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Notes and Comments

Length, weight, and longevity record for *Micrurus frontalis* (Duméril, Bibron & Duméril, 1854)

Recorde de comprimento, peso, e longevidade para Micrurus *frontalis* (Duméril, Bibron & Duméril, 1854)

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The South American triadal coral snakes (snakes with three black rings combined with red and white (or yellow rings) include 17 currently recognized species (Silva Júnior et al., 2003) and one of them is *Micrurus frontalis* (Figure 1a), which is distributed from the Cerrado formations of Central Brazil (including Sao Paulo and Minas Gerais), and west into Goias, and the Brazilian states of Mato Grosso and Mato Grosso do Sul. To the east, *M. frontalis* reaches the Atlantic coast in the state of Espirito Santo, and to the S-SW it is found in southern Paraguay (Silva Júnior and Sites Junior, 1999; Campbell and Lamar, 2004).

M. frontalis venom has a postsynaptic neurotoxin that produces loss of muscle strength and death by respiratory paralysis (Lomonte et al., 2016; Medeiros et al., 2019; Sanz et al., 2019), therefore all accidents must be carefully monitored and evaluated as potentially serious. Its venom is used in the production of Brazilian antielapidic serum, along with the venom of *M. corallinus.* Both species are maintained at the animal facility of the Laboratory of Herpetology at Butantan Institute (LHBI) to produce the anti-venom serum that is distributed to all Brazilian states by the Ministry of Health.

In May 2009, an adult male of *M. frontalis* from the State of São Paulo was donated to the LHBI, weighting 145g and with a snout-vent length (SVL) and total length (TL) of 105 cm and 112 cm, respectively. It was given the identification number Mf 0903.

In nature, *M. frontalis* diet consists of animals with fossorial or cryptozoic habits, as amphisbaenians, some snakes and lizards (Silva Junior, 1995; Roze, 1996; Silva Junior and Aird, 2001). During captivity the specimen was offered thawed snakes in a quantity of 40% of its body weight for three consecutive weeks, followed by a 15-day break after which the snake was milked (Mendes et al., 2019). The thawed preys offered were from various species, as *Sibynomorphus mikanii, S. neuwiedi, Oxyrhopus guibei, Tomodon dorsatus, Bothrops jararaca, B. alternatus, B. jararacussu, B. atrox, Atractus sp, Crotalus durissus, Philodryas sp* and *Pantherophis guttatus*, which were all well accepted by the male (Figure 1b).

Figure 1. (a) *Micrurus frontalis* kept in captivity in bark substrate; (b) *M. frontalis* grasping a thawed *Bothrops jararaca.*

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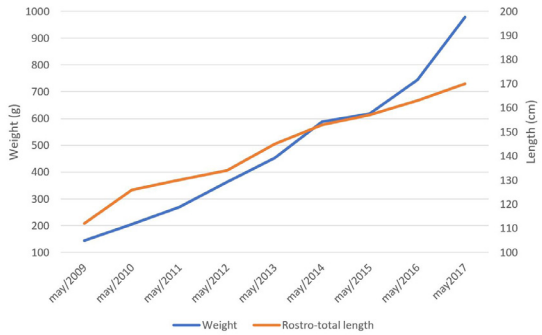
Figure 2. Tips attached to *M. frontalis* fangs for milking.

Figure 3. *M. frontalis* Mf 0903.

To increase milking efficiency, pilocarpine was administered intradermally (10mg Kg^{-1}) ten minutes before venom extraction (Morais-Zani et al., 2018). Pilocarpine is a natural alkaloid with cholinergic agonist activity that binds to muscarinic receptors inducing secretion from exocrine glands (NCI THESAURUS, 2020). Coral snake venom milking is done with tips attached to the proteroglyphs fangs (Figure 2) and afterwards the venom is pipetted to microtubes.

The specimen was kept in a glass terrarium measuring 120 cm x 40 cm x 60 cm, with bark previously treated with chlorine solution as substrate, water *ad libitum* and a shelter made of palm leaf. For 5 years, this specimen alone was responsible for the venom of *M. frontalis* mixed with the venom of *M. corallinus* for the production of antielapidic serum distributed through the Brazilian Territory. After 8 years in captivity (3123 days) this male died in 2017 due to heart failure, with a TL of 170 cm and weighing 978g (Figure 3). In literature the maximum length recorded for this specie is 164 cm, and to the best of our knowledge this is the record of *Micrurus frontalis* kept for the longest time in captivity. Oliveira et al. (2006), related a longevity record of 1298 days for *M. frontalis* kept in captivity.

The average amount of venom yielded per *M. frontalis* maintained in captivity at the LHBI in each milking is 70 mg of total venom (from 2018 to present); in contrast, this male yielded 500mg/milking. Graphic 1 shows the growth (weight and length) of the specimen during its 8 years in captivity.



Graphic 1. Growth of *Micrurus frontalis* during 8 years of captivity.

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