Identity check: documenting the type specimens of historical Malagasy wolf spiders (Araneae: Lycosidae)

Verificação de identidade: documentando os espécimes-tipo de aranhas-lobo malgaxes históricas (Araneae: Lycosidae)

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Abstract: This work aims to digitize and disseminate knowledge on historical specimens of Malagasy lycosids, as a foundation for future researchers intending to undertake a comprehensive review of this fauna. The types of *Arctosa atroventrosa* (Lenz, 1886), *Geolycosa nossibeensis* (Strand, 1907), *Hippasosa fera* (Strand, 1907), and *Trochosa urbana hova* Strand, 1907 were examined, figured, and their taxonomic identities discussed herein. *Arctosa atroventrosa* is proposed as a *nomen dubium*. *Geolycosa nossibeensis* is clearly misplaced in *Geolycosa* Montgomery, 1904 and is transferred to *Trochosa* C. L. Koch, 1847 as *Trochosa nossibeensis* comb. nov. Likewise, *H. fera* is a valid species but is misplaced in *Hippasosa* Roewer, 1960 and does not belong to this genus. *Trochosa urbana hova*, recently synonymised with the nominal species is confirmed in its current taxonomic placement. *Lycosa madagascariensis* Vinson, 1863 is treated as a *species inquirenda* as the types cannot be located but the mention of specific localities in Madagascar could allow future workers to designate a neotype to recognise this species. *Lycosa signata* Lenz, 1886 is treated as a valid species, although a neotype designation will be required in future as the holotype was destroyed as a result of bombing raids on the Museum of Lübeck during the World War II and its vulva never previously illustrated.

Keywords: Morphology. Taxonomy. *Arctosa*. *Hippasosa*. *Lycosa*. *Trochosa*.

Resumo: Este trabalho tem como objetivo digitalizar e disseminar conhecimento sobre espécimes históricos de licosídeos malgaxes, como base para futuros pesquisadores que queiram revisar de forma abrangente esta fauna. Os tipos de *Arctosa atroventrosa* (Lenz, 1886), *Geolycosa nossibeensis* (Strand, 1907), *Hippasosa fera* (Strand, 1907) e *Trochosa urbana hova* Strand, 1907 foram examinados e documentados, e suas identidades taxonômicas são discutidas aqui. *Arctosa atroventrosa* é proposto como um *nomen dubium*. *Geolycosa nossibeensis* claramente não pertence a *Geolycosa* Montgomery, 1904 e é transferido para *Trochosa* C. L. Koch, 1847 como *Trochosa nossibeensis* comb. nov. Da mesma forma, *H. fera* é uma espécie válida, mas está mal alocada em *Hippasosa* Roewer, 1960 e não pertence a este gênero. *Trochosa urbana hova*, recentemente sinonimizada com a espécie nominal, é confirmada em sua atual posição taxonômica. *Lycosa madagascariensis* Vinson, 1863 é tratada como uma *species inquirenda*, pois os tipos não podem ser localizados, mas a menção de localidades específicas em Madagascar pode permitir que futuros pesquisadores designem um neótipo para reconhecer esta espécie. *Lycosa signata* Lenz, 1886 é tratada como uma espécie válida, embora uma designação de neótipo seja necessária no futuro, pois o holótipo foi destruído como resultado de bombardeios no Museu de Lübeck durante a Segunda Guerra Mundial e sua vulva nunca foi ilustrada anteriormente.

Palavras-chave: Morfologia. Taxonomia. *Arctosa*. *Hippasosa*. *Lycosa*. *Trochosa*.

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INTRODUCTION

Lycosidae Sundevall, 1833, known globally as wolf spiders, are a ubiquitous group presently containing 134 genera and 2473 species (World Spider Catalog, 2024). Afrotropical Lycosidae prove a particular challenge, with many species known only from written descriptions (without illustrations) from the Victorian and Edwardian periods, but modern revisions are slowly improving knowledge of these taxa (e.g. Logunov, 2023; Sherwood et al., 2023).

Madagascar is an island renowned for its biodiversity (Myers et al., 2000), with many spider groups receiving attention from modern workers (e.g. Gregorič et al., 2015; Henrard & Jocqué, 2017; Jäger, 2020, 2021; Griswold et al., 2022). However, according to the World Spider Catalog (2024) only eight lycosid species are known to occur on the island, none having been illustrated or redescribed in the twenty first century. The Madagascan lycosid fauna is likely underestimated. However, before future studies with modern material can ascertain this, historical taxa must be addressed.

According to Vinson (1863) the species *Pardosa cinerascens* (Roewer, 1951) [as *Lycosa cinerea* Vinson, 1863] and *Pardosa vinsoni* (Roewer, 1951) [as *Lycosa nigra* Vinson, 1863] do not occur in Madagascar, as currently stated by the World Spider Catalog (2024) and thus the current count of eight must be reduced by two. These pardosine species are outside the scope of this contribution and should be addressed by future workers.

In this work, in order to lay a foundation for future workers, we assess the six species of lycosid spiders known from Madagascar, addressing the taxonomy of all but one of these species, and considering a further two recorded by the World Spider Catalog (2024) as being erroneous distribution records.

MATERIAL AND METHODS

Specimens were examined under binocular microscopes. Photographs were made (except those of *H. fera* which were made by Nadine Dupérré using a custom BK Labs imaging system) using a Canon EOS 6D Mark II attached to a Leica MZ12.5 stereomicroscope, with images stacked using Helicon Focus software. Abbreviations, Institutes: MLB = Lübeck Museum, Lübeck, Germany; MNHN = Muséum National d'Histoire Naturelle, Paris, France (collection staff: Christine Rollard and Elise-Anne Leguin); SMF = Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany (collection staff: PJ); ZMB = Museum für Naturkunde, Berlin, Germany (collection staff: Jason Dunlop); ZMH = Zoologisches Museum, Universität Hamburg, Germany (collection staff: Danilo Harms and Nadine Dupérré). Structures: ALE = anterior lateral eyes, AME = anterior median eyes, PLE = posterior lateral eyes, PME = posterior median eyes. Other: det. = determined by; leg. = legit. Leg formulae start with the longest leg to the shortest in order of decreasing size, e.g. 4123. The diagnoses given herein are only between other known species on Nosy Be, this is simply because the state of lycosid taxonomy precludes a proper analysis against all relevant congeners. The purpose of this work is to provide full information on the type specimens of existing species only, as a foundation for future workers. Total lengths exclude chelicerae. All measurements are in mm and were measured with an ocular micrometer. Non-ocular measurements are given to one decimal point, measurements of eyes and eye interdistances are conversely measured to two decimal points due to their much smaller size. In accordance with Article 8 of the International Code of Zoological Nomenclature, this work was preregistered in ZooBank prior to publication. LSID: urn:lsid:zoobank.org:pub:719F1B50-9979-4177-9C57-E4DF50048D26

TAXONOMY

Arctosa atroventrosa (Lenz, 1886) *nomen dubium*
(Figure 1)

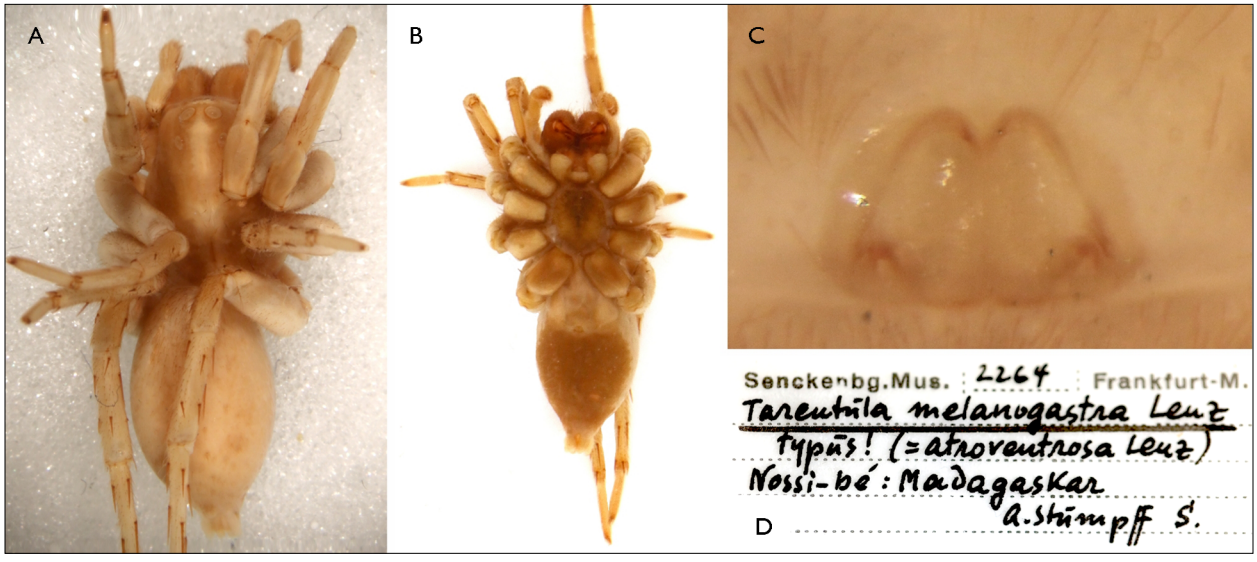

Figure 1. *Arctosa atroventrosa* (Lenz, 1886) *nomen dubium*: holotype immature female (SMF 2264). A) Habitus, dorsal view, B) habitus, ventral view, C) pre-epigyne, ventral view, D) data label.

Lycosa atroventrosa Lenz, 1886: 401, pl. 10, fig. 11 (imm. ♀, as *Lycosa melanogaster* [preoccupied] in main text but *L. atroventrosa* used in figure legend, thereby available).
Tarentula melanogaster: Strand, 1916: 79.
Hogna lenzi Roewer, 1951: 440 (superfluous replacement name).
Arctosa lenzi: Roewer, 1955: 229.
Arctosa atroventrosa: Roewer, 1960: 645, figs. 363a–b (imm. ♀).

Type material. Holotype imm. ♀ (SMF 2264), Nossi-bé [Nosy Be], A. Stumpf leg., examined.

Complimentary morphological data. Total length: 11.5. Carapace: 5.2 long, 4.0 wide, abdomen 6.2 long, 3.7 wide. Chelicerae with 3 promarginal and 4 retromarginal teeth, no denticles and a single escort seta.

Remarks. The holotype (Figures 1A–1D) is an immature female with a pre-epigyne (Figure 1C). It is not diagnosable from other taxa on Nosy Be and as an immature specimen is not informative for a tenable morphological diagnosis. Thus, is hereby proposed as a *nomen dubium*.

Trochosa nossibeensis (Strand, 1907) comb. nov.
(Figures 2–4)

Tarentula nossibeensis Strand, 1907: 743 (imm.).
Geolycosa nossibeensis: Roewer, 1955: 242.
Geolycosa nossibeensis: Roewer, 1960: 715, figs. 400a–c (♀).

Type material. Holotype imm. (Museum of Lübeck), destroyed during WWII; neotype ♀ (SMF 9910480) [designated by Roewer, 1960], Madagascar, Nossibé [Nosy Be], Roewer det. 1957, examined.

Diagnosis. *Trochosa nossibeensis* comb. nov. is readily distinguished from known sympatric congeners by the dumbbell-shaped median septum, with absence of pronounced sclerotization on the outer edges of the basal part (median septum anchor-shaped in *T. urbana*; I-shaped and with pronounced sclerotization of outer edges of basal part in *H. fera*).

Redescription of neotype female (SMF 9910480): Total length: 15.7. Carapace: 7.7 long, 5.6 wide. Eye sizes and interdistances: AME 0.36, ALE 0.30, PME 0.65, PLE 0.51, AME–AME 0.09, AME–ALE 0.05, PME–PME

0.31, PME–PLE 0.49, AME–PME 0.20, ALE–PLE 0.96. Abdomen: 8.0 long, 5.6 wide. Leg formula: 4123. Leg measurements: I 17.4 (5.0+2.7+4.1+3.3+2.3), II 16.3 (4.5+2.7+3.7+3.2+2.2), III 15.5 (4.2+2.9+3.1+3.6 +2.3), IV 20.7 (5.3+2.6+4.6+5.4+2.8). Chelicerae with 3 promarginal and 3 retromarginal teeth, no denticles and a single escort seta. Epigyne and vulva: epigyne (Figures 3C, 4A) with median septum dumbbell-shaped, longer than wide, lateral sides tapering distally (septal length/width ratio 3.8 at its narrowest part); length of septum and posterior transverse plate essentially equal; hoods wide and deep, separated by distance slightly less than width of each hood; vulva (Figures 4B–4D) with receptacles sinuous medially, terminating in elongate and rounded spermathecae, fertilisation ducts situated posteriorly, directed outwards. Colour (in alcohol): yellowish-brown; carapace with two wide lateral bands, medially with fovea dark and two parallel narrow lines between fovea and eyes, marginally with single patches; ventrally overall dark brown; chelicerae reddish-brown, with proximo-lateral humps yellow; opisthosoma dorsally light yellowish-brown with darker heart patch, laterally yellowish-brown with irregular pattern, ventrally dark-brown, spinnerets yellowish-brown (Figures 2A–2D, 3A–3B).

Male. Unknown.

Distribution. Known only from the type locality, Nosy Be, Madagascar.

Remarks. This species is clearly misplaced in *Geolycosa* Montgomery, 1904. The ocular arrangement, carapace colouration, and general form of the epigyne are congruent with that of *Trochosa ruricola* (De Geer, 1778), the type species of *Trochosa* C. L. Koch, 1847, suggesting this species is at the very least a member of the *Trochosa sensu lato*. Therefore, we herein transfer *G. nossibeensis* to this genus, creating the new combination *Trochosa nossibeensis* comb. nov., and suggest future workers attempt to collect topotypic material to better understand its placement. A global revision of *Trochosa* is warranted, but entirely outside the scope of the present work.

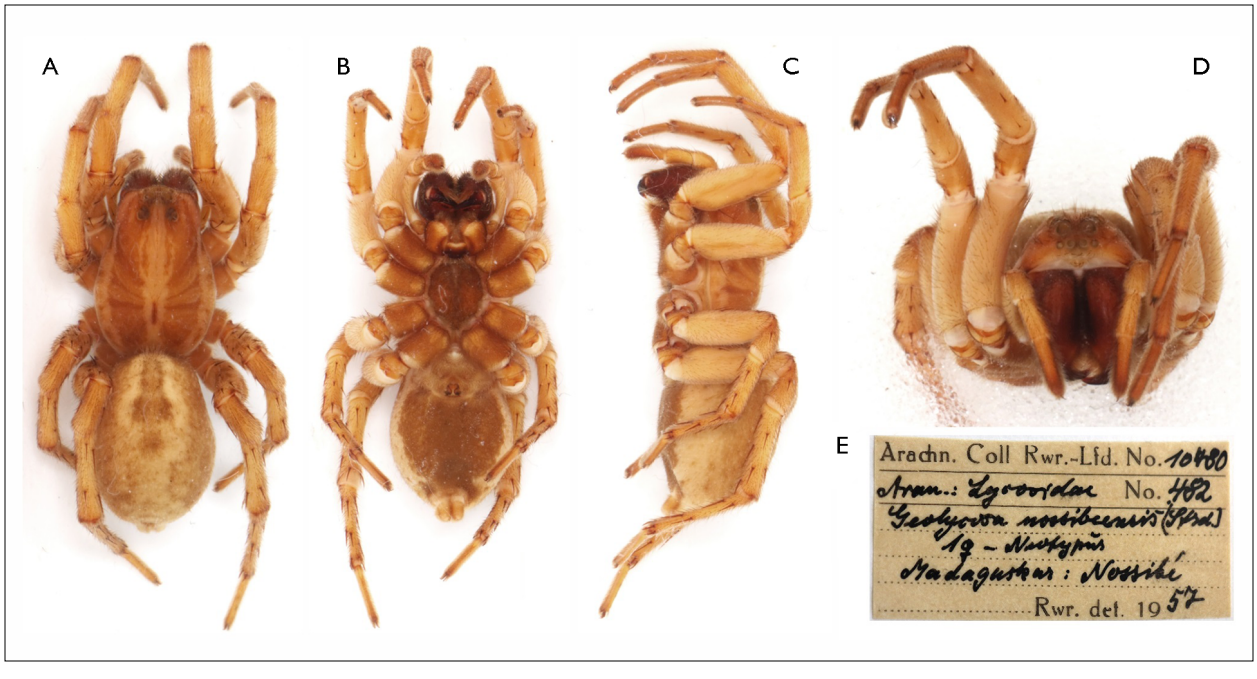

Figure 2. *Trochosa nossibeensis* (Strand, 1907) comb. nov.: holotype female (SMF 9910480). A) Habitus, dorsal view, B) habitus, ventral view, C) habitus, lateral view (left-hand side), D) cephalothorax, frontal view, E) data label.

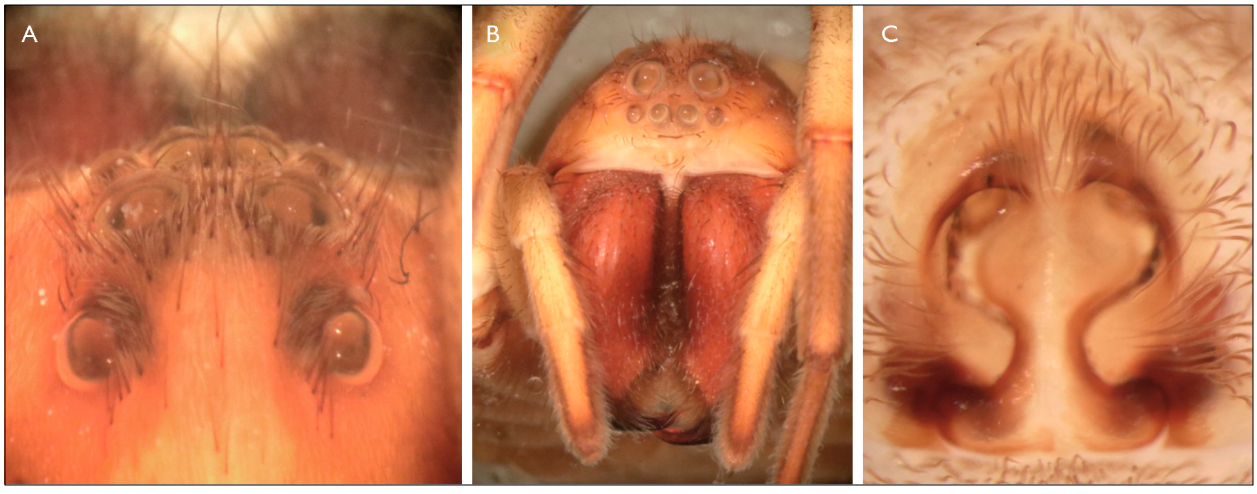

Figure 3. *Trochosa nossibeensis* (Strand, 1907) comb. nov.: holotype female (SMF 9910480). A) Close-up of eyes, dorsal view, B) same, frontal view, C) epigyne (undissected), ventral view.

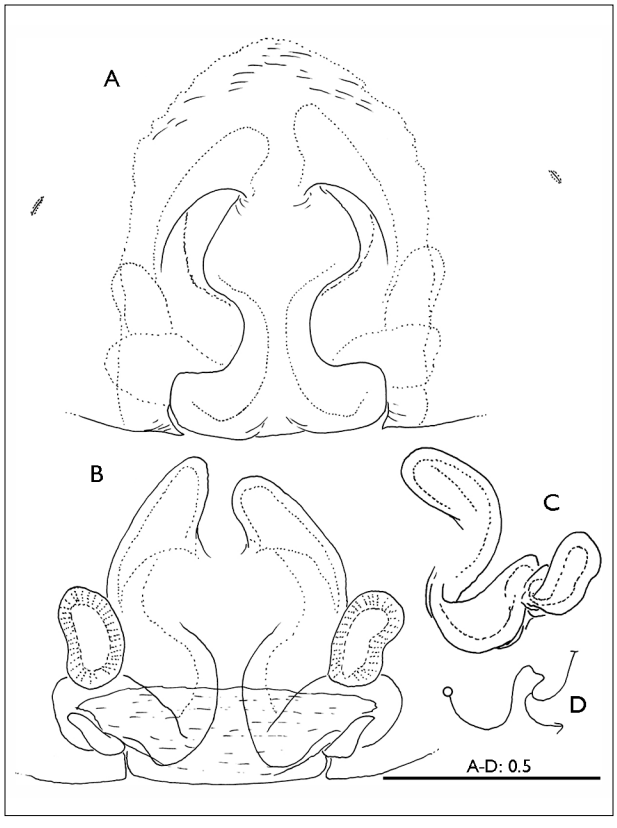

Figure 4. *Trochosa nossibeensis* (Strand, 1907) comb. nov.: holotype female (SMF 9910480), illustrations of epigyne and vulva. A) Epigyne (dissected), ventral view, B) vulva, dorsal view, C) detail of copulatory ducts, lateral view, D) schematic course of duct, lateral view. Scale bar = 0.5 mm.

Hippasosa fera (Strand, 1908)
(Figure 5)

Lycosa robusta Lenz, 1891: 171, pl. 1, fig. 7 (♀, preoccupied).
Ocyale fera Strand, 1908a: 155 (replacement name).
Ocyale fera: Roewer, 1960: 814, figs. 452a–b (♀).
Ocyale fera: Alderweireldt, 1996: 1364 (states as misplaced in *Ocyale*).
Hippasosa fera: Sherwood, 2022: 583 (transferred from the pisaurid genus *Ocyale*).

Type material. Holotype ♀ (ZMH-A0003552), Nossi-Bé [Nosy Be], Albr. O'Swald leg., ded. 02/07/1888, examined by photographs only.

Diagnosis. *Hippasosa fera* can be distinguished from females of *H. dewinterae* (Alderweireldt, 1996), *H. discrepans* (Roewer, 1960), *H. ghost* (Jocque & Jocqué, 2017), *H. grandis* (Alderweireldt, 1996), *H. guttata* (Karsch, 1878), *H. pilosa* Roewer, 1960, and *H. qiongzhongensis*(Ying & Peng, 1997) by the wide anterior flaring of the median septum (absent, anterior of septum extremely straight and thin in *H. dewinterae*, *H. discrepans*, *H. ghost*, *H. grandis*, *H. guttata*, *H. pilosa* and *H. qiongzhongensis*). The female genitalia of *H. kumari* (Dyal, 1935), *H. lanca* (Karsch, 1879),

and *H. pelliona* (Audouin, 1826) are unknown but can be tentatively differentiated based on their disjunct localities (Pakistan, Sri Lanka, Egypt and Algeria, respectively vs. Madagascar). The shape of the medium septum readily differentiates this species from other lycosid species presently described from Madagascar.

Complimentary redescription of holotype female. Total length: 9.87. Carapace: 5.14 long, 3.43 wide. Eye sizes and interdistances: AME 0.43, ALE 0.30, PME 0.22, PLE 0.19, AME–AME 0.36, AME–ALE 0.46, PME–PME 0.20, PME–PLE 0.08, AME–PME 0.12, ALE–PLE 0.57. Abdomen: 4.73 long, 2.70 wide. Leg formula: 4123. Leg measurements: I 12.89 (3.58+1.71+2.40+3.10+2.10); II 12.61 (3.64+1.45+2.48+3.05+1.99); III 12.56 (3.40+1.41+2.12+3.80+1.83); IV 16.99 (4.24+1.94+3.40+4.71+2.70). Chelicerae with 3 promarginal and 3 retromarginal teeth, no denticles and a single escort seta (Figure 5C). Epigyne and vulva: epigyne (Figures 5D–5E) T-shaped, median septum longer than wide, narrow medially, wide in posterior and anterior thirds, (septal length/width ratio 4.0 at its narrowest part); length of septum and posterior transverse plate essentially equal, anterior hoods laterally situated, shallow and indistinct, base of septum with outer edges heavily sclerotised; vulva (Figure 5F) with gently sinuous S-shaped copulatory ducts, leading to circular spermathecae, fertilisation ducts situated posteriorly, directed inwards. Colour (in alcohol): margins of carapace dark brown, rest light brown, abdomen beige with dark brown speckles all over; spinnerets light brown (Figure 5A); legs light brown with faint dark brown annulations; ventrally overall light brown except for legs which show faint dark brown annulations.

Distribution. Known only from the type locality, Nosy Be, Madagascar.

Remarks. We update the redescription given by Roewer (1960), who paid particular detail in (accurately) describing the colouration and leg spination but whose drawings of the genitalia are schematic. This species is certainly misplaced in *Hippasosa* Roewer, 1960, Alderweireldt (1996) postulated it may belong to *Lycosa sensu lato*, but we suspect instead it belongs to another genus. However, it is imperative that topotypic material be collected and material from mainland Madagascar be examined before any such taxonomic act is taken, especially since so many historical lycosid genera remain without any published illustrations of the genitalia.

Lycosa madagascariensis Vinson, 1863 *species inquirenda*

Lycosa madagascariensis Vinson, 1863: 297 (♀).
Lycosa madagascariensis: Roewer, 1955: 271.

Type material. Not located in MNHN, SMF, ZMB or ZMH, probably lost.

Remarks. Vinson (1863, p. 16) states this species occurs "le lit de la rivière de Ranomafana près du village de Voizanliar ou Bout-Zanaar", which provides a type locality that can be approximated today to the confines of the Ranomafana National Park. The description is not particularly useful for identification purposes, but we prefer to keep the species as valid until such time as it is possible for future workers to attempt to collect topotypes. Therefore, we treat *Lycosa madagascariensis* Vinson, 1863 as a *species inquirenda*.

Lycosa signata Lenz, 1886

Lycosa signata Lenz, 1886: 402, pl. 10, fig. 10 (♀).

Allohogna signata: Roewer, 1955: 212.
Allohogna signata: Roewer, 1960: 737, figs. 415a–b (♀).

Type material. Holotype ♀ (MLB), Nosy Be, Madagascar, destroyed during WWII.

Remarks. A drawing of the epigyne is presented by Lenz (1886, pl. 10, fig. 10), which shows the medium septum is flared medially, unlike that of the other known lycosids of Nosy Be. It is thus clearly not synonymous with any of the other species on that island. Unfortunately, the holotype is lost, precluding further study, and it is necessary that future topotypic material be collected with matching morphology

Figure 5. *Hippasosa fera* (Strand, 1908): holotype female (ZMH-A0003552). A) Carapace and abdomen, dorsal view, B) data labels, C) chelicerae, ventral view, D) epigyne (undissected), ventral view, E) epigyne (dissected and cleared), ventral view, F) vulva, dorsal view. Scale bars = 0.5 mm. Photographs by, and courtesy of, Nadine Dupérré (ZMH).

of the median septum before more can be said about the generic placement of this species.

Trochosa urbana O. Pickard-Cambridge, 1876
(Figure 6)

Trochosa urbana O. Pickard-Cambridge, 1876: 601, pl. 60, fig. 14 (♂♀).

Tarentula urbana gofensis Strand, 1906: 685 (♀).
Tarentula urbana hova Strand, 1907: 744 (♀). syn. conf.
Tarentula sansibarensis Strand, 1907: 743 (♀).
Tarentula urbana molensis Strand, 1908b: 48 (♂).
Trochosina arctosaeformis Caporiacco, 1940: 798 (imm.).
Trochosa urbana: Marusik, Nadolny & Koponen, 2020: 482, 487, 488, 489, figs. 1a–c, 2a–d, 3a–c, 4a–c, 4g,

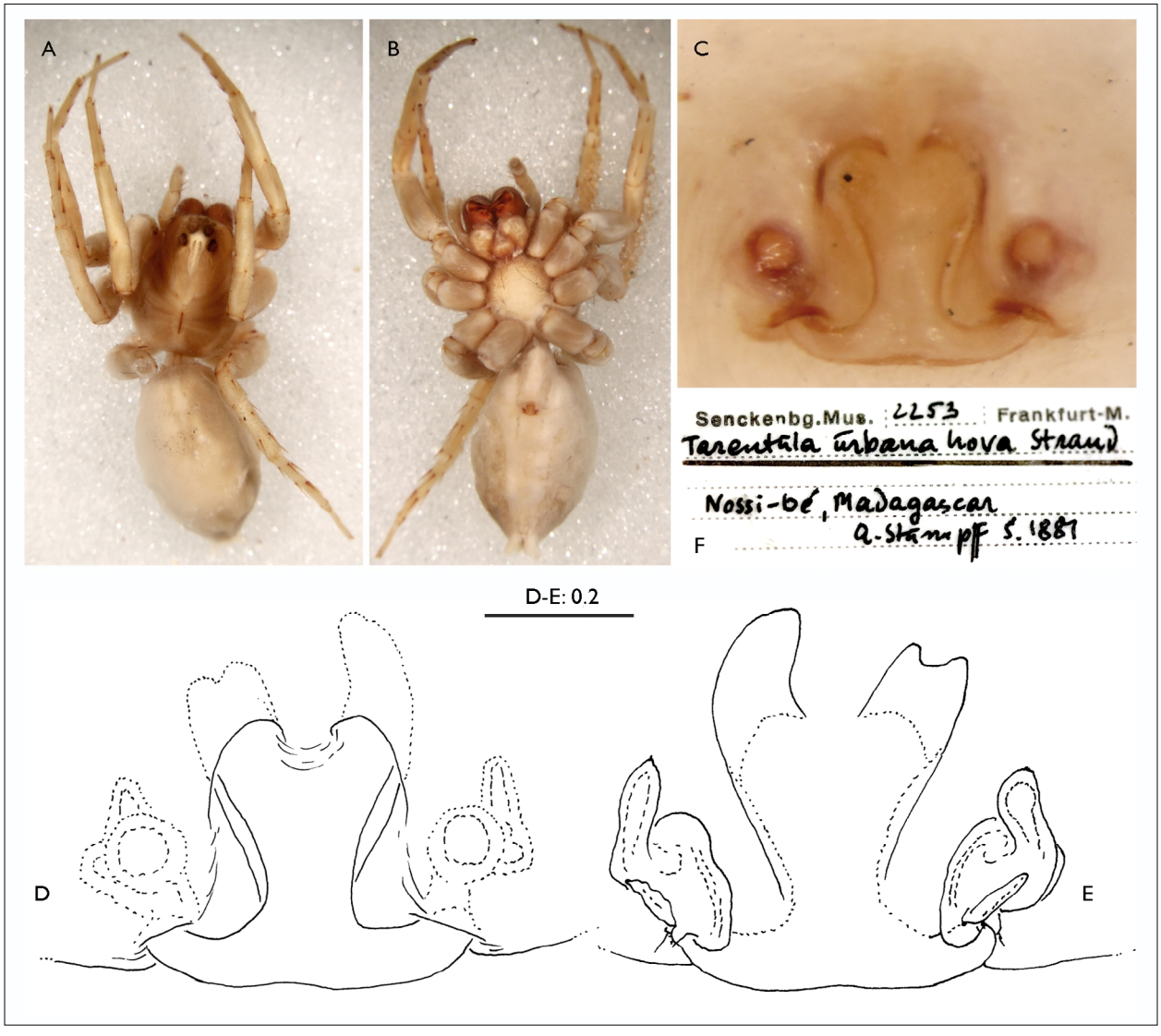

Figure 6. *Trochosa urbana* O. Pickard-Cambridge, 1876: holotype of *Tarentula urbana hova* Strand, 1907 (SMF 2253). A) Habitus, dorsal view, B) habitus, ventral view, C) epigyne (undissected), ventral view, D) illustration of epigyne (dissected and cleared), ventral view, E) illustration of vulva, dorsal view, F) data labels. Scale bar: 0.2 mm (D–E).

suppl. figs. 1A–E, 2.7–9, 3A–B, D, 4C–D, 5C (♂♀, synonomy of *Tarentula urbana hova*).

For full synonymy list, see World Spider Catalog (2024).

Type material. Holotype ♀ (SMF 2253), Madagascar, Nossi-bé [Nosy Be], A. Stumpff leg. 1881; for type material of other synonyms and the original material of Pickard-Cambridge (1876), see Marusik et al. (2020).

Complimentary morphological data. Total length: 11.1. Carapace: 4.8 long, 3.5 wide. Abdomen: 6.3 long, 3.9 wide. Chelicerae with 3 promarginal (distal tooth broken off on left chelicera) and 3 retromarginal teeth, no denticles and a single escort seta.

Remarks. Our examination of the female in SMF confirms the synonymy of the subspecies *T. urbana hova*, as proposed by Marusik et al. (2020). At present, *T. urbana* is the only non-native species of wolf spider currently known from Nosy Be and Madagascar broadly.

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AUTHOR'S CONTRIBUTION

D. Sherwood contributed to conceptualization, data curation, formal analysis, investigation, methodology, project administration, and writing (original draft, review and editing); and P. Jäger contributed to conceptualization, data curation, formal analysis, investigation, methodology, project administration, and writing (review and editing).