

Ibotyporanga Mello-Leitão: tropical spiders in Brazilian semi-arid habitats (Araneae: Pholcidae)

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Three new species of the previously monotypic ninetines genus *Ibotyporanga* Mello-Leitão, 1944 are described: *I. emekori* sp. n., *I. diroa* sp. n., and *I. ramosae* sp. n., all from the Brazilian state Bahia. All were collected in 'caatinga', a vegetation type that covers most of the area with semiarid climate in the northeastern region of Brazil. It is argued that two alternative explanations might account for the apparently almost universal restriction of ninetines to relatively inhospitable areas: they might be a relict group (possibly monophyletic), displaced from more favorable areas by more modern pholcids; or they might be a polyphyletic assemblage of lineages that independently evolved the ability to thrive in arid and semiarid areas by reducing their body size and appendage length to fit into spaces with tolerable microclimate. Preliminary cladistic analyses based on morphology alone have not been able to settle this question.

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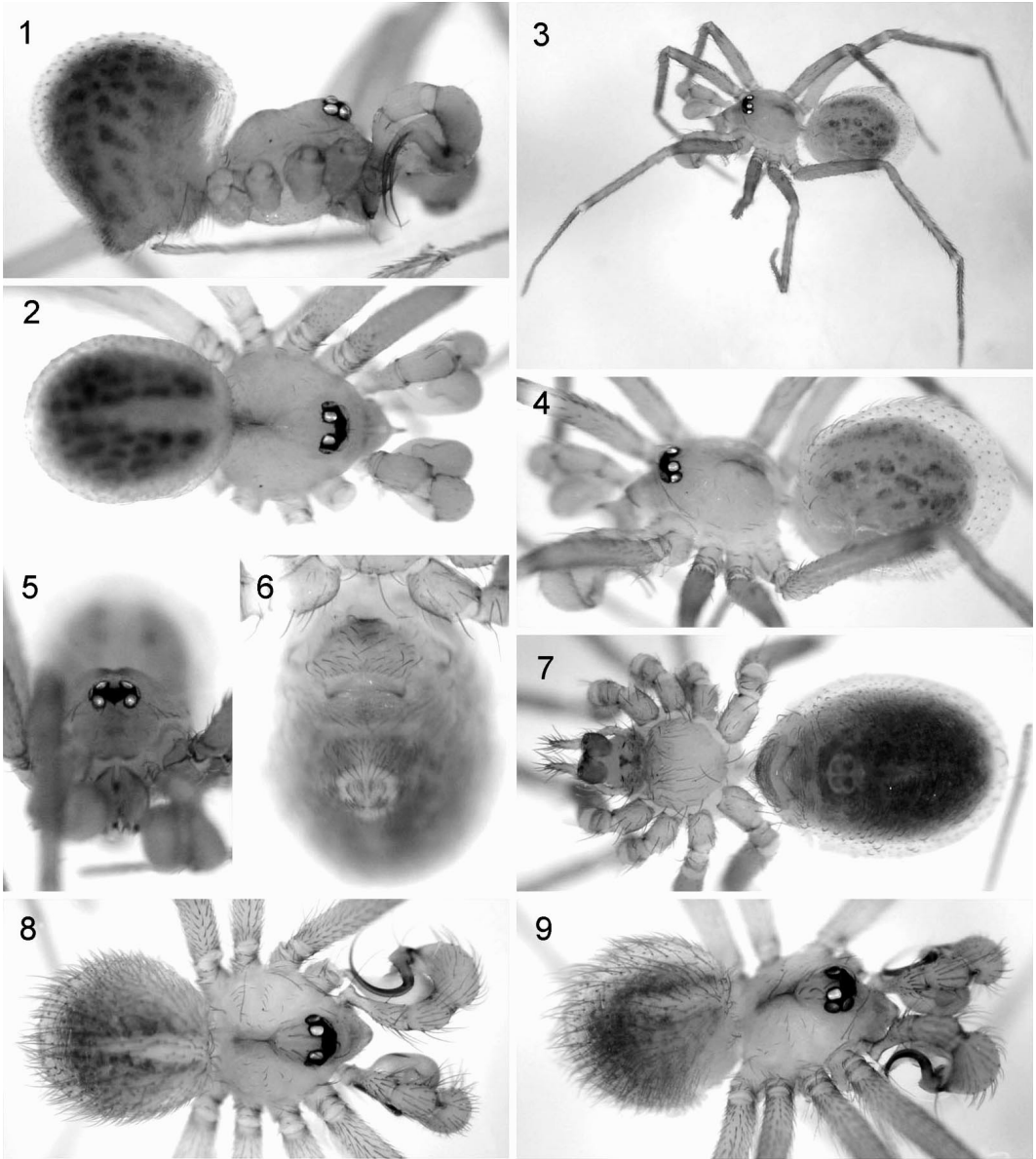
Introduction

Pholcids are usually characterized as a mainly tropical and subtropical family, with the highest diversity in the humid tropics. Despite this simplified categorization, two of the four taxa provisionally classified as subfamilies by Huber (2000), i.e. ninetines and holocnemines, appear to be widely distributed and most diverse in semi-arid and arid areas. As for ninetines, they have even been collected in extremely dry areas like the Atacama desert in Chile (Huber 2000), in northwestern Mexico (Gertsch 1982), in Yemen (Huber & van Harten 2001), and in Namibia (Huber 2000). In contrast, no ninetines have been collected by thorough searches in the humid tropics, as for example in Peru (by T. Erwin and colleagues), Bolivia (by J. Coddington and colleagues), and Costa Rica (by the first author and colleagues). This pattern appears disrupted by some species occurring in regions with relatively high rainfall, like *Ibotyporanga* in Brazil. However, a closer look at the collection data reveals that at least some of these

species come from localities that are unusual for their aridity, considering their geographic location. The arid character of these areas is not necessarily due to low precipitation, but probably results from a series of factors, like soil properties, climatic variability, fire frequency, etc. (Joly et al. 1999).

The present paper describes three new ninetines of the genus *Ibotyporanga* collected in 'caatinga', which is the semi-arid steppe in northeastern Brazil. Caatinga is characterized by hot, semi-arid climate and by plants that exhibit traits related to water deficiency (Joly et al. 1999). Average annual precipitation is usually below 800 mm, and severe droughts occur every few years, extending beyond the usual dry season and lasting years in certain areas (de Vivo 1997).

The genus *Ibotyporanga* has been monotypic since its description by Mello-Leitão (1944) with *I. naideae* Mello-Leitão as the single, widely distributed species. Thus, the present paper also provides data for a better understanding of the genus, its diagnosis and geographic distribution. This



Figures 1-9. *Ibotyporanga emekori* (1-7) and *I. diroa* (8-9): (1-4, 8-9) Male, habitus. 5. Male, frontal view. 6. Female opisthosoma, ventral view. 7. Female, ventral view.

paper continues a series devoted to spiders in Brazilian 'caatinga', resulting from the Central project (Brescovit & Ramos in press).

Materials and methods

All the material studied is deposited in the collection of the Laboratorio de Artrópodos of the Instituto Butantan, São Paulo (IBSP). Methods and style are as in Huber (2000). All measure-

ments are in mm (+/- 0.02 mm) unless otherwise noted. Drawings were done with a camera lucida on a Nikon Labophot-2 compound microscope. Photos were made with a Nikon Coolpix 950 digital camera (1600 x 1200 pixels) mounted on a Nikon SMZ-U dissecting scope.

Taxonomy

Genus *Ibotyporanga* Mello-Leitão, 1944

Diagnosis. – The diagnosis given by Huber (2000) was based on the single species then known, and therefore needs minor correction. The outstanding and singular apomorphy of the genus is the single median apophysis on the male chelicerae (Fig. 12, 13, 16, 17, 20, 21), apparently originating from the fusion of paired apophyses. The procurus, however, is too variable in shape to make it useful for generic diagnosis.

Distribution. – The type species *I. naideae* is widely distributed in Brazil (Amazonas, Pará, Tocantins, Mato Grosso). The three species newly described below are only known from Bahia.

Ibotyporanga emekori sp. n.

(Fig. 1-7, 10-13)

Type material. – Male holotype from Toca do Indio (11°01'06''S, 42°09'21''W), Central, Bahia, Brazil; July 12-18, 2000 (E. F. Ramos & A. D. Brescovit), pitfall, caatinga, sample 4.02, in IBSP (28760).

Etymology. – The specific name is a noun in apposition, taken from the Brazilian Indian 'Tukâno' language. 'Emêkori' is a good supernatural entity, present at parties and celebrations.

Diagnosis. – Easily distinguished from *I. naideae* and *I. diroa* by the longitudinal split of the procurus (Fig. 11) and by the smaller size; from the very similar *I. ramosae* by the longer palpal patella, by the shape of the procurus and the length and shape of its terminal branches (dorsal and ventral branches of approximately equal length). The females of *I. naideae* are larger, those of *I. diroa* and *ramosae* are unknown.

Description. – Male (holotype): Total length 1.88; carapace width 0.68. Leg 1: 3.44 (0.96 + 0.24 + 0.84 + 0.96 + 0.44), tibia 2: 0.72, tibia 3: 0.68, tibia 4: 1.04; tibia 1 l/d: 9. Habitus as in Fig. 1-4. Prosoma and legs ochre yellow; opisthosoma greyish with indistinct small spots. Carapace with

distinct but shallow thoracic furrow (Fig. 5). Eye pattern as in Fig. 2 and 5; AME diameter 40µm, PME diameter 70µm, distance PME-ALE 20µm, distance PME 50µm. Clypeus with distinct sclerotized rim distally. Chelicerae as in Fig. 12-13, with medially fused apophyses and fine stridulatory ridges (stridulatory pick is a modified hair proximally on palpal femur). Sternum slightly wider than long (~8/7). Palps as in Fig. 10-11, with strongly bent procurus that splits into two branches of approximately equal length. Bulb large, with simple bulbal projection. Legs without spines, without curved hairs; long stiff hairs ventrally on femora mostly lost, but present in other males; many short vertical hairs on tibiae 1, fewer on tibiae 2, none on tibiae 3 and 4; retrolateral trichobothrium on tibia 1 at 55%; tarsus 1 with about 5 indistinct pseudosegments. Opisthosoma globular. Genital plate large, light ochre.

Variation: Tibia 1 in 6 other males: 0.88-0.96.

Female: In general very similar to male. Carapace width (N=3) 0.72-0.76; tibia 1 length (N = 3) 0.88-0.96. Epigynum consisting of posterior plate and large frontal plate with sclerotized median indentation frontally (Fig. 6). Internally very simple, with pore plates similar to *I. naideae* (see figure 363 in Huber 2000), also with similar median structure, but without lateral membranous tubes.

Material examined. – BRAZIL: Bahia: Central: Toca do Indio: male holotype above and 4♂ 1♀ with same collection data (IBSP 28761-28765). Abrigo de Pilões (11°03'28''S, 42°06'16''W), July 9-21, 2000 (E. F. Ramos & A. D. Brescovit), 2♂ 2♀ (IBSP 28755-28757).

Ibotyporanga diroa sp. n.

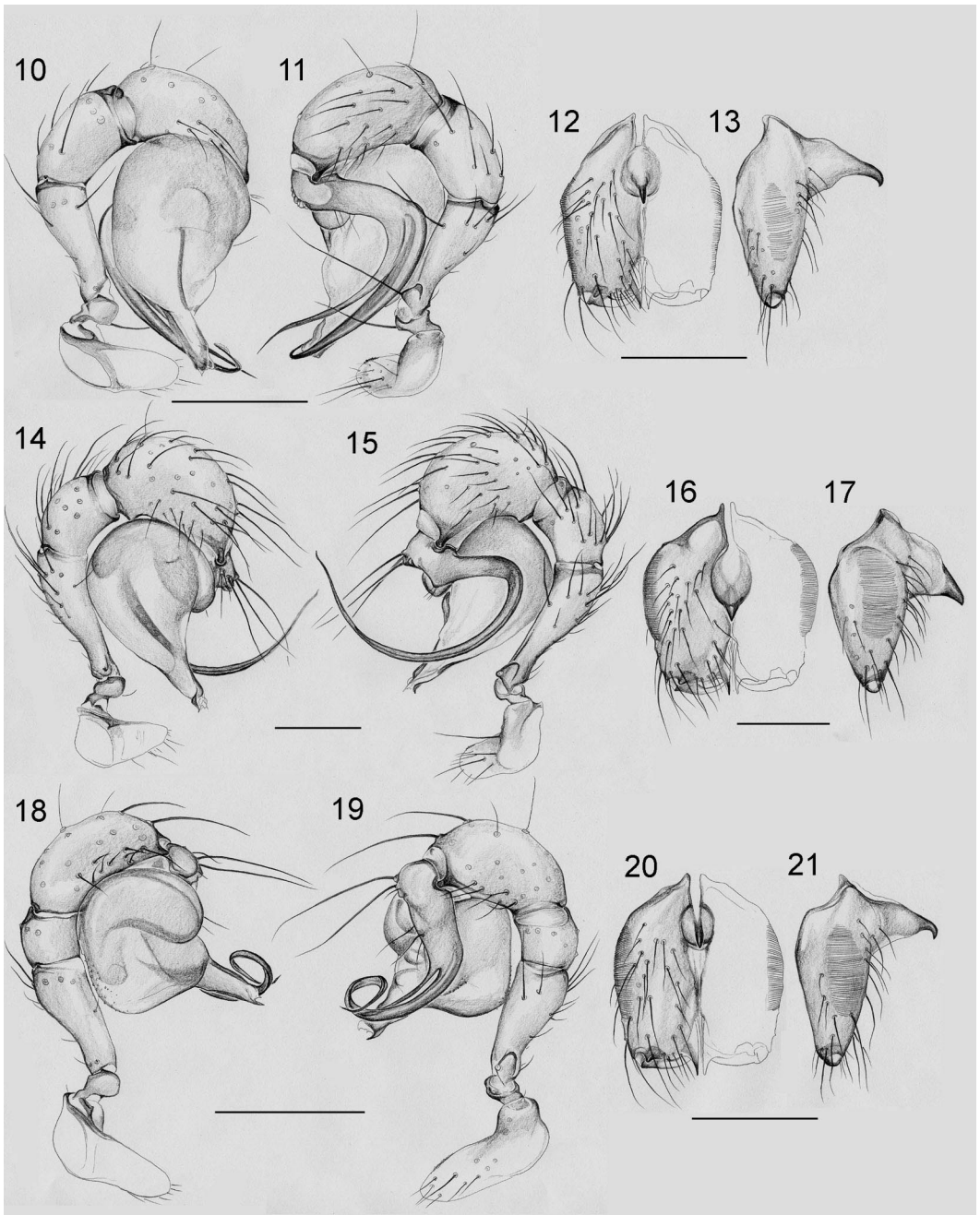
(Fig. 8-9, 14-17)

Type material. – Male holotype from Toca de Esperança (11°09'S, 42°07'W), Jussara, Bahia, Brazil; July 23, 2000 (A. D. Brescovit), beating, caatinga, sample 94, in IBSP (28759).

Etymology. – The specific name is a noun in apposition, taken from the Brazilian Indian 'Tukâno' language. 'Diroá' is a good supernatural entity, present during women's life and pregnancy.

Diagnosis. – Easily distinguished from *I. emekori* and *I. ramosae* by the single widely curved rod of the procurus (Fig. 15); from the very similar *I. naideae* by the much shorter cheliceral apophysis (Fig. 17).

Description. – Male (holotype): Total length 2.12;



Figures 10-21. *Ibotyporanga emekori* (10-13), *I. diroa* (14-17) and *I. ramosae* (18-21), males: Palps in prolateral and retrolateral views, chelicerae in frontal and lateral views. Scale lines: 0.3 mm (palps), 0.2 mm (chelicerae).

carapace width 0.92. Leg 1: 5.62 (1.56 + 0.18 + 1.44 + 1.92 + 0.52), tibia 2: 1.16, tibia 3: 1.04, tibia 4: 1.48; tibia 1 l/d: 12. Habitus and coloration very similar to *I. emekori* (Fig. 8-9). AME diameter 80µm, PME diameter 70µm, distance PME-ALE 30µm, distance PME 90µm. Chelicerae as in Fig. 16-17. Palps as in Fig. 14-15, with globular tibia and widely curved procurus. Bulb with simple bulbal projection. Legs without spines, without curved hairs; long stiff hairs ventrally on femora; many short vertical hairs on tibiae 1 only; retrolateral trichobothrium on tibia 1 at 59%; tarsus 1 with about 5-6 very indistinct pseudosegments. Opisthosoma globular. Genital plate large, light ochre.

Female: Unknown.

Material examined. – BRAZIL: Bahia: Jussara: holotype above.

Ibotyporanga ramosae sp. n.

(Fig. 18-21)

Type material. – Male holotype from Gruta das Pedras Brilhantes, São Desidério (12°36'33"S, ~45°W), Bahia, Brazil; July 8, 2000 (E. F. Ramos), pitfall, caatinga, sample 8.4, in IBSP (28758).

Etymology. – Named for Elaine Folly Ramos who collected the male holotype.

Diagnosis. – Easily distinguished from *I. naideae* and *I. diroa* by the longitudinal split of the procurus (Fig. 19) and by the smaller size; from the very similar *I. emekori* by the shorter palpal patella, by the shape of the procurus and the length and shape of its terminal branches (dorsal branch much shorter than ventral branch).

Description. – Male (holotype): Total length 1.60; carapace width 0.68. Leg 1: 3.92 (1.08 + 0.28 + 1.00 + 1.16 + 0.40), tibia 2: 0.88, tibia 3: 0.80, tibia 4: 1.16; tibia 1 l/d: 11. Habitus and coloration very similar to *I. emekori*. AME diameter 40µm, PME diameter 50µm, distance PME-ALE 30µm, distance PME 50µm. Chelicerae as in Fig. 20-21. Palps as in Fig. 18-19, with procurus that splits into two branches, dorsal branch short, straight, ventral branch long, curved. Bulb with simple bulbal projection. Legs without spines, without curved hairs; without long stiff hairs ventrally on femora (apparently lost); without short vertical hairs on tibiae 1; retrolateral trichobothrium on tibia 1 at 56%; tarsus 1 with about 4-6 very indistinct pseudosegments. Opisthosoma globular.

Genital plate not distinguishable from rest of opisthosoma.

Female: Unknown.

Material examined. – BRAZIL: Bahia: São Desidério: holotype above.

Discussion

Of the 36 nominal species currently included in Ninetinae, at least 27 occur in areas with less than 75 mm per month average precipitation. Several of the remaining species are restricted to the relatively dry belt between the Amazonian and Atlantic rainforests in South America. Two alternative explanations might account for the apparent restriction of ninetines to relatively dry habitats: First, ninetines might represent a primitive group within pholcids that was replaced in favourable habitats by more modern pholcids (the 'pholcines' and the 'New World clade' of Huber 2000). This view considers ninetines an ancient (possibly monophyletic) group that has managed to survive in widely disparate areas, with a long history of independent evolution in each area. Second, ninetines might represent a polyphyletic assemblage of lineages that independently acquired the ability to inhabit dry areas, primarily by reducing body size and leg length to fit into crevices, under stones, and the interstices of the soil.

The first view is the traditional one, dating back to Simon (1893), and supported by preliminary cladistic analyses of the family (Huber 2000, 2001). However, as argued in another context (Huber in press.), the monophyly of ninetines was supported by a set of morphological characters that might not be independent. Rather than that, size and leg length reduction might account for most if not all characters defining ninetines. Therefore, the monophyly of Ninetinae is not as convincingly supported as the mere number of apomorphies might suggest. It remains to be established whether molecular characters can help solve this problem.

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