

OCCASIONAL PAPERS OF THE MUSEUM OF
ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN

UNIVERSITY OF MICHIGAN PRESS

THE MEXICAN SNAKES OF THE GENUS *RHADINAEA*

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FOR some time it has been apparent that considerable confusion has existed regarding the specific identities of Mexican snakes referred to the genus *Rhadinaea* Cope. This confusion has resulted from the uncritical "lumping" of several forms under *vittata* Jan, by Boulenger (1894: 178-79), and the general lack of adequate comparative material in any one institution.

In pursuit of this investigation the collections of the British Museum of Natural History (B.M.), the Museum of Comparative Zoölogy, Harvard University (M.C.Z.), the United States National Museum (U.S.N.M.), the Academy of Natural Sciences, Philadelphia (A.N.S.P.), the Field Museum of Natural History, Chicago (F.M.N.H.), and the University of Michigan Museum of Zoology (U.M.M.Z.), and the private collection of Dr. E. H. Taylor, University of Kansas (E.H.T.), have been examined. To the authorities of these institutions I express my gratitude for generous co-operation.

Since adequate descriptions are not available for most of the forms treated here, I have given detailed descriptions of each form. Only references which can be placed with reasonable assurance are included in the synonymies. The pattern drawings were made on generalized scale diagrams; hence, the scale shapes are not exactly reproduced. Measurements are given in millimeters.

In general the Middle American species of *Rhadinaea* are forms inhabiting moderate to high altitudes—a factor which undoubtedly contributes to the characteristically limited distributions. *Rhadinaea decorata decorata* is the only Mexican form with an extended range (to the Panama Canal Zone) and is the only Mexican form found at low altitudes. It was also the first species in the genus to be described.

In 1863 Jan (p. 271) described and, later, Jan and Sordelli (1866: Pl. 2, Figs. 2–3) figured two specimens under the name *Enicognathus vittatus*. One of these specimens has been correctly allocated by authors to *decorata* (1866: Fig. 2), but as the other specimen (1866: Fig. 3) had not previously been described, the name *vittatus* has continued in general use. E. R. Dunn has called to my attention the fact that Hallowell (1845: 242) described a *Coluber vittatus* from Venezuela which was later referred to *Liophis* by Cope (1859: 297). Recently, Amaral (1929: 49) has placed the species of *Rhadinaea*, including *vittatus*, in *Liophis*. Although *Rhadinaea* (type *vermiculaticeps*) and *Liophis* (type *cobella*) are certainly not congeneric, Amaral's action created a homonym of the name *vittata*, and the name *Enicognathus vittatus* Jan is therefore suppressed. This is a fortunate quirk of circumstance, for apparently the name has never knowingly been associated with the proper species. Although examination of the type would be necessary if its identity were positively to be ascertained, judged from the illustration, it is conspecific with *fulvivittis* Cope.

Dromicus taeniatus Peters (1863: 275) was based upon two specimens from "Mexico" and is also a complex. The specimens were not described individually, but the only known species which together fit at all well the characters given by Peters are *omiltemana* Günther and *taeniata* of this paper.

Rhadinaea Cope

DIAGNOSIS.¹—Small to moderate in size with proportionately long tail, head only slightly distinct from neck. Dorsal scales

¹ Certain South American snakes which should perhaps be included in *Rhadinaea* will not fit all characters in this diagnosis.

smooth, in 17-21 normally continuous rows (17 in all Mexican species), without scale pits, anal ridges present or absent in mature males; head scutellation normal, 7 or 8 upper labials, 1 to 3 pre- and usually 2 postoculars. Color pattern striped, or almost unicolor. Maxillary teeth subequal, followed by a gap and 1 or 2 enlarged teeth. Hemipenis short, spinous proximally, with a capitate tip and forked sulcus.

KEY TO THE MEXICAN FORMS OF *RHADINAEA*

1. Three black longitudinal stripes separated sharply by narrow yellow lines on the common border of rows 6 and 7; 2 lowermost rows and belly whitish *aemula*, new species (Pl. I)
Color not as described 2
2. 7 upper labials; middorsal stripe gray, about 5 scales wide, not sharply defined on edges; a poorly defined lateral stripe usually present on row 4 (or 3-4); color of head extending 2-3 scales behind parietals and usually bordered behind by a fine white collar.....
..... *laureata* (Günther) (Pl. I)
8 upper labials; color not as described above, sides dark or with a distinct lateral dark stripe 3
3. No light temporal stripe extending back from upper corner of eye; a light bar from eye to corner of mouth *lachrymans* (Cope) (Pl. I)
A light temporal stripe extending back from corner of eye, often continuous with dorsolateral light body stripes; no light bar from eye to corner of mouth 4
4. Ventrals less than 135 *decorata decorata* (Günther) (Pl. II)
Ventrals more than 145 5
5. A very narrow dark stripe on middle of row 5, below which the sides including the tips of the ventrals are darkly shaded; dorsolateral light stripes not continuous with light temporal stripes.....
..... *hesperia*, new species (Pl. II)
Sides not darkly shaded; a distinct narrow lateral dark stripe not restricted to row 5; dorsolateral light stripe often continuous with light temporal stripe 6
6. Lateral dark stripe involving fourth and adjacent half rows, darker on edges than in the middle *fulvivittis* Cope (Pl. II)
Lateral stripe of different disposition, or not darker on its outer edges 7
7. Lateral dark stripe occupying median portion of row 4; ventrals usually without a black dot on either tip 8
Lateral dark stripe involving more than a single row; ventrals with a black dot on either tip 9
8. Paravertebral region dark gray, bordered by darker stripes on row 6 *quinquelineata* Cope (Pl. I)

- Paravertebral region light gray or olive brown; no dark stripes on row 6 (between median and lateral dark stripes).....
*gaigeae* Bailey (Pl. I)
9. Lateral dark stripe on row 4 and adjacent half rows, but not darker on the edges than in the middle; dark stripe on median row much more distinct than those on row 7.....*omiltemana* (Günther) (Pl. II)
- Lateral dark stripe on common border of rows 4 and 5; dark stripe on median row less distinct (except in young) than those on row 7.....
*taeniata* (Peters) (Pl. II)

Rhadinaea aemula, new species

Rhadinaea vittata Boulenger, 1894: 178, part, specimens *h* (?), and *i*.

HOLOTYPE.—M.C.Z. No. 42659 (figured), adult female, Omilteme and Sierra de Burro, Guerrero, collected by W. W. Brown.

PARATYPES.—U.M.M.Z. Nos. 84697–700, mountains near Chilpancingo, Guerrero; B.M. No. 94.11.14.13, Omilteme; B.M. No. 94.5.25.4, Amula, Guerrero; B.M. No. 99.7.8.9, Zabelate Cañon, Oaxaca; B.M. No. 1903.9.30.197, Totolapán, Oaxaca; E.H.T. No. 5218, Tres Marias, Morelos; E.H.T. No. 5219, 10 km. north of Cuernavaca, Morelos.

RANGE.—Known from the states of Guerrero, Morelos, and Oaxaca.

DESCRIPTION OF HOLOTYPE.—Dorsals, 17–17; ventrals, 167; subcaudals, 100 pairs. Upper labials, 8, fourth and fifth entering orbit; lower labials, 10, 6 in contact with chin shields; 2 preoculars (including a small subpreocular); postoculars $\frac{2}{3}$; temporals 1–1–2. Internasal suture $\frac{1}{2}$ length of prefrontal suture; frontal about $1\frac{1}{4}$ times as long as its distance from the tip of the snout, slightly shorter than parietals.

Back above middle of row 3 black, with sharp white lines on the common border of rows 6 and 7. Lowest $2\frac{1}{2}$ rows with tiny scattered dots, otherwise sides and venter yellowish white, immaculate. The lateral black stripes are continuous to snout, including upper edges of upper labials and a narrow black bar across middle of rostral. The dorsolateral light lines are parallel on the neck and continuous along outer edges of supraoculars to nasals.

Maxillary teeth, 15, followed by a gap and a moderately enlarged posterior tooth.

VARIATIONS.—Ventrals: males, 152–63 (average of 7, 157.4), females, 166–70 (average of 4, 168); caudals: males, 110–26 (average of 6, 116.5), females, 100–107 (average of 3, 104.3); tail-length to body-length ratio: males, 50.5 to 58.3 per cent, females, 43.1 to 47.2 per cent. Largest specimen, a female 440 mm. in body, 200 mm. in tail length. The two largest males, 297 mm. and 340 mm. in body length, have anal ridges. B.M. No. 99.7.8.9 has 7 upper labials, third and fourth entering the orbit, on one side, and the normal arrangement on the other side. Four paratypes lack the subpreocular. Two specimens have 3 postoculars on one side and the usual 2 on the other. The temporals are either 1 or 2 in the second row. The hemipenis of E.H.T. No. 5218, a subadult male, is 8 caudals long, an enlarged basal spine opposite third caudal, about 20 smaller hooks between third and sixth where sulcus forks, tip capitate.

REMARKS.—The specific name refers to the extraordinary resemblance of this species to *Coniophanes piceivittis* Cope. Duméril and Bocourt (1886: 630) refer to this similarity, and probably had a specimen of *aemula*. It is possible that their plate (1886: Pl. 41, Fig. 1) is meant to represent this species, but the lateral dark stripe is too narrow. Specimen *h* (Boulenger, 2, 1894: 178) from Xantipa, Guerrero, cannot now be found in the British Museum. It was undoubtedly *aemula*, as is Boulenger's specimen *i*.

Rhadinaea laureata (Günther)

Dromicus laureatus Günther, 1868: 419, Pl. 19, Fig. E; Duméril and

Bocourt, 1890: Pl. 45, Fig. 1; Günther, 1893: 112, Pl. 40, Fig. A.

Rhadinaea loreata Cope, 1876: 140.

Rhadinaea laureata Boulenger, 1894: 179; Cope, 1900: 755.

HOLOTYPE.—In the British Museum, from Mexico City.

MATERIAL EXAMINED.—F.M.N.H. No. 1498, Coyotes, Durango; B.M. Nos. (4) 92.10.31.47–50 (No. 92.10.31.48 figured), La Cumbre de los Arrastrados, Jalisco; E.H.T. No. 4566, 10 km. north of Cuernavaca, Morelos.

RANGE.—Central plateau region.

DESCRIPTION.—Ventrals, 159–64; caudals, 84–95 pairs. Upper labials, 7, third and fourth entering orbit (one specimen

has 8 on one side); lower labials, 9, 5 in contact with chin shields; 1 pre- and 2 postoculars; temporals, 1-2. Four males 270-341 mm. in body length have anal ridges, 1 male 190 mm. in body length and 1 large female lack them. One specimen has 10 maxillary teeth followed by a gap and 2 enlarged posterior teeth. Hemipenis of B.M. No. 92.10.31.48: 10 caudals long, 2 enlarged basal spines opposite third caudal, 38 smaller hooks between third and seventh caudal where sulcus forks, tip capitate. Tail-length to body-length ratio: 37.9-45.3 per cent. Largest specimen, a female, 388 mm. in body, 147 mm. in tail length.

Color reddish brown with a dark gray middorsal stripe 3 to 5 scales wide, edges not sharply defined. Sides punctulated with small dark dots, very few on dorsolateral areas bordering median stripe, but concentrated into a poorly defined lateral dark stripe on row 4 or border of rows 3 and 4. Small black spots may be present along the median portion of the belly. Head and 2 to 3 scales on the neck uniform brown, usually bordered behind by a very narrow white collar, which is more or less continuous with a light line through the middle of the upper labials. The light stripe through the top of the eye extends forward to the rostral, and may join the white collar near the corner of the mouth. Labials and chin spotted with dark.

Rhadinaea lachrymans (Cope)

Lygophis lachrymans Cope, 1869: 154.

Rhadinaea lachrymans Cope, 1876: 140; Boulenger, 1894: 174; Cope, 1900: 758.

Dromicus lachrymans Günther, 1894: 114.

HOLOTYPE.—A.N.S.P. No. 5539, adult female, from an unknown locality.

MATERIAL EXAMINED.—The holotype and F.M.N.H. Nos. 20329 and 20337 (No. 20337 figured), Volcán Tajumulco, San Marcos, Guatemala, 5500 and 7500 feet respectively; U.M.M.Z. uncatalogued, Mt. Ovanda, near Esquintla, Chiapas, 7500 feet.

RANGE.—Known only from the Pacific slopes of Guatemala and Chiapas. The type locality given by Cope (1900: 759) as

Orizaba, on the basis of Sumichrast's memory, is doubtless erroneous. The type probably came from Chiapas.

DESCRIPTION.—Upper labials 8, fourth and fifth entering orbit; lower labials 9, 5 in contact with chin shields; 1 pre- and 2 postoculars; temporals 1-2. The only mature male lacks anal ridges. The type and F.M.N.H. No. 20337 have about 18 maxillary teeth followed by a gap and 2 enlarged posterior teeth. Hemipenis of U.M.M.Z. specimen (dissected from partially everted position and probably somewhat stretched): 11 caudals long, about 43 small spines or hooks between sixth and ninth caudal, largest basally, sulcus forked opposite seventh caudal, tip capitate.

TABLE I

MUSEUM NUMBER	SEX	VENTRALS	CAUDALS	BODY LENGTH	TAIL LENGTH	TAIL-LENGTH TO BODY-LENGTH RATIO, IN PER CENT
F.M.N.H. 20329	♂	152	78	125	47	37.6
U.M.M.Z.	♂	167	90	315	139	44.1
A.N.S.P. 5539 ...	♀	174	77	338	123	36.4
F.M.N.H. 20337	♀	172	66	422	123	29.1

Seven dark brown stripes on a lighter brown ground. Dark stripes occupy median row, common border of rows 6 and 7, third and adjacent half rows, and outer edges of ventrals. Venter immaculate yellow. Head brown with a distinct light stripe from lower postocular to anterior corner of eighth upper labial. Upper labials with lower halves light. Lower labials with a few dark spots. The dark stripes are more distinct on larger specimens, a gradational series existing in the four specimens examined.

Rhadinaea decorata decorata (Günther)

Coronella decorata Günther, 1858: 35.

Enicognathus vittatus Jan, 1863: 61-62 (part); Jan and Sordelli, 1866: Pl. 2, Fig. 2.

Rhadinaea decorata Cope, 1885: 381.

Diadophis decoratus Duméril and Bocourt, 1886: 624, Pl. 40, Fig. 3.

Erythrolamprus longicaudus Werner, 1903: 348.

COTYPES.—Two males in the British Museum, from "Mexico."

MATERIAL EXAMINED.—U.M.M.Z. No. 85311, Ojo de Agua, Paraje Nuevo, Vera Cruz; U.M.M.Z. No. 85969, Necaxa, Puebla; A.N.S.P. No. 11709, Jicaltepec, Vera Cruz; U.S.N.M. Nos. 46361–63, mountains near Santo Domingo, Oaxaca; U.S.N.M. No. 46527, Ocuilapa, near Tuxtla Gutierrez, Chiapas; U.S.N.M. Nos. 12096 and 30409, Mexico; and 28 specimens from Central America (including *decorata ignita*). Figured specimen, U.M.M.Z. No. 83180, Costa Rica.

RANGE.—Central Vera Cruz and southern Mexico almost to South America, chiefly in Atlantic drainage.

DESCRIPTION.—Ventrals, 113–30; caudals, 86–123 pairs; anal ridges present in mature males, frequently extending to the anterior $\frac{1}{3}$ of body. Upper labials, 8, fourth and fifth (or third, fourth, and fifth) entering orbit. One to 3 pre- and 2 postoculars; temporals 1–2.

Maxillary teeth, about 20 followed by a gap and 2 enlarged posterior teeth. Hemipenis of a Costa Rican specimen (everted position): 8 caudals long, 4 large spines opposite fifth caudal, 13 smaller hooks between fifth caudal and capitate tip, hooks opposite sulcus slightly enlarged.

Sides to middle of row 5 more or less uniform, usually dark, darkest on row 5 adjacent to dorsolateral light stripes. The middorsal region shades off laterally from darkest on the median row to the dorsolateral light stripes. These stripes are interrupted twice, leaving a yellow spot on either side of the neck. The bellies of freshly preserved specimens are pink or red, fading in preservative to yellow.

REMARKS.—*Rhadinaea decorata ignita* (Cope) differs from the present form in having the light dorsolateral stripes continuous with the light temporal stripes. This race, the validity of which is questioned, occurs in Darien and intergrades with *decorata decorata* in the Canal Zone region.

Rhadinaea hesperia,² new species

Rhadinaea vittata Boulenger, 1894: 179, part, specimens *k–m*; Boulenger, 1896: 635, part, specimens *p* and *q* (?); Oliver, 1937: 20.

² ἔσπερος = western.

HOLOTYPE.—M.C.Z. No. 42661, adult male, Omilteme and Sierra de Burro, Guerrero, collected in 1936 by W. W. Brown.

PARATYPES.—M.C.Z. Nos. 42660 and 42662, same data as holotype; U.M.M.Z. Nos. 84701-9, mountains near Chilpancingo, Guerrero; U.M.M.Z. Nos. 80226-27, Queseria, Colima, 4500 feet; B.M. Nos. 94.5.17.4-5 (No. 94.5.17.5 figured) and 94.11.14.15, southern Mexico; B.M. No. 94.5.25.5, Amula, Guerrero; B.M. No. 1906.6.1.234, Chilpancingo, Guerrero; U.S.N.M. No. 46456, Plomosas, Sinaloa; U.S.N.M. Nos. 15429-30, Guanajuato; U.S.N.M. No. 20166, Barranca, near Cuernavaca, Morelos; E.H.T. No. 5444, El Treinte, Guerrero; E.H.T. Nos. 5441-42, Hacienda El Sabino, Michoacán.

RANGE.—Western Mexico, from southern Sinaloa to Guerrero, east to Morelos and Guanajuato.

DESCRIPTION OF HOLOTYPE.—Dorsals, 17-17; ventrals, 163; tail incomplete; anal ridges present. Upper labials, 8, fourth and fifth entering orbit; lower labials, 9, 6 in contact with chin shields; 2 preoculars including a small subpreocular; 2 postoculars; temporals, 1-2. Internasal suture, $\frac{1}{2}$ prefrontal suture; frontal, slightly longer than its distance from tip of snout, shorter than parietals, about equal to length of interparietal suture.

Maxillary teeth, about 20 followed by a gap and 2 enlarged posterior teeth. Hemipenis: 6 caudals long; about 26 hooks, largest basally; sulcus forked opposite fourth caudal, tip capitate.

Outer edges of ventrals to middle of row 5, dark gray, a fine black line through center of row 5 forming the upper border of the dark sides. A black stripe occupies the median portion of the middorsal row, and posteriorly very poorly developed stripes are present along centers of the rows 7 and 8; otherwise the paravertebral regions are gray speckled with black. On the neck the outer edges of the paravertebral regions are white, diverging laterally, and are separated from the light temporal stripes by 2 scales. Upper labials, black-edged above and dotted with black below. Belly salmon-colored with a few scattered black dots.

VARIATIONS IN PARATYPES.—Ventrals: males, 151–67 (average of 17, 156.9), females, 157–79 (average of 8, 168.4); caudals: males, 117–35 (average of 13, 124.4), females, 109–115 (average of 7, 111.3). The 11 males over 200 mm. in body length have anal ridges. Tail-length to body-length ratio: males, 55.6–71.2 per cent, females, 50.5–56.4 per cent. Largest specimen, a female, 388 mm. in body, 214 mm. in tail length. The subpreocular is frequently absent. Color variation is chiefly a matter of intensity, the position of the stripes being constant. The supplementary stripes of rows 7 and 8 may be lacking, especially on row 8. There may be a well-defined dorso-lateral light stripe on row 6 and adjacent half rows, depending upon the degree of contrast between it and the dark stripe on row 7. The sides below row 5, usually uniformly dark, are lighter in juvenile specimens, and in 2 adult males in Dr. Taylor's collection, but in these specimens the sides are still more or less uniformly pigmented.

Rhadinaea fulvivittis Cope

? *Enicognathus vittatus* Jan, 1863: 61–62, part, type locality, Mexico; name a suppressed homonym; Jan and Sordelli, 1866: Pl. 2, Fig. 3.

Rhadinaea fulvivittis Cope, 1876: 139.

Rhadinaea vittata Boulenger, 1894: 178, part, specimen *g*.

HOLOTYPE.—U.S.N.M. No. 7075. Alpine region, Orizaba, Vera Cruz.

MATERIAL EXAMINED.—Holotype and U.S.N.M. No. 6333 (figured), Orizaba; U.S.N.M. No. 46434, Mount Zempoaltepec, Oaxaca; B.M. No. 61.1.15.12, Mexico.

RANGE.—Eastern Mexican highlands, Orizaba to central Oaxaca.

DESCRIPTION.—Upper labials 8, fourth and fifth entering orbit (7 on one side in U.S.N.M. No. 6333); lower labials, 9, 5 or 6 in contact with chin shields; 2 preoculars, including a small subpreocular (lacking in U.S.N.M. No. 6333); 2 post-oculars.

Dark stripes occupy row 4 and adjacent half rows, and the median three and adjacent half rows. These stripes are darkest on the outer edges, where the borders are defined by narrow

TABLE II

MUSEUM NUMBER	SEX	VENTRALS	CAUDALS	BODY LENGTH	TAIL LENGTH	TAIL-LENGTH TO BODY-LENGTH RATIO, IN PER CENT
U.S.N.M. 7075...	♀	177	89	324	131	40.5
U.S.N.M. 6333...	♀	182	91	340	135	39.1
B.M. 64.1.15.12	♀	172	87	400	165	41.3
U.S.N.M. 46434	♂	159	86	122	50	40.9

black lines. In addition, a fine black line is present on the median row. Along row 6, dorsolateral light lines are continuous to the eye. The sides, including the tips of the ventrals, bear tiny scattered dark dots. The lateral dark stripes are continuous through the eye and around the middle of the rostral, including the upper edges of the upper labials. Labials and venter immaculate. The British Museum specimen has the lateral dark stripes narrowly interrupted just behind the corner of the mouth.

Rhadinaea quinquelineata Cope

Rhadinaea quinquelineata Cope, 1886: 277.

Rhadinaea vittata Cope, 1900: 756-57, part.

COTYPE.—U.S.N.M. No. 31350, adult female, Tezuitlan, Puebla. The location of the two cotypes from Hidalgo is not known. According to my data, the extant type tallies exactly in ventral and caudal counts and in total and tail length with the specimen described by Cope. I believe that he described this specimen rather than one of the Hidalgo specimens as would be inferred from the original description; hence, I designate U.S.N.M. No. 31350 as lectotype.

MATERIAL EXAMINED.—The type and A.N.S.P. No. 15355 (figured), adult male, Monterrey, Nuevo Leon.

RANGE.—Eastern Mexico, Monterrey to Puebla.

DESCRIPTION.—Ventrals: male, 170, female, 179; caudals: male, 100 pairs, female, 77 pairs; male with anal ridges. Upper labials, 8, third to fifth entering orbit; lower labials, 10, 6

in contact with chin shields; 1 pre- and 2 postoculars; temporals 1-2. Tail-length to body-length ratio: male, 48.8 per cent, female, 35.6 per cent.

Maxillary teeth, 15 followed by a gap and an enlarged posterior tooth. Hemipenis: 6 caudals long, about as described for *hesperia*.

Dark stripes along the centers of rows 4 and 6 and the median row, and a poorly defined one on the common border of rows 7 and 8. Row 5 and adjacent half rows bear a clear white stripe diverging laterally on the neck, and continuous with or interrupted by 1 scale from the light temporal stripe, which extends laterally to the top of the eighth upper labial. Paravertebral areas between median and dorsolateral dark stripes, gray, and sides below lateral dark stripes stippled with dark. Upper labials dark-edged above and with a band of dark markings along their centers.

Rhadinaea gaigeae Bailey

Diadophis decoratus Garman, 1887: 9.

Liophis decorata Barbour and Amaral, 1924: 130, part, M.C.Z. No. 4539.

Rhadinaea gaigeae Bailey, 1937: 118-19.

HOLOTYPE.—M.C.Z. No. 24983, Alvarez, San Luis Potosí.

PARATYPES.—M.C.Z. Nos. 24982, 24984-85 (No. 24984 figured), No. 19047 Alvarez, and No. 4539, mountains of Alvarez, 16 leagues southeast of San Luis Potosí.

MATERIAL EXAMINED.—The typical material and E.H.T. No. 5443, La Placita, near Jacala, Hidalgo.

RANGE.—Known only from the above localities.

DESCRIPTION.—Ventrals: males, 157-64, females, 163-73; caudals: males, 89-110; females, 85-97. Upper labials, 8, fourth and fifth entering orbit; lower labials, 10 (11), 6 (7) in contact with chin shields; 1 or 2 preoculars (small subpreocular present or absent), 2 postoculars; temporals, 1-2. Mature males with anal ridges. Tail-length to body-length ratio: males, 47.0-51.7 per cent, females, 42.2-45.0 per cent.

Maxillary teeth, 14 followed by a gap and 2 slightly enlarged teeth. The hemipenis is 7 subcaudals long, with several very small hooks proximally, followed by 15 moderate hooks of

varying sizes between subcaudals 3 and 6, then a well-defined capitate tip.

There are three narrow black lines, about one-third of a scale wide, running along the center of the median and fourth lateral rows. The 2 rows adjacent to the median row on either side are light gray to olive brown. The lateral dark stripes are bordered above by light stripes, which are continuous along the sides of the neck with the light temporal stripes to the rostral. The sides below the lateral dark stripes are punctulated with brown. The upper labials are black-edged above, and the anterior ones each bear a dark spot.

The Jacala specimen differs from the type series in having the lateral dark stripe covering the lower half of row 4, in having the highest ventral count (173), and in possessing small but distinct spots at the tips of the ventrals. From the locality, one might suspect intergradation with *quinquelineata*, which would account for most of its peculiarities. It differs from *quinquelineata* in having the third labial excluded from the eye by a subpreocular, in the presence of spots on the ventral tips, and in lacking the supplementary dark stripes between the median and lateral ones.

Rhadinæa omiltemana (Günther)

?*Dromicus taeniatus* Peters, 1863: 275, part. Type locality, Mexico.

Dromicus omiltemanus Günther, 1894: 113, Pl. XL, Fig. B.

Rhadinæa vittata Boulenger, 1896: 635, part, specimen *n*.

HOLOTYPE.—In the British Museum, 8000 feet, Omilteme, Guerrero.

MATERIAL EXAMINED.—B.M. No. 94.11.14.14 (figured) and No. 1906.6.1.235, Omilteme, Guerrero; U.M.M.Z. Nos. 84695–96, mountains near Chilpancingo, Guerrero.

RANGE.—Known only from the mountains of Guerrero.

DESCRIPTION.—Upper labials, 8, fourth and fifth entering orbit; lower labials, 10, 6 in contact with chin shields; 1 or 2 (including small subpreocular) pre- and 2 postoculars; temporals, 1–2.

Lateral stripe, uniformly dark, occupying fourth and adjacent half rows; a dark stripe along the middle of the median

row. The upper half of row 5 and lower half of row 6 are lightest. The rows between these and the median dark stripe are of an intermediate shade, slightly darker near the outer borders. Sides below lateral dark stripes, lightly stippled. A single dot on the outer edges of each ventral and subcaudal. About 3 scales behind the parietals the dorsolateral light stripes widen, medially, to leave only 3 scales on the mid-line dark, and laterally, to interrupt the lateral dark stripe behind the corner of the mouth. In 1 specimen the lateral dark stripe is continuous to the rostral. In 2 specimens the dorsolateral and temporal light stripes are continuous; in 1 they are continuous on 1 side only; and in the fourth specimen they are separated on both sides. Labials and venter, immaculate. Freshly preserved specimens have pink bellies.

TABLE III

MUSEUM NUMBER	SEX	VENTRALS	CAUDALS	BODY LENGTH	TAIL LENGTH	TAIL-LENGTH TO BODY-LENGTH RATIO, IN PER CENT
B.M. 1906.6.1.235	♂	148	88	117	53	45.3
B.M. Type*	♂	154	94	267	127	47.6
B.M. 94.11.14.14...	♀	162	85	229	104	45.4
U.M.M.Z. 84695...	♀	157	85	312	142	45.5
U.M.M.Z. 84696...	♀	165	87	400	175	43.8

* Measurements given in original description as 10½ inches and 5 inches; not examined.

Rhadinaea taeniata (Peters)

?*Dromicus taeniatus* Peters, 1863: 275, part.

Rhadinaea vittata Boulenger, 1894: 178, part, specimens *a-g*.

COTYPES.—Probably in the Berlin Museum, from Mexico. (One of the cotypes probably represents *omiltemana*, and the other the form I describe below. I am restricting *taeniata* to this form, as *taeniata* preoccupies *omiltemana* but is the only available name for the present species.)

MATERIAL EXAMINED.—B.M. Nos. 68.4.7.13–14, Mexico City; B.M. Nos. 92.10.31.44–46 (46 figured), La Cumbre de los Arrastrados, Jalisco.

RANGE.—Definitely known only from the above localities.

DESCRIPTION.—By far the largest known species of *Rhadinaea*. Anal ridges present in the only adult male. Upper labials, 8, fourth and fifth entering orbit; lower labials, 10, 6 in contact with chin shields; 1 or 2 (including small subpreocular) pre- and 2 postoculars; temporals, 1–2.

Maxillary teeth, 18 followed by a gap and an enlarged posterior tooth (2 specimens). Hemipenis: 6 caudals long, 32 hooks (largest basally) between caudals 2 and 5, sulcus forked opposite caudal 5, tip capitate.

Dorsal ground color, olive brown. Prominent dark lateral stripes on the common border of scale rows 4 and 5 (mid-body), disappearing shortly behind the vent, and continuous anteriorly to the eye. In 1 specimen they are interrupted on either side by a light bar behind the corner of the mouth, and 2 others show a similar tendency. The median and adjacent half rows are darkened. Anteriorly this dark area is bordered by fine black lines, but posteriorly there is no sharp distinction. The smallest specimen has a dark stripe on the median row, but this appears successively weaker in larger specimens. A conspicuous dot is present on each outer tip; otherwise, venter and labials immaculate.

TABLE IV

MUSEUM NUMBER	SEX	VENTRALS	CAUDALS	BODY LENGTH	TAIL LENGTH	TAIL-LENGTH TO BODY-LENGTH RATIO, IN PER CENT
B.M. 92.10.31.46	♂	168	88 +	480	207 +
B.M. 92.10.31.44	♂	168	106	203	92	45.3
B.M. 92.10.31.45	♀	180	89 +	600	220 +
B.M. 68.4.7.14.....	♀	181	105	500	213	42.6
B.M. 68.4.7.13.....	♀	181	100	468	202	42.9

RELATIONSHIPS

Two Mexican species of *Rhadinaea*, *aemula* and *lachrymans*, are very distinct from their congeners, and seem to be without very close relatives. The head pattern of *lachrymans* is almost

duplicated in *godmani* of western Guatemala. Both lack light temporal stripes, and they alone have a characteristic light bar from the eye to the corner of the mouth. The relationship is probably genetic, but rather distant, as is attested by the 21 scale rows and very different body pattern of *godmani*.

A third species, *laureata*, offers a clue to the relationships of the isolated *flavilata* of the southeastern United States. In these species the upper labials are normally 7, a reduction from the usual 8 in other forms. Recent examination of a living specimen of *flavilata* revealed further similarities to *laureata* which were unsuspected from preserved material. The head is uniform above for 2 or 3 scales on the neck, as in *laureata*, and a very faint trace of striped body pattern is present in *flavilata* for which the same scale-row relationship is found as in *laureata*. The stripes of *laureata* show unmistakable signs of diffusion (see Pl. I) which is simply further developed in *flavilata*, resulting in an almost unicolor pattern. In keeping with this general pattern weakness, the white collar of *laureata* is lacking and the light temporal stripes are less distinct in *flavilata*.

The remaining Mexican species are interrelated in a puzzling fashion, with each character offering a different grouping. The importance of the position of the lateral dark stripe as a distinguishing character has been emphasized in the foregoing key. In way of summary, it is on row 5 in *decorata* and *hesperia*, rows 5 and 4 in *taeniata*, rows 5, 4, and 3 in *fulvivittis* and *omiltemana*, and row 4 in *quinquelineata* and *gaigeae*. Single dark dots are present on the outer tips of the ventrals in *decorata*, *omiltemana*, and *taeniata*, and are diffuse or absent in the others. There is a tendency for the lateral dark stripe to be interrupted on the sides of the neck in *omiltemana*, *fulvivittis*, and *taeniata*, but this character is subject to considerable variation in these small series. The dorsolateral and temporal light stripes are continuous in *quinquelineata*, *gaigeae*, *omiltemana*, *fulvivittis*, and *taeniata*, and discontinuous in *decorata decorata* (continuous in *decorata ignita*) and *hesperia*. Possible significance of ventral and subcaudal scutellation is largely obscured in our material by sexual, geographic, and individual variations.

The nearest relatives of *decorata decorata* are the Panamanian *decorata ignita*, *sargenti*, and *vermiculaticeps*, but *hesperia* also bears significant resemblances to *decorata*. It seems logical that a wide-ranging low-altitude form such as *decorata* would represent the connecting link between geographically restricted forms at opposite extremes of its range.

As both *hesperia* and *omiltemana* are found in the same area it is believed that they represent 2 species groups. With *omiltemana* may be grouped *taeniata* and *fulvivittis*, and with *hesperia*, *quinquelineata* and *gaigae*. This arrangement leaves the forms of either group with ranges distinct from others in the same group and distinct from the range of *decorata*.

The above statements of relationships are only suggestive, as much more material is necessary before we can accurately delimit ranges, analyze variation, and otherwise determine whether or not all the listed species are really worthy of that rank. I have seen a specimen (A.M.N.H No. 19783) from Piuma Hidalgo, Oaxaca, which does not agree with any known form. It appears close to the *decorata-hesperia* complex, but has 139 ventrals and 71 pairs of subcaudals. As it is a very poorly preserved juvenile, no attempt has been made to diagnose it, but it serves to indicate a gap in our knowledge.

Erythrolamprus mentalis Werner (1909: 238), which will probably prove to be a *Rhadinaea*, may occur in Tabasco or Chiapas, and *Rhadinaea godmani* is to be looked for at high altitudes in western Chiapas. In view of the characteristically small ranges of the forms and the large areas from which no specimens of this genus are known, other Mexican additions are to be expected.

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PLATE I

Color patterns at mid-body in *Rhadinaea*.

- FIG. 1. *R. quinquelineata*.
- FIG. 2. *R. gaigeae*.
- FIG. 3. *R. aemula*.
- FIG. 4. *R. lachrymans*.
- FIG. 5. *R. laureata*.

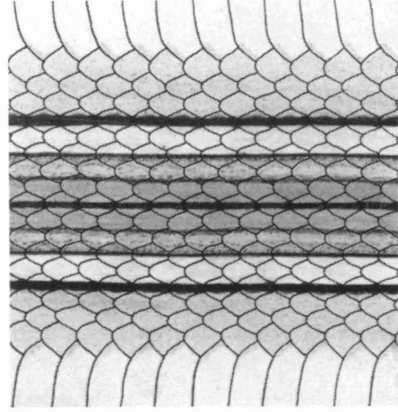


FIG. 1

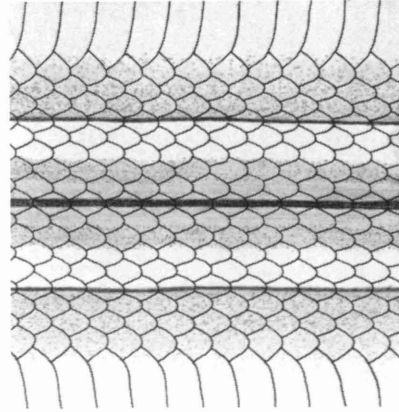


FIG. 2

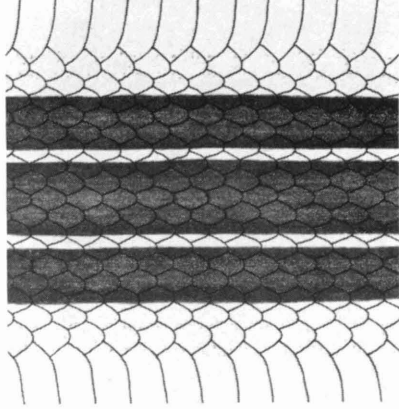


FIG. 3

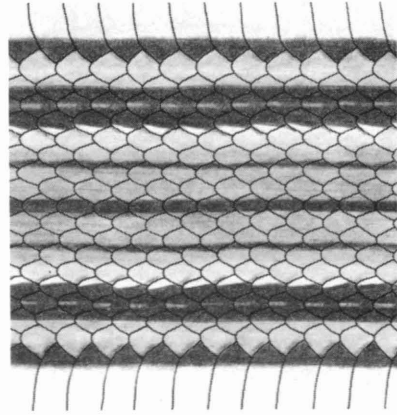


FIG. 4

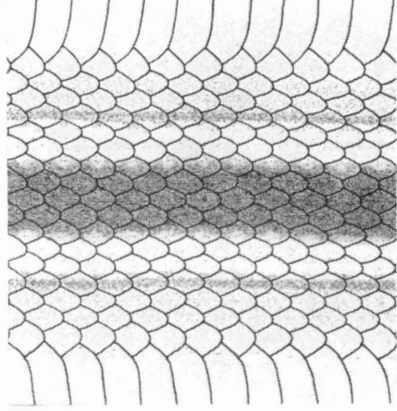


FIG. 5

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PLATE II

Color patterns at mid-body in *Rhadinaca*.

- FIG. 1. *R. fulvivittis*.
- FIG. 2. *R. omiltemana*.
- FIG. 3. *R. hesperia*.
- FIG. 4. *R. taeniata*.
- FIG. 5. *R. decorata decorata*.

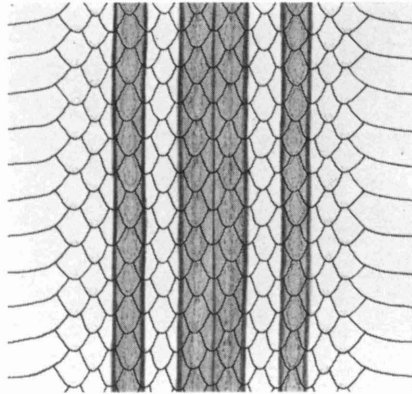


FIG. 1

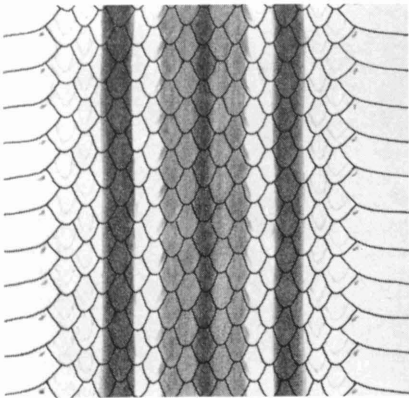


FIG. 2

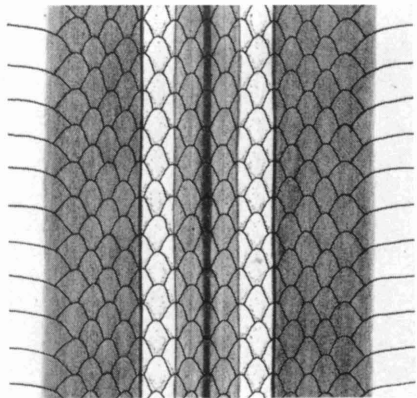


FIG. 3

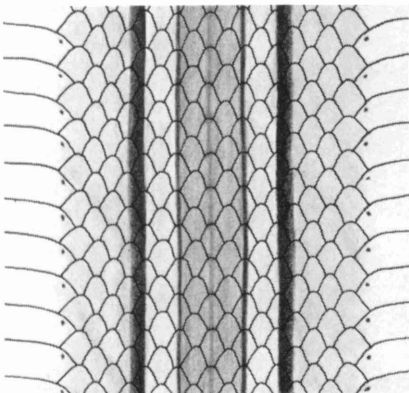


FIG. 4

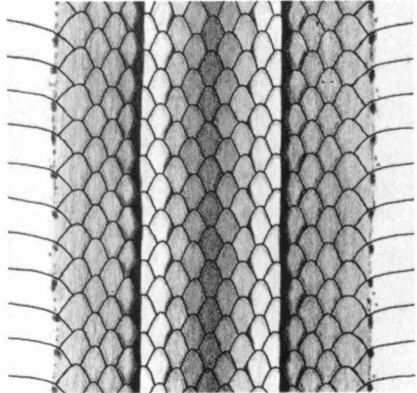


FIG. 5

