

A new species of *Antarctobius* Fairmaire from Islas Malvinas (Coleoptera: Curculionidae: Cyclominae)

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A new species of the genus *Antarctobius* Fairmaire (1885) from Islas Malvinas (Falkland Islands) is described and illustrated: *A. malvinensis* Posadas and Morrone n. sp. (type locality: East Falkland, Mt. Osborne). A key to the species of the genus is presented. A cladistic analysis of the species of *Antarctobius*, based on 25 characters from the external morphology, genitalia, and body vestiture, is undertaken. The resulting cladogram shows the following sequence: ((*A. lacunosus* (*A. hyadesii*, *A. vulsus*) (*A. malvinensis* (*A. yefacel*, *A. bidentatus* (*A. rugirostris* (*A. abditus* (*A. germaini*, *A. falklandicus*)))))).

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Introduction

The weevil genus *Antarctobius*, belonging to the subtribe Listroderina (Morrone 1997a, b; Alonso-Zarazaga & Lyal 1999), was described originally by Fairmaire (1885) for three species distributed in southern South America. It was posteriorly treated as a synonym of *Listroderes* Schönherr (1826) by Enderlein (1907) and Kuschel (1986) or subordinated to it as a subgenus (Kuschel 1950, 1952, 1955). Morrone (1992) revalidated the genus *Antarctobius* and assigned nine species to it.

Antarctobius is distributed in the southernmost portion of the Subantarctic subregion (Morrone 2000, 2001), with four species endemic to Islas Malvinas: *A. abditus* (Enderlein 1907), *A. bidentatus* (Champion 1918) *A. falklandicus* (Enderlein 1907), and *A. vulsus* (Enderlein 1907). Regarding *A. abditus*, Morrone and Marvaldi (1998) discussed its taxonomic placement, which according to larval characters seems to be better placed in *Listroderes*. Morrone (2002), however, reassigned it to *Antarctobius*, a treatment that we follow herein.

Our objective is to describe a new species of *Antarctobius* from Islas Malvinas. In addition, we

reanalyze the cladistic relationships of the species of the genus (Morrone 1992), in order to determine the placement of the new species.

Material and methods

The specimens examined are from the collection of the Natural History Museum, London (BMNH). Measurements were made with an ocular micrometer in a stereoscopic microscope. Body length was measured dorsally, along the midline, from the elytral apex to the fore margin of prothorax. Drawings were made with a camera lucida attached to the stereoscopic microscope. Label data are cited verbatim, enclosing information from each label with square brackets, and each line separated by a slash.

The cladistic analysis was carried out using a data matrix of 10 taxa by 25 morphological characters (table I). The terminal taxa were the 10 known species of *Antarctobius*: *A. abditus*, *A. bidentatus*, *A. falklandicus*, *A. germaini* (Kolbe 1907), *A. lacunosus* Fairmaire (1885), *A. hyadesii* Fairmaire (1885), *A. malvinensis* Posadas and

Table I. Data matrix used in the cladistic analysis of *Antarctobius*.

<i>Listroderes</i>	00000	00000	00000	00000	00000
<i>A. abditus</i>	11010	11000	00021	10000	10001
<i>A. bidentatus</i>	10100	01000	01012	????2	10011
<i>A. falklandicus</i>	00010	11001	00021	10000	10001
<i>A. germaini</i>	10010	11001	00031	10010	10011
<i>A. hyadesii</i>	01001	02000	01100	01101	11121
<i>A. lacunosus</i>	01101	01100	00000	01100	01121
<i>A. malvinensis</i>	01001	01110	00?20	1000?	????1
<i>A. rugirostris</i>	11000	12000	10021	????1	101?1
<i>A. vulsus</i>	01000	02011	00130	01100	11121
<i>A. yefacel</i>	11000	01000	00121	????0	10001

Morrone n. sp., *A. rugirostris* Champion (1918), *A. vulsus*, and *A. yefacel* Morrone (1992). The 25 characters and their corresponding states are listed below and were taken from the cladistic analysis by Morrone (1992). The cladogram was rooted with the genus *Listroderes* Schönherr. Multistate characters 14, 20, and 24 were treated as non-additive. The program Hennig86 (Farris 1988) was used to find the most parsimonious cladogram under equal weights, applying option *ie**, and under the successive weighting procedure (*xs w; ie**), the character optimization was made using Winclada (Nixon, 1999).

List of characters

1. Body size: (0) medium (6.5-8.5 mm); (1) small (< 6.4 mm).
2. Scales: (0) subcircular; (1) seta like.
3. Rostral dorsal carinae: (0) three; (1) absent. The presence of strongly developed rostral carinae is considered a plesiomorphic state within *Listroderina* genera based on previous analysis (see Morrone, 1997a and literature cited there in). The genus *Antarctobius* is polymorphic in that condition and shows species with three strongly developed rostral dorsal carinae and species without such carinae.
4. Rostrum length: (0) long; (1) short. According to Morrone (1997a), all *Antarctobius* species have a rostrum not longer than half of pronotum. This condition is considered as plesiomorphic for *Listroderina* species (Morrone, 1997a). Here we distinguished two character states for the rostrum length, based on its length/width ratio. Ratios over 1.3 are coded as long, whereas ratios minor to 1.3 are coded as short.
5. Rostrum: (0) striated; (1) smooth.
6. Scape: (0) long; (1) short. The scape length is defined according to its relative position, when resting in the scrobe, with respect to the eye margin: long scapes are those that reach the hind margin of eye and short ones are those that not reach it.
7. Prothorax anterior impression: (0) strongly developed; (1) slightly developed; (2) absent.
8. Prothorax medium sulcus: (0) absent; (1) present.
9. Prothorax dorsal carinae: (0) absent; (1) present.
10. Prothorax circular lateral impression: (0) absent; (1) present.
11. Prothorax triangular lateral impression: (0) absent; (1) present.
12. Elytral striae: (0) slightly convex; (1) flat.
13. Female elytra apical tubercles: (0) absent; (1) present.
14. Elytral anteapical tubercles: (0) present, conical; (1) present, long and conical; (2) poorly developed; (3) absent. Previous analyses in *Listroderina* indicate that the presence of anteapical tubercles is part of the groundplan of the group (Morrone, 1997a and literature cited there in). In *Antarctobius* we can identify four different states related to anteapical tubercles. It is not possible to hypothesize an evolutionary sequence for this multistate character, so its four states are treated as non-additive.
15. Metatibial spurs: (0) two; (1) one; (2) absent.
16. Aedeagal symmetry: (0) symmetrical; (1) asymmetrical. The aedeagal symmetry is defined according to its apex symmetry in dorsal view. Species that exhibit a right curved aedeagus are coded as possessing an asymmetrical aedeagus (see Fig. 5).
17. Aedeagus in lateral view: (0) robust; (1) slender.
18. Aedeagal apical third: (0) strongly curved; (1) slightly curved. Species that have an aedeagus with its apical third curved dorsally are coded as possessing an strongly curved aedeagal apical third (see Fig. 6). Conversely, species showing an aedeagal apical third that continues the ventrally curved shape of the remainder aedeagal tube are coded as possessing a slightly curved aedeagal apical third.
19. Aedeagal apodemes: (0) shorter than tube; (1) longer than tube.
20. Female sternum 8: (0) subcircular to ovate; (1) subpentagonal; (2) subquadrangular.

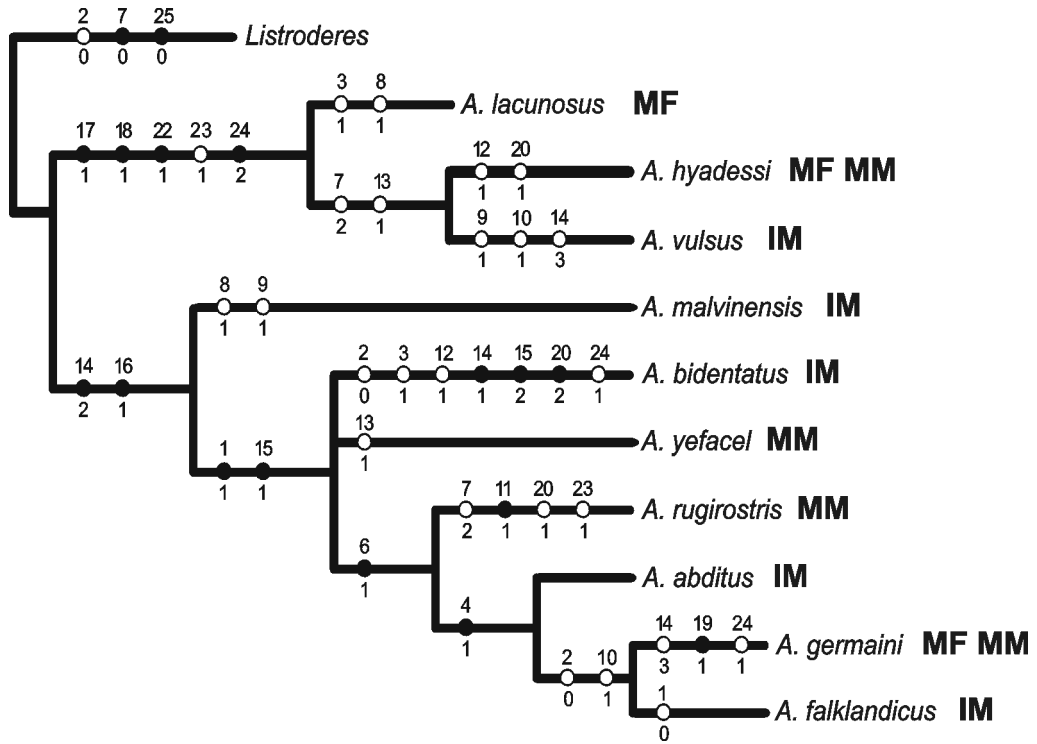


Fig. 1. Cladogram of the species of *Antarctobius*, with indication of their distribution in the biogeographic provinces of the Subantarctic subregion. Only those characters with unambiguous optimization were represented. Acronyms for Subantarctic provinces: MF= Magellanic Forest; MM= Magellanic Moorland; IM= Islas Malvinas

- 21. Apical setae of female sternum 8: (0) short; (1) long.
- 22. Hemisternite styli: (0) present; (1) absent.
- 23. Hemisternite papillae: (0) absent; (1) present.
- 24. Spermathecal ramus: (0) prominent; (1) developed; (2) absent.
- 25. Postocular lobes: (0) present; (1) absent.

Results

Cladistic analysis under equal weights resulted in a single most parsimonious cladogram (L=48, CI=64, and RI=64), stable to successive weighting (Fig. 1). Only those characters with unambiguous optimization are represented in figure 1.

The resulting cladogram shows two major clades: (*A. lacunosus* (*A. hyadessi*, *A. vulsus*)) and (*A. malvinensis* (*A. yefacel*, *A. bidentatus* (*A. rugirostris* (*A. abditus* (*A. germaini*, *A. falklandicus*))))). Both clades seem to be well supported, the former by four synapomorphies: aedeagus

slender in lateral view (17.1), aedeagal apical third slightly curved (18.1), hemisternite styli absent (22.1), and spermathecal ramus absent (24.2); and the latter by two synapomorphies: elytral anteapical tubercle poorly developed (14.2) and aedeagal apex asymmetrical (16.1). This cladistic hypothesis is similar to that proposed by Morrone (1992), being the main change the placement of *A. bidentatus*, which was the basal species of *Antarctobius* in Morrone's hypothesis, and now it is placed in a polytomy in the second clade. It is interesting to note that both major clades show synapomorphies represented by genitalic characters. Indeed, in the clade represented by *A. lacunosus*, *A. hyadessi*, and *A. vulsus* all the four synapomorphies correspond to genitalic characters, three of them being male genitalia characters and the remainder one a female genitalia character. In the second clade (represented by the seven remaining species of *Antarctobius*) one of the two synapomorphies that support it corresponds to a male genitalia charac-

Table II. List of the weevil genera recorded in Islas Malvinas. Those genera marked with * are endemic to the archipelago.

Subfamily	Genus	N° of species endemic to Islas Malvinas	N° of non-endemic species
Entiminae	<i>Caneorhinus</i>	1	0
	<i>Cylydrorhinus</i>	1	1
	<i>Malvinius*</i>	2	0
	<i>Morroneia*</i>	1	0
Cyclominae	<i>Antarctobius</i>	5	0
	<i>Falklandiellus</i>	0	1
	<i>Falklandius</i>	3	1
	<i>Germainiellus</i>	1	0
	<i>Haversiella</i>	0	1
	<i>Lanteriella*</i>	1	0
	<i>Puranius</i>	3	0

ter. Based on that it is possible to suggest that the changes in genitalia had played a major role in *Antarctobius* basal cladogenetic differentiation.

Biogeographic implications

According to Posadas (2002) the weevil fauna of Islas Malvinas is represented by 22 species (see table II). All species recorded for the archipelago belong to subfamilies Entiminae and Cyclominae. The Malvinas weevil fauna is highly endemic at the specific level, being 18 of the 22 species recorded endemic to the archipelago. The non-endemic weevil species of Islas Malvinas are distributed in the southernmost part of South America, inhabiting the Magellanic Forest, Magellanic Moorland, and Valdivian Forest biogeographic provinces of the Subantarctic subregion. At the generic level only three of the 11 genera recorded are endemic to the islands (see table II).

There are several cladistic analyses on Cyclominae genera inhabiting the archipelago and near continental areas (Morrone, 1992, 1993, 1994, 1997b; Morrone and Anderson 1995). Three genera have two or more species distributed on the Islas Malvinas: *Antarctobius* (Morrone, 1992; and Fig. 1 this paper), *Falklandius* (Morrone and Anderson 1995), and *Puranius* (Morrone 1994). In *Antarctobius* and *Puranius*, species inhabiting the archipelago do not constitute monophyletic groups. In *Falklandius*, the four Islas Malvinas species represent a monophyletic group ([*F. antarcticus* [*F. turbificatus* [*F. goliath*, *F. kuscheli*]]]), where the basal species *F. antarcticus* inhabits Islas Mal-

vinas, and the Magellanic Moorland and Valdivian Forest provinces.

Morrone (1992, 1995) has postulated the existence of a generalized track joining the Islas Malvinas and Tierra del Fuego archipelagoes, meaning the existence of an ancestral biota which was fragmented by geological events. Geological evidence suggests that during the several glaciations occurred during Tertiary and Quaternary times in the Southern Hemisphere, the geographical isolation of Islas Malvinas had been broken. Codignotto (1990) postulated that the coastal line during the final Pleistocene glaciation was located between the 100m and 150m present day bathymetric curves. According to that, most of the continental shelf of southern South America (in which Islas Malvinas are located) was an emerged landmass during glaciations. In this framework it is possible to postulate several vicariant events related to sea-level variations induced by glacial-eustatic agents. Such scenarios could explain the distributional patterns of the aforementioned Cyclominae genera in which Malvinas species do not constitute monophyletic clades, having their sister groups in continental areas of southern South America.

Antarctobius malvinensis Posadas and Morrone, sp. n.

(Figs. 2-6)

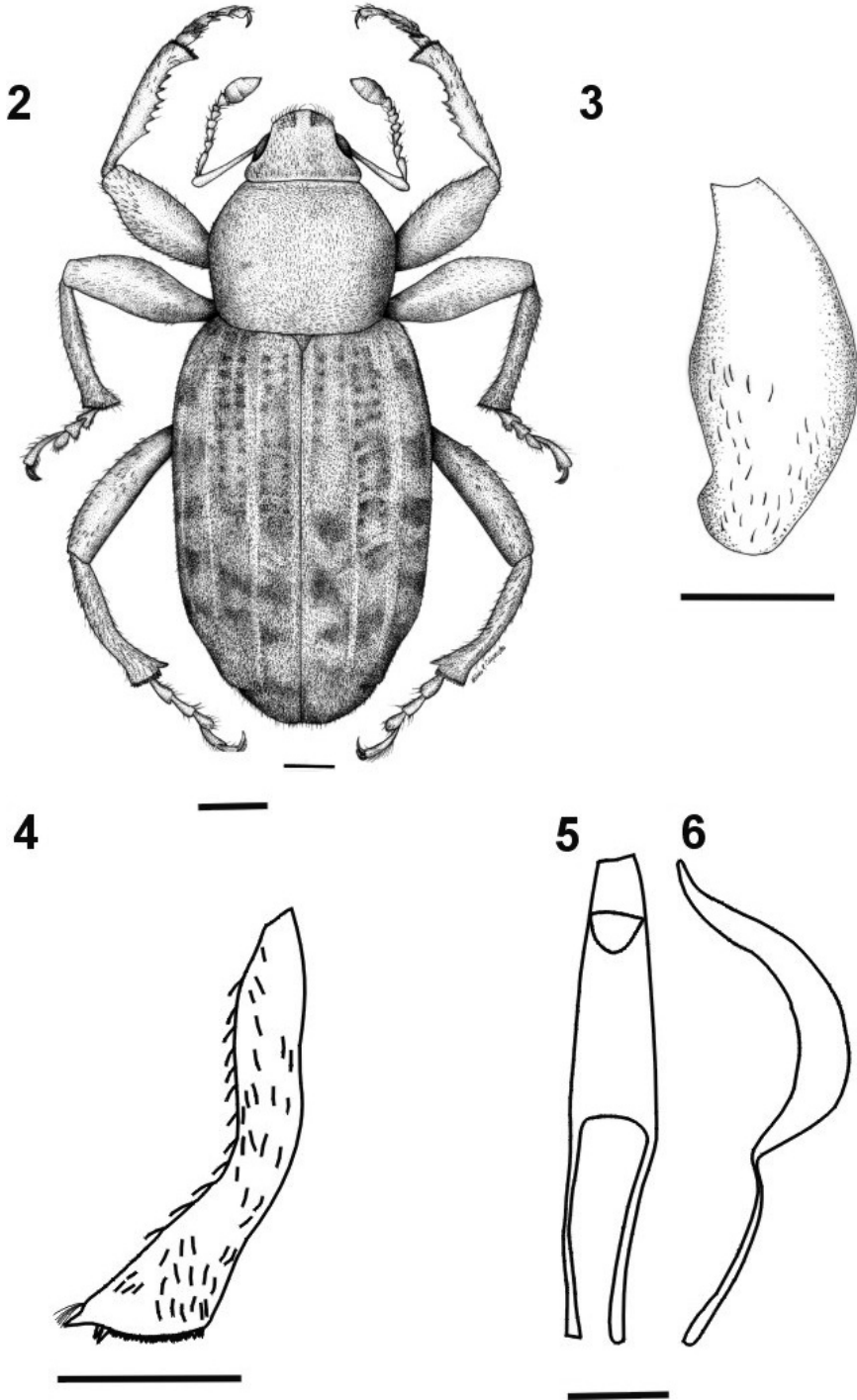
Etymology. The species name refers to the geographic distribution of the species (Islas Malvinas).

Type series. Holotype male: [Dry grassland with / moss. 700m.] [E. Falkland / Mt. Osborne / 3.ii.1985 / R.I. Lewis Smith] [1985-160] [166] (BMNH). Paratype male: [Dry grassland with / moss. 700m.] [E. Falkland / Mt. Osborne / 3.ii.1985 / R.I. Lewis Smith] [1985-160] [167] (BMNH).

Type locality. Falkland Islands (= Islas Malvinas): East Falkland, Mount Osborne.

Diagnosis. This species is easily recognized by the femora markedly inflates and clavate, and the metatibia strongly curved toward its inner margin.

Description. Holotype male. General habitus as in figure 2. Integument reddish brown; darker in head and ventral area (almost black); elytra showing darker, irregular patches. Body vestiture of seta-like scales. Rostrum 1.6 longer than wide, surface smooth, and with three dorsal carinae: central conspicuous and lateral slightly developed. Eyes flat. Antennal scape long (reaching hind margin of eye when resting in scrobe); funicular articles 1-3



Figs. 2-6. *Antarctobius malvinensis*, sp. n. 2, Habitus, dorsal view; 3, profemur, lateral view; 4, metatibia, lateral view; 5, aedeagus, dorsal view; 6, aedeagus, lateral view. Scale bars= 1 mm.

elongate, decreasing in size from 1 to 3; funicular articles 4-6 monilliform; funicular article 7 transversal. Prothorax 0.86 longer than wide; margins slightly convex; with an anterior impression slightly developed and a longitudinal median sulcus; and lacking dorsal carinae and lateral impressions. Elytra short, 1.8 longer than wide, intervals slightly convex (specially 3, 5, and 7); antepical tubercle present, slightly developed. Femora markedly inflate and clavate (specially profemur, Fig. 3). Protibia with inner margin strongly denticulate; meso- and metatibia with inner margins slightly denticulate in the proximal third; meso- and metatibiae becoming narrower in the apical third; mesotibia showing a slight curvature toward its inner margin; metatibia strongly curved toward the inner margin (Fig. 4); all tibiae mucronate; pro- and mesotibiae with one spur, metatibiae with two spurs. Male genitalia (Figs. 5-6): aedeagus slightly asymmetrical; robust in lateral view; with apical third strongly curved; aedeagal apodemes longer than tube. Female genitalia: unknown.

Key to species of *Antarctobius* (modified from Morrone 1992)

1. Elytra with antepical tubercle conical, elongate; tibiae lacking spurs; Islas Malvinas.....
..... *A. bidentatus*
 - Elytra with antepical tubercle slightly developed or absent; tibiae with spurs..... 2
 2. Body vestiture of subcircular scales..... 3
 - Body vestiture of seta-like scales..... 4
 3. Medium sized (6.5-8.5 mm); elytra short (length/ width > 1.5), with antepical tubercle slightly developed; Islas Malvinas.... *A. falklandicus*
 - Small (4.0-6.5 mm); elytra elongate (length/ width < 1.5), lacking antepical tubercle; Magellanic Forest *A. germaini*
 4. Antennal scape short (not reaching hind margin of eye) 5
 - Antennal scape long (reaching hind margin of eye) 6
 5. Rostrum long (length/ width > 1.3); prothorax lacking anterior impression, with two subtriangular lateral impressions; Magellanic Moorland *A. rugirostris*
 - Rostrum short (length/ width < 1.3); prothorax with anterior impression slightly developed, lacking subtriangular lateral impressions; Islas Malvinas *A. abditus*
 6. Metatibiae with one spur; Magellanic Moorland..... *A. yefacel*
 - Metatibiae with two spurs 7
 7. Rostrum striated; elytra lacking antepical tubercle; Islas Malvinas..... *A. vulsus*
 - Rostrum smooth; elytra with antepical tubercle... 8
 8. Profemora strongly inflate; Islas Malvinas
..... *A. malvinensis*
 - Profemora not strongly inflate 9
9. Rostrum lacking dorsal carinae; prothorax with anterior impression slightly developed; elytra with antepical tubercle in both sexes.....
..... *A. lacunosus*
 - Rostrum with three dorsal carinae; prothorax lacking anterior impression; elytra with antepical tubercle only in females, interstriae flat; Magellanic Forest..... *A. hyadesii*

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