

On the spider genus *Naubolus* Simon, 1901 (Araneae: Salticidae)

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ABSTRACT. As a part of a general revision of the South American Dendryphantini, type materials of several taxa have been examined. Certain inconsistencies regarding the species composition of the genus *Naubolus* Simon, 1901 have been observed. In order to resolve these inconsistencies the type series of two *Naubolus* species have been studied. The unknown male of *Naubolus posticatus* Simon, 1901 is described, and *N. simplex* Mello-Leitão, 1946 is redescribed; yet, a provisional species group with distinctive characters within the genus is proposed.

How to cite this article: Rubio G.D., Baigorria J.E.M., Stolar C.E. 2024. On the spider genus *Naubolus* Simon, 1901 (Araneae: Salticidae) // Invert. Zool. Vol.21. No.3. P. 384–393. doi: 10.15298/invertzool.21.3.10

KEY WORDS: Aranei, jumping spiders, Neotropics, (re)description, taxonomy.

О роде пауков-скакунчиков *Naubolus* Simon, 1901 (Araneae: Salticidae)

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РЕЗЮМЕ. В рамках общей ревизии трибы Dendryphantini Южной Америки исследован типовой материал нескольких таксонов. Выявлены несоответствия в видовом составе рода *Naubolus* Simon, 1901. Для решения этой проблемы изучены типовые серии двух видов рода. Описан ранее неизвестный самец *Naubolus posticatus* Simon, 1901, переописан вид *N. simplex* Mello-Leitão, 1946; также предложена хорошо отличающаяся группа видов внутри рода.

Как цитировать эту статью: Rubio G.D., Baigorria J.E.M., Stolar C.E. 2024. On the spider genus *Naubolus* Simon, 1901 (Araneae: Salticidae) // Invert. Zool. Vol.21. No.3. P. 384–393. doi: 10.15298/invertzool.21.3.10

КЛЮЧЕВЫЕ СЛОВА: Aranei, пауки-скакунчики, Неотропика, (пере)описание, таксономия.

Introduction

The genus *Naubolus* Simon, 1901 currently comprises nine species, varying greatly in shape and size (Metzner, 2024, WSC, 2024). Differences in reproductive organs, mainly in the male palps and female copulatory ducts, are likely to reflect generic incongruity. Such findings are part of a doctoral thesis on the Argentine dendryphantines currently being conducted by the second author (JEMB).

Naubolus micans Simon, 1901 is the type species of the genus *Naubolus*, the description of which and the genus itself was immediately followed by the description of the species *Naubolus posticatus* Simon, 1901, in the same paper and even on the same page 159 (Simon, 1901, WSC, 2024). Both species were described based on small female specimens, approximately 4 mm long (Simon, 1901), and both were well re-described by Galiano (1963). When analysing the reproductive structures of both species, significant differences in the length, thickness and extension of the copulatory ducts can be observed, sufficient to assign these species to different genera of Salticidae (cf. Figs 1, 2 and 3 with images in Metzner, 2024). In the case of *N. micans* one can see that the ducts are very long and twisted (pointed out by Galiano 1963 as well), resembling, for example, those of some *Ashtabula* G.W. Peckham et E.G. Peckham, 1894 and pointing out that *N. posticatus* is likely not to be congeneric with the type species of *Naubolus*. Unfortunately, the diagnosis of *Naubolus* should not be made until the differences between the two species have been analysed in terms of possible generic characters, and the relationships of the dendryphantine genera described after 1901 have been exhaustively studied. Yet, the first male of the *Naubolus* species was described in 1927: viz., *N. trifasciatus* Mello-Leitão, 1927, which was re-examined by Edwards with the co-authors (2005).

Among the priority names of South American dendryphantine genera for reinstatement is *Admirala* G.W. Peckham et E.G. Peckham, 1901. However, as *Admirala* has been considered a junior synonym of *Dendryphantes* C.L. Koch, 1837 (Simon 1901), this requires further analyses, including molecular markers,

which may possibly allow us to reveal differences between true *Dendryphantes* and new world *Dendryphantes* that morphology alone does not enable us to discern. Future studies could affect the composition of such genera as *Metaphidippus* F.O. Pickard-Cambridge, 1901 or the nomenclature of such *Dendryphantes* species as *D. lepidus* (G.W. Peckham et E.G. Peckham, 1901) (originally *Admirala lepida*) or *D. reimoseri* Roewer, 1951 (the replacing the name for *Admirala regia*).

This paper deals with the study of type materials of *N. pallidus* Mello-Leitão, 1945 from Argentina and *N. simplex* Mello-Leitão, 1946 from Paraguay, as well as numerous specimens of *N. posticatus*. The morphological discrepancy between the examined species and the type species *Naubolus* suggests that they are non-congeneric with it and possibly belong to a new genus. To further resolve this taxonomic inconsistency, we have considered these species, as well as *N. sawayai* Soares et Camargo, 1948, in a separate species group. The species *N. simplex* was re-described, and a description of an unknown male for *N. posticatus* was given; the name *N. pallidus* is considered *species inquirenda*.

Material and methods

Wherever possible, type specimens were used in the study of the material. The description format and measurements follow those of Galiano (1963), with morphological terms and the interpretation of structures as in Edwards (2015). Leg spination patterns follow Ramírez (2003). Female genitalia were dissected as described by Levi (1965), internal structures were examined after digestion in a hot ~15% NaOH solution, or cleared in clove oil solution. The pieces were placed in a double boiler and heated in a Fuyí © heater for anti-mosquito tablets (Ramírez, 2014). Temporary slide preparations were observed and photographed using a Leica DM500 compound microscope and a Leica M60 stereomicroscope. Structures were sketched from incident light photograph models using a computer system for drawing and image processing (Wacom digitizer tablet with GIMP software). Measurements were taken directly from microscope ocular lens with an ocular micrometer and are given in millimeters. Live photographs were taken using a Nikon D3400 digital camera with a Micro-Nikkor 85 mm lens. Plates were edited and composed in Corel Draw. Specimens were examined from the collections of the Museo de La Plata (MLP),

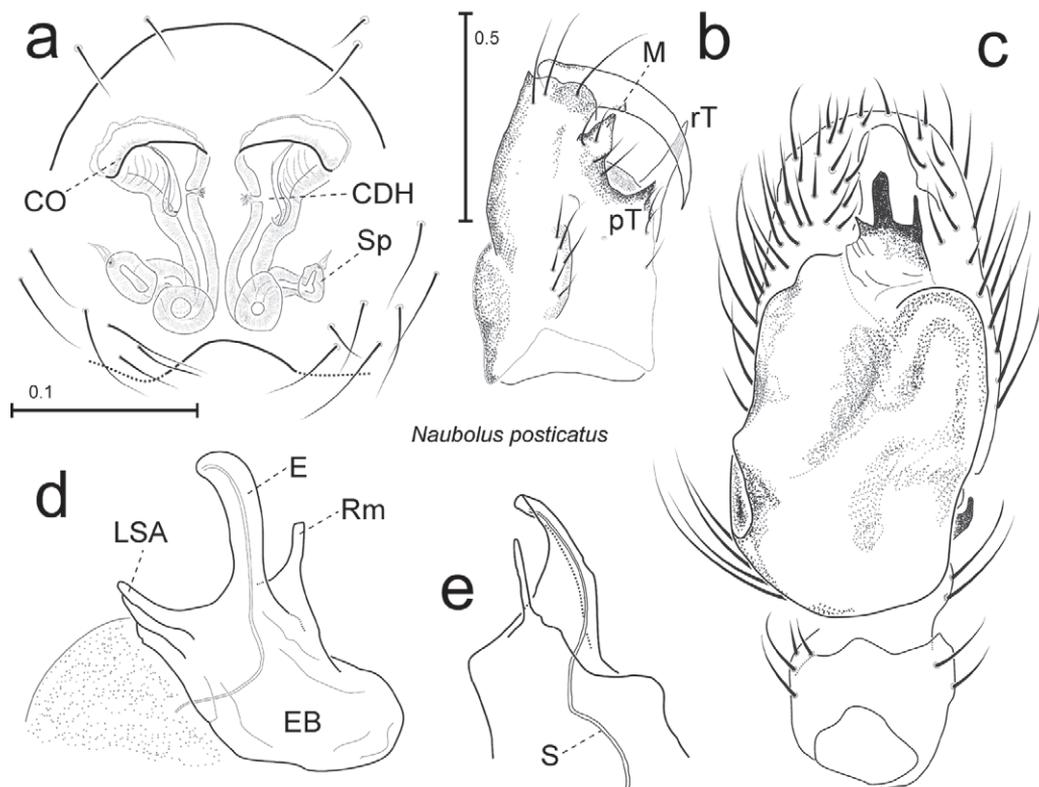


Fig. 1. *Naubolus posticatus*. a — cleared epigyne, ventral view (IBSI-Ar 1960); b–e — IBSI-Ar 1074; b — left male chelicera and teeth; c — left male palp, ventral; d — details of embolus, prolateral-ventral; e — same, retrolateral.

Abbreviations: CDH — copulatory duct head; CO — copulatory opening; E — embolus; EB — embolus base; LSA — lateral subterminal apophysis; M — mastidion; pT — promarginal tooth; Rm — ramus; rT — retromarginal tooth; S — spermophore; Sp — spermatheca. Scale bar in mm.

Рис. 1. *Naubolus posticatus*. a — очищенная эпигина, вентрально (IBSI-Ar 1960); b–e — IBSI-Ar 1074; b — левая хелицера самца и зубцы на ней; c — левая пальпа самца, вентрально; d — детали строения эмболюса, пролатерально-вентрально; e — то же, ретролатерально.

Обозначения: CDH — верхняя копуляторного канала; CO — копуляторное отверстие; E — эмболюс; EB — основание эмболюса; LSA — латеральный субтерминальный апофиз; M — мастидий; pT — зубец переднего края желобка хелицер; Rm — рамус; rT — зубец заднего края желобка хелицер; S — спермофор; Sp — сперматека. Масштаб в мм.

Buenos Aires and the Instituto de Biología Subtropical (IBSI-Ar), Misiones.

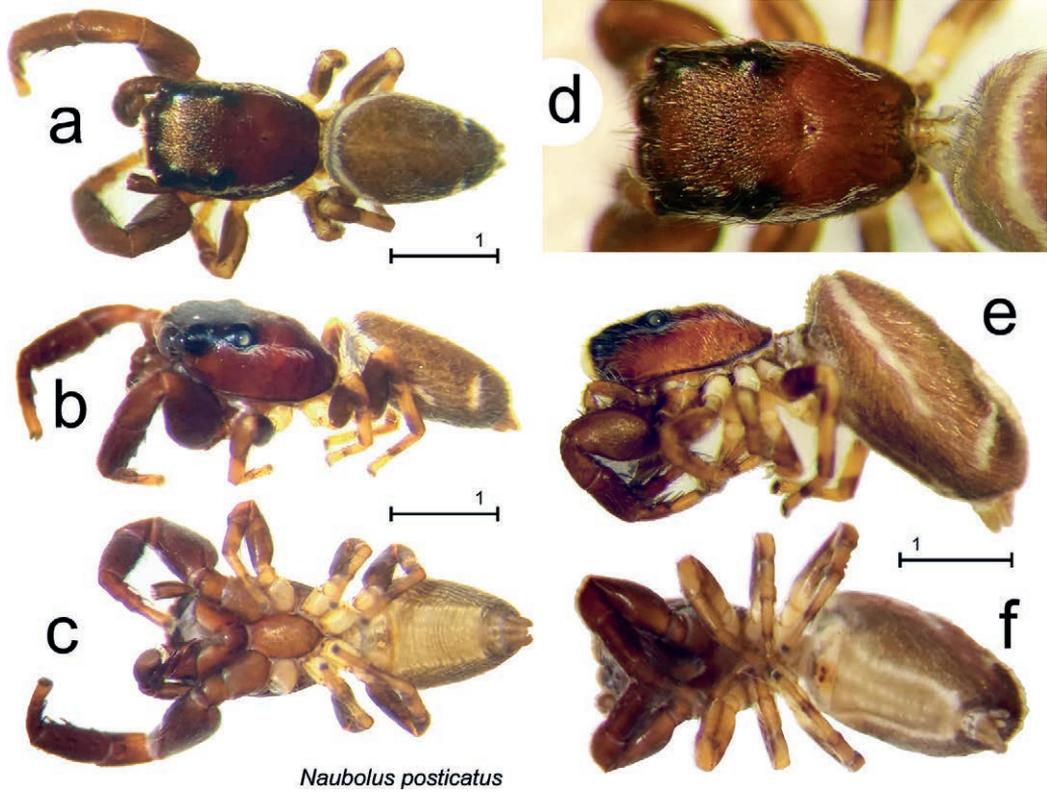
ABBREVIATIONS: AG — accessory gland; ALE — anterior lateral eye; AME — anterior median eye; CD — copulatory duct; CDH — copulatory duct head; CO — copulatory opening; E — embolus; EB — embolus base; LSA — lateral subterminal apophysis; M — mastidion; PLE — posterior lateral eye; PME — posterior median eye; pT — promarginal tooth; Rm — ramus; rT — retromarginal tooth; RTA — retrolateral tibial apophysis; S — spermophore; Sp — spermatheca.

Results

Naubolus Simon, 1901

Figs 1–5.

COMPOSITION. Nine species, the type species *Naubolus micans* plus *N. albopunctatus* Mello-Leitão, 1943, *N. sawayai* Soares et Camargo, 1948, *N. meloleitaoi* Caporiacco, 1947, *N. trifasciatus* Mello-Leitão, 1927, *N. tristis* Mello-Leitão, 1922, *N. posticatus* Simon, 1901, *N. simplex* Mello-Leitão, 1946, and *N. pallidus* Mello-Leitão, 1945 (WSC, 2024).



Naubolus posticatus

Fig. 2. Habitus of *Naubolus posticatus* (IBSI-Ar 1074). a–c — male in dorsal, lateral and ventral view, respectively; d–f — female, same views. Scale bar in mm.

Рис. 2. Внешний вид *Naubolus posticatus* (IBSI-Ar 1074). а–с — самец, соответственно дорсально, латерально и вентрально; d–f — самка, то же. Масштаб в мм.

Naubolus pallidus Mello-Leitão, 1945

Naubolus pallidus Mello-Leitão, 1945: 289 (the holotype from ARGENTINA: Corrientes, Aguapey deposited in MLP 16805, examined); Galiano, 1981: 12; WSC, 2024; Metzner, 2024.

TAXONOMIC STATUS. Galiano (1981) examined the type specimen and found out that it was a juvenile specimen that cannot be identified to species. We have also examined the holotype and come up with the same conclusions. Thus, this species name is to be treated as a *species inquirenda*.

Naubolus posticatus Simon, 1901

Figs 1, 2, 5.

Naubolus posticatus Simon, 1901c: 159; Galiano, 1963: 401, pl. XXVII, figs 11–12. WSC 2024; Metzner 2024: figs D-13210–13211, F-9095–9096.

MATERIAL. 3 ♀♀, 1 ♂ (IBSI-Ar 0523): Argentina, Misiones, Puerto Iguazú (–25.6343, –54.5438), 01/2015, coll. A. Munevar, g-vac sampling; 1 ♀ (IBSI-Ar 0073; fotGDR 2583-2594): Bernardo de

Irigoyen (–26.2539, –53.6513), 31/12/2013, coll. G. Rubio; 1 ♂ (IBSI-Ar 0224; fotGDR 4937-4943): same locality and coll., 16/11/2014; 1 ♂ (IBSI-Ar 1321): Reserva Privada Karadya, zona pasafauna (–25.8595, –53.9608), 28/11/2018, coll. J. Baigorria; 1 ♂ (IBSI-Ar 1239; dscn6949/62): San Pedro, Piñalito (–26.4139, –53.8444), 15/11/2018, same coll.; 1 ♂ (IBSI-Ar 1494): San Ignacio, Reserva Osununú, superior (–27.2798, –55.5780), 09/12/2019, coll. G. Rubio & C. Stolar; 1 ♀ (IBSI-Ar 1747): Colonia Aurora (–27.4721, –54.5292), 27/12/2019, coll. C. Stolar; 1 ♀ (IBSI-Ar 1000), 1 ♀ (IBSI-Ar 1044), 1 ♂ (IBSI-Ar 1045): Cerro Azul, Estación Experimental Agropecuaria INTA (–27.6671, –55.4318), 22/01/2018, coll. G. Rubio; 1 ♀ (IBSI-Ar 1003), 1 ♂ (IBSI-Ar 1020), 2 ♂♂, 1 ♀ (IBSI-Ar 1074): same locality and coll., 21/11/2017; 1 ♀ (IBSI-Ar 1008): same locality and coll., 20/10/2017; 1 ♀ (IBSI-Ar 1008), 1 ♂ (IBSI-Ar 1017): same locality and coll., 20/10/2017; 1 ♀ (IBSI-Ar 1317; fotGDR 123-129): same locality, 28/09/2018, coll. C. Stolar; 1 ♀ (IBSI-Ar 1559), 1 ♂ (IBSI-Ar 1614): Candelaria, Reserva Natural Urutaú (–27.4802, –55.7925), 05/02/2021, coll. G. Rubio, J.

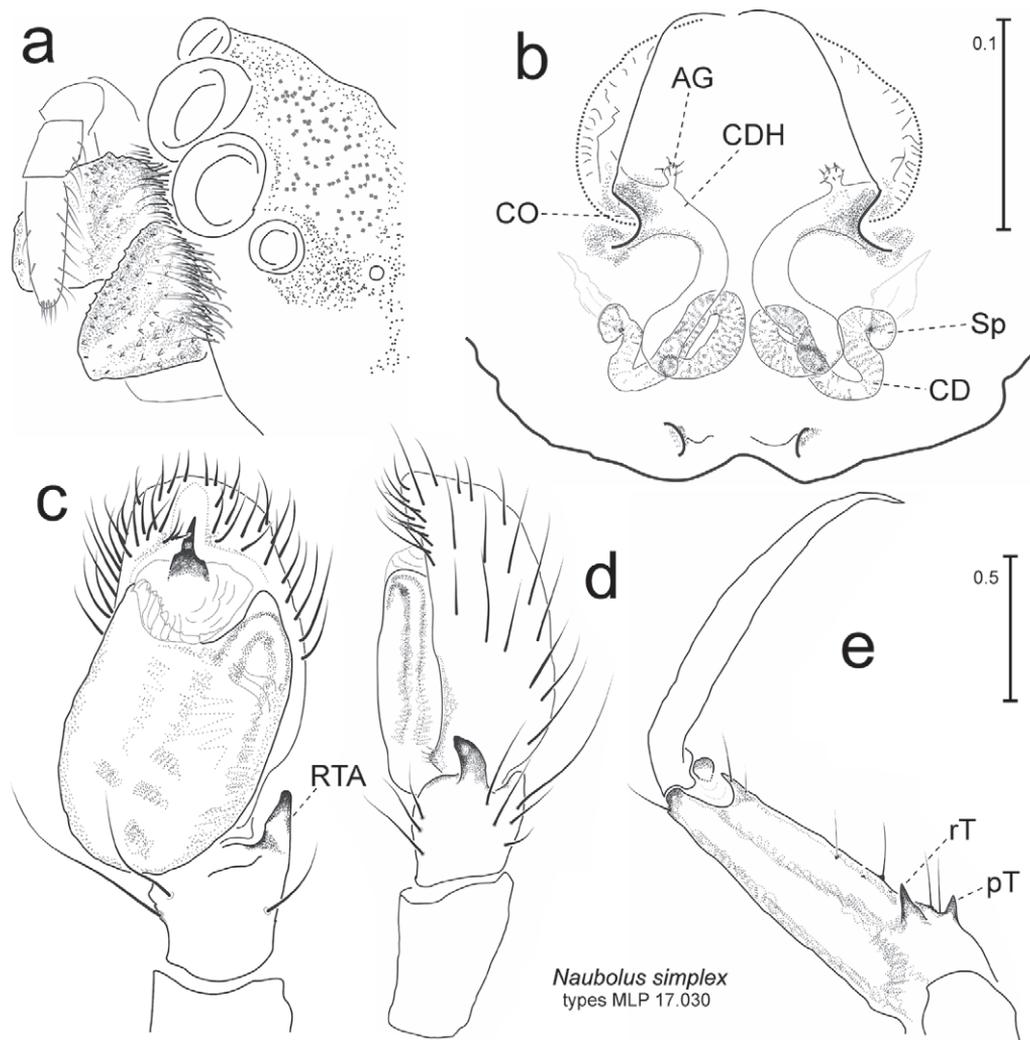


Fig. 3. *Naubolus simplex* (type materials). a — female frontal habitus; b — cleared epigyne, ventral view; c — left male palp, ventral; d — same, retrolateral; e — right male chelicera and teeth.

Abbreviations: AG — accessory gland; CD — copulatory duct; CDH — copulatory duct head; CO — copulatory opening; pT — promarginal tooth; rT — retromarginal tooth; RTA — retrolateral tibial apophysis; Sp — spermatheca. Scale bar in mm.

Рис. 3. *Naubolus simplex* (типовые материалы). а — самка, внешний вид спереди; б — очищенная эпигина, вентрально; в — левая пальпа самца, вентрально; д — то же, ретролатерально; е — правая хелицера самца и зубы на ней.

Обозначения: AG — дополнительная железа; CD — копуляторный канал; CDH — вершина копуляторного канала; CO — копуляторное отверстие; pT — зубец переднего края желобка хелицера; rT — зубец заднего края желобка хелицера; RTA — ретролатеральный вырост голени; Sp — сперматека. Масштаб в мм.

Baigorria & C. Stolar; 1 ♀ (IBSI-Ar 1923): Buenos Aires, Reserva Provincial Santa Catalina (–34.7673, –58.4623), 19/03/2021, coll. A. De Magistris, beating; 1 ♀ (IBSI-Ar 1960): same locality and coll., 14/02/2023.

DESCRIPTION. FEMALE. The lectotype female is kept in Muséum National d’Histoire Naturelle, Paris (France), from BRAZIL: Matto Grosso.

For a complete description see Galiano (1963). Habitus as in Figs 2d–f, 5a–c. Epigyne (IBSI-Ar 1960): small and weakly sclerotized plate; the CDs are relatively short, starting in two wide COs that enter anteriorly (Fig. 1a); ducts enter straight, towards the posterior side near the epigastric furrow where the first curvature occurs. The first stretch of the CDs is dorsal, and heads ventrally with the first curvature.

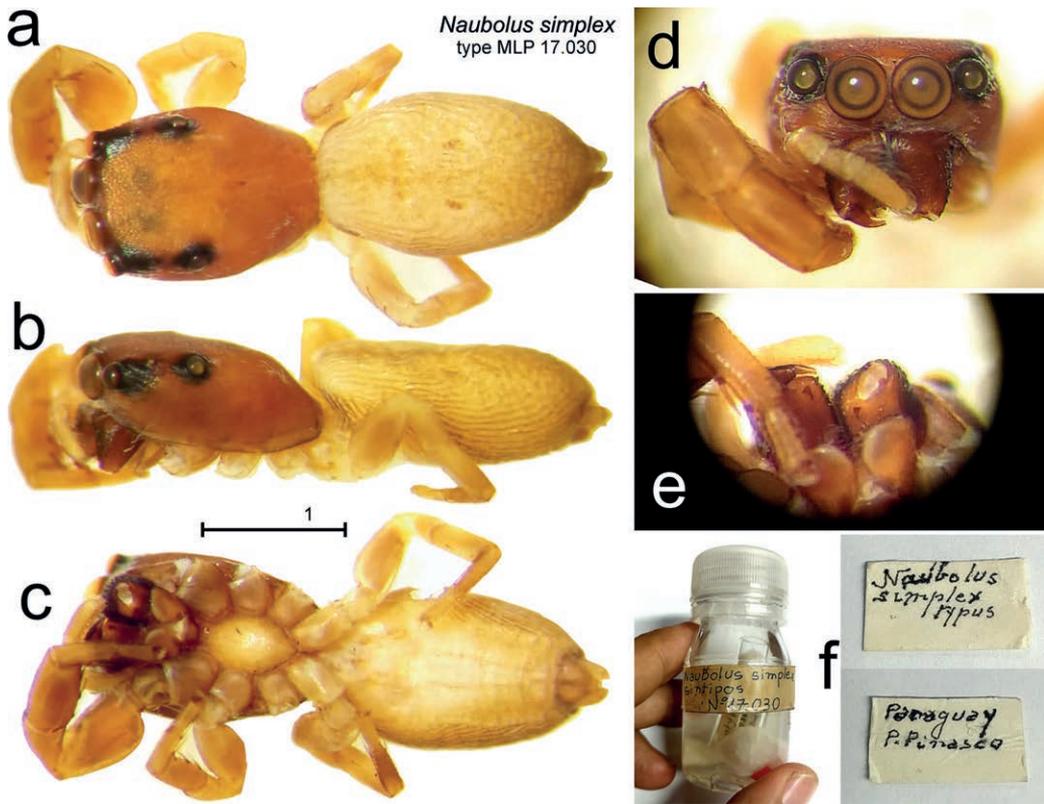


Fig. 4. *Naubolus simplex* (type materials). a–c — female habitus in dorsal, lateral and ventral view, respectively; d — same, frontal; e — same, chelicerae; f — preservation and data label. Scale bar in mm.

Рис. 4. *Naubolus simplex* (типовые материалы). а–с — внешний вид самки, соответственно дорсально, латерально и вентрально; d — то же, вид спереди; e — самка, хелицеры; f — тип хранения и этикетка. Масштаб в мм.

An accessory gland on each copulatory duct head (CDH), hard to see (Fig. 1a). The second stretch of the ducts extends laterally, forming an S and ending in a small spermatheca. Fertilization ducts dorsal to the spermathecae, small and hard to see. A posterior coupling pocket on the epigastric furrow, slightly sclerotized (Fig. 1a).

MALE (IBSI-Ar 1074). Total length 3.30. Carapace length 1.60, width 1.11, height 0.73; abdomen length 1.71, width 1.05. Clypeus null. Anterior eyes row slightly recurved. Upper edge of the AME somewhat higher than that of the ALE. Area of eye quadrangle with granulated integument, quadrangle length 0.75, width 1.00 (at PLE). Ocular diameters: AME 0.30, ALE 0.19, PME 0.05, PLE 0.16. Second row eyes separated from ALE by 0.24, and from the PLE by 0.46. Fovea dot-shaped, 0.25 mm posterior to the PLE (measured at center). Chelicerae vertical, slightly divergent, paturon with a frontal-promarginal mastidion, length 0.72, claw length ~0.50; one promarginal tooth, one retromarginal very long tooth,

claw curved (Fig. 1b). Labium length 0.25, width 0.27. External angle of the endites slightly pointed. Sternum length 0.70, width 0.43. First pair of legs more robust, femur I with a conspicuous dorsal convexity, tibia I thick (Figs 2a–c, 5d, e). Spination pattern: leg I, femur d 1–1–1 (all very small), p ap1, r 0, v 0; patella 0; tibia v 2–2–2, p, r and d 0; metatarsus v 2–2, p, r and d 0; tarsus 0; leg II same as leg I, except for femur d 1–1–1 all long, and tibia v 1–0–2. Palp dark brown; femur short; cymbium hirsute, hairs shorter and denser at the apex (Fig. 1c). RTA small, shaped like a cat's claw. Embolus short, sclerotized, like a short ribbon, associated with two smaller non-articulated projections: a retrolateral structure (Rm) and another prolateral structure (LSA) that emerge from the embolic base (EB) (Fig. 1c–e).

Colouration (Figs 2, 5d, e). Carapace dark brown, reddish, with sparse white/translucent hairs, two conspicuous white band on each side, below the eyes and towards the thoracic slope. Eye area dark, with small sparse translucent hairs. Eyes bordered in black.

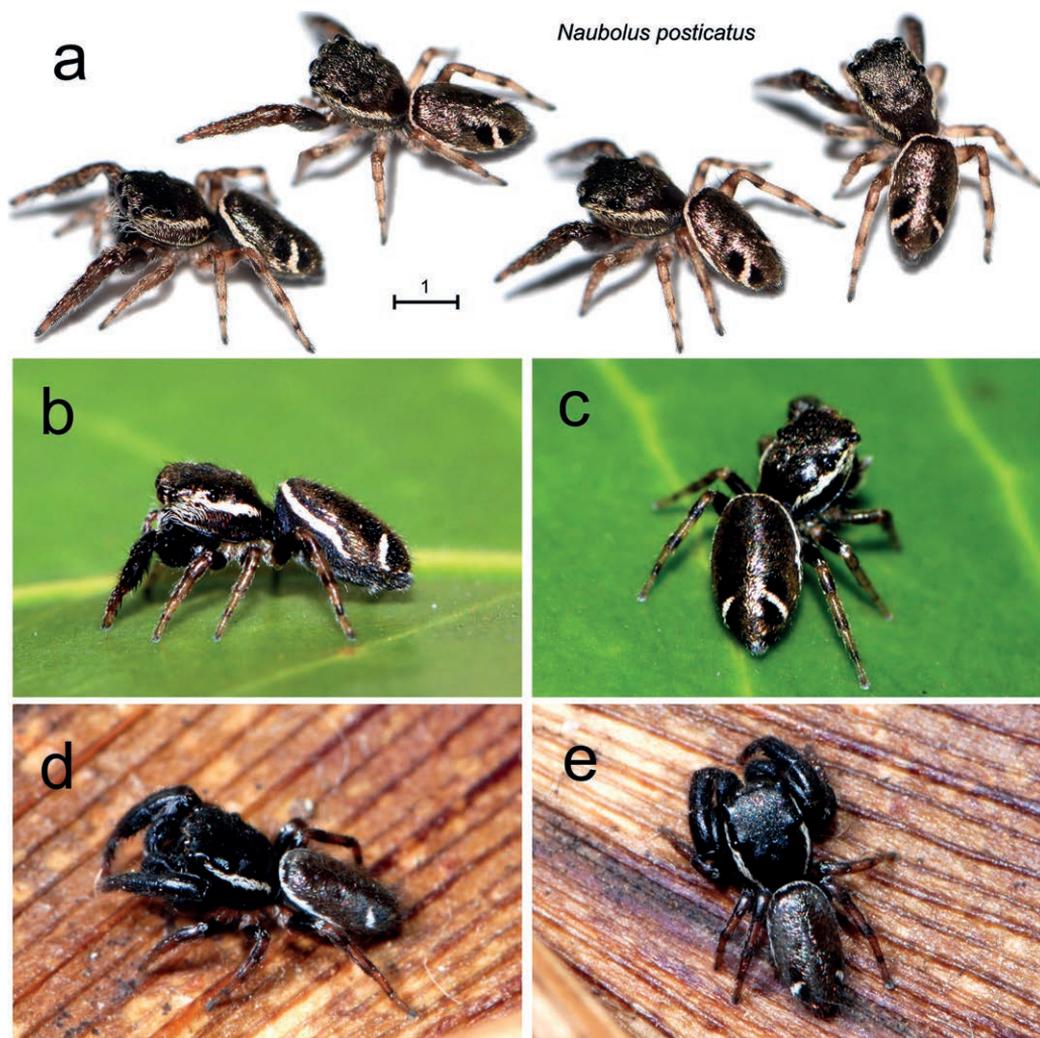


Fig. 5. Live specimens and habitus in nature of *Naubolus posticatus*. a–c — females (a — IBSI-Ar 1317; b, c — IBSI-Ar 0073); d, e — male (IBSI-Ar 0224). Scale bar in mm.

Рис. 5. Живые экземпляры и внешний вид в природе *Naubolus posticatus*. a–c — самки (a — IBSI-Ar 1317; b, c — IBSI-Ar 0073); d, e — самец (IBSI-Ar 0224). Масштаб в мм.

Abdomen brown, dorsally covered with numerous iridescent and translucent hairs, with two conspicuous white marks on the posterior half, and a lateral white band bordering the abdomen, anteriorly and until the half of abdomen. Ventral side pale yellow. Legs dark; palps and first pair of legs black, remaining dark brown with black ringed pattern; chelicerae dark mahogany; endites, sternum and labium dark brown.

Naubolus simplex Mello-Leitão, 1946
Figs 3, 4.

Naubolus simplex Mello-Leitão, 1946: 25, fig. 7 (the holotype ♀ from PARAGUAY: Puerto Pinasco deposited

in MLP 17030, examined; and 1♂, 2 ♀♀ paratypes from Asunción also deposited in MLP 17030, examined); Galiano, 1981: 12; WSC, 2024; Metzner, 2024: figs 30394–30396. The holotype female is faded; left cheliceral fang, left palp, left legs II and III missing; right leg III and epigyne separated from the body. The paratype male if faded; right palp, left legs III and IV, and abdomen missing.

DESCRIPTION. FEMALE: the holotype (Figs 3a, b, 4). Total length 3.55. Carapace length 1.60, width 1.22, height 0.67; abdomen length 1.95, width 1.17. Clypeus low 0.04. Anterior eyes row slightly recurved. Upper edge of the AME somewhat higher than that of the ALE. Eye quadrangle with granulated integument, length 0.80, width 1.11 (at PLE).

Ocular diameters: AME 0.30, ALE 0.17, PME 0.05, PLE 0.15. Second row eyes separated from ALE by 0.25, and from the PLE by 0.31. Fovea dot-shaped, 0.37 mm posterior to the PLE (measured at center). Chelicerae vertical, parallel, paturon with granulated integument and numerous thick, short setae (Fig. 3a); two promarginal teeth and one retromarginal tooth (Fig. 4e). Labium length 0.25, width 0.24. External angle of the endites rounded. Sternum length 0.77, width 0.44. First pair of legs more robust, femur I with great dorsal convexity, tibia I thick. Spination pattern (what is available): leg I, femur d 1–1–1, p ap2, r 0, v0; patella 0; tibia v 2–2–2, p, r and d 0; metatarsus v 2–2, p, r and d 0; tarsus 0; leg II same as leg I, except for tibia v 1–1–1 (retrolaterally). Epigyne: small and weakly sclerotized plate; the CDs are relatively long (within genus), starting in two COs that enter laterally, giving origin to a first curvature of the ducts, going towards the middle plane and extending directly back (Fig. 3b). A conspicuous accessory gland on each copulatory duct head (CDH). A second stretch of the ducts extends dorsally, forming an S and ending in a small spermatheca (Fig. 3b). Fertilization ducts dorsal to the spermathecae, hard to see. A small posterior coupling pocket on the epigastric furrow, with two small sclerotized flanges. Colouration (Fig. 4a–e). Carapace reddish brown, with sparse white scaly hairs of what was apparently a white band on each side, to the posterior margin. Eye area glabrous, lost all hairs, with two dark spots in the middle. Eyes bordered in black. Dorsum of abdomen light brown, yellowish, with two pairs of heart ostia's, the posterior pair more conspicuous than the other. Ventral side pale yellow. Legs and palps pale brown; chelicerae mahogany; endites, sternum and labium pale brown.

DESCRIPTION. MALE: the paratype (Fig. 3c–e). Carapace length 1.92, width 1.38, height 0.85; abdomen missing. Clypeus low 0.06. Anterior eyes row slightly recurved. Upper edge of the AME almost at the same height than that of the ALE. Eye quadrangle and thoracic area with granulated integument, quadrangle length 0.75, width 1.12 (at PLE). Ocular diameters: AME 0.32, ALE 0.17, PME 0.06, PLE 0.15. Second row eyes separated from ALE by 0.23, and from the PLE by 0.50. Fovea dot-shaped, 0.40 mm posterior to the PLE (measured at center). Chelicerae horizontal, divergent, paturon length 1.15, claw length 1.25; one promarginal tooth (smaller), one retromarginal tooth (very large), claw slightly curved at the tip (Fig. 3e). Labium length 0.30, width 0.30. External angle of the endites rounded. Sternum length 0.82, width 0.50. First pair of legs more robust, femur I with great dorsal convexity, tibia I thick. Spination pattern: leg I, femur d 1–1–1, p ap2, r 0, v 0; patella 0; tibia v 2–2–2, p, r and d 0; metatarsus v 2–2, p, r and d 0; tarsus 0; leg II same as leg I, except for tibia v 1–1–1, p 1–1. Palp faded, light brown; cymbium hirsute, hairs shorter and denser at the apex, without

embolus groove (Fig. 3c, d); femur curved, forming a 90-degree angle, with three conspicuous dorsal spines. RTA shaped like a small finger. Embolus short with broad base (EB), sclerotized, tip towards apex, slightly curved ventrally, with a small structural rudiment of ramus (Rm) on the retromargin of the EB (Fig. 3c). Colouration. Carapace color as in female. Eyes bordered in dark mahogany. Abdomen missing. Legs and palps pale brown; chelicerae mahogany; endites, sternum and labium pale brown, coxae pale yellow.

Discussion

A few words ought to be mentioned about the species under consideration here, *N. pallidus*, *N. posticatus* and *N. simplex*. The first name remains *species inquirenda*. Two others are part of a group of several dendryphantine genera of which species remain controversially classified but have similar genital structure, body shape and certain colouration features, e.g. *Dendryphantes lepidus*, *D. reimoseri* or *Metaphidippus fortunatus* (G.W. Peckham et E.G. Peckham, 1901). These species also share a small body size, less than 5 mm, with such dendryphantine genera as *Ahijuna* Rubio, Baigorria et Stolar, 2022, *Pseudofluda* Mello-Leitão, 1928 and *Lumptibiella* Rubio, Baigorria et Stolar, 2022. Yet, these *Naubolus* species can be distinguished from *D. lepidus* (apparently, a member of *Admirala*) by two small COs that are separated from the epigastric furrow instead of two large atria sitting near it (Figs 1a, 3b), plus a different abdominal pattern (cf. fig. 11 in Peckham & Peckham, 1901 or figs D-14958, D-14961 in Metzner, 2024). *Naubolus posticatus* and *N. simplex* can be distinguished from the type species of *Naubolus* by the short CDs, with no more than two loops (very long and coiled in *N. micans*) (Figs 1a, 3b; cf. with plate XXVII, fig. 14 in Galiano, 1963 or D-13209 in Metzner, 2024). Both differ from *Ahijuna* and *Pseudofluda* in having the epigynes lacking atrium and in non-flattened bodies (see fig. 2c, d in Rubio *et al.*, 2022, figs 3, 17 in Nadal & Rubio, 2019 or figs F-19497–8, D-46227, D-22202 in Metzner, 2024), and from *Lumptibiella* by the absence of the lump tibial process or the epigynal atrium (Fig. 3c, d; and cf. figs 3k, 4h in Rubio *et al.*, 2022 or figs F-19511–21 in Metzner, 2024). The males of *N. posticatus* and *N. simplex* have a narrow-tip, broad-based embolus as a potential differential characteristic (Figs 1c, 3c), which may be associated with a pair of projections

arising from the same sclerotized base (LSA and/or Rm), conspicuous in *N. posticatus* (Fig. 1c–e). It is also possible to include the third species, *N. sawayai*, to this species group, for the morphology of its chelicerae (close to that in *N. simplex*), embolus and RTA (very close to those in *N. posticatus*) and the first pair of legs coincide perfectly with the aforementioned, provisional diagnostic characters; the female of *N. sawayai* is also very different from the type species of *Naubolus* (Soares, Camargo, 1948: 431, figs 15–18).

Based purely on the morphology sexual organs, all these species could be also assigned to the genus *Dendryphantes*. However, the notable morphological differences between the species group under discussion and the type species *Dendryphantes hastatus* are as follows: a different body shape, colouration, notably smaller body size, leg size and shape, etc. On top of that, the groups analysed belong to completely different biogeographic regions with a very weak connection: *Naubolus* belongs to the Nearctic or South American zone, while *D. hastatus* belongs to the Palaearctic or Eurasia (*sensu* Cox, 2001; Kreft, Jetz, 2010; Morrone, 2015; Bodner, Maddison, 2015). It can therefore be speculated that these species (and probably many others currently included in the genus *Dendryphantes*) are hardly congeneric with the type species, and would be wrong to assign them to this genus only to reclassify them later on. For this reason, it has been decided to leave them within the genus *Naubolus* until future revisions of South American dendryphantines clarify the real taxonomic position of these species.

REMARKS. Since at present the taxonomic position of the species discussed above is not yet fully understood, the following technical description based on these species may be useful in further determining the true genus to which the species of this particular group within *Naubolus* could belong. Specimens with a total length of 3.30 to 5.00. Clypeus low (0.06) to null. Anterior eyes row slightly recurved. Granulated integument, fovea dot-shaped (Figs 2d, 3a). Chelicerae vertical and parallel in females, with granulated integument, divergent or slightly divergent in males, being parallel or modified on the paturon; one promarginal tooth in males and two teeth in females, both sexes with one retromarginal tooth (Figs 1b, 3e, 4e). Labium almost as long

as wide. External angle of the endites usually rounded. Sternum width 57–61% of its length. First pair of legs more robust, femur I with great dorsal convexity, tibia I thick (Figs 2a, 4a, 5e). Epigyne: small and weakly sclerotized plate; two COs notably separated from the epigastric furrow, CDs relatively short, starting anteriorly or laterally, giving origin to a slightly curvature and going towards the middle plane and extending directly back (Figs 1a, 3b). A conspicuous accessory gland (AG) on each copulatory duct head (CDH). A second stretch of the ducts extends dorsally, ending in a small spermatheca. Fertilization ducts dorsal to the spermathecae. A small posterior coupling pocket on the epigastric furrow. Male palp (Figs 1c, 3c, d): cymbium hirsute, hairs shorter and denser at the apex; femur curved, with three conspicuous dorsal spines. RTA shaped like a cat's claw or a small finger (Fig. 3d). Embolus sclerotized, short with a broad base, slightly curved ventrally, tip narrow, towards apex (Figs 1c–e, 3c). Colouration (Figs 2, 4a–e, 5). Carapace reddish brown to black, with white scaly hairs to the posterior margin that can form two lateral bands. Dorsum of abdomen brown; live specimens darker, covered with numerous iridescent and translucent hairs, conspicuous white marks on the posterior half. Legs and palps brown; chelicerae mahogany; endites, sternum and labium pale brown. Generally, live specimens darker, between brown and black.

Compliance with ethical standards

CONFLICTS OF INTEREST: The authors declare that they have no conflicts of interest.

Acknowledgements. We would like to thank G.B. Edwards for his help in interpreting the structures associated with the dendryphantine embolus; L.E. Acosta for advice on nomenclature. Rubio is Career researcher from CONICET, Baigorria holds a scholarship from the same institution and is a doctorate of Universidad de Buenos Aires. We acknowledge Kirill G. Mikhailov, Dmitri V. Logunov and anonymous reviewers for useful comments on the manuscript. Dmitri Logunov edited the English of the final draft.

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Responsible editor K.G. Mikhailov