

New geographic records of the brown spider *Loxosceles amazonica* Gertsch, 1967 (Araneae, Sicariidae) in Northeastern Brazil and its medical importance

Novos registros geográficos da aranha-marrom Loxosceles amazonica Gertsch, 1967 (Araneae, Sicariidae) no Nordeste do Brasil e sua importância médica

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ABSTRACT

Introduction: *Loxosceles* species, known as brown-spiders, are considered to be of medical importance, being responsible for the most severe form of araneism in Brazil. *Loxosceles amazonica* is a still little-studied species with wide geographic distribution in Northern, Northeastern, and Central-Western Brazil, although it is reported in a few localities. **Objectives:** new geographic records of *L. amazonica* are reported in northeastern Brazil in this study. **Methods:** occasional records for this spider were obtained in herpetological studies or fortuitously in urban environments, between September of 2011 and August of 2012. **Results:** specimens were found in the States of Paraíba (Maturéia and Serra Branca), Pernambuco (Serra Talhada), and Maranhão (Itapecuru Mirim, Santa Inés, Arari, Buriticupu, and Bom Jesus das Selvas) in a synanthropic form associated with houses in altered areas, and in an autochthonous form in secondary forests, in Amazon and the Caatinga domains. **Conclusions:** there is little information about the epidemiology of accidents with *L. amazonica*, however, it is likely that the species is the primary etiological agent of loxoscelism in its distribution area, which allows recognizing the species as of medical importance.

Key words: Spider; Animal Distribution; Animals, Poisonous; Zoology; Brazil.

RESUMO

Introdução: as espécies de *Loxosceles*, conhecidas como aranhas-marrons, são consideradas de importância médica, sendo responsáveis pela forma mais grave de araneísmo no Brasil. *Loxosceles amazonica* é uma espécie ainda pouco estudada e com ampla distribuição geográfica no Norte, Nordeste e Centro-Oeste do Brasil, embora seja reportada em poucas localidades. **Objetivos:** neste trabalho são apresentados novos registros geográficos de *L. amazonica* no Nordeste do Brasil. **Métodos:** foram obtidos registros ocasionais da aranha em coletas herpetológicas ou fortuitamente em ambientes urbanos, entre setembro de 2011 e outubro de 2012. **Resultados:** foram encontrados espécimes nos estados da Paraíba (Matureia e Serra Branca), Pernambuco (Serra Talhada) e Maranhão (Itapecuru Mirim, Santa Inês, Arari, Buriticupu e Bom Jesus das Selvas) de forma sinantrópica, associados a residências e em áreas alteradas, e de forma autóctone em matas secundárias, nos domínios da Amazônia e da Caatinga. **Conclusões:** há poucas informações sobre a epidemiologia de acidentes com *L. amazonica*, mas é provável que a espécie seja o principal agente etiológico de loxoscelismo em sua área de distribuição, o que permite reconhecê-la como de importância médica.

Palavras-chave: Aranhas; Distribuição Animal; Animais Venenosos; Zoologia; Brasil.

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INTRODUCTION

There are currently 102 species described in the genus *Loxosceles* Heineken and Lowe, 1835 (Araneae, Sicariidae), popularly known as brown spiders, which are widely distributed in temperate and tropical areas.¹⁻³ Native species occur only in Africa and in the Americas.¹ More than 30 species of brown spiders are described in South America; 11 autochthonous taxa are recorded in Brazil: *L. adelaida* (Gertsch, 1967); *L. amazonica* (Gertsch, 1967); *L. anomala* (Mello-Leitão, 1917); *L. chapadensis* (Bertani, Fukushima, and Nagahama, 2010); *L. gaucho* (Gertsch, 1967); *L. hirsuta* (Mello-Leitao, 1931); *L. immodesta* (Mello-Leitão, 1917); *L. intermedia* (Mello-Leitao, 1934); *L. niedeguidonae* (Gonçalves-de-Andrade, Bertani, Nagahama, and Barbosa, 2012); *L. puortoi* (Martins, Knysak e Bertani, 2002), and *L. similis* (Moenkhaus, 1898), in addition to an introduced species [*L. laeta* (Nicolet, 1849)].¹⁻¹⁰

Loxosceles species are considered to be of medical importance because they cause loxoscelism in humans, which corresponds to the most severe form of araneism in Brazil.¹¹ The following species are recognized as the most medically important in the country: *L. intermedia*, *L. laeta*, and *L. gaucho*; the majority of accidents is recorded in the Southern and Southeastern regions, mainly inside houses.¹¹

The main action of the *Loxosceles* venom is triggering intense inflammatory process at the bite site followed by obstruction of small vessels, edema, bleeding, focal necrosis, and intravascular hemolysis in the most serious forms of poisoning; the clinical picture may develop in the subcutaneous or cutaneous visceral forms (hemolytic).^{5,11} Different poison activities are known among the species of medical importance, and studies have been directed to taxa occurring in Southern and Southeastern Brazil.¹¹

There are practically no studies on the action of the venom from *L. amazonica* and the epidemiology of accidents caused by this species. The existing knowledge is a unique record of a specific account of loxoscelism in Ceará where the victim collected specimens of *L. amazonica* at the accident site, which allowed establishing the clinical and etiological correlation.¹² *Loxosceles amazonica* has a wide distribution in Northern, Northeastern, and Central-Western Brazil; however, records of loxoscelism are relatively scarce in those regions. Although *L. amazonica* occurs in a vast area inhabited by man, it is not men-

tioned among the country's brown spiders with great medical importance, a fact that can arise from the absence of accident notifications.

In the original description of *L. amazonica*, Gertsch defined "Santa Isabel, Araguaia River, Mato Grosso, Brazil" as the type location for the species and presented additional records of the taxon in Northern, Northeastern, and Central-Western regions of Brazil, in the States of Pará, Mato Grosso, Pernambuco (no defined location), Maranhão (almost 35 km south of Loreto), and other uncertain localities.¹ Subsequently, *L. amazonica* was reported in Ceará (Crato) in 1986 in an accident report.¹² In the last decades, individual records of *L. amazonica* were presented in Southwestern Paraíba (Sumé), Northwestern and Eastern Bahia (Santa Rita de Cássia, Buritirama, and Salvador), Northern Piauí (José de Freitas), Northeastern Maranhão (Paulino Neves), and in various localities in Ceará (Aiuaba, Araripe, Crateús, Pentecostes, Sobral, and Ubajara).¹²⁻¹⁹ However, records are punctual and with large gaps in between them in much of the known species' geographical distribution. This distribution includes areas of the Amazon, Caatinga, and Cerrado biomes besides coastal ecosystems. In Northern, Northeastern, and Central-Western Brazil, there is also punctual records of *L. similis* (Pará, Mato Grosso, Mato Grosso do Sul, and Bahia), *L. chapadensis* (Bahia), *L. niedeguidonae* (Piauí), *L. intermedia* (Distrito Federal, probably introduced), and *L. laeta* (Paraíba, introduced).^{1,2,5,6,14,20}

The relevance of formal records of new occurrences of the species is recognized in the light of knowledge gaps about the geographic distribution of *L. amazonica* and its medical importance. Additional records of *L. amazonica* in the States of Pernambuco, Paraíba, and Maranhão, Northeastern Brazil, are presented in the present study.

MATERIAL AND METHODS

The records presented here were occasionally obtained in herpetological samplings or fortuitously in urban environments, between September of 2011 and October of 2012. The environmental characteristics of the collection sites were observed, and occurrences of spiders were categorized as autochthonous (natural) or resulting from the trespassing into altered or synanthropic areas (associated with domicile and peridomestic habitats).

Testimony adult specimens of *Loxosceles amazonica* were collected, preserved in 70% alcohol, and identified. An immature specimen collected in Pernambuco was kept in captivity and fed with *Tenebrio molitor* Linnaeus, 1758 (Coleoptera, Tenebrionidae) larvae until reaching adulthood when it was preserved and correctly identified. However, this specimen was lost, and only its photographic record is presented.

The taxonomic identification was reached based on the diagnosis of *L. amazonica* proposed by Gertsch;¹ the specimens were analyzed with the aid of a stereoscopic microscope. Testimony specimens were deposited in the Scientific Collection of Arachnids in the Arachnology Laboratory of the Federal University of Minas Gerais.

RESULTS

During the expedition in the countryside of the State of Paraíba, I found several specimens of *Loxosceles amazonica* (Figure 1) in the city of Maturéia, including adult males and females in addition to juveniles on September 7, 2008. In the Engenho Bom Conselho farm, around the Pico do Jabre State Park (07°16'13"S, 37°23'18"W, 781 m alt.), spiders were found in peri-domestic habitats, and in cracks of an unfinished wall (Figure 2). Nearby, spiders were found between clay roof tiles littered on the side of the road accessing the Park (07°15'42"S, 37°23'10"W, 870 m alt.) on the same date. Webs were observed in both places.

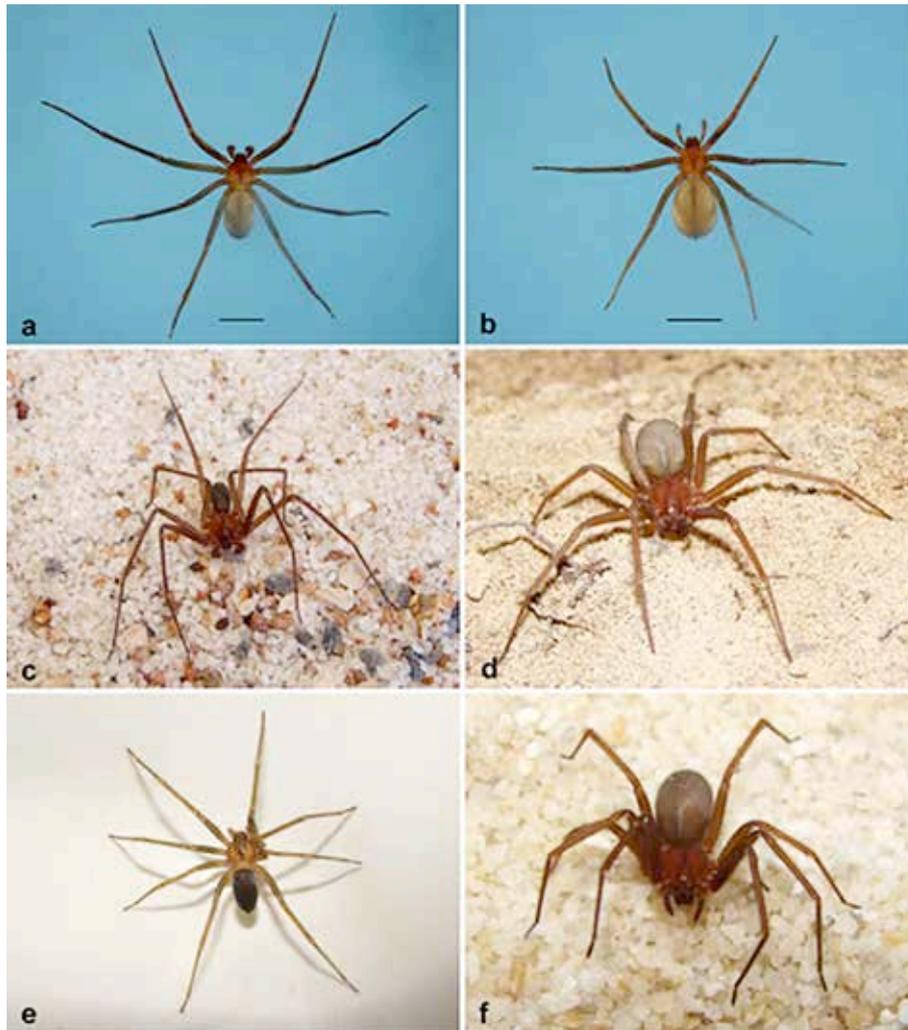


Figure 1 - Specimens of *Loxosceles amazonica*. Adult male (a) and female (b) collected in Serra Branca, Paraíba (scale bars: 5 mm); adult male (c) collected in Itapecuru Mirim, Maranhão; adult female (d) collected in Bom Jesus das Selvas, Maranhão; juvenile female (e) and the same specimen as adult (f) collected in Serra Talhada, Pernambuco.

The first occurrence was considered synanthropic, with spiders associated with residences while the second was considered a possible trespassing by the spiders into altered areas.



Figure 2 - Microenvironment inhabited by *Loxosceles amazonica* in peridomestic habitats. Cracks in the wall without plaster (a) observed in Maturéia, Paraíba, and cracks in the bark of the trunk of a mango tree (b) observed in Arari, Maranhão.

Also in the countryside of Paraíba, specimens of *L. amazonica* (Figure 1) were found in the municipality of Serra Branca, in the Pereiros neighborhood, in the urban area of the city, in a residence on Joaquim Borba Filho Street (07°29'16"S, 36°40'09"W, 496 m alt.) by Gesinaldo Moura da Silva on October 26, 2009. The batch included adult males and females and juveniles associated with webs, in both peridomestic habitats, under clay tiles and intra-domicile in wooden beams of a roof, and under a painting on the wall. This occurrence was considered synanthropic.

On an expedition in the countryside of the State of Pernambuco, I collected one specimen of *L. amazonica* (Figure 1) on September 9, 2008, in the municipality of Serra Talhada, in a building from the Federal Rural University of Pernambuco (07°57'22"S, 38°17'49"W, 520 m alt.). The spider was in a crack in a wooden window in a building, and web was observed; this occurrence was characterized as synanthropic.

Localities of *L. amazonica* in Paraíba and Pernambuco are inserted in the Caatinga biome and feature remnants of Forested Steppe Savanna (Pico do Jabre region) and Woody (remaining areas) forests in good conservation condition (field observations).^{21,22}

However, all specimens were found in disturbed environments, including homes. There were no records in naturally preserved environments despite that the collection site of spiders on the access road to Pico do Jabre State Park was located on the edge of a preserved forest remnant. There was an extensive collection effort in natural environments; microenvironments such as between and under rocks and logs on the ground, crevices in rocky outcrops locally known as lajeiros, and under tree bark in the woods were surveyed, but no brown spider was found. This evidence allows considering the likelihood that *L. amazonica* is a species introduced in urban and rural areas, in this case, in a synanthropic way or it is an invasive species in altered areas in regions where it has been found in Paraíba and Pernambuco. However, there are several microenvironments conducive to brown spiders in natural environments in these regions such as rock outcrops and tree barks, which do not rule out the possibility that *L. amazonica* is autochthonous.

On the occasion of the expeditions in the State of Maranhão, in the eastern areas of the Amazon, I collected specimens of *L. amazonica* in the municipalities of Itapecuru Mirim, Santa Inés, and Arari, located in the Baixada Maranhense region, and in the municipalities of Buriticupu and Bom Jesus das Selvas, located in the western portion of the State.²¹ In the lowlands of Maranhão State, there is great environmental complexity; Santa Inés is located in the area of an Ombrophilous Open Forest, Itapecuru Mirim presents formations of this forest type and contact between Savannah and Seasonal Forests, and Arari is located in the region with Vegetation under Fluvial and/or Lake Influence. Bom Jesus das Selvas and Buriticupu are inserted in the Dense Ombrophilous Forest region.²²

An adult male specimen of *L. amazonica* (Figure 1) was found in Itapecuru Mirim, inside a home in the urban area of the city, on Pequizeiro street (03° 23' 06" S, 44° 20' 54" W, 22 m alt.), in April 20, 2011. The spider was climbing a wall at night. In downtown of the same city, another adult male was collected within a hotel located on Brazil Avenue (03°23'38"S, 44°21'36"W, 22 m alt.) on December 10, 2011. The specimen was moving across the floor, in a stairway that connected the first two floors, at night. On both occasions, searches were carried out in and around the buildings but other spiders or webs were not found. These occurrences were characterized as synanthropic.

In the municipality of Santa Inés, an adult female of *L. amazonica* was found on October 3, 2012 in downtown, in the Barreirinha Street (03°39'10"S, 45°22'39"W, 26 m alt.) associated with the web in an pile of asbestos tiles adjacent to a building (a hotel), characterizing synanthropy. In Arari, some spiders were found associated with the web in the trunk of a mango tree (Figure 2), including one adult female, in a yard of a rural housing (peridomestic habitats) continuous to riparian forest fragments and secondary forests, in the marshland of the Mearim River (03°34'10"S, 44°49'03"W, 25 m alt.) on March 10, 2012. An invasion of an altered area by the spiders was considered. There were cobwebs in the midst of cracks on the trunk indicating the existence of several specimens, one of which was collected after removing part of the tree bark.

In Buriticupu, an adult male of *L. amazonica* was collected on February, 1 2012 inside a building (a hotel), on the Liberdade Street in downtown (04°19'09"S, 46°27'30"W, 170 m alt.) in a synanthropic way. The spider was found in the morning, in a room on the second floor of the hotel and was inside a half rolled

up sock over a shoe. The spider certainly entered the sock during the night when the shoe was left on the floor. Again, in a search throughout the building, webs or other specimens of brown spiders were not found.

Finally, in the municipality of Bom Jesus das Selvas, foci of *L. amazonica* were recorded (Figure 1) in three remnants of the secondary forest, in the marshland of the Pindaré River (04°21'30" S, 46°41'14" W, 126 m alt.; 04°21'36" S, 46°42'07" W, 84 m alt.; 04°23'00" S, 46°46'49" W, 98 m alt.) on February 5, 2012. Several spider specimens were found associated with webs between the sheath or petiole and the stem of dead anajá palm [*Attalea maripa* (Aubl.) Mart.] and babaçu palm (*Attalea speciosa* Mart. ex. Spreng.) leaves at up to one meter above ground; on the underside and inside of termite mounds over trees, at up to 2 m above ground; and inside crevices of iron rocks (canga) on the forest ground (Figure 3).²³ In most cases, foci were found in drier forest stretches but also in more humid areas. In this region, the species is common in forest environments, and occurrences were considered autochthones in natural environments. Testimony specimens in the study are listed in Table 1.



Figure 3 - Natural environments and microenvironments inhabited by *Loxosceles amazonica* in Bom Jesus das Selvas, Maranhão. Secondary forest with palm tree (a, b), brown spider under a palm leaf (c), secondary forest with mound on tree (d), mound with cobwebs of brown spider (e), rock outcropping with cobwebs in secondary forest (f).

Table 1 - Testimony specimens of *Loxosceles amazonica* deposited in the Scientific Collection of Arachnids in the Arachnology Laboratory at the Federal University of Minas Gerais.

Number in the collection	Specimens	State	Municipality	Location	Latitude and Longitude	Altitude	Date of collection	Collector
LAMG 12624	1 ♂, 1 ♀	PB	Maturéia	Fazenda Engenho Bom Conselho	07°16'13" S 37°23'18" W	781 m	07/IX/2008	A. L. Silveira
LAMG 12625	1 ♂, 1 ♀	PB	Serra Branca	Rua Joaquim Borba Filho, B. dos Pereiros	07°29'16" S 36°40'09" W	496 m	26/X/2009	G. Moura-da-Silva
LAMG 12626	1 ♂	MA	Itapecuru Mirim	Avenida Brasil, Centro	03°23'38" S 44°21'36" W	22 m	10/XII/2011	A. L. Silveira
LAMG 12627	1 ♀	MA	Santa Inês	Rua da Barreirinha, Centro	03°23'38" S 44°21'36" W	26 m	03/X/2012	A. L. Silveira
LAMG 12628	1 ♀	MA	Arari	Baixada do rio Mearim	03°34'10" S 44°49'03" W	25 m	10/III/2012	A. L. Silveira
LAMG 12629	1 ♂	MA	Burititupu	Rua da Liberdade, Centro	04°19'09" S 46°27'30" W	170 m	01/II/2012	A. L. Silveira
LAMG 12630	1 ♂, 1 ♀	MA	Bom Jesus das Selvas	Baixada do Rio Pindaré,	04°23'00" S 46°46'49" W	98 m	05/II/2012	A. L. Silveira

It is necessary to comment about some of the existing localities of *L. amazonica* presented in the original description of the species by Gertsch.¹ About the type location, there is no known place named Santa Isabel on the banks of the Araguaia River in Mato Grosso. In this study, it is assumed that the author had referred to the village of Santa Isabel do Morro, from the Iny Karajás Indians, located on the left bank (direction upstream to downstream) of the Araguaia River, in the Bananal Island, extreme southwestern of the city of Lagoa da Confusão, Tocantins State (11°34'40"S, 50°40'14"W, 195 m alt.). The village is situated just 4 km from the city of São Félix do Araguaia, located on the right bank of the Araguaia River, in the State of Mato Grosso, and possibly this proximity has led to the conclusion that Santa Isabel was located in Mato Grosso.

Another citation from the author that deserves attention is the location of "Cuyuba", also nonexistent and here considered as "Cuiabá, the capital of Mato Grosso. Gertsch also quoted a record in "*Pebas (Peru) to São Paulo de Olivença (Muth)*" as a location in Brazil, however, in the map's representation the record coincided with the location of Pebas in Peru. The localities of São Paulo de Olivença and Pebas are connected by the Amazon River, and because the author had made a reference to a record in Brazil, the *L. amazonica* sampling was probably conducted along that stretch of the river near São Paulo de Olivença, in the Amazonas State, Brazil.¹

Finally, in the geographic distribution map of *L. amazonica* presented by Gertsch a locality in the

center of Pará and another at the border between the Amazon and the extreme west of Rondônia States were represented, however, without any textual mention of these. These records were considered unreliable and, therefore, they were not replicated in this publication.¹

From the localities of prior records of *L. amazonica*, including those rectified here and new reported occurrences, a map of the known geographical distribution of the species is presented (Figure 4). This distribution includes the lowlands of the Amazon River, the eastern edge of the Amazon, northern and western portions of the Cerrado, Central and Northern coastal areas of the Caatinga, and Northeastern coastal areas in Brazil.

DISCUSSION

The new records presented here constitute a significant expansion in the known geographical distribution of *L. amazonica*, especially to the eastern edge of the Amazon; this evidences the lack of studies on spiders of medical importance in northeastern Brazil. The observations of *L. amazonica* now reported, occurred randomly and without great sampling efforts, indicating a high frequency of records for the species. Probably, *L. amazonica* is common and well distributed in the municipalities where it was found, which can also occur in other regions of Paraíba, Pernambuco, and Maranhão.

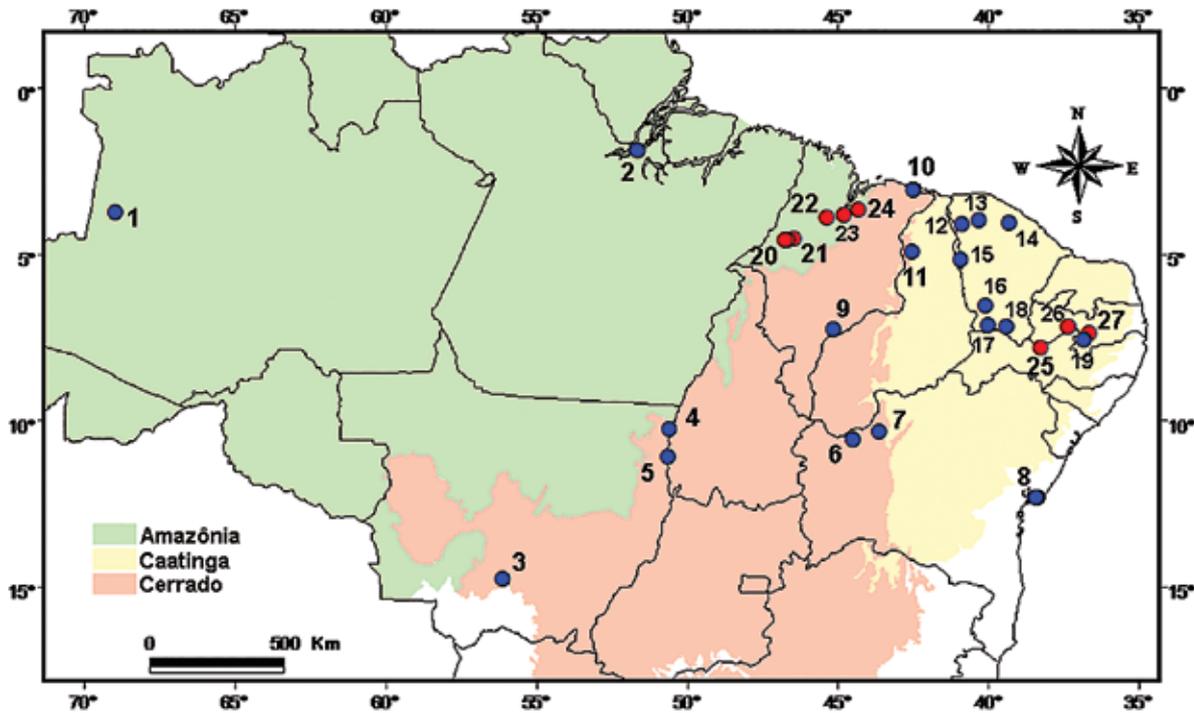


Figure 4 - Geographic distribution of *Loxosceles amazonica*. Previous records (blue dots): AMAZONAS: 1 – around São Paulo de Olivença; PARÁ: 2 – Gurupá; MATO GROSSO: 3 – Cuiabá, 4 – Barra do Tapirapé; TOCANTINS: 5 – Santa Isabel; BAHIA: 6 – Santa Rita de Cássia, 7 – Buritirama, 8 – Salvador; MARANHÃO: 9 – around Loreto, 10 – Paulino Neves; PIAUÍ: 11 – José de Freitas; CEARÁ: 12 – Ubajara, 13 – Sobral, 14 – Pentecoste, 15 – Crateús, 16 – Aiuaba, 17 – Araripe, 18 – Crato; PARAÍBA: 19 – Sumé.^{1,12-19} New records (red dots): MARANHÃO: 20 – Bom Jesus das Selvas (three locations), 21 – Buriticupu, 22 – Santa Inês, 23 – Arari, 24 – Itapecuru Mirim, (two locations); PERNAMBUCO: 25 – Serra Talhada; PARAÍBA: 26 – Maturéia (two locations), 27 – Serra Branca.

In Maranhão, it was considered that *L. amazonica* lives naturally in forest environments, but can be invasive of altered areas or be introduced in urban environments. In Paraíba and Pernambuco, there is the possibility that the species is invasive or exotic, being associated with only urban areas and rural households. According to the publication that reported *L. amazonica* in Sumé in Paraíba, spider specimens were found in a home and some juazeiro tree bark (*Ziziphus joazeiro* Mart.) and algarobeira [*Prosopis juliflora* (SW) DC.], without mention of one detection in the natural environment.¹³ Although juazeiro is a native species from the caatinga, algarobeira is exotic in the region indicating that the record of a brown spider was probably obtained in an altered environment.^{24,25} The fact that the spider exists associated with urban and rural environments in northeastern Brazil, including inside homes and surroundings, maximizes the probability for loxoscelism in this region and constitutes a factor of medical importance for this species. Potentially, any dark or shadowed microenvironment that saves a bit of moisture created

by humans can be colonized by *L. amazonica*, especially under objects and in cracks and cavities.

Until then, the natural habitat of *L. amazonica* had not been described in Amazonian domains. The records in Bom Jesus das Selvas allowed recognizing the natural occurrence of the species in remnants of Open Ombrophylus Forest in the secondary stage of regeneration. In this type of forest, several foci of the species were found in some microenvironments such as under dried leaves of palm trees, on the surface and inside termite mounds on trees, and cavities of rocks in the soil, which are here considered as conducive to colonization by *L. amazonica*. Given the diversity of existing ecosystems along the distribution range of *L. amazonica*, it is possible that the species is found in other habitats and natural microenvironments. Brown spider bites occur mainly intra-domiciles, thus, loxoscelism can be considered typically associated with urban and rural environments; however, new data in habitat use indicate the possibility of accidents with *L. amazonica* within forests in the Amazon region.⁵

In Itapecuru Mirim and Buriticupu, in Maranhão, only adult males of *L. amazonica* were found wandering inside buildings. These were inspected, and evidence of foci such as webs, oothecae, and clumps of spiders were not found. Therefore, it was considered that the specimens moved from external foci and were passively transported into the interior of buildings by human action (for example, in boxes). The possibility that males of *L. amazonica* display errant behavior identifies the risk of loxoscelism even inside homes where there are no spider's foci as long as the species exists nearby. The occasions of observation should also be highlighted – two males moving at night, and one male hidden inside a half wrapped sock on footwear – which exemplify situations potentially leading to accidents.

Addressing the epidemiological aspect, other authors agree with the likelihood that accidents with brown spiders are more frequent than reported on the basis of not being properly diagnosed and/or recorded due to the lack of a specific diagnostic test and difficulties in diagnosing clinical signs and capturing and identifying the offending agent.²⁶ According to data from the Ministry of Health on loxoscelism notifications in Brazil between 1990 and 1993, a reduced percentage of accidents (0.23%) was reported in the Northeast compared to the vast majority of the Southern region (95.58%); intermediate values are reported in Southeastern (4.10%) Brazil.¹¹ According to the same data source, even lower percentages of accidents were recorded in Central-Western (0.08%) and Northern (0.02%) regions. Based on data from the National System of Toxic Pharmacological Information, between 2005 and 2009 (the last five years for which there is information available in the system), no cases of accidents with spiders have been notified in the State of Maranhão, 20 accidents were reported in Pernambuco, and 370 accidents have been documented in Paraíba (accident-causing species not identified) based on the Brazilian States for which there are records of *L. amazonica*.²⁷

Based on the new geographical occurrences of *L. amazonica* and the high frequency of observations in Maranhão, there is a lack of loxoscelism diagnoses or accidents with other species of medical importance, probably in many northeastern regions of Brazil, as well as absence of correct notifications in the information systems and presence of brown spiders and/or accidents caused by them. Possibly, among the states referred here, the notifications reflect the reality in Paraíba only because there are records of a large number of accidents

with spiders in that state, and probably *L. amazonica* is the etiological agents in these accidents.

Thus, it is believed that in many areas of occurrence of *L. amazonica* in northeastern Brazil, including Paraíba, Pernambuco, and Maranhão, cases of loxoscelism likely happen accompanied by difficulties in diagnosis, and under notifications of accidents. The possibility of loxoscelism with *L. amazonica* is enhanced by an accident attributed to the species.¹² Consequently, in the case of accidents that are not properly diagnosed, patients would not receive the right treatment, including specific serum-therapy, which may be considered a public health problem. We still stress out the need to supply hospital networks in Paraíba, Pernambuco, and Maranhão with anti loxoscelid or anti arachnid sera.

CONCLUSIONS

It is concluded that *L. amazonica* is well distributed by northeastern Brazil, occurring in the Caatinga, Northern Cerrado, and Eastern Amazon. It is frequently found in some areas of Paraíba, Pernambuco, and Maranhão. The species occurs in a synanthropic way associated with households and in altered areas and in an autochthonous way in secondary forests, inhabiting various types of microenvironments. Its proximity to human beings maximizes the likelihood of accidents. Based on this evidence, it is likely that *L. amazonica* is the main etiologic agent of loxoscelism in Northeastern and Central-Western Brazil, which allows recognizing the species as of medical importance.

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