

A photograph of an American Milk Snake (Lampropeltis triangulum) resting on a light-colored, textured rock surface. The snake's body is coiled, showing its characteristic pattern of dark brown, black, and yellowish-green bands. The scales are highly detailed and glossy. The background is a close-up of the rock, with some shadows and highlights. The text is overlaid on the upper portion of the image.

Systematics and Natural History
of the American Milk Snake,
Lampropeltis triangulum

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scales on the otherwise white snout.

The Tres Marías Islands population tends to be different in several aspects of pattern. These differences, however, are not of the same magnitude as those used to separate other subspecies. The difference in ventral number is statistically significant ($P < 0.05$); however, as pointed out previously, this character should not be utilized as a diagnostic characteristic in island populations. I have, therefore, placed the name *L. t. schmidti* in the synonymy of *L. t. nelsoni*.

I have given the reasons for separating the populations to the northwest (Nayarit, Sinaloa and Sonora) from *L. t. nelsoni* under the subspecies account of *L. t. sinaloae*.

L. t. nelsoni integrates with *L. t. arcifera* in northern and central Jalisco, in northeastern Colima, and in western and northeastern Michoacán. These specimens are discussed under the subspecies account of *arcifera*.

Natural history

Collecting dates available for April through August. The only information on activity is that some specimens were collected dead on the road at night. There is no information on food habits.

Tryon and Hulsey (1976) reported on four clutches of eggs for captive specimens as follows: dates of laying July 6, 19, 21, 23; numbers of eggs 3-5; hatching September 5-6, 15-16, 18, 20; egg diameter 15-20 mm; egg weight 7.3-14.9 g; neonate total length 261-296 mm; neonate weight 8.7-11.6 g. Kardon (1979) presented the following data for a captive female, 4 eggs ranging in length from 56 to 57 mm; hatchlings ranged in total length from 260 to 270 mm ($\bar{X}=264$); weight ranged from 8 to 10 g ($\bar{X}=8.5$). Tryon and Murphy (1982) gave data for two captive females as follows: laying dates 18 June, 8 July; clutch size 6, 6; egg size (1 clutch), 42-46 mm ($\bar{X}=44$) x ($\bar{X}=19$ mm); egg weight 10.1-11.7 g ($\bar{X}=10.4$). Five eggs hatched on 31 August to 2 September. Five neonates had total lengths ranging from 265 to 276 ($\bar{X}=271$) and weights of 7.7 to 8.9 g ($\bar{X}=8.2$). They also reported multiple clutch production of 7 eggs on 29 June and 4 eggs on 10 September.

This subspecies is found on the Tres Marías Islands (recorded with certainty only from María Madre Island), which receive about 25 inches of rainfall annually, but are covered by Tropical Deciduous Forest (Zweifel, 1960). The adjacent coastal area of Jalisco and Colima receives approximately 12 to 15 inches of precipitation annually, decreasing in amount to the east (Vivo, 1964). Mainland *L. t. nelsoni* inhabit the north-western portion of Sierra Madre del Sur and the lower elevations of the western edge of the Mesa Central (West, 1964b). There is no information available on the microhabitat.

Bowler (1975) listed a captive specimen that survived over 13 years.

Specimens examined (23)

MEXICO. State unknown, "Mexican plateau," USNM 30504-5. Colima: "Colima," USNM 31492-3; 4 mi. WNW Bahía de Santiago, USL 12398; 5.7 mi. N jct. Rts. 80-200, LSUMZ 7887; just north Manzanillo (Rt. 200), USL 12386; 5 mi. NE Manzanillo, SAM 1114; 15 mi. N. Manzanillo, BYU 23941. Guanajuato: "Guanajuato," USNM 12680; Acámbaro, USNM 46552 (holotype). Jalisco: Guadalajara, USNM 24967-8; 10 km. N La Huerta (Rt. 80), USL 12344; 4.2 mi. NW Magdalena, TNHC 25443; Hacienda de Santa María, near Magdalena, AMNH 19702; Tenacatita Bay, UMMZ 84257. Michoacán: Sierra Madre, Río Nexpa, USNM 31491; Tres Marías Islands (Nayarit): "Tres Marías," BM 81.10.1.98, UMMZ 79510; María Madre Island, AMNH 78661, 78674, USNM 24684.

L. triangulum nelsoni x *L. t. sinaloae*.

Literature record.

MEXICO. Jalisco: 135 km. SW Zacatcas (8 km. NW Rio Chico at Mezquitic) (Mitchell, 1980).

Lampropeltis triangulum arcifera Werner Figures 45-46

Lampropeltis micropholis arcifera Werner, 1903:250.

Lampropeltis polyzona: Blanchard, 1921:139-48 (part).

Lampropeltis triangulum arcifera: H. M. Smith, 1942:198-9 (part).

Holotype

Institut Royal des Sciences Naturelles de Belgique 9.422, an adult female from "México." I consider the restriction to Necaxa, Puebla, by Smith and Taylor (1950) to be incorrect.

Definition

Snout is black, or has small amount of white flecks on nasals and loreals; head is black posteriorly; first black ring usually touches angle of the jaw, or is less than one scale long posteriorly, complete in a broad straight line across throat; red and white scales are not black tipped; red body rings number from 17 to 31, mean 21.0. Temporals are usually 2+3; dorsal scales are usually in 21 rows at midbody.

Range

In general *L. t. arcifera* inhabits the Mesa Central of México excluding the eastern portion. More precisely *arcifera* occurs in extreme northern Guerrero, in central Michoacán (in the Lake Pátzcuaro area), and in south-central Jalisco (east, north, and northeast of Lake Chapala).

Description of the holotype

Supralabials 7, third and fourth entering orbit; infralabials 9, first four touching anterior chin shields; fourth and fifth touching posterior chin shields; chin shields about equal in size, posterior shields separated at posterior end by small scales; loreal 1, slightly longer than wide; preocular 1; postoculars 2; temporals 2+3; scale reduction pattern

$$23 \frac{5+6 (12)}{5+6 (11)} 21 \frac{4+5 (141)}{4+5 (137)} 19 (204);$$

ventrals 204; tail incomplete. Total length 890 + mm, tail incomplete (113 + mm).

Head black to posterior edge of parietals, anterior edge of posterior temporals, and anterior edge of sixth supralabial, except for few white spots on internasals and narrow white border on ventral edge of supralabials; mental and first five infralabials black with few white marks; anterior chin shield borders dark; upper edge of sixth infralabial black; first white ring including tip of parietals and one scale row on body middorsally; first black ring five scales long middorsally, extending anteriorly across angle of jaw and gular scales; first black ring about three gular scale long midventrally; black pigment interrupting the red rings middorsally, except for the first and several posterior rings; all body rings complete across the venter, except on posterior one-fourth body where black pigment interrupts white rings; red body rings 20; red rings completely obscured by black pigment on tail; red scales not black tipped; white scales with scattered dark pigment.

Variation

Meristic and mensural data for this subspecies may be summarized as follows: supralabials 7-8 (7 in 88.8%);

infralabials 9; preocular 1; postoculars 2; loreal 1; temporals 2+3 (95.0%), 1+2 (4.2%); dorsal body scales predominantly 21-21-19; ventrals in males range from 192 to 217, mean 203.7 (6), in females from 201-214, mean 207.7 (6); subcaudals in males range from 43 to 54, mean 47.9 (3), in females from 42 to 52, mean 47.0 (4); total length in males ranges from 286 to 823 mm, in females from 740 to 890 mm; tail length/total length ratio in males ranges from 0.137 to 0.163, mean 0.152 (4), in females from 0.139 to 0.144, mean 0.142 (4).

The head is usually entirely black. A specimen (LACM 37307) from Jalisco has several small white spots on the frontal and prefrontals. One individual (UMMZ 121508) has a narrow white line on the prefrontals. The chin and throat have black pigment on infralabials three to five and on the medial margins of the chin shields; variations consist of having black infralabials one to six (Figure 48), or larger amounts of black pigment on the chin shields, or a reduction of black pigment on the chin shields (Figure 50).

First white ring occurs on the posterior one-fifth to one-fourth parietals and extends one scale length onto body. White body rings are usually one scale long; in one specimen (UIMNH 17782) the white rings are two scales long. The white rings are complete around the body.

The first black ring begins one scale length behind the parietals, and extends posteriorly two to five (usually four) scale lengths middorsally. The black body rings are usually expanded middorsally, often completely interrupting the red rings, and range from two to five scales (usually three) in length. The white scales are not black tipped, but they may contain many small black flecks, especially on the lateral scales.

The first red ring ranges from four to eight scales in length, mean 6.9 (4). It is not interrupted by black pigment middorsally. The red scales are not black tipped. Red body rings number from 17 to 31, mean 21.0 (7). The red rings are usually interrupted ventrally by black pigment. One specimen (IRSNB 9.422) has the red rings complete across the venter.

Discussion

L. t. arcifera was revived by (H. M. Smith, 1942) as a subspecies characterized mainly by black pigment interrupting the red rings middorsally. He indicated that this race ranges "... from Morelos and eastern Michoacán eastward to the edge of the plateau in Veracruz, and probably southward toward (not to) Tehuantepec." He also noted that specimens from the eastern edge of the range have black tips on the red scales, whereas those to the west lack black tips.

Although agreeing with Smith on the validity of recognizing *L. t. arcifera*, I feel he may have

placed too much taxonomic stress on black pigment interrupting the red rings middorsally. It is indeed characteristic of most *arcifera*, but also occurs occasionally in other populations.

The specimens from eastern México with black tips on their red scales, which Smith (1942) referred to *arcifera* do not belong in this subspecies. These specimens are either *L. t. smithi* or represent *L. t. smithi* x *L. t. polyzona* intergrades.

The diagnostic characteristics considered, which I consider important in *L. t. arcifera* as herein delimited, are as follows: black head; black pigment usually interrupting red rings middorsally and ventrally; red and white scales not black tipped; and a low number of ventrals and subcaudals.

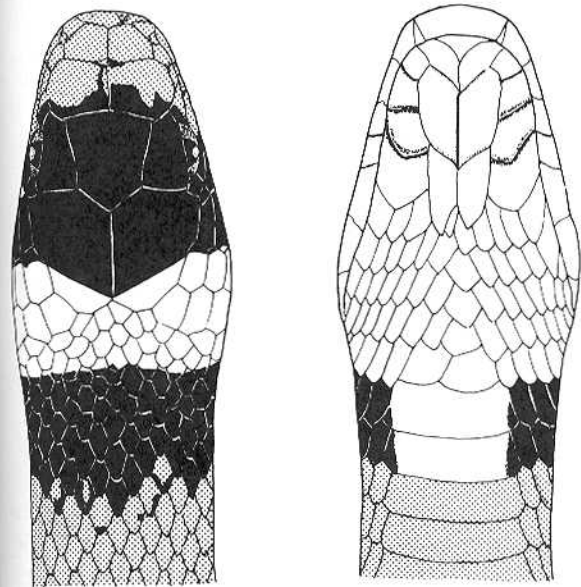
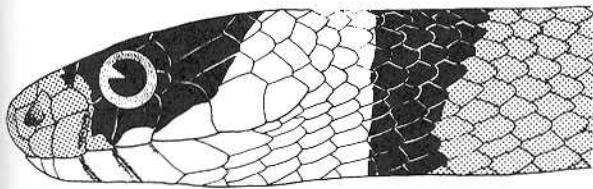


Figure 43. Head pattern of *Lampropeltis triangulum nelsoni* (BM 1946. 14. 31) from the Tres Mariás Islands, México.

The confusion concerning identification of milk snakes from the Jalisco-Michoacán area is apparent from several reports (Duellman, 1961; Zweifel, 1960; Fouquette and Rossmann, 1963). The difficulty has at times involved *L. t. schmidtii* (Tres Mariás, see discussion under *L. t. nelsoni* account), *L. t. nelsoni*, *L. t. arcifera*, and *L. t. blanchardi*, (*L. t. conanti* in this study). Williams (1978) considered *L. ruthveni* a synonym of this subspecies. Garstka (1982) provided data supporting the recognition of *L. ruthveni* as a separate species.

I consider three specimens (UMMZ 104694-5; female and male, respectively, and a female (KU 68921) from Coalcomán, Michoacán, two of which were reported as *L. t. blanchardi* by Peters (1954) to be intermediate between *L. t.*

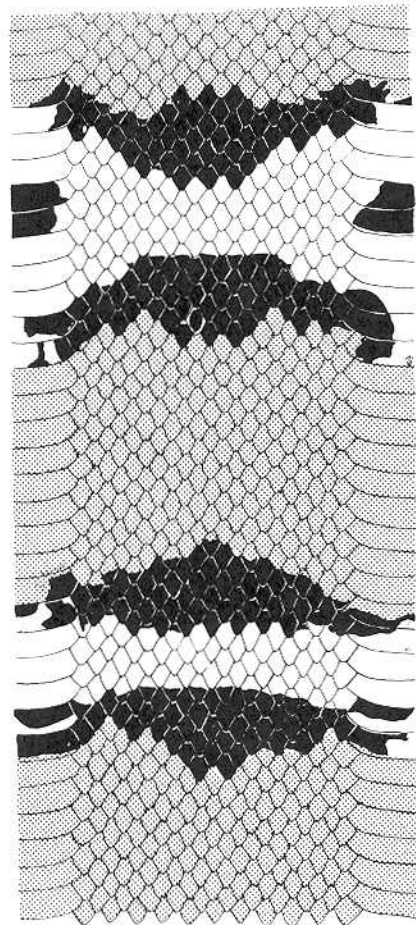


Figure 44. Pattern at midbody of *Lampropeltis triangulum nelsoni* (BM 1946. 14. 31) from the Tres Mariás Islands, México.

nelsoni and *L. t. arcifera* (Table 22). The red body rings number 27, 24, and 24, respectively; the red rings, although narrow, are complete around the body. The three specimens, however, have white snouts, and 219, 212, and 208 ventrals, respectively, both features typical of *nelsoni*.

A male from 5 miles east of Quiroga, Michoacán, has a white snout, 24 red body rings, the red rings complete around the body, and 197 ventrals (Table 21). Six specimens from eastern Colima are also intermediate in several characteristics or in a combination of characteristics (Table 21).

In Jalisco, two males (KU 80753, LACM 38524) from south of Lake Chapala have white snouts, 22 and 24 red body rings, 212 and 205 ventrals, respectively. One specimen (LACM 38524) has the black pigment interrupting or tending to cross the red rings middorsally (Table 21).

A male (BYU 13181) from one mile southeast of the Nayarit-Jalisco line (Route 15), Jalisco, has a black head, black pigment interrupting the red rings both middorsally and ventrally, 16 red body rings, and 213 ventrals. Respective data for three specimens (AMNH 19647, 19649, 19701) from the west-central portion of the northern extension of Jalisco (between Nayarit and Aguascalientes) are as follows: female, male, male; total length (mm) 897, 305, 305; ventrals 215, 211, 218; subcaudals 51, 54, 55; black snout, white snout with considerable black flecking, black snout with white flecks laterally; black not crossing red rings middorsally in first two specimens, tending to cross red rings in latter; red body rings 18, 17, 19.

A male (AMNH 87595) from four miles east of Ixtlán del Río, in southeastern Nayarit, has a black head, black pigment crossing the red rings middorsally, 19 red body rings, and 208 ventrals (Table 22).

Specimens of *L. t. arcifera* from Michoacán and Jalisco show some tendencies not found in the few specimens (six) available from other areas. There are more red body rings [19 to 31, mean 22.5(6)] in *arcifera* from Michoacán-Jalisco, than in other *arcifera* [14 to 21, mean 19.0 (5)]. There is also a tendency in *arcifera* from

Michoacán-Jalisco to have the red rings complete around the body rather than interrupted by black pigment.

Natural history

Collecting dates are available for June through August (data from collecting tags). No information is available on daily activity. Peters (1954) reported a specimen from Coalcomán; Michoacán (*L. t. arcifera* x *L. t. nelsoni* intergrade), which had six juvenile mice (*Reithrodontomys*) in its stomach.

Considerable breeding data has become available for captive specimens due to the efforts of Tryon and Murphy, 1982. Their data is summarized as follows: copulation dates, 17 March and 21 April; clutch size, 4-8; dates of hatching 5 July to 1 August; egg length 35 to 64 mm, diameter, 18-21 mm; juvenile length, snout-vent, 174-233 mm, tail, 23-45 mm; juvenile weight, 5.4-8.7 g. The reader should refer to this excellent paper for additional details.

L. t. arcifera inhabits the Mesa Central of México, except for the eastern one-fourth of that physiographic region (West, 1964a). This is the semiarid region often referred to as the Mexican Plateau. Oliver (1937) also referred to eastern Colima (area of *L. t. arcifera* x *L. t. nelsoni* intergradation) as being semiarid. Duellman (1965a) reported *L. triangulum* in Michoacán as moderately abundant in "arid tropical scrub forest," and rare in "mesquite-grassland," and "pine-oak."

Elevations at which *arcifera* occurs probably range from 1500 to nearly 2500 meters (data partly from Duellman, 1965). Tryon and Murphy (1982) indicate *arcifera* occurs between 2075 and 2317m.

A specimen (TCWC 7435) from northern Guerrero was collected in an arid region at an elevation of 5500 feet (data from TCWC card catalogue).

Specimens examined (8)

MÉXICO: State unknown, "México," IRSNB 9.422 (holotype). Guerrero: 17 km. S Taxco, TCWC 7435. Jalisco: Buena Vista, 40-50 mi. S Istlahuacán, UIMNH 47936; Hacienda de Capulinos, Jamay, AMNH 19650; west of west end of Lake Chapala, AMNH 71364; 6.5 mi. E Tapalpa,

LACM 37307. Michoacán: 15 km. W Morelia, UIMNH 17782; Uruapan, Parque Nacional, UMMZ 121508.

Literature records

MEXICO. Jalisco: Rancho San Francisco (Tryon and Murphy, 1982).

L. t. arcifera x *L. t. nelsoni*. Specimens examined (17)

MEXICO. Colima: near Buena Vista, UMMZ 80212; Colima, MCZ 27105; 0.25 km. N Colima, UMMZ 80213; 2 mi E Colima, AMNH 85753; 9 mi. E Colima, UMMZ 120224; 15.7 mi. NW Colima, UIMNH 68736. Jalisco: near Cerro la Bosca, road to La Yesca (in Nayrit), AMNH 19647; 1 mi. NE Contla, KU 80753; Hostotipaquillo near Las Víboras Mine, AMNH 19701; road from Hostotipaquillo to Cinco Minas, AMNH 19649; 1 mi. SE Nayarit-Jalisco line (Rt. 15), BYU 13181; south shore Lake Chapala, LACM 38524. Michoacán: Coalcomán, UMMZ 104695; 1.5 mi. S Coalcomán, airfield, KU 68921; 2 mi. NE Coalcomán, UMMZ 104694; 5 mi. E Quiroga, AMNH 82021. Nayarit: 4 mi. E Ixtlán del Río, AMNH 87595.

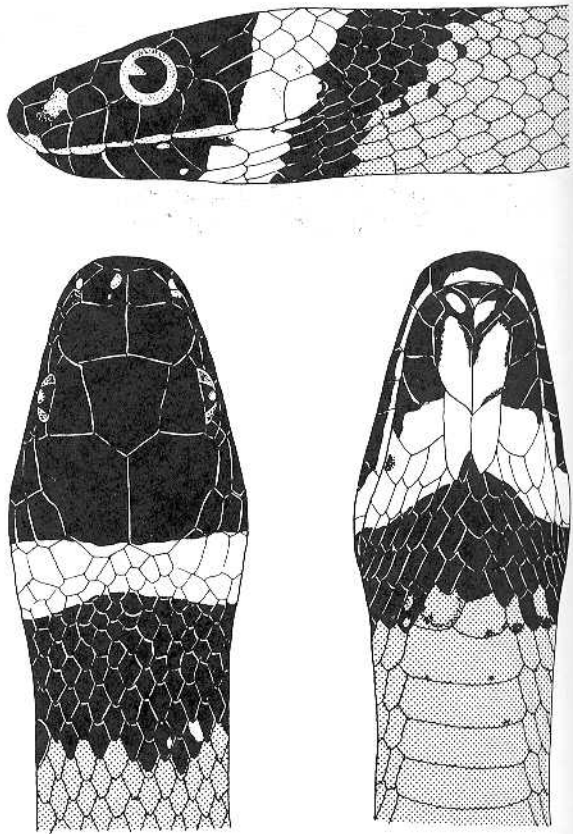


Figure 45. Head pattern of the holotype of *Lampropeltis triangulum arcifera* (IRSNB 9.422) from "México."

Table 22. Variation of ventrals, subcaudals, and red rings in *Lampropeltis triangulum sinaloae*, *L. t. nelsoni*, *L. t. arcifera*, *L. t. dixoni*, and *L. t. arcifera* x *L. t. nelsoni* intergrades.

Population	Ventrals		Subcaudals		No. of Red Body Rings	First Red Rings ¹	Other Red Body Rings ¹
	M	F	M	F			
<i>sinaloae</i>	216.1 (80)	215.6 (29)	52.7 (70)	48.9 (30)	13.1 (13)	18.3 (65)	10.4 (71)
<i>nelsoni</i>	215.9 (15)	213.4 (8)	51.3 (14)	46.6 (8)	16.0 (23)	11.8 (18)	5.9 (17)
Jalisco ²	211.2 (6)	215 (1)	51.4 (6)	51 (1)	19.3 (7)	8.2 (5)	3.7 (6)
Colima ²	210.0 (3)	214.7 (3)	49.0 (5)	46.5 (2)	19.8 (6)	7.0 (4)	3.3 (4)
Coalcomán ²	212 (1)	213.5 (2)	54 (1)	50.0 (2)	25.0 (3)	7.3 (3)	2.8 (3)
Quiroga ²	—	197 (1)	—	51 (1)	24 (1)	6 (1)	3 (1)
<i>arcifera</i>	206.3 (3)	207.7 (4)	53.0 (2)	48.0 (2)	20.0 (7)	6.9 (4)	0-3 ³
<i>dixoni</i>	196.8 (4)	197.0 (2)	47.8 (4)	49 (1)	22.5 (6)	1.6 (6)	0-2 ³

¹ Length of red rings given in number of scale lengths.

² See Specimens examined section under *L. t. arcifera* x *L. t. nelsoni* for list of specific localities. The Jalisco group contains a single specimen from southern Nayarit. Coalcomán and Quiroga are in the state of Michoacán.

³ Range, mean not available, many interrupted by black middorsally



Lampropeltis triangulum arcifera. Jalisco, Mexico.
Photo by John H. Tashjian.