



# ***Phoneutria depilata* (Araneae: Ctenidae) in Panama: report of a bite case in Bocas del Toro province, notes on distribution and public health relevance**

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## **Abstract**

*Phoneutria depilata* is considered Panama's most relevant spider species due to its aggressivity and venom. In this article, we described a case of *P. depilata* bite in a woman from Bocas del Toro Province, Panama. The symptoms included severe pain, swelling in the bite site, palpitation of submandibular ganglia, abundant salivation, tachycardia, and a sensation of "electricity". The swelling and pain lasted almost two days and three days, respectively. In addition, we present the geographical distribution of this spider species in Panama.

**Key word:** Phoneutrism, symptoms, human case, distribution, Panama.

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## **Introduction**

Spiders of the genus *Phoneutria* Perty, 1833 belong to the infraorder Araneomorphae (true spiders), family Ctenidae. This genus could be distinguished from other Ctenidae by the presence of pads of dense tufts of hair (scopulae) on the promargin of the tibiae and tarsi of the pedipalps. Currently, *Phoneutria* includes nine species of medium to large size of body (17-48 mm), although they can be much larger if the stretched legs are considered (1,2). Most species are found in South America, with only one species present in Central America, *Phoneutria depilata* (Strand, 1909) (3,4).

*Phoneutria* are errant spiders; they are found mainly on vegetation, ground, and structures built by humans. This species is incredibly aggressive. When behaving defensively, the body is placed in an erect position, and the spider moves laterally, raising the first two pairs of legs (5). In addition to their aggressivity, these spiders are considered among the most poisonous globally (6). Accidents with *Phoneutria* are reported mainly in Brazil, although there are also reports from Ecuador, Colombia, Peru, and Costa Rica (7-11). Accidents with *Phoneutria* can range from mild to severe; severe cases

mainly involve children (12). Moreover, noxious effects have been reported in other mammals (13).

To our knowledge, in Panama there is only one clinical case of phoneutrism described from Pedregal, a suburb of City of Panama (14), therefore, in this report we describe an additional case from Bocas del Toro province in north-western Panama. Additionally, we report a revision of the arachnid collection from the Colección Zoológica "Dr. Eustorgio Méndez" del Instituto Conmemorativo Gorgas de Estudios de la Salud (CoZEM-ICGES) and Museo de Invertebrados "G. B. Fairchild" of the Universidad de Panamá (MIUP).

## **Case History**

The accident occurred on September 17, 2020, in the town of Macca Bite, located on the southern end of Bastimentos Island, Bocas del Toro province, on the western-Caribbean coast of Panama (9° 15' 07.6" N, 82° 08' 54.6" W). The accident occurred in a rural house near a secondary forest on Bastimentos Island, one of the largest islands in the Bocas del Toro Archipelago. This island is home to 2,000 permanent inhabitants. Ecotourism is the focal economic activity on this island, mainly related to the Isla Bastimentos National Park.

A 42-year-old woman was bitten on her left hand while gardening behind her house. Once she felt the bite, the woman moved her hand and launched the spider several meters away. After landing, the spider maintained a defensive position on the ground. The victim immediately felt severe pain and swelling at the bite site (Fig. 1A, B). The pain quickly radiated to her wrist and elbow with paresthesia. A few minutes after the bite, the victim felt her submandibular glands were throbbing, fasciculations, diaphoresis, sialorrhea, and tachycardia. The pain persisted for 24 hours after the accident; upon contact with surfaces, the victim felt an "electricity" sensation running through her arm.

### Figure 1

Left hand of an affected person, showing the swelling after the accident. Ventral view (A). Dorsal view (B). *Phoneutria depilata* photographed after the bite (C).



In response to the symptoms, the woman immediately put the affected hand in a container with cold water and ice as a treatment. After approximately an hour, the symptoms worsened. To mitigate the intense pain, the patient took metamizole magnesium (575 mg) 30 minutes after the bite and naproxen (500 mg) 1.5 hours later, without significant improvement. As the extreme pain persisted, the patient took one diazepam (10 mg), which helped her sleep and relieved the pain. However, the discomfort of the "electricity" continued. The swelling and pain lasted almost two days and three days, respectively. While symptoms persisted, the patient continued to self-medicate at home, as there is no access to medical care on Bastimentos Island.

### Identification of spider and distribution of *Phoneutria depilata* in Panama:

A photo of the spider provided by the victim, allowed for identification at species level (Fig. 1C). In addition, a review of the *Phoneutria* specimens from two national collections of arachnids was carried out: the Colección Zoológica Dr. Eustorgio Méndez of the Instituto Conmemorativo Gorgas de Estudios de la Salud (CoZEM-ICGES), and the Museo de Invertebrados G. B. Fairchild of the Universidad de Panama (MIUP).

The geographical distribution points of *P. depilata* in Panama are summarized in Figure 2.

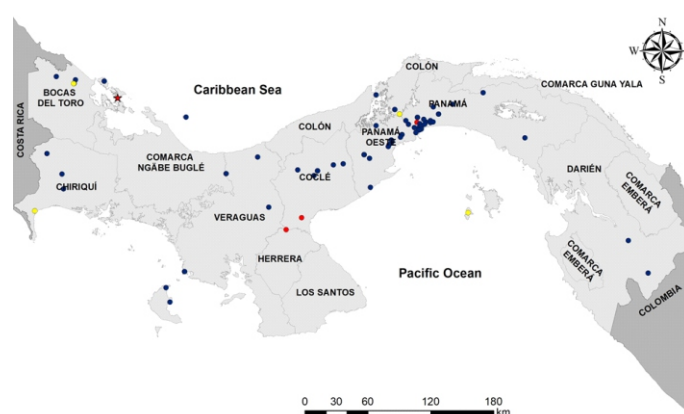
### Discussion

Recently, Hazzi and Hormiga (4) revalued *P. depilata* as a valid species, separate of *Phoneutria boliviensis* (F. O. P. Cambridge, 1897). These authors delimited the distribution of *P. depilata* from Trans-Andean region in Ecuador, through Colombia, Panamá, Costa Rica, Nicaragua, Honduras, and Guatemala. According to Hazzi and Hormiga (4), and the

records from COZEM-ICGES (41 records) and MIUP (49 records), this species has a wide geographical distribution in Panama (Fig. 2). These records include specimens collected from forests and inhabited rural and urban areas, including inside homes. It is important to indicate that of the registered specimens, 20% were collected from human-inhabited dwellings, four bites were on humans and one on a dog (see **Supplementary Data**). Two of these cases stand out: a human case with fasciculations at the bite site; and a dog that died 30 minutes after a bite on its nose.

### Figure 2

*Phoneutria depilata* in Panama. Red star, current case in Bastimentos Island. Red spots, additional reported cases of phoneutrism in Panama. Blue spots, geographical distribution according to CoZEM-ICGES and MIUP. Yellow spots, data from Hazzis and Hormiga (2021).



According to literature (7, 8, 12), most *Phoneutria* accidents occur on the extremities, provoking intense pain and edema. However, accidents involving children or if adults are bitten on the head could provoke serious systemic symptoms, evidencing severe envenomation (14, 15). Furthermore, despite the use of the term "banana spider" (7,9), which indicates the spiders are found in banana plants, nevertheless data related to bite accidents suggest that many accidents occur inside homes, associated with indoor or outdoor housework, or in places where construction materials are stored (12).

Similar to other species of *Phoneutria*, the *P. depilata* venom is a mixture of enzymes, protein, and non-protein neurotoxins that affect the ion channels of excitable cells (6,16). Their envenomation influences pain perception and affects the central and peripheral nervous systems. The intense and persistent pain is the main symptom of envenomation. Other symptoms reported in cases of phoneutrism are edema, erythema, excessive sweating, paresthesia, and muscle fasciculation (8). Reports of severe cases of envenomation may present with profuse vomiting, diarrhea, priapism, bradycardia, hypotension, cardiac arrhythmias, acute pulmonary edema, and shock (6,12). In Brazil (12), in symptomatic cases, treatment recommendations include the application of warm compresses to the bite site or infiltration of anesthetics such as lidocaine; if the pain does not decrease, periodic infiltrations with anesthetic have been recommended,

including the use of the analgesics such as meperidine. Benzodiazepine has been indicated for *Latrodectus* accidents in Brazil (12). However, treatment for *Phoneutria* accidents with benzodiazepine has not been previously described.

In Panama, Quintero (17) considers that *P. depilata* is the most dangerous spider due to its neurotoxic venom, large size, and aggressiveness. To our knowledge, the first clinical description of a human case of phoneutrism by *P. depilata* in Panama was from an accident that occurred in a suburban area of the City of Panama, when the affected suffered a bite in the neck and provoked a severe envenomation (15). This previous case differs from the one we present here. In the former case, the bite occurred in the neck of the victim; therefore, the envenomation was more severe than our victim. In addition, our case comes from a rural area on Bastimentos Island.

This island is a popular ecotourism destination, with no public or private health services exist, a situation repeated in other rural places of Panama.

## Conclusion

*Phoneutria depilata* represents the most relevant spider species in human health of Panamá. However, there are reports of other spider genera of medical interest in Panama, including *Latrodectus* (Theridiidae) and *Loxosceles* (Sicariidae) (2). Despite this, guidelines for identification, treatment and management of spider bites do not exist in Panama. Therefore, work must be done to adequately describe and report accidents with spiders since mandatory reporting of this accidents does not exist, similar to what occurs with scorpion and snake accidents with scorpions and snakes (18,19). Further reports are essential to describe the occurrence and geographical distribution of these accidents, and the symptoms caused by *Phoneutria* bites in Panama.

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## Author Contributions

Conceptualization, SB, RJM, RCT; Methodology, VG-M, ND; Validation, VG-M, AG, SB; Original Data: ND, SB, RJM, RCT; Formal Analysis, VG-M, AG; Investigation, SB, RM, ND, RCT; Writing—Original Draft Preparation, SB, ND, RCT; Writing—Review & Editing, SB, AG, VG-M, RM, RCT.

## Institutional Review Board Statement

This work was authorized by the Gorgas Memorial Institute's Bioethics Committee of Investigation (GMIBC) (No. 151/CBI/ICGES/22).

## Informed Consent Statement

The affected for *Phoneutria* bite victim was notified of this publication, and she gave permission to use photos and

general information about her case to be included, according to the regulations of GMIBC.

## Conflicts of Interest

None.

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