Instituto Nacional de Salud

· Coral cuello negro ·

(*Micrurus obscurus*)

Bites, venoms, and venomous snakes of Colombia

G3

MEDICAL IMPORTANCE GROUP 3

Snakes that **bite rarely**, but are **capable of causing serious and life-threatening envenoming**.

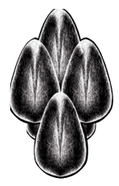
Poor confidence: Confidence for this species is poor due to the lack of data and information on Colombian populations. Therefore, most of our knowledge comes from a few studies and populations outside the national territory.

Detail of: Head, body and tail.

1. Envenomation symptoms

Only a single case of mild envenomation by a captive *Micrurus obscurus* specimen has been reported to date [1]. Reported symptoms include persistent, severe generalized pain in the joints, bones, and the tooth sockets [1]. The symptoms associated with more severe grades of envenomation for *M. obscurus* remain unknown because no snakebite accidents caused by this species have been recorded in Colombia's National Public Health Surveillance System (SIVIGILA, Spanish acronym).

The venom of *M. obscurus* is predominantly neurotoxic; the symptoms of envenomation by *M. obscurus* are, thus, likely to be like those that have been reported for envenomation by coralsnakes with venom having similar properties [2–4]. Local symptoms that are often observed following mild envenomation by coralsnakes include reddening of the skin (erythema), swelling, and muscle pain (myalgia) [5,6]. Local symptoms associated with moderate envenomation include severe reddening of the skin (perilesional erythema), as well as burning and aching (dysesthesia) [5,6]. Various systemic symptoms that can be observed following moderate envenomation include abnormal tingling sensation (paresthesia), drooping of the upper eyelid (palpebral ptosis), compromised ability to speak, due to muscle weakness (dysarthria), and altered taste (dysgeusia) [5,6]. Following severe envenomation, patients can experience flaccid paralysis within 30 minutes of the bite, along with the production of excessive amounts of saliva (sialorrhea), paralysis of the neck muscles ("broken neck sign"), shortness of breath (dypsnea), and paralysis of the breathing muscles leading to ventilatory failure [5–7].



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2. Treatments and snakebite care

Medical treatment is essential for ensuring patient safety following envenomation by *Micrurus obscurus* due to the rapidity with which serious symptoms can arise. After a bite by *M. obscurus*, the bitten limb should be immobilized, and the patient should be taken to a hospital as quickly as possible [8]. The application of ice, medicinal plants, or any other treatments to the site of the bite are not recommended given that many of these treatments have not been demonstrated as clinically effective and, more importantly, they can delay arrival to a hospital.

The number of antivenom vials that should be administered depends on the grade of envenomation (mild, moderate, or severe) and the geographical origin of the accident should be considered [8]. In cases occurring in the Amazon or Orinoquía regions, 10 vials of INS antivenom may be required, [6]. These recommended dosages are the same for both children and adults, and the administration of antivenom should be performed exclusively by qualified medical practitioners [9].

3. Snakebite capacity

Aside from a case of mild envenomation by a captive specimen, no clinically significant snakebite accidents caused by *Micrurus obscurus* have been reported in Colombia. Nevertheless, this snake should be regarded as highly dangerous because of its large size (1.0–1.5 m in total length), as well as its ability to bite through clothing. The temperament of this snake is variable, with some individuals docile and reluctant to bite and others irritable [10]. Although fang marks might not be left by *M. obscurus* bites, all bites by this species should be treated as a medical emergency.

4. Recognition

Micrurus obscurus is a large tricolored coralsnake with 4–9 body triads (repeating units consisting of three black rings separated by two pale rings that together separate the red-orange rings) and 23 of a triad on the tail. The white rings can be equal in length or longer than the black rings, and the red rings can be equal in length or slightly longer than the white bands. The black rings are equal in length, or the primary black ring in each triad (the black ring in the middle of each triad) is slightly longer than the two accessory black rings (the two outer black rings in each triad). The apical tips of all the white and red body rings are black. The snout has irregular black and white marks, and this is followed by a black band (often irregular or incomplete) that crosses the frontal scale.

The portion of the head behind the eye and frontal scale and including the supralabial and infralabial scales) is red with irregular black spots that can vary in size and density from one small black spot on each parietal scale to large black spots on each scale in this region. The first triad is typically incomplete, and the first black ring projects forward more than the first of the black body rings. However, specimens from Orinoquia in Colombia often have the first triad irregularly complete, with the first black and white rings much shorter than the rest of the white and black body rings [11]. Specimens can also be melanic. The frequency of melanism appears to be higher in the foothills of the Andes above 300 m [12].

M. obscurus can be distinguished from all other co-occurring coralsnakes bearing triads (*M. filiformis*, *M. helleri*, *M. ortoni*, *M. isozonus*, *M. nattereri*, and *M. surinamensis*) in Colombia by the color pattern on the head, body form and size, and the number of body triads. *Micrurus filiformis* and *M. ortoni* have black snouts, and the former is much smaller (typically 28–40 cm) than *M. obscurus*. *Micrurus helleri* has well-defined black bands and white bands on the snout and more body triads (9–11). *M. nattereri* and *M. surinamensis* have red snouts. *Micrurus isozonus* is most similar to *M. obscurus* but has more body triads (9–14) and a slightly more slender body.

5. Distribution

In Colombia, *M. obscurus* occurs in the Amazon, Orinoquia, and the foothills of the Andes up to 620 m [10,13]. It has been documented in the following departments: Amazonas, Caquetá, Guaviare, Meta, Putumayo, Vaupés, and Vichada. The potential area of the distribution of *M. obscurus* in Colombia is 580328,79 km2 (Figure 1).

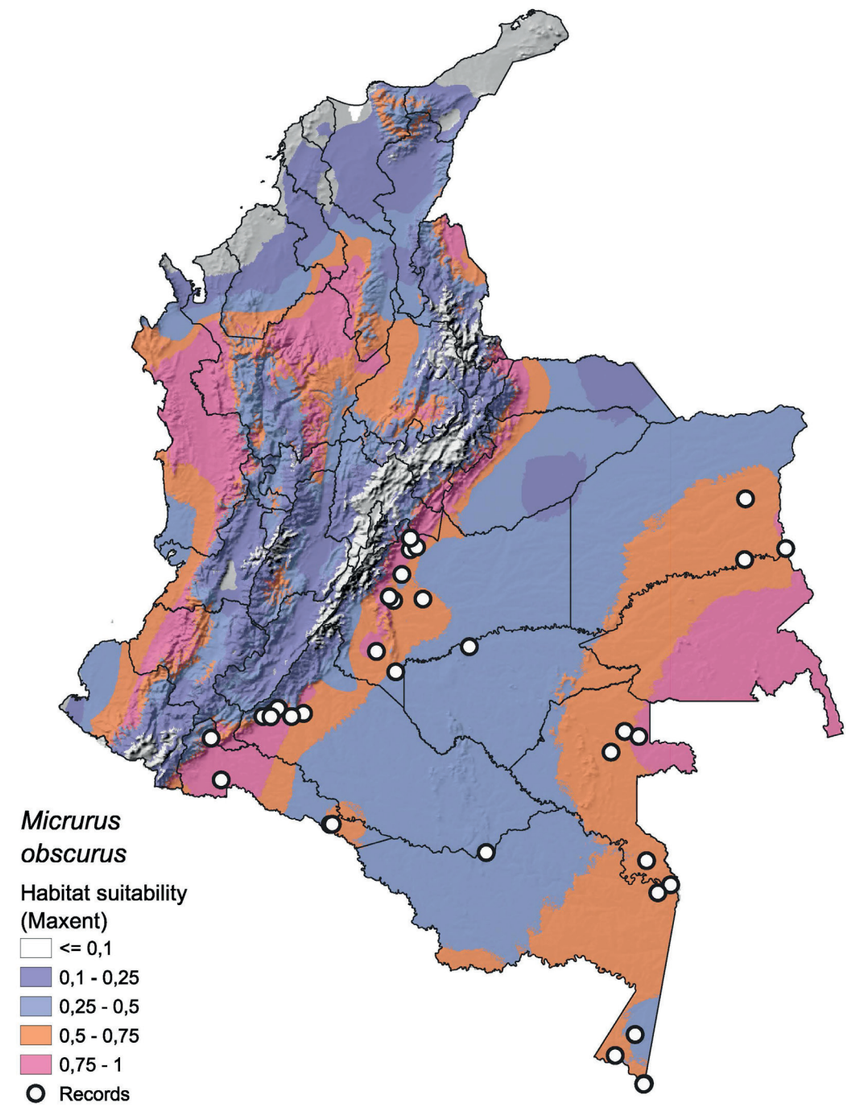

Figure 1. Geographic distribution of *Micrurus obscurus* in Colombia and its habitat suitability model. Based on bioclimatic variables, the habitat suitability model predicts the species' potential distribution in Colombia, identifying zones with suitable or unsuitable environmental conditions for its 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 snake can occur in diverse habitats, including tropical rainforest, secondary growth, savanna, and gallery forest [10,11,14–16]. It has also been found in pastures and near human habitations, but it is most common in humid forested areas [10,15,17,18]. Both diurnal and nocturnal activity have been observed in this species outside of Colombia [19–21]. The numbers of *Micrurus obscurus* encountered in various >1 month-long herpetological surveys indicate that this species can be found on average once every month to few months in appropriate habitat with sufficient survey effort [15,18,22].

In Colombia, *M. obscurus* has been documented to prey on the royal marsh snake (*Erythrolamprus reginae*), reticulate worm snake (*Amerotyphlops reticulatus*), speckled worm lizard (*Amphisbaena bassleri*), banded cat-eyed snake (*Leptodeira ashmeadii*), and *Atractus* sp. [23,24]. Outside of Colombia, *M. obscurus* has been reported to prey on various snakes, including the collared ground snake (*Atractus collaris*), golden-lipped marsh snake (*Erythrolamprus chrisostomus*), pygmy marsh snake (*Erythrolamprus pygmaeus*), banded cat-eyed snake (*Leptodeira annulata*), annellated coral snake (*Micrurus annellatus*), reticulate worm snake (*Amerotyphlops reticulatus*), common lancehead (*Bothrops atrox*), and unidentified *Atractus* and *Dipsas* species [10,11,16,25]. They have also been reported to prey on the reticulated creek lizard (*Arthrosaura reticulata*), forest whiptail (*Kentropyx pelviceps*), and caecilians [16,25,26].

An unidentified scolopendrid centipede preyed on a small *M. obscurus* specimen from Peru [27]. When threatened, this species typically flees, but it has also been documented to move erratically, hide the head beneath the body, dorso-ventrally flatten the body, and engage in a tail display [22,28,29]. The resemblance of *M. obscurus* to *M. isozonus* in the Colombian Orinoquia might represent a case of Müllerian mimicry; however, this requires confirmation [10,11]. In Brazil, the ectoparasite *Amblyomma rotundatum* has been documented on *M. obscurus* [30]. *Micrurus obscurus* is oviparous, but information on the reproduction of Colombian populations is lacking. In Ecuador, a clutch of 7 eggs was laid by one female [25].

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

Micrurus obscurus can be found crossing forest trails during the day or at night, especially after rain [10,22]. They can also be found hiding under rotting logs, in leaf litter, and in the nests of leaf-cutter ants (Atta spp.) [10,22].

8. Conservation

Least Concern. This species is not of conservation concern because it is widely distributed in the Amazon and Andean foothills in several protected areas in several countries. Habitat destruction and deliberate killing by humans are likely the main threats to *Micrurus obscurus* populations. This species is not listed in resolution 1912 of 2017 of the Colombian Environmental Ministry [31].

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 (*obscurus*) means dark, dusky, or shady in Latin, which likely alludes to the melanic coloration of many specimens of this species [11]. In Colombia, this species is often referred to by locals as coral.

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

★★

TOXICITY AND BIOLOGICAL ACTIVITY	VENOM ACTIVITY PROFILE	GENERAL BIOLOGICAL TRAITS
LD_{50} (µg/mice): Unknown	**Proteolytic:** Yes	**Total Length (cm):** ♂ ♀ 23–156
MCD (µg/mL): Unknown	**Neurotoxic:** Yes	**Weight (g):** Unknown
MDD (µg/mice): Unknown	**Myotoxic:** Yes	**Reproduction:** oviparous
MED (µg/mice): Unknown	**Hemotoxic:** No	**Diet:** snakes, amphibaenians, lizards, caecilians
MHD (µg/mice): Unknown	-	**Distribution:** Orinoquia, Amazon, and Andes up to 620 m

PROTEOME			
PLA_2: Unknown	**SVSP:** Unknown	**SVMP:** Unknown	**NGF:** Unknown
CRISP: Unknown	**CTL:** Unknown	**DIS:** Unknown	**KUN:** Unknown
BPPs: Unknown	**VEFG:** Unknown	**3FTx:** Unknown	
Crotoxin: Unknown	**Crotamine:** Unknown	**LAAO:** Unknown	

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

★ Poor confidence: 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_{50}: median lethal dose, MCD: minimum coagulant dose, MDD: minimum defibrinating dose, DEM: minimum edema-forming dose, DHM: minimum hemolytic Dose, PLA_2: phospholipases A_2, 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, VEFG: VEFG: vascular endothelial growth factor, 3FTx: three-finger toxins, LAAO: L-amino acid oxidases.

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