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*THE SNAKES OF THE GENUS NINIA**

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A study of the Herpetology of Panamá, Costa Rica and Nicaragua, begun under a John Simon Guggenheim Memorial Fellowship, was continued in the summer of 1933 under a Grant-in-Aid from the NATIONAL RESEARCH COUNCIL. In order to clarify the situation of Ninia in these countries it was found necessary to examine many specimens from elsewhere, so that a general idea of the genus was gained and is here offered. This clarification has involved examination of the entire collections of Ninia in the Museum of Comparative Zoölogy, the American Museum of Natural History, the Academy of Natural Sciences and the United States National Museum. To the authorities of these Museums (and of the many others, to be listed elsewhere, in which I have seen material from the countries named), and to the two foundations, I wish to express my thanks.

The genus Ninia may be defined as follows: Small Colubrid snakes with hypapophyses on all body vertebrae; hemipenis with sulcus forking proximally, with proximal hooks and distal calyces, the areas so furnished about equal in extent, calyculate area with free proximal edge (capitate) and divided so that the organ is somewhat bifurcate; maxillary teeth 15–18, subequal; mandibular teeth subequal; dorsal scales keeled, striate, without pits (Boulenger 1893, Cat. Snakes Brit. Mus. Nat. Hist. (2), 1, p. 292, says with pits, but microscopical examination of five forms has failed to disclose them); caudals double; anal single; preocular none (very rarely present in one form); pupil vertically elliptic; males with well developed spiny tubercles on chin scales; Mexico to Venezuela and Ecuador; five forms.

Two ill-known genera, Chersodromus of Mexico and Diapharolepis of Northwestern South America, seem to resemble Ninia except in having the prefrontals fused.

The least modified members of Geophis (leading to the allied genera Atractus, Carphophis, Farancia and Abacura) are manifestly allied to Ninia. So also the least modified members of Tropidodipsas (leading to Sibon, Sibynomorphus and the other so-called American "Amblycephalidae") are obviously similar to Ninia. These resemblances are shown by the hemipenis, the dentition, the elliptical pupil, the single anal, the keeled, pitless scales, the usual absence of the preocular, and the spiny tubercles on the chin of the male. Thus Ninia occupies a central position between a group of burrowing forms and a group of arboreal forms. No obvious allies to this group of genera are known at present.

I have examined 314 specimens of Ninia, 30 of which I took myself, having seen *sebae* and *diademata* in the field in Mexico; *maculata* and *psephota* in Costa Rica. The habits and behavior resemble those of Storeria. They flatten the entire body when alarmed.

Certain general statements in the following key may be modified. While *diademata* has six upper labials normally, a single specimen from Guatemala, which differs in no other respect, has been described as having seven, and called *labiosa*. No others with seven have been reported, and the 32 seen have six.

Two specimens of *atrata* have preoculars. Forty-eight seen, as well as those described, lack them. The two are: A.N.S. 3410, which has two preoculars on each side, the loreal entering the eye between them; A.N.S. 3412, which has two on each side separating the loreal from the eye. Preoculars are unknown in the rest of the forms.

Dumeril and Bibron report 17 scales for *sebae*, instead of 19.

Werner reports 21 scales in one of the types of his *subtessellatus*, instead of the normal 19.

A midventral black stripe appears in the following specimens, in place of the normal coloration:

atrata: Cartago, B.M.N.H.; Cariblanco, B.M.N.H., Vienna; Bruja Mts., M.C.Z. 24928–9; Atlantic side Darien, U.S.N.M. 24498. Six out of 50 specimens.

maculata: San Jose, A.M.N.H. 17294–5. Two out of 64 specimens.

sebae: Boquete, Mich. 57971; upper Costa Rica, U.S.N.M. 6357. Two out of 157 specimens.

With regard to my division of *atrata* into three species I urge the following considerations. I have had no difficulty in allocating 271 specimens. Only one form (*atrata*) is known from South America, and only one (*sebae*) from Mexico. *Atrata* is twice the size of *sebae* or *maculata*, and occurs with the latter in Costa Rica without a sign of change in either. *Maculata* occurs with *sebae* in eastern Nicaragua without any sign of intergradation. In Costa Rica *maculata* seems concentrated on the Atlantic slope and *sebae* on the Pacific. The latter occurs in Panamá only in Chiriqui, while *maculata* is all over the Canal Zone. In Nicaragua, *maculata* is only on the Atlantic slope while *sebae* is everywhere. These facts seem to me to imply specificity.

KEY TO FORM OF NINIA

A. 19 scale rows; 7–8 upper labials; caudals 34–70.

B. Uniform black above; a more or less marked lighter collar; belly usually immaculate, never checkered; ventrals 129–157; ♂ caudals 45–67; ♀ caudals 34–54 ..... *atrata.*

BB. Brown above with black cross bars; no marked collar; belly usually checkered, never immaculate; ventrals 130–155; ♂ caudals 54–56; ♀ caudals 45–54 ..... *maculata.*

BBB. Red above with or without black cross bars; a yellow collar followed by a black one; belly usually immaculate, never checkered; ventrals 131–147; ♂ caudals 48–70; ♀ caudals 36–52 ..... *sebae*.

AA. 19 scale rows; 6 upper labials; ♂ caudals 87–101; ♀ caudals 75–92; ventrals 136–156; black above with a yellow collar; belly yellow with a black midventral line or series of spots ..... *diademata*.

AAA. 17 scale rows; 6 upper labials; ventrals 158–162; caudals 68–73; black above with narrow white vermiculations; belly checkered with black and yellow .... *psephota*.

In the following list the types mentioned have been examined. The localities given are at the extremes of the ranges.

NINIA Baird and Girard.

1853 *Ninia* Baird and Girard, Cat. N. Amer. Rept., p. 49. Monotype *diademata*.

1854 *Streptophorus* Dumeril and Bibron, Erp. Gén. 7, p. 514. No type designated. Included species: *Sebae, Drozii, Lansbergi, bifasciatus*. I hereby designate *bifasciatus* (=*diademata*) as the type.

Ninia atrata (Hallowell).

1854 *Coluber atratus* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, p. 245. Colombia [Venezuela] less than 200 miles from Caracas. Types A.N.S. No. 3410–2.

1854 *Streptophorus Drozii* Dumeril and Bibron, Erp. Gén. 7, p. 518. New Orleans [?].

1854 *Streptophorus Lansbergi* Dumeril and Bibron, l.c., p. 518. Caracas.

1862 *Streptophorus sebae Schmidti* Jan, Arch. Zoöl. Anat. fis. 2, p. 27. Guayaquil.

1881 *Streptophorus spilogaster* Peters, Sitz. Ges. Nat. Fr. p. 49. Ecuador.

Range: Specimens have been seen from Trinidad (M.C.Z. 10266), Venezuela, Colombia, Ecuador (Pallatanga, A.M.N.H. 32026), Panamá, and Costa Rica (Cartago B.M.N.H.; Cariblanco, M.C.Z. 15292–3). Fifty specimens have been examined.

Ninia maculata (Peters).

1861 *Streptophorus maculatus* Peters, Mon. Ak. Berlin, p. 924. Costa Rica. Types Berlin 1872–4.

1875 *Ninia sebae tessellatus* Cope, Journ. Acad. Nat. Sci. Philadelphia (2), 8, p. 145. Sipurio, Costa Rica. Types U.S.N.M. 32568–9.

1909 *Streptophorus subtessellatus* Werner, Mitt. Nat. Mus. Hamburg 26, p. 215. Costa Rica. Types Hamburg 4185.

Range: Panamá Canal Zone (~~Gatun~~ U.A.N.M. 50114, Ancon M.C.Z. 22831–3), Costa Rica, Nicaragua (Jinotega B.M.N.H.). Sixty-four specimens have been examined.

Ninia sebae (Dumeril and Bibron).

1854 *Streptophorus Sebae* Dumeril and Bibron, Erp. Gén. 7, p. 515. Mexico. Type Paris 3778.

1855 *Elapoidis fasciatus* Hallowell, Journ. Acad. Nat. Sci. Philadelphia (2), 3, p. 35 pl. 4. Honduras. Type A.N.S. 3409.

1862 *Streptophorus sebae collaris* Jan, Arch Zoöl. Anat. fis. 2, p. 27. Mexico.

1883 *Streptophorus sebae dorsalis* Bocourt, Miss. Sci. Mex., p. 547. Belize.

1883 *Streptophorus sebae punctulatus* Bocourt, l.c., p. 547. Guatemala.

Range: Panamá (Boquete Mich. 57971), Costa Rica, Nicaragua, Honduras, British Honduras, Guatemala, Mexico (Jalapa M.C.Z. 16130–34; Cerro Barego, Oaxaca A.M.N.H. 19726–34). One hundred and fifty-seven specimens examined.

Ninia diademata Baird and Girard.

1853 *Ninia diademata* Baird and Girard, Cat. N. Amer. Rept., p. 49. Orizaba, Mexico. Type U.S.N.M. 12122.

1854 *Streptophorus bifasciatus* Dumeril and Bibron, Erp. Gén. 7, p. 520.

1883 *Streptophorus labiosus* Bocourt, Miss. Sci. Mex. p. 550, pl. 22, f. 6. Guatemala. Range: Honduras (Tela M.C.Z. 20202), Guatemala, Mexico (Zacualtipan A.N.S. 14757, Jalapa M.C.Z. 16112–21). Thirty-two specimens examined.

Ninia psephota (Cope).

1875 *Catostoma psephotum* Cope, Journ. Acad. Nat. Sci. Philadelphia (2), 8, p. 145. Pico Blanco, Costa Rica, 5000–7000 feet. Type U.S.N.M. 61971.

1909 *Streptophorus oxynotus* Werner, Mitt. Nat. Mus. Hamburg, 26, p. 216. Cariblanco, Costa Rica. Type Hamburg 4184.

Range: Higher regions of Costa Rica. Eleven specimens examined.

I cannot place *Streptophorus maculatus pavimentatus* Bocourt (1883, Miss. Sci. Mex. p. 549, pl. 32, f. 8; pl. 33 f. 2) from Haute Vera Paz, Guatemala. I have not seen the type nor any specimens from Guatemala resembling the figure.

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