIG. 3. *O. stenoptera.* Abuná, March 9, 1922 (type).
FIG. 4. *O. pachystigma.* Georgetown, January 27, 1912.
FIG. 5. *O. xanthopleura.* Manáos, June 6, 1922 (type).
FIG. 6. *O. crocogaster.* Porto Velho, April 24, 1922 (paratype).
FIG. 7. *O. amphinome.* Tumatumari, February 12, 1912 (paratype).
FIG. 8. *O. heliophila.* La Fria, April 14, 1920 (paratype).
FIG. 9. *O. raineyi.* Tumatumari, February 11, 1912 (paratype).
FIG. 10. *O. walkeri.* Tumatumari, February 8, 1912.
FIG. 11. *O. umbricola.* La Fria, April 15, 1920 (type).
FIG. 12. *O. abbreviata.* Potari Landing, February 10, 1912.

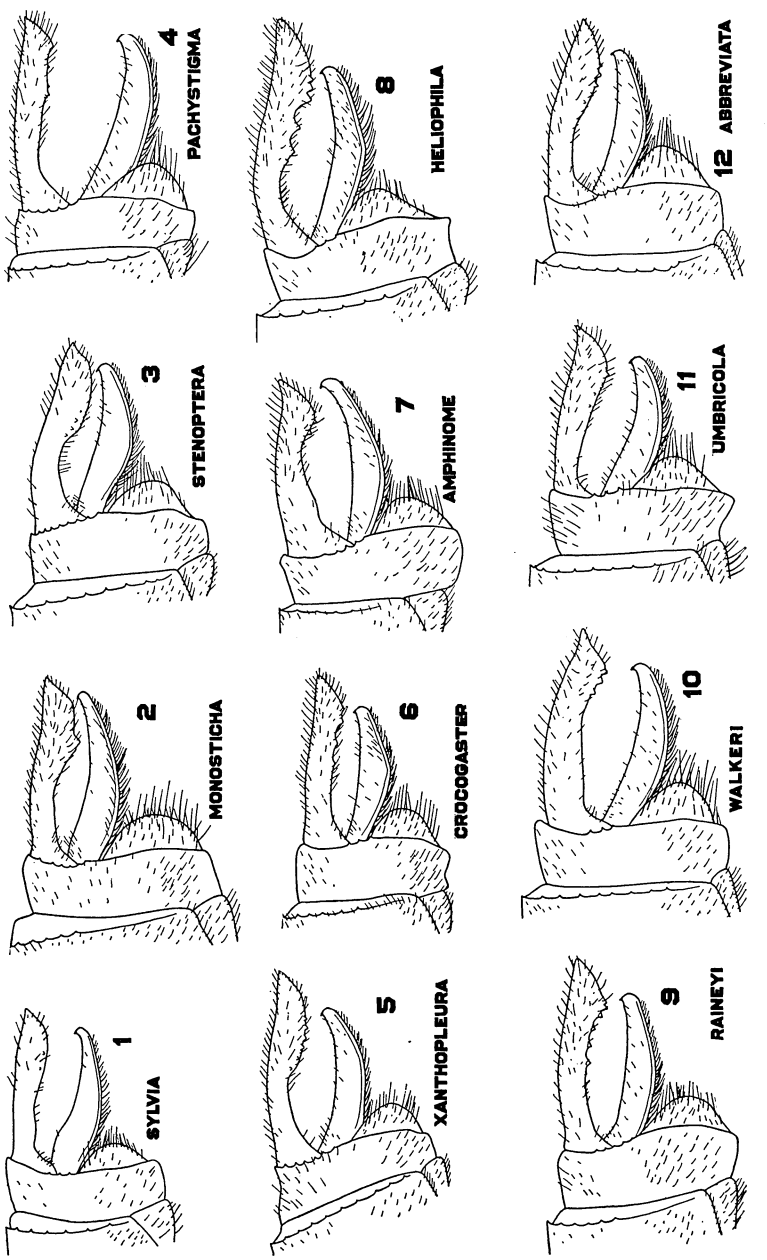
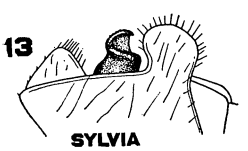

1 SYLVIA
2 MONOSTICHA
3 STENOPTERA
4 PACHYSTIGMA
5 XANTHOPLEURA
6 CROCOGASTER
7 AMPHINOME
8 HELIOPHILA
9 RAINEYI
10 WALKERI
11 UMBRICOLA
12 ABBREVIATA

PLATE II

Genitalia of Second Abdominal Segment of Male, as seen from right side.

FIG. 13. *O. sylvia.* Wismar, January 30, 1912.
FIG. 14. *O. monosticha.* Leticia, June 29, 1920 (type).
FIG. 15. *O. stenoptera.* Abuná, March 9, 1922 (type).
FIG. 16. *O. rhea.* Pará (type), in Coll. Selys. Redrawn from Ris (8), fig. 259, p. 402.
FIG. 17. *O. pachystigma.* Georgetown, January 27, 1912.
FIG. 18. *O. laetitia.* Porto Alegre (type), in Museum of Berlin. Redrawn from Ris (8), fig. 252, p. 404.
FIG. 19. *O. xanthopleura.* Manáos, June 6, 1922 (type).
FIG. 20. *O. crocogaster.* Porto Velho, April 24, 1922 (paratype).
FIG. 21. *O. amphinome.* Tumatumari, February 12, 1912 (paratype).
FIG. 22. *O. heliophila.* La Fria, April 14, 1920 (paratype).
FIG. 23. *O. raineyi.* Tumatumari, February 11, 1912 (paratype).
FIG. 24. *O. walkeri.* Tumatumari, Febuary 8, 1912.
FIG. 25. *O. umbricola.* La Fria, April 15, 1920 (type).
FIG. 26. *O. abbreviata.* Potaro Landing, February 10, 1912.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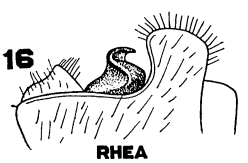
SYLVIA


14
MONOSTICHA

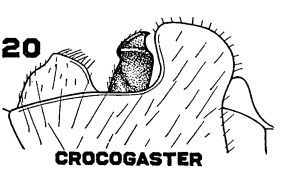

15
STENOPTERA


16
RHEA

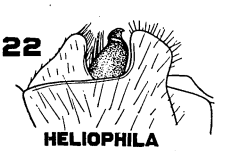

17
PACHYSTIGMA


18
LAETITIA


19
XANTHOPLEURA


20
CROCOGASTER


21
AMPHINOME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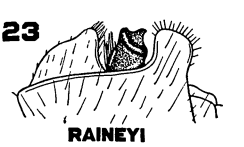
HELIOPHILA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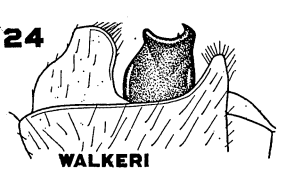
RAINEYI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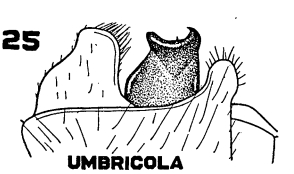
WALKERI

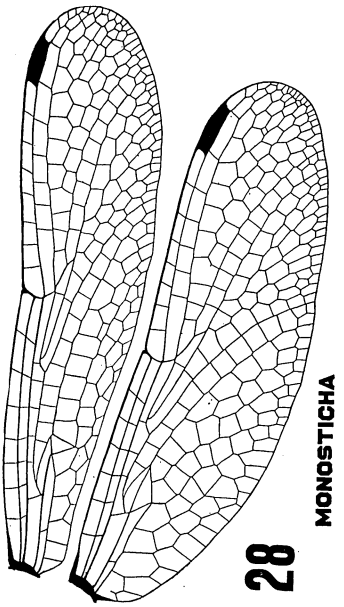

25
UMBRICOLA


26
ABBREVIATA

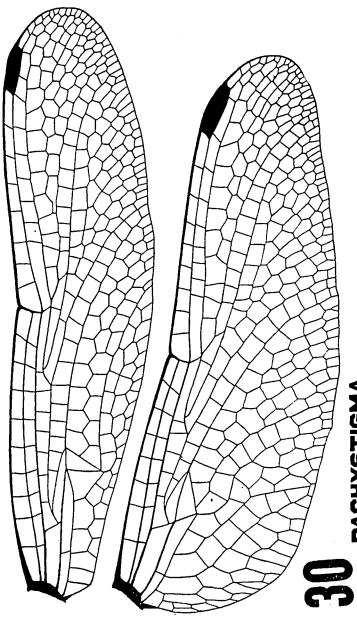
PLATE III

Wings of *Oligoclada* (all drawn from males)

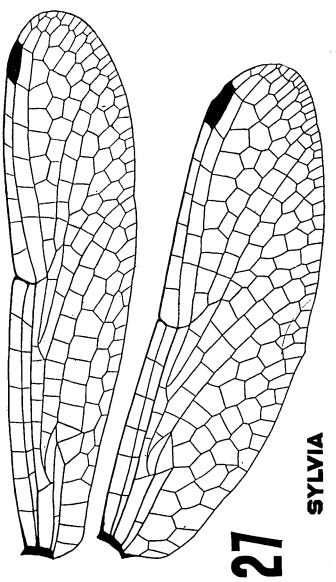
FIG. 27. *O. sylvia.* Carvoeiro, July 11, 1922.
FIG. 28. *O. monosticha.* Leticia, June 29, 1920 (paratype).
FIG. 29. *O. stenoptera.* Abuná, March 21, 1922 (paratype).
FIG. 30. *O. pachystigma.* Belem, August 10, 1922.



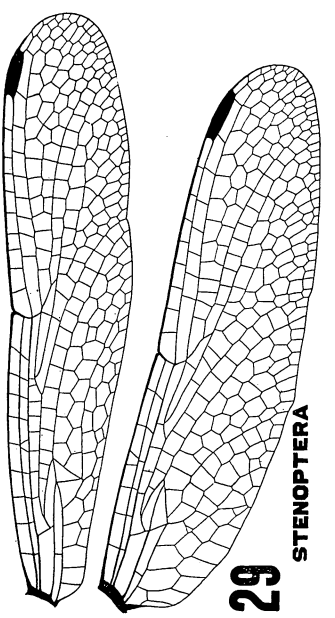
28 MONOSTICHA



30 PACHYSTIGMA



27 SYLVIA



29 STENOPTERA

PLATE IV

Wings of *Oligoclada* (all drawn from males)

FIG. 31. *O. xanthopleura.* Manáos, June 6, 1922 (paratype).
FIG. 32. *O. crocogaster.* Belem, August 14, 1922 (paratype).
FIG. 33. *O. amphinome.* Rockstone, February 1, 1912 (paratype).
FIG. 34. *O. abbreviata.* Belem, August 7, 1922.

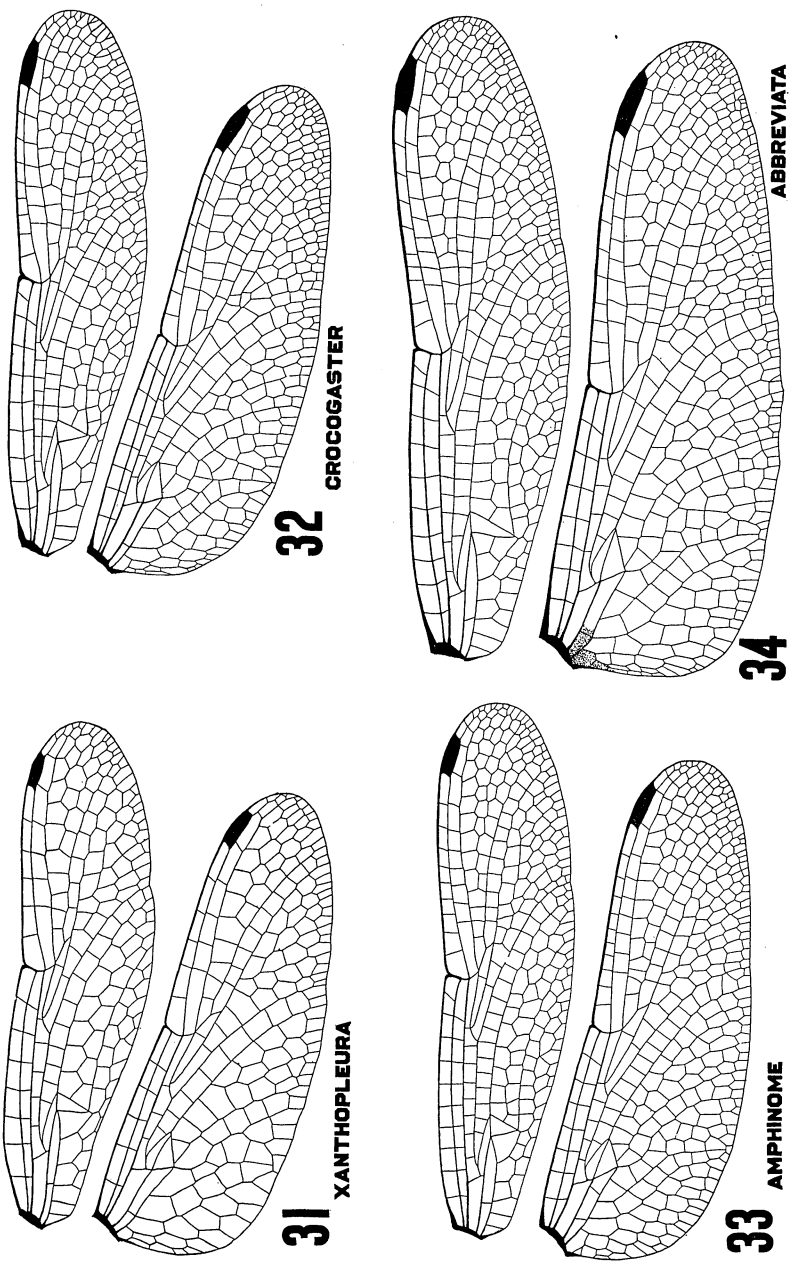

32 CROCOGASTER
ABBREVIATA 34
31 XANTHOPLEURA
33 AMPHINOME

PLATE V

FIGS. 35–46. Tarsal Claws.
FIGS. 47–63. Occipita, Dorsal View.
FIGS. 64–66. Vulvar Lamina.
FIGS. 67–71. Terminal Abdominal Segments of Female, Ventral View.
FIG. 35. *O. sylvia.* Wismar, January 30, 1912.
FIG. 36. *O. monosticha.* Leticia, June 29, 1920 (type).
FIG. 37. *O. stenoptera.* Abuná, March 9, 1922 (type).
FIG. 38. *O. pachystigma.* Georgetown, January 27, 1912.
FIG. 39. *O. xanthopleura.* Manáos, June 6, 1922 (type).
FIG. 40. *O. crocogaster.* Belem, August 7, 1922 (type).
FIG. 41. *O. amphinome.* Rockstone, February 1, 1912 (paratype).
FIG. 42. *O. heliophila.* La Fria, April 14, 1920 (paratype).
FIG. 43. *O. raineyi.* Tumatumari, February 11, 1912 (paratype).
FIG. 44. *O. walkeri.* Tumatumari, February 8, 1912.
FIG. 45. *O. umbricola.* La Fria, April 15, 1920 (type).
FIG. 46. *O. abbreviata.* Potaro Landing, February 10, 1912.
FIG. 47. *O. pachystigma,* male. Georgetown, February 18, 1912.
FIG. 48. *O. pachystigma,* female. Georgetown, January 27, 1912.
FIG. 49. *O. pachystigma,* male. Belem, August 9, 1922.
FIG. 50. *O. pachystigma,* female. Belem, August 9, 1922.
FIG. 51. *O. pachystigma,* male. Porto Velho, February 6, 1922.
FIG. 52. *O. pachystigma,* female. Porto Velho, April 27, 1922.
FIG. 53. *O. xanthopleura,* male. Manáos, June 6, 1922 (type).
FIG. 54. *O. xanthopleura,* female. Manáos, June 6, 1922 (allotype).
FIG. 55. *O. crocogaster,* male. Porto Velho, April 24, 1922 (paratype).
FIG. 56. *O. amphinome,* male. Tumatumari, February 12, 1912 (paratype).
FIG. 57. *O. heliophila,* male. Cristalina, February 13, 1917 (paratype).
FIG. 58. *O. raineyi,* male. Tumatumari, February 11, 1912 (paratype).
FIG. 59. *O. walkeri,* male. Tumatumari, February 8, 1912.
FIG. 60. *O. umbricola,* male. Cristalina, February 19, 1917 (paratype).
FIG. 61. *O. abbreviata,* female. Porto Velho, April 26, 1922.
FIG. 62. *O. abbreviata,* male. Potaro Landing, February 10, 1912.
FIG. 63. *O. abbreviata,* female. Tumatumari, February 9, 1912.
FIG. 64. *O. heliophila.* Rio Frio, January 5, 1917 (paratype).
FIG. 65. *O. walkeri.* Moura, July 11, 1922.
FIG. 66. *O. abbreviata.* Porto Velho, April 26, 1922.
FIG. 67. *O. pachystigma.* Georgetown, January 27, 1912.
FIG. 68. *O. xanthopleura.* Manáos, June 6, 1922 (allotype).
FIG. 69. *O. crocogaster.* Belem, August 7, 1922 (allotype).
FIG. 70. *O. heliophila.* Rio Frio, January 5, 1917 (paratype).
FIG. 71. *O. walkeri.* Tumatumari, February 11, 1912 (allotype).

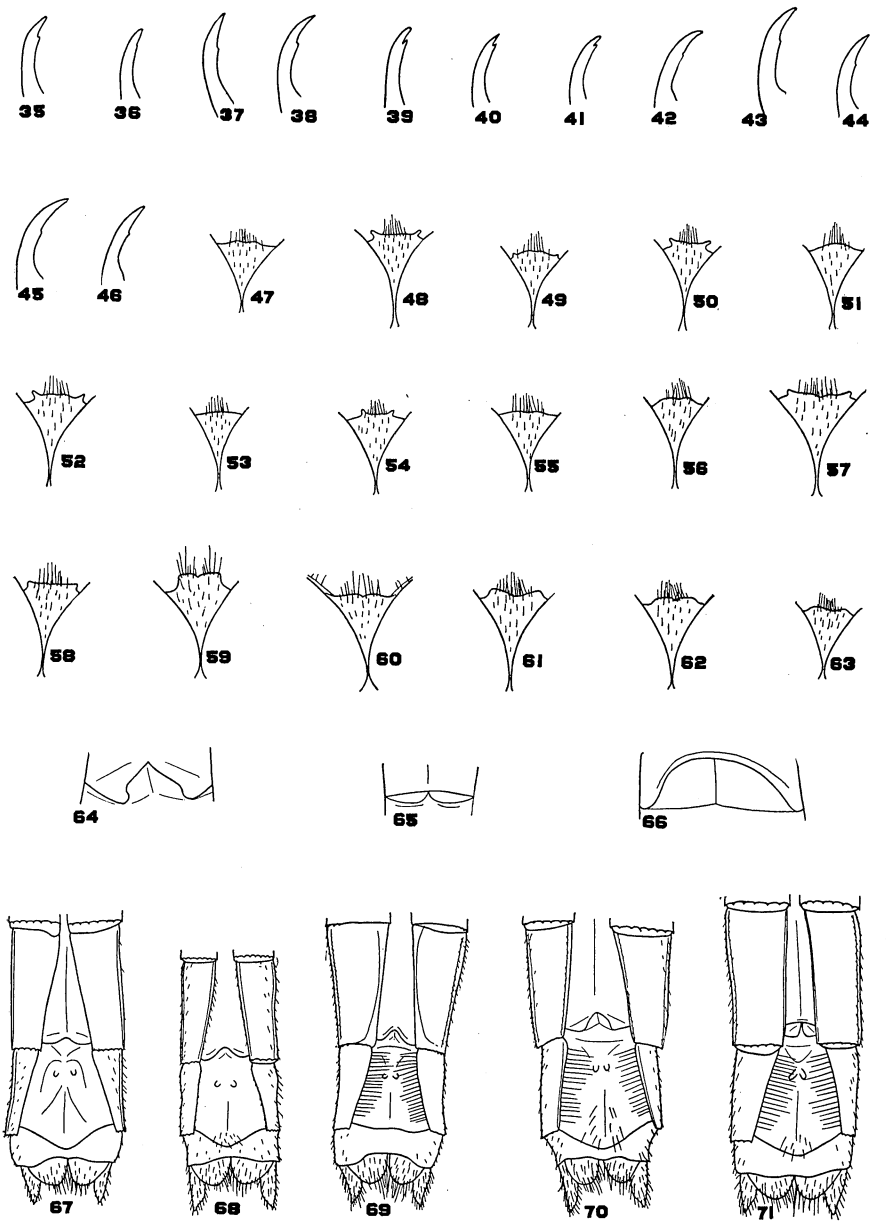

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PLATE VI

Penes of *Oligoclada*

The penes were treated with caustic potash and mounted in diaphane, and the drawings were made with projection apparatus from the slides thus made. The penes are all drawn from the right side, with the ventral edge at the top of the drawing. The lobes of the penis are labelled as follows: L—lateral lobes; M—medial lobes; I—internal lobes; C—cornua; P—posterior lobe. The paired structures within the lateral lobes are shown in evenly broken lines; those structures which are single are shown in irregularly broken lines (*i. e.*, dot and dash).

FIG. 72. *O. sylvia.* Carvoeiro, July 11, 1922.
FIG. 73. *O. monosticha.* Leticia, June 29, 1920 (paratype).
FIG. 74. *O. stenoptera.* Abuná, March 21, 1922 (paratype).
FIG. 75. *O. pachystigma.* Belem, August 5, 1922.
FIG. 76. *O. xanthopleura.* Manáos, June 6, 1922 (paratype).
FIG. 77. *O. crocogaster.* Porto Velho, February 13, 1922 (paratype).
FIG. 78. *O. amphinome.* Rockstone, February 1, 1912 (paratype).
FIG. 79. *O. heliophila.* Cristalina, February 17, 1917 (paratype).
FIG. 80. *O. raineyi.* Potaro River, February 4, 1912 (paratype).
FIG. 81. *O. walkeri.* Moura, July 11, 1922.
FIG. 82. *O. umbricola.* Cristalina, February 19, 1917 (paratype).
FIG. 83. *O. abbreviata.* Belem, August 7, 1922.

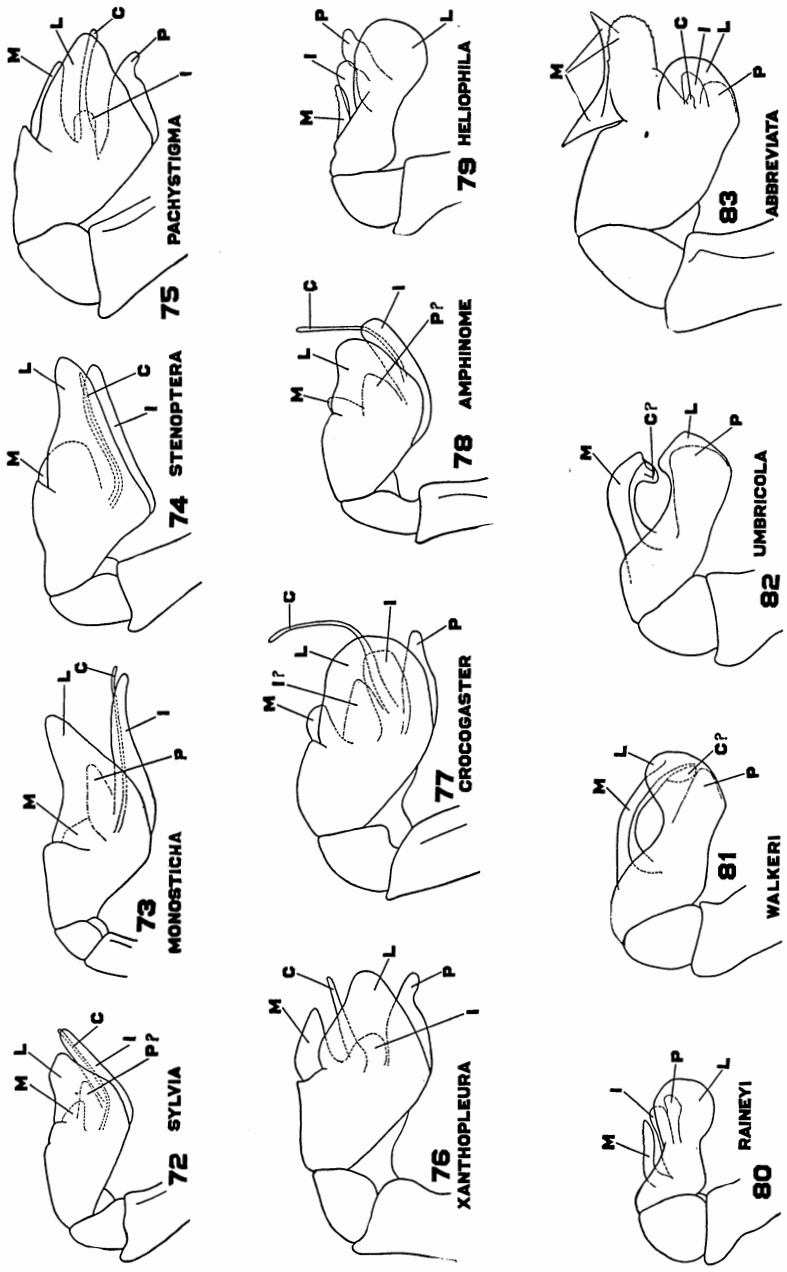
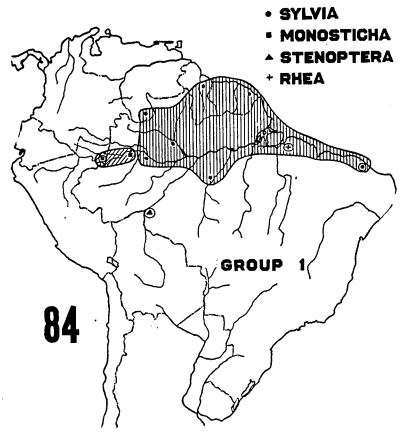

M L C I P?
72 SYLVIA
M L C I P
73 MONOSTICHA
M L C I P
74 STENOPTERA
M L C P I
75 PACHYSTIGMA
M C L P I
76 XANTHOPLEURA
M I? L C I P
77 CROCOGASTER
M L C I P?
78 AMPHINOME
M I P L
79 HELIOPHILA
M I P L
80 RAINEYI
M L C? P
81 WALKERI
M C? L P
82 UMBRICOLA
M C I L P
83 ABBREVIATA

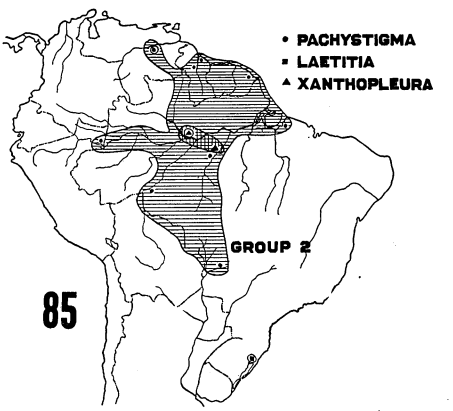
PLATE VII

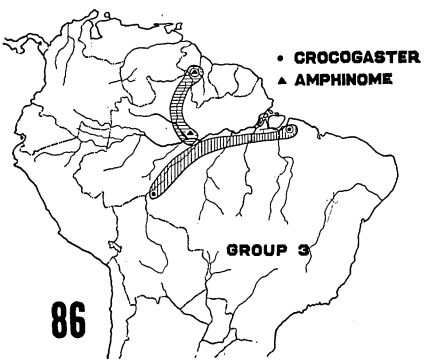
Distribution of *Oligoclada*

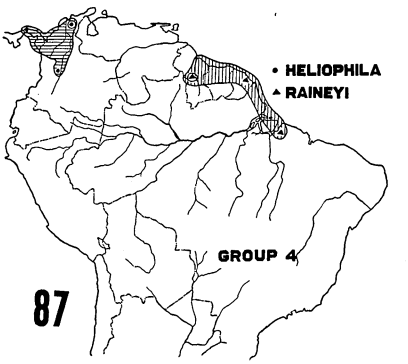
Localities where specimens have been collected are indicated; the type locality is encircled. The shaded areas indicate probable distribution. Each map (figures 84–89) shows the distribution of the species of one of the six natural groups within the genus. It is interesting to note that each of the six groups is represented in Guiana, and each by but a single species, and that these six species occur also in the Amazonian basin and one of them in Trinidad, the only known species for that island. There is no species peculiar to the Guianas, and the species which do not occur there tend to lie around the borders of the distribution of the genus to the south, west, and northwest of the Guianas, thus clearly indicating a Guianian highland origin for the genus.

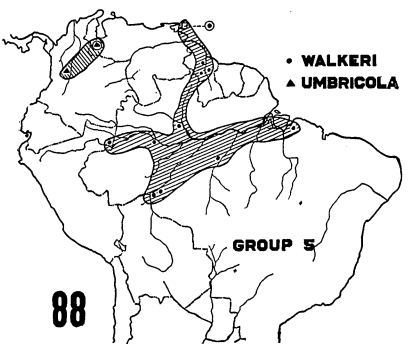
FIG. 84. Group I.
FIG. 85. Group II.
FIG. 86. Group III.
FIG. 87. Group IV.
FIG. 88. Group V.
FIG. 89. Group VI.

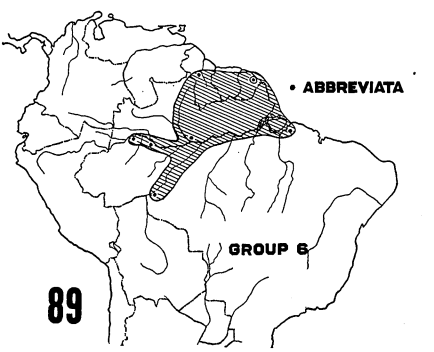

• SYLVIA
▪ MONOSTICHA
▲ STENOPTERA
+ RHEA
GROUP 1
84


• PACHYSTIGMA
▪ LAETITIA
▲ XANTHOPLEURA
GROUP 2
85


• CROCOGASTER
▲ AMPHINOME
GROUP 3
86


• HELIOPHILA
▲ RAINEYI
GROUP 4
87


• WALKERI
▲ UMBRICOLA
GROUP 5
88


• ABBREVIATA
GROUP 6
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