




# Updated geographical distribution of the family Barychelidae Simon, 1889 from Brazil (Araneae: Mygalomorphae)

## Distribuição geográfica atualizada da família Barychelidae Simon, 1889 do Brasil (Araneae: Mygalomorphae)

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**Abstract:** Spiders of the family Barychelidae, the sister group to Theraphosidae, are mainly concentrated in the Southern Hemisphere. In the Neotropical region, Barychelidae is represented by five genera found in Brazil, Colombia, Cuba, Ecuador, Panama, Peru and Venezuela. Barychelid spiders are known for their sedentary behavior, spending most of their lives in burrows constructed with a hinged trapdoor made of silk and soil. This habit and the difficulty in identifying and locating their camouflaged burrows, poses challenges to obtaining specimens thereby obscuring the group's true diversity. Examination of numerous specimens from different zoological collections allowed us to expand the distribution of Barychelidae spiders adding 95 new records. In addition to geographic data from collected material, we were able to find 56 iNaturalist observations of barychelid spiders, with 29 in unpublished locations, totaling 124 new records in Brazil. Overall, the expanded geographical distribution of Barychelidae spiders in Brazil has revealed remarkable diversity, with numerous species covering a variety of habitats. This distribution mapping can provide valuable information for the study of populations variation and evolutionary relationships and help in the biogeographical research of the family Barychelidae.

**Keywords:** Citizen science. New records. Neotropical region. Trapdoor spiders. Theraphosidae. iNaturalist.

**Resumo:** As aranhas da família Barychelidae, grupo irmão de Theraphosidae, estão principalmente concentradas no Hemisfério Sul. Na região neotropical, Barychelidae é representada por cinco gêneros encontrados em Brasil, Colômbia, Cuba, Equador, Panamá, Peru e Venezuela. Aranhas Barychelidae são conhecidas pelo seu hábito sedentário, passando a maior parte de suas vidas em tocas construídas com um alçapão articulado, feito de seda e solo. Este hábito e a dificuldade de identificar e localizar suas tocas camufladas representam desafios na obtenção de espécimes, mascarando a real diversidade do grupo. O exame de vários espécimes de diferentes coleções zoológicas nos permitiu expandir a distribuição geográfica de aranhas Barychelidae, acrescentando 95 novos registros. Adicionalmente aos dados geográficos de material de coleta, foi possível identificar 56 observações de aranhas Barychelidae no iNaturalist, 29 delas para locais não publicados, totalizando 124 novos registros no Brasil. Em geral, a distribuição geográfica expandida de Barychelidae no Brasil revelou uma notável diversidade, com inúmeras espécies cobrindo uma variedade de habitats. Este mapeamento da distribuição pode fornecer valiosas informações para o estudo da variação populacional e relações evolutivas, além de auxiliar em pesquisas biogeográficas da família Barychelidae.

**Palavras-chave:** Ciência cidadã. Novos registros. Região neotropical. Aranha-de-alçapão. Theraphosidae. iNaturalist.

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## INTRODUCTION

The family Barychelidae, commonly known as brush-footed trapdoor spiders, is phylogenetically related to the family Theraphosidae Thorell, 1869 as its sister group (Hedin & Bond, 2006; Bond et al., 2012; Wheeler et al., 2017; Opatova et al., 2020). It consists of two subfamilies, Barychelinae and Sasoninae, including 39 genera and 285 species (World Spider Catalog, 2024). Barychelid spiders can be distinguished by having a short and domed apical segment of posterior spinnerets, the absence of a third claw, well-developed claw tufts on all tarsi, the presence of scopula on metatarsi and tarsi I and II, a few clavate trichobothria grouped for only half the length of the tarsus, and a small anterior lobe of the maxillae (Raven, 1985, 1994; Guadanucci, 2012; Mori & Bertani, 2020).

Barychelidae displays typical Gondwanan distribution with the current highest species richness found in Oceania and the Pacific, followed by the African continent, the Neotropical region, India, Sri Lanka, Socotra Island, and Hawaii (Raven, 1994). In the Neotropical region, Barychelidae is represented by five genera found in countries such as Brazil, Colombia, Cuba, Ecuador, Panama, Peru, and Venezuela (World Spider Catalog, 2024). Among these countries, Brazil hosts five known genera: *Cosmopelma* Simon, 1889, *Idiophthalma* Pickard-Cambridge, 1877, *Neodiplothele* Mello-Leitão, 1917, *Paracsenobiopelma* Feio, 1952, and *Strophaeus* Ausserer, 1875. Currently, among the 27 Brazilian federative units (26 states + Distrito Federal), the Barychelidae family was registered for 16 of them: Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Minas Gerais, Mato Grosso do Sul, Paraíba, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Santa Catarina, Sergipe, São Paulo, and Tocantins (Pickard-Cambridge, 1896; Gonzalez-Filho et al., 2015; Mori & Bertani, 2016, 2020).

These spiders construct burrows with silk and soil trapdoors, which can be highly camouflaged, often making them difficult to detect even at close proximity (Raven, 1994). These burrows can be constructed in

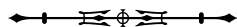
various microhabitats, such as ravines, litter attached to the underside of logs, rocks, or leaves (most genera), attached to a tree, within rolling logs, or built into a shallow depression in the tree with abutting doors lush with bark surface (Raven, 1994).

Recently, new tools have emerged to offer researchers the opportunity to access an additional information, such as localities of difficult or restricted accessibility (Mesaglio & Callaghan, 2021). Citizen science is one of the main tools for disseminating possibly relevant data for scientific research and can be defined as a research technique that involves the voluntary and conscious participation of citizens in conjunction with professional researchers. iNaturalist (n. d.) is a tool that exemplifies the power of community-driven collaboration. This free-access platform is designed to facilitate the sharing of a multitude of organisms, accessible through both a dedicated website and a mobile application (Mesaglio & Callaghan, 2021). This online platform serves as a powerful tool for scientific research, offering an additional pathway to acquire essential locality data. It provides researchers with a valuable platform to engage in collaborative species identification, facilitating a collective effort to enhance our understanding of biodiversity (Rosa et al., 2022; Forti & Szabo, 2023).

Given the limited information on distribution records of barychelids spiders, this study contributes to an updated scenario regarding the geographic distribution of Barychelidae in Brazil. We obtained a total of 124 unpublished localities using two data sources: zoological collections, with 95 new records, and the iNaturalist platform, with 29 new records.

## MATERIAL AND METHODS

Geographic coordinates were obtained through information on the original museum labels. Localities from museum samples without coordinates were georeferenced using Google Earth®. The geographic distribution of the specimens was created using SimpleMappr (Shorthouse, 2010). Data from the iNaturalist platform was initially sorted



by selecting all records of Infraorder Mygalomorphae taxa for Brazil, excluding duplicates from the research base. After that, all specimens identified as belonging to Barychelidae were selected and thoroughly reviewed by the authors. In addition to the general appearance of the body, the following criteria were used to identify a specimen of photographic record as Barychelidae: the presence of claw tufts, density and distribution of the scopula, shape of the eye group and pattern of spots and stripes on legs, carapace and abdomen. Each record was organized with all information available in each observation, in the following order: state, city, specific location, coordinates, data of the observation, citizen science, and the link of the observation.

Institutional abbreviations (curators in parentheses). The material examined is deposited in the following collections: CAD = Coleção Aracnológica Diamantina, São Paulo, Brazil (J. P. L. Guadanucci); IBSP = Instituto Butantan, São Paulo, Brazil (A. D. Brescovit); MACN = Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina (M. J. Ramirez); MNRJ = Museu Nacional do Rio de Janeiro, Rio de Janeiro, Brazil (A. B. Kury); MPEG = Museu Paraense Emílio Goeldi, Belém, Brazil (A. B. Bonaldo); MZUSP = Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil (R. Pinto-da-Rocha); UFMG = Universidade Federal de Minas Gerais, Belo Horizonte, Brazil (A. J. Santos).

## RESULTS

Despite all the challenges to study and identify the neotropical barychelid spiders, combining the two types of sampling, the newly registered locations of Brazilian barychelids add up to 124 unpublished locations summarized in two maps (Figure 1). Through an analysis of 7 zoological collections, we added up 95 new records, among them, Barychelidae was recorded for the first time for seven Brazilian federal units: Alagoas, Distrito Federal, Goiás, Mato Grosso, Maranhão, Pará and Rondônia (Figure 1A, circles). We conducted an extensive search on the platform iNaturalist, in which we filtered and analyzed images of all Mygalomorphae

specimens from Brazil, resulting in 56 observations of barychelid spiders, disregarding duplicate records, among these records, 29 are in new locations (Figure 1A, blue star). Additionally, as the vast majority of the new points belong to the genus *Neodiplothele*, the new records have been indicated at species level, or the lowest taxonomic level possible (Figure 1B). The points indicated as '*Neodiplothele* spp.' represent specimens whose specific identification was not possible or taxa that do not belong to any described species of the genus.

Class Arachnida Lamarck, 1801

Order Araneae Clerck, 1757

Infraorder Mygalomorphae Pocock, 1892

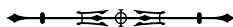
Family Barychelidae Simon, 1889

*Barychelidae* Simon, 1889: 192; Raven 1985: 111

Diagnosis. Barychelidae differs from Theraphosidae by the short apical segment of the posterior lateral spinnerets, weakly produced anterior lobe of the maxillae, and a few clavate trichobothria grouped for only half the length of the tarsus (Raven, 1985, 1994; Guadanucci, 2012; Mori & Bertani, 2020).

Distribution. Brazil: Pará, Amazonas, Maranhão, Piauí, Ceará, Rio Grande do Norte, Tocantins, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, Mato Grosso, Rondônia, Goiás, Brasília, Distrito Federal, Minas Gerais, Espírito Santo, Mato Grosso do Sul, Rio de Janeiro, São Paulo, Paraná and Santa Catarina (Figure 1).

New records. Brazil: Pará: APA de Aramanaí, Belterra, 2° 42' 44.8" S, 54° 59' 56.2" W, 28.IV-06.V.2010, Equipe Butantan leg., 1♂= (IBSP217236); Alter do Chão, Santarém, 2° 31' 40.4" S, 54° 56' 58.2" W, 1.XI.2014, A. Coronato, D. Chirivi, J. Cabra & C. Sampaio leg., 1♀ (IBSP220066); Moju, 2° 10' 45.6" S, 48° 48' 06.1" W, Ochoa leg., 1♀ (MPEG38759); Barcarena, 1° 30' 13.7" S, 48° 36' 52.5" W, A.B. Bonaldo leg., 1♀ (MPEG38757); Belém, 1° 26' 36.7" S, 48° 26' 43.2" W, 14.VI.1966,



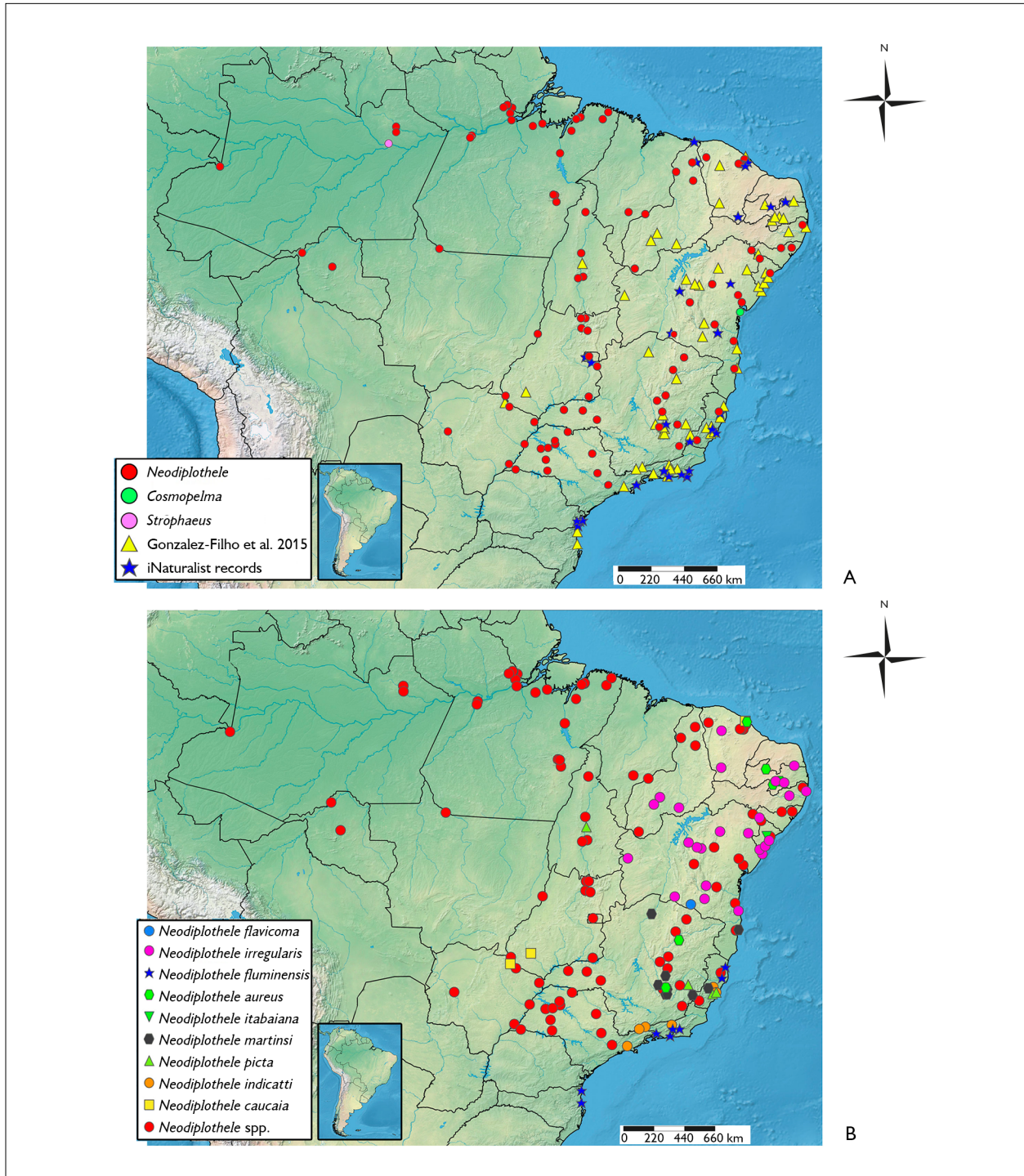
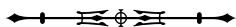


Figure 1. Distribution maps of Barychelidae from Brazil. A). Circles represent new records for Barychelidae from museum data, triangles show previous records, and stars indicate iNaturalist platform. B). Distribution map of *Neodiplothele* from Brazil, colored shapes correspond to specific *Neodiplothele* species. Map: elaborated by the authors (2024).

1♀ (MACN34705); FLONA Carajás, Canaã dos Carajás, 6° 29' 49.0" S, 49° 52' 40.0" W, 22-28.IX.2010, R. Andrade & I. Cizauskas et al. leg., 1♀ (IBSP175394); Bragança, 1° 06' 44.3" S, 46° 48' 14.2" W, 12.VII.2008, R. Reis leg., 1♂ (MPEG38756); Portel, 1° 59' 28" S, 51° 25' 48" W, 23.V.2006, G. Maschio leg., 1♂ (MPEG038750); Estação Científica Ferreira Penna, Floresta Nacional de Caxiunã, Melgaço, 1° 48' 30.9" S, 50° 42' 54.6" W, 09-11.IV.2002, J.A.P. Barreiros leg., 1♂ (MPEG210); Patauateua, Ourém, 1° 33' 02.3" S, 47° 06' 27.6" W; D. Guimarães leg., 1♀ (MPEG4638); Parque Ambiental de Belém, Mocambo, Belém, 1° 24' 47.2" S, 48° 25' 59.2" W, 9.II.1977, P. Waldir leg., 1♀ (MPEG5078); Reserva do Pacanari, Monte Dourado, Almeirim, 0° 51' 55.1" S, 52° 31' 43.3" W, 05.XII.2002, 1♀ (MPEG195); Jari, Almeirim, 0° 42' 33.0" S, 52° 46' 57.0" W, 22.VI.2005, T. Gardner & M.A. Ribeiro Junior leg., 1♂ (MPEG7462); same collection data as for preceding, 1° 11' 28.0" S, 52° 38' 51.0" W, 7.III.2005, T. Gardner leg., 1♂ (MPEG7457); 0° 41' 25.0" S, 52° 49' 09.0" W, 11.II.2005, same collector data as for preceding, 1♂ (MPEG7594); 1° 36' 14.0" S, 52° 34' 02.0" W; 28.VIII-03.IX.2004, same collector data as for preceding, 1♂ (MPEG7465); 0° 50' 09.0" S, 53° 02' 49.0" W, 28.VIII-03.IX.2004, same collector data as for preceding, 1♂ (MPEG7463); Projeto Serra Leste, Curionópolis, 6° 05' 37.5" S, 49° 57' 29.6" W, 2010, R. Zampaulo leg., 1♀ (CAD1333); Ilha de Germoplasma, Usina Hidrelétrica de Tucuruí, Tucuruí, 3° 52' 08.8" S, 49° 38' 33.3" W, 12.VII.2008, D. Candiani leg., 1♂ (MPEG38760); Floresta Nacional de Carajás, Parauapebas, 6° 03' 55.8" S, 50° 03' 33.9" W, 2010, R. Zampaulo leg., 1♀ (CAD1336); Floresta Nacional de Carajás, Parauapebas, 6° 03' 51.1" S, 50° 03' 26.6" W, 2007-2009, Equipe Carste leg., 1♀ (IBSP213441); Amazonas: Ilha Furo de Santa Luzia, UHE de Balbina, Presidente Figueiredo, 1° 44' 07.0" S, 59° 26' 29.0" W, 22-24.VI.2016, D. Stork-Tonon leg., 1♂ (IBSP305067); Ilha Beco do Catitu, UHE de Balbina, Presidente Figueiredo, 01° 15' 04" S, 59° 42' 27" W, 22-24.VI.2016, D. Stork-Tonon leg., 1♂ (IBSP305069); Benjamin Constant, 4° 22' 58.0" S, 70° 01' 51.0" W, 2014, P.S. Pompeu et al. leg., 1♂ (IBSP209863); Reserva Ducke, Manaus, 3° 00' 09.0" S, 59° 56' 34.5" W, 19.IV.1991, H. Mesquita leg., 1♀ (MACN22599); Maranhão: Campo Mamão, São Raimundo das Mangabeiras, 07° 02' 17" S, 45° 28' 26.7" W, 24.VII.2023, A.Galletti-Lima, R.P. Indicatti, B. Gambaré & J.P.L. Guadanucci leg., 1♀ (CAD1439); Piauí: Estrada Bar do Bode, Corrente, 10° 28' 30.4" S, 45° 08' 35.9" W, 20.VII.2023, A. Galletti-Lima, R.P. Indicatti, B. Gambaré & J.P.L. Guadanucci leg., juvenile (CAD1450); Fazenda União, Topo da Chapada, Uruçui, 7° 13' 44.0" S, 44° 33' 21.0" W, 21-26.X.2007, F.M. Oliveira-Neto leg., 5♂ (MPEG11658); Parque Nacional de Sete Cidades, Piracuruca, 4° 5' 55.4" S, 41° 42' 32.2" W, 17.IX.2005, W. A. Rocha leg., 1♂ (MPEG38743); Fazenda Nazareth, José de Freitas, 4° 45' 23" S, 42° 34' 32" W, 1♀ (MPEG38729); Fazenda Bonito, ECB Rochas Ornamentais LTDA, Castelo do Piauí, 5° 13' 49.0" S, 41° 41' 28.0" W, 07.XII.2005, F.M. Oliveira-Neto leg., 1♂ (MPEG2333); Ceará: Pacatuba, 3° 57' 07.1" S, 38° 36' 57.7" W, 03.I.2021, M.U.A. Lima leg., 1♂ (CAD1143); Comunidade Diamante, Redenção, 04° 14' 23.2" S, 38° 45' 55.4" W, 27.III.2021, R. Azevedo & K. Falcão leg., 1♀ (CAD1321); Sítio São Luis, Pacoti, 04° 13' 45.5" S, 38° 53' 27.9" W, 27.II.2021, same collector as preceding, 1♀ (CAD1324); Distrito Pernambuquinho, Pico Alto, Terras do Sr. Marcelo Cocão, Guaramiranga, 04° 12' 50.9" S, 38° 57' 59" W, 19.IX.2020, same collector as preceding, 1♀ (CAD1325); Parque Nacional de Ubajara, Ubajara, 3° 49' 30.7" S, 40° 53' 35.0" W, 08.X.2022, T. Valença leg., 1♀ (CAD1338); Tocantins: Matinha Paredão de Pedra UFNT, Araguaiana, 07° 06' 26.4" S, 48° 12' 31.2" W, 28.VII.2023, A.Galletti-Lima, R.P. Indicatti, B. Gambaré & J.P.L. Guadanucci leg., juvenile (CAD1451); U.H.E. Luis Eduardo Magalhães, Porto Nacional, 10° 58' 56.7" S, 48° 16' 37.0" W, 20.II.2003, I. Knysak, R. Martins & G. Puerto leg., 1 juvenile (IBSP110439); Brejinho de Nazaré, 11° 04' 00.0" S, 48° 34' 50.3" W, 14-23.II.2003, I. Knysak, R. Martins & G. Puerto leg., 2♀,



4 juvenile (IBSP110434); Miracema do Tocantins, 9° 34' 02.5" S, 48° 23' 44.0" W, 18-25-IV.2002, I. Knysak, R. Martins & G. Puerto leg., 1♀ (IBSP111275); Pernambuco: Campo de Instrução Marechal Newton Cavalcante (CIMNC), Araçoiaba, 07° 46' 55" S, 35° 09' 02" W, 2009-2010, A. Costa leg., 2♂ (IBSP285459 and IBSP285474); Alagoas: Reserva Biológica de Pedra Talhada, Quebrangulo, 09° 15' 30.91" S, 36° 25' 49.20" W, 26-27-IV.2022, M.D.F. Magalhães, P.H. Martins & H.M.O. Gonzalez-Filho leg., 1♂ (CAD1299); ESEC Murici, Murici, 9° 14' 39.1" S, 35° 47' 25.7" W, 29-IV.2022, M.D.F. Magalhães, P.H. Martins & H.M.O. Gonzalez-Filho leg., 1♂ (CAD1300); Sergipe: Poço Redondo, 09° 48' 21" S, 37° 41' 06" W, 2009, F.F.A. Gomes leg., 1♂ (IBSP226803); FAFEN, Laranjeiras, 10° 46' 06" S, 37° 07' 44.8" W, 2010, J.O. Dantas leg., 1♂ (IBSP245623); Bahia: Chapada Diamantina, Seabra, 12° 26' 25" S, 41° 46' 45" W, IV-V.2016, H.J. Souza leg., 1♂ (IBSP225401); Serra de São José, Feira de Santana, 12° 06' 56.6" S, 39° 03' 09.1" W, 2009-2010, G.S.C. Ferreira leg., 12♂, 1♀ (IBSP251512-IBSP251524); Serra de Monte Alto, Palmas de Monte Alto, 14° 25' 38.8" S, 42° 56' 52.3" W, 2009, A. Pimental & I. Soares leg., 1♀ (IBSP232232); Itabuna, 14° 49' 36.8" S, 39° 16' 04.1" W, Cepec-Ceplac leg., 1♀ (IBSP220111); Jaguaripe, 13° 06' 48.4" S, 38° 53' 34.5" W, 2014, C.M.P. Leite leg., 1 juvenile (IBSP220109); Monumento Nacional Canions do Subaé, Santo Amaro, 12° 30' 41.4" S, 38° 46' 39.7" W, 05-III.2022, M.D.F. Magalhães, A. Galleti-Lima & P.H. Martins leg., 1♀ (CAD1286); Rio das Contas, 13° 50' 30.7" S, 40° 24' 00.9" W, 21-I.2021, F.J.S. Cunha, M.J.A. Morales & R. Vergílio leg., 1♀ (CAD1287); Parque Nacional do Pau Brasil, Porto Seguro, 16° 29' 10.43" S, 39° 13' 33.22" W, 24-28-III.2022, H.M.O. Gonzalez-Filho, W.J. Moeller & R.P. Indicatti leg., 1♀ (CAD1296); Parque Estadual Sete Passagens, Miguel Calmon, 11° 25' 30.1" S, 40° 32' 56.3" W, 6-12-I.2018, V.E.O. Rodrigues leg., 1♂ (IBSP249669); Ilha do Urubu, Paulo Afonso, 9° 23' 33.3" S, 38° 11' 50.6" W, 2008, E. Daniele leg., 1♂, (IBSP125014); Mato Grosso: Fazenda Globo, Cocalinho, 14° 23' 57.6" S, 50° 59' 50.4" W, IX.1997, M. Cellefio leg., 1♀ (IBSP111277); Rio Teles Pires, alto Tapajós, 9° 18' 10.8" S, 56° 53' 26.0" W, VIII.1950, 1♀ (MNRJ06809); Rondônia: Mutum 7 (amostra M7P2A2), Porto Velho, 9° 34' 16" S, 65° 03' 18" W, 17-XI.2011, R.P. Indicatti leg., 1♀ (MZSP44316); Monte Negro, 10° 22' 57.0" S, 63° 18' 09.2" W, 17-XII.2013, P.H. Martins leg., 1♀ (UFMG17237); Distrito Federal: Brasília, 15° 44' 23.5" S, 47° 55' 38.3" W, III-IV.2000, D. Brianc leg., 1♂, 1 juvenile (IBSP111281); Goiás: Estrada Igrejinha, Colinas do Sul, 14° 08' 60.0" S, 48° 05' 25.9" W, 02-VIII.2023, A. Galleti-Lima, R.P. Indicatti, B. Gambaré & J.P.L. Guadanucci leg., 1♀ (CAD1452); mata preservada nos arredores de Cana Brava, Cana Brava, 13° 29' 26" S, 48° 20' 59.3" W, 01-VIII.2023, A. Galleti-Lima, R.P. Indicatti & J.P.L. Guadanucci leg., 1♂ (CAD1438); estrada para propriedade do Luiz de Abreu, Minaçu, 13° 29' 33.6" S, 48° 11' 05.2" W, 31-VII.2023, A. Galleti-Lima, R.P. Indicatti, B. Gambaré & J.P.L. Guadanucci leg., juvenile (CAD1437); Parque Nacional das Emas, Mineiros, 18° 06' 23.0" S, 52° 55' 40.0" W, II.1999, C. Nogueira & P. Vardujo leg., 1♀ (IBSP111526); Serra da Mesa, 14° 03' 39.0" S, 48° 22' 57.7" W, 18-21-III.1996, Silvestre, Brandão & Yamamoto leg., 1 juvenile (MZSP18991); Catalão, 18° 09' 24.8" S, 47° 56' 43.8" W, 30-I.2023, 1♂ (CAD1275); Minas Gerais: Rampa de Vôo, Pirapanema, Muriaé, 21° 05' 30.6" S, 42° 30' 05.3" W, 07-III.2017, C.A.R. Souza leg., 1♀, 1 juvenile (IBSP282836); Mina do Serro/Cave AAS02, Serro, 18° 36' 24.9" S, 43° 23' 08.5" W, VI.2014, L. Silva leg., 1♀ (IBSP189798); Serra do Gandaerla/Cave GAND-95, Rio Acima, 20° 03' 55" S, 43° 40' 11" W, 10-II-20-III.2014, Equipe Carste et al. leg., 1♀ (IBSP202681); Zelandia, Santa Juliana, 19° 32' 12.0" S, 47° 27' 10.0" W, 16-21-VIII.2010, F. Natali leg., 1♂ (UFMG9534); Taiobeiras, 15° 48' 40.9" S, 42° 14' 08.6" W, 08-17-IV.2002, Equipe Biota leg., 1♂ (IBSP113160); Uberlândia, 18° 59' 29.5" S, 48° 18' 02.8" W, V-VIII.1996, D. Cunha leg., 1♂ (IBSP111279); Fronteira, 20° 16' 04.0" S, 49° 11' 56.0" W, 18-II.1983, J.H. Vieira leg., 1♀ (IBSP111283); Vale das Cancelas, Grão Mogol, 16° 33' 28.5" S, 42° 53' 30.8" W, X.2011, D.R. Pedroso



leg., 1♂ (MNRJ04412); Reserva Particular do Patrimônio Natural Morro Gavião, Dionísio, 19° 49' 41.0" S, 42° 38' 03.3" W, X-XI.2005, J.C.R. Fontenelle leg., 1♂ (UFMG21269); Fazenda Requião, Gouveia, 18° 23' 48.54" S, 43° 51' 9.06" W, 15.II.2012, P.H. Martins leg., 1♀ (UFMG20077); Parque Estadual do Rio Preto, São Gonçalo do Rio Preto, 18° 05' 09.7" S, 43° 20' 26.5" W, 12.I.2012, J.P.L. Guadanucci leg., 1♀ (CAD573); Ituiutaba, 18° 56' 49.6" S, 49° 25' 56.7" W, 1♀ (CAD1302); Espírito Santo: PEAMA - Polo de Educação Ambiental da Mata Atlântica/lfes - *Campus* de Alegre, Alegre, 20° 45' 46.4" S, 41° 27' 45.0" W, 12.XII.2021, A. Michelotto leg., 1♂ (CAD1290-1291); REBIO Sooretama, Sooretama, 19° 03' 17.75" S, 40° 08' 50.94" W, 18-23.III.2022, H.M.O. Gonzalez-Filho, W.J. Moeller & R.P. Indicatti leg., 1♀ (CAD1295); Mato Grosso do Sul: Fazenda São Roque, Chapadão do Sul, 18° 47' 42.5" S, 52° 37' 05.5" W, X.2007, C. Pritsch leg., 1♂ (IBSP115381); Horto Barra do Moeda, Três Lagoas, 20° 59' 40.3" S, 51° 47' 11.7" W, 16.V.2009, M. Uehara-Prado leg., 1♂ (UFMG5876); UHE Porto Primavera, Anaurilândia, 22° 11' 16.0" S, 52° 43' 04.0" W, XII.1998, I. Knysak & R. Martins leg., 1♂ (IBSP110310); Agachi, Miranda, 20° 14' 27.0" S, 56° 22' 43.0" W, 2♀, 1 juvenile (IBSP102968); Fazenda Ponta Nova, Paranaíba, 19° 40' 29.3" S, 51° 11' 54.4" W, 16.IV.2004, Equipe Jauru leg., 1♀ (IBSP113762); São Paulo: Santa Bárbara do Oeste, 22° 44' 14.1" S, 47° 25' 13.3" W, 16.X.1995, G.C. Garcia leg., 1♂ (IBSP111284); Planalto Paulista, São Paulo, 21° 02' 18.5" S, 49° 55' 34.1" W, VIII.2007, Donizeti leg., 5♂ (IBSP114313); Macaúbal, 20° 48' 33.9" S, 49° 57' 50.2" W, VIII.2007, Donizeti leg., 1♂ (IBSP114308); Estação Ecológica de Jataí, Luís Antônio, 21° 34' 13.9" S, 47° 44' 09.2" W, 12-18.IV.2010, A. G. Cristovão leg., 3♂ (IBSP165158); Tupã, 21° 56' 06.0" S, 50° 30' 50.0" W, V.2007, G.R.S. Ruiz leg., 1♀ (IBSP115318); Parque Estadual do Jaraguá, São Paulo, 23° 27' 33.0" S, 46° 46' 02.0" W, 28.IX.1969, O. Franchlich leg., 1 juvenile (IBSP108831); Bento de Abreu, 21° 16' 15.0" S, 50° 48' 43.0" W, 25.IV.1969, R. Moreira leg., 2♀ (IBSP103919); Rua dos Fundos, Araçatuba, 21° 13' 19.5" S, 50° 22' 59.8" W, 23-24.XI.2019, A. Galleti-Lima & R.P. Indicatti leg., 1♂ (CAD1231); Trilha do Morro do Diabo, Teodoro Sampaio, 22° 30' 58.0" S, 2° 19' 20.0" W, 9-16.II.2021, A. Galleti-Lima, R.P. Indicatti & J.P.L. Guadanucci leg., 1♀ (CAD1306); Estação Ecológica de Assis, Assis, 22° 35' 18.9" S, 50° 25' 15.9" W, VII.2008-V.2009, F.T.S. Morimoto leg., 1♀ (IBSP220873).

iNaturalist new records. Piauí: Brasileira, Piri-piri, 4° 06' 53.3" S, 41° 29' 47.6" W, 23.IV.2023, L. Serafim 1♀ (<<https://www.inaturalist.org/observations/163394392>>); Parnaíba, 2° 53' 25.3" S, 41° 43' 59.5" W, 18.II.2018, J. Martins, 1♀ (<<https://www.inaturalist.org/observations/71699270>>); Ceará: São José, Abaiara, 7° 23' 00.6" S, 38° 59' 53.3" W, 14.III.2022, G. Augusto, 1♀ (<<https://www.inaturalist.org/observations/151119266>>); Monte Alegre, Pacatuba, 3° 57' 29.8" S, 38° 37' 51.7" W, 12.VII.2017, C. Moura Neto, 1♀ (<<https://www.inaturalist.org/observations/66987539>>); Jubaia, 4° 02' 58.4" S, 38° 42' 46.6" W, 19.VIII.2023, Carlos, 1♀ (<<https://www.inaturalist.org/observations/179270271>>); Paraíba: Cutié, Sítio Olho d'Água da Bica, 6° 29' 42.5" S, 36° 09' 32.7" W, 25.IV.2023, P. Couto, 1♀ (<<https://www.inaturalist.org/observations/163715250>>); UFCG *Campus*, Cuité, 6° 29' 39.3" S, 36° 09' 32.4" W, 04.IV.2023, P. Couto, 1♀ (<<https://www.inaturalist.org/observations/153512651>>); Junco do Seridó, 6° 58' 03.6" S, 36° 46' 52.4" W, 06.XI.2023, P. Santos, 1♀ (<<https://www.inaturalist.org/observations/190593604>>); Bahia: Guanambi, Mutãs, 14° 21' 26.7" S, 42° 59' 43.9" W, 03.I.2023, F. Ronan, 1♀ (<<https://www.inaturalist.org/observations/145793336>>); Ipujiara, 11° 49' 47.1" S, 42° 30' 13.0" W, 23.XI.2022, F. Amorim, 1♀ (<<https://www.inaturalist.org/observations/142764658>>); Boa Nova, 14° 20' 03.2" S; 40° 12' 55.3" W, 07.XII.2021, S. Sampaio, 1♀ (<<https://www.inaturalist.org/observations/102684199>>); Pereira, Santaluz, 11° 20' 55.7" S, 39° 39' 47.4" W, 14.IV.2023, T. Santos, 1♀ (<<https://www.inaturalist.org/observations/200452758>>); Distrito Federal:



Ceilândia, 15° 46' 18.9" S, 48° 07' 55.0" W, 08.VI.2023, J.D.M. de Paiva, juvenile (<<https://www.inaturalist.org/observations/166289724>>); Goiás: Cidade Ocidental, 16° 06' 43.3" S, 47° 46' 24.6" W, 05.XII.2020, M. Barroso, 1♀ (<<https://www.inaturalist.org/observations/66267949>>); Minas Gerais: Caeté, 19° 51' 52.0" S, 43° 44' 00.1" W, 14.VII.2016, J.D.M. de Paiva, 1♀ (<<https://www.inaturalist.org/observations/85522591>>); Espírito Santo: Santa Leopoldina, 20° 06' 32.4" S, 40° 31' 55.4" W, 30.III.2023, L. Felipe Teixeira, 1♀ (<<https://www.inaturalist.org/observations/153072767>>); Reserva Biológica de Sooretama, Sooretama, 19° 09' 05.0" S, 40° 04' 14.9" W, 28.XII.2017, M.S. Ferreira, 1♂ (<<https://www.inaturalist.org/observations/66621437>>); Convento da Penha, Vila Velha, 20° 19' 47.5" S, 40° 17' 14.0" W, 10.I.2022, F. Mendes, 1♀ (<<https://www.inaturalist.org/observations/104734343>>); Rio de Janeiro: Parque Natural Municipal de Nova Iguaçu, Nova Iguaçu, 22° 46' 44.6" S, 43° 27' 23.9" W, 13.VII.2023, R. Depes, juvenile (<<https://www.inaturalist.org/observations/172744936>>); Arraial do Cabo, 22° 56' 32.9" S, 42° 03' 25.7" W, 17.VII.2019, A.S. Michelotto, 1♀ (<<https://www.inaturalist.org/observations/29031385>>); Tinguá, Nova Iguaçu, 22° 36' 12.7" S, 43° 26' 08.5" W, 15.X.2016, D. Luiz, 1♀ (<<https://www.inaturalist.org/observations/30214282>>); Cabo Frio, 22° 53' 16.1" S, 42° 01' 33.9" W, 08.I.2017, D. Luiz, 1♂ (<<https://www.inaturalist.org/observations/31156713>>); Angra dos Reis, 23° 07' 20.4" S, 44° 12' 49.5" W, 05.VII.2021, Uriel, 1♀ (<<https://www.inaturalist.org/observations/86221897>>); Natividade, 20° 58' 24.9" S, 41° 55' 00.3" W, 08.X.2023, R. Danilo, 1♀ (<<https://www.inaturalist.org/observations/188650320>>); São Paulo: Ubatuba, 23° 26' 01.7" S, 45° 05' 09.5" W, 28.XII.2010, C. Moura Neto, 1♀ (<<https://www.inaturalist.org/observations/67056153>>); Paraná: Ilha do Mel, Paranaguá, 25° 33' 56.9" S, 48° 18' 52.3" W, 26.XII.2021, A. Aguiar, 1♂ (<<https://www.inaturalist.org/observations/103714198>>); Pontal do Paraná, 25° 36' 52.0" S, 48° 28' 03.0" W, 26.XII.2010, Antônio, 1♂

(<<https://www.inaturalist.org/observations/69624612>>); Guaratuba, 25° 53' 24.8" S, 48° 35' 14.0" W, 24.X.2021, H. de Oliveira Bonato, 1♂ (<<https://www.inaturalist.org/observations/99212306>>); Ilha dos Valadares, Paranaguá, 25° 32' 17.5" S, 48° 30' 31.7" W, 31.VIII.2023, R. Danilo, 1♂ (<<https://www.inaturalist.org/observations/196423301>>).

## DISCUSSION

Barychelid spiders are known for their behavior of constructing burrows with a hinged trapdoor made of silk and soil or other materials. These burrows are cylindrical, lined internally with silk, closed with circular trapdoors that are thin, malleable, made of silk and aggregated materials such as soil, leaves and branches (Figures 2-3). Many species have burrows with two openings on opposite sides, each with its own trapdoor (Figures 3B, 3H). Live specimens of Barychelidae found in Brazil can generally be recognized by their small size, a coloration pattern ranging from a darker brown to an orange-brown pattern, with a light band of bristles on the central part of the cephalothorax, striped legs, and a pattern of spots on the abdomen (Figures 4-7).

The sedentary habit and the difficulty in identifying and locating the burrows, arising from the camouflage of the trapdoors, hinder the obtaining of materials, masking the real diversity of the group in Brazil and in the Neotropical region (Figures 2-3). Therefore, in view of this special difficulty and scarcity of studies, phylogenetic analyses and taxonomic reviews are necessary to understand the evolutionary history of the group in the Neotropics. Furthermore, there remains a substantial amount of knowledge yet to be gained regarding their taxonomy, ecology, and distribution. Barychelidae exhibits significantly greater diversity in the Pacific region compared to other areas worldwide, due to the extensive review of this family in Australia and Western Pacific (Raven, 1994). According to Mori and Bertani (2016), neotropical barychelids are one of the most neglected groups, as many genera have never been revised and for many groups only the original descriptions are available.







Figure 2. Collection site of barychelid spiders: A) Parque Nacional do Itatiaia, Itamonte, Minas Gerais; B) Araçatuba, São Paulo; C-D) Circle showing the camouflaged burrow: Catalão, Goiás (C); Parque Nacional do Itatiaia, Itamonte, Minas Gerais (D); E-F) *Neodiplothele indicattii* (IBSP165132) from Parque Nacional da Serra dos Órgãos, Teresópolis, Rio de Janeiro: Arrow indicates the burrow (E); Specimens lurking (F); Arrow indicates closed trapdoors from Araçatuba, São Paulo (G-H). Photo credits: Rafael P. Indicatti (2011-2013) (A, D-F); Arthur Galleti Lima (2019) (B, G-H); José Paulo L. Guadanucci (2010) (C).



Figure 3. Collection site of barychelid spiders: A-B) Specimen from Paranapiacaba, Santo André, São Paulo: Circle indicates the trapdoors closed (A); Burrows with the two doors opened (B); C-D) Specimen from Estação Ecológica Mata de Acauã, Leme do Prado, Minas Gerais: Circle indicates the burrow (C); Burrow with the door open (D); E-H) Specimen from Parque Nacional da Serra dos Órgãos, Teresópolis, Rio de Janeiro: Circle indicates the trapdoors closed (E); Burrow with the door opened (F); Arrows indicate the burrows (G); Burrows with the two doors closed (H). Photo credits: Rafael P. Indicatti (2023, 2010-2011) (A-B, E-H); Pedro H. Martins (2013) (C-D).



Figure 4. Live specimens, dorsal habitus. A) *Neodiplothele aureus* (female) from Monumento Nacional Canions do Subaé, Santo Amaro, Bahia; B) *Neodiplothele irregularis* (female) from Parque Nacional da Serra da Capivara, São Raimundo Nonato, Piauí; C) *Neodiplothele irregularis* (female) from Monumento Nacional Canions do Subaé, Santo Amaro, Bahia; D) *Neodiplothele* sp. (male) from Reserva Biológica de Una, Una, Bahia; E) *Neodiplothele caucaia* (male) from Pacatuba, Ceará; F) *Neodiplothele* sp. (female) from Trilha do Morro do Diabo, Teodoro Sampaio, São Paulo; G-H) *Neodiplothele itabaiana* (female and male) from Parque Nacional da Serra de Itabaiana, Areia Branca, Sergipe. Photo credits: Wolf J Moeller (2022-2023) (A-F); Pedro H. Martins (2023) (G); Hector M. O. Gonzalez Filho (2022) (H).

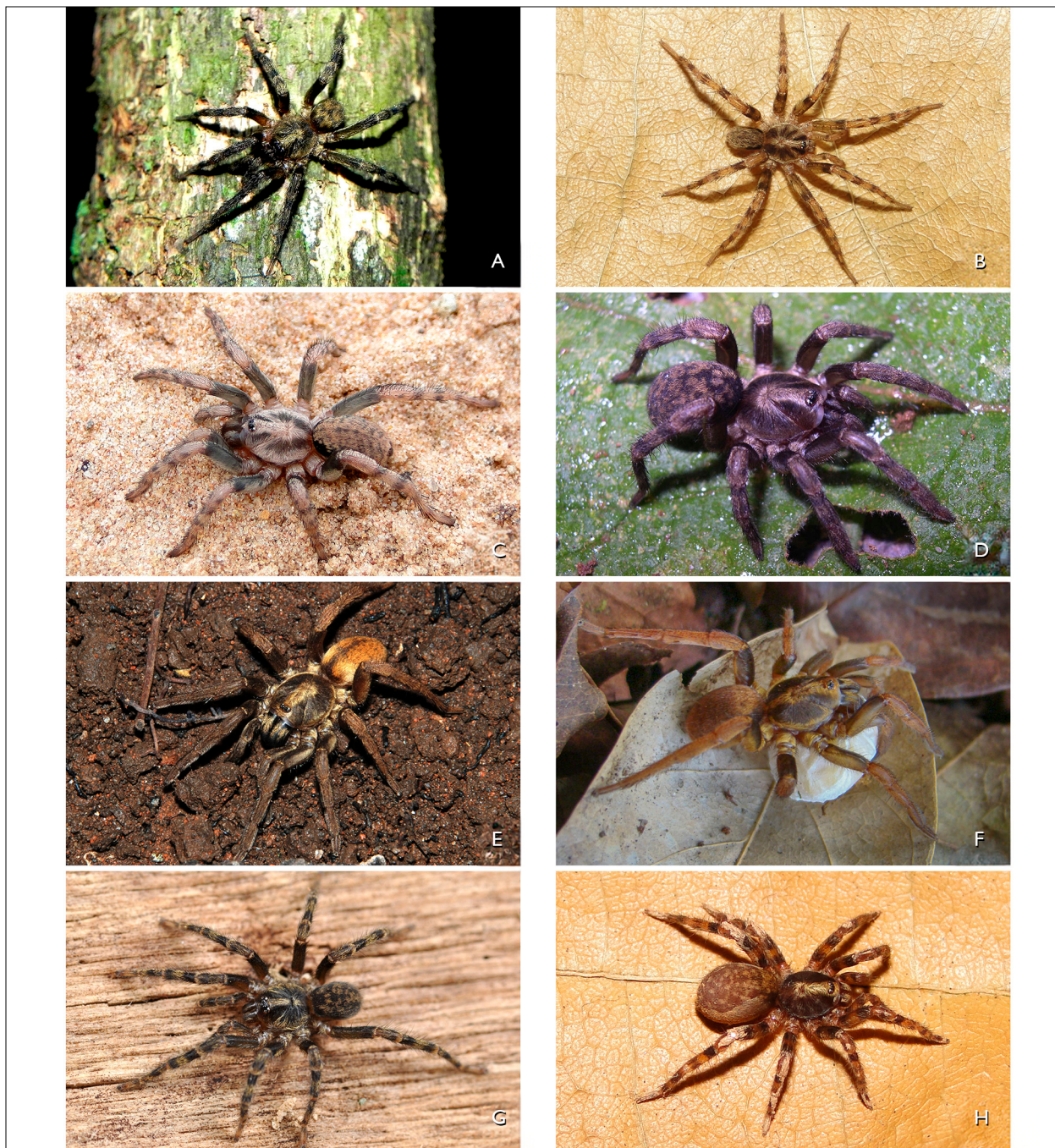


Figure 5. Live specimens, dorsal habitus. A) *Neodiplothele* aff. *picta* (male) from PEAMA - Polo de Educação Ambiental da Mata Atlântica/ Ifes - Campus de Alegre, Alegre; B) *Neodiplothele fluminensis* (male) from Parque Nacional Serra dos Órgãos, Teresópolis, Rio de Janeiro; C) *Neodiplothele* sp. (female) from Parque Nacional da Serra da Capivara, Coronel José Dias, Piauí; D) Female from Catalão, Goiás; E) *Neodiplothele aureus* (female) from Leme do Prado, Minas Gerais; F) *Neodiplothele* sp. (female) from Belém, Pará; G) *Neodiplothele martinsi* (male) from Alto Caparaó, Minas Gerais; H) *Neodiplothele* sp. (female) from Parque Nacional da Serra dos Órgãos, Teresópolis, Rio de Janeiro. Photo credits: Alexandre S. Michelotto (2021) (A); Rafael P. Indicatti (2010) (B, H); Leonardo S. Carvalho (2013) (C); José Paulo L. Guadanucci (2012) (D); Pedro H. Martins (2013-2023) (E, G); Igor Cizauskas (2016) (F).



Figure 6. Live specimens, dorsal habitus. A) *Neodiplothele* sp. (juvenile) from Parque Nacional do Pau Brasil, Porto Seguro, Bahia; B) *Neodiplothele* sp.; C) *Neodiplothele* sp. (female) from Tupã, São Paulo; D) *Neodiplothele* sp. (male) from Parque Natural Municipal Professor João Vasconcelos Sobrinho - Serra dos Cavalos, Caruaru, Pernambuco; E-F) *Neodiplothele* sp. (juvenile and male) from Reserva Biológica de Pedra Talhada, Quebrangulo; G) *Neodiplothele* sp. (female) from Parque Nacional Serra do Cipó, Santana do Riacho, Minas Gerais; H) *Neodiplothele* sp. (female) from Estação de Preservação e Desenvolvimento de Peti, São Gonçalo do Rio Abaixo, Minas Gerais. Photo credits: Wolf J Moeller (2022) (A); Rafael P. Indicatti (2010) (B-C); Pedro H. Martins (2023) (D-H).



Figure 7. Live specimens, dorsal habitus. A) *Neodiplothele martinsi* (female) from Gouveia, Minas Gerais; B) *Neodiplothele indicattii* (female) from Parque Nacional do Itatiaia, Itamonte, Minas Gerais; C-D) *Neodiplothele* sp. (male and female) from Estação de Preservação e Desenvolvimento de Peti, São Gonçalo do Rio Abaixo, Minas Gerais; E-F) *Neodiplothele martinsi* (female and male) from Estação Ecológica Mata de Acauã, Leme do Prado, Minas Gerais; G) *Neodiplothele* sp. (female) from Mutum, Porto Velho, Rondônia; H) *Neodiplothele* aff. *indicattii* (male) from Paranapiacaba, Santo André, São Paulo. Photo credits: Pedro H. Martins (2012, 2012, 2013) (A, C-F); Rafael P. Indicatti (2013, 2011, 2023) (B, G-H).

As demonstrated by Rosa et al. (2022), the existence of a platform dedicated to accessible biodiversity records such as iNaturalist, which has a mobile application, makes it more accessible for the common population to record fauna and flora throughout the planet. Taking into account that smartphone cameras have a satisfactory resolution, it is possible that we have images with a reasonable quality to arrive at a concise identification, reaching at least the family level. These characteristics make iNaturalist a platform of scientific importance, generating geographic data, seasonality graphs, life stage and sex of several clades.

Other positive points of the platform are the unpublished records of fauna and flora in life, in which species were only known through illustrations of old scientific works or for the simple fact of being rare species and even the discovery of new species. This can be proven by the observation made in iNaturalist (<<https://www.inaturalist.org/observations/30214282>>) of the species *Paraceniopelma gericormophilum* Feio, 1952, which could be easily identified by one of the authors (HMOGF) due the unique pattern of the abdomen (see Feio, 1952, figure 7). This monotypic genus is only known by the types deposited in the Museu Nacional do Rio de Janeiro, Rio de Janeiro (MNRJ). This rare specimen was recorded in Tinguá, Nova Iguaçu, Rio de Janeiro, 50km close to the type-locality of Niterói, Rio de Janeiro. In the data analyzed in the present work, some new Neodiplothele species were recognized, which are already in the description process (Figures 4A, 4F, 5D, 5H, 6H). Thus, citizen science platforms like this one help researchers plan field trips to collect specimens, contributing to better use of public research funding and collection efficiency.

## CONCLUSION

Overall, the expanding geographic distribution of the Barychelidae spiders from Brazil has revealed remarkable diversity, with numerous specimens spanning a variety of habitats, including the Amazon rainforest, Atlantic forests, Cerrado (savanna fields), and Caatinga, highlighting their

ability to adapt to varied ecological conditions within Brazil. Mapping the distribution can provide valuable information for studying population variations, and aids in biogeographic research, enabling the investigation of historical processes, such as dispersal, and evolutionary relationships among different populations. Even among described species, there is a distinct lack of knowledge regarding their distribution and biogeography, as well as basic biology, such as life histories, feeding habits, and habitat preferences of this group.

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## AUTHORS' CONTRIBUTION

H. M. O. Gonzalez Filho contributed to conceptualization, data curation, methodology, investigation, visualization, project administration, and writing (original draft, review and editing); P. H. D. S. Costa to formal analysis, visualization, and writing (review and editing); J. M. D. Paiva to formal analysis, visualization, investigation, methodology, and writing (review and editing); and J. P. L. Guadanucci to resources, funding acquisition, supervision, and writing (review and editing).

