



## Article

## The alien synanthropic Salticidae in Brazil (Araneae)

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**ABSTRACT.** Salticidae is the most diverse family of Araneae and in Brazil, there are 667 species. Among these species, five are synanthropic exotics: *Plexippus paykulli* (Audouin, 1826), *Hasarius adansoni* (Audouin, 1826), *Menemerus bivittatus* (Dufour, 1831), *M. nigli* Wesolowska & Freudenschuss, 2012 and *Thyene coccineovittata* (Simon, 1886). To understand the current distribution of these species in Brazil, seven collections of 643 lots were examined from seven Brazilian zoological collections. The synanthropic exotic species with the highest records were *Plexippus paykulli*, *Menemerus bivittatus*, and *Hasarius adansoni*, generally collected and associated with human dwellings and buildings. They are present in all regions (North, Northeast, Midwest, and South macro-regions), with the largest region, in all regions of the country in 22 states and 98 municipalities, followed by *Hasarius adansoni* in 17 states and 88 municipalities, *Menemerus bivittatus* in 19 states and 68 municipalities. *Menemerus nigli* and *Thyene coccineovittata* are from recent introductions that occurred in the city of Rio de Janeiro, Rio de Janeiro, Brazil.

**KEYWORDS.** Spiders, distribution geographics, alien species.

**RESUMO.** As aranhas Salticidae exóticas sinantrópicas no Brasil (Araneae). Salticidae é a família mais diversa de Araneae e no Brasil ocorrem 667 espécies, dentre elas cinco são exóticas sinantrópicas: *Plexippus paykulli* (Audouin, 1826), *Menemerus bivittatus* (Dufour, 1831), *Hasarius adansoni* (Audouin, 1826), *Menemerus nigli* Wesolowska & Freudenschuss, 2012 e *Thyene coccineovittata* (Simon, 1886). Foram examinados 643 lotes destas cinco espécies no Brasil, depositados em sete coleções zoológicas brasileiras. As espécies exóticas sinantrópicas com maior número de registros foram *Plexippus paykulli*, *Hasarius adansoni* e *Menemerus bivittatus*, na maioria dos casos coletadas associadas a habitações e edificações humanas. Elas estão presentes em todas as macrorregiões do país (Norte, Nordeste, Centro-Oeste, Sudeste e Sul), sendo *P. paykulli* a que possui a maior distribuição, ocorrendo em 22 estados e 98 municípios, seguido de *H. adansoni* em 17 estados e 88 municípios e *M. bivittatus* em 19 estados e 68 municípios. *Menemerus nigli* e *Thyene coccineovittata*, são introduções recentes, ocorrendo apenas na cidade do Rio de Janeiro, Rio de Janeiro, Brasil.

**PALAVRAS-CHAVE.** Aranhas, distribuição geográfica, espécies exóticas.

Urban environments went through anthropological processes with a high demand for natural resources and inadequate discard of tailings (HOGAN *et al.*, 2001), creating urban niches with conditions for some arachnids to establish their populations (ROBINSON, 2005). Among these are the spiders (Araneae), with their ability to occupy different niches (PICKETT *et al.*, 2001; SWANSON *et al.*, 2009), occupying mainly the peridomicile of the residences (e.g. walls, gardens, other constructions) (ROBINSON, 2005).

In Brazil, there is still no national survey of Brazilian synanthropic spiders, but INDICATTI & BRESCOVIT (2008) reported 92 species of urban spiders in the city of São Paulo. Some other authors contributed with surveys of populations of synanthropic species in the states of Pará and Maranhão (RODRIGUES *et al.*, 2017), Bahia (BRAZIL *et al.*, 2005), and in several other northeastern states (CARVALHO *et al.*, 2014).

One of the easily found families is the Salticidae (jumping spiders) (MONDAL *et al.*, 2020), spiders of these

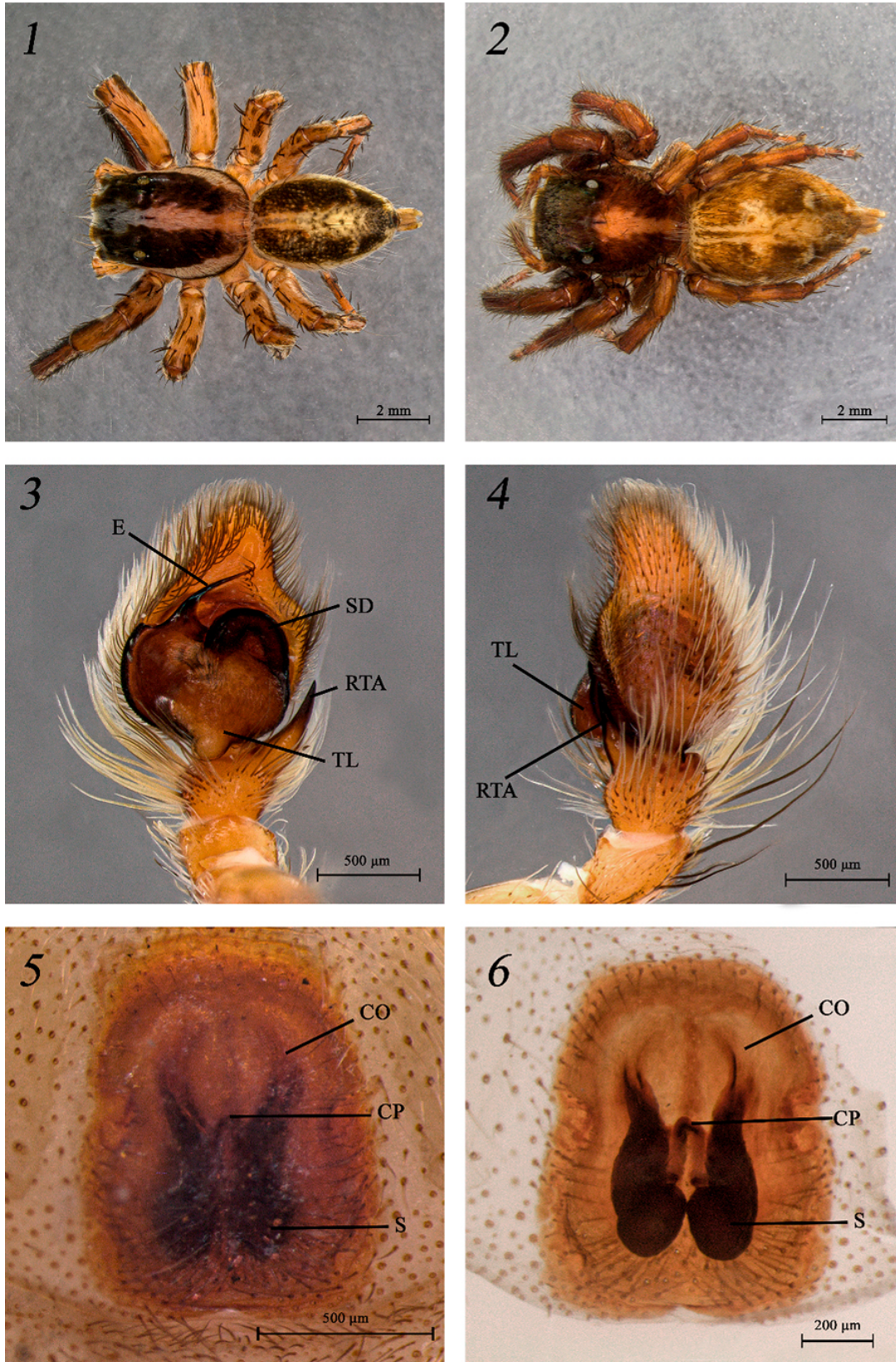
are small, not exceeding 10 mm in size, with eight eyes, arranged in ocular formula 4–2–2, being the two medium eyes anterior, larger than the others (MONDAL *et al.*, 2020; PLATNICK, 2020). It is the most diverse family within Araneae, having more than 6,395 species distributed worldwide (WORLD SPIDER CATALOG, 2022). Of these, 670 species occur in Brazil, being the largest diversity hotspot in the world, and followed by China with 574 species and Australia, with 507 species (METZNER, 2020).

Some occupations of urban niches occur through the accidental or intentional introduction of alien species (ROBINSON, 2005), under favorable conditions, these introductions can affect arthropod assemblages since spiders are efficient predators (NYFFELER, 2000; NENTWIG, 2015).

In Brazil, at least 36 introductions of spiders were recorded (INDICATTI & BRESCOVIT, 2008; BRESCOVIT *et al.*, 2019; MARIANTE & HILL, 2019; 2020), of these, five species belong to Salticidae: *Plexippus paykulli* (Audouin, 1826),







Figs 1–6. *Plexippus paykulli* (Audouin, 1826) (1, 3, 4: ♂; 2, 5, 6: ♀). Figs 1, 2, habitus, dorsal view; 3, palp, ventral view; 4, palp, retrolateral view; 5, epigynum, ventral view; 6, epigynum, dorsal view (CO, copulatory opening; CP, central pocket; E, embolus; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; TL, tegular lobe).



- Buckup col. (MCN 28715); Rio Tocantins (10°11'29"S; 48°21'52"W), ♀, IX.2005, no collector (IBSP 57589); Usina Hidrelétrica Luis Eduardo Magalhães (10°15'36"S; 48°20'50"W), ♂, 2♀, 07.I.2002, D. M. Cândido & M. Costa col. (IBSP 40512); Brejinho do Nazaré (11°00'51"S; 48°33'50"W), ♀ (IBSP 159658); 2♀ (IBSP 159675); ♀ (IBSP 159678); ♂, 5♀ (IBSP 159689) all collected on 28.X-04.XI.2001 by I. Knysak & R. Martins col. Lagoa da Confusão (11°02'53"S; 50°05'42"W), ♀, 29.X.2009, VQP col. (IBSP 160866); Sandolândia (Ilha do Bananal, 11°21'03"S; 50°18'39"W), ♀, XI.1952, H. Schulz col. (IBSP 4211B); Gurupi (Estação Experimental da Universidade Federal do Tocantins, 11°44'44.86"S; 9°03'8.96"W), ♂, 29.VI.2015, P. H. Tschoeke col. (UFMG 19060); **Sergipe**: Riachão do Dantas (11°01'07"S; 37°47'32"W), 2♀, 11.VI.1986, no collector (IBSP 7652); Santa Luzia do Itanhê, Mata do Crasto (11°25'25"S; 37°23'47"W), ♂, 08.XII.1997, no collector (IBSP 21010); **Mato Grosso**: Campo Novo do Parecis, Utariiti (13°01'18"S; 58°17'14"W), ♂, 07.VIII.1961 (MZSP 3566); ♂, 12.VIII.1961 (MZSP 10711); ♂, 30.VIII.1961 (MZSP 10708) all collected by K. Lenko col.; Canarana (13°11'33"S; 52°14'27"W), ♂, ♀, 16.XII.200-10.I.2001, C. Q. Falatti & R. A. K. Ribeiro col. (IBSP 27116); Alto Paraguai, (14°30'49"S; 56°28'57"W), ♀, VI.1984, C. A. Cunha col. (IBSP 4409); Barra dos Bugres (15°03'20"S; 57°11'25"W), ♂, XI.1984, A. Cerruti col. (MNRJ 02865); Cuiabá (Bairro Santa Cruz, 15°35'S; 56°05'W), ♀, 12.VI.2005-26.IV.2006, R. A. K. Ribeiro col., (IBSP 63175); Cáceres (Bairro Centro, 16°04'14"S; 57°41'11"W), ♂, 17.II.2005, N.M. Rocha col. (IBSP 70939); Bairro Jardim Paraíso (16°04'54"S; 57°42'10"W), ♀, 17.XI.2004, N. M. Rocha col. (IBSP 70940); **Bahia**: Juazeiro (9°26'34"S; 40°29'46"W), ♀ (IBSP 40233); ♀ (IBSP 40234); ♂ (IBSP 40235); 2♂, 2♀ (IBSP 40236); ♀ (IBSP 40237); ♂ (IBSP 40238); ♂, 2♀ (IBSP 40239); ♂ (IBSP 40240) all collected on VII.2003 by M. G. Paranhos col.; Reserva Ecológica Raso da Catarina (09°39'59"S; 38°40'00"W), ♀, no date, T. Brazil col. (IBSP 7257); Feira de Santana (Parque Ipê, 12°12'50"S; 38°57'27"W), 2♂ 6♀, 01.X.1991, V. Santos col. (IBSP 7113); Salvador (12°52'31"S; 38°30'06"W), ♀, XII.1962, V. M. Napoli col. (MZSP 14444); Lagoa do Abaeté (12°56'44"S; 30°21'29"W), ♀, 21.III.2004, A. O. Alves col. (IBSP 68653); Jequié, Barragem da Pedra (13°52'12.8"S; 40°14'16.5"W), ♀, 4.XII.2010, G. H. F. Azevedo *et al.* col. (UFMG 16746); **Goiás**: (15°56'48"S; 49°34'40"W), ♀, 1986, I. Knysak col. (IBSP 63165); Goianésia (15°19'18"S; 49°07'23"W), ♂, 2♀, 10-16.VIII.2007, P. Naves col. (IBSP 86589); Aragarças, Rio Araguaia (22°43'26"S; 47°17'26"W), 2♀, 15-22.IX.1946, H. Sick col. (MZSP 1204); ♂, 15-22.IX.1946, H. Sick col. (MZSP 1282); **Minas Gerais**: Itacarambi (15°10'19"S; 44°10'49"W), 2♀, 17-22.X.2010, G. F. B. P. Ferreira *et al.* col. (UFMG 9361); Unai, Usina Hidrelétrica Queimado (16°12'37"S; 47°19'45"W), 2♂, ♀, X.2003, E. O. Machado col. (IBSP 59068); Uberlândia, (18°54'40"S; 48°15'44"W), 3♀, 31.VII.2008, P. F. Vilela col. (UFMG 5636); ♂, X.1996, D. Cunha col. (IBSP 8305); ♂, X.1996, D. Cunha col. (IBSP 8329); Belo Horizonte: (19°55'15"S; 43°56'16"W), 2♀, VI-VII.1993, A. J. Santos & M. O. Gonzaga col. (IBSP 42917); 3♀, VIII-IX.1994, A. J. Santos, M. O. Gonzaga & G. F. Dutra col. (IBSP 26353); ♀, VIII-IX.1994, M. O. Gonzaga, A. J. Santos & G. F. Dutra col. (IBSP 37480); 2♀ 1 juv., III-IV.1995, A. J. Santos, M. O. Gonzaga & G. F. Dutra col. (IBSP 26334); Machado (21°40'53"S; 45°55'48"W), ♀, 19.V.2011, Equipe do Laboratório de Artrópodos do IBSP col. (IBSP 211667); **Mato Grosso do Sul**: Cassilândia, Chapada do Gaúcho (15°27'26"S; 45°27'22"W), ♀, III.1983, R. R. Silva col. (IBSP 4251); Corumbá, Passo da Lontra (19°34'33"S; 57°01'40"W), ♂, VII.1999, A. D. Brescovit *et al.* col. (IBSP 23947); Paranaíba (19°40'38"S; 51°11'27"W), 4♂, 3♀ (IBSP 6774); ♀ (IBSP 6803); ♀ (IBSP 6811); ♂, ♀ (IBSP 4136) all collected on 1983 by R. R. Silva col.; ♀, III.1983, R. R. Silva col. (IBSP 3653); ♀, III.1983, R. R. Silva col. (IBSP 6818); 2♀, 1984, R. R. Silva col. (IBSP 14094); Selvíria, Barragem de Ilha Solteira (20°21'10"S; 51°23'49"W), ♂, IV.1973, Equipe IBSP col. (IBSP 5228); Três Lagoas, Fazenda Floresta (20°24'17"S; 52°11'04"W), ♀, 17.IX.1964, Expedição do Museu de Zoologia col. (MZSP 3672); Campo Grande (20°26'34"S; 54°38'47"W), ♀, 21.VI.1973, S. Francisco col. (IBSP 20956); ♂, 19.VI.1983, M. Batistute col. (IBSP 20944); ♀, II.1984, J. A. Galafassi col. (IBSP 4408); 4♂, 30.VII.1990, R. S. Bernilz col., (IBSP 6318); Brasília, (21°15'16"S; 52°02'15"W), ♂, 11.VIII.2000, R. Bertani & C. F. Y. Fukami col. (IBSP 35272); ♀, 2000, Equipe IBSP col. (IBSP 30965); 2♂ 2♀, 15.VII.2000, Equipe IBSP col. (IBSP 30771); 2♂, ♀, 26.VII.2000, Equipe IBSP col. (IBSP 35476); Santa Rita do Pardo (21°18'08"S; 52°49'40"W), 3♀, 09-10.V.2001, R.P. Indicatti & J. Império col. (IBSP 53304); **Espírito Santo**: Vitória, Morro Moscoso (20°19'35"S; 40°20'31"W), ♂, XI-1981, A. Cerruti col. (MNRJ 02864); **Rio de Janeiro**: Petrópolis (22°28'33"S; 43°09'21"W), ♂, no date, T. Borgmeyer col. (MNRJ 01117); Seropédica, Campus da UFRRJ (22°46'09"S; 43°41'06"W), ♂, 04.V.2009, F. U. Yamamoto col. (IBSP 144847); Rio de Janeiro, Museu Nacional (22°54'20"S; 43°13'35"W), ♂, ♀ 4 juv., 22.XI.1961, H. Cunha col. (MNRJ 0863); **São Paulo**: ♂, juv., no date, no collector (IBSP 11723); Votuporanga (20°26'46"S; 50°00'12"W), ♂, ♀, 08.VI.2002, R. Pavam col. (IBSP 57884); Auriflama (20°41'08"S; 50°33'17"W), ♀, 10.III.2001, A. G. Suguimoto col. (IBSP 28593); São José do Rio Preto (21°36'20"S; 46°54'12"W), 2♂, ♀, 16.V.2001, N. S. Stafuzza col. (IBSP 57802); ♀, 2002, Ruiz, G. R. S. col. (MZSP 72234); ♂, ♀, V.2002, D. F. Biceglio col. (IBSP 57793); Castilho (20°51'51"S; 51°29'23"W), ♀, X.1964, Expedição do Museu de Zoologia col. (MZSP 10710); Nova Aliança, Estância Boa Esperança (21°00'57"S; 49°30'05"W), ♂, V.2002, R. Y. Ouchi col. (IBSP 57859); Catanduva (21°08'16"S; 48°58'22"W), ♂, 1 juv., X.1996, F. Bariab col. (IBSP 14158); Sertãozinho (21°08'08"S; 47°59'39"W), ♀, IV.2002, E. C. Guerrieri col. (IBSP 57788); Presidente Epitácio (21°46'29"S; 52°06'45"W), 5♂, 5♀, 1999-2001, Equipe IBSP col. (IBSP 53403); Araraquara (21°46'46"S; 48°09'27"W), ♂, no date, no collector (IBSP 145359); Vargem Grande do Sul (21°50'19"S; 46°54'09"W), 2♂, ♀, 26.XII.2007-05.I.2008, G. P. Perroni col. (IBSP 99258); Águas da Prata (21°56'12"S 46°43'00"W), ♀, 22.XI.1997, V. C. Onofrio col. (IBSP 14446); Tupã (21°57'27"S 46°54'09"W), ♂, IX.2007, G. R. S. Ruiz col. (IBSP 220823); ♀, IX.2007, G. R. S. Ruiz col. (IBSP 220833); São Carlos, (22°01'03"S; 47°53'27"W), 3♂ 4♀, no date, D. Miawama col. (IBSP 27039); Rio Claro, Campus Unesp (22°23'49"S; 47°32'52"W), 1 juv., III.2008, E. Fox col. (IBSP 91697); ♀, X.2011, E. Fox col. (IBSP 210034); ♂, 25.VI.2018, T. G. Pinheiros col. (IBSP 229332); Primavera (22°31'41"S; 52°56'53"W), ♀, 2001, Equipe IBSP col. (IBSP 53095); 2♂, ♀, II.2001, D. F. Candiani & R. P. Indicatti col. (IBSP 53426); Rosana (22°34'47"S; 53°03'33"W), ♀, XII.1986, Equipe IBSP col. (IBSP 4581); Americana (22°43'26"S; 47°17'26"W), ♀, 1944, R. Eller col. (MZSP 802); ♀, 03.VII.1944, R. Eller col. (MZSP 5481); ♂, 03.VII.1944, R. Eller col. (MZSP 5482); Botucatu, Jardim Botânico da Universidade Estadual de São Paulo (22°53'11"S; 48°29'59"W), ♂, 01.IV.2002, G. R. S. Ruiz col. (MZSP 63088); Tietê, (23°06'07"S; 47°42'20"W), 1 juv, 19.VI.1995, A. Guimarães col. (IBSP 180); ♀, 19.VI.1995, A. Guimarães col. (IBSP 6439); São José dos Campos (23°10'46"S; 45°53'13"W), 1♂ 1♀, 14. III.1996, Secretária Municipal da Saúde col. (IBSP 14349); Promissão, Usina Hidrelétrica de Promissão, Rodovia BR 153, Km 39 (23°17'22"S; 50°03'39"W), 7♀, VI-VII.2001, no collector (IBSP 28434); São Paulo (23°32'51"S; 46°38'10"W), ♀, 22.II.1983, no collector (IBSP 20935); ♀, 18.VII.1977, M.S. Shigoki col. (IBSP 19699); ♂, 06.X.1979, R. Bentler col. (IBSP 19711); ♀, III.1995, L. A. S. Minas col. (IBSP 6018); ♀, 22. IX.1999, L. Minella col. (IBSP 24091); ♀, 01.III.2001, P. S. Lins Filho col. (IBSP 27430); 2♂, 01.V.2001, L. S. Isa col. (IBSP 57853); ♀, 23.I.2002, S. Magno col. (IBSP 33101); ♂, 03.V.2002, J. Albino col. (IBSP 36129); ♀, 07.I.2008, A. de Almeida col. (IBSP 99435); ♀, 28.III.2012, M. Batista col. (IBSP 211043); Bairro Perus (23°24'34"S; 46°46'24"W), ♂, 3♀, 01.III.1984, T. A. Santos col. (IBSP 15005); Campus USP (23°33'41"S; 46°43'50"W), ♀, 20.XII.1999, R. P. Indicatti col. (IBSP 34698); ♀, 14.V.2003, R. P. Indicatti col. (IBSP 131533); Bairro Campo Limpo (23°38'05"S; 46°45'17"W), ♂, 21.XI.1983, N. F. Lima col. (IBSP 3773); Vila Leopoldina (23°31'47"S; 46°44'06"W), ♀ juv., 06.IX.2011, C. C. de Menezes col. (IBSP 210942); Vila Pirajussara (23°34'19"S; 46°42'58"W), ♀, 01.VIII.2000, J. Império col. (IBSP 34689A); Guarulhos (23°27'46"S; 46°32'00"W), ♀, VI.1964, Expedição do Museu de Zoologia col. (MZSP 10673); ♂, 16.XII.1982, T. Luz col. (IBSP 19728); Osasco, (23°31'57"S; 46°47'30"W), ♂, ♀, XI.1972, A. Souza col. (IBSP 2232); ♀, 17.I.1995, C. A. Gomes col., (IBSP 6196); Salesópolis, Barragem Paraitinga (23°31'43"S 45°57'08"W), ♂, 1 juv., 11.VI.2002, Equipe IBSP col. (IBSP 122578); Itapevi (23°32'56"S; 46°56'03"W), ♀, 11.III.1980, N. L. Silva col. (IBSP 19723); São Roque (23°32'06"S; 47°07'57"W), ♀, 10.XII.2007, V. M. Silva col. (IBSP 151661); Suzano, Sabesp (23°33'03"S; 46°18'58"W), ♂, ♀, 08.III.2005, D. Polotow col. (IBSP 51607); Itapetininga, (23°35'30"S



48°03'11"W), ♀, 05.V.1995, R. M. Almeida col. (IBSP 6080); Biritiba Mirim, Barragem do Rio Biritiba (23°35'47"S; 46°05'06"W), ♂, V.2003, Equipe Biota col. (IBSP 91061); Cotia, Granja Viana (23°35'20"S; 46°49'50"W), ♀, I.1983, P. Sampaio col. (IBSP 3620); São Caetano, Parque Chico Mendes (23°37'55"S; 46°34'19"W), ♀, 2004, A. Macedo col. (IBSP 75152); Embu das Artes (23°38'56"S; 46°51'08"W), 2♀, 23.X.1990, R. Eimerly col. (IBSP 11756); **Paraná:** Cruzeiro do Iguaçu, Foz do Chopim (23°33'55"S; 53°06'55"W), ♀, (IBSP 21117); ♂ (IBSP 21262); ♂ (IBSP 21363) all collected on 08–15.X.1998 by team IBSP col.; Refúgio Biológico de Bela Vista (25°26'45"S; 54°35'01"W), ♀, 17.III.1991, K. S. Marta col. (MCN 20969); **Santa Catarina:** São Bento do Sul (26°14'38.38"S; 49°23'20.51"W), ♀, 03.IV.2015, B. G. Alves col. (IBSP 270931); Chapecó, Reserva do IBAMA (27°11'13"S; 52°36'35"W), ♀, no date, T. Kunst col. (IBSP 58078); Cocal do Sul (28°36'03"S; 49°19'30"W), ♂, 22.VIII.2007, R. A. Teixeira col. (IBSP 132968); ♂ ♀, 01.XI.2007, R. A. Teixeira col. (IBSP 132930); ♂, 23.IX.2007, R. A. Teixeira col. (IBSP 132929); **Rio Grande do Sul:** Lajeado (29°26'59"S; 51°59'43"W), ♀, 30.I.1987, E. H. Buckup col. (MCN 16693); Santa Maria (29°46'39"S; 53°49'28"W), ♀, 08.X.1985, K. S. Marta col. (MCN 15283); 3♂, ♀, 05.XI.1985, A. Braul col. (MCN 15333); ♂, 10.XI.1985, A. Braul col. (MCN 15280); Porto Alegre (30°06'31"S; 51°10'37"W), 2♂, ♀, 23.V.1934, P. Buck col. (MNRJ 42188); ♀, 05.IV.1968, K. S. Marta col. (MCN 9051); ♀, 08.VII.1973, K. S. Marta col. (MCN 1160); ♂, 04.IV.1973, A. Braul col. (MCN 3829); ♂, 28.IX.1977, A. Braul col. (MCN 6512); ♀, 28.I.1987, M. A. L. Marques col. (MCN 16676); 2♂, 1 juv., 01.II.1987, E. H. Buckup col. (MCN 16688); ♂, 03.XII.1988, A. B. Bonaldo col. (MCN 17964); Vila Santa Rosa (30°00'15"S; 51°05'47"W), ♀, 19.IX.1986, M. A. L. Marques col. (MCN 16675); Jardim Botânico (30°03'05"S; 51°10'37"W), ♂, 29.IV.1998, E. H. Buckup col. (MCN 29335); Vila Cruzeiro (30°03'12"S 51°10'08"W), ♂, ♀ (MCN 16672); 2♂, ♀ (MCN 16673); 2♂, 2♀ (MCN 16674) all collected 15.IX.1986 by M. A. L. Marques col.; Lomba do Pinheiro (30°06'54"S; 51°07'42"W), ♂, XI–XII.2006, K. Ohlweiler col. (IBSP 71074).

### *Menemerus bivittatus* (Dufour, 1831)

(Figs 7–12; 32)

*Salticus bivittatus* DUFOUR, 1831:369.

*Menemerus bivittatus*: PECKHAM & PECKHAM, 1886:292.

(Check other synonyms in WORLD SPIDER CATALOG, 2022).

**Diagnosis.** *Menemerus bivittatus* differs from the other synanthropic species for having a dorsoventrally flattened body and for the two marginal stripes that run along the entire length of the body (Figs 7, 8). Males and females can be confused with *Menemerus nigli*, due to the dorsoventrally flattened body shape, however, males of *M. bivittatus* differ by not having a curvature of the embolus in the palp (Figs 9, 10). Females of *M. bivittatus* differ in having an epigynum with a large anterior atrium, short median septum, and short copulation ducts (Figs 11, 12).

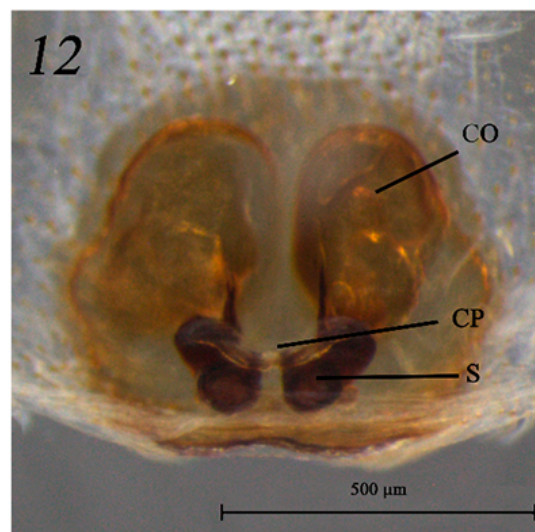
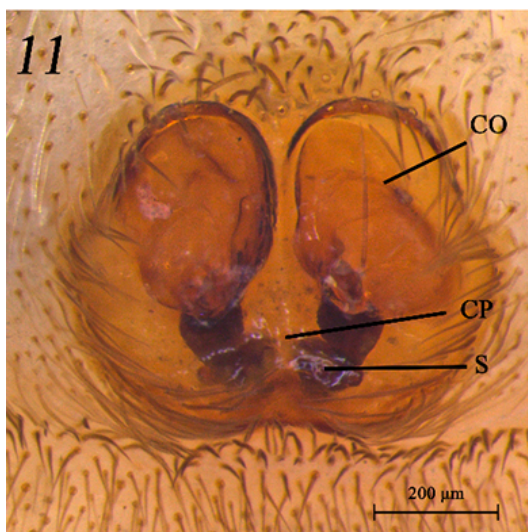
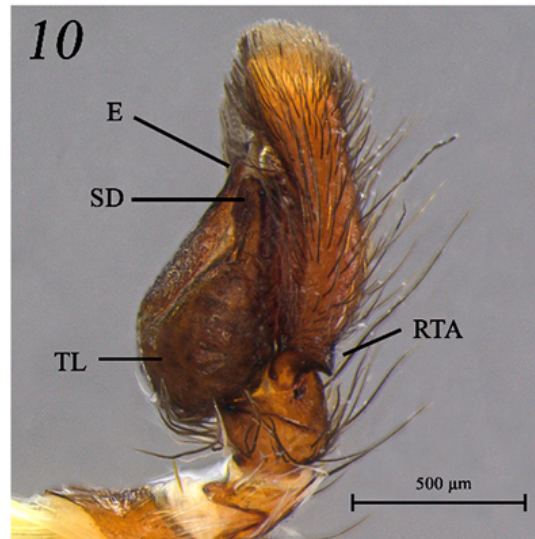
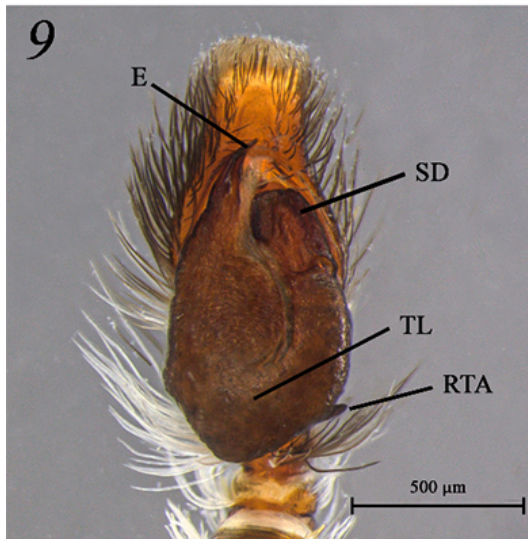
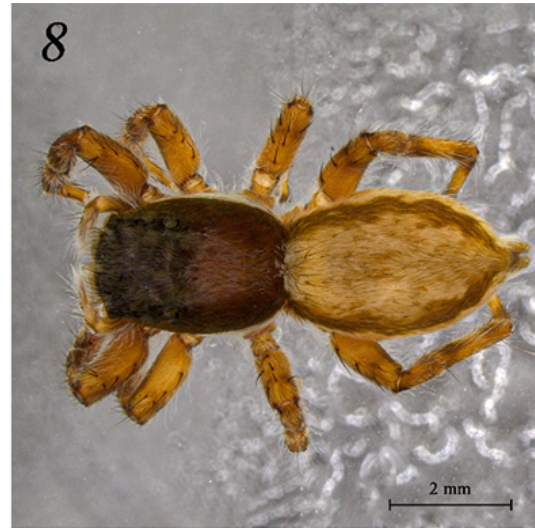
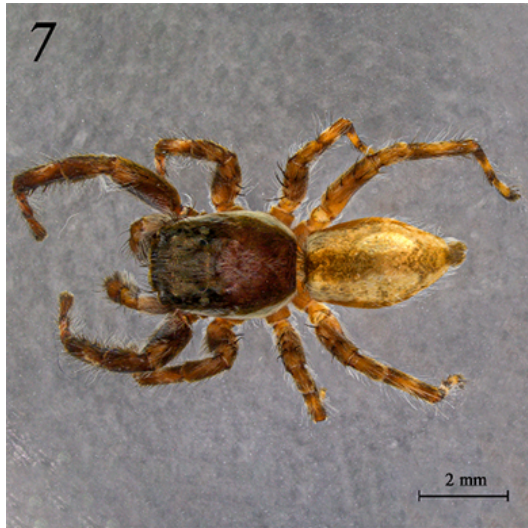
**Records in the World.** *Menemerus bivittatus* is an African species introduced by anthropic action in southern Europe, China, Taiwan, Japan, Australia, Pacific islands, and the Americas (WORLD SPIDER CATALOG, 2022).

**Natural history.** The species was popularly named “Saltique à deux raies” (Jumping-spider-two-stripes) (DUFOUR, 1831), and is a synanthropic and cosmopolitan species (WESOŁOWSKA, 1999; RICHARDSON, 2016). Records in Brazilian zoological collections (Fig. 32) indicate that the species occurs only in urban environments, with 83 records in buildings (e.g. sheds, churches, and other commercial

constructions, etc.), fourteen registered in walls, twelve in tree trunks, and seven in beehives (Tab. I).

In their natural environment, they prefer tree trunks (PENNEY & GABRIEL, 2009), feeding on flies, ants, and spiders (MONDAL *et al.*, 2020), but have preference by preying on Meliponini (stingless bees) individuals (PENNEY & GABRIEL, 2009). In Brazil, *M. bivittatus* was recorded preying on pupae of *Camponotus crassus* Mayr, 1862 (Carpenter ants) that were being transported by the ants (HALFELD, 2015).

**Material examined.** BRASIL, **Acre:** Rio Branco, Seringal Catuaba, BR-364, Km 20 (10°06'21"S; 67°37'21"W), ♀, II.1988, E. H. Buckup col. (MCN 17355); **Amazonas:** Manaus, Rio Solimões (02°59'44"S; 60°04'44"W), ♂ 2♀, 16–17.XII.1987, M. A. L. Marques col. (MCN 17303); Borba, Rio Mapiá (04°23'36"S; 59°35'38"W), ♀, 22.IV.1996, Equipe IBSP/SMNK col. (IBSP 15997); Humaitá (07°30'22"S; 63°01'14,9"W), ♂, 21.II.1978, U. Caramaschi col. (MZSP 63070); ♂, 21.II.1978, U. Caramaschi col. (MZSP 60799); **Pará:** Belém, Curió Utinga (01°26'28.7"S; 48°24'46.2"W), 2♀, 04.IV.2006, L. S. Carvalho, col. (MPEG 003927); 5♂, 28.V.2006, L. S. Carvalho, col. (MPEG 003936); Bairro Terra Firme (01°25'37"S; 48°27'23"W), 3♀, 28.I.2009 (MPEG 033366); ♀, 11.III.2009 (MPEG 033372) all collected by B. V. B. Rodrigues; Bairro Marco (01°25'35"S; 48°27'48"W), ♀, 27.II.2009 (MPEG 033368); ♀, 11.III.2009 (MPEG 033369); ♀, 12.III.2009, (MPEG 033371); ♀, 12.III.2009 (MPEG 033367), all collected by B. V. B. Rodrigues; Bairro Sacramento (01°25'25"S; 48°27'54"W), ♂, 27.II.2009 (MPEG 033365); 2♀, 10.III.2009 (MPEG 033373); 2♀, 11.III.2009 (MPEG 033370), all collected by B. V. B. Rodrigues; Uruará (03°43'14"S; 53°44'13"W), ♀, 2015, R. L. Caraiba col. (IBSP 230897); Belterra, (03°14'52"S; 55°00'59"W), ♀, 2009–2010, L. Chagas col. (IBSP 258435); ♂, 2♀, 1 juv., 04–06.V.2014, A. D. Brescovit col. (IBSP 217301); ♂, 17.VIII.2019, A. D. Brescovit col. (IBSP 242726); **Piauí:** Piri-piri, Olho D'Água Jagata (04°16'32"S; 42°12'13"W), ♂, 19.IV.2014, T. G. Pinheiro & E. S. Martins col. (IBSP 220318); **Rio Grande do Norte:** Atol das Rocas (03°51'53"S; 33°48'16"W), 4♂, 3♀, 01.IX.1996, C. E. Almeida col. (IBSP 26523); Natal (05°47'42"S; 35°12'34"W), ♂, XII.1990, PETROBRÁS col. (IBSP 4898); **Paraíba:** Bananeiras, (06°41'38"S; 35°36'15"W), ♂, no date, B. Pickel col. (MNRJ 01008); Campina Grande (07°14'34"S; 35°54'05"W), 1 juv., no date, T. Leitão col. (MNRJ 01013); **Pernambuco:** Arquipélago de Fernando de Noronha (03°51'07"S; 32°26'01"W), ♂, 9–19.X.2005 (IBSP 70345); 2♂, 2♀, 9–19.X.2005 (IBSP 70343); ♀, 17.IV.2006 (IBSP 70347); 2♀, 17.IV.2006 (IBSP 70344) all collected by G. C. C. Freitas col.; 2♀, 20.VI.2010, V.Q.P. col. (IBSP 220041); ♀, 24.V.2010, V. Q. P. col. (IBSP 220045); Moreno, Bonança (08°06'41"S; 35°11'52"W), ♂, no date, B. Pickel col. (MNRJ 01010); Custódia (08°08'51"S; 37°42'09"W), ♂, 2 juv., no date, R. V. Ihering col. (MNRJ 01161); **Tocantins:** Araguaína (07°12'39"S; 48°13'02"W), ♀, 20.IX.2014, K. E. Castelo col. (IBSP 237253); São João (07°11'40"S; 48°11'51"W), ♀, 10.II.2016, K. S. Parcco col. (IBSP 237276); Araguaína, Cimba (07°11'28"S; 48°12'08"W), ♀, 09.VII.2014, S. Barros col. (IBSP 237266); ♀, 25.IX.2014, C. Pereira col. (IBSP 237238); **Alagoas:** Maceió (09°35'40"S; 35°41'12"W), ♂, ♀, 01.III.2003, D. Candiani & N. L. Hung col. (IBSP 41066); Couriipe, (10°07'30"S; 36°10'32"W), ♂, 09.I.2010, V. Q. P. col. (IBSP 160872); **Sergipe:** São Cristóvão, Campus UFSE (10°55'35"S; 07°06'09"W), ♀ juv., no date, Equipe UFSe col. (IBSP 10387); **Mato Grosso:** Canarana, (13°11'33"S; 52°14'27"W), ♀, 16.XII.2000–10.I.2001, C. Q. Falatti & R. A. K. Ribeiro col. (IBSP 27107); **Bahia:** "S; 38°21'54"W), ♀, 25.II.2003, L. Almeida col. (IBSP 39896); Jequié (13°52'04"S; 40°04'49"W), ♂, 21–23.XI.2006, A. D. Brescovit col. (IBSP 70992); **Goiás:** Aragarças, Rio Araguaia (22°43'26"S; 47°17'26"W), ♀, 15–22.IX.1946, H. Sick col. (MZSP 1285); **Minas Gerais:** Marliéria, Parque Estadual do Rio Doce (19°42'58.62"S; 42°44'1.69"W), ♀, 2.IX.2003, T. Rodrigues *et al.* col. (UFMG 11453); Belo Horizonte (19°55'15"S; 43°56'16"W), ♂, ♀, 1 juv., 23.IX.1994, M. O. Gonzaga col. (IBSP 26337); 26♂, 30♀ 2 juv., III–IV.1995, A. J. Santos, M. O. Gonzaga & G. F. Dutra col. (IBSP 26705); 7♂ 7♀, III–IV.1995, A. J. Santos, M. O. Gonzaga & G. F. Dutra col. (IBSP 37484);



Figs 7–12. *Menemerus bivittatus* (Dufour, 1831) (7, 9, 10: ♂, 8, 11, 12: ♀). Figs 7, 8, habitus, dorsal view; 9, palp, ventral view; 10, palp, retrolateral view; 11, epigynum, ventral view; 12, epigynum, dorsal view (CO, copulatory opening; CP, central pocket; E, embolus; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; TL, tegular lobe).



- Bairro Coração Eucarístico, Campus da PUCMG (19°55'15.39"S; 43°59'33.12"W), ♀, 8.III.2004, D. P. Araújo col. (UFMG 1568); Caxambu (21°59'32"S; 44°57'11"W), 1 juv., no date, C. F. de Mello-Leitão col. (MNRJ 01166); Inconfidentes (22°18'47"S; 46°19'50"W), ♂, ♀, IV–IX.2014, M. M. Souza col., (UFMG 17458); **Mato Grosso do Sul:** Paranaíba (19°40'38"S; 51°11'27"W), ♀, 1983, R. R. Silva col. (IBSP 6776); Corumbá, Passo da Lontra, Base de Estudos UFMS, Pantanal (19°34'36"S; 57°01'09"W), ♀, 22.V.1993, J. Raizer col. (IBSP 20546); Brasília, Usina Hidrelétrica Engenheiro Sérgio Motta (21°15'47"S; 52°02'19"W), ♂, 2000, D. F. Candiani & C. A. R. Souza col. (IBSP 35245); Ivinhema, (22°18'07"S; 53°49'40"W), ♀, 2011–2012, D. Araújo col. (IBSP 168255); ♂, 4 ♀, 2012, D. Araújo col. (IBSP 168298); Bela Vista, (22°06'32"S; 56°31'16"W), ♂, 13.II.1995, R. S. Bernilz col. (IBSP 6267); Santa Rita do Pardo, Usina Hidrelétrica de Engenheiro Sérgio Motta (21°18'08"S; 52°49'40"W), 1 ♂, 4 ♀, 09–10.V.2001, R. P. Indicatti & J. Império col. (IBSP 53308); **Espírito Santo:** Colatina, (19°31'00"S; 40°39'08"W), ♀, 19.I.2015, T. Pessoa col. (IBSP 210086); São Mateus, Reserva Florestal da Companhia Vale do Rio Doce (19°09'04"S; 40°04'36"W), ♂, 05–12.I.1998, A. D. Brescovit *et al.* col. (IBSP16902); Ilha da Trindade (20°31'29"S; 29°19'29"W), 5 ♂ 6 ♀, XII.1965, J. Becker col. (MNRJ 02923); ♀, 04.V.2010, R. J. Alves col. (IBSP 250264); 2 ♀, 04.V.2010, R. J. Alves col. (IBSP 250268); **Rio de Janeiro:** Rio de Janeiro, Museu Nacional (22°54'20"S; 43°13'35"W), ♀, 22.XI.1961, H. Cunha col. (MNRJ 02807); Campus UFRJ, Prédio Centro de Ciências da Saúde (22°50'31"S; 43°14'04"W), ♀, 23.IX.2010, A. M. Giroti col. (IBSP 167304); **São Paulo:** São José do Rio Preto (20°47'41"S; 49°21'33"W), ♂, 11.XI.2001, G. R. S. Ruiz col. (MZSP 72756); ♂, XII.2001, G. R. S. Ruiz col. (MZSP 72755); Águas da Prata (21°56'12"S; 46°43'00"W), ♂, 10–15.I.1999, V. C. Onófrío col. (IBSP 20787); ♀, 13–19.II.1999, V. C. Onófrío col. (IBSP 22014); Tupã, (21°57'27"S; 46°54'09"W), 2 ♂ 3 ♀, I.2002, G. R. S. Ruiz col. (MZSP 72754); Arco-Íris (21°46'10"S; 50°25'22"W), ♀, 10.XI.2002, G. R. S. Ruiz col. (MZSP 72753); Presidente Epitácio (21°46'29"S; 52°06'45"W), 4 ♂, ♀, 20–25.III.2001, J. P. Guadanucci & R. Bertani col. (IBSP 53233); Águas de Lindóia (22°28'35"S; 46°43'00"W), ♂, 23–25.I.1999, M. P. Castro col. (IBSP 20646); Monte Alegre do Sul, Fazenda Santa Maria (22°41'07"S; 46°40'51"W), ♀, 27–31.XII.1942, B. A. M. Soares col. (MZSP 14446); Americana (22°43'26"S; 47°17'26"W), ♂, 03.VII.1944, R. Eller col. (MZSP 5478); 1 ♂, 03.VII.1944, R. Eller col. (MZSP 5480); Botucatu, Fazenda Lageado (22°50'17"S; 48°32'44"W), ♀, 08.VI.2003, E. F. Santos & C. R. S. Santos col. (IBSP 39666); Paraguaçu Paulista (22°24'46"S; 50°34'33"W), ♀, III.1995, B. S. A. Mourad col. (IBSP 6070); Primavera (22°31'41"S; 52°56'53"W), ♂ (IBSP 53061); ♀ (IBSP 53110); ♀ (IBSP 53144) all collected on 2001 by Equipe IBSP col.; 12 ♂, 9 ♀, II.2001, D. F. Candiani & R. P. Indicatti col. (IBSP 53431); Carapicuíba (23°31'21"S; 46°50'08"W), ♂, ♀, 20.III.1996, L. C. Silva col. (IBSP 14373); Embu das Artes (23°38'56"S; 46°51'08"W), ♂, 23.X.1990, R. Eimerly col. (IBSP 11728); Francisco Morato (23°16'54"S; 46°44'43"W), ♀, 11.VII.1977, B. R. Reis col. (IBSP 19868); Pirituba (23°28'44"S; 46°44'30"W), ♂, ♀, 05.VII.2012, P. Fecchio col. (IBSP 211717); Santana de Parnaíba (23°26'39"S; 46°55'04"W), ♂, 21.I.1978, F. Santos col. (IBSP 19707); São Bernardo do Campo (23°41'38"S; 46°33'54"W), ♂, 27.III.1989, E. G. Castro col. (IBSP 20288); ♀, 06.I.2010, V. Q. P. col. (IBSP 160867); ♂, 09.I.2010, V. Q. P. col. (IBSP 160880); ♂, 13.I.2010, V. Q. P. col. (IBSP 160874); ♂, 13.I.2010, V. Q. P. col. (IBSP 160877); ♂, 18.I.2010, V. Q. P. col. (IBSP 160879); ♀, 25.I.2010, V. Q. P. col. (IBSP 160875); ♂, 25.I.2010, V. Q. P. col. (IBSP 160886); São Paulo (23°32'51"S; 46°38'10"W), ♀, M. L. Pereira col., 1941 (MZSP 9246); ♂, 16.XII.1997, A. D. Brescovit col. (IBSP 15358); Ijuv., 1999, A. D. Brescovit col. (IBSP 27887); ♀, 06.IV.1999, F. S. Cunha col. (IBSP 34230); ♀, 06.IV.1999, D. F. Candiani col. (IBSP 34231); ♂, no date, D. F. Candiani col. (IBSP 35795); Bairro Butantã (23°33'50"S; 46°43'31"W), ♀, 17.XII.1999, D. F. Candiani col. (IBSP 34197); 2 ♀, 02.V.2000, F. S. Cunha col. (IBSP 34199); ♀, 04.V.2000, F. S. Cunha col. (IBSP 34201); ♀, 16.XI.2000, J. Império col. (IBSP 34204); ♀, 21.XI.2000, J. Império col. (IBSP 34202); 2 ♂ 2 ♀, 23.XI.2000, J. Império col. (IBSP 34203); ♂, 14.II.2001, R. P. Indicatti col. (IBSP 34198); ♂, ♀, 14.II.2001, M. S. Sebastião col. (IBSP34200); Vila São Francisco (23°33'50"S; 46°43'31"W), ♂, 16.XII.1999, F. S. Cunha col. (IBSP 34234); Campus USP (23°33'41"S; 46°43'50"W), ♂, 16.XII.1999, F. S. Cunha col. (IBSP 34209); ♂, 24.X.2000, F. S. Cunha col. (IBSP 34211); ♀, 24.X.2000, F. S. Cunha col. (IBSP 34212); ♂, 20.XII.1999, R. P. Indicatti col. (IBSP 34213); 2 ♀, 20.I.2000, D. F. Candiani col. (IBSP 34215); ♀, 21.I.2000, D. F. Candiani col. (IBSP 34214); ♂, 06.XII.2001, M. S. Sebastião col. (IBSP 34210); 3 ♂, 20.V.2003, C. D. Barron col. (IBSP 131542); ♂ (IBSP 239786); ♀, juv. (IBSP 239830); ♂ (IBSP 239836); ♀ (IBSP 239838); ♀ (IBSP 239843) all collected on XI.2013 by S. D. Hilário col.; Campus USP, Reserva Florestal da CUASO (23°33'49"S 46°43'15"W), ♀, 04.VIII.1999, D. F. Candiani col. (IBSP 34228); Bairro Caxingui (23°34'56"S; 46°43'08"W), 2 ♀, 14.VI.1999, M. S. Sebastião col. (IBSP 34232); ♀, 14.VI.1999, M. S. Sebastião col. (IBSP 34233); ♂, 16.VI.1999, F. S. Cunha col. (IBSP 33438); Campus Instituto Butantan (23°34'03"S; 46°43'07"W), ♀, 20.II.1997, A. D. Brescovit col. (IBSP 13946); ♂, 10.XI.2000, A. D. Brescovit col. (IBSP 26837); ♂, 21.XII.1998, F. S. Cunha col. (IBSP 20866); ♂, 25.XII.2002, F. S. Cunha col. (IBSP 37322); Jardim Bonfiglioli (23°34'50"S; 46°44'15"W), ♂, ♀, 20.VII.1999, D. F. Candiani col. (IBSP 34208); ♂, 21.VII.1999, D. F. Candiani col. (IBSP 34205); ♂, 21.VII.1999, D. F. Candiani col. (IBSP 34206); ♀, 21.VII.1999, R. P. Indicatti col. (IBSP 34207); Jardim Rizzo (23°34'45"S; 46°43'51"W), ♀, 09.XI.1998, A. D. Brescovit col. (IBSP 20648); ♂, 4 ♀, 3 juv., 09.XI.1998, A. D. Brescovit col. (IBSP 20683); ♂, 09.XI.1998, M. P. Castro col. (IBSP 20658); ♀, 02.II.1999, M. P. Castro col. (IBSP 21408); ♂, ♀, 02.II.1999, H. F. Japyassu col. (IBSP 21422); ♂, 02.II.1999, M. P. Castro & F. S. Cunha col. (IBSP 28782); ♂, 14.IV.2000, F. S. Cunha col. (IBSP 34225); ♂, 14.IV.2000, J. Império col. (IBSP 34226); ♀, 15.IV.2000, J. Império col. (IBSP 34227); Vila Pirajussara (23°34'19"S; 46°42'58"W), ♀, 20.I.2000, D. F. Candiani col. (IBSP 34216); ♂, 20.I.2000, F. S. Cunha col. (IBSP 34217); ♀ (IBSP 34222); ♀ (IBSP 34223); ♂, 2 ♀ (IBSP 34224) all collected on 01.VIII.2000 by F. S. Cunha; ♀, 01.VIII.2000, J. Império col. (IBSP 34221); ♂, 26.X.2000, J. Império col. (IBSP 34218); ♀, 26.X.2000, M. S. Sebastião col. (IBSP 34219); Ipiranga (23°35'03"S; 46°36'07"W), ♂, 15.V.1945, T. Meissner col. (MZSP 5479); Jardim Caravelas (23°38'20"S; 46°42'59"W), ♀, XII.2006, C. G. Peixoto col. (IBSP 72051); Instituto de Previdência, Parque da Previdência (23°34'47"S; 46°43'36"W), ♀, 15.V.2001, R. P. Indicatti col. (IBSP 39678); ♂, 20.IV.2001, R. P. Indicatti col. (IBSP 39677); ♂, 20.IV.2001, R. P. Indicatti col. (IBSP 39683); Suzano, SABESP (23°33'03"S; 46°18'58"W), ♂, 08.III.2005, D. Polotow col. (IBSP 51608); Promissão, Rodovia BR-153, Km 39 (23°17'22"S; 50°03'39"W), ♂, ♀, VI–VII.2001, no collector (IBSP 28432); Guarulhos (23°26'39"S; 46°27'55"W), ♀, 12.XII.1941, F. S. Pereira col. (MZSP 10764); Itatinga, Lobo (22°58'00.0"S; 48°44'50.0"W), ♂, 09.I.1982, Soares col. (MZSP 60801); Botucatu, Jardim Botânico, UNESP (22°53'08.0"S; 48°26'42.0"W), ♂, 1.IX.1982, Soares col. (MZSP 63068); Presidente Epitácio, Usina Hidrelétrica Engenheiro Sérgio Motta, Ilha da Lagoa do Machado (21°39'36"S; 52°01'24"W), ♀, 30.III.2001, R. P. Indicatti & C. A. R. Souza col. (IBSP 38391); **Paraná:** Morretes, Parque Estadual Pico do Marumbi (25°26'43"S; 48°54'58"W), ♀, 28.IV–25.VIII.1996, J. A. Caetano col. (IBSP 7330); ♂, 28.IV–25.VIII.1996, J. A. Caetano col. (IBSP 7331); **Santa Catarina:** Blumenau (26°55'10"S; 49°03'58"W), 2 ♀, 08–10.IX.1966, H. Riehm col. (IBSP 8238); ♀, XI.1924, H. Luederwaldt col. (MZSP 9245); **Rio Grande do Sul:** Santa Maria, (29°46'39"S; 53°49'28"W), ♂, 6 ♀, 09.V.1973, no collector (MCN 1676); 2 ♂, 2 ♀, I–VI.1982, no collector (MCN 12012); Porto Alegre (30°06'31"S; 51°10'37"W), ♀, 19.V.1973, no col. (MCN 3580); ♂, 24.II.1989, M. A. L. Marques col. (MCN 18414); Vila Cruzeiro (30°03'12"S; 51°10'08"W), ♂, 12.IX.1986, M. A. L. Marques col. (MCN 16696); ♀, 15.IX.1986, M. A. L. Marques col. (MCN 16695); Viamão (30°05'51"S; 51°00'54"W), 2 ♂, 2 ♀, 15.III.1987, M. A. L. Marques col. (MCN 16765); Pelotas (31°34'05"S; 52°17'09"W), ♀, 12.I.2002, E. H. Buckup col. (MCN 34367); ♀, 05.V.2002, E. H. Buckup col. (MCN 34369); 2 ♂, 06.V.2002, E. H. Buckup col. (MCN 34368).

**Menemerus nigli Wesolowska & Freudenschuss, 2012**

(Figs 13–18; 34)

*Menemerus nigli* WESOLOWSKA & FREUDENSCHUSS, 2012: 449, figs 1–6.

Diagnosis, *Menemerus nigli* differs from *M. bivittatus* by presenting a white marginal stripe, however thinner and does not extend to the abdomen (Figs 13, 14). Males have a marked curvature of the embolus in the palp (Figs 15, 16) and females have a pyramid-shaped epigynum, with a shorter anterior atrium, and a short median septum (Figs 17, 18).

Records in the World. *Menemerus nigli* is a newly described species originally from Pakistan; its distribution extends to India and Thailand (WORLD SPIDER CATALOG, 2022), and was recently registered in Brazil (MARIANTE & HILL, 2020) (Fig. 34).

Natural history. In its natural habitat the species is found under rocks (CHATTERJEE *et al.*, 2017), but in urban areas, it is found inside buildings, external walls, and stucco (MARIANTE & HILL, 2020).

Material examined. BRAZIL, **Rio de Janeiro**: Rio de Janeiro, Bairro de Manguinhos, campus of Instituto Oswaldo Cruz (22°52'19.7"S; 43°14'54.2"W), ♂, ♀, (UFRJ 1634); ♂, ♀ (UFRJ 1636); all collected on II.2020; ♂, ♀ (IBSP 282916); ♀, 1 juv. (IBSP 282916) all collected on VII.2021 by R. M. Mariante col.

### *Hasarius adansoni* (Audouin, 1826)

(Figs 19–24; 33)

*Attus adansonii* AUDOUIN, 1826:404, plate 7, fig. 8.

*Plexippus adansoni*: SIMON, 1868:644, plate 2, fig. 12; plates 3, fig. 3.

*Hasarius adansoni*: SIMON, 1871:330.

(Check other synonyms in WORLD SPIDER CATALOG, 2022).

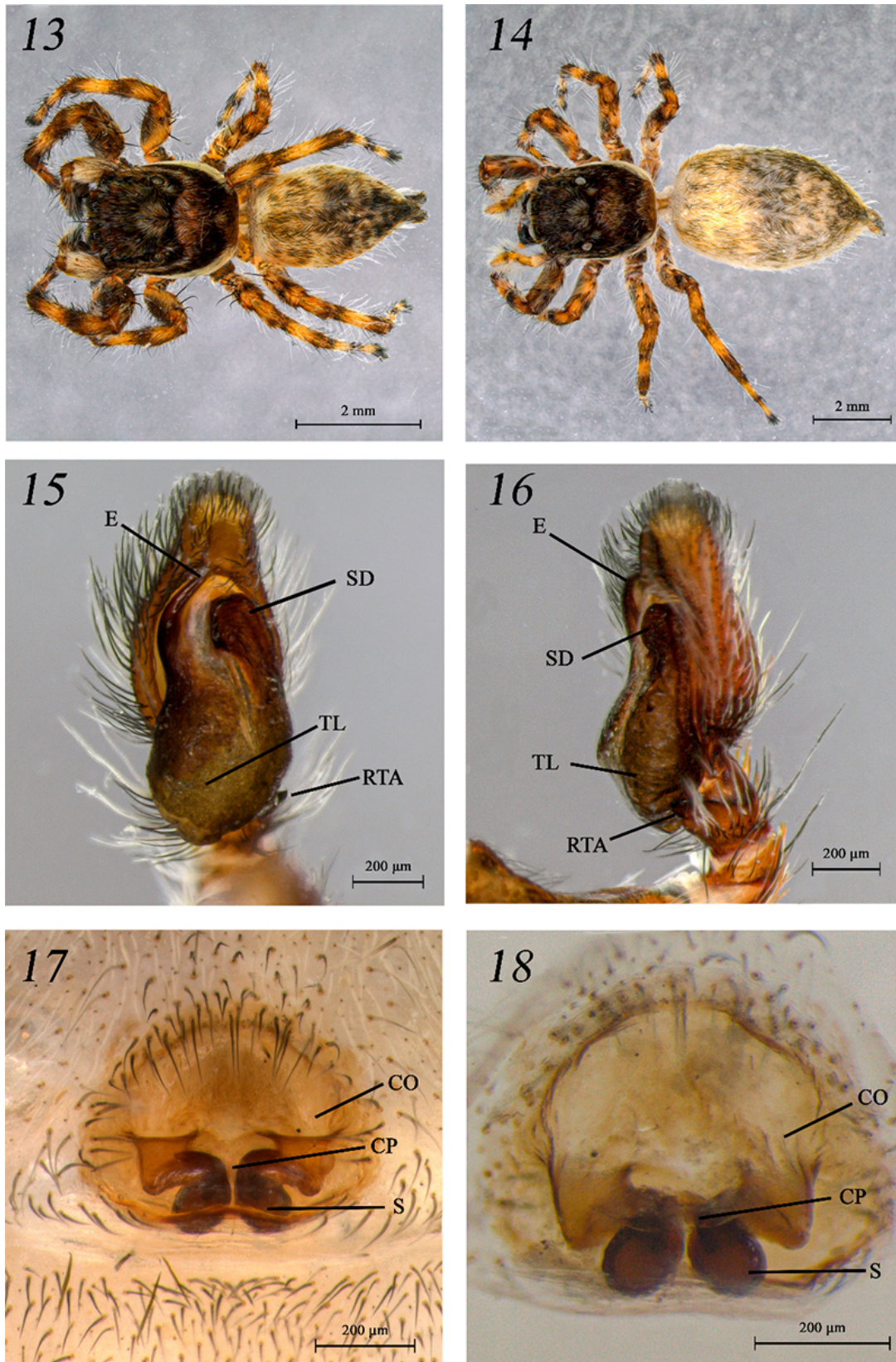
Diagnosis. *Hasarius adansoni* differs from other synanthropic exotic Salticidae species in that it has a white arc-shaped band on the posterior area of the cephalothorax and three clear spots on the abdomen, one on the anterior part of the arc-shaped abdomen and two spots on the dorsal part (Figs 19, 20). In the frontal view of the tegulum, the spermatid duct presents a curvature, with the convex side up. Short, robust, triangular-shaped embolus (Figs 21, 22). The female differs from the other species in having a simple and small epigynum, with sclerotized copulatory openings (Figs 23, 24).

Records in the World. *Hasarius adansoni* is a species native to Africa and the Middle East and has been introduced in Europe, India, Laos, Vietnam, China, Taiwan, Japan, Australia, the Pacific Islands, and the Americas (WORLD SPIDER CATALOG, 2022).

Natural history. Records in Brazilian zoological collections (Fig. 33) indicate that in Brazil the species occurs in an urban environment, being 132 records in urban regions, of these, 68 records in housing and 42 records in other buildings (e.g. sheds and other commercial constructions, etc.) (Tab. I). In the literature, the species is found on external walls, gardens, buildings, shrubs, and around forests (CLARK & BENOIT, 1977; MONDAL *et al.*, 2020), where they deposit their cream-colored eggsac and build shelters up to twice their size (MONDAL *et al.*, 2020).

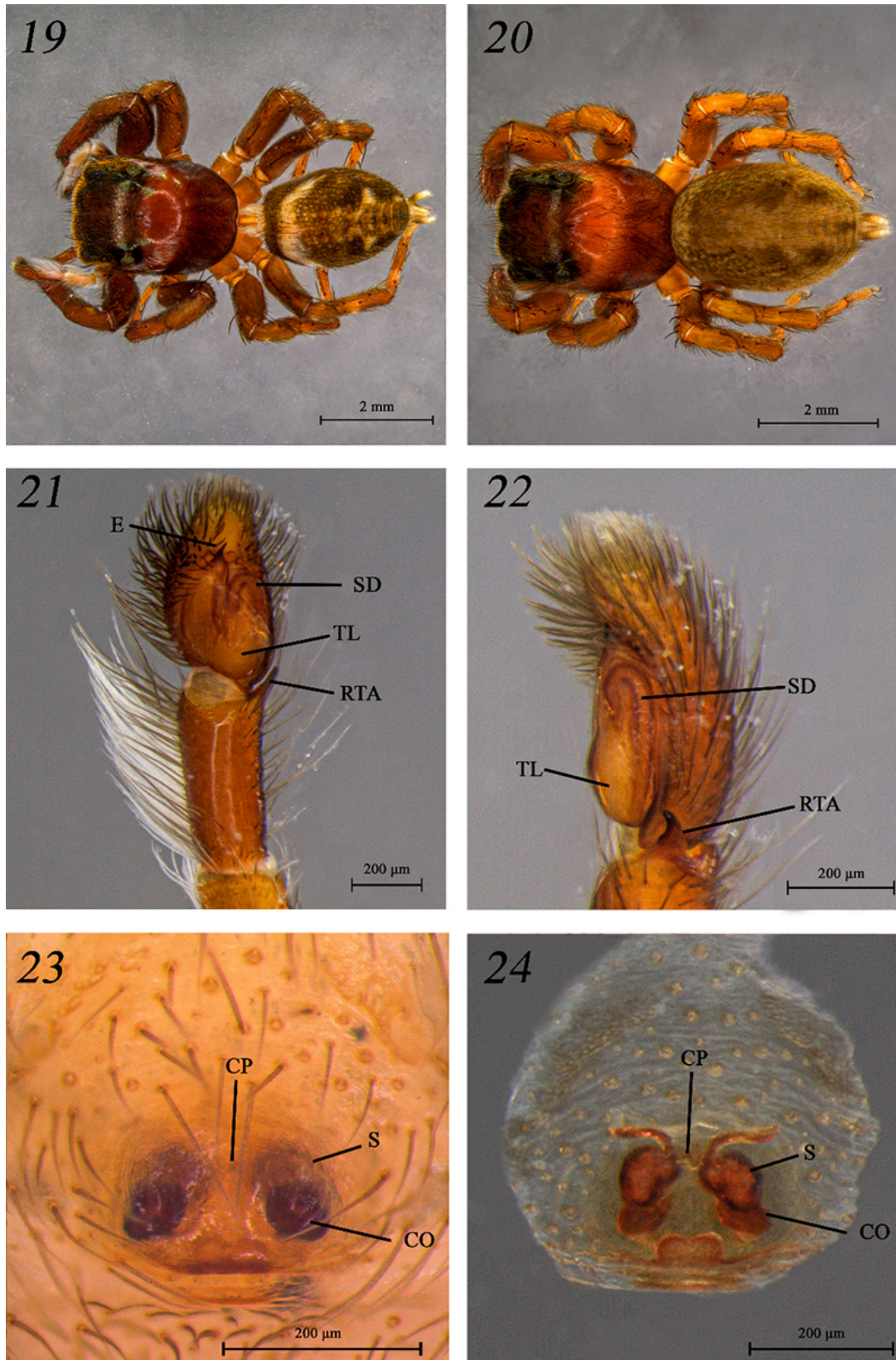
Material examinado. BRAZIL, **Pará**: Ilha de Marajó, Soure (00°42'57"S; 48°31'02"W), 2♂ 6♀, 27–28.IX.2016, A. D. Brescovit & A. B. Bonaldo col. (IBSP 210849); Belém (01°20'28"S; 48°27'01"W), ♀, 11.III.2005, A. D. Brescovit col. (IBSP 51221); ♂, 11.III.2005, A. D. Brescovit col. (IBSP 123925); Conjunto Santos Dumont (01°25'05"S; 48°27'57"W), ♂, 11.II.2009, B. V. B. Rodrigues col. (MPEG 033359); Curió Utinga (01°26'28.7"S; 48°24'46.2"W), ♂, 4♀, no date, B. V. B. Rodrigues col. (MPEG 033361); ♂, 04.IV.2006, L. S. Carvalho col. (MPEG 003929); ♀, 04.IV.2006, L. S. Carvalho col. (MPEG 003930); IAN – Instituto Agrônomico de Norte (01°26'09"S; 48°26'57"W), ♂, 15.XI.1951, P. Ledoux col. (IBSP 590); Campus Museu Paraense Emílio Goeldi (01°27'4.44"S; 48°26'39.32"W), ♂, 18.VI.2001, D. Santos–Souza col. (MPEG 004906); ♀, 20.VII.2004, L. T. Miglio col. (MPEG 002508); ♀, 30.VIII.2005, L. T. Miglio col. (MPEG 004784); ♂, 09.II.2006, L. S. Carvalho col. (MPEG 002525); ♀, 25.III.2006, A. D. Brescovit col. (MPEG 002528); ♀, 01.VIII.2015, P. Pantoja, L. F. Serrão, S. Bendelak & C. Xavier col. (MPEG 034080); Campina (01°28'18"S; 48°28'37"W), 2♂, 11.III.2009, B. V. B. Rodrigues col. (MPEG 033363); 2♀, 11.III.2009, B. V. B. Rodrigues col. (MPEG 033364); São Brás (01°25'43"S; 48°27'28"W), 2♀, 28.I.2009 (MPEG 033360); ♀, 10.III.2009 (MPEG 033362); ♀, 11.III.2009 (MPEG 033358), all collected by B. V. B. Rodrigues; Campus da Universidade Federal do Pará (01°28'S; 48°27'W), ♀, 16.VII.2002, L. T. Miglio col., (MPEG 011205); Melgaço, Estação Científica Ferreira Penna, Flona Caxiuanã (01°44'18.02"S; 51°27'48.01"W), ♀, 06.VII.2002, Rosimeire col. (MPEG 025618); Belterra (03°14'52"S; 55°00'59"W), ♂, 26–29.X.2009, Equipe IBSP col. (IBSP 217293); 2♂ 6♀, V.2010, A. D. Brescovit *et al.* col. (IBSP 217036); ♀, VII.2018, A. D. Brescovit *et al.* col. (IBSP 222753); ♀, IV.2012, A. D. Brescovit col. (IBSP 217458); **Maranhão**: São Luis (02°31'47"S; 43°56'26"W), ♂, ♀, VIII.1985, W. E. Kerr col. (IBSP 4413); **Piauí**: Campo Maior (04°49'48"S; 42°10'23"W), ♀, 15.V.2013, T. G. Pinheiros col. (IBSP 229336); ♀, 18.IX.2012, T. G. Pinheiros col. (IBSP 229346); **Rio Grande do Norte**: Atol das Rocas (03°51'53"S; 33°48'16"W), ♂, ♀, 01.IX.1996, C. E. Almeida col. (IBSP 26518); ♂, 6♀, 04.IX.1996, C. E. Almeida col. (IBSP 12051); **Paraíba**: Bananeiras, (06°41'38"S; 35°36'16"W), ♂, no date, B. Pickel col. (MNRJ 01090); **Pernambuco**: Arquipélago de Fernando de Noronha (03°51'07"S; 32°26'01"W), ♂ (IBSP 70340); ♀ (IBSP 70342); 2♀ (IBSP 70356) all collected on 9–19.X.2005 by G. C. C. Freitas col.; ♂, 7–17.V.2006, G. C. C. Freitas col. (IBSP 70341); Bananeiras (6°41'38"S; 5°36'15"W), ♀, no date, B. Pickel col. (MNRJ 01954); Olinda (08°00'32"S; 34°51'19"W), 2♂, ♀, 1963, A. E. Coelho col. (IBSP 28013); Moreno, Bonança (08°06'41"S; 35°11'52"W), ♂, no date, B. Pickel col. (MNRJ 01089); Garanhuns (08°56'11"S; 36°30'06"W), ♂, 7♀, 16.XI.2007, A. D. Brescovit col. (IBSP 88482); **Tocantins**: Brejinho do Nazaré, (11°00'51"S; 48°33'50"W), ♂, ♀, 28.X–04.XI.2001, I. Knysak & R. Martins col. (IBSP 159682); 2♀, 28.X–04.XI.2001, I. Knysak & R. Martins col. (IBSP 159688); **Sergipe**: Aracajú, Areia Branca (10°47'11"S; 37°19'32"W), ♀, 05.I.2002, no collector (IBSP 36339); São Cristóvão, Campus UFSE (10°55'35"S; 37°06'09"W), ♀, no date, Equipe UFSe col. (IBSP 10364); **Mato Grosso**: Nova Mutum (14°13'8"S; 56°01'46"W), 3♂, ♀, 15.II.2000, L. S. Rocha col. (IBSP 26519); Cuiabá, Bairro CPA III (15°34'06"S; 56°02'43"W), ♀, 26.II.2012, T. G. Pinheiro col. (IBSP 250477); Bairro Centro (16°04'14"S; 57°41'11"W), ♀, 12.VIII.2004 (IBSP 70930); Bairro Jardim Guanabara (16°05'33"S; 57°39'43"W), ♂, 30.II.2004 (IBSP 70896); Bairro Jardim Padre Paulo (16°03'01"S; 57°39'10"W), ♂, 30.III.2004, (IBSP 70628); ♀, 30.III.2004, (IBSP 70890); ♂, 20.V.2004 (IBSP 70922); ♀, 18.VIII.2004 (IBSP 70931); ♂, 18.XI.2004 (IBSP 70904); ♀, 18.II.2005 (IBSP 70915); Bairro Jardim Paraíso (16°04'54"S; 57°42'10"W), ♀, 17.XI.2004 (IBSP 70909), all collected by N. M. Rocha; **Bahia**: Salvador (12°52'31"S; 38°30'06"W), ♀ (IBSP 58314); 2♀ (IBSP 58315); ♂ (IBSP 58323) all collected on 13–24.IX.2005 by L. Almeida; Parque Municipal de Pituauçu (12°57'40"S; 38°25'18"W), ♂, 27.III–02.IV.2012, M. Martina & M. Peres col. (IBSP 244437); Jequié (13°52'04"S; 40°04'49"W), ♂, 21–23.XI.2006, A. D. Brescovit col. (IBSP 70993); Barragem da Pedra (13°52'12.8"S; 40°14'16.5"W), ♂, ♀, 4.XII.2010, G. H. F. Azevedo *et al.* col. (UFMG 16745); Vale Jequitinhonha, 2♂, 24.IV.1998, A. D. Brescovit *et al.* col. (IBSP 19488); **Goiás**: Pirenópolis, Fazenda Babilônia (15°58'48"S; 49°05'40"W), ♂, 2♀, V.2011, A. G. Cristóvão col. (IBSP 169310); Morrinhos, Fazenda Recanto do Jatobá (17°48'00"S; 49°08'16"W), ♂,





Figs 13–18. *Menemerus nigli* Wesolowska & Freudenschuss, 2012 (13, 15, 16: ♂; 14, 17, 18: ♀). Figs 13, 14, habitus, dorsal view; 15, palp, ventral view; 16, palp, retrolateral view; 17, epigynum, ventral view; 18, epigynum, dorsal view (CO, copulatory opening; CP, central pocket; E, embolus; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; TL, tegular lobe).





Figs 19–24. *Hasarius adansoni* (Audouin, 1826) (19, 21, 22: ♂; 20, 23, 24: ♀). Figs 19, 20, habitus, dorsal view; 21, palp, ventral view; 22, palp, retrolateral view; 23, epigynum, ventral view; 24, epigynum, dorsal view (CO, copulatory opening; CP, central pocket; E, embolus; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; TL, tegular lobe).



- 2009, W. C. R. Pinho col. (IBSP 233176); Jataí, Fazenda Aceiro (17°54'12"S; 51°43'51"W), ♂, X.1962, Expedição do Museu de Zoologia col. (MZSP 2835); **Minas Gerais:** Montes Claros (16°43'41"S; 43°51'03"W), ♂, 2003, G. L. B. Leite col. (IBSP 42986); Belo Horizonte (19°55'15"S; 43°56'16"W), 3♂, 8♀, VIII–IX.1994 (IBSP 26707); 9♂, 10♀, 1 juv., III–IV.1995 (IBSP 26333); 4♂, 4♀, 1 juv., VIII–IX.1994 (IBSP 37481), all collected by M. O. Gonzaga, A. J. Santos & G. F. Dutra Campus da UFMG (19°51'41"S; 43°57'48"W), ♂, 18.VII.2005, D. P. Araújo col. (UFMG 1877); Laboratório de Aracnologia (19°51'53"S; 48°57'58"W), 1♀, 18.I.2013, I. L. F. Magalhães col. (UFMG 12349); Santo Antônio do Rio Abaixo, Cave 0046 (19°10'58"S; 43°15'53"W), ♀, 05.XII.2013, E. L. Borges col. (IBSP 185040); Matozinhos, Cave 65 (19°33'30"S; 44°04'19"W), ♀, VI.2014, F. Bondezan col. (IBSP 189450); Ouro Preto, (20°22'57.96"S; 43°30'35.73"W), ♀ 1 juv., 18.I.2008, M. T. T. Santos col. (UFMG 18886); Arcos, Cave S2–CRH–037 (20°18'58"S; 45°35'16"W), ♂, 06.II–28.III.2018, Equipe Spelayon *et al.* col. (IBSP 199972); Inconfidentes (22°18'47"S; 46°19'50"W), ♀, III.2015, M. M. Souza col. (UFMG 17421); ♀, III.2015, M. M. Souza col. (UFMG 17422); **Mato Grosso do Sul:** Paranaíba (19°40'38"S; 51°11'27"W), 2♂, 7♀ (IBSP 6781); ♀ (IBSP 6794); ♀ (IBSP 6800) all collected on 1983 by R.R. Silva col.; ♂, ♀, VIII.1983, R. R. Silva col. (IBSP 6769); ♀, no date, R. R. Silva col. (IBSP 20838); Corumbá, Passo da Lontra, Base de Estudos UFMS, Pantanal (19°34'36"S; 57°01'09"W), ♂, 22.V.1993, J. Raizer col. (IBSP 20556); São Domingos (19°14'00"S; 57°38'00"W), ♀, IX.1949, A. R. Hoge col. (IBSP 16232); Campo Grande (20°26'34"S; 54°38'47"W), ♀, 30.VII.1990, R. S. Bernilz col. (IBSP 6324); Ivinhema (22°18'07"S; 53°49'40"W), ♀, 2011–2012, D. Araújo col. (IBSP 165022); Bela Vista (22°06'32"S; 56°31'16"W), 2♀, 13.II.1995, R. S. Bernilz col. (IBSP 6266); **Espirito Santo:** Ilha da Trindade (20°31'29"S; 29°19'29"W), 4♂, 12♀, 7 juv., 1950, J. Alberto col. (MNRJ 02924); 3♂, 12.XII.1955, J. Becker col. (MNRJ 02789); ♂, ♀, 17.VIII.1957, Equipe IBSP col. (IBSP 1333); ♀, 04.V.2010, R. J. Alves col. (IBSP 250265); ♀, 04.V.2010, R.J. Alves col. (IBSP 250275); **Rio de Janeiro:** Rio de Janeiro, Museu Nacional (20°31'29"S 29°19'29"W), ♂, 22.XI.1961, H. Cunha col. (MNRJ 02790); Campus UFRJ, Centro de Ciências e Saúde (22°50'31"S; 43°14'04"W), ♂, ♀, 23.IX.2010, A. M. Giroti col. (IBSP 16730); Piraiá, Pinheiral (22°37'35"S; 43°54'02"W), 4♀, no date, C. F. de Mello–Leitão col. (MNRJ 01086); Petrópolis (22°29'02"S; 43°10'58"W), ♂, no date, C. F. de Mello–Leitão col. (MNRJ 02857); Volta Redonda (22°31'23"S; 44°06'15"W), 2♀, 27.IV.2002, F. S. Cunha col. (IBSP 36645); Ilha Marambaia, Praia Brava (23°04'08"S; 43°55'07"W), 1♂, 28.IV.2001, E. F. Ramos col. (IBSP 28250); **São Paulo:** (23°19'07"S; 46°35'12"W), ♂, 21.XII.1994, E. Follman col. (IBSP 1215); São José do Rio Preto (20°47'02"S; 49°21'33"W), ♂, 17.VI.2002, no collector (IBSP 57886); Tupã (21°57'27"S; 46°54'09"W), ♀, IX.2007, G. R. S. Ruiz col. (IBSP 220820); Vargem Grande do Sul (21°50'19"S; 46°54'09"W), ♂, 2008, G. Perroni col. (IBSP 119800); Sertãozinho (21°08'08"S; 47°59'39"W), ♀, IV.2002, E. C. Guerrieri col. (IBSP 57855); Araraquara (21°46'46"S; 48°09'27"W), ♂, ♀, no date, no collector (IBSP 145358); Catanduva (21°08'16"S; 48°58'22"W), ♀, X.1996, F. Bauab col. (IBSP 2299); ♂, X.1996, F. Brando col. (IBSP 10109); Cachoeira Paulista (22°39'54"S; 45°00'34"W), ♀, 18.VIII.1998, L. R. Andrade col. (IBSP 20449); Lorena (22°43'51"S; 45°06'41"W), ♀, 01.XI.1962, Ary de Rezende col. (MZSP 2775); Piracicaba (22°42'40"S; 47°47'40"W), 3♀, 1937, T. Piza col. (IBSP 137971); Rio Claro (22°23'45"S; 47°33'57"W), ♀, 24.VIII.2011, E. L. Silva col. (IBSP 163000); São Carlos (22°01'03"S; 47°53'27"W), ♀, no date, D. Miawama col. (IBSP 27043); São Pedro (22°32'55"S; 47°54'50"W), ♀, 07.XII.2001, F. S. Cunha col. (IBSP 33090); Americana (22°43'26"S; 47°17'26"W), ♂, 03.VII.1944, R. Eller col. (MZSP 5484); Botucatu, Fazenda Lageado, UNESP (22°52'47"S; 48°28'23"W), ♂, 03.XII.1969, V. C. Jesus col. (MZSP 60997); Primavera, Usina Hidrelétrica Pontal do Parapanema (22°28'55"S; 52°57'22"W), ♂, I.1998, no collector (IBSP 16247); Atibaia (23°07'23"S; 46°33'31"W), ♀, 07.V.2007, J. Cuyuniam col. (IBSP 116774); Carapicuíba (23°31'21"S; 46°50'08"W), ♂, 4♀, no date, S. Firmino col. (IBSP 20936); 2♂, 20.III.1996, L. C. Silva col. (IBSP 14361); ♀, 24.I.2000, M. Gevatask col. (IBSP 27571); Cotia (23°36'14"S; 46°55'09"W), ♂ 2♀, 26.XII.1983, O. Ummes col. (IBSP 19717); ♀, 30.XII.1991, C. Mus col. (IBSP 11725); Bairro Granja Viana (23°35'20"S; 46°49'50"W), ♀, 18.XI.2003, E. Pereira col. (IBSP 41983); Guarujá (23°57'16"S; 46°13'28"W), ♀, 28.I.2006, Prefeitura de Guarujá col. (IBSP 72772); Itapeccerica da Serra (23°43'01"S; 46°50'57"W), ♂, ♀, 19.XII.1980, D. Lourenço col. (IBSP 19865); Itapevi (23°32'56"S; 46°56'03"W), ♀, 11.III.1980, N. L. Silva col. (IBSP 19724); ♂, 24–29.VIII.1998, R. Martins & I. Knysak col. (IBSP 37833); Jarinu (23°06'05"S; 46°43'42"W), ♂, 2♀, 17.IV.1976, I. Kuhlmann col. (IBSP 2800A); Jundiá (23°11'11"S; 46°53'03"W), ♂, 31.I.1981, H. Taldi col. (IBSP 19700); Mauá (23°40'04"S; 46°27'41"W), 3♀, 08.II.1982, G. Stella col. (IBSP 2997); Mogi das Cruzes (23°31'22"S; 46°11'18"W), ♀, 18.IV.1995, M. A. Liranza col. (IBSP 6203); Osasco (23°31'57"S; 46°47'30"W), ♂, 3♀, 19.XI.1979, A. Souza col. (IBSP 19854); ♂, 30.XI.2009, M. A. R. Souza col. (IBSP 151557); Pirituba (23°28'44"S; 46°44'30"W), ♀, 27.VII.1975, D. R. Bugaete col. (IBSP 11774); Santana de Parnaíba (23°26'39"; S46°55'04"W), ♀, 21.I.1978, F. Santos col. (IBSP 19720); ♀, 05.III.2013, Hospital Vital Brazil col. (IBSP 211853); Santos (23°57'39"S; 46°20'01"W), ♂, ♀, 22.IX.1992, M. Garcez col. (IBSP 10005); São Paulo (23°32'51"S; 46°38'10"W), ♀, no date, no collector. (IBSP 212945); ♀, 1944, no collector. (MZSP 14483); ♂, IV.1941, no collector (MZSP 14485); ♀, no date, F. S. Cunha col. (IBSP 35809); ♂, 20.IX.1948, R. Nathan col. (IBSP 117); ♀, 23.II.1960, J. S. Alarino col. (IBSP 1492); ♀, 23.VIII.1960, Equipe IBSP col. (IBSP 6226); ♀, 03–10.X.2000, Equipe IBSP col. (IBSP 38918); ♀, X.1977, R. B. Martinelli col. (IBSP 19811); ♂, 01.X.1977, N. Moraes col. (IBSP 15003); ♂, 17.XI.1977, R. A. Arcaz col. (IBSP 19693); ♀, 22.V.1992, C. N. Souza col. (IBSP 11730); ♀, III.1995, B. Pirutti col. (IBSP 6003); ♀, III.1995, A. M. S. Carvalho col. (IBSP 6020); ♀, III.1995, L. A. S. Minas col. (IBSP 6066); ♀, III.1995, A. L. S. Neto col. (IBSP 6072); ♂, 25.X.1995, G. Lever *et al.* col. (IBSP 6429); ♀, 24.IX.1996, J. Motta col. (IBSP 11815); ♂, 24.V.1997, A. D. Brescovit col. (IBSP 14051); ♀, 18.I.1999, M. Luiza col. (IBSP 20842); ♂, 2♀, 13.V.1999, A. M. M. Lopes col. (IBSP 23632); ♂, 21.XII.2006, M. Dorion col. (IBSP 71959); ♀, 08.XII.2009, VQP col. (IBSP 160868); ♀, 04.V.2011, E. L. Garcia col. (IBSP 209982); ♂, 03.XI.2014, J. F. Zorguitem col. (IBSP 210211); ♀, 03.V.2002, J. Albino col. (IBSP 36130); ♀ (MZSP 3050); ♂ (MZSP 3051); ♂ (MZSP 3052); ♀ (MZSP 3053); ♂ (MZSP 3054); ♀ (MZSP 3055); ♀ (MZSP 3056); ♀ (MZSP 3057); ♂ (MZSP 3058); ♀ (MZSP 3059); ♂ (MZSP 3060); ♂ (MZSP 3061) all collected on V.1941 by M. S. Pereira; ♀, 28.X.2003, B. R. Silva col. (IBSP 41041); Alto de Perdizes (23°32'23"S 46°40'43"W), ♀, III.1950, H. Urban col. (MZSP 14484); Jardim Bonfiglioli (23°34'50"S; 46°44'15"W), ♀, 21.VII.1999, D. F. Candiani col. (IBSP 34433); ♀, 22.VII.1999, D. F. Candiani col. (IBSP 34432); Jardim Rizzo (23°34'45"S; 46°43'51"W), ♂, 09.XI.1998, F. S. Cunha col. (IBSP 20649); ♀, 25.II.1999, F. S. Cunha col. (IBSP 28858); ♀, 13.IV.2000, F. S. Cunha col. (IBSP 34434); ♀, 09.XI.1998, A. D. Brescovit col. (IBSP 20678); ♀, 09.XI.1998, A. D. Brescovit col. (IBSP 20664); ♀, 09.XI.1998, M. P. Castro col. (IBSP 20670); ♂, 02.II.1999, M. P. Castro col. (IBSP 21407); ♂, ♀, 22.II.1999, M. P. Castro col. (IBSP 28807); ♀, 23.II.1999, M. P. Castro col. (IBSP 28813); ♀, 04.II.1999, H. F. Japayú col. (IBSP 28793); Bairro da Previdência (23°34'39"S; 46°43'05"W), ♂, 08.XII.2000, J. Império col. (IBSP 34423); ♀, 05.X.1999, R. P. Indicatti col. (IBSP 34424); ♂, 03.XI.1999, D. F. Candiani col. (IBSP 34426); ♀, 02.III.2001, F. S. Cunha col. (IBSP 34425); Parque da Previdência (23°34'47"S; 46°43'36"W), ♂, 17.XII.1999, D. F. Candiani col. (IBSP 33485); ♂, 2001, Equipe IBSP col. (IBSP 38961); ♀, 18.V.2001, R. P. Indicatti col. (IBSP 39685); Vila Pirajussara (23°34'19"S; 46°42'58"W), ♀, 21.I.2000, F. S. Cunha col. (IBSP 34427); ♀, 21.I.2000, F. S. Cunha col. (IBSP 34429); 2♀, 21.I.2000, D. F. Candiani col. (IBSP 34428); Vila São Francisco (23°31'10"S; 46°29'30"W), 2♂, ♀, 16.XII.1999, M. S. Sebastião col. (IBSP 34435); Campus USP Medicina, Laboratório de Medicina da USP (23°33'18"S; 46°40'14"W), 2♂, ♀, 01–13.IX.1948, R. Nathan col. (IBSP 87); Campus USP (23°33'41"S; 46°43'50"W), ♀, 08.II.2001, F. S. Cunha col. (IBSP 34419); ♂, 26.X.2000, F. S. Cunha col. (IBSP 34418); ♀ (IBSP 34412); ♀ (IBSP 34413); ♀ (IBSP 34415); ♀ (IBSP 34416); ♀ (IBSP 34422) all collected on 08.XII.2000 by F. S. Cunha col.; ♂, 15.XII.1999, D. F. Candiani col. (IBSP 34417); ♂, 15.XII.1999, D. F. Candiani col. (IBSP 34421); ♂, 20.XII.1999, D. F. Candiani col. (IBSP 34414); ♂, 20.XII.1999, D. F. Candiani col. (IBSP 34420); ♂, 19.V.2003, C. D. Duron col. (IBSP 131474); Campus do Instituto Butantan (23°34'03"S; 46°43'07"W), ♀, 23.II.1999, D. F. Candiani col. (IBSP 21465); ♀, 13.IV.1999, D. F. Candiani col. (IBSP 34431); ♀ (IBSP 39692); ♀ (IBSP 39693);

♂ (IBSP 39694) all collected on 11.VII.2001 by R. P. Indicatti; 2♀, 20.XII.1999, R. P. Indicatti col. (IBSP 34430); ♂, 05.I.1999, F. S. Cunha col. (IBSP 20857); 2♂, 21.XII.1998, F. S. Cunha col. (IBSP 20879); ♀, C. R. M. Garcia col., 29.IV.2003 (IBSP 36705); Jardim Bonfiglioli (23°34'50"S; 46°44'15"W), ♂, 22.XII.2014, J. L. Chavari col. (IBSP 214803); Itaquera, Parque do Carmo (23°34'31"S; 46°28'03"W), 2♀, 22.IV.1999, M. Miyasi col. (IBSP 23563); Parque dos Príncipes (23°34'22"S; 46°46'11"W), ♂, 2004, P. A. M. Goldoni col. (IBSP 48670); Jundiá (23°11'22"S; 46°54'24"W), ♂, 29.V.2008, Prefeitura Municipal de Jundiá col. (IBSP 99573); Mandaqui (23°28'59"S; 46°37'35"W), ♀, IV.2007, F. V. Yamamoto col. (IBSP 116780); Santo André, Centro Universitário Fundação Santo André (23°39'40"S; 46°33'14"W), ♂, ♀, VIII.IX.2012, W. B. Garcia col. (IBSP 225653); São Bernardo do Campo (23°42'06"S; 46°33'13"W), ♀, 06.I.2010 (IBSP 160889); ♀, 09.I.2010 (IBSP 160885); ♂, 25.IV.2010 (IBSP 160884), all collected by VQP; Nova Petrópolis (23°41'38"S; 46°33'54"W), ♀, 20.VIII.1969, J. A. Nunes Filho col. (IBSP 2326); Guarulhos, Aeroporto de Cumbica (23°25'50"S; 46°28'22"W), ♂, 16.VIII.1982, A. D. Luiz col. (IBSP 19725); Araçariçuama (23°25'23"S; 47°04'36.63"W), ♂, no date, no collector (IBSP 213292); Tatui (23°20'21"S; 47°53'26"W), ♂ (IBSP 250473); ♀ (IBSP 250474); ♀ (IBSP 250481) all collected on 31.III.2012 by T. G. Pinheiro; Mairinque, Portal do Sol (23°27'26"S; 47°11'50"W), ♂, 27.XII.1997, L. Mirazorer col. (IBSP 14606); Angatuba (23°29'23"S; 48°24'46"W), ♀, XII.1981, C. F. Giraldi col. (IBSP 4960); Botucatu, Fazenda Lageado (22°52'48.0"S; 48°26'24.0"W), ♀, no date, V. C. Jesus col. (MZSP 63282); Carapicuíba (23°31'21"S; 46°50'08"W), ♀, 20.III.1996, L. C. Silva col. (IBSP 37731); Paraná: Curitiba (25°29'42"S; 49°17'23"W), ♀, 23.II.2001, E. Ramires *et al.* col. (IBSP 35921); 2♀, 14.VIII.2006, C. Terzian col. (IBSP 70997); Cruzeiro do Iguaçu (25°36'56"S; 53°07'40"W), ♀, 10.V.1946, R. Lange col. (IBSP 1089); União da Vitória (26°13'48"S; 51°5'9"W), ♂, 1 juv., 2009, D. Woldan *et al.* col. (IBSP 230153); Santa Catarina: (26°56'24"S; 49°29'44"W), ♀, 22.I.1995, L. Silva col. (IBSP 13991); Guaruva, (26°02'19"S; 48°50'54"W), ♂, 11.I.2006, A. D. Brescovit col. (IBSP 72638); Blumenau (26°51'23"S; 49°05'56"W), ♀, XI.1924, H. Luederwaldt col. (MZSP 9249); Campus 1 da FURB (26°54'18"S; 49°04'45"W), ♀, 20.V.2015, B. G. Alves col. (IBSP 271002); Cocal do Sul (28°36'03"S; 49°19'30"W), ♂, 30.IV.2007, R. Teixeira col. (IBSP 133904); Florianópolis, Bairro Coqueiros (27°36'28"S; 48°34'46"W), ♂, ♀, 05.II.1992, A. D. Brescovit col. (MCN 22009); Rio Grande do Sul: (30°25'07"S; 53°40'11"W), 3♀, no date, B. Rambo col. (MNRJ 42105); Porto Alegre (31°34'05"S; 52°17'09"W), ♂, ♀, 01.II.1987, E. H. Buckup col. (MCN 16689); ♂, 03.II.1987, M. A. L. Marques col. (MCN 16766); Jardim Botânico de Porto Alegre (30°03'05"S; 51°10'37"W), ♂, 14.V.1995, E. H. Buckup col. (MCN 26588); ♂, 01.III.2001, M. H. Galileo col. (MCN 33653); ♂, 30.I.2002, R. Ott col. (MCN 34306); Vila Cruzeiro (30°04'53"S; 51°12'36"W), 2♀, 15.IX.1986, Rita col. (MCN 16694); Pelotas, (31°34'05"S; 52°17'09"W), 2♀, 01.VII.2000, E. N. L. Rodrigues col. (MCN 33492); 2♂, 03.I.2001, E. N. L. Rodrigues col. (MCN 33788).

### *Thyene coccineovittata* (Simon, 1886)

(Figs 25–30; 34)

*Hyllus coccineovittatus* SIMON, 1886:348.

*Thyene coccineovittata* BERLAND & MILLOT, 1941:371; 373, figs 70,71;

HILL & MARIANTE, 2019:2, figs 1-4.

(Check other synonyms in WORLD SPIDER CATALOG, 2022).

**Diagnosis.** *Thyene coccineovittata* differs from the other synanthropic Salticidae by its more orange and vibrant color, and by the abdomen decorated with two white lateral stripes and one centralized (Figs 25, 26). Males have a long spiral-shaped embolus around the tegulum (Figs 27, 28) and the female differs from the other species in having a simple epigynum, with copulatory openings that are not very sclerotized and long spermatid ducts (Figs. 29, 30).

Records in the World. *Thyene coccineovittata* is a species of African origin (BERLAND & MILLOT, 1941; WORLD SPIDER CATALOG, 2022), which was accidentally introduced in France (OGER & VAN KEER, 2017) and Brazil (Fig. 34) (MARIANTE & HILL, 2018).

**Natural history.** *Thyene coccineovittata* is the synanthropic exotic Salticidae in Brazil with more striking coloration, is commonly found in vegetation (DIPPENAAR-SCHOEMAN *et al.*, 2005), Brazil it was recorded in *Triplaris* sp. (Polygonaceae) (MARIANTE & HILL, 2018), the species is an efficient insect predator (DIPPENAAR-SCHOEMAN *et al.*, 2005; MONDAL *et al.*, 2020) and has been recorded feeding on insect Pentatomidae eggs (CUKIER, 2020).

**Material examinado.** BRAZIL, Rio de Janeiro: Rio de Janeiro, Bairro Vargem Pequena (22°59'21.1"S; 43°27'55.7"W), ♂, ♀, 12.IV.2019, R. M. Mariante col. (UFRJ 1633); ♀, 24.IV.2019, R. M. Mariante col. (UFRJ 1635); ♂, 11.VII.2021, R. M. Mariante col. (UFRJ 1635 A).

### The environment of synanthropic exotic Salticidae.

From the date of the zoological collections examined, 647 records were obtained, containing 1118 individuals, being 633 females, 446 males, and 39 juveniles. *Hasarius adansoni* was the species with the highest number of records in the collections (258), followed by *Plexippus paykulli* (196), and *Menemerus bivittatus* (186), *Menemerus nigli* (4), and *Thyene coccineovittata* (3). Of these, 363 (56%) had additional information regarding the collections (*e.g.* collected indoors, on walls, vegetation, etc.). *Plexippus paykulli* had 97 (49%) records with collection observations, *M. bivittatus* 120 (65%) and *H. adansoni* 139 (54%) (Tab. I), the four records of *M. nigli* are from collections in urban buildings and *T. coccineovittata* presented three records associated with urban vegetation.

### The distribution of synanthropic exotic Salticidae.

Three of the five species have a wide distribution in Brazil, where *Plexippus paykulli* occurs in 22 of the 27 federative units, being absent in Alagoas, Amapá, Distrito Federal, Pernambuco, and Rondônia (Fig. 30).

*Menemerus bivittatus* occurs in 19 states, being absent in Amapá, Ceará, Distrito Federal, Goiás, Maranhão, Paraíba, Rondônia and Roraima (Fig. 32).

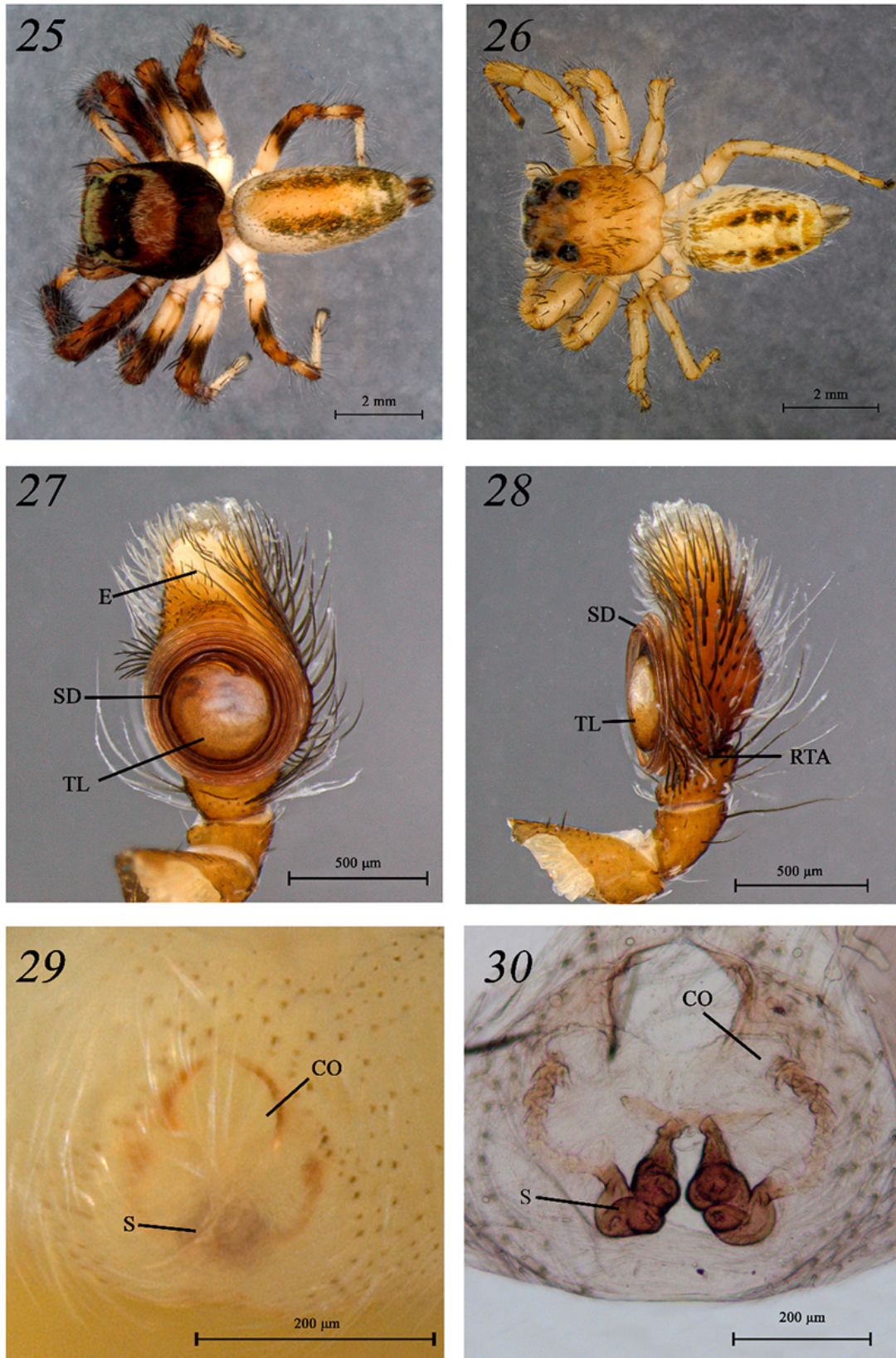
*Hasarius adansoni* occurs in 17 states, being absent in Acre, Alagoas, Amapá, Amazonas, Ceará, Distrito Federal, Paraíba, Rio Grande do Norte, Rondônia and Roraima (Fig. 32).

*Menemerus nigli* and *Thyene coccineovittata* in Brazil were only recorded in the city of Rio de Janeiro (Fig. 34).

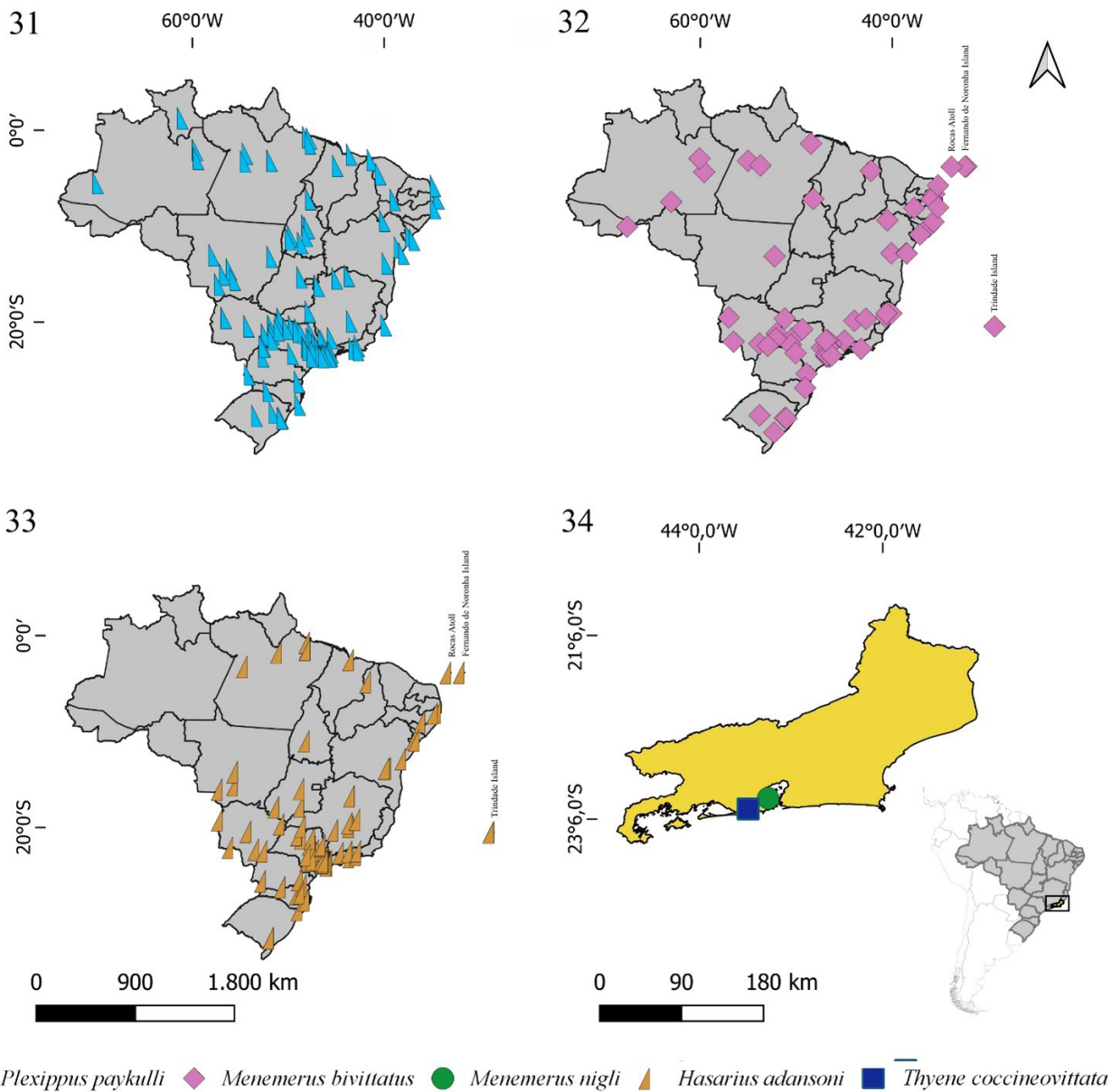
Currently, Brazil has only five species of exotic Salticidae. The introduction of *M. bivittatus* and *H. adansoni* it has first recorded in the year 1924 in Blumenau, Santa Catarina; *P. paykulli* was registered for the first time in the year 1934 in Porto Alegre, Rio Grande do Sul.

*Plexippus paykulli* was the species that showed greatest restriction to anthropized areas, with 94 records associated with human constructions and two records related with urban vegetation; this information corroborates the existing





Figs 25–30. *Thyene coccineovittata* (Simon, 1886) (25, 27, 28: ♂; 26, 29, 30: ♀). Figs. 25, 26, habitus, dorsal view; 27, palp, ventral view; 28, palp, retrolateral view; 29, epigynum, ventral view; 30, epigynum, dorsal view (CO, copulatory opening; E, embolus; RTA, retrolateral tibial apophysis; S, spermatheca; SD, sperm duct; TL, tegular lobe). Fig. 30 was used with the permission of Dr. David Hill and Dr. Rafael.



Figs 31–34 Distribution map of alien synanthropic species of Salticidae in Brazil: 31, *Plexippus paykulli* (Audouin, 1826); 32, *Menemerus bivittatus* (Dufour, 1831); 33, *Hasarius adansoni* (Audouin, 1826); 34, *Menemerus nigli* Wesolowska & Freudenschuss, 2012 and *Thyene coccineovittata* (Simon, 1886).

literature (JACKSON & MACNAB, 1989; MONDAL *et al.*, 2020), the only record in which the plant was identified, is from a collection carried out in *Digitaria horizontalis* (Jamaican crabgrass). The greater number of records associated with human constructions may be linked to the fact that the species uses the corners of buildings to build their refuges (JACKSON & MACNAB, 1989; MONDAL *et al.*, 2020).

*Menemerus bivittatus* has 95 records associated with human constructions (mainly on walls) and 16 related with urban vegetation (mainly on tree trunks), corroborating the existing literature (WESOŁOWSKA, 1999; PENNEY & GABRIEL,

2009; MONDAL *et al.*, 2020). However, the higher occurrence in anthropized regions may indicate a preference for urban niches in regions where the species was introduced. Beyond these, five records are associated with the hive of bees in São Paulo, São Paulo, and the one record is related with the hive of *Trypoxylon* sp. (wasp) in the region of Botucatu, São Paulo.

*Hasarius adansoni* has the greater diversity of occupied niches, with 108 records in human constructions and 16 records related with urban vegetation, of this, only one in a tree trunk; this information corroborates the existing



Tab. I. Number of records per observation of the collection site of the most representative species of synanthropic exotic Salticidae.

Collection location	<i>Plexippus paykulli</i>	<i>Menemerus bivittatus</i>	<i>Hasarius adansoni</i>
Dwellings	74	46	68
Edification	10	26	32
Buildings in the natural park	6	5	2
Urban Park buildings	4	5	6
Urban tree trunk	1	12	1
Urban vegetation	1	4	15
External walls		14	6
Hive		6	1
Plantations	1	1	1
Atoll structure		1	2
Cave			3
Mountain			1
Near waterfall			1
Not specified	99	66	119
Total	196	186	258

literature, where the species is commonly reported in the peridomicile of residences (CLARK & BENOIT, 1977; MONDAL *et al.*, 2020).

*Menemerus nigli* was only found in anthropized areas, but the presence of another species of the same genus allows us to speculate that it will have the same distribution profile and occupy the same niches.

The records of *T. coccineovittata* in urban vegetation may indicate that this Salticidae prefers environments such as gardens, urban parks, woods, and forests. If the species starts to occupy natural niches, it could pose a threat to arthropod populations and their ecosystem relationships. More studies are need on its invasive potential and its impact on ecosystems.

*Menemerus nigli* and *Thyene coccineovittata* have a restricted distribution in the city of Rio de Janeiro – Rio de Janeiro, probably due to the recent introductions of the species. *Plexippus paykulli*, *M. bivittatus*, and *Hasarius adansoni* are widely distributed throughout Brazil, and the regions where no records were found are likely related to the lack of collections.

Although *M. bivittatus* occurs in urban áreas and probably does not impact most other species, further studies are needed to understand whether the species may be impacting native bee populations. Already *P. paykulli* and *H. adansoni* do not affect native species and they occur together with synanthropic native Salticidae in urban niches such as *Megafreya sutrix* (Holmberg, 1875) and *Frigga quintensis* (Tullgren, 1905).

In addition, in the Americas, there are species of exotic *Menemerus* and may result in new introductions *M. brachygnathus* (Thorell, 1887), *M. taeniatus* (L. Koch, 1867), *M. semilimbatus* (Hahn, 1829). Although the literature indicates two species of *Hasarius* for Brazil, *Hasarius lisei*

needs a taxonomic review, since its structures do not match the diagnosis of the genus.

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