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Snakes of the Genus *Imantodes* in Western Mexico

BY RICHARD G. ZWEIFEL

INTRODUCTION

As part of a study of the herpetology of the Tres Mariás Islands, an effort was made to determine which of three nominal species of *Imantodes* on the adjacent Mexican mainland was represented on the islands. It became evident that the mainland populations were in a state of taxonomic confusion; before the insular population could be assigned it became necessary to prepare this brief revision.

Several persons cooperated by furnishing data or specimens, and I wish to acknowledge with thanks their assistance: Mr. J. C. Battersby, Department of Zoology, British Museum (Natural History); Dr. Doris M. Cochran, United States National Museum; Dr. William B. Davis, Texas Cooperative Wildlife Museum; Dr. Hobart M. Smith, University of Illinois Museum of Natural History; Dr. Edward H. Taylor, University of Kansas; Dr. Charles F. Walker, University of Michigan Museum of Zoölogy; Dr. Ernest E. Williams, Museum of Comparative Zoölogy.

Thanks are also due Mr. Charles M. Bogert and Dr. James A. Oliver, who read and criticized the manuscript.

The following abbreviations are used with reference to museum specimens:

A.M.N.H., the American Museum of Natural History, New York
A.N.S.P., Academy of Natural Sciences of Philadelphia
B.M.N.H., British Museum (Natural History), London
E.H.T.-H.M.S., Edward H. Taylor-Hobart M. Smith Collection

M.C.Z., Museum of Comparative Zoölogy at Harvard College
T.C.W.M., Texas Cooperative Wildlife Museum, College Station
U.I.M.N.H., University of Illinois Museum of Natural History, Urbana
U.M.M.Z., University of Michigan Museum of Zoölogy, Ann Arbor
U.S.N.M., United States National Museum, Washington

HISTORICAL REVIEW

Apparently the first record of a snake of the genus *Imantodes* in western Mexico is Cope's (1887) description of *Dipsas gemmistrata latistrata* from "Guadalajara." A few records have appeared in subsequent publications, but the snakes remain rare in collections. The nomenclature of Mexican *Imantodes* currently in use is based largely on the work of Smith (1942), modified slightly by Peters (1954). Smith recognizes three species in western Mexico, but notes that "the apparent existence in the area between Guerrero and Nayarit of three relatively closely related species of *Imantodes* is extraordinary and invites further attention as other specimens become available" (1942, p. 387). Peters (1954) suggests that the Mexican snakes referred to *I. splendidus* by Smith belong to *I. gemmistratus* of Central America, and he changes the specific allocation of several Mexican forms, including one (*I. s. oliveri*) in western Mexico.

As demonstrated below, only one species of *Imantodes* inhabits western Mexico. This is *I. gemmistratus*, represented by two subspecies. Smith recognized that he was hampered, having only 11 specimens from western Mexico. He, as well as others, was misled by erroneous data published for a type specimen. The 24 specimens that I have examined provide a better understanding of the variation and distribution of snakes of this genus, and perhaps provide improvements in the taxonomic arrangement, at least for the species inhabiting western Mexico, from Sonora to Guerrero. Extralimital forms are treated only when necessary for purposes of comparison.

VARIABLES STUDIED

Previous workers with *Imantodes* have employed differences in both color pattern and scutellation in diagnosing species and subspecies.

SCUTELLATION: Marked enlargement of the vertebral row of scales is characteristic of *Imantodes cenchoa*, and within the species *I. gemmistratus* populations are recognizably different in the relative enlargement of these scales (Peters, 1954). However, variation in this character is not of importance in the populations that I have studied; the vertebral row of scales is scarcely or not at all enlarged. For similar reasons, I have not used the number of labial scales entering the orbit.

Ventral and subcaudal scales vary significantly in number, as shown in the accounts of subspecies.

PATTERN: In *Imantodes*, the pattern on the anterior part of the dorsum commonly consists of dark cross bands or saddles on a lighter background. Secondary intermediate blotches and a more or less distinct vertebral line may be present. In some individuals, the pattern throughout the length of the body is similar to that on the anterior part, but in others a lateral fragmentation of posterior blotches takes place (fig. 1), so that over a greater or lesser length of the body the pattern consists of a series of dorsal blotches and one or two rows of separate lateral blotches. Often the dorsal blotches become fused and

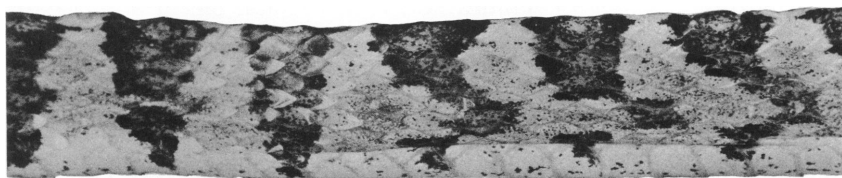


FIG. 1. Lateral view of body of *Imantodes gemmistratus gracillimus*, showing change from complete, anterior cross bands (left) to broken bands (U.M.M.Z. No. 114468, 2.1 miles north-northeast of La Salada, Colima).

staggered and counts somewhat arbitrary. In pale or faded specimens, it may be difficult to count the posterior blotches or determine whether they are broken laterally. Lateral fragmentation is expressed as a percentage of complete dorsal blotches on the body. To indicate the size of anterior blotches, the total length of the first three blotches is measured in terms of scales of the vertebral row, including any scale of which one-half or more is involved in each blotch.

There are two color patterns on the head of *I. gemmistratus*: one with dark brown, irregular spots that stand out sharply against the pale background (fig. 2D); the other with melanic pigmentation greatly reduced, and little or no pattern evident (fig. 2A-C). These head patterns show geographic correlation with other characters useful in the definition of subspecies.

ACCOUNTS OF SUBSPECIES

Imantodes gemmistratus latistratus (Cope)

Dipsas gemmistrata latistrata COPE, 1887, p. 68.

Dipsas tenuissima, GÜNTHER, 1895 [1885-1902], p. 176 (part, specimen from Hacienda Santa Gertrudis, [Jalisco ?], Mexico.

Himantodes gemmistratus, BOULENGER, 1896, p. 87 (part, specimen *c*, Haci-

enda Santa Gertrudis, [Jalisco ?], Mexico. WERNER, 1909, p. 229.

Himantodes gracillimus, BOULENGER, 1896, p. 87 (part, specimen *b*, Tres Marias Islands).

Sibon gemmistratum latistratum, HERRERA, 1904, p. 30.

Imantodes latistratus, SMITH, 1942, p. 387; 1943a, p. 435; 1943b, p. 250. SMITH AND TAYLOR, 1945, p. 76. DUELLMAN, 1957, p. 239. SMITH AND GRANT, 1958, p. 22 (*latistratus* \times *gracillimus* intergrade).

Imantodes splendidus oliveri SMITH, 1942, p. 390 (part, record for Nayarit only). SMITH AND TAYLOR, 1945, p. 77 (part, record for Nayarit only).

Imantodes gracillimus, BOGERT AND OLIVER, 1945, p. 392. SMITH, 1942, p. 387 (part, record for Tres Marias Islands). SMITH AND TAYLOR, 1945, p. 76 (part, record for Tres Marias Islands).

TYPE: In the brief original description, Cope (1887, p. 68) mentions two localities, Valley of Toluca and Guadalajara. Smith and Taylor (1945, p. 76) indicate that the two cotype specimens from these localities are, respectively, A.N.S.P. No. 11677 and U.S.N.M. No. 24963. These authors restrict the type locality to Guadalajara, Jalisco, effectively designating U.S.N.M. No. 24973 as lectotype. As is shown below, there is reason to believe that the specimens shipped from Guadalajara by J. J. Major (the collector of U.S.N.M. No. 24963) were not collected at that locality. Similarly, the Valley of Toluca, mostly above 8000 feet in elevation, does not seem to be within the range of *Imantodes*, all species of which are restricted to elevations below 6000 feet in Mexico, to judge from well-documented specimens. The restriction of the type locality to Guadalajara, Jalisco, is misleading, and the limited information scarcely warrants a restriction more definite than southern Jalisco. Reasons for the opinion that U.S.N.M. No. 24963 came from this region are presented below.

DEFINITION AND DIAGNOSIS: The subspecies *latistratus* is characterized by the combination of the following features of color pattern: Head pale, without large, dark markings; anterior body blotches relatively long, the length of the first three blotches 13 to 25 scales; dorsal pattern often faded posteriorly; body blotches usually fewer than 55.

The blotches on the body are relatively long in *latistratus*, the first three involving from 13 to 25 scales along the midline of the dorsum. The maximum in the subspecies, *gemmistratus*, *oliveri*, *luciodorsus*, and *gracillimus*, excluding intergrades between *gracillimus* and *latistratus*, is 12. *Imantodes gemmistratus splendidus*, which I have not examined, may be similar to *latistratus* in blotch size, but it differs in other characters noted below.

The blotches on the body of *latistratus* characteristically become progressively fainter towards the rear of the body and may be obscure

there. In the other races, anteroposterior differentiation in intensity of markings is less well developed, or entirely absent.

The head of *I. g. latistratus* (fig. 2A) resembles that of *I. g. gracillimus* (fig. 2C) in lacking a pattern of strongly contrasting colors. In the other subspecies dark brown spots or blotches stand out against the pale ground color of the dorsal surface.



FIG. 2. Pattern of head and neck in *Imantodes gemmistratus*. A. *I. g. latistratus* (T.C.W.C. No. 12643, 3 miles south of Coyotitán, Sinaloa). B. *I. g. latistratus* \times *gracillimus* (U.I.M.N.H. No. 41440, Puerto Vallarta, Jalisco). C. *I. g. gracillimus* (A.M.N.H. No. 66119, Tierra Colorado or Laguna Coyuca, Guerrero). D. *I. g. oliveri* (U.I.M.N.H. No. 4001, Tehuantepec, Oaxaca).

Imantodes g. latistratus appears distinguishable from the geographically adjacent form, *gracillimus*, in the number of body blotches. The maximum number in 18 specimens of *latistratus* is 63, but only two specimens have more than 54. Six specimens of *gracillimus* have from 65 to 76 blotches. The minimum number of blotches in *latistratus* is 35, but only one specimen has fewer than 41. Thus the blotch count may distinguish *latistratus* from *splendidus*, which has from 34 to 39 (Smith, 1942, p. 386). There is no marked difference in blotch count

between *latistratus* and the other subspecies, *oliveri*, *luciodorsus*, and *gemmastratus*.

DESCRIPTION AND VARIATION: The head of northwestern (Sonora, Sinaloa, and Nayarit) specimens is pale whitish tan in color, with few markings other than an obscure V-shaped mark in the parietal region (the point of the V directed posteriorly) of an occasional individual and the suggestion of a dark horizontal line behind the eye. Specimens from the southeastern end of the range (México, Morelos, and Guerrero) are more strongly pigmented, but lack the heavily spotted head pattern of the southern races.

The blotches on the anterior part of the body are dark-edged and squarish, with little lateral constriction, and reach to the tips of the ventrals. The blotches are separated by a distance of from one to two scales. The length of the first three blotches is from 13 to 25 scales. Posteriorly, the blotches become shorter and narrower laterally, with the dark border losing its distinctness. Although Smith (1942, p. 387) states that in *latistratus* "none of the dark bands [is] broken laterally," this does not hold true for many specimens. Usually the pattern of *latistratus* is obscure on the posterior part of the body, but among specimens in which the pattern can be made out, the tendency to develop a lateral row of spots is often evident. However, because of the lack of contrast in the pattern of the posterior part of the body, a distinct lateral row of spots is not seen. Six specimens in which the pattern is distinct enough for the point of lateral fragmentation clearly to be observed have from 41 to 67 per cent of the blotches complete. On some specimens blotches break up at midbody but appear whole again posteriorly. Body blotches on 10 specimens from the northern part of the range average 50.0, ranging from 40 to 63. Seven specimens from Guerrero, Morelos, and México average 45.4, with a range of 35 to 53. The samples are too small for significance to be given to the difference between the means. The average for the whole group is 48.9, range 35-63.

The following description of the color in life of *Imantodes gemmistratus latistratus* from Sinaloa is quoted from Dellman (1957, p. 239): "Ground color grayish white anteriorly fading to light tan posteriorly; dorsal blotches pink-rose anteriorly changing to reddish brown at midbody and to brown posteriorly; eye pale rose."

The ventral scales of six northern female specimens number 223 to 232, mean 228.3. Five southern females have a slightly higher average (232.2) and range (227-236). The average for six northern males is 227.1, range 220-231, suggesting that there is little difference between the

sexes in the number of ventral scutes. Only two southern male specimens are available, with centrals numbering 217 and 226. The average of all 11 females is 230.1, range 223–236; nine males average 225.6, range 217–231.

There are too few specimens with complete tails to allow an adequate analysis of variation in the number of subcaudals, but both sexual dimorphism and geographic variation are strongly indicated. Five northern females have from 109 to 120 subcaudals, mean 115.8, whereas three southern females have 130, 131, and 136 scales. Five northern males average distinctly higher than the northern females, 126.0, range 117–130. Curiously, counts of 129 and 131 for two southern males are similar to those of the southern females.

The single specimen, B.M.N.H. No. 81.10.1.101, from the Tres Mariás Islands is not included in the above discussion. According to Boulenger (1896, p. 87), this is a male with 42 body blotches, 253 ventrals, and 145 subcaudals. Mr. J. C. Battersby of the British Museum (Natural History) has kindly examined the specimen at my request and (*in litt.*) confirms in essence the characters noted by Boulenger. Mr. Battersby counts 43 blotches and 145 subcaudals. He finds 255 ventrals and estimates that four more may have been present in damaged areas. The specimen has not been dissected, so there is doubt concerning its sex.

The specimen from the Tres Mariás Islands possesses many more ventrals and subcaudals than any specimen of *latistratus* from the mainland, but more closely approaches the subspecies *gracillimus*, in which the known maxima for these counts are 253 and 145. The specimen also has fewer body blotches, well below the average for *latistratus* and far out of the range of *gracillimus*. The tendency of insular populations of snakes to possess more ventral scutes than their nearest relatives on the mainland is well established (Mertens, 1934), and most snake species on the Tres Mariás Islands conform to the rule. Assuming that color pattern offers a better indication of relationship, I assign the insular population to the subspecies *latistratus*. It should be emphasized, however, that I have not examined the specimen from the Tres Mariás. Differentiation in number of ventral scales alone has been considered adequate justification for the erection of insular subspecies, but the nature of the variation in this character in mainland populations lends no support to the practice.

INTERGRADATION WITH *Imantodes gemmistratus gracillimus*: Although Cope (1887, p. 68) described *latistratus* as a subspecies of *gemmistratus*, and Boulenger (1896, p. 86) listed *latistratus* in the synonymy

of *gemmistratus*, Smith (1942, p. 387) considered it a "very distinct species." The scanty information available to Smith led him to believe that there were three species of *Imantodes* in western Mexico with overlapping ranges. Other workers have done little to disturb the arrangement proposed by Smith. Bogert and Oliver (1945, p. 392) report *I. gracillimus* from Sonora and southern Sinaloa, Duellman (1957, p. 239) reports *I. latistratus* from southern Sinaloa and (1958, p. 11) *I. gracillimus* from Colima, and Peters (1954, p. 23) records *I. gemmistratus oliveri* from Colima and Michoacán. The re-identification of some of the specimens reported by these authors alters the picture considerably. Specimens reported as *gracillimus* from Sonora and Sinaloa fall within the range of variation in *latistratus* as that form is delimited here; specimens from Colima and Michoacán thought to represent *oliveri* are re-assigned to *gracillimus*. As a result of these re-allocations, *latistratus* and *gracillimus*, now seen to be allopatric, are the only forms of the genus known in the Pacific coastal region of Mexico north of Oaxaca.

As indicated in the diagnosis of *I. gemmistratus latistratus*, this form differs from *I. gemmistratus gracillimus* principally in having fewer dorsal blotches on the body, in the greater length of the anterior blotches, and the less pronounced pigmentation on the posterior part of the body. A specimen from Puerto Vallarta, Jalisco (U.I.M.N.H. No. 41440), appears to be intermediate between the two forms. It has 59 dorsal blotches, more than are found in all but two specimens of *latistratus*, but fewer than the minimum of 65 seen in *gracillimus*. The first three blotches have a total length of 12 scales, compared to a maximum of 11 in *gracillimus* and a minimum of 13 in *latistratus*. The pigmentation of the posterior part of the body of the Puerto Vallarta specimen is slightly more pronounced than is typical of *latistratus*, but the difficulty of dealing objectively with this character detracts from its value.

The intermediate specimen is a female with 237 ventral scales and an incomplete tail. It has five more ventrals than the maximum number in six northern female specimens of *latistratus*, and falls within the range (230–253) of four *gracillimus*.

Both morphologically and geographically the specimen from Puerto Vallarta is intermediate between *Imantodes gemmistratus latistratus* and *I. g. gracillimus* and presumably represents an annectant population.

Other specimens suggest intergradation. Werner (1909, p. 230) reports one from "Hacienda de Ixtapa, Tepic" (probably Hacienda de

Ixtapan, about 15 miles southwest of Compostela, Nayarit), with alternating lateral and dorsal spots on the back half of the body. It is my inference that the pattern is more distinct posteriorly than is usual in *latistratus*, a tendency towards *gracillimus*. However, the numbers of ventral scales (230) and dorsal blotches (50) are more typical of *latistratus*. The length of anterior blotches in terms of scale lengths is not known, but Werner states "*Querbinden des Rumpfes in der Halsregion . . . viel breiter als die hellen Zwischenräume*" ("Cross bands of the body in the neck region . . . much broader than the light interspaces"). Smith (1943b, p. 250) evidently mistranslated Werner's statement as "bands . . . a little wider on neck than spaces between," and considered that the relatively narrow bands served along with the broken posterior spots to distinguish this specimen from *latistratus*. In the absence of more definite information possibly to be gained by an examination of the specimen, I assign this snake to the subspecies of *latistratus*.

A specimen reported by Günther (1895 [1885–1902], p. 176) and Boulenger (1896, p. 87) from Hacienda Santa Gertrudis, Mexico, apparently resembles the specimen from Ixtapan, as Werner recognized. The location of the Hacienda Santa Gertrudis is uncertain. The collector, Audley C. Buller, traveled widely in Mexico, and visited many localities in Jalisco and adjacent states. There are (or were) three haciendas in western Jalisco by the name of Santa Gertrudis (García Cubas, 1898, p. 143). One of these is approximately 30 miles west-northwest of Zapotlán (Ciudad Guzmán), where Buller is known to have collected, and this is the locality mapped (fig. 3). The specimen is reportedly a male with 231 ventrals, 130 caudals, and 50 dorsal spots that are broken laterally on the posterior fourth of the body (Boulenger, *loc. cit.*). As in the case of Werner's specimen, the apparent distinctness of the posterior pattern favors assignment to *gracillimus*, but the numbers of dorsal spots and ventral and subcaudal scales are more characteristic of *latistratus*. The specimen is assigned to *I. g. latistratus*.

There is a third specimen intermediate in some respects between *latistratus* and *gracillimus*. This individual is, unfortunately, the lectotype of *latistratus*, U.S.N.M. No. 24963. The specimen, the sex of which has not been ascertained, is a rather pale and faded juvenile, with 235 ventral scutes, 128 subcaudals, and 51 dorsal blotches. The total length of the first three blotches is 12 scales. The number of body blotches is close to the mean for *latistratus*, but the specimen resembles *gracillimus* in having relatively short anterior blotches. The number of ventral scales exceeds that of northern *latistratus* (maximum 232 in 12 specimens of both sexes), but compares favorably to counts (230 and

239) for two female specimens of *gracillimus* from Colima. The specimen, however, is close to the average (126) of five northern male *latistratus* in number of subcaudal scales (128), and has several fewer than the two females from Colima (135 and 145).

The type specimen of *latistratus* is one of a number of reptiles and amphibians sent to the Smithsonian Institution from Guadalajara, Jalisco, by J. J. Major. It is questionable whether Guadalajara is the locality where these specimens were collected (Zweifel, 1959). The geographic distribution of the species in Major's collection strongly suggests that Guadalajara is not the original source but merely the shipping point for most of the species. The collection may have been made in the coastal region, perhaps in Colima, with a few specimens gathered between Colima and Guadalajara. The characters of the type specimen of *latistratus* make it doubtful that it came from Colima, but it may represent a population intermediate between *latistratus* and *gracillimus*. Such a population may exist in southern Jalisco. If *Imantodes gemmistratus* occurs in the vicinity of Guadalajara, for example, in the barranca of the Rio Santiago, the population probably would show less influence of *gracillimus*. It is not desirable to restrict the type locality more closely than southern Jalisco.

The only specimen of *Imantodes* from Michoacán examined by me is E.H.T.-H.M.S. No. 5330, a male from Hacienda El Sabino. This snake is in some ways intermediate between *latistratus* and *gracillimus*. The body blotches are very numerous (63), and the first three blotches are relatively short, only 13 scales in length. Thus the specimen lies between *latistratus* and *gracillimus* in these two aspects of pattern. The pattern of the posterior part of the body lacks the relatively distinct fragmentation of the blotches of *gracillimus*, but resembles that of *latistratus* in lacking a well-defined row of lateral spots. The numbers of ventral (224) and subcaudal scales (132) ally the specimen much more closely to *latistratus*.

The specimen is referred to *I. g. latistratus*, although it should perhaps be called an intergrade. Elucidation of the status of populations of *Imantodes* in the inland area between Nayarit and México must await additional specimens. The existence of similar populations of *latistratus* to the northwest and southeast suggests that this form ranges continuously from Sonora to Morelos. Intermediacy of the El Sabino specimen may result from the influence of the penetration of the coastal form *gracillimus* into the valley of the Río Balsas.

DISTRIBUTION (FIG. 3): *Imantodes gemmistratus latistratus* ranges northward at least to southern Sonora and is the northernmost mem-

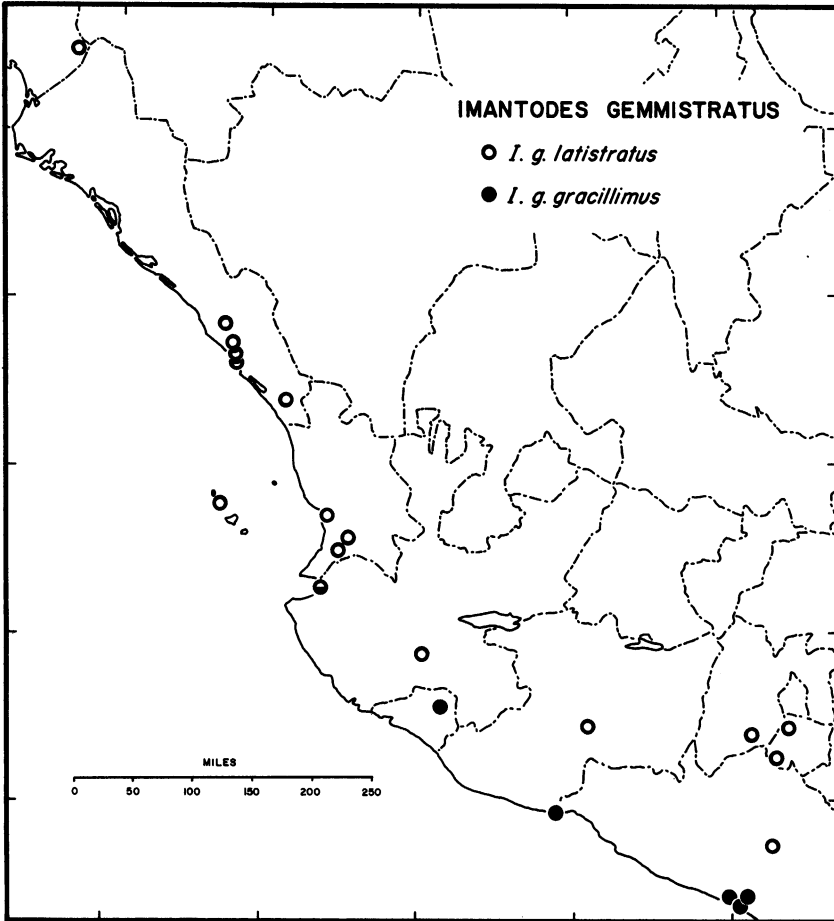


FIG. 3. Distribution of *Imantodes gemmistratus* in western Mexico. The half-filled circle indicates an area of intergradation.

ber of its genus. On the east coast of Mexico, *Imantodes cenchoa* is found as far north as southern Tamaulipas, and *I. gemmistratus luciodorsus* only to central Veracruz. From Sonora, *latistratus* ranges southward through Nayarit and then swings inland, apparently terminating in Morelos and central Guerrero. Discovery of this subspecies in western Puebla and adjacent regions of Oaxaca would not be surprising. The range also includes the Tres Marias Islands. Intergradation with the subspecies *gracillimus* occurs in the vicinity of Banderas Bay, northwestern Jalisco, and probably at other places where the ranges of the two forms meet.

Imantodes gemmistratus latistratus is recorded from the following localities (18 specimens cited by museum number have been examined): *Sonora*: Rancho Guirocoba (A.M.N.H. No. 64022). *Sinaloa*: Three miles south of Coyotitán, 450 feet (T.C.W.C. No. 12643); 31.8 miles north-northwest of Mazatlán, 400 feet (U.M.M.Z. No. 114466); 10.3 miles north-northwest of Mazatlán, 200 feet (U.M.M.Z. No. 114467); 8.3 miles north-northwest of Mazatlán, 100 feet (U.M.M.Z. No. 114465); 6.6 miles north-northwest of Mazatlán, 100 feet (U.M.M.Z. No. 114464); Escuinapa (A.M.N.H. No. 3848). *Nayarit*: Mirimar (U.S.N.M. Nos. 51481–51483); Compostela (Smith, 1943b, p. 250); Hacienda de Ixtapa[n?] (Werner, 1909, p. 229); Tres Marias Islands [probably María Madre Island], (Boulenger, 1896, p. 87). *Jalisco*¹: Hacienda Santa Gertrudis (Günther, 1895 [1885–1902], p. 176). *Michoacán*: Hacienda El Sabino (E.H.T.-H.M.S. No. 5330). *México*²: Ixtapan de la Sal, 5250 feet (A.M.N.H. No. 71361); Motajé (Herrera, 1904, p. 30).³ *Morelos*: Huajintlán (E.H.T.-H.M.S. No. 5205); 6 miles northeast of Cuernavaca (U.I.M.N.H. No. 1777, formerly E.H.T.-H.M.S. No. 5517). *Guerro*: Vicinity of Chilpancingo (U.M.M.Z. No. 73935 [two specimens], M.C.Z. Nos. 33651–33652).

A specimen (U.I.M.N.H. No. 41440) from Puerto Vallarta, Banderas Bay, Jalisco, is classed as an intergrade between *Imantodes gemmistratus latistratus* and *I. g. gracillimus*.

Imantodes gemmistratus gracillimus (Günther)

Dipsas gracillima GÜNTHER, 1895 [1885–1902], p. 177.

Himantodes gracillimus, BOULENGER, 1896, p. 87 (part, specimen a).

Imantodes gemmistratus, OLIVER, 1937, p. 23.

Imantodes gracillimus, SMITH, 1942, p. 387 (part, specimen from Acapulco, Guerrero). SMITH AND TAYLOR, 1945, p. 76 (part). DUELLMAN, 1958, p. 11.

Imantodes splendidus oliveri SMITH, 1942, p. 388 (part, specimen from Hacienda Albarradita, Colima). SMITH AND TAYLOR, 1945, p. 77 (part).

Imantodes gemmistratus oliveri, PETERS, 1954, p. 23.

TYPE: The type specimen, British Museum (Natural History) No. 1946.1.4.76 (formerly no. 95.1.4.6), was obtained in southern Mexico by F. D. Godman. Precise locality data are not available, but a brief discussion of the type locality is given below.

DEFINITION AND DIAGNOSIS: The combination of the following features of color pattern characterizes this subspecies: head pale, without

¹ The type locality, "Guadalajara," is regarded as erroneous.

² The cotype locality, "Valley of Toluca," is probably erroneous.

³ I have been unable to locate Motajé on a map.

strongly contrasting dark markings on a light background; anterior body blotches relatively short, the total length of the first three blotches 11 scales or less; body blotches very numerous, 65 to 76.

Imantodes gemmistratus gracillimus is compared with *I. g. latistratus* in the account, above, of that subspecies. The relatively pale head, lacking large, contrasting dark markings, separates *gracillimus* from the other subspecies (*oliveri*, *splendidus*, *luciodorsus*, and *gemmistratus*). Also, the large number of body blotches distinguishes *gracillimus* from all but a few individuals of the other subspecies. Occasional specimens of *oliveri* have as many as 68 blotches, but the mean for 14

TABLE 1
PATTERN CHARACTERISTICS OF *Imantodes gemmistratus*

Subspecies	Body Blotches			Length of First Three Blotches (in Scales of Vertebral Row)			Percentage of Unbroken Blotches		
	Mean	Range	N	Mean	Range	N	Mean	Range	N
<i>oliveri</i> ^a	56.1	(45-68)	14	8.5	(7-10)	13	37.1	(22-78)	14
<i>gracillimus</i>	70.2	(65-76)	6	9.5	(9-11)	4	33.0	(21-47)	4
<i>latistratus</i> ^b									
Northern	50.0	(40-63)	10	18.5	(14-25)	10	56.6	(46-67)	5
Southern	45.4	(35-53)	7	17.6	(15-22)	7	—	(41)	1
All	48.9	(35-63)	18	17.8	(13-25)	18	54.0	(41-67)	6

^aSample restricted to the vicinity of Tehuantepec City.

^bSpecimen from Tres Marías Islands not included.

specimens of this race from the vicinity of Tehuantepec, 56.1, is well below the mean of 70.2 for six specimens of *gracillimus*.

DESCRIPTION AND VARIATION: As this subspecies is known from only seven specimens, of which I have examined five, doubtless the range of variation will be extended when more specimens become available.

The pattern of the head resembles that of *latistratus* in lacking large, dark markings (fig. 2C). However, the amount of pigmentation is more pronounced than is usual in *latistratus*.

The anterior dorsal blotches are dark-edged and squarish. They reach the first row of dorsal scales or to the tips of the ventrals, and are separated along the dorsal midline by one to one and one-half scale lengths. The length of the first three blotches is nine to 11 scales. Behind the neck, the blotches become constricted and then broken laterally, forming a distinct row of dorsal blotches and a somewhat less dis-

tinct lateral row. Two specimens from the vicinity of Acapulco have only 21 per cent of the blotches complete, but 43 and 47 per cent are complete on two specimens from Colima. There is a faint indication of a midvertebral dark line.

In the original description, the type of *gracillimus* was reported to have 244 ventral scales (Günther, 1895 [1885–1902], p. 177). However, Günther was mistaken in this count, as he was in the count published for the type of *Dipsas splendida* (= *Imantodes gemmistratus splendida*; see Schmidt and Andrews, 1936, pp. 176–177). In a letter (kindly

TABLE 2
SCUTELLATION OF *Imantodes gemmistratus*

Subspecies	Mean	Ventrals Range	N	Mean	Subcaudals Range	N
<i>oliveri</i> ^a						
Males	231.7	(230–235)	3	139.0	(134–144)	2
Females	228.2	(221–237)	13	126.9	(117–135)	10
<i>gracillimus</i>						
Male	—	(242)	1	—	(143)	1
Females	242.5	(230–253)	4	137.7	(133–145)	4
<i>latiistratus</i> ^b						
Males (northern)	227.1	(220–231)	6	126.0	(117–130)	5
Males (southern)	221.5	(217–226)	2	130.0	(129–131)	2
Females (northern)	228.3	(223–232)	6	115.8	(109–120)	5
Females (southern)	232.2	(227–236)	5	132.3	(130–136)	3

^aSample restricted to the vicinity of Tehuantepec City.

^bSpecimen from Tres Mariás Islands not included.

brought to my attention by Dr. Charles F. Walker) to Mrs. H. Gaige dated September 28, 1938, Dr. H. W. Parker comments as follows: "Type of *Dipsas gracillimus* Günther (95.1.4.6) juv. male; Sc. 17; V. 233 (2 counts); C. 92 + n." Recently Mr. J. C. Battersby reexamined the specimen, and (*in litt.*) records 232 ventrals and 88 subcaudals, tail incomplete. Possibly the specimen described by Günther and the one preserved as the type specimen are not the same. This is improbable, however, as the blotch counts recorded by Günther "about seventy-four", Parker ("circa 70") and Battersby ("70") are similar, and the total length given by Günther (21½ inches) agrees with that found by Battersby (545 mm.).

Three specimens from the vicinity of Acapulco, Guerrero, a male with 242 ventrals and two females with 248 and 253 ventrals, have the highest counts of any mainland specimens of *Imantodes gemmistratus*; they are exceeded only by those of the specimen of *latistratus* from the Tres Mariás Islands. Two females of *gracillimus* from Colima have 230 and 239 ventrals; thus one of these and the type specimen overlap the range of variation of mainland *latistratus* (maximum for mainland specimens, 236). Probably there is a cline in average number of ventral scales northward along the coast from Acapulco. Because of this variation, the high average ventral count of *gracillimus* is of limited value as a diagnostic character.

The suggestion of clinal variation in ventral scales does not extend to subcaudals. Two females from the vicinity of Acapulco have 133 and 138 subcaudals, and two from Colima have 135 and 145. A single male from Acapulco has 143 subcaudals. The maximum counts recorded for *latistratus* are 120 and 130 for northwestern females and males, respectively, 132 for a male from Michoacán, and 131 for males and 136 for females from the southeastern part of the range.

RELATIONSHIP OF *I. gemmistratus gracillimus* AND *I. g. oliveri*: Some specimens of *gracillimus* were referred to *oliveri* by previous authors; *oliveri* is no longer considered a member of the fauna of western Mexico, and there is a gap of over 300 miles between localities for *oliveri* in the vicinity of Tehuantepec, Oaxaca, and *gracillimus* at Acapulco, Guerrero. In the absence of specimens from so great an intermediate region, intergradation cannot be shown to occur, but the conspecific status of *gracillimus* and *oliveri* cannot seriously be questioned. The most distinctive character of *gracillimus* was the erroneous scale count given by Günther and repeated by Boulenger (1896, p. 87). Understandably this was not detected by Smith (1942), when he reviewed Mexican *Imantodes*, with only a single specimen of *gracillimus* available for examination. With the additional specimens now available, *gracillimus* proves to have affinities easily discerned in both southern (*oliveri*) and northern (*latistratus*) allopatric populations, serving as a link connecting them with the polytypic species.

TYPE LOCALITY: The type of *Imantodes gemmistratus gracillimus* was obtained by F. D. Godman, and no locality more specific than "southern Mexico" is recorded. If it be assumed that Godman collected the specimen personally, he must have obtained it on his trip to Mexico in 1887 (Godman, 1915, pp. 9-10). With Mexico City as a base, Godman journeyed to Veracruz, Yucatan, Cuernavaca, Morelia, and Lake Pátzcuaro. On some of these journeys he was within the range of

Imantodes gemmistratus. The subspecies *I. g. latistratus* is found at Cuernavaca in Morelos. In Veracruz, he passed through territory inhabited by *I. g. luciodorsus*. In Yucatan, he was within the range of *I. g. splendidus*. However, snakes possessing characters of the type of *gracillimus* are not known in the regions Godman says he visited. Quite possibly Godman did not collect the specimen himself, but obtained it by purchase. This would explain the vague type locality of *Imantodes g. gracillimus*, which cannot be suitably restricted without additional information.

DISTRIBUTION (FIG. 3): *Imantodes gemmistratus gracillimus* is known from only seven specimens, of which I have examined five. The known range is the coastal region from Colima to central Guerrero. In the following list of localities, specimens examined are indicated by museum number. *Colima*: Hacienda Albarradita (U.M.M.Z. No. 80215); 2.1 miles north-northeast of La Salada, 1500 feet (U.M.M.Z. No. 114468). *Michoacán*: La Orilla (Peters, 1954, p. 23). *Guerrero*: Acapulco (M.C.Z. No. 823); Tierra Colorada and vicinity of Laguna Coyuca (A.M.N.H. Nos. 66119-66120).¹

SUMMARY

The snakes of the genus *Imantodes* in western Mexico (Guerrero to Sonora) previously referred to three species, *I. gemmistratus oliveri*, *I. gracillimus*, and *I. latistratus*, on the basis of misidentifications and other erroneous information are shown to be assignable to a single species, *Imantodes gemmistratus*. Two subspecies, *I. g. latistratus* and *I. g. gracillimus*, differ from each other and from other subspecies of *gemmistratus* in pattern and, to a lesser extent, in scutellation. *Imantodes gemmistratus oliveri*, formerly thought to range from Chiapas to Colima and possibly to Nayarit, occurs no farther west than the Tehuantepec area in Oaxaca. With *latistratus* and *gracillimus* reduced to subspecific status, only three species of *Imantodes* are known in Mexico: *I. cenchoa*, *I. gemmistratus*, and *I. tenuissimus*.

BIBLIOGRAPHY

BOGERT, CHARLES M., AND JAMES A. OLIVER

1945. A preliminary analysis of the herpetofauna of Sonora. Bull. Amer. Mus. Nat. Hist., vol. 83, pp. 297-426, figs. 1-13, pls. 30-37, table 1, maps 1-2.

¹ Because of the illegibility of the field tags, it cannot be determined which specimen came from which locality. The field notes of the collector Walter Mosauer, indicate that *Imantodes* was taken at each of these places.

BOULENGER, GEORGE ALBERT

1896. Catalogue of the snakes in the British Museum (Natural History). London, vol. 3, pp. i-xiv, 1-727, figs. 1-37, pls. 1-25.

COPE, E. D.

1887. Catalogue of batrachians and reptiles of Central America and Mexico. Bull. U. S. Natl. Mus., no. 32, pp. 7-98.

DUELLMAN, WILLIAM E.

1957. Notes on snakes from the Mexican state of Sinaloa. *Herpetologica*, vol. 13, pp. 237-240.
1958. A preliminary analysis of the herpetofauna of Colima, Mexico. *Occas. Papers Mus. Zool. Univ. Michigan*, no. 589, pp. 1-22, maps 1-2, table 1.

GARCÍA CUBAS, ANTONIO

1898. Diccionario geografico, historico y biografico de los Estados Unidos Mexicanos. [Mexico], vol. 5, 567 pp.

GODMAN, FREDERICK DUCANE

1915. *Biologia Centrali-Americana*. Introductory volume. London, Dulau and Co., Ltd., viii+149 pp., 2 pls., 8 maps.

GÜNTHER, ALBERT

- 1885-1902. *Biologia Centrali-Americana*. Reptilia and Batrachia. London, xx+326 pp., 76 pls.

HERRERA, ALFONSO L.

1904. Catálogo de la colección de reptiles y batracios del Museo Nacional. Segunda edición. México, pp. 1-65.

MERTENS, ROBERT

1934. Die Insel-Reptilien, ihre Ausbreitung, Variation und Artbildung. *Zoologica, Stuttgart*, no. 84, pp. 1-209, figs. 1-9, pls. 1-6.

OLIVER, JAMES A.

1937. Notes on a collection of amphibians and reptiles from the state of Colima, Mexico. *Occas. Papers Mus. Zool. Univ. Michigan*, no. 360, pp. 1-28, fig. 1, pl. 1, map 1.

PETERS, JAMES A.

1954. The amphibians and reptiles of the coast and coastal sierra of Michoacán, Mexico. *Occas. Papers Mus. Zool. Univ. Michigan*, no. 554, pp. 1-37.

SCHMIDT, KARL P., AND E. WYLLYS ANDREWS

1936. Notes on snakes from Yucatan. *Publ. Field. Mus. Nat. Hist., Zool.*, vol. 20, pp. 167-187, figs. 20-23.

SMITH, HOBART M.

1942. Mexican herpetological miscellany. *Proc. U. S. Natl. Mus.*, vol. 92, pp. 349-395, fig. 38, pl. 37, tables 1-2.
- 1943a. Summary of the collections of snakes and crocodilians made in Mexico under the Walter Rathbone Bacon traveling scholarship. *Ibid.*, vol. 93, pp. 393-504, figs. 13-15, pl. 32, tables 1-42.
- 1943b. Notes on reptiles from Mexico. *Copeia*, p. 250.

SMITH, HOBART M., AND CHAPMAN GRANT

1958. Noteworthy herptiles from Jalisco, Mexico. *Herpetologica*, vol. 14, pp. 18-23, figs. 1-2.

SMITH, HOBART M., AND EDWARD H. TAYLOR

1945. An annotated checklist and key to the snakes of Mexico. Bull. U. S. Natl. Mus., vol. 187, pp. i-iv, 1-239.

WERNER, F.

1909. Über neue oder seltene Reptilien des Naturhistorischen Museums in Hamburg. Mitt. Naturhist. Mus., Hamburg, vol. 26, pp. 205-247, figs. 1-14.

ZWEIFEL, RICHARD G.

1959. The provenance of reptiles and amphibians collected in western Mexico by J. J. Major. Amer. Mus. Novitates, no. 1949, pp. 1-9.