Catalogue of American Amphibians and Reptiles.

Smith, H.M. and D. Chiszar. 2001. *Pliocercus euryzonus*.

Pliocercus euryzonus Cope

Cope's False Coral Snake

Pliocercus euryzonus Cope 1862:72. Type locality, "Region of the Truando, New Granada," now in Chocó, Colombia. Holotype, National Museum of Natural History (USNM) 4303 (now lost, *fide* Savage and Crother 1989), collected by Lt. Michler's Exploring and Surveying Expedition, date of collection unknown.

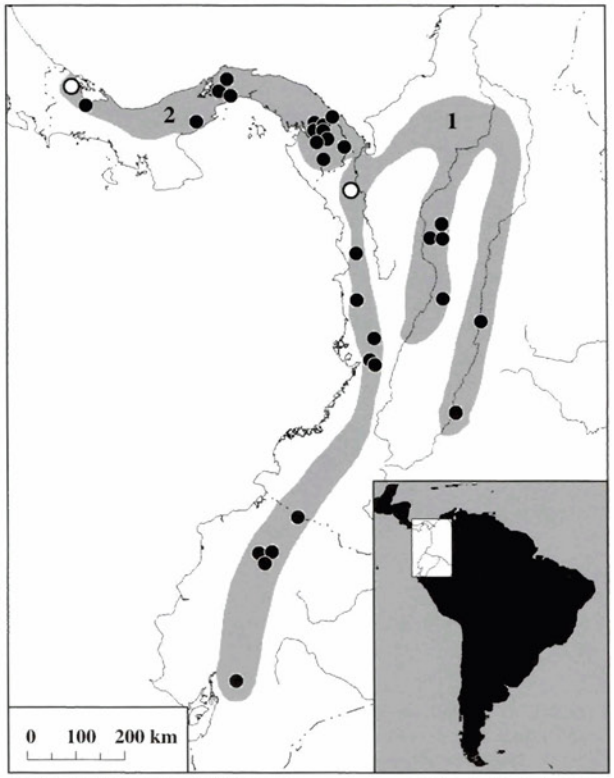
Elapochrus euryzona: Günther 1893:107.

Urotheca euryzona: Boulenger 1894:182 (part).

FIGURE 1. *Pliocercus euryzonus burghardti* (KU 112422), from Río Tuira at Río Mono, Darién, Panamá (photograph courtesy of W.E. Duellman), apparently a mimic of *Micrurus m. multifasciatus* (Fig. 2).

FIGURE 2. *Micrurus m. multifasciatus*, possibly from Panamá (photograph by E. Seligman); apparently a model for *P. e. burghardt* (Fig. 1).

FIGURE 3. *Micrurus mipartitus anomalus*, from Bella Vista, Cundinamarca, Colombia (photograph by W.W. Lamar); a model for *P. e. euryzonus* (Figs. 1 and 4–6).



MAP. Distribution of *Pliocercus euryzonus*; circles indicate type localities, dots denote other localities (adapted in part from Savage and Crother 1989).

Pliocercus euryzonus dimidiatus: Dunn 1949:55 (*nec* Cope).

Pliocercus aequalis euryzonus: Pérez-Higareda and Smith 1986: 126.

• **CONTENT.** Two subspecies, *Pliocercus euryzonus euryzonus* and *P. e. burghardti*, are recognized.

• **DEFINITION.** *Pliocercus euryzonus* is a small, bicolored colubrid snake, with a maximum recorded TL of 560 mm (tail length 260 mm). The tail is somewhat less than half the total length. Scalation is as follows (in 48 specimens): usually 8 supralabials (78%, 69 of 89), occasionally 9 (22%); infralabials usually 10 (92%), seldom 9 (4%) or 11 (3%); preoculars usually 2 (84%), occasionally 1 (15%), rarely 3 (1%); postoculars usually 2 (99%), rarely 3 (1%); temporals 1–2 or 1–3 on at least one side in 90% (43 of 48) of specimens, 1–1 on both sides in 10% (5 of 48). Ventral scales number 117–137 in males ($\bar{x}$ = 126, N = 30), 130–145 in females ($\bar{x}$ = 136, N = 10). Subcaudal scales number 109–122 in males ($\bar{x}$ = 116, N = 11), 92–117 in females ($\bar{x}$ = 103, N = 7).

Body color is mostly black, with 11–27 yellowish to whitish (reddish in some *P. e. burghardti*) light rings on body, 6–22 light rings on tail, usually (96%, 46 of 48) no more than 0.25–1.5 dorsal scales in length middorsally (2 scales long only on part of body in 2 of 48 specimens), 1–2 scales in length on venter. A parietal light ring is absent or interrupted or narrow (15% or less of the length of the parietals), often of erratic course and sometimes displaced onto the neck. A nuchal black ring is usually (88%, 43 of 48) complete. The maximum number of light subcaudals in any given ring is usually 3 or fewer (76%, 16 of 21). Light dorsal scales are usually (71%) without black tips.

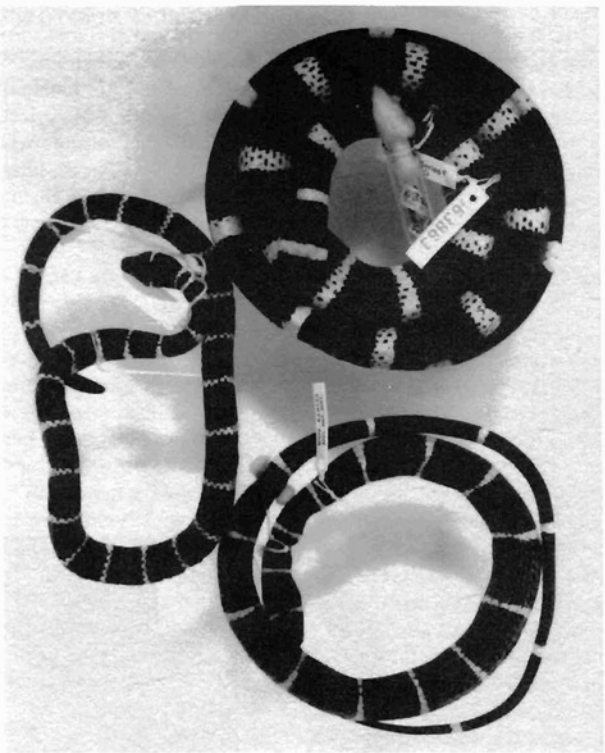


FIGURE 4. Dorsal views of three taxa: *Pliocercus dimidiatus* (KU 63863), from 1.5 km N Puerto Viejo, 100 m, Heredia, Costa Rica (top right); *P. euryzonus burghardti* (holotype, KU 112426), from 1.6 km W Almirante, 10 m, Bocas del Toro, Panamá (below); *P. e. euryzonus* (FMNH 165484), from km 13 from Buenaventura to Río Calima, Valle, Colombia (from Smith and Chiszar 1996).

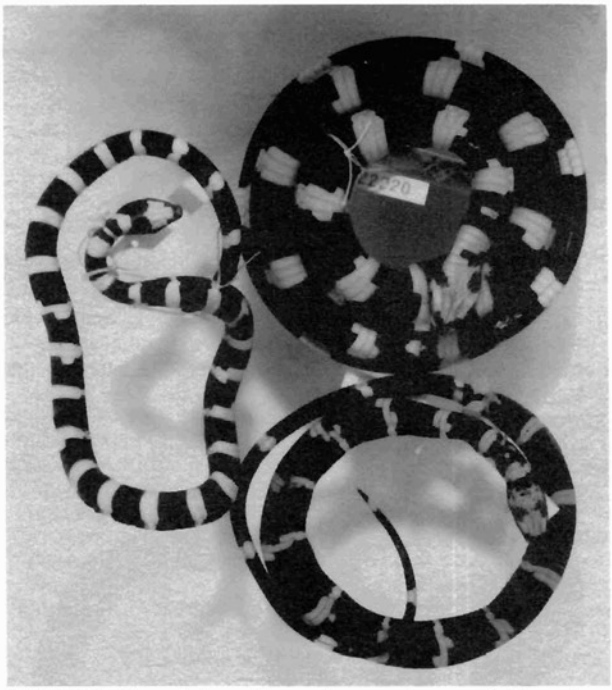


FIGURE 5. Ventral views of same three specimens as in Figure 4.

• **DIAGNOSIS.** *Pliocercus euryzonus* differs from all taxa of the genus in the tricolor complex by having only bicolor rings, black and pale, usually without red, which occurs only dorsally in the pale rings and never forms a complete ring.

Pliocercus euryzonus differs from *P. dimidiatus* (the only other species of the bicolor complex) in having categorically shorter pale rings on head, body, and tail; usually two secondary temporals (versus usually one); pale rings never distinctly red, although a slight reddish infusion may be present (versus usually distinctly red rings); and nuchal black ring usually complete ventrally (versus usually incomplete). Details expressing these and other differences include the lack of a pale parietal ring, or one that is interrupted or whose length is 15% or less of the length of the parietals (versus a continuous ring 25–70% as long as the parietals), pale rings almost always (96% of specimens) 0.25–1.5 scales in length at midline throughout body (versus 2 scales in length or more on at least part of body in 98%), commonly (69%, 35 of 48) no black tips on pale dorsals (versus 26%, 7 of 27), usually (90% versus 14% at most) two secondary temporals on one or both sides; black nuchal ring usually (88%, 43 of 48) complete (versus 12%); and usually (76%, 16 of 21) 3 or fewer subcaudals in any pale ring (versus 7%, 1 of 15).

• **DESCRIPTIONS AND ILLUSTRATIONS.** Original descriptions appeared in Cope (1862), Jan (1863), and Smith and Chiszar (1996). Redescriptions appeared in Boulenger (1894), Dunn and Bailey (1939), Wilson and Meyer (1982, 1985), Savage and Crother (1989), and Pérez-Santos and Moreno (1988, 1991). The holotype of Jan's (1863) *Liophis splendens* was illustrated in Jan and Sordelli (1866). Drawings of head scales and pattern appeared in Pérez-Santos and Moreno (1988, 1991), apparently adapted from Jan and Sordelli (1866).

• **DISTRIBUTION.** *Pliocercus e. euryzonus* occurs on the Pacific coast of Colombia and Ecuador and on Atlantic slopes of the Andes in Colombia; *P. e. burghardti* is limited to most if not all of Panamá. The southernmost record is for Yucca Plantation, near Pallatanga, Guayas, Ecuador (1° 59' 00" S, 70° 51' 00" W; AMNH 23029).

• **FOSSIL RECORD.** None.

• **PERTINENT LITERATURE.** Little is recorded of this species in addition to the taxonomic and distributional accounts already cited. Additional references include Dixon (1979, distribution, but erroneously said to be "widely spread" in the Amazon), Dunn (1933, El Valle de Antón, Panamá), Lamar (1990, corrected erroneous listing for Guatemala in Villa et al. 1988), Obst et al. (1988, mention), Pough (1988, noted Coral Snake pattern), Savage and Slowinski (1990, bicolor pattern type), Smith and Smith (1976, literature), Sokolov (1988, list), Stuart (1948, mention), Villa et al. (1988, distribution), Wilson and Meyer (1982, 1985, Honduras), and Zhao et al. (1993, list).

• **REMARKS.** Dunn (1949) recognized two subspecies of *P. euryzonus* in Panamá: *P. e. euryzonus* from Darién (11 specimens) and *P. e. dimidiatus* from Sabanas (2) and Chagres (15). On what grounds he distinguished two subspecies in Panamá is not apparent. Of the 25 specimens we examined from Panamá, 9 were from Darién, and those were not distinguishable from the specimens from elsewhere.

Because of the numerous differences between the Panamá/South America populations and those northward from Costa Rica, including one categorical difference in pattern (light nuchal ring), and several other strong differences in pattern as well as one equally strong in scalation, Smith and Chiszar (1996) concluded that two species are involved, with *P. dimidiatus* separate from *P. euryzonus*. They noted that no evidence of intergradation exists where their ranges are most closely approximated. They also regarded *P. euryzonus* as the most plesiomorphic of the genus, with features from which those of other members of the genus could readily have been derived.

Supportive of the concept of allospecificity of *P. dimidiatus* and *P. euryzonus* are three other strong, but independently nondiagnostic differences in number of preoculars, minimum number of subcaudals in any pale ring, and maximum number of ventrals in any pale ring (Smith and Chiszar 1996).

Although the treatment by Smith and Chiszar (1996) of the bicolor complex differs substantially from that of Savage and Crother (1989), and even from that of Pérez and Smith (1986), the former workers were unaware of the differences in pattern details and the secondary temporals, and were more concerned with a firm establishment of the difference between the bicolor and tricolor complexes, which they achieved. They made no concerted attempt to seek geographic correlations of pattern differences of the sort that are usually associated with subspecies. The proposals by Pérez and Smith (1986) were based on inadequate data and misconceptions.

The subcaudals of this species are more numerous than in *P. bicolor*, at the other extreme of the range in the genus (males, 109–122 versus 91–97; females, 92–117 versus 83–92), and the sex ratio is reversed in the material examined (males/females 31/10 versus 19/44). Populations in between are intermediate.

The common name for the species was proposed by Frank and Ramus (1995). "Black Halloween snake" was adopted by Greene (1997), but has not been commonly used.

• **ETYMOLOGY.** The name *euryzonus* is of Greek origin, derived from "*eurys*," meaning "broad," and "*zona*," meaning "belt," and was applied in reference to the wide (i.e., long) black rings compared with the very narrow white rings. The name *burghardti* honors Dr. Gordon M. Burghardt for his pioneering herpetoethological studies in Panamá and elsewhere.

1. *Pliocercus euryzonus euryzonus* Cope Andean False Coral Snake

Pliocercus euryzonus Cope 1862:72. See species synonymy.
Pliocercus euryzonus euryzonus: Dunn and Bailey 1939:12.
Elapochrus euryzona: Günther 1893:107 (part).
Urotheca euryzona: Boulenger 1894:182.
Urotheca elapoides euryzona: Amaral 1929:177.
Liophis (Cosmiosophis) splendens Jan 1863:289. Type locality, "Santa Fe de Bogotá, [Cundinamarca, Colombia]." Holotype, Muséum Nationale d'Histoire Naturelle, Paris (MNHN) 3599, an adult female, collected by Lewy, date of collection unknown (not examined by authors).

• **DIAGNOSIS.** This subspecies of *Pliocercus euryzonus* (based on 23 specimens) is limited to South America and differs from *P. e. burghardti* of Panamá (25 specimens) basically in having more numerous, hence shorter, black rings on body and tail. Fewer than 9 subcaudals are present in any black ring (100% versus 8%), and a minimum of 5 or fewer subcaudals are present in any black ring (85% versus 14%); more than 12 black rings on tail (77% versus 0%); minimum median dorsal length of black rings on body less than 5 successive dorsal scales (65% versus 4%); more than 22 black rings on body (65% versus 24%); maximum median or paramedian length of black nuchal ring less than 7 successive dorsal scales (78% versus 30%). Pale rings are never reddish (Savage and Crother 1989).

• **REMARKS.** This subspecies is extensively mimetic of the sympatric Coral Snake *Micrurus mipartitus*, reinforced peripherally by *M. spurrelli*, *M. multifasciatus*, and *M. stewarti*.

2. *Pliocercus euryzonus burghardti* Smith and Chiszar Burghardt's False Coral Snake

Pliocercus euryzonus: Cope 1871:200 (first record of the subspecies, from "Darien").
Elapochrus euryzona: Günther 1893:107 (part, includes *P. e. euryzonus*).
Urotheca euryzona: Savage and Crother 1989:346 (part, includes *P. dimidiatus* and *P. e. euryzonus*).
Pliocercus euryzonus burghardti Smith and Chiszar 1996:31. Type locality, "1.6 km W Almirante, 10 m, Bocas del Toro, Panamá." Holotype, University of Kansas Natural History Museum (KU) 112426, an adult male, collected by C.W. Myers, 7 September 1965 (examined by authors).

• **DIAGNOSIS.** This subspecies is limited to Panamá and differs from *P. e. euryzonus* in having fewer, hence longer, black rings on body and tail, a maximum of 9 or more subcaudals in

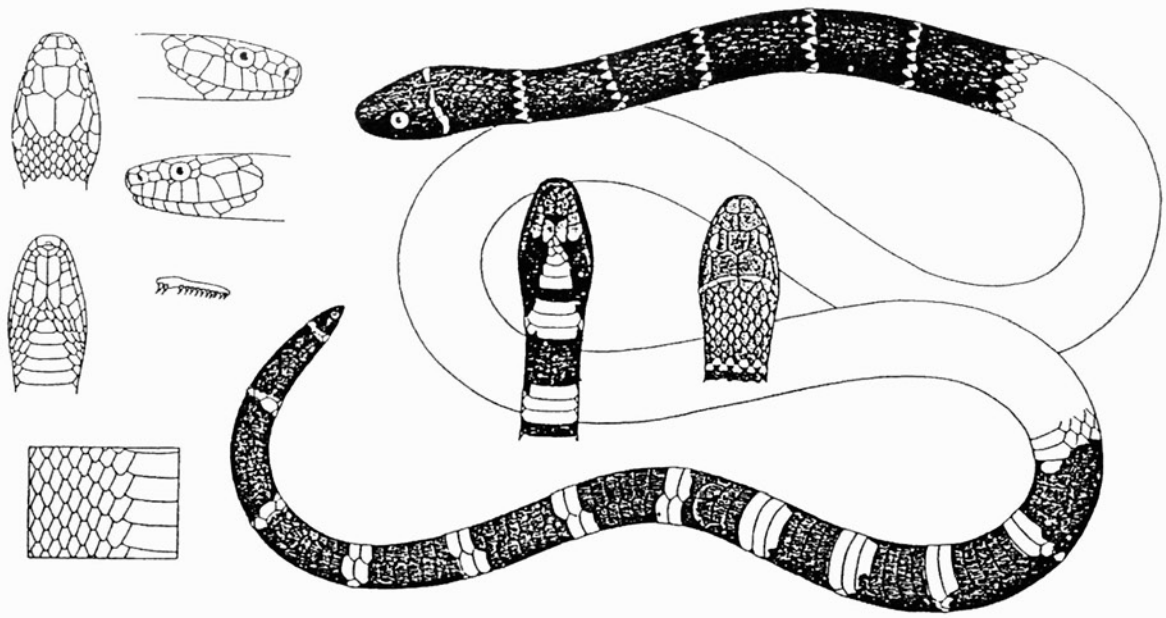


FIGURE 6. The holotype of *Liophis splendens* Jan (= *P. e. euryzonus*; from Jan and Sordelli 1866: livr. 13, pl. 5, fig. 1). Note the double secondary temporal.

any black ring (92% versus 0%), a minimum of 6 or more subcaudals in any black ring (86% versus 15%), fewer than 13 black rings on tail (100% versus 23%), a minimum median dorsal length of black rings on body 5 or more successive dorsal scales (96% versus 35%), fewer than 23 black rings on the body (76% versus 35%), and a maximum median or paramedian length of black nuchal ring 7 or more successive dorsal scales (70% versus 22%). Light rings often reddish in central and western Panamá, but not in eastern Panamá (Savage and Crother 1989).

• **REMARKS.** This subspecies is extensively mimetic of the sympatric *Micrurus multifasciatus*.

Supportive evidence of the taxonomic difference of *P. e. euryzonus* and *P. e. burghardti* is provided by two strong but independently non-diagnostic differences: the maximum number of successive median dorsals in the black rings on the body and the maximum number of ventrals at least 2/3 black in any ring (Smith and Chiszar 1996).

Pliocercus e. burghardti resembles *P. dimidiatus* in a number of ways that *P. e. euryzonus* does not, but the difference appears to reflect different models for mimicry. The northern range limit of *Micrurus mipartitus*, the chief model for *P. e. euryzonus*, lies close to the Panamá/Colombia border (Campbell and Lamar 1989), hence that species does not directly influence the pattern of *P. euryzonus* in most of Panamá. On the contrary, the primary model in Panamá (as well as in much of the rest of Central America) is *M. multifasciatus*, which is mimicked not only by *P. e. burghardti*, but also by *P. dimidiatus* (hence the appearance of red in the light interspaces of the latter species), and to some extent in western *P. e. burghardti* (*fide* Savage and Crother 1989). These two taxa converge somewhat through mimicry of the same species, yet remain as distinct species by virtue of their presumed separate ancestry, as deduced from their morphological differences. Thus the intermediacy in some respects of *P. e. burghardti* between *P. e. euryzonus* and *P. dimidiatus* is not, as we interpret the data, a product of intergradation, past or present, between the latter two taxa, but of geographically segregated mimicry by *P. euryzonus* of two different sympatric models, one of which is mimicked also by *P. dimidiatus* in ways similar to those adopted by the corresponding segment of *P. euryzonus*.

• **ACKNOWLEDGMENTS.** We are indebted to Linda S. Ford for critical locality information, to the personnel of the University of Colorado Map Library for their aid in fixation of obscure localities, to Deborah Aguiar for map preparation, to Ivan Ineich for information on Paris Museum specimens, to Cornell University Press for permission to reproduce figure 73 from Campbell and Lamar (1989), and to Krieger Publishing Company for permission to use figure 45 in Roze (1996).

LITERATURE CITED

Amaral, A. do. 1929. Estudos sobre ophidios neotrópicos XVIII - Lista remissiva dos ophidios de região neotrópica. Mem. Inst. Butantan 4: viii + 271 p.

Boulenger, G. A. 1894. Catalogue of the Snakes in the British Museum (Natural History). Vol. II. Trustees, Brit. Mus., London.

Campbell, J. A. and W. W. Lamar. 1989. The Venomous Reptiles of Latin America. Cornell Univ. Press, Ithaca, New York.

Cope, E. D. 1862. Synopsis of the species of *Holcosus* and *Ameiva*, with diagnoses of new West Indian and South American Colubridae. Proc. Acad. Nat. Sci. Philadelphia 14:16–82.

—. 1871. Ninth contribution to the herpetology of tropical America. Proc. Acad. Nat. Sci. Philadelphia 23:200–224.

Dixon, J.R. 1979. Origin and distribution of reptiles in lowland tropical rainforests of South America, p. 217–240. *In* W.E. Duellman (ed.), The South American Herpetofauna: Its Origin, Evolution, and Dispersal. Mus. Nat. Hist. Univ. Kansas Monogr. (7):vii + 469 p.

Dunn, E.R. 1933. Amphibians and reptiles from El Valle de Antón, Panamá. Occ. Pap. Boston Soc. Nat. Hist. 8:65–79.

—. 1949. Relative abundance of some Panamanian snakes. Ecology 30:39–57.

— and J.R. Bailey. 1939. Snakes from the uplands of the Canal Zone and of Darién. Bull. Mus. Comp. Zool. 86:1–22.

Frank, N. and E. Ramus. 1995. A Complete Guide to Scientific and Common Names of Reptiles and Amphibians of the World. NG Publ. Co., Pottsville, Pennsylvania.

Greene, H.W. 1997. Snakes: The Evolution of Mystery in Nature. Univ. California Press, Berkeley.

Günther, A.C.L.G. 1885–1902. Biologia Centrali-Americana. Reptilia and Batrachia. Porter, London.

Jan, G. 1863. Enumerazione sistematico degli ofidi appartenenti al gruppo Coronellidae. Archo. Zool. Anat. Fisiol. 2:211–330.

— and F. Sordelli. 1860–1881. Iconographie Générale des Ophidiens. Atlas. 3 vols. Bailleère, Milan and Paris.

Lamar, W.W. 1990. Middle American Herpetology. A Bibliographic Checklist (review). Herpetol. Rev. 21:65-67.

Obst, F.J., K. Richter, and U. Jacob. 1988. The Completely Illustrated Atlas of Reptiles and Amphibians for the Terrarium. T.F.H. Publ., Inc., Neptune City, New Jersey.

Pérez-Higareda, G. and H.M. Smith. 1986. The status of the Los Tuxtlas (Mexico) False Coral Snakes (*Pliocercus*). Bull. Maryland Herpetol. Soc. 22:125–130.

Pérez-Santos, C. and A.G. Moreno. 1988. Ofidios de Colombia. Mus. Reg. Sci. Nat., Torino, Monogr. (6):1–517.

— and —. 1991. Ofidios de Ecuador. Mus. Reg. Sci. Nat., Torino, Monogr. (11):1–537.

Pough, F.H. 1988. Mimicry and related phenomena, p. 153–234. *In* C. Gans and R.B. Huey (eds.), Biology of the Reptilia. Vol. 16, Ecology B. Defense and Life History. Alan R. Liss, New York.

Roze, J.A. 1996. Coral Snakes of the Americas: Biology, Identification, and Venoms. Krieger Publ., Inc., Malabar, Florida.

Savage, J.M. and B.I. Crother. 1989. The status of *Pliocercus* and *Urotheca* (Serpentes: Colubridae), with a review of included species of Coral Snake mimics. Zool. J. Linn. Soc. 95:335–362.

— and J.B. Slowinski. 1990. A simple consistent terminology for the basic colour patterns of the venomous Coral Snakes and their mimics. Herpetol. J. 1:530–532.

Smith, H. M., and D. Chiszar. 1996. Species-group taxa of the False Coral Snake genus *Pliocercus*. Ramus Publ. Co., Pottsville, Pennsylvania.

— and R.B. Smith. 1976. Synopsis of the Herpetofauna of Mexico. Vol. III. Source Analysis and Index for Mexican Reptiles. John Johnson, North Bennington, Vermont.

Sokolov, V.E. 1988. Dictionary of Animal Names in Five Languages. Amphibians and Reptiles. Russky Yazyk, Moscow.

Stuart, L.C. 1948. The amphibians and reptiles of Alta Verapaz, Guatemala. Misc. Publ. Mus. Zool. Univ. Michigan (69):1–109.

Villa R., J.D., L.D. Wilson, and J.D. Johnson. 1988. Middle American Herpetology: A Bibliographic Checklist. Univ. Missouri Press, Columbia.

Wilson, L.D. and J. R. Meyer. 1982. The snakes of Honduras. Milwaukee Pub. Mus. Publ. Biol. Geol. (6):1–159.

— and —. 1985. The Snakes of Honduras. 2nd ed. Milwaukee Pub. Mus., Milwaukee, Wisconsin.

Zhao, E.-M, Y.-M. Jiang, Q.-Y Huang, S.-Q. Hu, L. Fei, and C.-Y Ye. 1993. Latin-Chinese-English Names of Amphibians and Reptiles. Science Press, Bei-Jing, China.

HOBART M. SMITH, Department of EPO Biology, University of Colorado, Boulder, CO 80309-0334, USA (hsmith@spot.colorado.edu), and **DAVID CHISZAR**, Departmemt of Psychology, University of Colorado, Boulder, CO 80309-0345, USA (chiszar@clipr.colorado.edu).

Primary editor for this account, Robert Powell.