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On the female of *Metagonia taruma* (Araneae: Pholcidae), ecology of the pholcid spiders in the Urucu River Basin, Amazonas, Brazil and new records from Brazilian Amazonia

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ABSTRACT. In this study we describe the unknown female of *Metagonia taruma* Huber, 2000, which was discovered after sampling in two forest gap types at Porto Urucu (Urucu River Basin, Coari, Amazonas, Brazil), and also provide information on the community ecology and natural history of the sampled species. The female of *M. taruma* is similar to that of *M. samiria* (Huber, 2000) by having an epigynum with a slightly projecting broad scape with a distal pocket; it differs by the larger pore plates. We collected twelve Pholcidae species at Porto Urucu and *M. taruma* was the most frequent and abundant. The populations of *Carapoia ocaina* Huber, 2000 and *Mesabolivar aurantiacus* (Mello-Leitão, 1930) present homogeneous sex ratios, while *M. taruma* and *Mesabolivar* sp. were female biased. Only two species (*M. taruma* and *Mesabolivar* sp.) exhibited differences in abundance in each forest gap type, being higher at the poorly regenerated gaps. Thus, the use of Pholcidae species as ecological indicators is promising. We also present new records, throughout the Amazon Basin, for the Pholcidae species collected at Porto Urucu.

KEY WORDS. Forest gaps; natural history; neotropical region; species distribution; taxonomy.

Pholcidae comprises over 1000 species of spiders in about 85 genera (Platnick 2009) and its species occur in a variety of habitats worldwide, from rain forests to deserts, and from sea level to over 3500 m (Huber 2000). The taxonomic and phylogenetic knowledge of these animals has increased considerably over the past few years (e.g. Huber 2000, 2001, 2005a, b, Bruvo-Madaric *et al*. 2005, Astrin *et al*. 2006, 2007). The New World genera were subject to a recent comprehensive revision (Huber 2000) and further taxonomical additions (Huber & Brescovit 2003, Huber 2005a, c, Huber & Wunderlich 2006, Huber *et al*. 2005a, b, c, Huber *et al*. 2010, Huber & Astrin 2009, Astrin *et al*. 2006, Machado *et al*. 2007a, b, c). Nevertheless, a large number of taxa are yet undescribed, many of them available in South American collections (Huber 2000). This is the case for *Metagonia* Simon, 1893, which occurs from Mexico to Central Argentina and is one of the most species-rich pholcid genus in the neotropics, with 81 described species (Platnick 2009). The taxonomic knowledge of Pholcidae gathered to date contrasts with the sparse ecological and biological data available for most of the New World species, although advancements have already been made (e.g. Briceño 1985, Eberhard 1992a, b, Eberhard & Briceño 1983, 1985, Huber 1994, 1997a, c, d, 1998a, b, Huber & Eberhard 1997, Japyassú & Macagnan 2004, Machado *et al*. 2007a, c, Peretti *et al*. 2006, Sewlal & Starr 2008).

In the present paper, the unknown female of *Metagonia taruma* Huber, 2000 is described and new records of four pholcid species in the Brazilian Amazon are reported. Data on the community ecology, the abundance of pholcid spiders in two different forest gap types, sex ratios, and natural history of pholcid species from Porto Urucu (Urucu River Basin, Coari, Amazonas, Brazil) are presented.

MATERIAL AND METHODS

Porto Urucu is a 54000 ha petroleum and natural gas production facility on the right margin of the Urucu River, Solimões River basin, Coari municipality, state of Amazonas, Brazil (04°53'S, 65°20'W, Fig. 1), where several structured inventory initiatives have been carried out to evaluate the environmental impact of such production activities on the forest matrix fauna. The regional climate is classified as "Afi" in the Köppen system, with the rainy season between September and April, and the dry season between May and August (Radambrasil 1978). The main forest formation in Porto Urucu is "terra firme" (upland forest) associated with lowlands and plateaus irrigated by small creeks ("igarapés"), tributaries of the Urucu River (for a description of an area with similar topography, see Ribeiro *et al*. 1999). Twelve well regenerated forest gaps (Class

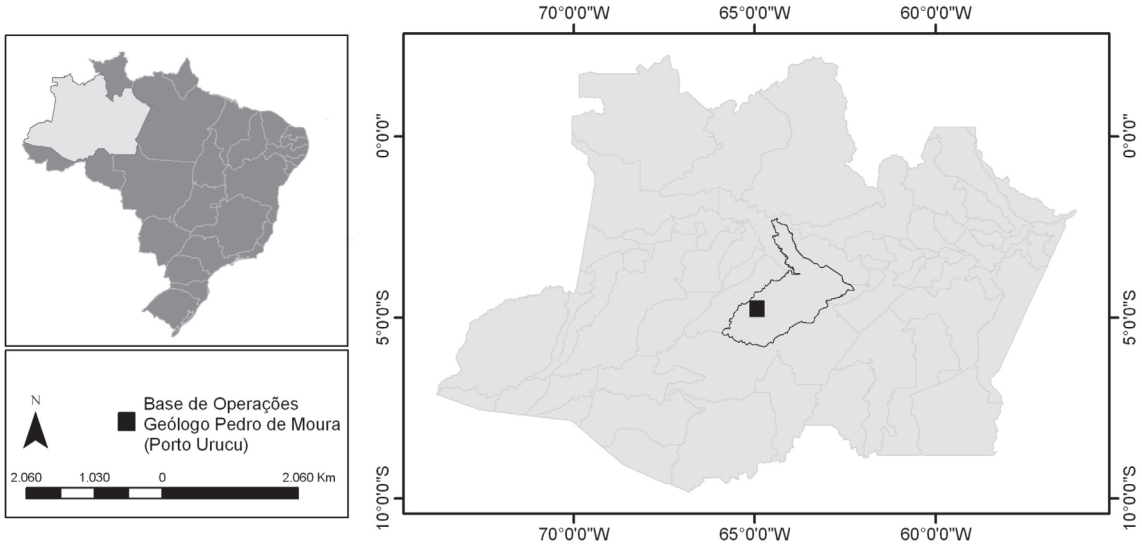


Figure 1. Urucu River Basin, Coari, Amazonas, Brazil.

"I-good", age > 5 years) and seventeen poorly regenerated forest gaps (Class "II-poor", age < 5 years) were sampled during a three month expedition (between June and November, 2006), using Winkler extractors, beating trays, and nocturnal hand collecting. Beating trays were used to access shrub-dwelling spiders during the day. Each tray was composed of a 0.8 m^2 white cotton sheet. The nocturnal hand collecting method was modified by combining the "looking up – looking down" methods proposed by Coddington *et al.* (1991). The samples, combined for each methodology, were the results of one square meter of litter (sifted and placed in Winkler extractors for two days), one hour using beating trays per collector and one hour of nocturnal hand collecting per collector, within an area of 300 m^2. To complete the species list, a few individuals gathered on occasional collections were also computed. Kruskal-Wallis tests were used to test if the differences between the abundances by samples for each of the four most abundant species were statistically significant, and a Dunn test was performed to search for the source of statistical differences. Chi-squared tests were used to verify the sex ratio (always expressed as male/female) of each species and its frequency of occurrence (number of samples with a given species divided by the total number of samples with pholcid species). To test statistical differences between the species abundance by the forest gap classes, a Mann-Whitney test was performed, using all males and females sampled. All analyses were performed using BioEstat 5.0 software (Ayres *et al.* 2007). The statistical analyses were performed at 0.05 levels and only included data for species with abundances higher than ten individuals. The material examined is deposited in the collection of the Museu Paraense Emílio Goeldi, Pará, Brazil (MPEG, curator A.B. Bonaldo). The description style follows Huber (2000). All measurements are in millimeters. The epigynum was dissected and examined in clove oil (Levi 1965), after digestion of soft tissues with pancreatin/borax (Álvarez-Padilla & Hormiga 2008). The length/width (L/d) ratio of tibia 1 is a measure of the leg robustness and has a precision of about ± 2. The abbreviations used in the text are PME (posterior median eyes) and ALE (anterior median eyes).

RESULTS AND DISCUSSION

Taxonomy

Metagonia taruma Huber, 2000

Figs 2-5

Metagonia taruma Huber, 2000: 61, figs 232-237 (male holotype from "Kuyuwini Landing, Kuyuwini ni river", Upper Takutu-Upper Essequibo, Guyana, in American Museum of Natural History, not examined).

Diagnosis. Females of *M. taruma* differ from the remaining congeneric species, except from *Metagonia samiria* (Huber, 2000: figs 238-243), by the epigynum with a slightly projecting broad scape with a distal pocket; they differ from *M. samiria* by the larger pore plates (Figs 4-5).

Description. Female (MPEG 13875). Total length 3.1, carapace width 0.9, length 1.0. Leg I: 23.8 (6.2 + 0.4 + 5.9 + 9.5 + 1.8), tibia II: 3.5, tibia III: 1.9, tibia IV: 3.9, tibia I L/d: 40. Habitus as in figures 2 and 3. Caparace light ochre, with blackish lines near border and in middle of thoracic region, without thoracic groove, ocular area light ochre, PME-ALE about 20% of PME diameter. Clypeus and sternum light ochre. Chelicerae ochre. Palps light brown. Legs yellowish, with brown patellae and tibia-metatarsus joints. Tarsus I with more than 20 pseudosegments. Opisthosoma ochre-gray, with some light brown

spots. Epigynum light brown, with slightly projecting scape and a spoon-like tip; fully symmetrical internally (Figs 4 and 5).

Male. Described by HUBER (2000: 61). Males collected at Porto Urucu differ slightly with respect to the relative sizes of the distal elements of the procursus, and the clypeus apophysis (the lateral "wings" are more prominent), as described by HUBER (2000: 63-64).

Variation. Slight variation in prosoma and opisthosoma coloration pattern with few paler individuals. The carapace of some individuals examined with only scattered blackish lines. Measurements (10 females): total length 3.1-4.0; carapace width 0.8-0.9, length 0.8-1.0; Leg I 3.2-3.7; tibia III 1.8-2.2; tibia IV 3.3-3.8.

Material examined. BRAZIL, *Pará*: Juruti (Sítio Barroso, 02°27'41"S, 56°00'11"W), 1 male, 08.VIII.2004, D.F. Candiani *leg*. (MPEG 8727); (Vale do Igarapé Mutum, Platô do Rio Juruti, 02°36'11"S, 56°12'36"W), 1 female, 04.VIII.2004, D.F. Candiani *leg*. (MPEG 8790); (Sítio Três Irmãos, 02°27'51.4"S, 56°00'08"W), 3 males and 1 female, 08.II.2007, J.A.P. Barreiros *leg*. (MPEG 13903-13905); 1 female, 16.XI.2007, C. M. Souza *leg*. (MPEG 13906); *Óbidos* (Ilha Januaria, Ilha Grande 2, 02°06'09"S, 55°18'05"W), 4 males, 29.X.2003 (MPEG 1898); *Prainha* (Margem Norte, Paranaquara, Merendeira, 01°44'38"S, 53°10'30"W), 3 males, 21-22.X.2003 (MPEG 1891); (Margem Norte, Fazenda JK, 01°51'44"S, 53°43'17"W), 1 male, 23.X.2003 (MPEG 1888). *Amazonas*: Coari (Base de Operações Geólogo Pedro de Moura, Porto Urucu, 04°53'S, 65°20'W), 10 males and 3 females, VII-IX.2006, C.A.C. Santos-Júnior *leg* (MPEG 13823-13835); 7 males and 14 females, IX-XI.2006, D.F. Candiani *leg*. (MPEG 13836-13852); 3 males, 1 female, VII.2006, L.T. Miglio *leg*. (MPEG 13853-13856); 2 females, X.2006, N.C. Bastos *leg*. (MPEG 13857, 13858); 10 males, 28 females, IX-X.2006, N.F. Lo-Man-Hung *leg*. (MPEG 13859-13884); 7 males, 9 females, VII-X.2006, S.C. Dias *leg*. (MPEG 13885-13899); 1 male, 1 female, 2006, S.C. Dias et al *leg*. (MPEG 13900); Itacoatiara (Ilha Nossa Senhora do Perpétuo Socorro, Lago Compridão, 03°10'31"S, 59°18'38"W), 1 female, 08.XI.2003 (MPEG 1890); (Margem Norte, São José, ilha do Soreano, 03°20'24"S, 58°48'42"O), 3 females, 06.XI.2003 (MPEG 1861); Urucurituba (Ilha Nossa Senhora de Fátima, Ilha Grande, Cucuiari, 02°46'55"S, 57°55'2"O), 1 male, 1 female, 05.XI.2003 (MPEG 1859); 1 male, 05.XI.2003 (MPEG 1893); Urucará (Ilha, Lírio do Vale, Quitéria, 02°23'47"S, 57°30'52"O), 3 females, 03.XI.2003 (MPEG 1860); Parintins (Ilha, Menino de Deus, Catuaba, 02°32'32", 56°32'47"W), 4 females, 01.XI.2003 (MPEG 1858 e 1899).

Distribution. Known from Guyana and Brazil (states of Amazonas and Pará).

New records

We also collected individuals of four described species, at Porto Urucu River Basin. Below, the records of these species are listed, including our findings and the remaining individuals present in the spider collection of MPEG.

Metagonia beni Huber, 2000

BRAZIL, *Pará*: Juruti (Vale do Igarapé Mutum, Platô do Rio Juruti, 02º36'11"S 56º12'36"W), 2 males, 10-13.VIII.2006, D.F. Candiani *leg*. (MPEG 13901-13902); Óbidos (Ilha, Januaria, Ilha Grande 2, 02º06'09"S 55º18'05"W), 1 female, 29.X.2003 (MPEG 13908); Melgaço (Estação Científica Ferreira Penna, FLONA Caxiuanã, 01º44'18.02"S 51º27'48"W), 1 male, 04.XII.2000, A.B. Bonaldo *leg*. (MPEG 3517); 1 male, 03.XII.2000, Tommaso *leg*. (MPEG 3519); Prainha (Margem Sul, Curuarana, Margem do Pixuna, 02º22'58"S 54º04'55"W), 1 female, 24.X.2003 (MPEG 1894); *Amazonas*: Coari (Base de Operações Geólogo Pedro de Moura, Porto Urucu, 04°53'S, 65°20'W), 1 male, 2 females, XI.2006, D.F. Candiani *leg*. (MPEG 14239, 14241, 14242); 3 males, 3 females, IX-XI.2006, N.F. Lo-Man-Hung *leg*. (MPEG 14240, 14243-14247).

Distribution. Previously known from Peru (Huánuco, Madre de Dios) and northern Bolivia (Beni). Recorded from Brazil (Amazonas, Pará) for the first time.

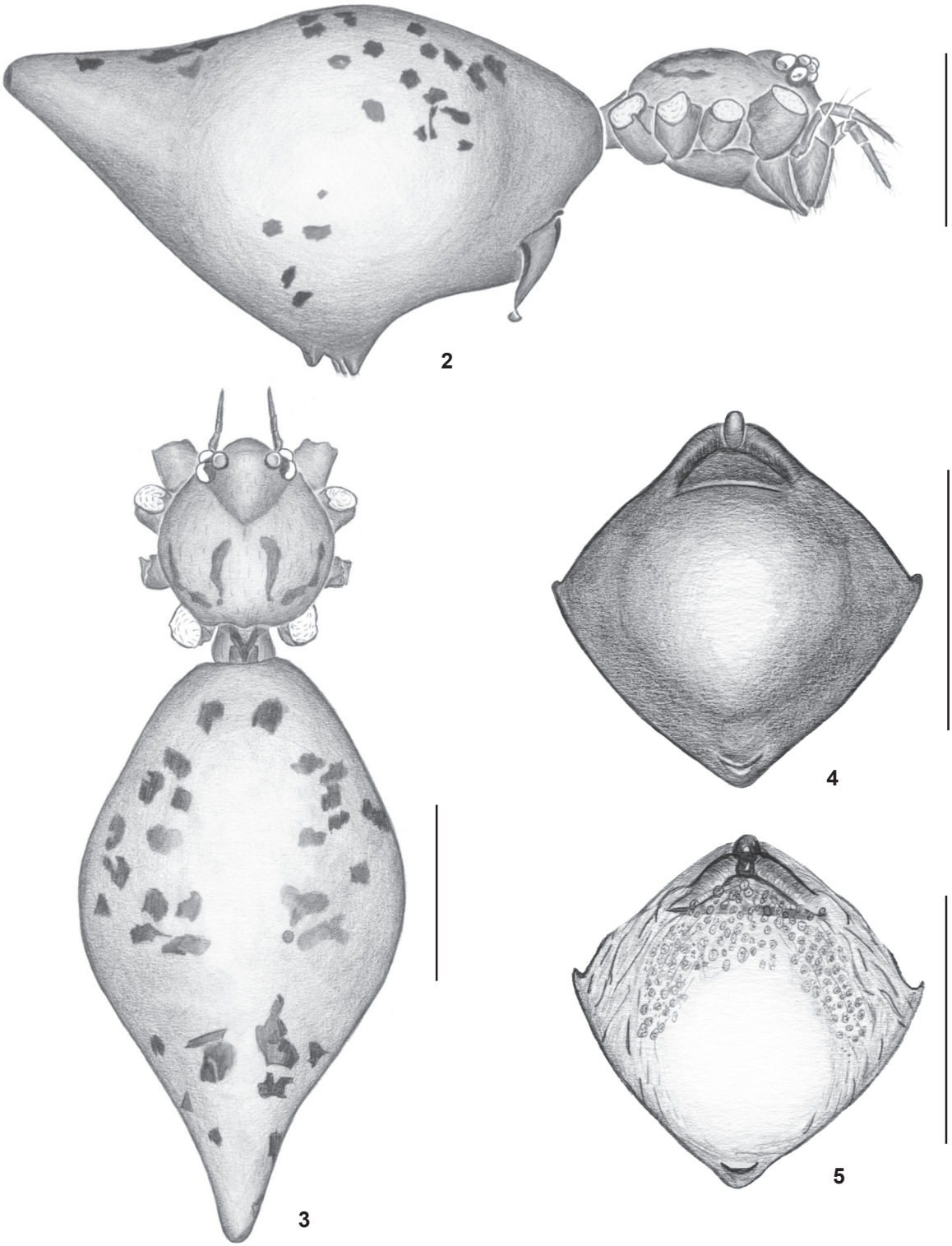
Carapoia ocaina Huber, 2000

BRAZIL, *Pará*: Altamira (Novo Progresso, 07°9'53"S, 55°18'53"W), 1 male, 2 females, 19.XI.2005, D.R. Santos-Souza *leg*. (MPEG 3513); *Amazonas*: Coari (Base de Operações Geólogo Pedro de Moura, Porto Urucu, 04°53'S, 65°20'W), 1 male, 18.VII.2006 (MPEG 14248); 1 male, IX.2006 (MPEG 14249), C.A.C. Santos-Júnior *leg*.; 2 males, IX.2006, D.F. Candiani *leg*. (MPEG 14250-14251); 1 male, 2 females, 2006, S.C. Dias et al *leg*. (MPEG 14252-14253); 1 male, 2 females, VII.2006, L.T. Miglio *leg*. (MPEG 14254-14256); 2 females, X.2006, N.C. Bastos *leg*. (MPEG 14258); 1 female, 19.IX.2006, N.F. Lo-Man-Hung *leg*. (MPEG 14257); 2 males, 1 female, IX.2006 (MPEG 14259); 2 males, 3 females, X.2006 (MPEG 14260-14263, 14265); 1 male, 1 female, XI.2006 (MPEG 14264); 2 males, IX.2006 (MPEG 14266-14267); 2 males, 1 female, IX.2006, S.C. Dias *leg*. (MPEG 14269, 14271, 14275); males, 03.IX.2006 (MPEG 14268); 1 male, 11.IX.2006 (MPEG 14274); 1 male, 15.X.2006 (MPEG 14273); 1 male, 1 female, XI.2006 (MPEG 14270, 14272).

Distribution. Previously known from Peru (Amazonas, Huánuco, Loreto) and Brazil (Amazonas: Manaus). Recorded for the first time from the Brazilian municipalities Altamira (State of Pará) and Coari (Amazonas).

Mesabolivar aurantiacus (Mello-Leitão, 1930)

BRAZIL, *Amapá*: Laranjal do Jari (Jari), 2 males, 4 females, (MPEG 3474); 1 female (MPEG 3475), 22-23.II.2003, D.D. Guimarães *leg*.; 5 males, 3 females, 21-23.II.2003, J.A.P. Barreiros *leg*. (MPEG 3472, 3476-3480); *Pará*: Almeirim (Ilha Arumanduba, Genipapo, 01°29'42"S, 52°27.23'14"W), 1 male, 2 females, 20.X.2003, T. Gardner & M.A. Ribeiro-Júnior *leg*. (MPEG 1887); (Jari, 01°01'33"S, 52°34'02"W), 1 female, 22.II.2003, J.A.P. Barreiros *leg*. (MPEG 3473); 2 males, 11.II.2005 (MPEG 2657, 2658); 1 male, 18.V.2005 (MPEG 3466); 3 males, 1 female, 22.VI.2005 (MPEG 2654, 2659, 2660); 1 male, 2 females, 25.V.2005 (MPEG 3465, 2656); 1 male, 15.VI.2005 (MPEG 2655);



Figures 2-5. *Metagonia taruma*, female: (2-3) habitus, lateral (2) and dorsal (3) views; (4-5) cleared female genitalia, ventral (4) and dorsal (5) views. Scale bars: (2-3) 1 mm, (4-5) 0.5 mm.

5 males, 4 females, VIII-IX.2004, T. Gardner *leg*. (MPEG 3467-3471); Juruti (Vale do Igarapé Mutum, Platô do Rio Juruti, 02°36'11"S, 56°12'36"W), 2 males, 04.VIII.2004, D.F. Candiani & D.R. Santos-Souza *leg*. (MPEG 8737, 8739); 6 males, 1 female, D.R. Santos-Souza *leg*. (MPEG 8803, 8813); (Sítio Barroso, 02°27'41"S, 56°00'11"W), 2 males, 08.VIII.2004, D.R. Santos-Souza *leg*. (MPEG 8812); (Sítio Três Irmãos, 02°27'51"S, 56°00'08"W), 3 males, 3 females, 04.III.2006, D.R. Santos-Souza *leg*. (MPEG 9101, 9106); Platô Capiranga, Linha 168E, 02°28'22"S, 56°12'29"W), 1 male, 1 female, 11.III.2006, D.R. Santos-Souza *leg*. (MPEG 9208); 3 males, 4 females, 08.III.2006, D.R. Santos-Souza *leg*. (MPEG 9207); Senador José Porfírio (Rio Xingu), 1 male, 03.III.2001 (MPEG 2341); Altamira (Castelo de Sonhos, 08°20'03"S, 55°12'52"W), 1 female, 17.XI.2005, D.R. Santos-Souza *leg*. (MPEG 2652); Prainha (Margem Norte, Fazenda JK, Cachorrinho, 01°51'44"S, 53°43'17"W), 1 female, 23.X.2003 (MPEG 1883); Santa Isabel (Rio Itá), 1 male, 09.XII.2001, A.B. Bonaldo & J.A.P. Barreiros *leg*. (MPEG 2354); Tucuruí (Rio Tocantins), 1 male, 22.VI.1984, W.L. Overal *leg*. (MPEG 2345); Barcarena (01°30'S, 48°40'W), 1 male, 20.XI.2001, A.B. Bonaldo *leg*. (MPEG 2356); 3 males, 3 females, D.D. Guimarães *leg*. (MPEG 2347, 2357-2358); Santa Bárbara (Vila Denpasa), 1 male, 21.IV.2002, D.R. Santos-Souza *leg*. (MPEG 2350); Benevides (Fazenda Souza), 2 males, 27.I.2002, D.R. Santos-Souza *leg*. (MPEG 2351-2352); 1 male, 1 female, 03.IV.2001, D.R. Santos-Souza *leg*. (MPEG 2353); Santo Antônio do Tauá, 1 male, 02.VIII.2002, L.T. Miglio *leg*. (MPEG 2344); *Amazonas*: Tabatinga (Margem Norte, Palmares, Terra Firme Palmares, 04°00'51"S, 69°27'51"W), 1 female, 11.IX.2003 (MPEG 1897); São Paulo de Olivença (Margem Sul, Palmares, Solimões, 03°28'37"S, 69°2'59"W), 1 female, 11.IX.2003 (MPEG 1892); Coari (Base de Operações Geólogo Pedro de Moura, Porto Urucu, 04°53'S, 65°20'W), males, 1 female, 18.VII.2006, C.A.C. Santos-Júnior *leg*. (MPEG 14277); 2 males, 1 female, IX-X.2006, D.F. Candiani *leg*. (MPEG 14278-14280); 1 male, VII.2006, L.T. Miglio *leg*. (MPEG 14281); 6 males, 8 females, IX-X.2006, N.F. Lo-Man-Hung *leg*. (MPEG 14282-14292); 1 female, 29.VII.2006, S.C. Dias *leg*. (MPEG 14296); 6 males, 1 female, IX-X.2006, S.C. Dias *leg*. (MPEG 14293-14295, 14297-14298); Itacoatiara (Ilha Nossa Senhora de Fátima, Ilha do Januário, 03°10.87'52"S, 59°18.52' 31"W), 1 male, 08.XI.2003 (MPEG 1884); 1 female, 06.XI.2003 (MPEG 1895); Urucurituba (Ilha Nossa Senhora de Fátima, Ilha Grande Cucuiari, 02°46'18"S, 57°55'42"W), 1 male, 05.XI.2003 (MPEG 1896); Parintins (Ilha Menino de Deus, Ilha do Meio, 02°31'18"S, 56°31'44"W), 1 male, 01.XI.2003 (MPEG 1886), C.A. Rheims *leg*.; 1 female, 01.XI.2003 (MPEG 1885); (Ilha Menino de Deus, Catuaba, 02°31'18"S, 56°31'44"W), 2 females, 01.XI.2003 (MPEG 1889).

Distribution. Previously known from Surinam, Guyana, Trinidad, Colombia, Ecuador, Peru, Bolivia and Brazil (Amazonas, Pará, Mato Grosso, Acre). Recorded for the first time from the Brazilian State of Amapá and the following municipalities of the State of Pará: Almeirim, Altamira, Barcarena, Benevides, Juruti, Santa Bárbara, Santa Isabel, Santo Antônio do Tauá, Senador José Porfírio and Tucuruí.

Litoporus dimona Huber, 2000

Brazil, *Amazonas*: *Coari* (Base de Operações Geólogo Pedro de Moura, Porto Urucu, 04°53'S, 65°20'W), 1 female, IX.2006, C.A.C. Santos-Júnior *leg*. (MPEG 14234); 1 female, VII.2006, L.T. Miglio *leg*. (MPEG 14237); 2 males, 1 female, 27.IX.2006, N.F. Lo-Man-Hung *leg*. (MPEG 14235); 2 males, XI.2006 (MPEG 14236); 2 females, IX.2006, S.C. Dias *leg*. (MPEG 14238, 14233).

Distribution. Previously known only from the type-locality Dimona Reserve, 80 km N Manaus, Amazonas, Brazil. Recorded for the first time from Coari, Amazonas, Brazil.

Ecology and natural history

Combining the material from the two forest gap classes with additional occasional collections, 241 adult pholcid spiders representing eleven species were collected. This represents the highest known pholcid diversity on a single locality in the Brazilian Amazon, surpassing the nine and eight species recorded from Floresta Nacional de Caxiuanã (Bonaldo *et al.* 2009) and Reserva Florestal Adolpho Ducke (Höfer & Brescovit 2001), respectively. On the other hand, for the entire Amazon Basin, the highest Pholcidae species richness is recorded for Pakitza (Madre de Dios, Peru), with twelve species (Silva & Coddington 1996). Four pholcid species collected at Porto Urucu were singletons belonging to *Ibotyporanga* Mello-Leitão, 1944 (collected with Winkler extractor), *Otavaloa* Huber, 2000 species (collected during nocturnal hand searches), and two species of undetermined genera (Pholcidae sp. 1 and sp. 2; both collected with beating trays). Other infrequent species were *L. dimona* (n = 9), *M. beni* (n = 9) and an undetermined species of *Litoporus* Simon, 1893 (n = 2). The remaining four species, all collected with beating trays and nocturnal hand searches, were abundant at Porto Urucu: *M. aurantiacus* (n = 29), *C. ocaina* (n = 34); *Metagonia taruma* (n = 98) and an undescribed species of *Mesabolivar* González-Sponga, 1998 (n = 56, B.A. Huber & E.O. Machado, pers. comm.). Most *M. aurantiacus* and *Mesabolivar* sp. specimens were collected in nocturnal hand searches, and for *C. ocaina* the abundances using both collecting methods were similar.

Species of *Metagonia* are known to inhabit leaf litter, foliage and caves (Huber 1997a, b, 1998a, Pérez-González & Huber 1999, Huber *et al*. 2005c, Huber & Schütte 2009), and most of the forest species are adapted to a cryptic life on the underside of living leaves, with pale greenish bodies, very thin and long legs, elongated abdomens, and sometimes even elongated egg-sacs (Huber *et al*. 2005c). *Metagonia taruma* is a foliage-dwelling species with all of these cryptic morphological features, although its egg-sac shape has never been described and neither was it observed in the present study. This species was most efficiently collected with beating trays, a method that easily accesses the herb and shrub layers (Coddington *et al*. 1991), and can also be found in the forest canopy or sub-canopy, as

attested by fogging samples at Urucu River Basin, when the shrub layer was removed.

Metagonia taruma was significantly the most abundant (Kruskal-Wallis: H = 73.4694; d.f. = 3; p < 0.0001) and frequent (χ^2 = 27.346, d.f. = 3, p < 0.0001) Pholcidae species from Porto Urucu. The abundance pattern of Pholcidae species on different collecting localities throughout the Amazon Basin is variable; at Floresta Nacional de Caxiuanã, the most abundant pholcid is *Carapoia fowleri* Huber, 2000 (Bonaldo *et al*. 2009). This variation could be the result of differences in the sampling effort and collecting methods and/or real differences between the local biota. A summary of the data (number of individuals, collecting method used and frequency of occurrence) for all pholcid species from Porto Urucu is shown in table I. The remaining Pholcidae species had similar abundances by samples, according to the Dunn test results.

The sex ratio in *C. ocaina* was 1.45 (χ^2 = 0.926, d.f. = 1, p = 0.4414; with Yates correction), in *M. aurantiacus* 1.08 (χ^2 = 0.037, d.f. = 1, p = 1, with Yates correction) showing that the ratios were fairly 1:1 and the differences found are likely due to stochastic variation. In *M. taruma* the sex ratio was 0.63 (χ^2 = 4.742, d.f. = 1, p = 0.0381, with Yates correction) and for *Mesabolivar* sp. was 0.35 (χ^2 = 9.524, d.f. = 1, p = 0.0034, with Yates correction). Table II shows a summary of the data used in the chi-square tests. For *C. ocaina* and *M. aurantiacus* the statistical tests did not reveal differences in the sex ratio, but the populations of *M. taruma* and *Mesabolivar* sp. at Urucu River Basin appear to be female biased. Machado *et al*. (2007a) measured the sex ratio of two *Mesabolivar* species, and concluded that *Mesabolivar forceps* Machado *et al*., 2007 was male biased, which was explained by the higher activity of males than females, making them easier to capture in pit-fall traps (Álvares *et al*. 2004), while *Mesabolivar mairyara* Machado *et al*., 2007 had a homogeneous sex ratio, which was explained only by the low number of adult specimens collected. Our findings should not be explained by the low sampling intensity, neither by the use of pit-fall traps, as all of the four most abundant Pholcidae species were collected with active methods (beating tray and nocturnal hand searches). Thus, this sex ratio pattern can represent the real sex ratio of these species, because all of the visualized individuals were sampled independently of their sex class, although further studies are also required to understand the whole process of sexual ratio in Pholcidae. At least for species of *Metagonia*, female biased populations have already been reported by Huber & Schütte (2009) who captured more than twice as many females than males – *Metagonia osa* Gertsch, 1986: 8 males, 18 females; *Metagonia uvita* Huber, 1997: 6 males, 20 females –, with active diurnal hand collecting.

The abundances of *C. ocaina* and *M. aurantiacus* were similar in both forest gap types of different regeneration levels, while *M. taruma*, *Mesabolivar* sp. and all the pholcid species sampled at the Urucu River Basin together were statistically higher in the poorly regenerated gap type forests (Tab. III). This data shows that pholcid abundance at Porto Urucu can be higher in poorly regenerated areas, where a myriad of effects could be underway: the availability of microhabitats could increase, certain predators might be absent, individuals might find better conditions for establishing their webs, or food availability could be higher. Thus, Pholcidae species can be considered potential ecological indicators of habitat quality, as the species respond differently to environmental conditions, such as the regeneration stage. This response has already been reported: Machado *et al*. (2007a) argued that *M. forceps* seems to present some degree of tolerance to habitats influenced by

Table I. Summary of the abundance and capture method of the Pholcidae species found at Porto Urucu, Coari, Amazonas, Brazil. (BT) Beating tray, (N) nocturnal hand collecting, (WIN) Winkler extractor, (CF) canopy fogging, (O) occasional sampling, (FO) frequency of occurrence. *"Forest gap type" does not certainly represent the number of individuals collected in the whole basin.

Pholcid species	Number of adults			Forest gap type*		Capture method					F.O. (%)
	Males	Females	Total	I – good	II – poor	BT	CF	N	O	WIN	
M. taruma	19	13	98	10	17	63	1	33	1		66.37
Mesabolivar sp.		1	56	1		14		42			34.51
C. ocaina	2	5	34	6	2	10		22	2		23.01
M. aurantiacus	1	1	29	2		1		28			18.58
L. dimona	12	13	9	10	17	6		3			5.31
Metagonia beni	11	31	9	14	40	3		6			7.96
Litoporus sp.	4	5	2	2	7	1		1			1.77
Ibotyporanga sp.	36	51	1	33	60					1	0.88
Otavaloa sp.	1		1		1			1			0.88
Pholcidae sp. 1		1	1	1		1					0.88
Pholcidae sp. 2	1		1	1		1					0.88

Table II. Abundances of the four most common Pholcidae species collected at Porto Urucu, Coari, Amazonas, Brazil, by sex class, forest gap types and the entire Amazon Basin.

	C. ocaina			*M. aurantiacus*			*M. taruma*			*Mesabolivar* sp.		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
I – Good	5	5	10	5	5	10	11	22	33	3	11	14
II – Poor	11	6	17	9	8	17	25	35	60	10	30	40
Entire basin	20	14	34	15	14	29	38	60	98	13	43	56

Table III. Mann-Whitney test results to verify abundance by forest gap regeneration type for *C. ocaina*, *M. aurantiacus*, *M. taruma*, *Mesabolivar* sp. and the combined data for all Pholcidae species collected at Porto Urucu, Coari, Amazonas.

	C. ocaina	*M. aurantiacus*	*M. taruma*	*Mesabolivar* sp.	All species
I – good (number of individuals/rank sum)	10/142	10/119	33/1475	14/446	80/6386
II – poor (number of individuals/rank sum)	17/209	17/181	60/2266	40/829	144/9904
Mann-Whitney (U)	51	41	529	121	2291
p-value (bilateral)	0.0858	0.0735	0.0006	0.0002	< 0.0001

human activity; and Machado *et al.* (2007c) reported that *Mesabolivar cantharus* Machado *et al.*, 2007, *M. camussi* Machado *et al.*, 2007, *M. cavicelatus* Machado *et al.*, 2007 were collected in slightly higher numbers in *Pinus* than in native areas, although the opposite occurred for *Tupigea cantareira* Machado *et al.*, 2007.

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