

A New Long-Nosed Snake (*Rhinocheilus lecontei*) from Isla Cerralvo, Baja California Sur, México

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ABSTRACT.—A population of *Rhinocheilus lecontei* from Isla Cerralvo, Baja California Sur, México (previously included in *R. l. lecontei*), is described here as a new subspecies based partly on its possession of uniquely shaped loreal and temporal scales, shallow dorsal body blotches, and large size. It is most closely related to *R. l. antonii* of northwestern México and probably arrived on Isla Cerralvo as the result of a relatively recent overwater dispersal.

RESUMEN.—Una población de *Rhinocheilus lecontei* de Isla Cerralvo, Baja California del Sur, México anteriormente reconocido como *R. l. lecontei*, se describe aquí como una subespecie nueva, *R. l. etheridgei*, en honor de Richard E. Etheridge. *Rhinocheilus l. etheridgei* está más relacionada a *R. l. antonii* de noroeste México costero y probablemente llegó a Isla Cerralvo via un dispersulo reciente a través el Golfo de California.

INTRODUCTION

The long-nosed snake, *Rhinocheilus lecontei*, currently consists of three subspecies: *R. l. antonii*, which ranges from southern Nayarit to northern Sonora, México, west of the Sierra Madre Occidental; *R. l. tessellatus*, ranging from southern San Luis Potosí in central México north to southwestern Kansas; and *R. l. lecontei*, ranging from eastern Arizona and western Utah to coastal California and south to northern Sonora and northern Baja California, México. In Baja California Norte (BCN), *R. l. lecontei* has been reported as far south as Misión San Borja, approximately 500 km south of the international border. It is also known from a disjunct population on Isla Cerralvo, Baja California Sur (BCS) (Medica 1975). The presence of *R. l. lecontei* on the Baja California peninsula presumably led Soulé and Sloan (1966) to consider the Isla Cerralvo population (known at the time from a single specimen) as *R. l. lecontei*, although it occurs 800 km south of the nearest known peninsular locality.

The genus *Rhinocheilus* is notably constant in scalation and variable in color pattern (Klauber, 1941). It is peculiar among North American colubrids in that it has a characteristic color pattern inversion or transposition where the centers of the scales in the lateral portions of the alternating red and black bands are colored black or reddish, respectively (Fig. 1). *Rhinocheilus lecontei tessellatus* and *R. l. lecontei* illustrate this character the best, whereas in *R. l. antonii*, color pattern transposition is sometimes weak. In morphology the subspecies are rather similar except for the shape of the snout (Klauber, 1941). *Rhinocheilus l. tessellatus* has a sharp upturned snout resulting from an enlarged rostral scale. In *R. l. antonii* this characteristic is similar (Fig. 2) but less pronounced. In *R. l. lecontei*, the rostral scale is enlarged but not upturned (Fig. 2). Klauber (1941) characterized the subspecies as

follows: *R. l. antonii* has elongate dark body blotches that usually number less than 17, a moderately upturned snout, and little in the way of color pattern transposition; *R. l. tessellatus* has an extensive amount of color pattern transposition, a sharply upturned snout, and more than 17 dark body blotches; *R. l. lecontei* has at least 16 dark body blotches, color pattern transpositions, but no upturned snout.

I have obtained four additional specimens from Isla Cerralvo and find them sufficiently distinct in morphology and color pattern to warrant a reexamination of this population's relationships and taxonomic allocation.

MATERIALS AND METHODS

On 14 and 15 June 1988 I visited Arroyo Viejos at the southwestern tip of Isla Cerralvo opposite the village of El Sargento on the peninsula. Here, two specimens of *Rhinocheilus lecontei* were collected between 2230 and 0100 hours. These specimens and two others previously collected from this arroyo (Soulé and Sloan, 1966, and see below) were compared to the data of Klauber (1941) and to preserved specimens from throughout the range of *R. lecontei* representing all of the known subspecies (Appendix 1). One of the two previously collected (on 26 April 1988) was lost in transit from the Hospital Militar de La Paz (HMLP) to the San Diego Natural History Museum but not before it was examined and photographed. It is referred to as HMLP 2737.

All scale counts (ventrals, subcaudals, dorsals, supralabials, and infralabials) and body and caudal blotch counts (from both living and preserved specimens) were taken according to the methods of Klauber (1941). The shapes of the rostral, frontal, loreal, and temporal scales were compared. Comparisons of coloration included degree of red on the head, black on the supralabial scales, presence



Figure 1. Three specimens of *Rhinocentrus lecontei etheridgei* ssp nov. Upper, holotype, SDSNH 66294; middle, paratype, SDSNH 66309; lower, HMLP 2737.

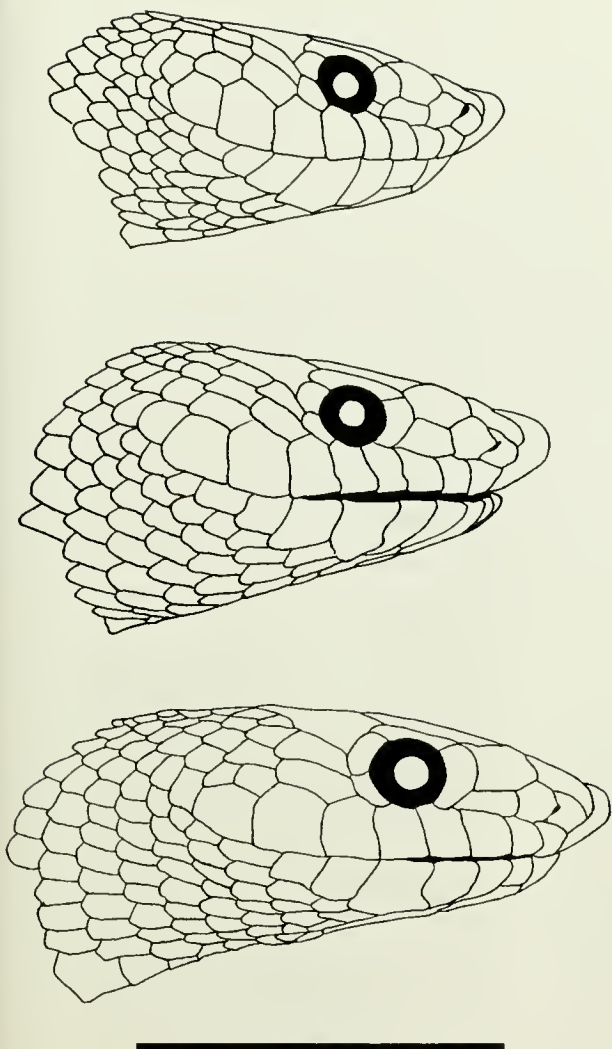


Figure 2. Side view of heads of *Rhinocrocheilus lecontei antonii* (upper, LACM 125584), holotype of *R. l. etheridgei* ssp. nov. (middle, SDSNH 66294), and *R. l. lecontei* (lower, SDSNH 16028). Bar equals 2 cm.

or absence of ventral mottling, and presence or absence of caudal color transpositions in the red bands. Also compared were tongue coloration and total length.

RESULTS

Klauber (1941) noted that the rostral scales of *Rhinocrocheilus lecontei tessellatus* and *R. l. antonii* are much more prominent and protuberant than that of *R. l. lecontei*. He noted also that the edges of the rostral scale in *R. l. tessellatus* and some *R. l. antonii* are raised above those of adjacent scales. The rostral of the Isla Cerralvo population is similarly shaped (Fig. 2). In the Isla Cerralvo population, the rostral also extends posteriorly for more than one-half the length of the internasals, and in one specimen, HMLP 2737, it almost completely separated them (Fig. 1). Klauber (1941) noted that the rostral extended farther posteriorly in *R. l. tessellatus* than in *R. l. lecontei*, but in the specimens I examined, their conditions were nearly equal. In roughly 38% of the *R. l. antonii* I examined, the rostral separated the internasals for over one-half their length.

The anterior end of the frontal scale in the Isla Cerralvo popula-

tion tends to indent more deeply into the prefrontals than does that of *Rhinocrocheilus lecontei lecontei* or *R. l. antonii*. In the latter, the frontal tends to have a straight anterior margin. Klauber (1941) noted that a deeply indenting frontal scale occurs in *R. l. tessellatus*, but I found it in less than one-half of the specimens I examined.

Klauber (1941) noted that the posterior edge of the loreal in *Rhinocrocheilus lecontei tessellatus* is more vertical than that of *R. l. lecontei*. This difference results from the difference in height of the loreal scales. The loreal scale of *R. l. tessellatus* is higher, resulting in less of an anterior inclination of the posterior edge as well as a less rectangular shape of the entire scale. This condition is exaggerated in the Isla Cerralvo population, in which the loreal is nearly square (Fig. 2). Also in the Isla Cerralvo population, the posterior edge is longer than the anterior edge and gives the dorsal margin a forward tilt, a condition not observed in the other subspecies. Klauber (1941) stated that *R. l. antonii* has a rectangular loreal, and in the material I examined (Appendix 1), I found its loreal shape like that of *R. l. tessellatus* (Fig. 2). All but one (SDSNH 34535) *R. l. lecontei* examined had narrow, rectangular loreals. SDSNH 34535 approached the condition seen in *R. l. antonii* and *R. l. tessellatus*.

The most anterior temporal scales in the Isla Cerralvo population are only slightly larger than those more posterior (Fig. 2). In all other subspecies the anterior temporals are elongate and much larger than the posterior temporal scales. Klauber (1941) noted, as I did, that temporal scales of *Rhinocrocheilus lecontei tessellatus* tend to be smaller than those of *R. l. lecontei*; however, they are not as small as those of the Isla Cerralvo population. *Rhinocrocheilus l. antonii* resembles *R. l. lecontei* in having elongate anterior temporal scales.

Rhinocrocheilus lecontei antonii and the Isla Cerralvo population have red tongues with gray tips. In *R. l. tessellatus* and *R. l. lecontei*, the tongue is black with gray tips (Klauber, 1941). Klauber (1941) stated that in *R. l. clarus* (= *lecontei*), the tongue is black with light tips and a red-brown base. I was unable to confirm this in either preserved or living material.

Of 313 specimens of *Rhinocrocheilus lecontei lecontei* examined by Klauber (1941), the total length of the largest specimen was 892 mm, and 19 specimens (6.0%) were over 800 mm in length. The longest *R. l. tessellatus* reported by Klauber (1941) was 936 mm in total length, and of his 79 specimens, nine (11.4%) were over 900 mm. Conant (1975) stated that adult *R. l. tessellatus* range from 560 to 810 mm in length but listed a record individual at 1041 mm. The largest *R. l. antonii* that I examined measured 1097 mm in total length, and 11 specimens (9.0%) were over 900 mm long. Of the four known specimens of the Isla Cerralvo population, CAS 98095 is 1246 mm, SDSNH 66294 is 1166 mm, SDSNH 66309 is 832 mm, and HMLP 2737 was 241 mm in total length. Therefore, the largest known specimen of the Isla Cerralvo population is 354 mm longer than the largest known *R. l. lecontei* and is similar to the mainland Mexican forms in its large adult size. With such a small sample size it is reasonable to assume that CAS 98095 and SDSNH 66294 are not the two largest individuals of the Isla Cerralvo population and that additional material may prove to be larger.

The anterior portions of the frontal, prefrontals, nasals, and rostral scales in the Isla Cerralvo population are heavily washed with red-orange and dark only at the scale junctions (Fig. 1). A similar condition occurs in *Rhinocrocheilus lecontei tessellatus*. In *R. l. lecontei*, the frontal is usually only cream colored on the edges, and the prefrontals, nasals, and rostral are only occasionally red-orange. The snout of *R. l. antonii* is heavily mottled, and the light areas are also cream colored.

Klauber (1941) noted that all the supralabial scales of *Rhinocrocheilus lecontei lecontei* are edged with black. I have confirmed this condition in the additional specimens from BCN that I examined, except one (SDSNH 42523) lacks such banding between supralabials 1 and 2. Klauber (1941) reported the same condition

for *R. l. antonii*, though I found that some specimens tend to lack bands between the anterior supralabials. In *R. l. tessellatus*, banding between the first four supralabials ranges from absent to present, and banding is absent in all Isla Cerralvo specimens (Fig. 1).

The Isla Cerralvo specimens do not differ greatly from the other subspecies in the number of dark body or caudal blotches, although they do tend to have more blotches than does *Rhinocheilus lecontei antonii* (Table 1). In the Isla Cerralvo specimens, the dark body blotches rarely extend ventrally past the third or second dorsal scale row. This leaves the ventrolateral surface of the body immaculate (Fig. 1, upper). In all other subspecies, the body blotches almost always extend ventrally far enough to reach the lateral edges of the ventral scales.

The Isla Cerralvo population lacks the color pattern transposition of black mottling in the red interspaces in the caudal region (Fig. 1). Such a color transposition rarely occurs in *Rhinocheilus lecontei antonii* and is present in all but one juvenile specimen of *R. l. tessellatus* (SDSNH 33198; total length 278 mm). Caudal color transposition is occasionally absent in hatchling and juvenile *R. l. lecontei*. Klauber (1941) noted that color pattern transpositions are absent in many juveniles but became frequent in progressively larger specimens.

The venter in the Isla Cerralvo population is immaculate. This is generally the case in *Rhinocheilus lecontei tessellatus* except for edgings on the lateral edges of the ventral scales by the black dorsal blotches. The venters of *R. l. lecontei* and *R. l. antonii* are never immaculate, and in the majority of *R. l. antonii* the venter is heavily marked.

From this analysis I believe the Isla Cerralvo population is sufficiently distinct to warrant subspecific recognition and thus propose the following new subspecies:

Rhinocheilus lecontei etheridgei new subspecies
Figures 1 and 2

Suggested common name.—Isla Cerralvo long-nosed snake.

Holotype.—SDSNH 66294; adult male, 1016 mm snout-to-vent length (SVL); collected by Víctor M. Velázquez, L. Lee Grismer, and Mark A. Galván on 14 June 1988 in Arroyo Viejos at 10 m in elevation on the southwestern end of Isla Cerralvo, Baja California Sur, México.

Paratypes.—Two paratypes from same locality as holotype. CAS 98095, adult male, 954 mm SVL, collected on 29 October 1961, and SDSNH 66309, adult male, 732 mm SVL. The lost fourth specimen, HMLP 2737, is not considered part of the type series.

Diagnosis.—*Rhinocheilus lecontei etheridgei* differs from all other subspecies of *R. lecontei* by having (1) an enlarged, square loreal scale with a forward-sloping dorsal margin; (2) shortened anterior temporal scales (Fig. 2); (3) shallow dorsal body blotches that do not extend onto the lateral edges of the ventral scales (Fig. 1, upper); and (4) a much larger adult size. It differs further from *R. l. antonii* and *R. l. lecontei* in lacking darkened supralabial borders anterior to the eyes (Fig. 1), from *R. l. lecontei* and *R. l. tessellatus* in having a red tongue, and from *R. l. lecontei* in having a greatly enlarged rostral scale (Fig. 2).

Distribution.—Known only from the southwestern end of Isla Cerralvo, Baja California Sur, México.

Description of holotype.—Adult male, 1016 mm SVL, 150 mm tail length; body stout; head narrow and triangular, slightly distinct from neck; snout sharply pointed in lateral aspect; diameter of eye 68% of distance from anterior edge of orbit to nostril; pupil round. Rostral enlarged, pointed, protuberant, distinctly elevated from adjacent scales, and concave below with dorsal process extending

TABLE 1. Ranges, means (\bar{x}), and standard errors (SE) of scale, dark body blotch, and dark caudal blotch counts of the four subspecies of *Rhinocheilus lecontei*.

	<i>lecontei</i>	<i>tessellatus</i>	<i>antonii</i>	<i>etheridgei</i>
<i>n</i>	34	20	129	3
Ventrals				
Range	188–213	184–207	183–217	210–215
(\bar{x} , \pm SE)	(203.7, \pm 2.3)	(197.8, \pm 2.4)	(198.0, \pm 1.9)	(212.3, \pm 1.5)
Subcaudals				
Range	41–61	44–59	41–56	50–53
(\bar{x} , \pm SE)	(48.1, \pm 3.2)	(52.1, \pm 2.8)	(46.9, \pm 3.0)	(51.7, \pm 0.9)
Dorsals				
Neck				
Range	23–26	24–25	23–25	25
(\bar{x} , \pm SE)	(24.4, \pm 1.3)	(24.8, \pm 1.1)	(24.1, \pm 0.9)	(25.0, \pm 0.0)
Midbody				
Range	22–24	23–25	22–25	23
(\bar{x} , \pm SE)	(23.5, \pm 1.0)	(28.8, \pm 1.3)	(23.3, \pm 0.7)	(23.0, \pm 0.0)
Vent				
Range	19–21	19–20	19–20	19–20
(\bar{x} , \pm SE)	(20.2, \pm 0.9)	(19.4, \pm 0.6)	(19.3, \pm 0.4)	(19.3, \pm 0.3)
Supralabials				
Range	7–9	7–9	8–10	8
(\bar{x} , \pm SE)	(8.1, \pm 0.7)	(7.9, \pm 0.7)	(8.2, \pm 0.6)	(8.0, \pm 0.0)
Infralabials				
Range	7–11	8–11	9–11	9
(\bar{x} , \pm SE)	(9.3, \pm 0.4)	(9.1, \pm 0.3)	(9.4, \pm 0.7)	(9.0, \pm 0.0)
Body blotches ^a				
Range	15–51	17–37	13–30	21–30
(\bar{x} , \pm SE)	(25.6, \pm 13.1)	(26.1, \pm 8.2)	(18.9, \pm 4.2)	(25.0, \pm 1.9)
Caudal blotches ^a				
Range	5–17	6–18	3–8	7–10
(\bar{x} , \pm SE)	(8.8, \pm 3.8)	(9.8, \pm 4.1)	(5.8, \pm 2.7)	(8.5, \pm 0.6)

^a HMLP 2737 included.

posteriorly greater than one-half the length of the internasals. Rostral followed dorsoposteriorly in succession by a pair of triangular internasals meeting posteriorly on the midline, a pair of wedge-shaped prefrontals curving ventrally over the rostrum and contacting medially, a hexagonal frontal longer than wide and widest anteriorly where it indents deeply into the prefrontals, and a pair of elongate parietals that are widest anteriorly, meet broadly on the midline, and are separated anteriorly by the frontal. On each side of frontal is an elongate supraocular that is pointed anteriorly. Following rostral posterolaterally in succession are a prenasal (1-1), a postnasal (1-1), a large square loreal with a forward-sloping dorsal margin (1-1), and a moderate-sized preocular (1-1). Posterior to eye are a pair of small equally sized postoculars (2-2) followed by temporal scales (2+3-2+3), anterior temporal scales only slightly larger than those posteriorly. Supralabials 8-8 increasing in size posteriorly. Infralabials 9-9, first pair contacting medially; second infralabial one-half size of first and third, fifth infralabial largest; infralabials decrease in size from this point posteriorly. Mental small, triangular, and completely enclosed within first pair of infralabials which are followed by an elongate pair of chin shields that make broad medial contact and contact the second and third infralabials laterally. Dorsal scales smooth, 25 rows one head length behind depression of neck, 23 at midbody, and 19 one head length anterior to vent; 212 ventrals, lateral portions curving dorsally and easily visible on side of body. Anal plate entire; subcaudals 52, 34th. and last 15 divided, the rest single.

Coloration of holotype in life.—Head suffused with red-orange, frontal and parietals black centrally and red-orange laterally. Temporals and adjacent posterior dorsals have red-orange centers and dark edges; supralabial banding restricted to edges of supralabials 4-8. Pupils red; tongue bright red with gray tips. Body markings consist of 24 black blotches that taper ventrally and reach to the second dorsal scale row at most. The four to seven most ventral scale rows of the dark dorsal blotches suffused centrally with cream; secondary blotches usually present between main body blotches on first to fifth scale rows. Twenty-four red-orange interspaces on body with dark suffusion in scale centers of the most ventral five to seven rows of the red-orange interspace; interspace solid red-orange medially. Tail with seven black blotches showing same color transposition as in body blotches; eight red-orange caudal interspaces almost completely devoid of dark suffusion. Ventrals cream-yellow and immaculate; ventral color usually extending dorsally to middle of fourth dorsal scale row.

Variation.—The paratypes approximate the holotype very closely in scale morphology; the only noteworthy difference is that the posterior extension of the rostral scale in HMLP 2737 almost completely separated the internasals (Fig. 1, lower).

CAS 98095 is nearly identical to the holotype in coloration. The same is true for SDSNH 66309 except that its dorsal interspaces are narrower (Fig. 1). HMLP 2737 varied widely in both coloration and dorsal blotching (Fig. 1). The dorsal blotches of the central third of the body formed a reticulated pattern and their color transposition was more prominent centrally. Also, the interspaces on its body and tail were light orange instead of red-orange. The light coloration on its head was cream-yellow and the iris was silver-gray instead of red-orange. HMLP 2737 was only 241 mm in total length, suggesting that these colors may change with age. Klauber (1941) noted an ontogenetic change in coloration in the other subspecies.

Etymology.—It is with great honor and pleasure that I name this population after Richard E. Etheridge in recognition of his early work on Isla Cerralvo (Etheridge, 1961).

Ecological notes.—The first specimen of *Rhinocheilus lecontei etheridgei* to be collected (CAS 98095) was found on 29 October 1961 (Soulé and Sloan, 1966) during the day coiled beneath a bush in the shade eating a *Dipsosaurus dorsalis lucasensis* (Banks and

Farmer, 1963). HMLP 2737 was collected on 26 April 1988 at 1100 hours on coastal dunes at the mouth of Arroyo Viejos. SDSNH 66309 was collected on 14 June 1988 at 0100 hours in Arroyo Viejos approximately 1 km from its mouth. This specimen was crawling in the arroyo bottom on loose gravel. SDSNH 66294 was collected on the same date as SDSNH 66309 at 2230 hours and was found slightly over 2 meters above the ground in an elephant tree (*Bursera microphylla*). Earlier that evening, several individuals of the lizard *Sator grandaevus* were observed roosting in the branches of *B. microphylla* and other brush. Other specimens of *S. grandaevus* were observed out in the open on the arroyo bottom and retreated into the lower branches of the brush when frightened by our lights. Arboreal activities by *Rhinocheilus* have never been reported. Presumably this snake was foraging for *S. grandaevus*, though its eyes were opaque when it was collected.

DISCUSSION

Relationships.—Most often, subspecies are the result of subjective designation of sections of a more widely ranging continuous population (Frost and Hillis, 1990) responding differently to regional environmental constraints. Although each of the continental subspecies of *Rhinocheilus lecontei* can be clearly diagnosed from one another, none is demonstrably monophyletic. On the other hand, there is no evidence suggesting that they are paraphyletic and thus a designation as metataxa (Gauthier *et al.*, 1988) for these subspecies is appropriate.

Rhinocheilus lecontei etheridgei has the greatly enlarged and protuberant rostral scale characteristic of *R. l. antonii* and *R. l. tessellatus* (Fig. 2). This character varies clinally (Klauber, 1941), the scale being intermediate in size where *R. l. lecontei* intergrades narrowly with *R. l. antonii* and *R. l. tessellatus* in northern Sonora and southeastern Arizona, respectively (Medica, 1975). The absence of this feature in species of the related colubrid genera *Lampropeltis*, *Pituophis*, *Elaphe*, *Cemophora*, *Arizona*, and *Phyllorhynchus* (Dessauer, 1967; Underwood, 1967; Bury *et al.* 1970), considered here as outgroups, suggests that enlargement of the rostral is a derived condition. Thus, *R. l. etheridgei*, *R. l. antonii*, and *R. l. tessellatus* form a clade exclusive of *R. l. lecontei*. To assess relationships within this clade, *R. l. lecontei* can be used as the functional first outgroup (Watrous and Wheeler, 1981). Both *R. l. antonii* and *R. l. etheridgei* have red tongues and lack color transpositions in the caudal interspaces (see above for variation), character states not shared with *R. l. tessellatus* or the outgroup *R. l. lecontei*, suggesting that the former two are sister taxa (Fig. 3). Although *R. l. etheridgei* is more similar to *R. l. tessellatus* in overall color pattern than it is to *R. l. antonii* (Table 2), I prefer to base relationships on the presence of shared derived character states. *Rhinocheilus l. etheridgei* has the autapomorphic states of an enlarged square loreal, shortened anterior temporals, and shallow dorsal body blotches. The weakness here is that only one outgroup could be employed and that additional outgroups could demonstrate that these character states are equivocal. Given the poor resolution of relationships among North American colubrid genera, however, I believe this is the most reasonable estimate that can be made at this point.

Biogeography.—Medica (1975) and Murphy and Ottley (1984) followed Soulé and Sloan (1966) and listed the Isla Cerralvo population as *Rhinocheilus lecontei lecontei*. Medica (1975) stated that *R. lecontei* will most likely be found to inhabit all of the Baja California peninsula, and Murphy and Ottley (1984) suggested that *R. l. etheridgei* is a peninsular derivative. I disagree with both statements. It is likely *R. l. lecontei* ranges throughout the Sierra San Borja, BCN, and even possibly the Sierra San Francisco, BCS, as far south as the Magdalena Region, approximately 150 km south

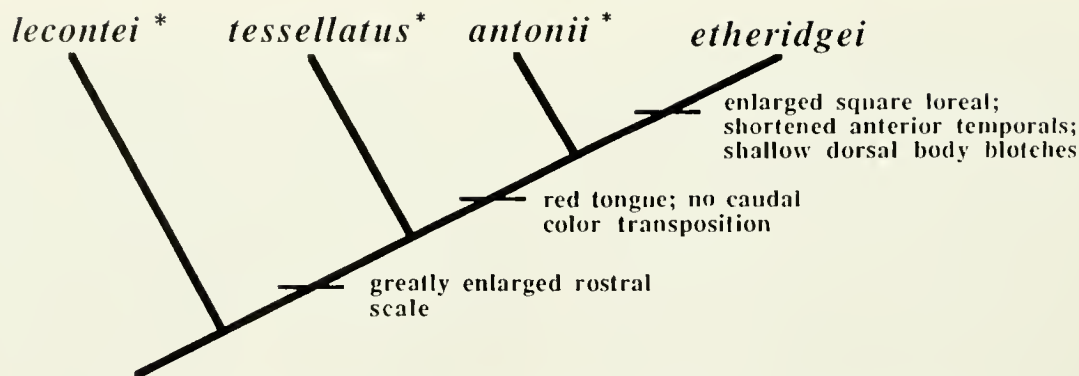


Figure 3. Cladistic relationships of the subspecies of *Rhinocheilus lecontei*. Asterisks designate metataxa.

of its current southernmost record. However, its apparent absence from heavily collected areas in the vicinity of San Ignacio, BCS, at the northern edge of the Magdalena Region suggests it does not occur there. Furthermore, I showed the Isla Cerralvo specimens (while living) to many ranchers throughout BCS (especially in the Cape Region) who have proven to be knowledgeable and reliable sources in the past and none had any knowledge of this species.

Because *Rhinocheilus lecontei etheridgei* is related to mainland Mexican taxa and Isla Cerralvo is an old continental island derived from southwestern México about 10-14 million years ago (Gastil and Jansky, 1973), the population may have originated through either vicariance or overwater dispersal. If *R. l. etheridgei* is the sister taxon of *R. l. antonii*, as I propose, both must be of relatively recent origin because these are the most recently derived lineages within *R. lecontei* (Fig. 3). Furthermore, if *R. l. antonii* is not demonstrably monophyletic, it could serve as the potential ancestor of *R. l. etheridgei*. Other snakes proposed to have evolved on the Cape Block have diverged much more from their mainland Mexican sister taxon, which occurs in southwestern México near the proposed point of origin of the Cape Block (Grismer, 1990; Murphy, 1983). Overwater dispersals of mainland Mexican taxa to islands in the Gulf of California that are geographically closer to the peninsula are not uncommon. Other insular taxa derived from mainland Mexican stock that must have arrived by overwater dispersal are *Cnemidophorus tigris catalinensis* (Walker and Maslin, 1981) and *Lampropeltis getula splendida* (Blanney, 1977) of Isla Santa

Catalina, *Crotalus atrox atrox* of Isla Santa Cruz (Murphy and Outley, 1984), and *C. a. tortugensis* of Isla Tortuga (Klauber, 1972).

APPENDIX I

Material of *Rhinocheilus lecontei* Examined

Rhinocheilus lecontei antonii.—Sonora: LACM 7085, 9145, 9512, 27785-87, 37292-93, 51554, 192734-48, 115903-08, 122376; SDSNH 3811, 18163, 18174, 18175, 35914-15, 46085, 49552-53, 49913. Sinaloa: LACM 7055-84, 50907-09, 51557-58, 59126-27, 63459, 76594, 8658-59, 37323, 38199-201, 102712-29, 115899-902, 121328-29, 125584-85, 136963; SDSNH 49554, 49572, 49572, 57008, 60489-90.

Rhinocheilus lecontei lecontei.—Baja California Norte: LACM 2660, 25077, 36576, 20821-22, 59125, 102709-11, 133919, 133921; MVZ

182121, 189973, 189889, 189922. SDSNH 1689, 2257, 48147, 62225, 16028, 31450, 34003, 34535, 39705, 39706, 39940, 42094, 42176, 42439, 42543, 42632, 42747, 42989, 49571.

Rhinocheilus lecontei tessellatus.—New Mexico: SDSNH 25492, 40883, 32672. Texas: SDSNH 30420-22, 20513, 36171, 25523, 33198-200, 34548, 46180, 42484, 33395. Coahuila: SDSNH 57025, 58402. Durango: SDSNH 49579. San Luis Potosí: SDSNH 58396.

TABLE 2. Summary of diagnostic differences between the subspecies of *Rhinocheilus lecontei*.^a

	<i>etheridgei</i>	<i>tessellatus</i>	<i>antonii</i>	<i>lecontei</i>
Rostral enlarged	+	+	+	0
Long posterior extension of rostral	+	0	+0	0
Frontal indenting deeply into prefrontals	+	0	+0	0
Loreal enlarged and square ^b	+	0	0	0
Anterior temporals small ^c	+	0	0	0
Tongue red with gray tips	+	0	+	0
Adult total length > 1200 mm	+	0	0	0
Red-orange on rostrum	+	+	0	+0
Inter-supralabial banding	0	+0	+	+
Body blotches shallow	+	0	0	0
Caudal color transposition in interspaces	0	+	0	+
Ventrum immaculate	+	+0	0	0

^a+, character present; 0, character absent.

^bTendency toward condition of *R. l. etheridgei* in *R. l. antonii* and *R. l. tessellatus*.

^cTendency toward condition of *R. l. etheridgei* in *R. l. tessellatus*.

Rhinocheilus lecontei etheridgei.— Baja California Sur: CAS 98095; HMLP 2737; SDSNH 66294, 66309.

ACKNOWLEDGMENTS

For the loan of material I thank G. Pregill, San Diego Natural History Museum (SDSNH), A. Leviton and J. Vindum, California Academy of Sciences (CAS), J. W. Wright, Los Angeles County Museum (LACM), and D. B. Wake, Museum of Vertebrate Zoology (MVZ). The Isla Cerralvo specimens were collected under scientific collecting permits issued to Lt. Victor M. Velázquez and L. Lee Grismer by Jorge Rodríguez Reyes and José Luis Genel of the Secretaría de Desarrollo Urbano y Ecología (SEDUE). For comments on the manuscript I thank R. E. Etheridge, J. Iverson, P. A. Medica, G. K. Pregill, S. Sweet, P. Unitt, and J. W. Wright.

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