

A replacement name for *Bostra* Stål (Insecta, Phasmida, Diapheromeridae), a junior homonym of *Bostra* Walker (Insecta, Lepidoptera, Pyralidae)

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Academic editor: Ming Kai Tan | Received 20 January 2023 | Accepted 3 February 2023 | Published 8 September 2023

<https://zoobank.org/9F370A3C-2874-4CD3-8CD1-C5EFE3E78BD7>

Citation: Villet MH (2023) A replacement name for *Bostra* Stål (Insecta, Phasmida, Diapheromeridae), a junior homonym of *Bostra* Walker (Insecta, Lepidoptera, Pyralidae). Journal of Orthoptera Research 32(2): 149–152. <https://doi.org/10.3897/jor.32.97047>

Abstract

Bostra Stål (Phasmida, Diapheromeridae) is a junior homonym of *Bostra* Walker (Lepidoptera, Pyralidae). The replacement name *Bostranova* Villet **nomen nov.** is proposed for *Bostra* Stål, and new combinations are proposed for the species-group names currently included in that phasmid genus.

Keywords

homonymy, name change, new combination, nomenclature, replacement name, stick insects

Introduction

Francis Walker (1863) described a monotypic genus of pyralid moths using the name *Bostra*. This genus now contains about 50 species from Africa, Turkey, and India. Twelve years later, Carl Stål (1875) used the same name in describing a genus of diapheromerid stick insects that now contains 27 species distributed from Brazil to Mexico. Walker died in 1874 (Carrington 1874), the year before Stål's publication, and Stål died a few years later in 1878 (Reuter 1878). Stål's publications focused on Hemiptera, especially from southern Africa, and also included Orthoptera, Phasmida, Coleoptera, and Hymenoptera (Reuter 1878) but not Lepidoptera. For these and perhaps other reasons, this homonymy was discovered by neither author.

The phasmid genus was last augmented in 2012 with a single species from Tobago (Langlois and Bellanger 2012). Prior to that, Werner (1929) added one new species, Hebard (1919) added one, Redtenbacher (1908) added 24 species, Rehn (1904) added three, Griffini (1896) added one, and Brunner von Wattenwyl, Scudder, and Westwood each described a species that was subsequently transferred to *Bostra* (Stål 1875, Kirby 1904, Rehn 1904, Redtenbacher 1908). Several species placed in *Bostra* (e.g. *Bostra crudelis* (Westwood, 1859), *Bostra dorsuaria* Stål, 1875, *Bostra podagrica* Stål, 1875, *Bostra martini* Griffini, 1896, *Bostra scabrinota* Redtenbacher, 1908, *Bostra tridenticulata* Redtenbacher, 1908, *Bostra imperialis* Redtenbacher, 1908, *Bostra ibaguena* (Giglio-Tos, 1910)

and *Bostra trinitatis* Werner, 1929) were later associated with various other genera as new taxon concepts developed (e.g., Zompro 2001, Conle et al. 2011, Figueiredo de Araujo and Senna Garraffoni 2012, Hennemann and Conle 2021). The genus was diagnosed and redescribed in 2001 (Zompro 2001). The homonym posed by *Bostra* was noticed by the lepidopterist Roger Kendrick (personal communication to P. D. Brock), and Paul Brock recorded this discover in a scrutiny note in 2009 in the Phasmida Species File Online (Brock et al. 2023, <http://phasmida.speciesfile.org/Common/basic/Taxa.aspx?TaxonNameID=1202238>), but it has remained unaddressed. No junior synonym of *Bostra* Stål, 1875 was traced (cf. Brock et al. 2023) that could serve as a replacement name under Article 60b of the International Commission on Zoological Nomenclature (ICZN) (ICZN et al. 1999).

In line with the requirements of Article 60 of the International Code of Zoological Nomenclature (ICZN et al. 1999), a replacement name for Stål's taxon is proposed here to relieve this situation.

Methods

In forming a replacement name, consideration was given to the cultural aspects of nomenclature raised by Gillman and Wright (2020) and to the needs of the users of scientific names (Garnett and Christidis 2017, Thomson et al. 2018). Attention was therefore given to interpreting Stål's intention in naming *Bostra*.

To ensure that the proposed replacement name was not itself a junior homonym, four global on-line nomenclatural databases were consulted: the Phasmida Species File Online (<http://Phasmida.SpeciesFile.org>), the Catalogue of Life (<https://www.catalogueoflife.org/>), the Encyclopedia of Life (<https://eol.org>), and the Global Biodiversity Information Facility (<https://www.gbif.org>). To some extent, these are cross-referenced to one another but also to other nomenclatural database initiatives, giving them an extensive collective reach (Garnett et al. 2020).

To evaluate the consequences of this nomenclatural act, a contemporary species list was compiled from examination of the literature (e.g., Kirby 1904, Rehn 1904, Redtenbacher 1908, Zompro 2001,

Table 1. Explanations for abbreviations of names of repositories of type material.

Abbreviation	Repository
ANSP	Academy of Natural Sciences, Philadelphia, Pennsylvania, USA
ETHZ	Erdgenössische Technische Hochschule-Zentrum, Zurich, Switzerland
FLYB	Frédéric Langlois and Yannick Bellanger collection, France
HNHM	Hungarian Natural History Museum, Budapest, Hungary
MHNG	Muséum d'Histoire Naturelle, Geneva, Switzerland
MNCN	Museo Nacional de Ciencias Naturales, Madrid, Spain
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NHMUK	The Natural History Museum, London, United Kingdom
NHMW	Naturhistorisches Museum am Wien, Wien, Austria
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany
USNM	National Museum of Natural History, Washington D.C., USA
ZMUH	Universität von Hamburg, Zoologisches Institut und Zoologisches Museum, Hamburg, Germany

Conle et al. 2011, Figueiredo de Araujo and Senna Garraffoni 2012, Langlois and Bellanger 2012). To facilitate future taxonomic review, additional taxonomic and nomenclatural information was gleaned from published museum catalogues (Brock 1998, Zompro and Brock 2003, Zompro 2005, Brock et al. 2016, Delfosse et al. 2019).

Results

Taxonomy

Family Diapheromeridae Kirby, 1904

Genus *Bostranova* Villet, nomen nov.

Bostra Stål, 1875: 6, 13. Type species, by original monotypy: *Bacteria turgida* Westwood, 1859.

Bostranova Villet, nomen nov. for *Bostra* Stål, 1875, not Walker, 1863.

nec Bostra Walker, 1863: 123 (Walker 1863), = *Therapne* Ragonot, 1890: xciii (Ragonot 1890), synonymized by Leraut 2003: 123.

Type species.—*Bacteria turgida* Westwood, 1859, inherited from replaced name.

Discussion

It was decided to base the replacement name on Stål's original name to minimize users' frustration with the change (Garnett and Christidis 2017, Thomson et al. 2018), and to explain why the issue of cultural imperialism in nomenclature (Gillman and Wright 2020) has not strongly affected this particular nomenclatural action. The name is derived from the original genus *Bostra* and a suffix formed from the Latin word '*novum*' ('new' in English), having the sense of "the new *Bostra*", which is aligned with Stål's original apparent intention to commemorate a particular Middle Eastern town. *Bostra* (or *Bosra* or *Busra*; Ancient Greek: Βόστρα; Latin: Colonia *Bostra*, Nova *Trajana Bosra*; Turkish: Eski Şam; Arabic: بصرى) was a commercial and administrative city of the Nabataean kingdom at the northern end of the Wādī al-Sirhān trade route in southern Syria (32°30'53"N, 36°28'48"E) and was the capital of the Roman province of Arabia under Trajan from 106 A.D. and

headquarters of the Legio III Cyreniaca (Dentzer-Feydy et al. 2014). It is unclear why Walker or Stål used this name for their genera, but no alternative etymology was found by internet searches. However, Stål named over 1000 genera and regularly used Classical names for them, e.g., the names of the cities Macynia, Banasa, and Stagira, and the names of the Romans Carausius, Statilia, and Arulenus, are all commemorated in Stål's insect genera. It would have been apposite to use a name from the organism's geographical range, as William L. Distant did with his new taxa only 30 years after Stål's publications, but it seems unlikely that, in 1875, Stål had access to the type of information that Gillman and Wright (2020) point out as useful to consider when forming scientific names for organisms.

Perhaps whimsically, it is also hoped that these insects walk with a gait and rhythm that resembles the '*bossa nova*' Latin dance style that originated within their geographical distribution.

The replacement name's grammatical gender is feminine. This nomenclatural action results in the new combinations (comb. nov.) listed in Table 2.

Table 2. List of new combinations (comb. nov.) resulting from the replacement name *Bostranova* Villet **nomen nov.**, with the original genus of each species, its type repository and the nature of its type material, and its country of occurrence as recorded by Stål (1875), Rehn (1904), Redtenbacher (1908) and Figueiredo de Araujo and Senna Garraffoni (2012) were also compiled; the abbreviations for repositories are explained in Table 1.

<i>Bostranova arcuata</i> (Redtenbacher, 1908: 408) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [NHMW, holotype ♀ nymph] Espirito Santo, Brazil (Brock 1998)
<i>Bostranova bifida</i> (Redtenbacher, 1908: 412) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [NHMW, holotype ♀ ?nymph] Venezuela (Brock 1998)
<i>Bostranova championi</i> (Redtenbacher, 1908: 410) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [NHMUK, holotype ♂] Cahabon, Vera Paz, Guatemala (Brock et al. 2016)
<i>Bostranova deplanata</i> (Redtenbacher, 1908: 411) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [MHNG, holotype ♀] Cuba (Zompro and Brock 2003)
<i>Bostranova exigua</i> (Scudder, 1875: 278) comb. nov. (<i>Bacteria</i> Berthold) [ANSP, holotype ♂] Peru
<i>Bostranova incompta</i> (Rehn, 1904: 57) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [USNM, holotype ♂] San Carlos, Costa Rica
<i>Bostranova innocens</i> (Brunner von Wattenwyl, 1907: 324) comb. nov. (<i>Dyme</i> Stål) [NHMW, holotype ♂] Marcapata, Peru
<i>Bostranova jaliscensis</i> (Rehn, 1904: 514) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [ANSP, holotype ♂] Jalisco, Tuxpan, Mexico
<i>Bostranova lobata</i> (Redtenbacher, 1908: 408) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [NHMUK, holotype ♀] Chiriqui, Panama (Brock et al. 2016)
<i>Bostranova magistralis</i> (Redtenbacher, 1908: 410) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [NHMUK, holotype ♀] Panzos, Vera Paz, Guatemala (Brock et al. 2016)
<i>Bostranova magnifica</i> (Redtenbacher, 1908: 410) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [SMNS, at least one ♀, missing] Brazil
<i>Bostranova margaritata</i> (Redtenbacher, 1908: 412) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [MNHN, holotype ♀] Sierra del Nayarit, Mexico (Delfosse et al. 2019)
<i>Bostranova mirata</i> (Redtenbacher, 1908: 410) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [MNCN, at least one ♂, missing] Guatemala
<i>Bostranova nuptialis</i> (Redtenbacher, 1908: 410) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [MHNG, at least one ♂, missing] Guyana (Zompro and Brock 2003)
<i>Bostranova obtusecornuta</i> (Redtenbacher, 1908:409) comb. nov. (<i>Bostra</i> Stål, <i>nec</i> Walker) [NHMW, MHNG, ZMHB, syntypes 3 ♂♂, 2 ♀♀] Guatemala and Costa Rica (Brock 1998, Zompro and Brock 2003, Zompro 2005)

- Bostranova procoppi* (Redtenbacher, 1908: 411) **comb. nov.** (*Bostra* Stål, *nec* Walker) [HNHM, at least one ♀, destroyed] Mexico
- Bostranova pruinosa* (Redtenbacher, 1908: 411, pl. 19: 3) **comb. nov.** (*Bostra* Stål, *nec* Walker) [NHMW, holotype ♀] Bahia, Belmonte, Brazil (Brock 1998)
- Bostranova reductedentata* (Redtenbacher, 1908: 409) **comb. nov.** (*Bostra* Stål, *nec* Walker) [ETHZ, syntypes 2 ♂♂] Pará, Brazil
- Bostranova remiformis* (Rehn, 1904: 58) **comb. nov.** (*Bostra* Stål, *nec* Walker) [USNM, holotype ♀] Piedras Negras, Costa Rica
- Bostranova saussurei* Redtenbacher, 1908: 411) **comb. nov.** (*Bostra* Stål, *nec* Walker) [HNHM, at least one ♀, destroyed] Mexico
- Bostranova similis* (Redtenbacher, 1908: 412) **comb. nov.** (*Bostra* Stål, *nec* Walker) [NHMUK, holotype ♀] Jalisco, Mexico (Brock et al. 2016)
- Bostranova submutica* (Redtenbacher, 1908: 409) **comb. nov.** (*Bostra* Stål, *nec* Walker) [NHMW, holotype ♂] Venezuela (Brock 1998)
- Bostranova tabida* (Redtenbacher, 1908: 410) **comb. nov.** (*Bostra* Stål, *nec* Walker) [ZMUH, holotype ♀] Espirito Santo, Brazil
- Bostranova tobagoensis* (Langlois & Bellanger, 2012: 98) **comb. nov.** (*Bostra* Stål, *nec* Walker) [MNHN, FLYB, holotype ♀, paratypes 3 ♂♂, 2 ♀♀] track 3.2 km west of Castara – Plymouth road, Tobago (Langlois and Bellanger 2012, Delfosse et al. 2019)
- Bostranova tridenticulata* (Redtenbacher, 1908: 411) **comb. nov.** (*Bostra* Stål, *nec* Walker) [NHMUK, holotype ♀] Guerrero, Acaguizolta, Mexico (Brock et al. 2016)
- Bostranova turgida* (Westwood, 1859: 28, pl. 8: 4, 9) **comb. nov.** (*Bacteria* Berthold) [NHMUK, lectotype ♂, paralectotype ♀] Venezuela (Brock et al. 2016)
- Bostranova vacca* (Redtenbacher, 1908: 408) **comb. nov.** (*Bostra* Stål, *nec* Walker) [NHMW, holotype ♀] origin unknown (Brock 1998)

Conclusion

There has been a fair amount of taxonomic traffic in and out of this genus, and new genera (e.g., *Oncotophasma* Rehn, 1904, *Alienobostra* Zompro, 2001, and *Caribbiopheromera* Zompro, 2001) have absorbed species once assigned to *Bostra* Stål (Zompro 2001). It is hoped that replacing this homonym will attract attention to the genus and that the information summarized in Table 2 will facilitate its comprehensive revision.

Acknowledgements

Annelize Lloyd and Suncana Bradley attracted attention to the nomenclature of *Bostra* through their enquiries about South African tent caterpillars; Rhodes University provided computing and digital resources for resolving the matter; and Paul Brock and Judith Marshall (The Natural History Museum, London) very kindly improved the manuscript. All are thanked for their generous contributions.

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