

# • Coral distante •

## (*Micrurus remotus*)

Bites, venoms, and venomous snakes of Colombia

### G4

MEDICAL IMPORTANCE GROUP 4

Snakes that **bite rarely**, and **have not caused significant envenoming** or have not caused documented bites



⚠ Poorly Reliable: Confidence for this species is poor due to the lack of data and information on Colombian populations. Therefore, most of our knowledge comes from a few studies and populations outside the national territory.



⚠ Detail of: Head, body and tail.

## 1. Envenomation symptoms



Envenomation caused by *Micrurus remotus* has not been described in the medical literature or reported in the National surveillance health system (SIVIGILA, Spanish acronym). In general, symptoms of envenoming caused by South American *Micrurus* species may include local effects such as pain and radiated pain, edema, erythema, bleeding, swelling and paresthesia (as numbness) [1]. Furthermore, systematic symptoms, caused by the neurotoxic activity of the venom may provoke palpebral ptosis, eye movement limitation, visual accommodation difficulties, chewing or swallowing difficulties, sialorrhea, decreased muscle strength, paralysis of muscles and limbs, difficulty in moving and standing upright, acute myasthenic syndrome, dyspnea, and paralysis of the thoracic musculature that can lead to diaphragmatic paralysis and death [2,3,4]. Paralytic symptoms may occur a few hours after the snakebite.

An envenomation caused by *M. remotus* is considered mild when in the first 6 hours the patient only manifests local symptoms that usually include minor bleeding from the fang marks and paresthesia (a numbness feeling in the bitten area that can later spread to nearby areas) [5]. A moderate envenomation will be characterized with the manifestation of an acute myasthenia (weakness and fatigue in the muscles) without paralysis involved [1,4]. Finally, an envenomation is considered severe when there is an intense myasthenia that can evolve to paralysis [1,4].



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## 2. Treatments and snakebite care



For effective treatment, envenomation caused by *M. remotus* or any *Micrurus* species must be urgently attended by medical care. The time between envenomation and treatment should be as short as possible. The use of tourniquets, potions, sucking, or other non-medical treatment must be avoided [4]. Also, in cases where the snake has not been correctly identified, this procedure can lead to aggravation. Envenomation caused by *Micrurus* can be classified as mild to moderate or severe according to the symptoms shown by patient [5].

For envenomation caused by any species of coral there is a general management protocol. First, coral antivenom serum must be applied during the first two hours before or when the signs of paralysis appear [6]. The amount of antivenom serum to be administered will depend on the degree of severity, as well as neutralization capability of the serum laboratory brand. However, it is recommended to start with 5 vials (INS antivenom) for mild cases and 10 vials (INS antivenom) for moderate to severe cases [6]. Dosage is not different between children and adults [7]. In moderate and severe envenoming cases the patient should be referred to a third and second level hospital with ventilator support and intensive care units (ICU) without stopping the application of antivenom [7]. Further, hypersensitivity to antivenoms can always appear, so it is important that its application is done exclusively by medical trained staff.

Even so, envenomation caused by *Micrurus* species is potentially serious in all cases and may require mechanical ventilation, and the specific therapy (antimicruric snake antivenom) should be used to neutralize the venom effects. The patient must be observed within the first 6 hours after the snakebite for the safe identification of snakebite severity [5].

## 3. Snakebite capacity



Given that *M. remotus* is a rare species from remote regions, snakebite events are more likely in isolated populations, such as indigenous and other Amazonian communities [8]. The inoculation capacity is relatively low due to the osteological limitations present in several *Micrurus* snakes. They have a small head, and a limited mouth opening with about an angle of 30 degrees. In general, the alarming colors showed by coralsnakes also allow them to be seen in advance by people. These animals usually stay hidden under leaf litter of the forest floor. In general, *Micrurus* envenomation occurs in snake handling situations [2]. In these cases, the snake needs to hold and "chew" the hand, interdigital membranes, or edges of the fingers [5].

## 4. Recognition



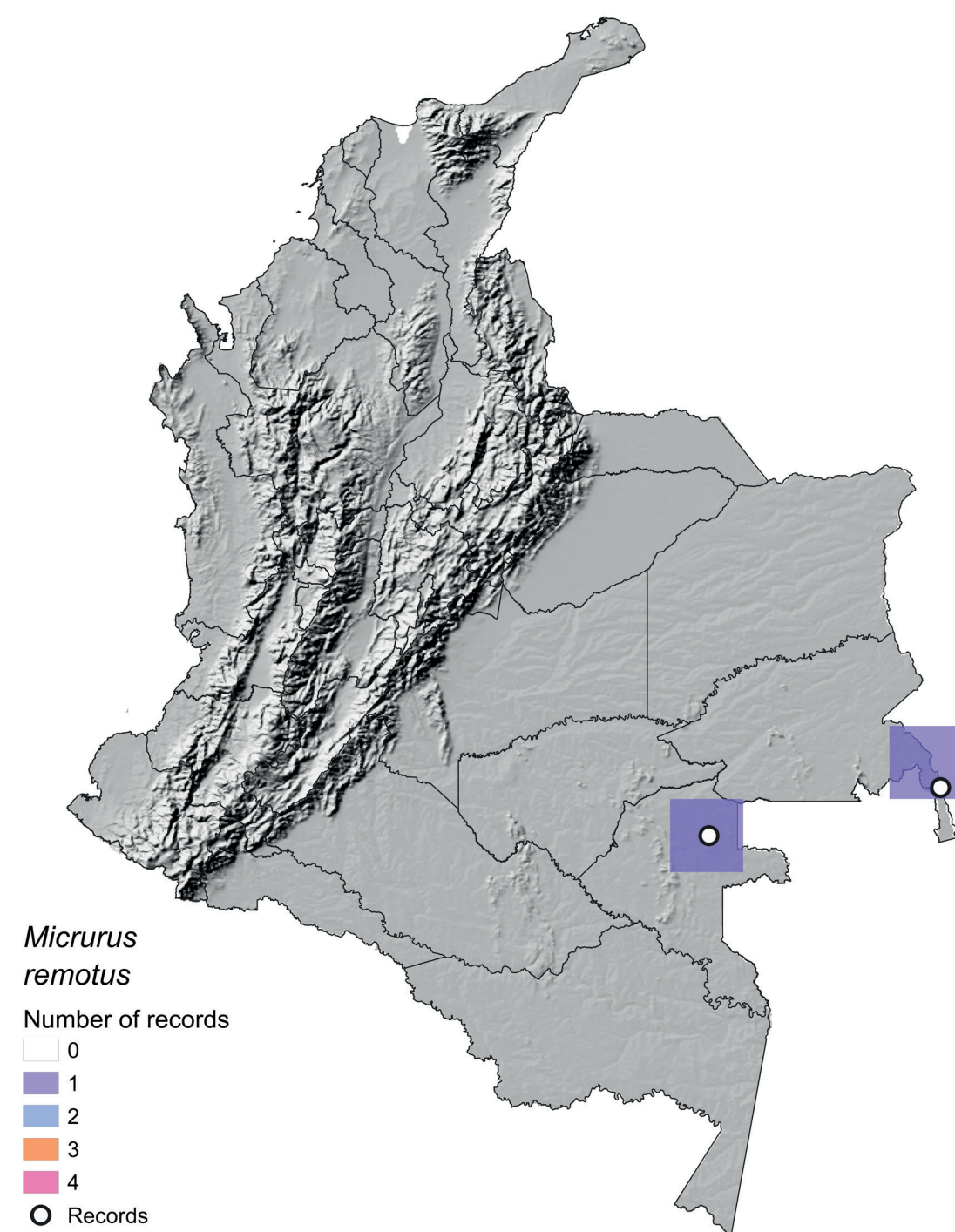
This coral snake can be recognized by having a monadal pattern (e.g., one black single-ringed) composed by red, white, and black rings, the last one ranging from 22 to 37 rings along the body. A white region is present between the black cephalic-cap and the first black nuchal band; and the tail is mostly bicolor (i.e., with black and yellowish-white rings). When the tail is tricolor it shows only a few reddish-brown dorsal spots [8,9].

Two other species of Colombian coralsnakes from western Amazon show the same tricolor pattern of dorsal body as *M. remotus*: *M. ornatissimus* and *M. tikuna*. [9]. However, *M. remotus* differs from both by having the scales on the top of the head completely black, without white spots; the tail is mostly bicolor (i.e., black, and yellowish-white rings versus tail tricolor in both species). *Micrurus remotus* also differs from *M. tikuna* by the presence of a white region (versus red region in *M. tikuna*) between the black cephalic-cap and the first dorsal ring; and it differs from *M. ornatissimus* by having 22 to 37 black body rings (versus 38 to 67 in *M. ornatissimus*) [8,9].

## 5. Distribution



In Colombia, *M. remotus* is distributed in lowland Amazonian forest in eastern parts of the country [8,11] This snake has records only in Guainía and Vaupes departments (corregimiento Puerto Colombia and Mitú municipality), 240 m asl [11,12] (Figure 1).



**Figure 1.** Geographic distribution of *Micrurus remotus* in Colombia and its habitat suitability model. Based on bioclimatic variables, the habitat suitability model predicts the species' potential distribution in Colombia, identifying zones with suitable or unsuitable environmental conditions for its occurrence across the country. Values close to 1 indicate optimal environmental conditions (high probability of presence), while values close to 0 indicate unsuitable conditions (absence likely).

## 6. Natural history



Rare. It inhabits tropical rainforests, lower montane moist forest and cloud forest in remote regions of the Amazon [8]. Colombian populations are still unknown from a natural history point of view, meaning that basic biological features such as diet, reproductive cycle, antipredator behaviors, and ecological interactions remain unknown. However, at Serra da Mocidade, Roraima state, Brazil, there is a record of an individual found at an altitude level of 1,060 asl (Pers. Obs. NKC) [13].

## 7. See it in the wild, rural or peri-urban areas



As it is a rare species, the detailed distribution of *M. remotus* and its putative presence in urban or peri-urban areas is not recorded in the literature.

There are no records of *M. remotus* at iNaturalist biodiversity platform and only 16 records at GBIF platform [14,15]. In the latter, the only one record from Colombia is the paratype, registered at Mitu municipality, Vaupés department. The other records are from Brazil and Venezuela, some of which are in national parks or areas already devastated by hydroelectric plant building.

## 8. Conservation



**Least Concern.** *Micrurus remotus* has a restricted distribution in eastern Colombian lowland rainforests of the Amazon. Its occurrence is poorly documented in the literature and mostly associated with ancient and general records. Some of these regions currently may be destroyed. Due to the low number of localities in Colombia and the few records, this taxon may need a detailed review of its conservation status. Despite this *M. remotus* is not listed in Resolution 1912/2017 from the Colombian Environmental Ministry, nor is it considered in CITES.

# 9. Nombre científico y comunes



The name of the genus *Micrurus* alludes to the small tail shown by these snakes. The word “*mikros*” means small, and the word “*oura*” means tail. Both are from the Greek language. The specific epithet originates from the Latin word *remotus*, which means “distant”. This is an allusion to the distribution of the species, which is in sparsely inhabited areas of the Amazon [8].

**Table 1. Summary of important biological, venomous, epidemiological and medical traits.**



★		
TOXICITY AND BIOLOGICAL ACTIVITY	VENOM ACTIVITY PROFILE	GENERAL BIOLOGICAL TRAITS
<b>LD<sub>50</sub> (µg/mice):</b> Unknown	<b>Proteolytic:</b> Unknown	<b>Total Length (cm):</b> ♂ ♀ 45–56.7
<b>MCD (µg/mL):</b> Unknown	<b>Neurotoxic:</b> Yes	<b>Weight (g):</b> ♂ ♀ Unknown
<b>MDD (µg/mice):</b> Unknown	<b>Myotoxic:</b> Unknown	<b>Reproduction:</b> oviparous
<b>MED (µg/mice):</b> Unknown	<b>Hemotoxic:</b> Unknown	<b>Diet:</b> Unknown
<b>MHD (µg/mice):</b> Unknown	-	<b>Distribution:</b> Guainía and Vaupés departments Southeastern Colombia

PROTEOME			
<b>PLA<sub>2</sub>:</b> Unknown	<b>SVSP:</b> Unknown	<b>SVMP:</b> Unknown	<b>NGF:</b> Unknown
<b>CRISP:</b> Unknown	<b>CTL:</b> Unknown	<b>DIS:</b> Unknown	<b>KUN:</b> Unknown
<b>BPPs:</b> Unknown	<b>VEFG:</b> Unknown	<b>3FTx:</b> Unknown	
<b>Crotoxin:</b> No	<b>Crotamine:</b> No	<b>LAAO:</b> Unknown	

MAIN ENVENOMATION SYMPTOMS		RISK	GRADE OF ENVENOMATION
<b>Hemorrhage:</b> Unknown	<b>Ecchymosis:</b> Unknown	<b>Bites per year:</b> Unknown	<b>Mild:</b> Unknown
<b>Nausea:</b> Unknown	<b>Hematemesis:</b> Unknown		
<b>Hypotension:</b> Unknown	<b>Blisters:</b> Unknown	<b>Bites per 1,000 people yearly:</b> Unknown	<b>Moderate:</b> Unknown
<b>Edema:</b> Unknown	<b>Vomiting:</b> Unknown		
<b>Coagulopathy:</b> Unknown	<b>Diarrhea:</b> Unknown	<b>Sequelae caused per year:</b> Unknown	<b>Severe:</b> Unknown
<b>Sialorrhea:</b> Unknown	<b>Local Pain:</b> Unknown		
<b>Hematuria:</b> Unknown	<b>Necrosis:</b> Unknown	<b>Deaths caused per year:</b> Unknown	
<b>Renal failure:</b> Unknown			

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# 10. Referencias

1. Bisneto, P.F.; dos Santos Araújo, B.; da Silva Pereira, H.; da Silva, I.M.; Sachett, J.D.A.G.; Bernarde, P.S.; Kaefer, I.L. Envenomations by coral snakes in an Amazonian metropolis: Ecological, epidemiological and clinical aspects. *Toxicon*. **2020**, 185, 193–202.
2. Pardal, P.P.D.O.; Pardal, J.S.D.O.; Gadelha, M.A.D.C.; Rodrigues, L.D.S.; Feitosa, D.T.; Prudente, A.L.D.C.; Fan, H.W. Envenomation by *Micrurus* coral snakes in the Brazilian Amazon region: Report of two cases. *Rev. Inst. Med. Trop.* **2010**, 52, 333–373.
3. Bucarechi, F.; Hyslop, S.; Vieira, R.J.; Toledo, A.S.; Madureira, P.R.; Capitani, E.M.D. Bites by coral snakes (*Micrurus* spp.) in Campinas, state of São Paulo, southeastern Brazil. *Rev. Inst. Med. Trop.* **2006**, 48, 141–145.
4. Bucarechi, F.E.M.; Capitani, S.; Hyslop, N.J.; Silva Jr. Aspectos clínicos do envenenamento causado por cobras-corais no Brasil. In *As Cobras-Corais do Brasil: Biologia, Taxonomia, Venenos e Envenenamentos*; Silva Junior, N.J. Eds.; Editora da Pontifícia Universidade Católica de Goiás: Goiânia, Brazil, **2016**, pp. 346–379.
5. Ayerbe, S.; Latorre, J.P. Manual para la prevención y mejoramiento en la atención del paciente con accidente ofídico. **2009**. Popayán, Colombia: Secretaría Departamental de Salud del Cauca.
6. Rodríguez Vargas, A. Accidente ofídico. In: *Guía para el manejo de emergencias toxicológicas*. Ministerio de Salud, Bogotá, **2017**; pp. 499–507
7. Instituto Nacional de Salud. Antiveneno anticoral polivalente. Available online: <http://www.ins.gov.co> (accessed on 03 December 2021).
8. Campbell, J.A.; Lamar, W. *The venomous reptiles of the western hemisphere* (Vol. 1); Comstock Publishing: New York, **2004**; ISBN 978-0801441417.
9. Feitosa, D.T.; Silva Junior, N.J.; Pires, M.G.; Zaher, H.; Prudente, A.L.D.C. A new species of monadal coral snake of the genus *Micrurus* (Serpentes, Elapidae) from western Amazon. *Zootaxa*. **2015**, 3974, 538–554.
10. Roze, J.A. Notes on the taxonomy of venomous coral snakes (*Elapidae*) of South America. *Bull. Maryland Herp. Soc.* **1994**, 30, 177–185.
11. Roze, J.A. *Coral snakes of the Americas – Biology, identification, and venoms*. **1996**. Malabar: Krieger Publishing Co. 328 pp.
12. Wallach, V.; Williams, K. L.; Boundy, J. **2014**. *Snakes of the world: A catalogue of living and extinct species*. Taylor and Francis, CRC Press, 1237 pp.
13. Moraes, L.J.; de Almeida, A.P.; de Fraga, R.; Rojas, R.R.; Pirani, R.M.; Silva, A.A.; Werneck, F.P. **2017**. Integrative overview of the herpetofauna from Serra da Mocidade, a granitic mountain range in northern Brazil. *ZooKeys*. 715, 103.
14. iNaturalist observations [Internet]. Available online: <https://www.inaturalist.org/observations> (accessed on 05 April 2022).
15. GBIF Global Biodiversity information facility. Available online: <https://www.gbif.org/> (accessed on 03 December 2021) <https://doi.org/10.15468/dl.f3gs32>