

SYNONYMY, DISTRIBUTION AND VARIATION IN *ELEUTHERODACTYLUS DECORATUS* OF MEXICO (AMPHIBIA: LEPTODACTYLIDAE)

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ABSTRACT. — *Eleutherodactylus hidalgoensis* Taylor is regarded as a junior synonym of *E. decoratus* Taylor. The species ranges from southern Tamaulipas to central Veracruz, Mexico, along the Sierra Madre Oriental. A new subspecies, *E. decoratus purpureus* is described based on the northern samples. Intergradation occurs in eastern San Luis Potosí.

The wide-spread leptodactylid frog genus *Eleutherodactylus* contains approximately 300 named taxa and many others as yet undescribed. More than 40 species are known from México. These 40 species are disposed into 8 rather well-defined species groups. The *alfredi*-group contains the most taxa (12) and at present is known from the foothills and mountains of eastern México and Guatemala, from southern Tamaulipas to the Yucatan Peninsula and Alta Verapaz, Guatemala.

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manuscript. Miss Alice Boatright prepared the drawings in FIGURE 3. I am grateful also to the following curators of several institutions for the loan of specimens: Robert F. Inger and Hymen Marx, Field Museum of Natural History (FMNH); William E. Duellman, University of Kansas Museum of Natural History (KU); George H. Lowery, Jr., Louisiana State University Museum of Zoology (LSU); Ernest E. Williams, Museum of Comparative Zoology, Harvard University (MCZ); Richard J. Baldauf, Texas Co-operative Wildlife Collection, Texas A & M College (TCWC); the late Norman L. Hartweg and Charles F. Walker, University of Michigan Museum of Zoology (UMMZ); Doris M. Cochran, United States National Museum (USNM). Specimens from the University of Illinois Museum of Natural History are abbreviated UIMNH.

Taylor (1942:299-303) described *Eleutherodactylus decoratus* and *E. hidalgoensis* from Bandería, Veracruz, México, and Tianguistengo, Hidalgo, México, respectively, on the basis of two juveniles of each. His diagnoses were apparently based on only the holotypes of the two frogs since the paratypes bridge the gap separating the two supposed species. A comparison of the features used by Taylor to separate the two is given in TABLE 1.

TABLE 1.—Comparison of characters used by Taylor (1942) to separate *E. hidalgoensis* and *E. decoratus*.

<i>hidalgoensis</i>	<i>decoratus</i>
1. heel of adpressed leg reaches considerably beyond snout.	1. heel of adpressed leg reaches only slightly beyond snout.
2. diameter of tympanum slightly less than $\frac{1}{2}$ eye diameter.	2. diameter of tympanum slightly less than $\frac{1}{2}$ eye diameter.
3. canthus rounded.	3. canthus moderately sharp.
4. finger tips emarginate.	4. finger tips emarginate.
5. sides darker than dorsum.	5. sides same color as dorsum.
6. occipital ridge between eyes.	6. no occipital ridge.
7. elongate tubercle on tarsus.	7. one or two indistinct tubercles on tarsus

The holotype of *E. decoratus* (FMNH 100115) does not possess the elongate tubercle on the tarsus as stated by Taylor (1942:302), but instead has a faint tarsal fold. The same condition is seen in the paratype (FMNH 100243). A specimen from San Luis Potosí (Xilitla region) has a tarsal fold the length of the tarsus. In the holotype of *E. hidalgoensis* (FMNH 100094) there is a short ($3/5$ length of tarsus) tarsal fold. The paratype (FMNH 100500) is similar. All specimens of *decoratus* or *hidalgoensis*-like frogs I have examined have a faint to moderately distinct tarsal fold varying from a full tarsal fold to one one-half the length of the tarsus or breaking up into tubercles.

One of the primary characters used by Taylor (1942) and Smith and Taylor (1948:58) in separating these two supposed species was leg length. As shown in the scatter diagram (FIG. 1) this

character will not separate the two nor will it separate the two races of *E. decoratus* which I herein recognize.

The differences in canthal shape and distinctness, dorsal vs. lateral coloration (which is darker) and presence or absence of an occipital ridge are due to individual variation even among the four type-specimens of the two nominate species. I conclude that the two are synonymous and as first revisor select *E. decoratus* Taylor (1942:301-3) as the name of the taxon in spite of the fact that *E. hidalgoensis* Taylor (1942:299-301) has page priority. *Eleutherodactylus decoratus* is selected as the name since it is shorter and less restrictive in a geographic sense. Neither name has appeared often in the literature.

The species ranges from central Veracruz, México, along the foothills and slopes of the Sierra Madre Oriental to south-central Tamaulipas, México (FIGURE 2). Within this range two color patterns are evident (FIGURE 3) and

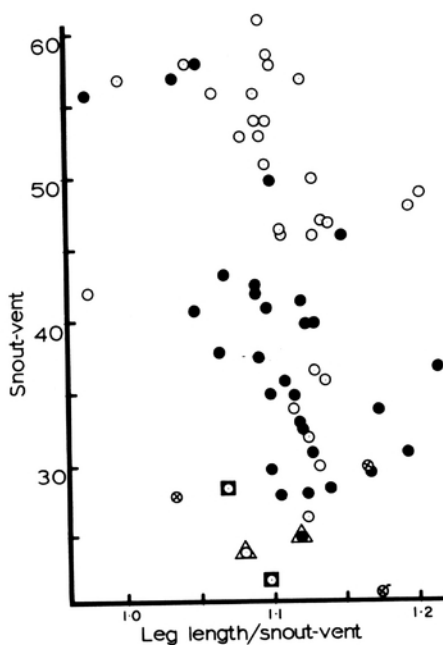


FIGURE 1. Scatter diagram illustrating variation in leg length in *Eleutherodactylus decoratus*. Solid circles—male; open circles—female; open circles with x—juveniles; circles in squares (type-series of *E. hidalgoensis*); circles in triangles (type-series of *E. decoratus*.)

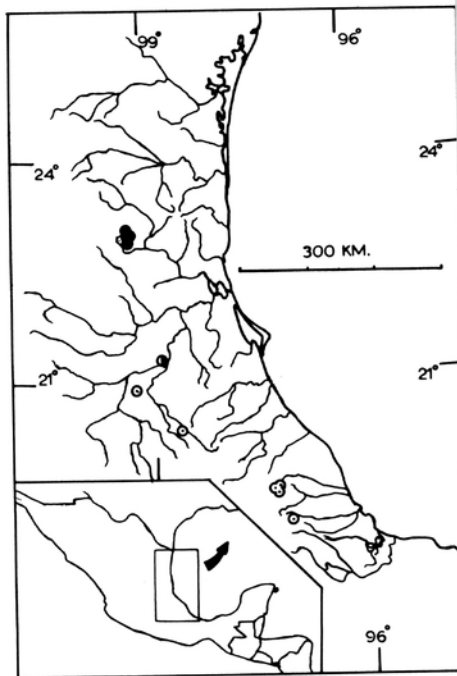


FIGURE 2. Distribution of *E. decoratus*. Hollow circles are nominate subspecies, solid circles are *purpureus*.

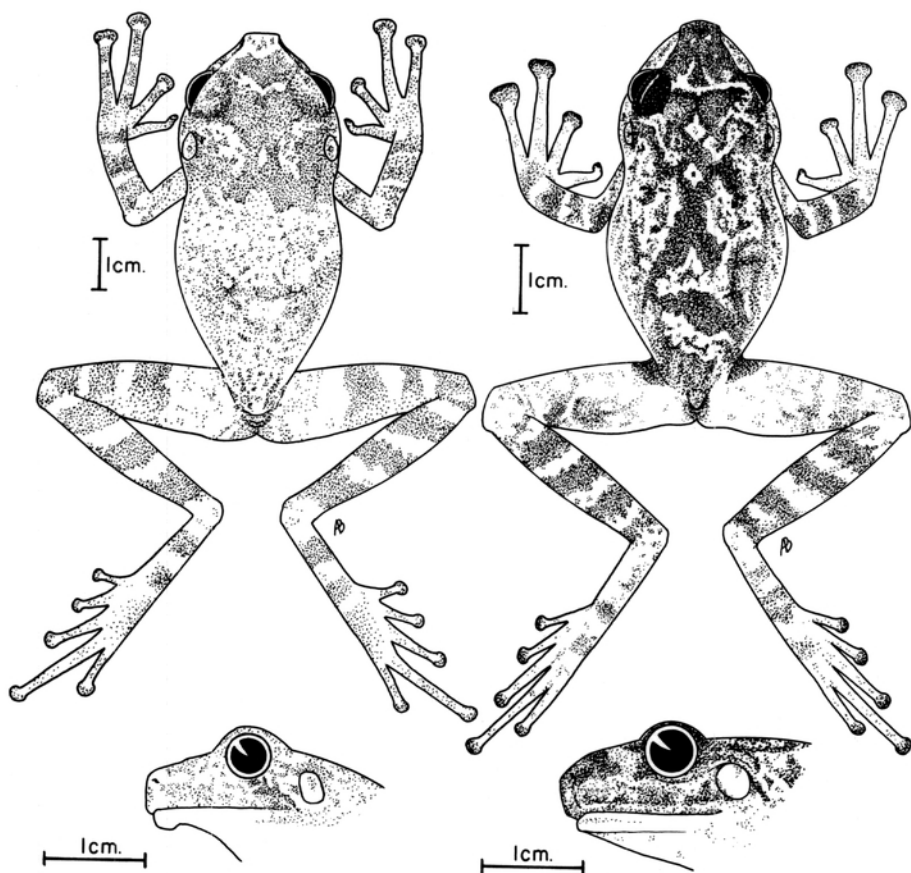


FIGURE 3.—*Eleutherodactylus decoratus*. Right: *E. decoratus decoratus* (Louisiana State Univ. 524; Xilitla region, San Luis Potosí, Mexico). Left: *E. decoratus purpurus* subsp. nov. (Univ. Michigan Mus. Zool. 101194; Rancho del Cielo, 8 km. NW Gomez Farias, Tamaulipas, Mexico).

they are geographically separated. There apparently are also differences in "flash" colors between the two although additional field work is needed to verify this. The nominate race is found from central Veracruz northward through eastern Hidalgo and northern Puebla to southern San Luis Potosí where intergrades appear. Those to the north have been called *E. hidalgoensis* by Taylor (1949) and Martin (1958). For this population I propose the name,

Eleutherodactylus decoratus purpurus
subsp. nov.

Eleutherodactylus hidalgoensis (part):
Taylor, 1949, Univ. Kansas Sci. Bull.,
33:175-76.—Martin, 1955, Copeia, p.

173.—1955, Amer. Nat., 89:354.—1958.
Misc. Publs. Mus. Zool., Univ. Michi-
gan, 101:45, 49, 52, 81, 88-89.

Holotype.—UMMZ 102496 (CFW 3035) collected in a cave near Rancho del Cielo, 5 km. NW Gomez Farias, Tamaulipas, México, 3500 feet elev.

Paratypes.—UMMZ 102947 (CFW 3147-48, 3154), 102948-49; same data as for holotype.

Definition.—A subspecies of *Eleutherodactylus decoratus* characterized and distinguished by: dorsal blotching more extensive and distinct than in nominate race; groin and/or posterior surfaces of thigh fuscous with purplish coat.

Description of holotype.—Adult female; head broader than long; canthus rostralis distinct; loreal region slightly concave, sloping gently to lip; distance from eye to tip of snout one-half again as great as length of eye; eye small, interorbital distance greater than width of eyelid; tympani large, circular, upper borders hidden by supra and posttympanic folds; tympani about $\frac{1}{2}$ diameter of eye; skin of head granular; large tubercles behind and below tympani; snout in dorsal profile rounded, in later profile truncate, extending beyond lower lip; choanae visible from below and well within border of lips; choanae large, area of a choana about three to three and one-half times area of a vomerine tooth boss; vomerine tooth bosses in arrangement lying between choanae posterior to a line drawn through centers of choanae; tongue large, subcircular, not notched behind, free posteriorly for about $\frac{1}{6}$ its length.

Skin of dorsum finely granular, more strongly so on sides; venter smooth except on posterior surfaces of thighs and around anus; abdominal disc very faint; fingers, shortest to longest, 1, 2, 4, 3, tips expanded into very broad triangular pads; supernumerary tubercles on palm; subarticular tubercles large and prominent; three palmar tubercles, outer smallest; no tubercles or fold on arms; carpal tubercle small, nearly indiscernible; heel extending well beyond tip of snout; moderately strong inner tarsal fold for about $\frac{1}{2}$ length of tarsus; no outer fold or tubercles; inner metatarsal tubercle suboval, about five times size of outer; latter round, not compressed; no supernumerary tubercles; no webbing between toes; subarticular tubercles prominent; tips of toes expanded into pads like those on fingers but proportionately smaller; lateral fringes on toes.

Color.—Ground color pale cream; dorsum with numerous spots and blotches made up of small spots; area of no pigmentation across eyelids and interorbital space; faintly discernible interorbital triangle; arms and legs banded, bands of arms more definite in outline; bands of legs with bands in interspaces; darker bands equal on thighs; no interspace banding on tibia or tarsus; interspaces smaller than bands; venter uniform light cream in color; labial bands not definite, but at least two enter orbit.

Measurements in mm of holotype.—Snout to vent 56; tibia 32; tympanum

4.0; head width 23.5; head length 18.7; eye length 6.8; eyelid 5.3; interorbital distance 6.5; width of 3rd finger pad 4.7; heel beyond snout 5.0.

Color in life.—Dr. Charles F. Walker provided the following color notes: "UMMZ 102496—Bright jade green (in light phase), the dorsal pattern scarcely apparent; in dark phase as preserved the dorsal ground color duller, the dark pattern very prominent. No color ventrally or in groin. Concealed thigh surface dark fuscous with faint purplish tinge, almost black after killing in chloretone.

"UMMZ 102947 (3) - CFW 3147 - Ground color a dull green; dorsal pattern dark gray; a dark area in groin, and posterior thigh surface fuscous with a purplish cast. CFW 3148 - Ground color bright green; dark areas in groin and on thighs not as strongly developed as in 3147, the barred thigh pattern apparent. CFW 3154 - Brilliant apple green ground color; pattern a moderately dark green; purplish fuscous in groin and on legs. Iris predominately a dull gold, finely reticulate with black. Small areas immediately anterior and posterior to pupil are reddish or coppery.

"UMMZ 102948 - Dark rich green ground color; dorsal pattern a quite dark green, darker than ground color; fuscous in groin and on concealed thigh surface. Throat, under surfaces of tibiae mottled with gray, traces of mottling on chest and under thighs. This ventral mottling not noted on other specimens.

"UMMZ 102949 - Ground color a rich dark green; purplish fuscous in groin and on concealed thigh surfaces. Iris gold, with reddish before and behind pupil as in 3154."

Remarks.—The description of specimens of *E. hidalgoensis* (= *decoratus*) from San Luis Potosí, in Taylor's (1949: 175-176) account, indicates that he had intergrades between *E. d. decoratus* and *E. d. purpureus*. The W-shape mark on the occiput is present, one has lavender coloration, the pattern in one is indistinct, in another quite distinct. His specimens were collected in a cave.

The northern populations of *E. decoratus* are peppered, more so than the southern ones. One specimen from near Las Vigas, Veracruz, is peppered like those in Tamaulipas. In other specimens from Veracruz, Hidalgo and San Luis Potosí (except as noted above) the pattern is drab and for the most part indefinable. In all *E. decoratus decoratus*.

tus, the W-mark on the occiput is visible, and other markings are faint if at all present.

Martin (1958:51) reports that only 4 of the 69 Tamaulipan specimens were encountered in places other than caves and sinks. Taylor (1949: Loc. cit.) has also commented on specimens from San Luis Potosí. Other specimens, KU 24036 and USNM 140129, bear remarks on the field tag which note the specimens were taken in caves. This crepuscular or cavernicolous habit might explain in part the seeming rarity of the species prior to Martin's collections in Tamaulipas.

Comparisons. — *E. decoratus purpureus* differs from *E. spatulatus*, *E. bufonoides*, *E. alfredi*, *E. taylori*, *E. xucanebi* and *E. megalotympanum* in the same manner as the nominate race. From *E. d. decoratus* it differs in having well defined labial bars, no pink flash colors and a more clearly defined dorsal pattern.

Also found with or near *E. d. purpureus* are *E. augusti augusti*, and *E. rhodopsis*, neither of which has greatly expanded finger pads.

Distribution. — The Gomez Farias region of southern Tamaulipas, México (Fig. 2). Specimens examined (45) as follows: MÉXICO, Tamaulipas: 9 mi. NNW Chamal, Aseradero del Paraíso, UMMZ 111258-62; 5 mi. NW Gomez Farias, Rancho del Cielo, UMMZ 98949, 101188 (7), 101189 (3), 101190, 101191 (2), 101192-96, 101357-59, 102861 (8), 102946, 102947 (3), 102948-49, 105495 (3). Martin (1958) has also recorded it from the nearby localities of Aserradero del Infierno, 1 km. S La Gloria; Chihue; and near La Joya de Salsas.

The frog is found in cloud forest between 420 and 1830 meters; most frogs however were taken at localities between 1050 and 1200 m.

Following is a synopsis of the nominate subspecies:

Eleutherodactylus decoratus decoratus
Taylor

Eleutherodactylus decoratus Taylor, 1942, Univ. Kansas Sci. Bull., 28 (2) 14, 301-303; Smith and Taylor, 1948, Bull. U. S. Natl. Mus., 194: 58, 61; 1950, Univ. Kansas Sci. Bull., 33 (2) 8: 348; Smith, Smith and Werler, 1952, Texas Jour. Sci., 4 (2) :253-254; Martin, 1958, Misc. Publ. Mus. Zool. Univ. Michigan, 101:52.

Eleutherodactylus hidalgoensis Taylor, 1942, Univ. Kansas Sci. Bull., 28 (2) 14: 299-301; Taylor and Smith, 1945, Proc. U. S. Natl. Mus., 95:569-70; Smith and Taylor, 1948, Bull. U. S. Natl. Mus., 194:58-61; Taylor, 1949, Univ. Kansas Sci. Bull., 33 (1) 2:171, 175; Smith and Taylor, 1950, Univ. Kansas Sci. Bull., 33:333; Martin, 1958, Misc. Publs. Mus. Zool. Univ. Michigan, 101:52; Langebartel and Smith, 1959, Herpetologica, 15:27.

Holotype. — FMNH 100115, Banderilla, 6 mi. W. Jalapa, Veracruz, México, coll. E. H. Taylor, 16 Aug. 1941. The holotype of the junior synonym *E. hidalgoensis* is FMNH 100094, ca. 4 mi. N Tianguistengo, Hidalgo, Mexico, coll. E. H. Taylor, 3 July, 1940.

Diagnosis. — The largest species of the *alfredi* group of *Eleutherodactylus*, separable from all other forms by the following combination of characters: vocal sacs and slits present in males; tarsus with only a weak fold, frequently an elongate tubercle; skin of dorsum pustular; canthus rostralis moderately distinct; tympanum less than one-half diameter of eye; tibiotarsal articulation reaching beyond tip of snout (occasionally only to nostril); supernumerary tubercles absent or only faintly indicated on sole; median elevated area on occiput present or not; pink (not purplish) coloration in prehumeral and groin areas and by the dorsum frequently lacking extensive pattern.

Distribution. — The eastern slopes of the Cordillera Volcanica in Veracruz and Hidalgo, and northward along the Sierra Madre Oriental to San Luis Potosí, México (Fig. 2). Specimens examined (18) as follows: MÉXICO, Hidalgo: Puerto Obscura, Cueva Piedra Ancho, LSU 13189; Puerto de la Zorra, 6 mi. NE Jacala, TCWC 10996; 4 mi. N Tianguistengo, FMNH 100094, 100500. San Luis Potosí: Xilitla region, KU 24036, LSU 523-24, USNM 140129. Veracruz: 6 mi. W Jalapa, FMNH 100115; 2 mi. W La Joya, FMNH 100243; 3 mi. E Las Vigas, UIMNH 21758; 5.6 mi. S Las Vigas, UIMNH 42477-85; Metlac, MCZ 24773; Potrero Viejo, MCZ 24733; Tequeyutepec, USNM 116490.

SUMMARY

Eleutherodactylus hidalgoensis and *E. decoratus* represent variants

of a single population. As first revisor, I select the shorter name, *E. decoratus*, although *E. hidalgoensis* has page priority.

The northern samples of *E. decoratus* are regarded as representing a distinct subspecies, *E. decoratus purpureus*, differing from the nominate one in color pattern and possibly "flash" color in the groin. The distribution of the species, based upon the examination of 63 specimens, follows the Caribbean slopes of the Sierra Madre Oriental and the Cordillera Volcánica from southern Tamaulipas to central Veracruz, Mexico. Intergradation between the

two subspecies occurs in eastern San Luis Potosí.

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