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**A REVIEW OF THE MEXICAN GARTER SNAKE
THAMNOPHIS CYRTOPSIS POSTREMUS SMITH
WITH COMMENTS ON *THAMNOPHIS VICINUS*
SMITH**

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Abstract. The variation and distribution of the Mexican garter snake *Thamnophis cyrtopsis postremus* Smith, 1942 is discussed. The taxon is known only from the arid Tepalcatepec Valley of Michoacan. The well-defined subspecies is compared with and distinguished from *T. c. collaris* and *T. c. pulchrilatus*, the other two subspecies that occur in Michoacan. In addition, the enigmatic *Thamnophis vicinus* Smith, 1942 is reviewed; *T. vicinus* is confined to pine and pine-oak forests in Michoacan, is closely related to *T. cyrtopsis collaris*, and is tentatively regarded as a distinct species.

* * *

Smith (1942:109-110) described *Thamnophis cyrtopsis postremus* from the Mexican state of Michoacan primarily on the basis of pattern and low ventral count. The only subsequent published data on variation of this taxon is by Duellman (1961), who compared it to *T. cyrtopsis cyclides*, now an invalid name. During a previous study of *T. cyrtopsis* (Webb, 1966), my subjective impression was that the pattern features of *T. c. postremus* were not greatly different from those of *T. c. collaris*, and that the two subspecies were weakly differentiated. The purpose of this report is to reassess the taxonomic status of *T. c. postremus*.

Only specimens from the state of Michoacan have been examined. Specimens previously studied from that state (Webb, 1966) have not been re-examined, but data from them is used in this report. Museum abbreviations (cited in text) indicate the location of preserved specimens: AMNH, American Museum of Natural History; FMNH, Field Museum of Natural History; KU, Museum of Natural History, University of Kansas; LACM, Natural History Museum of Los Angeles County; MCZ, Museum of Comparative Zoology; UI, Museum of Natural History, University of Illinois; UMMZ, Museum of Zoology, University of Michigan; USNM, National Museum of Natural History. I thank the curators in charge of these collections for the loan of specimens.

Only numbers of supralabials, ventrals and subcaudals, and aspects of

pattern were used as taxonomic characters. This study reveals that, contrary to my previous opinion (Webb, 1966), *Thamnophis c. postremus* is a well-defined subspecies. The taxon is compared with *T. c. collaris* and *T. c. pulchrilatus*, the two other subspecies recognized from Michoacan.

Thamnophis cyrtopsis postremus Smith

Thamnophis eques postremus Smith, 1942:109. Type-locality, "El Sabino, Michoacan." Holotype (by original designation), female, FMNH 120235 (formerly E.H. Taylor-H.M. Smith Coll. 5275), collected by Hobart M. Smith. Three paratypes—UI 23433 (formerly EHT-HMS 5274), FMNH 100541 (formerly EHT-HMS 5285), and FMNH 100542 (formerly EHT-HMS 5286), all from "Uruapan, Michoacan." The UI paratype bears a field tag with the locality "Uruapan, Hda. El Sabino." Duellman (1961) in his gazetteer noted that Uruapan is about 24 kilometers distant from Hacienda El Sabino and in pine-oak forest, a habitat foreign to *T. c. postremus*. The UI specimen was listed as a topoparatype from Hda. El Sabino, 20 miles south Uruapan by Smith, Langebartel and Williams (1964). Probably all paratypes are from the environs of Hacienda El Sabino in arid tropical scrub forest.

There is little to add to the relatively complete descriptive data of the type material provided by Smith in the original description. The holotype, bearing an attached glass vial containing the right maxilla with 27 teeth (as recorded by Smith, 1942:109), is photographed in Figure 1.

Color and pattern: The nuchal blotches are fused to form a black collar. The buffy vertebral stripe, confined to the vertebral row, may be virtually absent but it is usually indistinct the length of the body, not sharply contrasting with the pale brown dorsolateral areas, and is absent on most of the tail (stripe more contrasting when scales sloughed). There is no pale lateral stripe. The first three scale rows are unicolor and paler than the dorsolateral areas, and may be either devoid of dark markings or have scattered, small black specks. The dorsolateral areas have relatively small alternating black spots (rarely touching, about same size or smaller than pale interspaces) for the length of the body; the uppermost row of spots enroaches on the vertebral stripe. The top of head is brown or dark brown. Bold black supralabial markings are usually on all sutures, most reduced on the anteriormost suture. The large comma-shaped suture mark between the fifth and sixth (if seven) or sixth and seventh (if eight) supralabials is characteristic. The upper expanded part of this mark often enroaches on the lower margin of the anterior temporal and may extend in barlike fashion onto the middle postocular. Black supralabial suture marks may be fused dorsad forming horseshoe-shaped marks. There is a black suture mark between the last two infralabials, and usually black marks on other infralabial sutures. The ventral surfaces may be immaculate, but usually

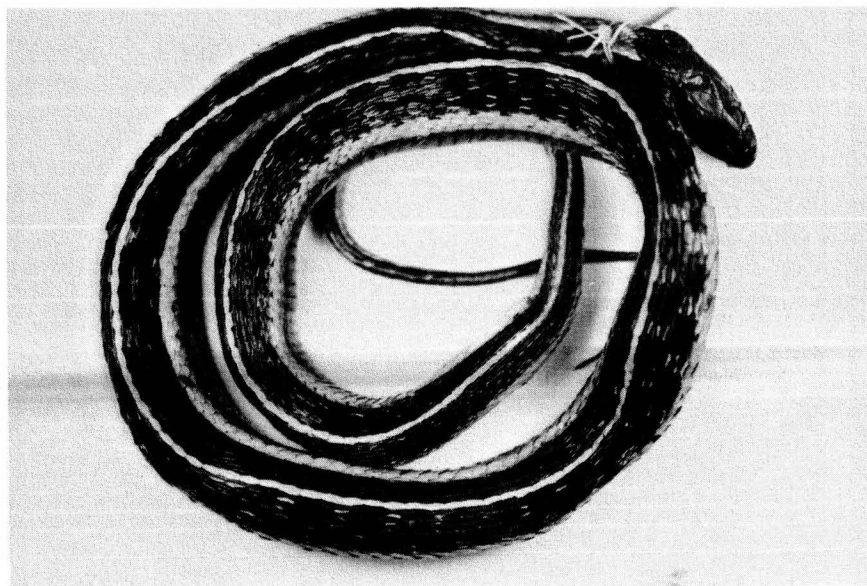
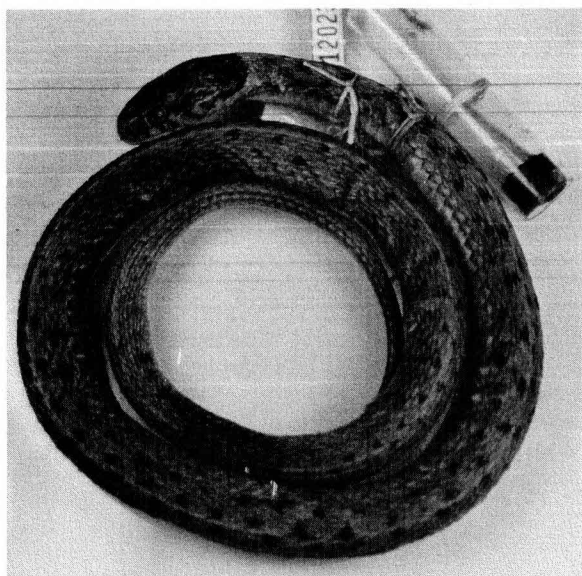


Figure 1. Top, holotype of *Thamnophis cyrtopsis postremus* Smith (FMNH 120235) from Hacienda El Sabino, Michoacan, showing dorsal pattern characteristic for the subspecies. Bottom, *Thamnophis cyrtopsis collaris* (MCZ 131014) from 8 kilometers west-northwest Cheran, Michoacan, showing characteristic dorsal pattern.

there are small black spots laterally (arranged in rows) on the anterior margins of most ventral scales. New-born young generally resemble adults. In 18 of 25 young born to a female 560 mm total length (UMMZ 119402, N = 19) the brown head contrasts with the black collar, and the blotched pattern is distinct the length of the body; the vertebral stripe seems to be somewhat more distinct than in adults. Tongues are red with black tips. The body pattern of *Thamnophis c. postremus* was illustrated in Duellman (1961:115, Fig. 10B). The supralabial pattern is compared with that of the other two subspecies in Figure 2.

Scutellation: Dorsal scale rows are characteristically 19-19-17; two specimens have 15 rows posteriorly. Seven supralabials (60%) occur more frequently than eight (37%), with varying combinations of 7-6 (4.1%), 7-7 (50.0%), 7-8 (16.2%), 8-8 (28.3%), and 8-9 (1.4%) on either side of the head. Ventrals in 28 males average 146.1 (142-151), and in 29 females 139.7 (136-142); one of 17 unsexed snakes has the lowest recorded number of 130. Subcaudals in 22 males average 74.5 (65-80), and in 18 females 71.8 (67-75); one of 17 unsexed snakes has the lowest recorded number of 64. There are relatively fewer ventrals and subcaudals in both sexes of *Thamnophis c. postremus* than in the other two subspecies (Table 1).

Michoacan specimens examined (74): 3.3 mi N Capirio (UMMZ 114557); 5.2 mi N Capirio (UMMZ 114558); 5.3 mi E Apatzingan (UMMZ 119407); 5.6 mi E Apatzingan (UMMZ 112534); 6.2 mi E Apatzingan (UMMZ 114554); 7.5 mi E Apatzingan (UMMZ 114556); 7.7 mi E Apatzingan (UMMZ 112531); 10 mi E Apatzingan (UMMZ 119406, N = 7; UMMZ 119408, N = 5); 12 mi E Apatzingan (UMMZ 112540); 15.5 mi E Apatzingan (UMMZ 112533); Hacienda El Sabino (FMNH 100541-42, 120235; UI 23433); Cuatro Caminos (UMMZ 114560); 2 mi W Cuatro Caminos (UMMZ 119403-04; 2-4 mi W Cuatro Caminos (UMMZ 114555, N = 4); 3.2 mi W Cuatro Caminos (UMMZ 119402, N = 19); 3.6 mi S Cuatro Caminos (UMMZ 114559); 9 mi on road between Rio Marquez and Cuatro Caminos (KU 62512-16); road between Rio Marquez and Cuatro Caminos (KU 67526); 1.7 mi S Nueva Italia (UMMZ 112529-30); 2.4 mi N Nueva Italia (UMMZ 119405, 121544); 2.5 mi S Nueva Italia (UMMZ 112535); 4.3 mi SW Nueva Italia (UMMZ 112532); 6.2 mi SW Nueva Italia (UMMZ 112539); 1.2 mi S Charapendo (UMMZ 112528); 2.5 mi S Lombardia (UMMZ 121545); 4.2 mi S Lombardia (UMMZ 121543, N = 2); 5 mi S Lombardia (UMMZ 112538); 6-7 mi S Lombardia (UMMZ 112536); 9 mi S Lombardia (KU 29313); 7 mi on road between Rio Marquez and Lombardia (KU 62517-18).

Thamnophis cyrtopsis postremus is geographically restricted to the lowland arid tropical scrub forest in the Tepalcatepec Valley. The maximum elevation recorded is 3500 ft (1094 m) for the specimen from near Charapendo, which Duellman (1961) noted as being near the upper limit of the arid scrub forest. The subspecies probably extends eastward in the lowest parts of the Balsas Basin into Guerrero.

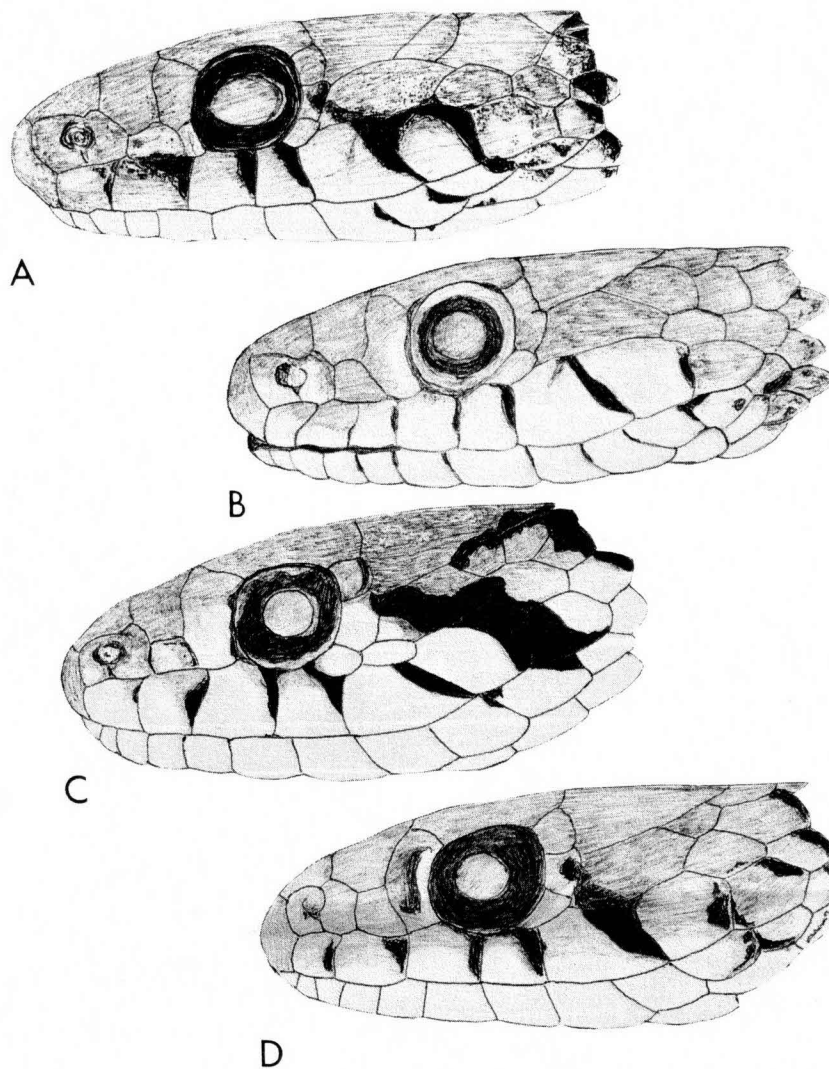


Figure 2. Variation in supralabial pattern of three subspecies of *Thamnophis cyrtopsis* (A, *T. c. postremus*, UMMZ 119403; B, *T. c. collaris*, AMNH 114854, specimen from Chiapas; C, *T. c. pulchrilatus*, UMMZ 101910) and *Thamnophis vicinus* (D, FMNH 100098, holotype).

Table 1. Variation in number of ventral and subcaudal scales in three subspecies of *Thamnophis cyrtopsis* and *Thamnophis vicinus*. Data for *T. c. collaris* and *T. c. pulchrilatus* from Webb (1966).

Sample	Ventals			Subcaudals		
	N	Range	Mean	N	Range	Mean
<i>T. c. postremus</i>						
males	28	142-151	146.1	22	65-80	74.5
females	29	136-142	139.7	18	67-75	71.8
<i>T. c. collaris</i>						
males	38	151-168	160.2	28	77-109	97.5
females	65	147-169	155.6	39	76-103	88.7
<i>T. c. pulchrilatus</i>						
males	15	160-176	166.4	13	76-94	82.5
females	12	153-172	164.5	10	68-86	76.1
<i>T. vicinus</i>						
males	7	155-169	160.4	5	85-90	87.0
females	4	149-156	151.3	4	79-82	80.5

Remarks: *Thamnophis cyrtopsis postremus* is a well-defined subspecies . . . if it is conspecific with *T. cyrtopsis*. There is no evidence of intergradation between *T. c. postremus* and *T. c. collaris*, the other lowland subspecies in Michoacan; the smallest geographical gap separating individuals of each subspecies is about 15 kilometers (Charapendo-Uruapan). Future workers might investigate possible affinities with *Thamnophis marcianus*. Impressive is the resemblance of *T. c. postremus* to different populations of *T. marcianus* from southern Mexico and Central America (Rossman, 1971) in some features — distinct checkerboard pattern of dark blotches the length of body, indistinct vertebral stripe confined to vertebral row, small dark spots aligned in rows on lateral edges of ventral scales, low ventral and subcaudal counts, maximum of 19 dorsal scale rows, seven or eight supralabials (Rossman fails to mention number of supralabials, which presumably is most frequently eight, but is occasionally seven), and 27 maxillary teeth. The indistinct vertebral stripe, dark belly spots, and low ventral and subcaudal counts of *T. c. postremus* are not matched in other subspecies of *T. cyrtopsis*. And the characteristic pale-dark "marcianus" head pattern is not well-defined in some specimens of *T. marcianus* (USNM 108598-99, Chiapas).

Thamnophis cyrtopsis collaris (Jan)

Thamnophis c. collaris has a ventrolateral pattern similar to that of *T. c. postremus* and also occurs in lowland tropical habitats, but it is otherwise distinctive. *Thamnophis c. collaris* differs from *T. c. postremus* in usually having dark-brown to red-brown or blackish dorsolateral areas with relatively large but indistinct black blotches (when scales unsloughed), and especially in having a distinct, narrow vertebral stripe extending the length of the body and tail. The upper rows of large black blotches in the dorsolateral areas often encroach on the vertebral stripe. The dorsolateral blotches (and white flecks) are more distinct when scales are spread. The dorsal pattern is depicted in Figure 1. *Thamnophis c. collaris* resembles *T. c. postremus* in having the first three scale rows pale and unicolor with scattered black specks. In *T. c. collaris* however, relatively large dark marks are usually arranged in longitudinal rows along the lower parts of scales of the first dorsal row and parts of the adjacent ventral scales; often the ground color between these regularly spaced dark marks is pale brown thus suggesting the appearance of stripes. This ventrolateral pattern (rows of dark marks) is depicted in specimens of *T. c. collaris* photographed by Webb (1966:61, Fig. 3). The supralabial suture pattern of *T. c. collaris* consists mostly of narrow lines (lacking the characteristic comma-shaped mark of *T. c. postremus*) and is reduced when compared to that of *T. c. postremus* (Fig. 2). *Thamnophis c. collaris* usually lacks black marks on infralabial sutures (except posteriormost), whereas *T. c. postremus* usually has more than one black infralabial suture mark.

All nine Michoacan specimens of *T. c. collaris* have the combination of 8-8 supralabials; the supralabials of specimens from throughout the range

of *T. c. collaris* are usually eight (94.3%, Webb, 1966:61), instead of seven (60%) or eight (37%) in *T. c. postremus*. Ventrals in five males average 155.0 (153-159), and in four females 151.0 (148-154). Subcaudals in three males average 97.0 (93-104), and in four females 91.0 (88-93). These meager data for Michoacan specimens do not differ appreciably from data obtained for specimens from throughout the range of *T. c. collaris*, which are employed herein for comparative purposes (Table 1). There are many more ventrals and subcaudals in *T. c. collaris* than in *T. c. postremus*.

Michoacan specimens examined (9): 8 km WNW Cheran on Mex. Hwy 37 (MCZ 131014); about 7 mi W Jacona on Mex. Hwy 15 (LACM 65252); Uruapan, Parque Nacional (UMMZ 112541); 3 mi W Tangamandapio (UMMZ 119409-10); near Coalcoman, Cerro de los Havillos (UMMZ 104699); Morelia (UI 23414); Tacicuaró (USNM 110783); Los Reyes (USNM 46463).

Thamnophis cyrtopsis collaris occurs in lowland habitats, exclusive of the Tepalcatepec Valley, but extends to relatively high elevations in grassland areas fringing the pine-oak forest, which is occupied by *Thamnophis c. pulchrilatus*. None of the Michoacan specimens indicates intergradation between *T. c. collaris* and *T. c. pulchrilatus*. See account of *Thamnophis vicinus* (below).

Thamnophis cyrtopsis pulchrilatus (Cope)

Thamnophis c. pulchrilatus is easily distinguished from both *T. c. postremus* and *T. c. collaris* in having a well-defined ventrolateral dark stripe, mostly on the first dorsal scale row; this stripe usually includes regularly spaced black spots or paired spots (when scales sloughed, stripe dim or absent with only spots prominent). A distinct pale lateral stripe involves the second and third scale rows. The dorsolateral areas are either dark brown with black blotches, or are black; often the pale keels on most dorsolateral scales tend to form thin longitudinal lines. The vertebral stripe, confined to the vertebral row, is distinct for the length of body and tail. The supralabial suture pattern of *T. c. pulchrilatus* differs from both *T. c. postremus* and *T. c. collaris* in having a characteristic black barlike mark between the last two supralabials that often extends dorsad and blackens most of the anterior temporal (Fig. 2). The body pattern of *T. c. pulchrilatus* was illustrated by Duellman (1961:115, Fig. 10B). Photographs of *T. c. pulchrilatus* were figured by Webb (1966:64, Fig. 5).

All 15 Michoacan specimens have a combination of 7-7 supralabials. Considering specimens from throughout the range of the subspecies, the number of supralabials is most always seven (95.4%, Webb, 1966:65). Ventrals in seven males average 161.3 (157-171) and in five females 160.4 (157-164). Subcaudals in six males average 81.5 (77-85) and in four females 71.8 (70-75). These data for Michoacan specimens do not differ appreciably from those obtained for specimens from throughout the range of *T. c. pulchrilatus*, which are used herein for comparative purposes (Table 1.)

Michoacan specimens examined (15): about 5 mi S Paracho (LACM 65253); 15 km W Morelia at turnoff to Tacicuaro (UMMZ 104370); 7 mi SSE Opopeo (UMMZ 101910); Tzintzuntzan (UMMZ 104683); 17 mi W Jiquilpan (AMNH 87570); "where road to Chinapa branches" (UI 23420-21); Tacicuaro (UI 23418-19, USNM 110777-81); Morelia (FMNH 112460).

Thamnophis c. pulchrilatus is restricted to highland pine-oak and fir forests in the Cordillera Volcanica (Duellman, 1965).

Comment on *Thamnophis vicinus* Smith

Knowledge of variation in the three subspecies of *Thamnophis cyrtopsis* in Michoacan prompts further consideration of the status of *Thamnophis vicinus* Smith. This taxon is currently considered to be a phenotypic variant of *T. cyrtopsis* (see historical discussion by Duellman, 1961). Based on the examination of only one paratype of *T. vicinus* (UI 23435), I tentatively considered *T. vicinus* to be a synonym of *T. cyrtopsis collaris* (Webb, 1966).

Smith (1942:104) described *Thamnophis vicinus* on the basis of ten specimens. I have examined nine of these as follows: Holotype - FMNH 100098 (formerly E. H. Taylor - H. M. Smith Coll. 21539), collected by E. H. Taylor in August, 1939, from "near Temaxcal, Michoacan, about 20 kilometers east of Morelia"; Duellman (1961:140) noted the place-name as El Temazcal. Paratypes - UI 23435 (formerly EHT-HMS 15897) from Morelia (Smith, Langebartel and Williams, 1964); MCZ 56019 (formerly EHT-HMS 15895 and UI 23434) and FMNH 126499-504 (formerly EHT-HMS 15994, 15896, 15992, 15894, 15893, 15995, respectively), from Morelia. I cannot locate the other paratype (EHT-HMS 15993) from Morelia listed by Smith (1942:105). One other specimen herein referred to *T. vicinus* (mentioned by Duellman, 1961:115) is UMMZ 102510 from Pino Gordo. Thus, there are 11 specimens available from three different localities.

Smith provided detailed comments on *Thamnophis vicinus* in the original description, and he tabulated scutellation data for each specimen; his data for EHT-HMS 15993 (not examined by me) is included with the other 11 specimens examined for a total of 12 (Table 1).

The supralabial count for the holotype is 7-8, whereas all other specimens have a combination of 8-8. Ventrals in seven males average 160.4 (155-169), and in four females 151.3 (149-156). Subcaudals in five males average 87.0 (85-90), and in four females 80.5 (79-82). The variation in ventrals and subcaudals is compared with that in the three subspecies of *Thamnophis cyrtopsis* in Table 1.

There is a broad black nuchal collar. The top of the head is brown (unsloughed scales). Anteriorly the dorsolateral areas have large black blotches that may extend laterally as far as the edges of the ventral scales and that alternate and fuse irregularly with a vertebral series of black

blotches. The vertebral series of blotches represent the upper, paravertebral series of dorsolateral blotches on either side that are fused middorsally. Blotches may be fused to form crossbands that extend to the edges of the ventral scales. Posteriorly the dorsolateral series of blotches become smaller and do not extend laterally past the second dorsal scale row, and there is a series of smaller black spots along the juncture of the scales of the first dorsal row and edges of the ventrals (black spotting may occur on scales of second row); the first two or three dorsal scale rows are otherwise pale. There is no pale lateral stripe or vertebral stripe. Except for MCZ 56019, the black supralabial suture pattern is well developed, with the suture mark between the sixth and seventh supralabials enlarged and often comma- or thorn-shaped (Fig. 2); only the posteriormost infralabial suture is blackened. The ventral surfaces are devoid of black markings. All specimens generally agree in these features of pattern, although some specimens are dark and discolored. The UMMZ specimen bears an attached glass vial containing a maxilla with 27 teeth; the holotype has 26 maxillary teeth (Smith, 1942:105). Photographs of *Thamnophis vicinus* are presented in Figure 3.

Records of occurrence for *Thamnophis vicinus* are in highland areas of pine and pine-oak forest with the lowest elevation recorded for Morelia (1900 m or 6080 ft) by Duellman (1961). Most specimens of *T. vicinus* are from Morelia, which Duellman (1961:137) characterizes as having mesquite grassland on flats (frequented by *T. c. collaris*) and pine-oak forest on the surrounding hills (characteristic of *T. c. pulchrilatus*). Most specimens of *T. vicinus* are thus from a general area of close geographic contact between *T. c. collaris* and *T. c. pulchrilatus*, and it might be speculated that specimens of *T. vicinus* represent intergrades between those two subspecies. However, features of *T. c. pulchrilatus* are not readily evident, and the specimens of *T. vicinus* do not resemble intergrades between the two subspecies known elsewhere in Mexico (Webb, 1966). Specimens of *T. c. collaris* and *T. c. pulchrilatus* are recorded from both Morelia (one specimen of each) and Tacicuaró (seven of *pulchrilatus*, one of *collaris*), although more precise data of collection might provide microgeographic separation of the two subspecies. The geographic relationships suggest that *T. vicinus* is interacting in some way with *T. c. collaris* and *T. c. pulchrilatus* to cause them to behave as distinct species.

Six Michoacan specimens have unusual pattern features that seem to combine those of *T. c. collaris* and *T. vicinus*. Two specimens are from Tancitaro, elevation 1850 m (5920 ft); data accompanying both specimens indicate an elevation of 5000 ft. One of these (FMNH 39060), a male with 159 ventrals and incomplete tail, closely resembles *T. vicinus* in dorsal pattern, except for the absence of dark crossbands and an indistinct pale vertebral line in the middle segment of the body. The other Tancitaro specimen (FMNH 39061), a large female with 155 ventrals and 80 subcaudals, is most like *T. c. collaris* except for an ill-defined vertebral stripe (but most body scales sloughed off). Three from Dos Aguas (UMMZ

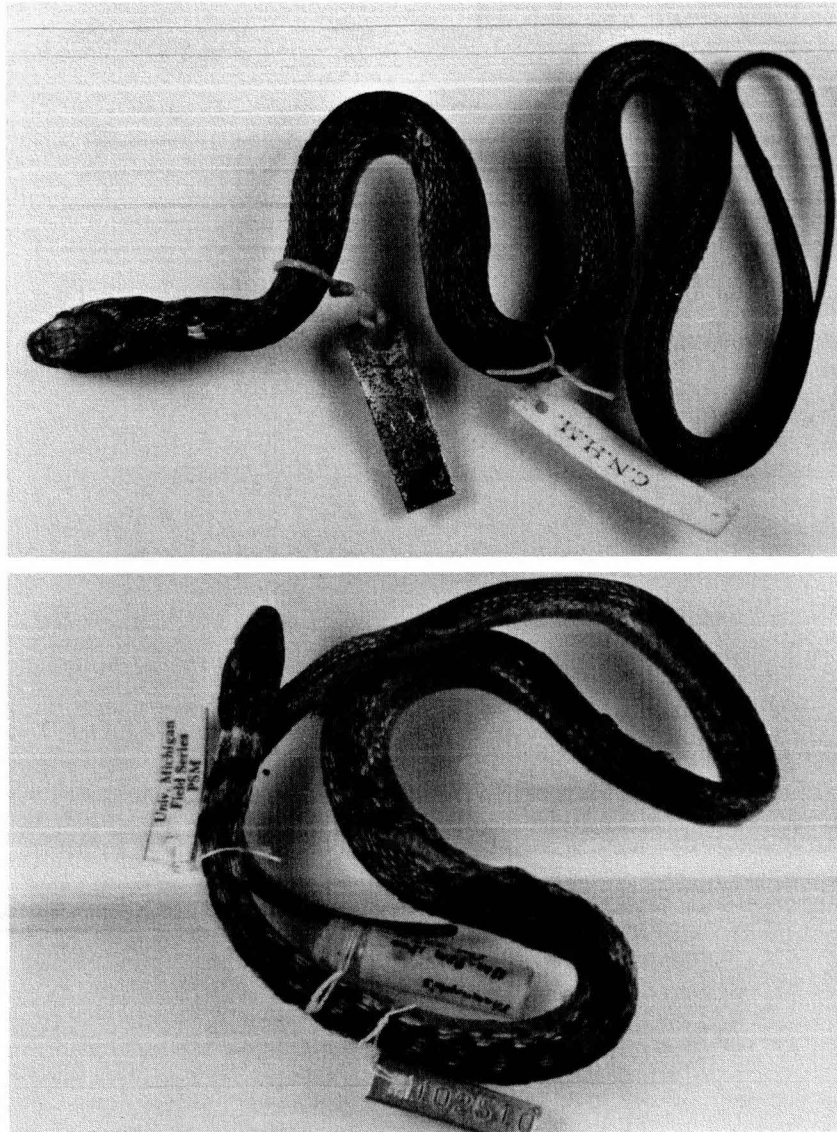


Figure 3. *Thamnophis vicinus* showing characteristic stripeless pattern of dark blotches-bands anteriorly, and reduced, mostly uniform pattern posteriorly. Top, holotype, FMNH 100098, from near Temazcal, about 20 kilometers east Morelia, Michoacan. Bottom, UMMZ 102510 from Pino Gordo, Michoacan.

119411-12, 121546), elevation 2100 m (6720 ft), have dark dorsolateral areas with large black blotches (*collaris*), but the vertebral stripe is scarcely evident and some of the black blotches in the uppermost rows are fused middorsally (*vicinus*). One (UMMZ 119412) is unusual in having extensive black markings on most ventral scales. The supralabial pattern is most like *T. vicinus* in UMMZ 119412 and 121546, but resembles *T. c. collaris* in UMMZ 119411. The three Dos Aguas specimens are females with 148, 155, and 156 ventrals, and 74, 77, and 80 subcaudals. Another female (UMMZ 112537) from nearby Rancho Barolosa, elevation 2320 m (7424 ft), with 156 ventrals and incomplete tail, resembles *T. c. collaris* in supralabial and body pattern, except that the vertebral stripe is indistinct, mostly absent posteriorly, and some of the uppermost black spots on either side are fused to form vertebral blotches (*vicinus*). The dorsal pattern of four specimens (UMMZ 119411-12, 121546; FMNH 39060) especially suggests "intergrades" or "hybrids" between *T. vicinus* and *T. c. collaris*.

Thamnophis vicinus seems to be most closely related to *T. cyrtopsis collaris*. The anterior body pattern of *T. vicinus* is unique. The black supralabial suture pattern is most comparable to that of *T. c. postremus*, but the general lack of black infralabial markings is similar to *T. c. collaris* (see comparison in Fig. 2). The range of variation in number of ventral and subcaudal scales of *T. vicinus* is encompassed by that of *T. c. collaris* (Table 1). The taxonomic status of *T. vicinus* remains uncertain. If it is a pattern phase of *T. cyrtopsis collaris* it seems strange that the phase does not occur elsewhere in the range of the subspecies. The *vicinus-collaris* problem, which involves specimens with intermediate patterns, is different from the pattern dimorphism of *Thamnophis sumichrasti* (Rossman, 1966) in which specimens with patterns intermediate between the markedly different "*sumichrasti*" and "*phenax*" pattern phases are lacking. Pending data from an examination of broods or further morphological and geographical evidence, the taxon *vicinus* is tentatively recognized as a distinct species.

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