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A REVIEW OF THE FROGS OF THE GENUS *SYRRHOPHUS*
IN WESTERN MEXICO*

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FIELD work in México, during the summer of 1956, and subsequent examination of series of specimens provided a basis for the re-evaluation of the systematics and distribution of the species of *Syrrhophus* of western México.¹ Firschein (1954) discussed most of the species known to occur in eastern Mexico. The only published work on the western species since that of Taylor and Smith (1945), is a description of *Syrrhophus interorbitalis* by Langebartel and Shannon (1956). The present paper deals with the western species and with one eastern form, *S. leprus*, which approaches the ranges of the western species.

One hundred and ninety-six preserved specimens were examined. Measurements were taken in the manner described by Duellman (1956), and unless otherwise stated, all of them and the proportions apply to males only. The standard error of the mean is doubled to be of significance at the .975 level; the calculation of twice the standard error was modified for small samples by multiplying the standard error by the appropriate Student *t* rather than by two.

VARIATION

SIZE AND PROPORTIONS.—Eight measurements were taken on each specimen; from them, eight proportions were calculated (Table I). Two species are relatively small; *modestus* has an average snout-vent length of 19.6 mm., and *rubrimaculatus* has an average of 21.3 mm. The other forms are larger; *leprus* 24.6 mm., *interorbitalis* 24.3 mm., *nebulosus* 24.0 mm., and *pipilans* 26.8 mm. In body proportions there are few striking differences between the species, although in some

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TABLE I

ANALYSIS OF VARIATION IN EIGHT FORMS OF *Syrhophus*
All proportions are for males only and are in per cent.

| Ratio | No. | Mean | Range | 2σm |
|--|-----|------|-----------|------|
| Tibia Length/ Snout-Vent Length | | | | |
| <i>interorbitalis</i> | 7 | 41.5 | 39.6-43.1 | 1.05 |
| <i>leprus</i> | 12 | 45.4 | 41.5-47.1 | 0.96 |
| <i>modestus modestus</i> | 10 | 41.5 | 39.5-42.9 | 0.81 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 43.0 | 40.0-46.1 | 1.71 |
| Tres Marias Islands | 17 | 45.1 | 43.7-47.2 | 1.64 |
| <i>pipilans pipilans</i> | 18 | 39.8 | 34.4-44.0 | 1.05 |
| <i>pipilans nebulosus</i> | 7 | 41.1 | 35.7-44.7 | 3.33 |
| <i>rubrimaculatus</i> | 10 | 43.8 | 41.8-46.2 | 1.13 |
| <i>teretistes</i> | 1 | 39.4 | ..... | .... |
| Foot Length/ Snout-Vent Length | | | | |
| <i>interorbitalis</i> | 7 | 38.6 | 36.7-39.6 | 0.86 |
| <i>leprus</i> | 12 | 44.2 | 39.2-46.1 | 1.17 |
| <i>modestus modestus</i> | 10 | 37.9 | 36.2-41.2 | 0.97 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 37.1 | 34.0-38.9 | 1.31 |
| Tres Marias Islands | 17 | 39.4 | 37.1-44.2 | 2.18 |
| <i>pipilans pipilans</i> | 18 | 39.2 | 36.0-44.0 | 1.09 |
| <i>pipilans nebulosus</i> | 7 | 38.4 | 34.0-44.7 | 3.61 |
| <i>rubrimaculatus</i> | 10 | 42.0 | 39.1-45.1 | 1.44 |
| <i>teretistes</i> | 1 | 36.0 | ..... | .... |
| Head Length/ Snout-Vent Length | | | | |
| <i>interorbitalis</i> | 7 | 34.8 | 33.2-36.2 | 0.83 |
| <i>leprus</i> | 12 | 38.4 | 37.1-39.6 | 0.52 |
| <i>modestus modestus</i> | 10 | 34.3 | 33.3-35.3 | 0.54 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 33.9 | 30.9-35.8 | 1.29 |
| Tres Marias Islands | 17 | 34.1 | 33.2-36.1 | 0.74 |
| <i>pipilans pipilans</i> | 18 | 35.1 | 32.8-38.0 | 0.81 |
| <i>pipilans nebulosus</i> | 7 | 35.8 | 34.0-37.5 | 1.18 |
| <i>rubrimaculatus</i> | 10 | 36.9 | 35.7-38.9 | 0.74 |
| <i>teretistes</i> | 1 | 30.4 | ..... | .... |
| Head Width/ Snout-Vent Length | | | | |
| <i>interorbitalis</i> | 7 | 31.9 | 30.2-33.8 | 1.03 |
| <i>leprus</i> | 12 | 35.2 | 33.3-36.5 | 0.62 |
| <i>modestus modestus</i> | 10 | 32.6 | 31.2-33.7 | 0.56 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 33.9 | 30.0-36.5 | 1.77 |
| Tres Marias Islands | 17 | 33.1 | 29.8-34.1 | 1.02 |
| <i>pipilans pipilans</i> | 18 | 33.4 | 31.1-36.3 | 0.67 |
| <i>pipilans nebulosus</i> | 7 | 33.0 | 31.2-35.4 | 1.42 |
| <i>rubrimaculatus</i> | 10 | 33.6 | 31.8-35.9 | 0.93 |
| <i>teretistes</i> | 1 | 32.1 | ..... | .... |

TABLE I (Cont.)

| Ratio | No. | Mean | Range | 2 σ m |
|---|-----|------|-----------|--------------|
| Interorbital Distance/ Head Width | | | | |
| <i>interorbitalis</i> | 7 | 33.0 | 29.4-36.2 | 2.19 |
| <i>leprus</i> | 12 | 32.5 | 30.2-36.1 | 1.07 |
| <i>modestus modestus</i> | 10 | 34.7 | 32.8-37.7 | 1.14 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 34.3 | 33.3-35.3 | 0.53 |
| Tres Marias Islands | 17 | 35.1 | 34.0-36.5 | 1.72 |
| <i>pipilans pipilans</i> | 18 | 31.7 | 27.0-35.9 | 1.35 |
| <i>pipilans nebulosus</i> | 7 | 32.7 | 28.9-34.7 | 1.89 |
| <i>rubrimaculatus</i> | 10 | 32.7 | 31.1-34.8 | 0.80 |
| <i>teretistes</i> | 1 | 36.9 | ..... | .... |
| Width of Eyelid/ Interorbital Distance | | | | |
| <i>interorbitalis</i> | 7 | 75.2 | 64.0-84.0 | 6.51 |
| <i>leprus</i> | 12 | 71.6 | 68.9-75.9 | 1.46 |
| <i>modestus modestus</i> | 10 | 60.6 | 50.0-68.0 | 3.21 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 75.8 | 70.8-83.3 | 3.37 |
| Tres Marias Islands | 17 | 74.9 | 69.2-77.6 | 2.52 |
| <i>pipilans pipilans</i> | 18 | 67.1 | 56.2-80.0 | 3.28 |
| <i>pipilans nebulosus</i> | 7 | 69.7 | 61.5-75.0 | 4.06 |
| <i>rubrimaculatus</i> | 10 | 72.2 | 65.2-78.3 | 3.08 |
| <i>teretistes</i> | 1 | 64.5 | ..... | .... |
| Tympanum Length/ Head Length | | | | |
| <i>interorbitalis</i> | 7 | 13.0 | 11.6-14.9 | 1.01 |
| <i>leprus</i> | 12 | 20.9 | 18.4-23.8 | 0.89 |
| <i>modestus modestus</i> | 10 | 11.7 | 10.0-13.4 | 0.74 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 11.6 | 9.9-13.2 | 0.76 |
| Tres Marias Islands | 17 | 11.6 | 9.7-12.9 | 0.81 |
| <i>pipilans pipilans</i> | 18 | 16.1 | 14.6-17.8 | 0.54 |
| <i>pipilans nebulosus</i> | 7 | 13.9 | 13.2-15.0 | 0.61 |
| <i>rubrimaculatus</i> | 10 | 14.8 | 13.6-16.3 | 0.56 |
| <i>teretistes</i> | 1 | 12.9 | ..... | .... |
| Tympanum Length/ Diameter of Eye | | | | |
| <i>interorbitalis</i> | 7 | 40.2 | 36.6-42.9 | 3.31 |
| <i>leprus</i> | 12 | 66.9 | 61.1-77.8 | 5.04 |
| <i>modestus modestus</i> | 10 | 35.2 | 31.8-40.0 | 1.93 |
| <i>modestus pallidus</i> | | | | |
| Nayarit Mainland | 8 | 37.3 | 31.8-40.0 | 2.40 |
| Tres Marias Islands | 17 | 38.1 | 32.9-41.4 | 1.81 |
| <i>pipilans pipilans</i> | 18 | 50.5 | 45.2-58.0 | 3.74 |
| <i>pipilans nebulosus</i> | 7 | 40.2 | 36.7-41.4 | 1.44 |
| <i>rubrimaculatus</i> | 10 | 42.3 | 37.9-46.4 | 1.76 |
| <i>teretistes</i> | 1 | 38.4 | ..... | .... |

they are sufficiently different between two or more species to be useful as criteria in the recognition of those forms. In this respect *modestus* and *leprus* differ from each other and from the other species in the length of the head relative to the snout-vent length; the new species described here has a much shorter head than any of the others. Likewise, the northern and southern populations of *modestus* are distinguishable on the basis of the width of the eyelid. The tympanum is much larger in *leprus*, and the average value of the ratio of foot length/snout-vent length is greater in *leprus* and *rubrimaculatus*.

COLOR PATTERN.—All of the species have a dorsal color pattern consisting of blotches, spots, or mottling. In *modestus* the ground color is light with dark markings; in the others the reverse is true. In *leprus*, however, the pattern may have been derived from a stock with a light ground color, for the spots are numerous and close together and could be interpreted as a light ground color with dark reticulations. Variation in color pattern is discussed in accounts of the species.

STRUCTURAL CHARACTERS.—Species of *Syrrhophus* inhabiting eastern México and referred to the Sierra Madre Oriental complex of the genus by Firschein (1954), have three evident palmar tubercles. The only species of that group treated here is *leprus*. The others discussed, western species or members of the Sierra Madre Occidental group, have two large tubercles on the palm, but the third is either absent or greatly reduced. The species with a reduced outer palmar tubercle are *modestus* and *rubrimaculatus*; in the others it is lacking.

In all of the species except *rubrimaculatus* the tips of the digits are expanded. They are most noticeably so in *interorbitalis* and the new species described; also in these they are truncate.

There are major differences in the relative size and shape of the metatarsal tubercles. In *modestus* the inner metatarsal tubercle is elongate and about one and one-half times the size of the conical outer metatarsal tubercle; in *rubrimaculatus* the inner is slender, sharp-edged, and twice the size of the conical outer tubercle. In *nebulosus* and *pipilans*, the tubercles are conical and equal in size. In *interorbitalis* they are rounded, the inner half again as large as the outer, and in the new species the inner is rounded, massive, and three times the size of the outer. In *leprus* and its eastern relatives the tubercles are rounded and subequal in size.

The tympanum is clearly distinct in *leprus* and other eastern forms and in *rubrimaculatus*, *nebulosus*, and *pipilans*. In *interorbitalis* and the new species it is partly covered with skin; in *modestus* it is barely discernable.

ACCOUNT OF SPECIES

Syrrophus modestus modestus Taylor, new comb.

(Pl. I, Fig. 1)

Syrrophus modestus Taylor, 1942, Univ. Kansas Sci. Bull., 28: 304-6, Pl. 29.

TYPE LOCALITY.—Hacienda Paso del Río, Colima.

This small species has a bold color pattern of irregular dark spots on a light ground color. In life, the ground color is red-rust above, the spots are black, the belly is pale gray, and the iris is golden. Individuals were heard calling from dense brush near Tecolapa, Colima, on August 9, 1956. The call was a single loud "chirp."

RANGE.—Coastal region and lower slopes of the Sierra Madre Occidental in Colima and the southern part of the state of Jalisco and, probably, the coast of Michoacán. Specimens examined (14):

MEXICO: *Colima*: Arroyo de la Estancia, AMNH 6540; Colima AMNH 13269; 6 mi. SE of Colima, AMNH 6539; Paso del Río, UIMNH 13300-301, UMMZ 110877 (2); 4.5 miles SW of Tecolapa, UMMZ 115477 (4). *Jalisco*: Cerro de los Carboneros, AMNH 12506; 2 miles N of La Resolana, UMMZ 102100; Bahía Tenacatita, UMMZ 84264.

Syrrophus modestus pallidus, new subspecies

(Pl. III)

DIAGNOSIS.—A subspecies differing from the nominal race in having a wider eyelid in relation to the interorbital distance and a light-gray ground color with comparatively fine dark-brown mottling.

HOLOTYPE.—UMMZ 115452, an adult male, one of a series of seven specimens collected near sea level at San Blas, Nayarit, on August 13, 1956, by William E. and Ann S. Duellman. Original number WED 11253.

PARATYPES.—UMMZ 115453-57, collected with the type. One other specimen, not designated as a paratype, is cleared and stained.

DESCRIPTION OF HOLOTYPE.—Snout-vent length 19.6 mm.; tibia length 8.4 mm. (42.9 per cent of the snout-vent length); foot length 7.4 mm.; head width 6.8 mm.; head length 6.8 mm.; interorbital distance 2.4 mm.; width of eyelid 1.7 mm. (70.8 per cent of interorbital distance); internarial distance 2.0 mm.; diameter of eye 2.2 mm.; diameter of tympanum 0.9 mm. Snout relatively short, somewhat pointed, and noticeably protruding beyond lower jaw; canthus rounded, not distinct; loreal region slightly concave. Diameter of eye greater than its distance from nostril; tympanum nearly concealed; tongue narrowly pyriform, free for about one-half its length posteriorly, and barely notched behind; inner nares small, elliptical, and situated laterally; paired slits along posterior half of jaw rami open into the vocal sac.

Forelimb of moderate length; when carried forward about one-third of forelimb extends beyond snout. Median palmar tubercle large and subconical, thrice size of the inner palmar tubercle; minute outer palmar tubercle; five supernumerary tubercles on palm and bases of digits; subarticular tubercles obtusely conical, one each on digits 1 and 2 and two each on digits 3 and 4; order of length of fingers, from shortest to longest, 1-2-4-3. Terminal discs on digits 1 and 2 slightly wider than digit; those on 3 and 4 about twice as wide as narrowest part of digit. Hindlimb when carried forward tibiotarsal articulation reaches anterior edge of orbit; when hind limbs folded heels slightly overlap. Inner metatarsal tubercle elongate and slightly more than twice size of high, conical, outer metatarsal tubercle. Supernumerary tubercles small and conical; subarticular tubercles large and conical; order of length of toes, from shortest to longest, 1-2-5-3-4; terminal discs about half again as wide as narrowest part of digit.

Skin smooth above and below with exception of minute granules on flanks and somewhat larger tubercles on posteroventral surfaces of thighs. No external evidence of inguinal gland.

In alcohol, the dorsal ground color is a pale grayish tan, the upper surfaces of the limbs having a yellowish tint. There is a dense dorsal pattern of interconnecting dark brown spots. The ventral surfaces are cream with small scattered dark flecks. In life, the ground color is pale tan and the dorsal markings dark chocolate brown. The venter was grayish white and the vocal sac white. The iris was dark golden.

VARIATION.—The variation in measurements and proportions are given in Table I. The type series is rather uniform in color pattern. The pattern of dark spots is fragmented in some, whereas in UMMZ 115455 the spots are fused to form irregular stripes. Thirty-eight specimens from the Tres Mariás Islands show only minor differences from the type series (Table I). The dark dorsal flecking is greatly reduced in some. All have a distinct dark preorbital stripe. Two specimens from 30 miles southeast of Tepic (3000 feet) are sufficiently unlike the type series to warrant special mention. In both the ground color is grayish brown. The dorsal markings are reduced to indistinct scattered spots in one and to a few small flecks in the other. Another individual (UIMNH 7808) has a light-tan ground color with scattered dark-brown flecks. In measurements and proportions the last three specimens are close to the type series of *pallidus* and more closely resemble the coloration in that form than they do the bold markings of the nominal subspecies.

COMPARISONS.—Although there are no specimens intermediate in

diagnostic characters between *pallidus* and *S. m modestus*, the overlap in morphological characters and apparent adjacency of their ranges indicate that the two populations are subspecies rather than species. The structural differences are minor, but *modestus* usually has a more distinct tympanum and a smaller eyelid/interorbital distance ratio (60.0 per cent in *modestus*, as compared with 75.8 per cent in *pallidus*). The light-tan ground color of *pallidus* is in striking contrast to the darker red-rust color of *modestus*. Both forms have irregular spots on the back; in *modestus* these are black, larger, and fewer than in *pallidus*. In *pallidus* the spots are brown and sometimes interconnected.

REMARKS.—The individuals comprising the type series were found calling from herbaceous plants and bushes at the base of a granitic cliff just inland from the town of San Blas. The call is a single, loud "chirp," not noticeably different from that of *modestus*. Richard G. Zweifel collected a large series on María Madre and María Magdalena islands; there the frogs were found during the dry season beneath rocks in moist arroyos. The subspecific name *pallidus* is from the Latin and refers to the pale dorsal color as compared with the nominal subspecies.

RANGE.—A limited area from the coast to elevations of about 3000 feet in the central part of the state of Nayarit and on the Tres Mariás Islands. Specimens examined (47):

MEXICO: *Nayarit*: 18.8 miles NW of Ahuacatlán, UIMNH 7808; 30 miles SE of Tepic, TCWC 12169-70; San Blas, UMMZ 115452-57. *Isla Mariá Magdalena*, AMNH 60392-98(16); *Isla María Madre*, AMNH 60399-60404(22).

Syrhophus rubrimaculatus Taylor and Smith

Syrhophus rubrimaculatus Taylor and Smith, 1945, Proc. U.S. Nat. Mus., 95: 583-85.

TYPE LOCALITY.—La Esperanza, Chiapas.

This small species is distinguished from all other forms by the following combination of characters: outer palmar tubercle greatly reduced, digits not expanded at the tips, inner metatarsal tubercle slender and sharp-edged, and a dorsal color pattern of small reddish spots on a brown ground color. In general appearance it does not resemble any other species in the genus; however, the small size and the presence of red in the dorsal coloration, as well as the elongate inner metatarsal tubercle may indicate a relationship with *modestus*.

RANGE.—Apparently restricted to the Pacific slopes of the Sierra Madre in Chiapas. Specimens examined (30):

MEXICO: *Chiapas*: Escuintla, UMMZ 87876-80, 88283, 88319, 88329 (2); La Esperanza, UMMZ 88496-97, USNM 114054-69, 114072-73.

Syrrophus leprus Cope

(Pl. I, Fig. 2)

Syrrophus leprus Cope, 1879, Proc. Amer. Philos. Soc., 18: 268-69.

TYPE LOCALITY.—Santa Efigenia, Oaxaca.

Possession of a well-developed outer palmar tubercle establishes that *leprus* belongs to the eastern group of *Syrrophus*, and it appears to be most closely related to *cystignathoides* and *campi*. There is a superficial resemblance of color pattern in preserved specimens to *rubrimaculatus* and *nebulosus*. In life, *leprus* has a dorsal pattern of dark chocolate brown with yellowish green spots or mottling; the flanks are flecked with bluish white. The belly is gray; the iris is golden above and copper-colored below. Individuals were heard calling from rock piles in San Andrés Tuxtla, Veracruz; the call is a single chirp.

The type locality, Santa Efigenia, Oaxaca, was the home of Francis Sumichrast, who sent large collections to the United States National Museum. The locality is on the Pacific slopes near the crest of the western part of the Chiapan highlands where they drop into the region of the Isthmus of Tehuantepec. Since all records for *leprus* are from the Atlantic lowlands, suspicion was aroused as to the proper assignment of the name *leprus*. Through the courtesy of Remington Kellogg and Doris M. Cochran of the United States National Museum I was permitted to examine the type of *leprus*. The specimen is a female, and although somewhat faded, the color pattern is typical of the frogs currently assigned to *leprus*.

RANGE.—From southern Veracruz and northern Oaxaca, in Mexico, eastward through El Petén, Guatemala. Specimens examined (37):

MEXICO: *Oaxaca*: Finca La Gloria, USNM 114093; 18 miles N of Matías Romero, UIMNH 39459; Santa Efigenia, USNM 10040 (holotype). *Tabasco*: Teapa, UMMZ 113779-80. *Veracruz*: 2 miles N of Catemaco, FAS 4148-49; Coyame, UIMNH 38995, 38998; San Andrés Tuxtla, FAS 4150, UIMNH 27123-31, 28611, UMMZ 115450 (5); 2.8 miles NW of Santiago Tuxtla, UIMNH 27122. GUATEMALA: *El Petén*: Piedras Negras, USNM 114085-92; Tikal, UMMZ 117035.

Syrrophus pipilans pipilans Taylor, new comb.

(Pl. II, Fig. 1)

Syrrophus pipilans Taylor, 1940, Proc. Biol. Soc. Washington, 53: 95-97, Pl. 1.

TYPE LOCALITY.—9 miles south of Mazatlán, Guerrero.

This is the largest form of *Syrrophus* in western México. The color pattern usually consists of a dark ground color with irregular light-brown, orange-brown, or yellowish blotches. In some these are reduced

to small spots. Specimens from eastern Oaxaca sometimes have a grayish brown ground color with scattered dark flecks as well as light spots. Specimens from the vicinity of Tehuantepec had in life a dorsal pattern of greenish tan and dark-brown mottling; the belly was white and the iris golden. Individuals were heard calling from the ground and from trees to a height of 12 feet. The call is a single, long, high-pitched "peep."

RANGE.—Apparently includes the Pacific slopes of the Sierra del Sur in Guerrero and Oaxaca to the Isthmus of Tehuantepec. To the east in Chiapas and Guatemala it is replaced by *nebulosus*, here placed as a subspecies of *pipilans*. Specimens examined (49):

MEXICO: *Guerrero*: Acahuitzotla, TCWC 8380; Acapulco, AMNH 55277-79, UMMZ 110125; Agua del Obispo, UIMNH 13315, USNM 114078-79, 134275, TCWC 8378, 10971-84, 11240-44, 12174-75; 1 mile SW of Colotlipa, TCWC 10144-45; 8.3 miles NW of Coyuca, UIMNH 38367; 1 mile N of Ocotito, TCWC 12176; Río Aguacatillo, 30 km. N of Acapulco, TCWC 833; Tierra Colorado, UIMNH 13313-14; 1 mile SW of Tierra Colorado, TCWC 8379; 9 miles SW of Tierra Colorado, TCWC 12177. *Oaxaca*: Cafetal Mirador, AMNH 6278; 4 miles N of El Candelaria, UIMNH 9501; 7 miles S of El Candelaria, UIMNH 9502; Cerro Arenal, USNM 114077; Cerro San Pedro de Istmo, near Tehuantepec, UIMNH 35510; 3.8 miles N of Santiago Chivela, UMMZ 115499; La Reforma, 49 miles W of Tehuantepec, TCWC 12173; 9 miles W of Tehuantepec, UMMZ 115448 (2).

Syrrophus pipilans nebulosus Taylor, new comb.

Syrrophus nebulosus Taylor, 1943, Univ. Kansas Sci. Bull., 29: 353-55, Pl. 27, Figs. 3-5.

TYPE LOCALITY.—Tonolá, Chiapas.

The dorsal color pattern of *nebulosus* consists of scattered small light spots on a dark-brown ground color. The spots are smaller and more numerous than those in *pipilans*. One individual (UMMZ 102258) from Hacienda Monserrate, Chiapas, has a grayish brown dorsum with scattered dark flecks; in this manner it closely resembles certain individuals of *pipilans* from eastern Oaxaca. In most measurements and proportions the Chiapan frogs are similar to *pipilans*. In the relative length of the tibia and size of the tympanum greater differences prevail (Table I). In both cases specimens of *pipilans* from eastern Oaxaca are intermediate between *nebulosus* in Chiapas and *pipilans* in Guerrero. On the basis of these similarities and because the inner and outer metatarsal tubercles are subequal in size and conical in shape, a condition not found in other west coast *Syrrophus*, *nebulosus* should be placed as a subspecies of *pipilans*. Taylor (1943)

suggested that this might be the proper arrangement, but at that time he did not have specimens from eastern Oaxaca.

RANGE.—The Pacific slopes of the Sierra Madre in Chiapas and in the central depression of that state eastward into extreme western Guatemala. Specimens examined (10):

MEXICO: *Chiapas*: 11.8 mi. N of Arriaga, UMMZ 117279; 12.8 mi. N of Arriaga, UMMZ 117280; Hacienda Monserrate, 40 miles NW of Arriaga, UMMZ 102258; Tapachula, UIMNH 13292; Tonolá, UIMNH 13293-96; Tuxtla Gutierrez, USNM 134274. GUATEMALA: *Huehuetenango*: Jacaltenango, UMMZ 117036.

Syrrhophus interorbitalis Langebartel and Shannon

Syrrhophus interorbitalis Langebartel and Shannon, 1956, *Herpetologica*, 12 (3): 161-65, Figs. 1-2.

TYPE LOCALITY.—36 miles north of Mazatlán, Sinaloa.

By color pattern alone this species may be distinguished from all others. The presence of a light bar between the eyes appears to be constant in the known specimens. The dorsal coloration consists of a light-brown dorsum with scattered dark flecks.

RANGE.—Known only from the type locality, but probably having an extensive range along the Pacific lowlands of Sinaloa, possibly northward into southern Sonora. Specimens examined (9):

MEXICO: *Sinaloa*: 36 miles N of Mazatlán, FAS 9379-82, UIMNH 38094-98.

Syrrhophus teretistes, new species

(Pl. II, Fig. 2)

DIAGNOSIS.—A species of *Syrrhophus* apparently related to *interorbitalis*, and characterized by having expanded truncate terminal discs, an indistinct tympanum about one-third the diameter of the eye, a very large inner metatarsal tubercle that is three times the size of the outer metatarsal tubercle, and a dark-gray vocal sac in the male.

HOLOTYPE.—UMMZ 115451, an adult male collected 3 miles north-west of Tepic, Nayarit (\pm 2950 feet), on August 12, 1956, by William E. Duellman. Original number WED 11200.

DESCRIPTION OF HOLOTYPE.—Snout-vent length, 25.3 mm.; tibia length, 10.0 mm. (39.4 per cent of snout-vent length); foot length, 9.1 mm.; head width, 8.4 mm.; head length, 7.7 mm.; interorbital distance, 3.1 mm.; width of eyelid, 2.0 mm. (64.5 per cent of interorbital distance); internarial distance, 2.0 mm.; diameter of eye, 2.6 mm.; diameter of tympanum, 1.0 mm. (38.4 per cent of diameter of eye). Snout moderately long, slightly pointed, and noticeably protruding beyond lower jaw; canthus rostralis rounded but distinct;

loreal region slightly concave. Eye equal to its distance from nostril; tympanum higher than long, indistinct, and separated from eye by distance equal to length of tympanum. Tongue pyriform, widest posteriorly, its width about half its length, posterior edge free for about one-half its length. Inner nares small, round, and situated laterally. Paired slits along posterior half of jaw rami open into vocal sac.

Forelimb long; when carried forward about half of forearm extends beyond snout. Median palmar tubercle large and flat, more than twice size of inner; outer palmar tubercle absent. Six supernumerary tubercles on palm and bases of digits. Subarticular tubercles large and high, one each on digits 1 and 2, and two each on digits 3 and 4; order of length of fingers, from shortest to longest, 1-2-4-3; terminal discs of digits 1 and 2 slightly wider than digit, those on 3 and 4 more than twice as wide as narrowest part of digit, truncate. Hindlimb when carried forward tibiotarsal articulation reaches posterior corner of orbit; when hind limbs folded heels barely overlap. Inner metatarsal tubercle elliptical, high, and massive, slightly more than three times size of conical outer metatarsal tubercle. Supernumerary tubercles small and conical; subarticular tubercles large, flattened on digits 1 and 2, conical on others; order of length of toes, from shortest to longest, 1-2-5-3-4; terminal discs about twice as wide as narrowest part of digit and truncate.

Skin smooth above and below except for minute tubercles behind tympanum and larger tubercles in anal region. Thin dermal fold from orbit curves slightly downward behind tympanum and extends posteriorly to point above insertion of forelimb. No external evidence of inguinal gland, but cream spot in inguinal region on right side.

In alcohol, the ground color appears as a yellowish brown with scattered dark brown pigment. There is a mottling of purplish brown on the head and back. The ground color continues on the upper surfaces of the limbs, where it is interrupted by brown transverse bands two to three times the width of the interspaces. There are two bands on the upper arm and three each on the forearm, thigh, shank, and foot. The bands do not extend onto the posterior surface of the thigh, which is a dirty cream color. The flanks are a dirty cream mottled with brown. The vocal sac and crest are purplish black with this color fading to a dirty cream on the posterior part of the belly. In life, the specimen was light tan above with the middorsal area a dark grayish brown. The venter was creamish white, and the vocal sac was dark gray. The iris was reddish brown. Before the frog was preserved the dorsal color changed to dark brown with tan flecks.

COMPARISONS.—*Syrrophus teretistes* belongs to that group of the genus that contains *interorbitalis* and *pipilans*. From these *teretistes* may be distinguished by the presence of the large inner metatarsal tubercle and the dark throat. From *pipilans* it also differs in having wider and more truncate discs and a rather indistinct tympanum that is relatively smaller. From *interorbitalis* it also may be distinguished by its relatively narrower eyelids and the absence of a light interorbital bar. In the characters of the truncate discs and small indistinct tympanum *teretistes* appears most closely related to its nearest geographical neighbor, *interorbitalis*.

REMARKS.—The type specimen was found on a rainy night in a thorny bush on a densely wooded hillside. The frog was calling from a branch about 4 feet above the ground. The call is a short, harsh "chirp," often quickly repeated. Other individuals were heard and one other was seen at the same locality.

The specific name *teretistes*, which is derived from Greek *τερητιστες* ("a whistler"), alludes to the call of the species.

DISTRIBUTION OF SPECIES

As presently known the distribution of *Syrrophus* in western México extends from southern Sinaloa through Chiapas and into extreme western Guatemala at elevations ranging from sea level to about 3000 feet (Map 1). The eastern species comprising the Sierra Madre Oriental complex range from southern Texas to El Petén, Guatemala. Discontinuities in the range of *Syrrophus* in western México probably are not real, but are, instead, indicative of inadequate collecting in many areas. However, while the slopes of the Sierra Madre Occidental in Michoacán and Morelos, and the adjacent area of the Balsas Basin, have been well investigated, they have produced no specimens of *Syrrophus*. Although no two species have been collected at exactly the same locality, there apparently are sympatric forms; *rubrimaculatus* and *pipilans nebulosus* are together in the lowlands of Chiapas and *teretistes* and *modestus pallidus* in Nayarit.

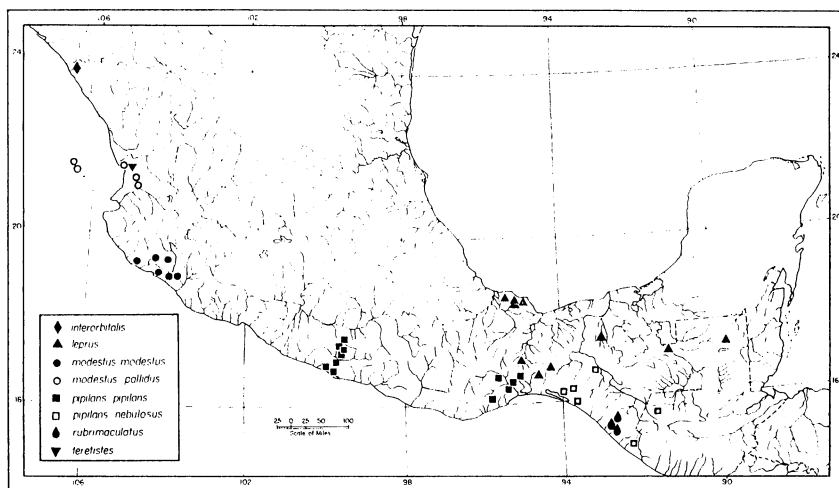
Ecologically, most individuals live in dense scrub forest, a widespread type of vegetation in the lowlands and foothills of western México.

RELATIONSHIPS OF SPECIES

The species of *Syrrophus* in western México are readily separable into two groups. The first of these groups, consisting of *modestus* and *rubrimaculatus*, is characterized by small size, reduced outer palmar tubercle, and elongate inner metatarsal tubercle. The second,

including *interorbitalis*, *pipilans*, and *teretistes*, by a larger size, expanded tips of the digits, no outer palmar tubercle, and a variable inner metatarsal tubercle. Of the latter group *teretistes* and *interorbitalis* have greatly expanded tips of the digits, a smaller tympanum, and an inner metatarsal tubercle larger than the outer; in these features they more closely resemble one another than *pipilans*.

If loss or reduction of the outer palmar tubercle is of phylogenetic significance in *Syrrophus*, the groupings presented here may be of importance. Moreover, if this loss or reduction is considered to be a condition that is advanced over forms that have the tubercle well developed, then the west coast species can be derived from an ancestral



MAP 1. México and northern Central America showing locality records for specimens of *Syrrophus*.

stock which more closely resembled the eastern species in this particular character; this may possibly explain the presence of two groups in western México, an earlier stock that has now completely lost the outer palmar tubercle and a later stock that still retains a small outer tubercle. Conversely, the species still having a small tubercle may be closest to the prototype, which gave rise to two stocks, one losing the small tubercle and the other developing a larger one. Before one can clarify the relationships and evolution of the western species, a better knowledge of the eastern species is necessary.

The following key is to the forms of *Syrrophus* in western México, all of which have the outer palmar tubercle greatly reduced or absent, thus setting them apart from the eastern species.

KEY TO FORMS OF *Syrrophus* IN WESTERN MEXICO

1. Terminal discs not expanded; tympanum distinct; venter dark ... *rubrimaculatus*
Terminal discs expanded; tympanum distinct or not; venter light or with only
throat and chest dark 2
2. Size small, usually not exceeding 20 mm.; tympanum indistinct 3
Size larger; tympanum usually distinct 4
3. Reddish above with bold brown and black mottling; width of eyelid usually less
than two-thirds the interorbital distance *modestus modestus*
Tan above with small brown spots; width of eyelid more than two-thirds the
interorbital distance *modestus pallidus*
4. An interorbital light bar; disc truncate *interorbitalis*
No interorbital light bar; discs truncate or not 5
5. Throat dark; inner metatarsal tubercle three times the size of the outer; discs
truncate *teretistes*
Throat light; inner metatarsal tubercle smaller, conical, subequal in size to the
outer; discs slightly expanded, not truncate 6
6. Diameter of the tympanum at least half the diameter of the eye; color pattern
usually consisting of large light spots or blotches on a dark ground color
..... *pipilans pipilans*
Diameter of the tympanum slightly less than half that of the eye; color pattern
usually consisting of large light spots or blotches on a dark ground color
..... *pipilans nebulosus*

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PLATES

PLATE I



FIG. 1. *Syrrhophus modestus modestus*, adult male, 4.0 miles SW of Colima.

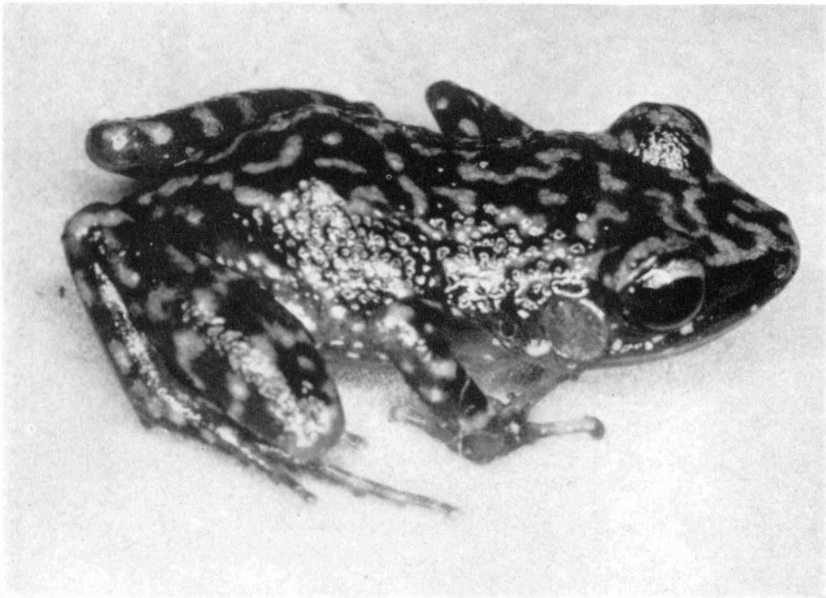


FIG. 2. *Syrrhophus leprus*, adult male, San Andrés Tuxtla, Veracruz.

PLATE II

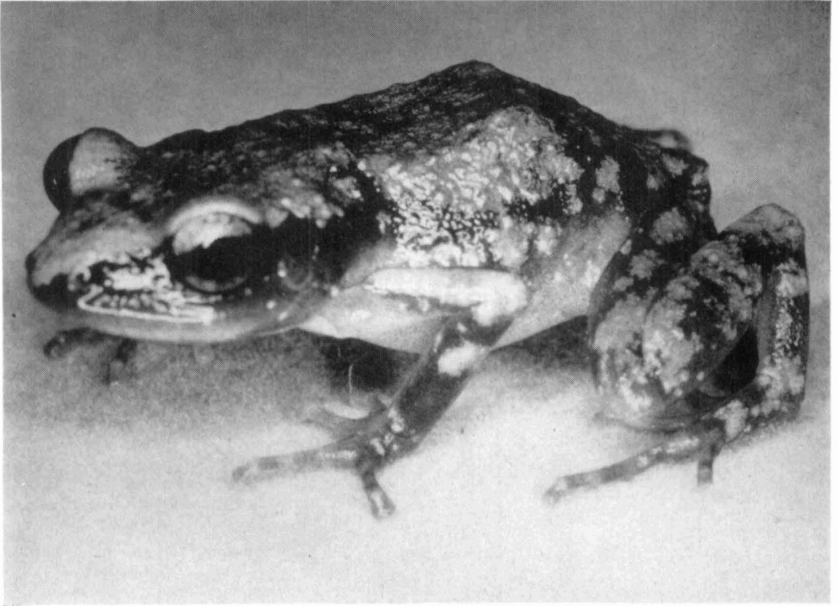


FIG. 1. *Syrrhophus p. pipilans*, adult male, 9 miles W of Tehuantepec, Oaxaca.

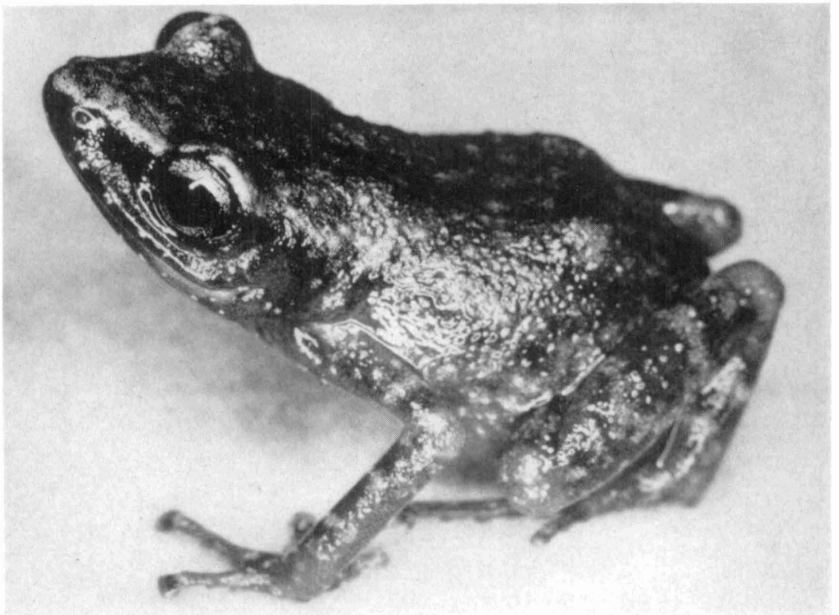


FIG. 2. *Syrrhophus teretistes*, holotype, 3 miles NW of Tepic, Nayarit.

PLATE III



Syrrhophus modestus pallidus, holotype, San Blas, Nayarit.

Photograph by William L. Brudon, Artist, Museum of Zoology.

