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9. POISONOUS SNAKES OF SURINAM

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Relatively little has been published about the poisonous snakes of Surinam. Scattered notes on isolated specimens or on small collections have been published in various journals. Moreover, some information may be obtained from comprehensive works, like Schlegel's (1837) "Essai", Boulenger's (1896) catalogue, Amaral's (1929, 1931) check lists, Klemmer's (1963) list of the poisonous snakes of the world, and as far as ELAPIDAE are concerned from Schmidt's (1936) preliminary account of South American coral snakes. It seems that in the last hundred years only two authors (Kappler, Van Lidth de Jeude) have dealt with the Surinam snake fauna as such. Van Lidth de Jeude (1914-1916) dealt with poisonous snakes in a series of articles in an encyclopaedia; he did not aim at completeness, and his notes have only a very limited value for our purpose. From 1842 to 1846 Kappler made it his business to collect zoological specimens in Surinam, and in two books he published notes on the snakes (Kappler, 1881:137-139, 166-167; 1887:128-137). Of most interest is the list of species (Kappler, 1881: 166-167) of which he sent specimens to the Stuttgart Museum; it is not known to me who was responsible for the identifications. The following poisonous snakes were recorded by Kappler (1881:166-167): *Elaps surinamensis, E. hemprichii, E. lemniscatus, E. collaris, Crotalus horridus, Lachesis mutus* (on pp. 33, 138, named: *Trigonocephalus rhombeatus*), *Bothrops bilineatus, B. atrox.*

Since 1881 only three species have been added to this list, viz., *Micrurus psyches, M. averyi,* and *Bothrops neglecta.*

Taking into account taxonomic and nomenclatorial changes, to-day a list of the poisonous snakes of Surinam reads as follows:

ELAPIDAE

Leptomicrurus collaris (Schlegel, 1837),

Micrurus averyi Schmidt, 1939,

Micrurus hemprichii hemprichii (Jan, 1858),

Micrurus lemniscatus lemniscatus (Linnaeus, 1758),

Micrurus psyches (Daudin, 1802-1803),

Micrurus surinamensis surinamensis (Cuvier, 1817)

CROTALIDAE

Bothrops atrox (Linnaeus, 1758),

Bothrops bilineatus (Wied, 1825),

Bothrops neglecta Amaral, 1923,

Crotalus durissus terrificus (Laurenti, 1768),

Lachesis mutus mutus (Linnaeus, 1766).

Leptomicrurus collaris (Schlegel)

The history of *Elaps collaris* Schlegel was discussed by Schmidt (1937; 1939: 45, note 1), but as his survey is incomplete, and erroneous as regards some details, a more complete account will be published by me elsewhere. For long years this species has been included in surveys in the Philippine fauna as *Hemibungarus collaris*. Schmidt (1937:361) believed that the specimen from (British) Guiana was the first that proved in which part of the world the species is to be found. This is incorrect, however. Both Schmidt (1937) and Thompson (1913) overlooked that the species had been recorded from Surinam already by Kappler (1881:167). This record is substantiated by a specimen, which Kappler sent in 1844 to the Stuttgart Museum (now: Staatliches Museum für Naturkunde, Ludwigsburg). Another specimen from Surinam, collected more than hundred years ago, was discovered recently in the collections of the Zoologisch Museum, Amsterdam. At one time it belonged to the Vrolik collection *, part of which was acquired by the Anatomical Institute of Amsterdam University; in 1943 it was passed on to Zoological Museum. Schmidt made *Elaps collaris* Schlegel the type of his new genus *Leptomicrurus*.

Leptomicrurus collaris is one of the Coral Snakes that lacks an annulate pattern. Except for a whitish collar, an indication of a whitish bar across the snout, and large whitish spots on the ventrals reaching laterally on to scales of the first two rows, it is uniformly dark brown.

Micrurus lemniscatus lemniscatus (L.)

The Surinam specimens examined by me agree with the typical subspecies both in the number of ventrals and in coloration. A specimen from Macasseema, (British) Guiana (BM 87.1.22.14), with 256 ventrals also agrees with this subspecies. A male from Cayenne (French Guiana) (ML 1422) has only 223 ventrals, and in this respect it would come within the range of variation of *M. l. diutius* Burger (1955), which, according to the original description, occurs in Trinidad, Venezuela, and part of Guiana; in coloration this Cayenne specimen agrees with the typical subspecies.

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* The Vrolik collection belonged to Prof. G. Vrolik (25-iv-1775 — 10-xi-1859), and later to his son Prof. W. Vrolik (29-iv-1801 — 22-xii-1863) (Engel, 1939:329-330).

Micrurus surinamensis surinamensis (Cuv.)

Although it is usually stated that one of the characters of Elapid snakes is the absence of a loreal, the (posterior) nasal being in contact with the preocular, and thus separating the prefrontal from the upper labials, there are some abnormal specimens of *M. s. surinamensis* in which a scale is present between the nasal and the preocular, and which hence show a loreal. In one Surinam specimen (ML no. 1398) such a loreal is present on either side; another Surinam specimen (ML no. 1417) has a loreal on the right side, and in a further specimen (ML no. 1419) two loreals, one behind the other, are present on the left side; in a specimen from (British) Guiana (BM, purchased of Mr. Leadbeater) a loreal is present on the left side.

Bothrops atrox (L.)

Bothrops atrox is a species with a very wide range of distribution in South-America, and it is not to be wondered that it is found also in Surinam. I have not used trinomials in this case, because I believe that more research is necessary on the variation of this species before one can safely divide the species into subspecies. Should the occasion arise, that Guiana specimens have to be recognized as a distinct subspecies, it must be borne in mind that at least three names are available, viz., *Bothrops subscutatus* Gray (1842:47), *Bothrops sabinii* Gray (1842:47), and *Bothrops affinis* Gray (1849:7).

Bothrops atrox is fairly common in the low coastal area, but it also occurs farther into the interior. In the Nassau Mountains it was found in a river valley at 464 m above sea level. As far as our information goes at present, it seems that it has a preference for damp areas near water.

Bothrops neglecta Amaral

This species was described by Amaral (1923:100-101) from two specimens, both males. The holotype came from Bahia, Brazil, the paratype from (British) Guiana. At the time, Amaral (1923:101) suggested that the locality record for the paratype might be erroneous. Amaral (1929:237; 1931:100, reprint: 8), mentions the species from Bahia only; Klemmer (1963:408) mentions it from Bahia and Venezuela. However, it seems to be unlikely that the paratype, which the British Museum (Natural History) received from the Demerara Museum came from anywhere else than Guiana. Moreover, Parker (1935:525) mentions four other Guiana specimens received by the British Museum (Natural History), and since that time still another specimen was added to the London collection. From Surinam I have examined eight specimens. The range of variation in the numbers of ventrals and subcaudals is small, and as far as the small number of specimens allows, of any tentative conclusions, there seems to be very little difference between the sexes; in eight males the number of ventrals varies from 156-162, that of subcaudals (pairs + one) from 45-52; three females show 156-162 ventrals, and 43-46 subcaudals.

A specimen, taken on the Upper Tapanohoni river, in the mountains on the Surinam-Brazil border, was referred by Hoge (1964:63) to *Bothrops brazili* Hoge (1953). After having examined this specimen, I identified it as being *Bothrops neglecta*, for the following reasons. The specimen, a male, has 159 ventrals, and

the subcaudals 8/7 + 4 + 26/26 + 1 + 6/6 + 1 + 0/1 + 1 (47 in all). With these counts it comes within the range of variation of *B. neglecta*, but it remains below the counts of the two type specimens of *B. brazili*, which have 175 and 179 ventrals, and 55 and 60 subcaudals respectively. It must be remembered that Hoge (1953:15) pointed out that there was a strong resemblance in colour pattern between *B. brazili* and *B. neglecta* (as well as with *B. pirajai* Amaral). The colour pattern of the Tapanahoni specimen agrees very well with that of the other Surinam and Guiana specimens of *B. neglecta*, but with reference to Hoge's (1953:15) remarks, this need not be decisive. However, *B. brazili* is stated to lack a nasal pore (Hoge, 1953:15), whilst in *B. neglecta* such a pore is present. After careful examination of the Tapanahoni specimen, I arrived at the conclusion that a nasal pore is present, and that it is of the same shape as that of *B. neglecta*. Taking all these features (ventral and subcaudal counts, colour pattern, nasal pore) into account I feel convinced that the specimen must be referred to *Bothrops neglecta* Amaral.

Whether the Guiana specimens (including the paratype) and the Surinam specimens of *B. neglecta* are conspecific with the holotype, which came from Bahia, is a question that can only be settled by direct comparison.

As far as our present knowldege goes, *B. neglecta* is not found in the coastal area of Surinam, but only on higher grounds more in the interior. It seems that it does not have the preference of *B. atrox* for the vicinity of water, but that it occurs in the forest on higher ground. The only specimen with a definite record of the altitude was taken in the Nassau Mountains at 406 m above sea level in the forest on the slope of a hill.

Bothrops bilineatus (Wied)

This species has been recorded from Surinam already by Kappler (1881:167; 1887:137); Schlegel (1837, II:540, *Trigonocephalus bilineatus*) mentioned its occurrence in Cayenne (French Guiana); Quelch (1899:407, *Lachesis bilineatus*), and Parker (1935:525, 529) recorded it from (British) Guiana. Therefore, it is rather astonishing that the occurrence of this species in the three Guianas is not mentioned in comprehensive works, like Klemmer's (1963:404) list.

Crotalus durissus terrificus (Laur.)

Allen & Neill (1957) have pointed to the possible existence of two ecological forms of *Crotalus durissus terrificus* in (British) Guiana. In Surinam too it is said that there are two different forms of rattlesnake, which differ in coloration, and which occur in different habitats. The material available to me is too small to form a definite opinion.

Comparing the snake fauna of the three Guianas, there seems to be no difference, at least as regards the poisonous snakes. It is true that *Bothrops neglecta* has not yet been recorded from French Guiana, but this will be only a matter of time. *Micrurus averyi* is known from a single specimen only, but I do no doubt that it will be found to occur in all three Guianas.

Very little is known about the distribution of snakes within Surinam. In the old times "Surinam" as a locality record was considered to be sufficient, and in any case most collecting was done fairly close to the coast. Gradually some

information is coming from the interior, as more collectors are penetrating farther to the south. *Bothrops neglecta* apparently is a species that prefers the higher parts of the country, and this may explain why it has been reported from Surinam only fairly recently. Coral snakes (genera *Micrurus* and *Leptomicrurus*) are not very often represented in collections, but this need not mean that they are exceedingly rare. More probably it is a matter of not knowing the habitats preferred by these species. *M. s. surinamensis* and *M. l. lemniscatus* are more often represented in collections than the other species, and this may also point to their being lowland species.

If little is known about the distribution of snakes within Surinam, still less is known about the frequency of snake bite. Recently, Kabaart (1962) reviewed the situation. Although military personnel often goes on patrol into the jungle, the data collected by Kabaart show that in the period 1925-1958 not a single case of snake bite by a poisonous snake occurred. In 1958 two civilians died from snake bite, but the species of snake is not mentioned. There have been a few cases of snake bite, apparently by non-poisonous snakes, no effects of poisoning being apparent. Earlier authors (reviewed by Kabaart, 1962:220-221, reprint: 3-4) also state that snake bite is very rare in Surinam.

Of course one does not know how many cases of snake bite occur in the interior, because these are not reported to the medical authorities.

As an inheritance of their African ancestors, the negro population of Surinam (and many other people as well) put great faith in "sneki koti", which may be used for inoculation, or as an antidote after snake bite has occurred. Its composition is not completely known, except that the main ingredient is the head of a poisonous snake, roasted and ground into powder. Opinions differ slightly as to what is added, but usually it is stated that roasted and ground leaves of various plants are added. Those, who know how to prepare "sneki-koti" are not allowed to tell what the ingredients are, because then the antidote would lose its power. Moreover, inoculated persons have to refrain from eating some kinds of food, e.g., deer or turtle, etc. Although it has repeatedly been shown that "sneki koti" is of no value at all, it is very difficult to eradicate this superstition. Only very rarely it is known which species of snake was responsible in a case of snake bite. "Sneki koti" will be applied to bites of harmless snakes too, and if the patients after this treatment do not show any signs of poisoning, this is ascribed to the effect of "sneki koti". If the patients dies, it is assumed that he has eaten of forbidden food.

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Discussion

A. do Amaral: "The generic name *Bothrops* being of feminine gender oblige us to say *Bothrops neglecta* and not *neglectus*. With regard to the variabilities of the markings and changes that occur during growth I have written a paper, in 1925, about the variations in colour pattern in other species."

B. Lutz: "The Guiana-specimens of *Bothrops bilineata* belong to the same subspecies as those occurring further to the south of Bahia?"

L. D. Brongersma: "Perhaps Dr. Hoge may answer the last question because he has recently distinguished between two subspecies of *B. bilineata.*"

A. R. Hoge: "I have only seen a few specimen from the Guianas and although very similar to *B. bilineata.* There are slight differences in colour and pattern but more material is needed to arrive to a conclusion."

After the meeting A. do Amaral, A. R. Hoge and L. D. Brongersma have examined and discussed the specimens of *Bothrops neglecta, B. pirajai* and *B. brazili* in the collection of the Instituto Butantan. It became clear to all that the Guiana- and Surinam-specimens, referred to *B. neglecta* by Brongersma, must be placed with *B. brazili,* of which this probably represents a subspecies. Brongersma and Hoge agree that *B. neglecta* is a synonym of *B. pirajai;* Amaral does not agree with this synonymy, in as much as the former comes from the subxerophytic section (N.E.) of Bahia and the latter from the S. wooded area. In addition A. R. Hoge informs: "The information about the origin of *Bothrops neglecta* type specimen is from Amaral, who never published it and there is no information in the snake-register of the Instituto Butantan."

Amaral's additional remarks: In view of the profound divergence existing among ophiologists concerning the real systematic status and nomenclatural situation of the various populations of *Bothrops atrox* and *atrox*-like forms (in their mutual relations as well as in their relation to *B. jararacussu*: *megaera, lanceolata, aspera, neglecta, pirajai, brazili* and others) as scattered from S. Mexico, Central America, some Antilles and S. America to N.C. Argentina, it seems to be high time for a thorough (preferably cooperative) revision to be undertaken of that complex group of serpents.

That revision should take into consideration, besides other possible bases of comparison, the following points: geographic, topographic (altitudinal, clinal and climatic) distribution; ontogenetic evolution of body markings; general pholidosis; body and head shape and relative size; head scutellation; nasal pore; hemi-penis formation; number and character of vertebrae; scale keel type, etc.

Whenever possible, that study should also include comparative observations of living specimens (behaviour and striking position; average number of young in a brood and venom characteristics: toxico-pharmacological, biochemical and physico-chemical peculiarities of active components; venom-antivenom reactions).

— Through the same scientific approach it would be advisable to try to clear the status of the various populations (morphologically too closely allied) of the Neotropic rattler, gen. *Crotalus*.