THE SYSTEMATICS OF
RHADINAEA (COLUBRIDAE),
a genus of New World snakes

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THE GENUS Rhadinaea contains 45 species of small to medium-sized snakes that dwell on the American mainland between latitudes 35° North (Cape Hatteras, North Carolina) and 35° South (east-central Argentina), from sea level to 3200 meters of elevation. Most species seem to be diurnal foragers of the forest floor, although several are probably highly secretive and even semiaquatic; they feed principally on amphibians and lizards. The primary habitats and routes of dispersal are pine-oak woodlands and cloud forests of Mexico and upper Central America and humid, tropical broadleaf forests, including montane and lowland rain forests.

The generic limits are vague, in part because characters customarily utilized in distinguishing snake genera break down within single species of Rhadinaea. A variety of morphological information is useful in the taxonomy of Rhadinaea, but species can largely be identified on the basis of color pattern, and the hemipenis proves to be a particularly important source of clues to intergeneric and intrageneric relationships. Underwood's recent expansion of the Natricidae to include Rhadinaea and allied genera is not accepted as a natural arrangement, and the genus is retained in the family Colubridae.

Eight species groups are recognized, primarily on the basis of characteristics of the hemipenis, color pattern, and maxillary dentition. The godmani group (11 species) has its ancestral homeland and center of dispersal in Nuclear Central America and is considered closest to the basic stock that gave rise to certain other species groups of Rhadinaea and to the genera Trimetopon and Coniophanes. One evolutionary trend seen within the godmani group is the reduction from 21 to 19 to 17 rows of dorsal scales. Rhadinaea godmani is shown to be an unexpectedly wide-ranging species with a disjunct distribution; the possibility of genetic interchange between this species and R. kemsteadae, on the Meseta Central of Chiapas, needs further investigation. The northern flavilata group (two species), perhaps derived from the old godmani group, is comprised of peripheral relicts and has been largely replaced by the more modern decorata (11 species) and taenita (three species) groups. These three groups are confined to Mexico except for the isolated Rhadinaea flavilata in the southeastern United States and for Rhadinaea decorata, which ranges from east-central Mexico to northwestern Ecuador. The latter species exhibits remarkable geographic variation in the hemipenis and has acquired keeled scales, a new feature in the genus. The occurrence of secondary hybridization in the taenita group is discussed, and the distinctive aemula is placed as a subspecies of Rhadinaea taenita; R. t. aemula possibly evolved as a mimic of the opisthoglyphous Coniophanes plicatilis. The calligator group includes a single, highly variable species in lower Central America and is of questionable derivation from the godmani group. The verruculacteops group (three species) is confined to lower Central America and is probably derived from the godmani group. The hemipenis of species in the verruculacteops group is strikingly similar to that of the diminutive Rhadinaea schistosa, a godmani-group relict in Veracruz, Mexico, even to the presence of straight spines that were once thought to characterize the nominal genus Rhadinella. The origin of the lateristriga group (eight species) is obscure, but this group is possibly ancestral to Pituophis, an evidently specialized genus of poisonous-snake mimics. Some specimens of Rhadinaea decipiens show an unexplained resemblance in color and pattern to nearly sympatric Rhadinaea calligator, a species not closely related to the lateristriga group. Some specimens of the Central American Rhadinaea guenteri have shallow grooves on the posterior fangs; this species is closely related to congeners that lack grooves and represents an initial stage in the evolution of opisthoglyphy; a view that the grooved-fang condition is primitive and being lost in such groups is disputed. The brevirostris group (six species) is confined to South America. Hemipenial features and scale-row reduction of Rhadinaea brevirostris indicate close relationship between this Amazonian species and the more southern Rhadinaea accipitalis, which is unique in the genus in having acquired a color pattern of dark spots and the low number of 15 scale rows. Several species have had their center of evolution in or near the Brazilian highlands and show convergence in aspects of color pattern with species that have evolved in Mexico. The general tendency in modern Rhadinaea toward loss of bilobation of the hemipenis is well exemplified by the brevirostris group, in which all species have retained a split insertion of the major retractor muscle and in which the primitive bilobed condition still appears in the variational repertory of two species.

There are few strict generic synonyms, because the species are sufficiently generalized to have permitted misassignment to a variety of named genera. The rediscovery of Calamaria dumerilii is reported; it was originally thought to be a Cuban species and is the type of the name Urobothia. The species is a distinct South American member of the lateristriga group, thus confirming Dunn's suggestion that the name Rhadinaea Cope, 1863, is a junior synonym of Urobothia Bibron "1843" [184-?]. However, Rhadinaea is retained in the interest of nomenclatural stability, pending application for conservation to The International Commission on Zoological Nomenclature. The names Taeniophallus
Cope, 1895, and Rhadinella Smith, 1941, are considered to be junior subjective synonyms of Rhadinaea, and the emendation Rhadinaea Garman, 1883, is a junior objective synonym. Two new species, both in the decorata group, are described. Taxonomic innovations and changes in nomenclature are summarized in the concluding chapter.