

# • Coral fina •

## (*Micrurus filiformis*)

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.



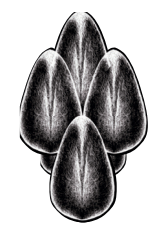
⚠ Detail of: Head, body and tail.

## 1. Envenomation symptoms



Only one single case of mild envenomation by a 50-cm *Micrurus filiformis* specimen from Pará, Brazil has been published to date [1]. Reported symptoms include mild pain immediately after the bite, mild swelling (edema) on the bitten finger one hour after the bite, epigastric pain, and vomiting [1]. Envenomation symptoms associated with more severe grades of envenomation for *M. filiformis* remain unknown given that no cases of snakebite accidents caused by this species have been recorded in Colombia's National Public Health Surveillance System (SIVIGILA, Spanish acronym). In addition, there is no information on the composition of its venom. Nevertheless, the symptoms of envenomation by *M. filiformis* are likely similar to those that have been documented for envenomation by other coral snake species.

In addition to the symptoms mentioned above, mild envenomation by coral snakes can result in other local symptoms such as redness of the skin (erythema), and potentially, muscle pain (myalgia) and muscle twitching (i.e., fasciculation) [2,3]. Moderate envenomation can lead to more severe redness of the skin, painful burning or aching (dysesthesia), burning or prickling sensations (paresthesia), drooping of the upper eyelid (palpebral ptosis), weakening of the muscles used to produce speech (dysarthria), and altered sense of taste (dysgeusia) [2,3]. Severe envenomation can lead to flaccid paralysis within the first 30 minutes of the bite, excessive salivation (sialorrhea), severe dysarthria, paralysis of the flexor muscles of the neck ("broken neck sign"), and shortness of breath (dyspnea) [2–4].



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## 2. Treatments and snakebite care



Given the rapidity with which severe symptoms of envenomation by *M. filiformis* can appear, the most effective approach for treating envenomation by this species, as for bites by any coralsnake, is to rapidly seek medical treatment, especially antivenom therapy [5]. In the only reported case of envenomation by *M. filiformis*, administration of 100 mL of *Micrurus* antivenom was sufficient to promote the full recovery of the patient within 24 hours [1].

Immediately after a bite by *M. filiformis* and while en route to the hospital, the bitten limb should be immobilized [6]. Other treatments (e.g., the application of ice, various plants, or oils to the site of the bite) should be avoided, given that they have no proven clinical efficacy and would only delay the arrival of patients to medical facilities.

Upon arrival at a medical facility, the antivenom treatment regimen should be administered once envenomation is confirmed (mild, moderate, or severe), and the geographical origin of the accident should be considered [2]. In cases occurring in the Andean, Caribbean, and Pacific regions, five vials of INS antivenom may be required, while for cases in the Amazon or Orinoquía regions, 10 vials are needed [2,3]. These antivenom dosages are the same for both children and adults [7], and the application of antivenom should only be performed by qualified medical personnel.

## 3. Snakebite capacity



A herpetologist (William W. Lamar) was bitten twice on the palm of the hand by a 20-cm specimen of *Micrurus filiformis* in Vaupés, Colombia that was swimming in a river, but no symptoms of envenomation were observed [8]. Otherwise, no clinically significant snakebite accidents by *M. filiformis* have been reported in Colombia. However, the occurrence of this species in diverse lowland habitats, including near human settlements, and its tendency to defend itself vigorously when threatened, predispose it to being a cause of clinically significant bites. Some indigenous groups have been reported to handle this species without taking any precautionary measures to obtain medicinal substances for the treatment of various ailments [9].

Given the small size and short fangs of this species, envenomation can occur even if fang marks are not visible at the site of a bite. Handling of this species should thus be regarded as dangerous, and all bites by this species should be treated as life-threatening whether or not fang marks on the skin are present.

## 4. Recognition



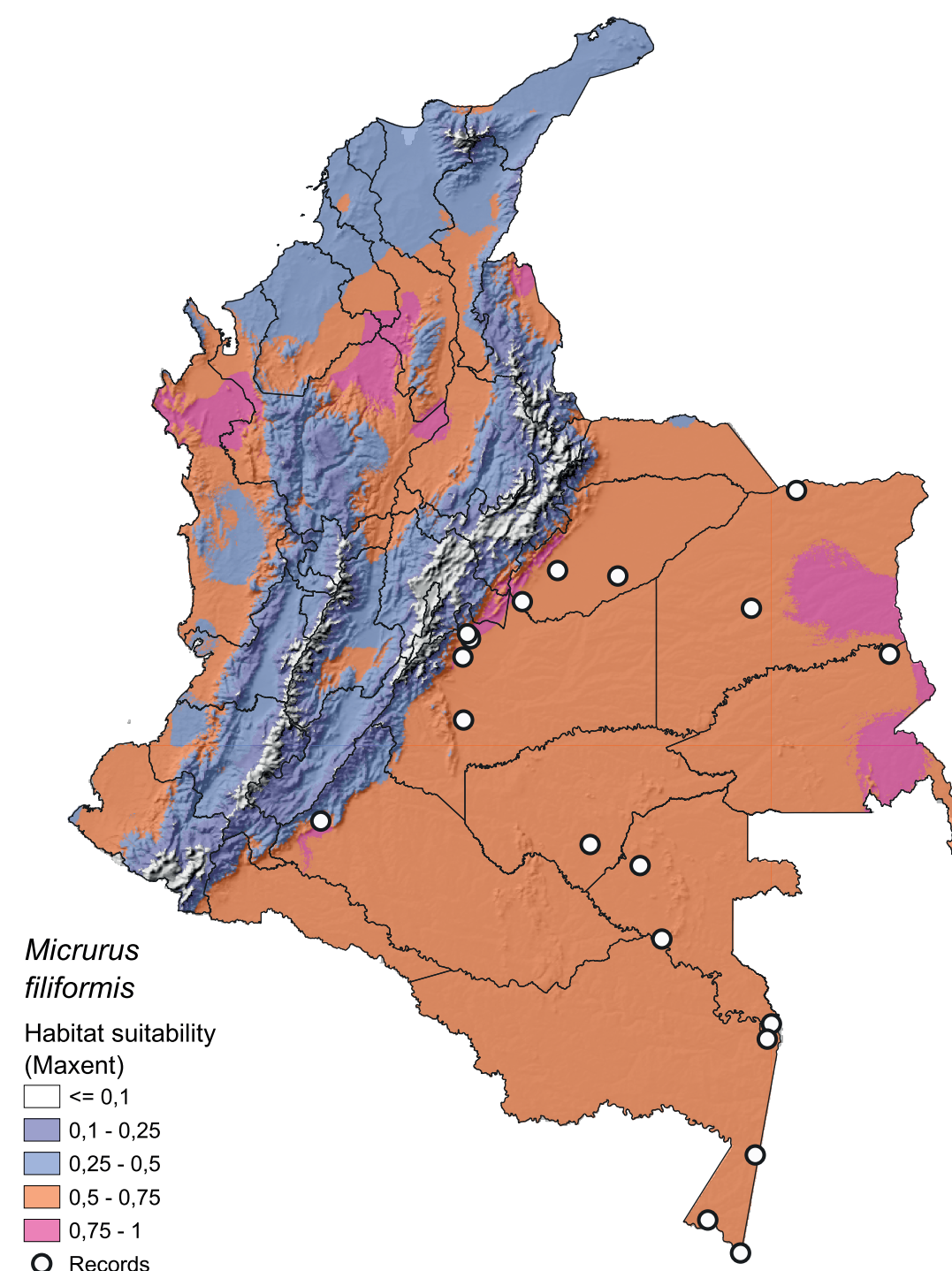
*M. filiformis* is a slender, small to medium-sized tricolored coralsnake with 12–23 body triads (repeating units consisting of three black rings separated by two white rings that together separate the red rings) and 1–2 triads on the tail. The primary black ring in each triad (the black ring in the middle of each triad) is typically longer than the two accessory black rings (the two outer black rings in each triad), and the red rings are longer than the white rings. The tip of the snout is black, which is followed by a white ring (that can either be complete or incomplete), a black ring, a red ring, and then the first complete body triad.

*M. filiformis* can be distinguished from all other co-occurring coralsnakes bearing triads (*M. helleri*, *M. hemprichi*, *M. isozonus*, *M. nattereri*, *M. obscurus*, and *M. surinamensis*) in Colombia by its slender body (diameter less than 0.5 cm in *M. filiformis* and greater than 0.5 cm in all other triad-bearing species) and higher number of body triads (10–24 in *M. filiformis* and 14 or fewer in all other triad-bearing species) [10].

## 5. Distribution

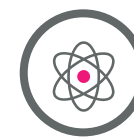


In Colombia, *M. filiformis* occurs in lowlands in the Orinoquia, Amazon Basin, and eastern versant of the Andes up to 400 m in elevation (Figure 1) [10,11]. It has been documented in the following departments: Amazonas, Caquetá, Casanare, Cundinamarca, Guainía, Meta, Putumayo, Vaupés, and Vichada [12–16]. The potential area of the distribution of *M. filiformis* in Colombia is 531153,64 km<sup>2</sup> (Figure 1).



**Figure 1.** Geographic distribution of *Micrurus filiformis* 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



Uncommon. This fossorial snake occurs in humid primary and secondary forests, riparian areas, savannas, and various disturbed habitats (e.g., open fields) in lowland areas in Colombia [11,17]; it has often been sighted near streams and rivers [8,9,18]. It is primarily active on the surface at night or near sunset [9]. *Micrurus filiformis* in Brazil and Peru has been observed to occur in similarly diverse habitats and display similar activity patterns [19–21]. It might be more common in disturbed areas than in natural habitats across its range [22–24], and a niche model of the potential distribution of *M. filiformis* in Brazil indicates that the probability of occurrence of this species is highest in areas closest to the Amazon watershed [25]. This species has been detected in several short-duration (weeks to months) herpetological surveys in Brazil and Peru, suggesting that it might be reliably detected in appropriate habitat with sufficient sampling effort [21,26–28].

No prey items for this species have been documented in Colombia. In Brazil and Peru, *M. filiformis* has been reported to prey on amphisbaenians, small snakes, and invertebrates [23,29]. Species that have been documented to prey on *M. filiformis* include the smooth-fronted caiman (*Paleosuchus trigonatus*) and the black spot piranha (*Pygocentrus cariba*) [22,29–31]. An attempted predation event on *M. filiformis* by the gray-winged trumpeter (*Psophia crepitans*) has also been reported [32].

This species typically flees when threatened, but it has also been observed to vigorously defend itself, move erratically, and engage in a tail display to thwart attack by predators [24,33]. In Brazil, *M. filiformis* is the host of the intestinal parasite *Eimera micruri* [34].

*Micrurus filiformis* is oviparous, but no information on the reproduction of this species has been collected to date. Much remains to be learned of the natural history and ecology of this widely distributed but poorly known snake in Colombia (Table 1).

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



*Micrurus filiformis* can be found at night or near sunset in forests, fields, and near human dwellings, especially near or in rivers [8,9]. During the day, this snake can be found hiding in crevices or under various types of cover, such as leaf litter, rocks, and logs [30].

## 8. Conservation



**Least Concern.** This species is not of conservation concern given that it is widely distributed in the Amazon Basin in several protected areas and occurs in diverse habitats, including disturbed ones, such as near human settlements and orchards [30]. Although no major widespread threats currently affect *M. filiformis*, its presence near human dwellings and other disturbed habitats makes it particularly vulnerable to being killed by humans. This species is not listed in resolution 1912 of 2017 of the Colombian Environmental Ministry [35].

## 9. Scientific name and common names



The scientific name of this species is derived from the Greek roots *Mikros* (small) and *oura* (tail) referring to the short tails, which is a general trait of species from the *Micrurus* genus. The specific epithet (*filiformis*) is derived from two Latin roots, *filum* (thread) and *forma* (shape or figure), which allude to the slender body of this species. [8,24]. In Colombia, this species is often referred to by locals as coral or coral fina or in English thread Coralsnake.

**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> ♂ ♀ 59 (22-96)
<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> Invertebrates, amphisbaenians, snakes
<b>MHD (µg/mice):</b> Unknown	-	<b>Distribution:</b> Orinoquia, Amazon, and Andes up to 400 m

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> None	<b>Crotamine:</b> None	<b>LAAO:</b> Unknown	

MAIN ENVENOMATION SYMPTOMS		RISK	GRADE OF ENVENOMATION
<b>Hemorrhage:</b> No	<b>Ecchymosis:</b> No	<b>Bites per year:</b> Unknown	<b>Mild:</b> Unknown
<b>Nausea:</b> No	<b>Hematemesis:</b> Unknown		
<b>Hypotension:</b> No	<b>Blisters:</b> No	<b>Bites per 1,000 people yearly:</b> Unknown	<b>Moderate:</b> Unknown
<b>Edema:</b> Yes	<b>Vomiting:</b> Yes		
<b>Coagulopathy:</b> No	<b>Diarrhea:</b> No	<b>Sequelae caused per year:</b> Unknown	<b>Severe:</b> Unknown
<b>Sialorrhea:</b> Unknown	<b>Local Pain:</b> Yes		
<b>Hematuria:</b> No	<b>Necrosis:</b> No	<b>Deaths caused per year:</b> Unknown	
<b>Renal failure:</b> No			

★ 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. LD<sub>50</sub>: median lethal dose; MCD: minimum coagulant dose; MDD: minimum defibrinating dose; DEM: minimum edema-forming dose; DHM: minimum hemolytic dose; PLA<sub>2</sub>: phospholipases A<sub>2</sub>; SVSP: serine proteases, SVMP: metalloproteinases; NGF: nerve growth factor; CRISP: cysteine-rich secretory protein; CTL: C-type lectin/lectin-like, DIS: disintegrins, KUN: Kunitz peptides; BPPs: bradykinin-potentiating peptides; VEGF: vascular endothelial growth factor; 3FTx: three-finger toxins; LAAO: L-amino acid oxidases.

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