THE SNAKES OF SURINAM, PART XVII: FAMILY *ELAPIDAE*, SUBFAMILY *MICRURINAE* (GENERA *LEPTOMICRURUS* AND *MICRURUS*).

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THE FAMILY *ELAPIDAE* (CORAL SNAKES)

Venomous snakes are classified in four groups: the family *Viperidae* consisting of the subfamilies *Viperinae* (Adders) and *Crotalinae* (Pit vipers), the family *Hydrophiidae* (Sea snakes) and the family *Elapidae* (Coral snakes, cobras and mambas). The coral snakes are slender, lively, snakes which have nine large scales on their head, which is also typical for non-venomous snakes of the family *Colubridae*. With a few exceptions coral snakes do not have a loreal scale; this is in contrast with most colubrid snakes.
The most feared venomous snakes, like cobras, mambas and the australian taipan, belong to the *Elapidae*. As with the sea snakes the coral snakes have small venom fangs at the front of the upper jaw. These fangs are fixed, unlike those of the vipers, which are hinged. The fangs of the sea snakes have a deep gutter or groove, but the fangs of the coral snakes have evolved to possess an enclosed venom duct. A seam, however, indicates where the join is.
The poison of the *Elapidae* is mainly neurotoxic. A few species, however, have venom which is not only

Foto 1. *Leptomicrurus collaris*. Foto: John de Bruin.

neurotoxic, but also cardiotoxic (for example cobras). The neurotoxic venom specially affects the nervous system. The venom blocks the nerves in such a way that muscles (including the respiratory muscles) no longer fuction properly. Because of the paralysis of these muscles death from asphyxia is possible. The neurotoxic venom also blocks the sense-organs, so that the pain treshold is heightened and the conciousness lowered. Often the victims of some elapids do not even notice the bite! The venom gland has evolved out of a part of the ear salivary gland; in other words, the venom has the same main fuction as the normal saliva. Besides it has a strong toxic effect. Apart from enzymes important for digestion of food, the venom contains many chemical components including:

- neurotoxins : these affect the nerves.
- haemorrhagins : these destroy the walls of the

blood vessels causing internal bleeding.
- thrombase : causes blood coagulation.
- haemolysines : which destroy the red blood-corpuscles.
- cytolysins : affecting red and white blood-corpuscles and tissue cells.
- antifibrins or anticoagulins : to delay the blood coagulation.
- antibacteria : to protect against bacterial infection.

The effect of a venom in its totality can be (Molenaar, 1986):

- neurotoxic (coral snakes and sea snakes): affecting mainly the nervous system.
- cardiotoxic (coral snakes): paralyses the heart muscles.
- myotoxic (sea snakes): paralyses the respiratory muscles.
- haemotoxic (adders and pit vipers): affects the blood and blood vessels.
- histolytic (adders and pit vipers): destroys the tissue cells.

THE SUBFAMILY *MICRURINAE* (TRUE CORAL SNAKES)

The family *Elapidae* is represented by a great number of genera in Africa and Asia. The family is especially well-represented in Australia, where 75% of all snakes belong to this family. In America it is only represented by the subfamily *Micrurinae*. This subfamily encloses three genera:

- the genus *Leptomicrurus* (slender coral snakes) confined to South America.
- the genus *Micruroides* (north american coral snakes) only found in North America and Mexico.

- the genus *Micrurus* (true american coral snakes) widely distributed in North, Central and South America.

The american coral snakes belong, together with the mambas from Africa, to the most highly developed species in the family *Elapidae*. In their upper-jaw, behind their poison fangs, they have no other teeth, where other elapid species do have one or more small teeth. On the palatine bone, sphenoid bone and the lower jaw we find in all species the normal prey-holding teeth.
Although they have strongly toxic venom, american coral snakes rarely cause fatal bites. Their secretive nature means one seldom meets these snakes. Also because of their shy nature, small mouth and small fangs they are not very likely inject venom into humans, although people who go barefoot risk a fatal bite. Very young coral snakes are not able to penetrate the human skin with their small fangs. Because of their small fangs, coral snakes do not need to open their mouths as widely as many other snakes to deliver a bite, but in order to get enough venom into the victim often have to chew.

THE GENUS *LEPTOMICRURUS* SCHMIDT, 1937

Herpetologists do not agree yet over the exact number of species. Peters & Orejas Miranda (1970) give three species and Freiberg (1982) gives two species, one of them with one subspecies. The species that lives in Surinam, *Leptomicrurus collaris*, is described as a species of the genus *Micrurus* by Lancini V. (1979).

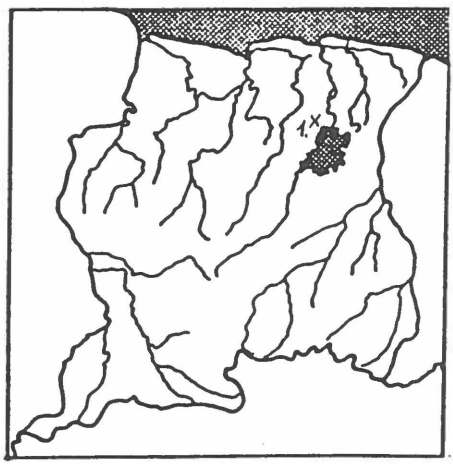
General data and characteristics of the genus:
Head: The head is blunt and does not narrow towards the neck. The eyes have round pupils.
Body: These snakes have a cylindrical, long, thin

body with smooth scales.
Tail: The tail is very short.
Way of life: *Leptomicrurus* lives fossorial. The prey is chased during the night by grubbing in the humus.
Food: Mainly small prey because the mouth is smaller and less flexible than the mouth of the colubrids from which they have evolved. They eat small lizards, small snakes, eels, caecilians, arthropods (for instance spiders), onychophora (caterpillar-like animals), very young birds and fish.
Habitat: The soil of savanna and rain forest under the foliage, in chinks of rocks, under rotting tree trunks, in holes under the ground, often near creeks or marsh lands.
Reproduction: The snakes lay between three and fourteen elongate eggs, which are laid in an existing hole or under a fallen tree trunk.
Particular details: Herpetologists do not agree about the correct name for the genus. Characteristic is the colour, which differs from the genus *Micrurus*. It lacks the coloured bands - instead the dorsum is entirely dark, and the belly is checkered in two colours. As the name indicates (Lepto = slender, thin) this genus is more slender than the species of the genus *Micrurus*.

Leptomicrurus collaris (Schlegel, 1837).

Dutch name: Slanke nekbandkoraalslang.
Maximum length: About 60 cm.
Scalation: 15 rows of smooth dorsals; 215-230 ventrals; anal scale divided; 1 preocular scale; 2 postoculars; no loreal; 7 supralabials of which the third and fourth touch the eye; 7 sublabials; 0+1 temporals.
Characteristics: Dorsally this species is coloured

uniform black. Ventrally it is also black, interrupted by red cross-bands. At the edge of the belly these cross-bands end in a point. In the prolongation of this point there are a few small red spots which cross the edge of the belly and appear up to the fourth or fifth row of dorsal scales.
The head is also black, with (immediately behind the parietal scales) a white ring. A particular characteristic is the formula of the temporal scales: 0+1.
Good plates of this species are to be found in Roze (1966) on pages 244 and 246.
Distribution: Venezuela and the Guianas.
Locality records in Surinam: 1. Brownsberg (P. Theunissen, 1984).



THE GENUS *MICRURUS* WAGLER, 1824

In its totality this genus contains 62 species, of which only eight species do not live on the continent of Central and South America (including the isles near to the coast). Including the subspecies the genus contains about 89 forms.

General data and characteristics of the genus:
Head: The head is blunt and is not distinct from the neck. The eyes have small, round pupils. The nine large head scales, which are characteristic of colubrids are also characteristic

of this genus. The loreal scale is lacking in *Micrurus*.

At the front of the upper jaw we find on each side one poison tooth with a closed poison gutter or groove. The seam where the edges of the gutter have fused is still clearly visible. The mouth of *Micrurus* is small and less flexible and thus can not be opened as wide as in most other genera of snake. Because the fangs are small and the snakes do not hunt large prey, they do not need to open their mouths very wide to deliver a bite.

Body: Slender and cylindrical with smooth scales. Because of their characteristic bands in black, red or orange and white or yellow, they are called coral snakes. These rings are not interrupted in any way, so that the snake has the same colours on the belly as on the back. However, there are exceptions: some species are entirely black with small white or yellow rings, the red rings being absent.

Tail: short.

Way of life: A coral snake is a burrower which chases its prey during the night by grubbing in the humus.

Food: Relatively small prey is taken in keeping with its small mouth. It eats mainly small snakes (and has been recorded as truly cannibalistic) and lizards, however, also frogs, fish including eels, small birds, caecilians, onychophora, arthropods and other insects.

Habitat: The soil of rain forest or savanna forest, but also fringe areas of marsh lands, rice fields, creeks or small lakes.

Reproduction: The snakes lay between two and fourteen eggs in existing holes or under tree trunks which lay on the ground. The eggs vary between 7 x 25 and 20 x 40 mm, depending on the species.

Particular details: In general this genus is not aggressive. When there is any danger, the coral snake brings its body into the form of a ring and spreads it flat on the ground. In this way the body becomes broader and the snake appears larger. The tail is stuck in the air, with the top of it curled a little. The snake moves its tail in an attempt to convince predators that it is in fact its head. The head itself is hidden somewhere under the body. If this means of self defence fails, the snake will attack. The strike is not very fast and the reach is short. The venom, however, is very strong and has a neurotoxic effect. The quantity per bite varies depending on the size and species, usually between 20 and 200 mg. When the snakes are milked the average quantity in dried substance is about 60 mg. A dose of 15 mg is enough to kill an adult person.
Once a coral snake has bitten its prey, it will chew a few times in order to ensure injection of enough venom. This extra chewing is a rare phenomenon among snakes. The genus *Clelia* (Mussurana) also has this habit (Abuys, 1983).

Some believe the remarkable colours of the coral snake act as warning colouration. The unpleasant experience of a predator - if it should survive the bite of a coral snake - should retain it from trying to catch such a coloured snake again. Some colubrids (which are not venomous) look very like the coral snake and profit by this resemblance. A theory Prof. Dr. Robert Mertens wants to prove is based on snakes whose bite is not fatal, but nevertheless unpleasant (for example bites of some opistoglyph snakes). The predator should learn from its experience and pass the information on to its progeny.
However, it is possible to make some critical

notes about the function of the remarkable colouration of *Micrurus*. Coral snakes and false coral snakes are nocturnal animals; during their active period the colours are not to be distinguished. By day the coloured rings serve to break up the appearance of the animal: on first sight the snake is not recognisable. If the colours are designed to frighten a predator the defensive posture adopted is not a convincing support to the warning colours. The defence attitude is designed to limit the damage caused by an attack by the predator or to keep the head safe in order to make a counter-attack. Some snakes that imitate these warning colours are for instance some members of the genera *Erythrolamprus*, *Anilius*, *Hydrops*, *Oxyrhopus* and the young of *Hydrodynastes*.

An aid to memory to distinguish the coral snakes of North America from the false coral snakes, is the following little rhyme:

Red on yellow (or white)
kill a fellow (or might)
Red on black
venom lack.

But pay attention: this rhyme is not applicable on species of South or Central America.

REFERENCES

Abuys, A., 1983. The snakes of Surinam, Part VII: Subfamily *Xenodontinae* (genera *Clelia* and *Dipsas*). Litt. Serp., Vol. 3 (4): 111-120 / Dutch Ed.: 124-134.

Ameling, A.D., 1978. De adder. Dieren dichterbij No. 4. Uitg. Het Spectrum, Utrecht/Antwerpen. Pp. 1-116.

Cunha, Osvaldo Rodrigues da & Francisco Paiva do

Nascimento, 1978. Ofídios da Amazônia, X: As cobras da região leste do Pará. Publ. Avulsas Museu Paraense Emílio Goeldi. Pp. 1-218, 1 map, errata.

--- & ---, 1982. Ofídios da Amazônia, XIV: As espécies de *Micrurus, Bothrops, Lachesis* e *Crotalus* do sul do Pará e Oeste do Maranhão, incluindo áreas do Cerrado deste Estado. Bol. Museo Paraense Emilio Goeldi, Nova Série: Zoologia, No. 112: 1-58.

Freiberg, Marcos, 1982. Snakes of South America. T.F.H. Publications Inc., Ltd., Neptune. No. PS-758. Pp. 1-189.

Grzimek, B., 1973. Het leven der dieren, deel VI: Reptielen. Dutch ed. Het Spectrum, Utrecht/ Antwerpen. Pp. 1-742.

Lancini V., Abdem R., 1979. Serpientes de Venezuela. Ernesto Armitano, Caracas. Pp. 1-262.

Molenaar, G.J., 1986. Lacerta, Vol. 44 (12): 197-212.

Peters, James A. & Braulio Orejas-Miranda, 1970. Catalogue of the Neotropical Squamata: Part I Snakes. Smithsonian Inst. Bull., No. 297: i-viii, 1-347.

Roze, Jánis A., 1966. La Taxonomia y Zoogeografia de los Ofidios de Venezuela. Univ. Centr. Venezuela, Caracas. Pp. 1-362.

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