

# *Dinidor mactabilis* (Perty, 1833): first record of Dinidoridae (Hemiptera: Pentatomoidea) in the state of São Paulo, Brazil

Bruno C. Genevcius<sup>1\*</sup>, Renan Carrenho<sup>2</sup> and Cristiano F. Schwertner<sup>2</sup>

1 University of São Paulo, Museum of Zoology (MZUSP), Av. Nazaré, 481, CEP 04263-000, São Paulo, SP, Brazil

2 Federal University of São Paulo, Department of Biological Sciences, R. Prof. Artur Riedel, 275, CEP 09972-270, Diadema, SP, Brazil

\* Corresponding author. E-mail: [bgenevcius@gmail.com](mailto:bgenevcius@gmail.com)

**Abstract:** Species of Dinidoridae in Brazil are currently known only from five localities, which has been attributed in the literature to the lack of field collections. We report the first record of *Dinidor mactabilis* (Perty, 1833) in the state of São Paulo, Brazil, also representing the first record of the family Dinidoridae in São Paulo. A female of *Dinidor mactabilis* was collected in a fragment of the Atlantic Forest close to the Billings Reservoir, in the municipality of São Bernardo do Campo, extending its known distribution in southeastern Brazil by at least 200 km.

**Key words:** Heteroptera; Pentatomomorpha; diversity; new record

Dinidoridae is a small family of Pentatomoidea that comprises 115 species divided into 13 genera (Grazia and Schwertner 2011). Species of this family have elliptical large body (9–30 mm), aposematic coloration with black or brown body covered with red marks, laterally keeled head and short scutellum. The Dinidoridae are broadly understudied in terms of biology, ecology, and systematics, especially those species of the Neotropical region. Despite their large size and attractive color, they are poorly collected and represented in entomological collections (Schwertner and Grazia 2016).

The taxon was firstly established as a subfamily of Pentatomidae (Stål 1870), but it has been recognized as a separate family since Leston (1955). The classification of the family has been recently revised (Rolston et al. 1996; Kocorek and Lis 2000), and it is currently divided into two subfamilies (Dinidorinae and Megymeninae) and four tribes (Dinidorini, Thalmini, Megymenini and Byrsodepsini). The vast majority of the diversity in Dinidoridae is distributed in the Afrotropical and Indomalayan regions, but a few species have been recorded in Australia and in the Neotropics (Schuh and Slater 1995).

The type genus, *Dinidor* Latreille, 1829, is the only one that occurs in the Neotropics. The genus is endemic to this region, distributed in Argentina, Bolivia, Brazil, Colombia, Ecuador, Panama and Paraguay (Rolston et al. 1996). Four species are known to occur in Brazil: *Dinidor braziliensis* Durai, 1987, *Dinidor mactabilis* (Perty, 1833), *Dinidor saucius* Stål, 1870 and *Dinidor rufocinctus* Stål, 1870. *Dinidor braziliensis* has been recorded exclusively in Distrito Federal, *D. saucius* in Espírito Santo and Rio de Janeiro and *D. rufocinctus* has no records at state level. To date, *D. mactabilis* has the largest number of records in the country, occurring in the states of Amazonas, Rio de Janeiro and Rio Grande do Sul. However, specific records at the municipality level have been provided only twice, both to Rio Grande do Sul (municipalities of Santa Maria and Derrubadas). Because these three states embrace distinct biomes and the exact distribution of the species is far from sufficiently representative, our capability to approach ecological and biogeographical questions with this group is very limited.

In this note we report the first record of *Dinidor mactabilis* in the state of São Paulo (Table 1; Figure 1). BCG and CFS collected a female by beating and sweeping the vegetation using insect nets during a heteropteran survey on 11 and 12 November 2010. The area is a relatively homogeneous small fragment of Atlantic Forest of around 10,000 m<sup>2</sup>, where secondary forest is most predominant. It is located at the northwestern portion of the Billings Reservoir (Figure 2), in the municipality of São Bernardo do Campo, São Paulo (23°44'93.3" S, 046°38'28.4" W). The specimen was collected under a SISBIO permit (number 21383-1) and deposited pinned in the entomological collection of the Museum of Zoology of the University of São Paulo, SP, Brazil (voucher MZUSP DIN-1110).

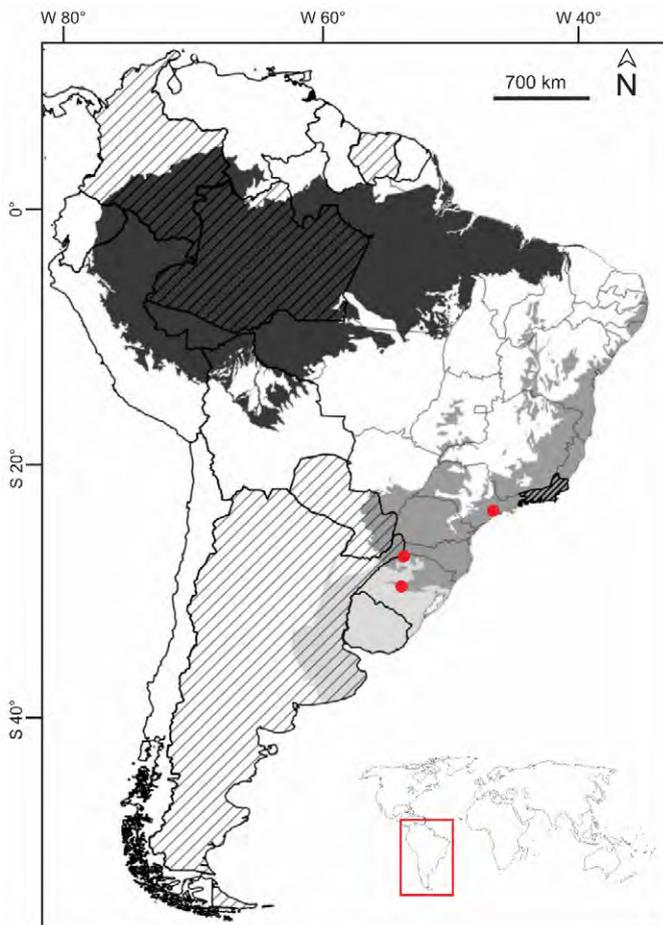
The specimen was photographed in dorsal, ventral and lateral views using a stereoscope Leica M205c to allow the visualization of key morphological features. The distribution maps were built using Quantum GIS

**Table 1.** All records of *Dinidor mactabilis* including the new record reported herein.

Country/State	Municipality	Coordinates	Reference/voucher
Brazil/Amazonas	—	—	Rolston et al. (1996) <sup>†</sup>
Brazil/Rio de Janeiro	—	—	Rolston et al. (1996) <sup>†</sup>
Brazil/Rio Grande do Sul	Santa Maria	29°46'36.2" S, 054°06'16.6" W	Grazia et al. (2012) <sup>†</sup>
Brazil/Rio Grande do Sul	Derrubadas	27°15'57" S, 053°51'45" W	Schmidt and Barcellos (2007) <sup>†</sup>
Brazil/São Paulo*	São Bernardo do Campo	23°44'93.3" S, 046°38'28.4" W	MZUSP DIN—1110
Argentina	—	—	Rolston et al. (1996) <sup>†</sup>
Colombia	—	—	Rolston et al. (1996) <sup>†</sup>
Paraguay	—	—	Rolston et al. (1996) <sup>†</sup>
Surinam	—	—	Rolston et al. (1996) <sup>†</sup>

\* New record in São Paulo reported in this note

† Records from literature with voucher numbers not informed.

**Figure 1.** Distribution map of *Dinidor mactabilis* showing political division and biomes with species occurrence points. Shaded areas represent biomes: dark gray (Amazonia), medium gray (Atlantic Forest) and light gray (Pampa). Dashed areas represent states or countries with reported records on literature where specific locations are not informed. Red dots are the only records at the municipality level.

(QGIS Development Team 2016), shape files obtained from MMA (2015) and TNC (2013) web sites and Google Earth™.

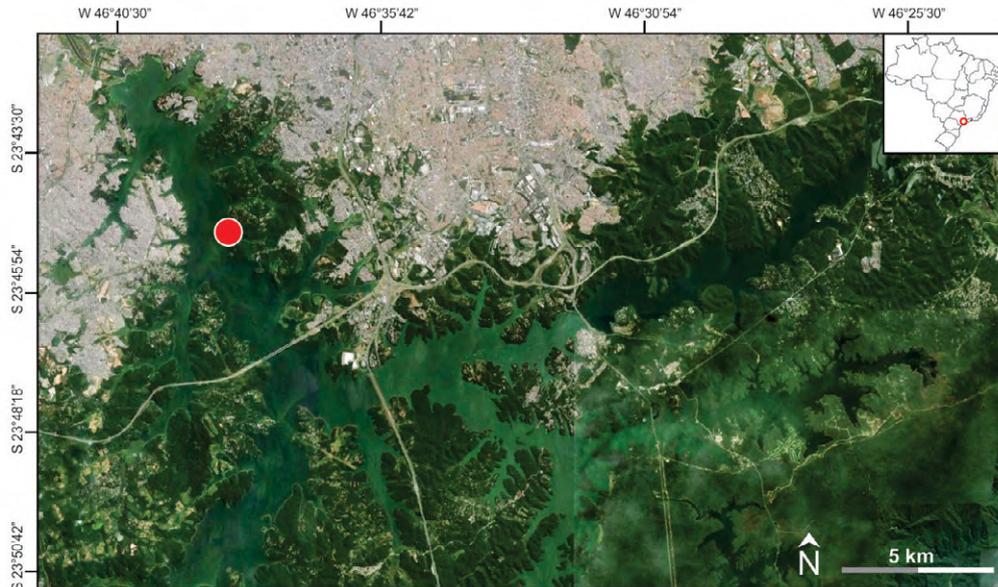
The specimen was identified in laboratory using the taxonomic key of Durai (1987) and compared to the holotypes of *D. rufocinctus* and *D. saucius* (photographs available at [http://www2.nrm.se/en/het\\_nrm](http://www2.nrm.se/en/het_nrm)). Individuals of *Dinidor* can be recognized by large bodies,

small heads, antennae 4-segmented with first three segments uniformly colored in orange, corium much longer than scutellum (usually more than twice), connexivum exposed at least partially, spiracles placed in linear arrangement usually colored in red or yellow, and several characteristics of male and female genitalia (Durai 1987). As mentioned before, this is the only genus of Dinidoridae occurring on the Neotropics.

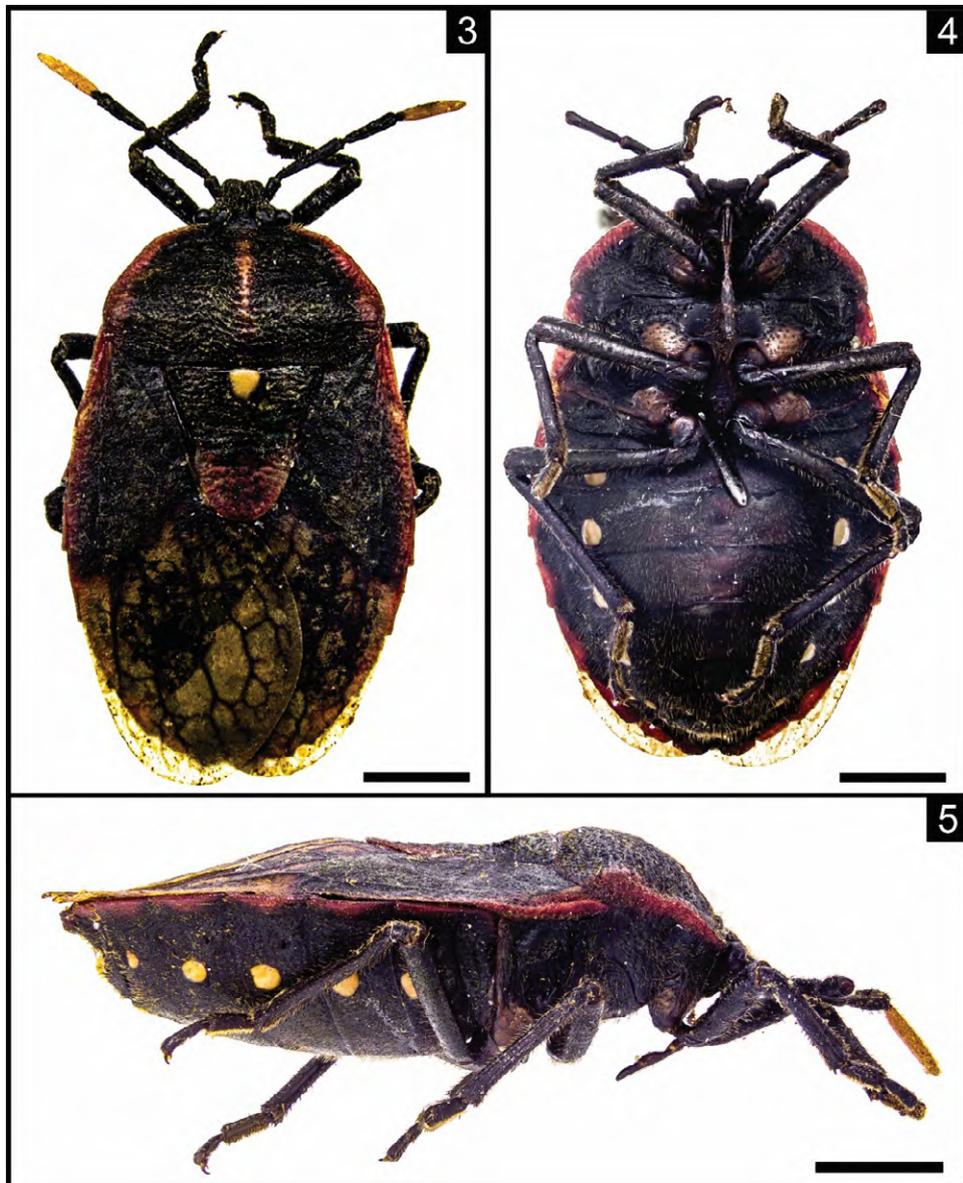
Within *Dinidor*, most diagnostic characteristics are based on color patterns (Durai 1987). *Dinidor mactabilis* can be distinguished from *D. impicticollis* by the pronotum colored in red along its external margins (Figures 3 and 4). From *D. braziliensis*, *D. saucius* and *D. rufocinctus*, *D. mactabilis* can be distinguished by the presence of darkened spots at each intersegment of the connexivum and urosternite (Figure 5), while are uniformly orange or red in the other three species. The most remarkable characteristic of *D. mactabilis* is the presence of a thin longitudinal red stripe (as wide as the eye) in the median region of the pronotum (Figure 3). The band is uniformly conspicuous in 80% of its whole extension, becoming inconspicuous close to the posterior margin of the pronotum. This red band is absent in *D. braziliensis* and *D. impicticollis*, whereas present and much larger in *D. saucius* (four times wider than *D. mactabilis*).

The four species of Dinidoridae that occur in Brazil have, together, only seven records of geographic distribution (Rolston et al. 1996). This lack of data *per se* makes field collections and publications of new records high priority. As such, a better understanding of distribution patterns is certainly fundamental for decision making in conservation strategies and future studies on ecology and evolution with geographical approaches.

In this note we extend the known distribution of *D. mactabilis* in southeastern Brazil between 200 and 600 km, but we cannot provide a more precise estimate because nearly all records to date are given only in state level. 200 and 600 km are the closest and farthest points within Rio de Janeiro state north of our new record. *Dinidor mactabilis* has been previously reported in Amazonas, Rio de Janeiro and Rio Grande do Sul, and therefore occurs in at least two biomes: the Atlantic Forest and the Amazonia. The records of



**Figure 2.** Site where the specimen of *Dinidor mactabilis* was collected, at the northwestern branch of the Billings Reservoir. In the north, the metropolitan region of São Bernardo do Campo. Source of image: © 2016 DigitalGlobe, GoogleEarth (© 2016 Google).



**Figures 3–5.** Female of *Dinidor mactabilis* collected in the State of São Paulo and key diagnostic features. **3:** Dorsal view, external lateral margins of pronotum colored in red and the longitudinal median red band. **4:** Ventral view, lateral margins of pronotum colored in red. **5:** Right lateral view, blackened intersegments of the urosternite. Scale bar is 3 mm. Photos by B.C. Genevicius.

Rio Grande do Sul are located in the municipalities of Santa Maria and Derrubadas, the first a transition zone between the Atlantic Forest and the Pampa, and the second within the Atlantic Forest (Löbler et al. 2015). Because disjunct distributions in terrestrial insects are unusual, especially when a particular species occurs at a broad geographic scale, the most likely scenario is that the distribution pattern of *D. mactabilis* is still largely unknown, as predicted by Grazia and Schwertner (2011). We believe this species is likely distributed along at least the south portion of the Atlantic Forest and should occur also in the states of Paraná and Santa Catarina. To improve our knowledge about these understudied bugs, we urge for more attention to basic aspects as reports of geographical records, both in terms of quality and quantity, records of host plants and general biology.

### ACKNOWLEDGEMENTS

We are grateful to the administration of the Instituto de Engenharia for providing us access to Acampamento dos Engenheiros, the particular property in São Bernardo do Campo where the specimen was collected. We also thank to the editor and two reviewers for valuable comments and suggestions.

### LITERATURE CITED

- Durai, P.S.S. 1987. A revision of the Dinidoridae of the world (Heteroptera: Pentatomoidea). *Oriental Insects* 21: 163–360.
- Grazia, J., and C.F. Schwertner. 2011. Check-list dos percevejos-domato (Hemiptera: Heteroptera: Pentatomoidea) do Estado de São Paulo, Brasil. *Biota Neotropica* 11(1a): 705–716. doi: [10.1590/S1676-06032011000500034](https://doi.org/10.1590/S1676-06032011000500034)
- Grazia, J., R.R. Cavicchioli, V.R.S. Wolff, J.A.M. Fernandes and D.M. Takiya. 2012. Hemiptera; pp. 348–405, in: J.A. Rafael, G.A.R. Melo, C.J.B. Carvalho and S. Casari (eds.). *Os insetos do Brasil: Diversidade e taxonomia*. Ribeirão Preto: Editora Holos.
- Kocorek, A. and J.A. Lis. 2000. A cladistic revision of the Megymeninae of the world [Hemiptera: Heteroptera: Dinidoridae]. *Polskie Pismo Entomologiczne* 69(1): 7–30.
- Latreille, P.A. 1829. Suite et fin de insects. Vol. 5: 556 pp., in: G. Cuvier. *Règne Animal, distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction de l'anatomie comparée*. Paris. doi: [10.5962/bhl.title.49223](https://doi.org/10.5962/bhl.title.49223)
- Leston, D. 1955. The aedeagus of the Dinidoridae (Hem., Pentatomidae). *Entomologist's Monthly Magazine* 91: 214–215.
- Löbler, C.A., A.A.V. Scotti and M.K. Werlang. 2015. Contribution to the delineation of Pampa and Atlantic Forest biomes in Santa Maria, RS. *Revista Eletrônica em Gestão, Educação e Tecnologia Ambiental* 19(2): 1250–1257. doi: [10.5902/22361170](https://doi.org/10.5902/22361170)
- Perty, M. 1833. Hemiptera; pp. 125–224, in: *Delectus Animalium articulorum, quæ in itinere per Brasiliam annis MDCCCXVII–MDCCCXX, Bavariae regis augustissimi peracto, collegerunt J. B. de Spix ... et ... C. F. Ph. de Martius, digessit, descripsit, pingenda curavit M. Perty ... Præfatus est et edidit C. F. P. de Martius ... Accedit dissertatio de insectorum in America Meridionali habitantium vitæ genere, moribus et distributione geographica*. Monachii: Hübschmann.
- Rolston, L.H., D.A. Rider, M.J. Murray and R.L. Aalbu. 1996. Catalog of the Dinidoridae of the World. *Papua New Guinea Journal of Agriculture, Forestry and Fisheries* 39(2): 22–101.
- Schmidt, L.S. and A. Barcellos. 2007. Abundance and species richness of Heteroptera (Hemiptera) from Parque Estadual do Turvo, southern Brazil: Pentatomoidea. *Iheringia, Série Zoologia* 97(1): 73–79. doi: [10.1590/S0073-47212007000100011](https://doi.org/10.1590/S0073-47212007000100011)
- Schuh, T.R. and J.C. Slater. 1995. *True bugs of the world (Hemiptera: Heteroptera): classification and natural history*. Ithaca: Cornell University Press. 338 pp.
- Schwertner, C.F. and J. Grazia. 2016. Less diverse pentatomoid families (Acanthosomatidae, Canopidae, Dinidoridae, Megarididae, Phloeidae, and Tessaratomidae); pp. 821–862, in: A.R. Panizzi and J. Grazia (eds.). *True bugs (Heteroptera) of the Neotropics*. New York: Springer. doi: [10.1007/978-94-017-9861-7](https://doi.org/10.1007/978-94-017-9861-7)
- Stål, C. 1870. Hemiptera insularum Philippinarum. — Bidrag till Phippinkska öarnes, Hemipter-fauna. *Öfversigt af Kongliga Vetenskaps-Akademiens, Förhandlingar* 27: 607–776. <http://biodiversitylibrary.org/page/24634225>

**Author contributions:** BCG and CFS collected the specimen. BCG took the pictures and RC made the maps. All authors identified the species and wrote the paper.

**Received:** 10 April 2016

**Accepted:** 29 May 2016

**Academic editor:** Marcus Guidoti