



A preliminar overview of species composition and geographical distribution of Malvinian weevils (Insecta: Coleoptera: Curculionidae)

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Abstract

The objective of this paper is to provide an integrative approach to species composition and distributional information on the weevil fauna of Islas Malvinas (Falkland Islands). A total of 22 species belonging to 11 Curculionidae genera are recorded for the archipelago. Four of these genera belong to Entiminae (i.e., *Caneorhinus*, *Cylydrorhinus*, *Malvinus*, and *Morrionia*) and the remaining seven belong to Cyclominae (i.e., *Antarctobius*, *Falklandiellus*, *Falklandius*, *Germainiellus*, *Haversiella*, *Lanteriella*, and *Puranius*). The Malvinian weevil fauna could be considered as an impoverished version of that from Tierra del Fuego at the generic level, but with a very high degree of species level endemism. The Malvinian weevil fauna exhibits a great linkage to that from southernmost South America. It has been postulated that the evolution of Malvinian weevil fauna responded to several geodispersal and subsequent vicariant events which determined the archipelago's alternative connections and disconnections from southern South America. These events were due to sea-level variations induced by glacial-eustatic agents during Tertiary and Quaternary times. Finally, synonymic lists are provided for each species known to occur on the islands. Also, distributional data for each species are mapped and keys and illustrations are presented to identify weevil taxa recorded for the Islas Malvinas.

Key words: South America, Curculionidae, Islas Malvinas, Falkland Islands, Tierra del Fuego.

Introduction

Weevils (Coleoptera: Curculionidae) are the most diverse family of known organisms. It includes more than 48,000 valid species (Anderson 1993, 1995). The current distribution of this group extends from the Arctic to the Subantarctic and its species are found in all continents and insular habitats, except Antarctica. Nonetheless, fossil weevils have been registered from Antarctica (Ashworth & Kuschel 2003), in fossiliferous bed of uncertain age (probably within the range of Pliocene to Middle Miocene). Most species of Curculionidae are terrestrial, but some of them inhabit freshwater habitats.

The Islas Malvinas (Falkland Islands) is an archipelago located 520 km east from the Magallanes Strait, between 51° to 52° 30' S and 57° 40' to 61° 30' W. The total land surface of the archipelago is near 10,000 to 12,000 km² (Moore 1968), 80% of which is taken by two main islands: Gran Malvina or West Falkland (5000 km² area) and Soledad or East Falkland (3500 km² area). The relief presents numerous hills, usually less than 300 m in height, with maximum heights of near 700 m (Mt. Osborne in East Falkland is 705 m high). The climate is oceanic-cold (mean annual precipitation is around 600 mm and mean temperature is 2.2°C in the coldest month and 8.8°C in the warmest one, Moore 1968). A typical Malvinian soil has a range of pH from 4.1 to 5.0 and is deficient in calcium and phosphate (Cruickshank 2001). It comprises a shallow (generally no deeper than 38 cm) peaty horizon overlying compact, poorly drained silty clay subsoil (Broughton & McAdam 2005). Mineral soils are present particularly on mountaintops and coastal areas (Broughton & McAdam

2005). From a biogeographic viewpoint the archipelago is considered as a unit named as the Insular province (Cabrera 1971; Cabrera & Willink 1973) or Islas Malvinas province (Morrone 2001, 2006). The typical vegetation is represented by grasslands, steppes, and tundra (Cabrera & Willink 1973; Dinerstein *et al.* 1995). Particularly, Broughton & McAdam (2005) refer to acid grasslands dominated by *Cortaderia pilosa* (Poaceae) and dwarf shrub heathland dominated by *Empetrum rubrum* (Ericaceae) as the main vegetation types. The taxonomic composition of the Malvinian flora is very similar to that of Tierra del Fuego (the archipelago of southern Chile and Argentina) except for the lack of arboreal species and a diminished number of other species. Thus, Islas Malvinas have a total of 171 species of native plants (according to the most updated vascular flora of the archipelago published by Broughton & McAdam 2005) while Tierra del Fuego has 417 native species recorded (Moore 1983). Regarding species introduction, while in Islas Malvinas the record of alien plants are similar to that of their native species (175 introduced plant species, Broughton & McAdam 2005); in Tierra del Fuego the number of alien species represents a third of the native ones (128 introduced plant species, Moore 1983). Malvinian vegetation exhibits only a few species level endemisms, nearly 8% of recorded species are endemics (Broughton & McAdam 2005).

The small fauna of Islas Malvinas is interesting because of their isolated southern position and because of their biogeographical and phylogenetic relationships. During the last one hundred years several contributions have been made which include lists of the Malvinian weevil fauna (Enderlein 1907, 1912; Champion 1918; Robinson 1984; Voisin 1986; Morrone & Roig-Juñent 1995). In his work of 1912, Enderlein listed the insects of Tierra del Fuego, Islas Malvinas, and South Georgia collected during the Swedish South Polar Expedition led by Dr. Otto Nordenskiöld during 1901 to 1904 on the vessel *Antarctic*. Enderlein (1912) registered the presence of 16 apterous Curculionidae from Islas Malvinas, with only nine of them considered as valid species today. On 1918, Champion published a checklist of the Coleoptera of Islas Malvinas. In his work, Champion recorded the presence of 22 weevil species, with at present 14 of them recognized as valid species. Champion's checklist includes the Coleoptera collected by Charles Darwin in Islas Malvinas during the voyage of the *Beagle* and "various other collections from the same islands received during recent years, including a few species obtained by Fleet-Surgeon M. Cameron in December, 1914" (Champion 1918:167). In 1984, Robinson published a checklist and bibliography of the insects of the Islas Malvinas. As he stated, his list is "based largely upon published records and includes a number of new records based both on old and newly-collected material" (Robinson 1984: 2). Robinson's checklist records 17 valid species and mentions another five unidentified species plus an adventive species of *Otiorhynchus*. Robinson (1984) remarks on the fact that "a large number of [Malvinian insect] species exhibit the classical oceanic-subantarctic adaptation of brachyptery or complete loss of wing" especially in the Coleoptera. In 1986, Voisin published a note on Malvinian Coleoptera in which the material collected by him was listed. Voisin mentioned ten species of Curculionidae in this note. In 1995, Morrone & Roig-Juñent published a checklist of Patagonian weevil fauna which includes species from the Islas Malvinas.

Phylogenetic and taxonomic advances on the Patagonian and Subantarctic weevil fauna during the last 20 years (e.g., Morrone 1991, 1992a–c, 1993 a–f, 1994a–d, 1995 a b, 1997; Morrone & Anderson 1995; Marvaldi 1997, 1998; Morrone & Marvaldi 1998; Posadas & Ocampo 2001; Posadas & Morrone 2004) made an updated list of Malvinian Curculionidae necessary. The objective of this paper is to provide an integrative approach to species composition and distributional information on the Malvinian weevil fauna.

Material and methods

The material examined was obtained on loan from the following collections: American Museum of Natural History, New York, USA (AMNH); Natural History Museum, London, United Kingdom (BMNH); Museo de La Plata, La Plata, Argentina (MLP); and Smithsonian Institution, Washington DC, USA (USNM). Addition-

ally, a bibliographic search was carried out to check records of Malvinian Curculionidae. Temporal and geographic distribution of taxa was determined based on label data and literature. Also, a comparison with the weevil fauna of the archipelago located at the southernmost part of South America (Tierra del Fuego) was carried out. Aspects of plant associations of both weevil faunas were established based on personal observations in the field, specimen labels, and relevant literature. Synonymic lists are provided for species and generic level names and they include literature related to descriptions or revisions.

Results

No records of Curculionoidea families other than Curculionidae had been registered for the Islas Malvinas. A total of 22 species belonging to 11 Curculionidae genera were recorded for the archipelago (table 1). All of them belong to two subfamilies: Entiminae (six species in four genera) and Cyclominae (16 species in seven genera).

TABLE 1. Genera and species of Curculionidae recorded for Islas Malvinas.

Acronyms: Malv= Islas Malvinas; Mage= Magellanic Forest; Moor= Magellanic Moorland; Fuego= Fuegian-Patagonian Steppe. Bold names correspond to Malvinian endemic genera.

Subfamily	Species	Distribution
Entiminae	<i>Caneorhinus biangulatus</i>	Malv
	<i>Cylydrorhinus caudiculatus</i>	Mage Fuego Malv
	<i>Cylydrorhinus lemniscatus</i>	Malv
	<i>Malvinus compressiventris</i>	Malv
	<i>Malvinus nordenskiöldi</i>	Malv
	<i>Morronia brevirostris</i>	Malv
Cyclominae	<i>Antarctobius abditus</i>	Malv
	<i>Antarctobius bidentatus</i>	Malv
	<i>Antarctobius falklandicus</i>	Malv
	<i>Antarctobius malvinensis</i>	Malv
	<i>Antarctobius vulsus</i>	Malv
	<i>Falklandiellus suffodens</i>	Mage Malv
	<i>Falklandius antarcticus</i>	Mage Malv Vald
	<i>Falklandius goliath</i>	Malv
	<i>Falklandius kuscheli</i>	Malv
	<i>Falklandius turbificatus</i>	Malv
	<i>Germainiellus salebrosus</i>	Malv
	<i>Haversiella albolimbata</i>	Moor Malv
	<i>Lanteriella microphthalmia</i>	Malv
	<i>Puranius championi</i>	Malv
	<i>P. exculpticollis</i>	Malv
	<i>P. scaber</i>	Malv

Through the information available on labels of examined material and literature, it was possible to extract information from 170 specimens on temporal and geographic distribution. The data available covers collections made from 1902 to 1989 from which general information can be summarized.

Figure 1 shows the number of specimens collected per decade. Consistently, the number of specimens collected is low with a mean of 17 specimens per decade, except for the 60's and 80's when collected specimens dramatically increase.

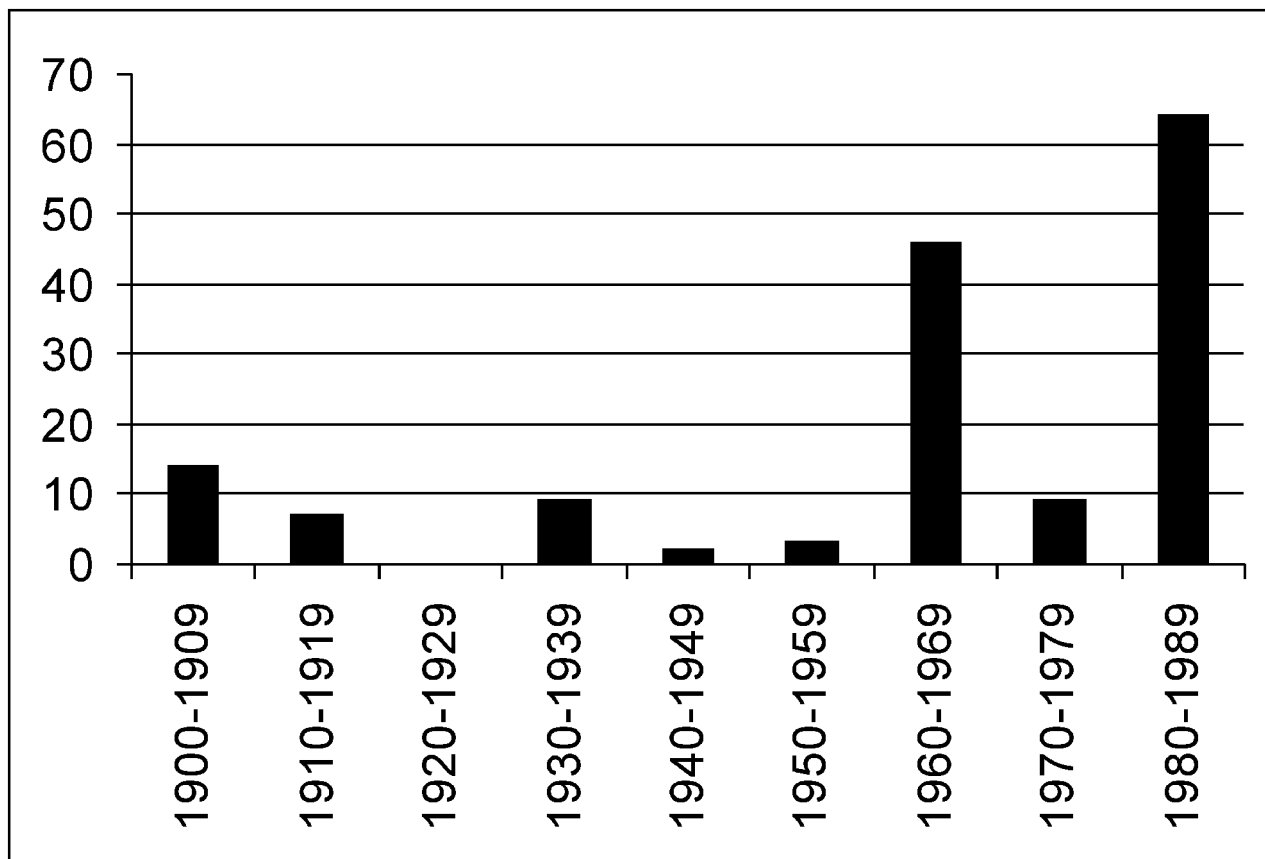


FIGURE 1. Number of specimens collected per decade.

Figure 2 shows the number of specimens collected per month. Higher numbers of specimens have been collected during spring. Fifty one percent of the 145 specimens with data available on collection month, were captured during the southern hemisphere spring (October to December). Furthermore, the highest collections corresponded to November with 38 specimens, which represented 26% of the analyzed records. Remaining records were as follow: 38% corresponded to summer months (January to March) and 11% to early-middle autumn (April and May). There are four months without records of collection corresponding to the end of autumn, all the winter and the first week of spring in the southern hemisphere (June to September).

When species and genus diversity is analyzed according to the month of collection (Fig. 3), the month in which highest diversity is achieved was November (with 13 species and 6 genera recorded for this month, representing almost 60% of total species diversity and 56% of total genus diversity for the archipelago).

The subfamily Cyclominae, which represents the 73% of Malvinian known species diversity, accounts for 63% of the analyzed records (107 specimens). While Entiminae, representing the 27% of Malvinian known species diversity, accounts for the remaining 37% records (63 records). Figure 4 illustrates the quantities of records for each genus. *Falklandius*, with its four species, resulted in the most recorded genus followed by *Antarctobius* with its five species.

Regarding geographic distribution, Figure 5 shows the number of specimens, genera, and species collected in each locality and figure 6 indicates main localities. Regarding the number of specimens collected, 70% of the 170 records considered correspond to East Falkland. Furthermore, most records from the East Falklands correspond to Port Stanley and neighboring areas (see Figs. 5– 6), which concentrate 100 of the 120

records for East Falkland. Regarding the West Falkland records, it is interesting to note that most correspond to minor islands and not to the main one (see Figs. 5–6). When the number of genera recorded by locality is analyzed, Port Stanley exhibits the greatest generic diversity with 9 genera recorded of the 11 that have been registered for the whole archipelago. A similar situation is observed regarding species records by localities. Port Stanley has records of 17 of the 22 species listed for Islas Malvinas. As mentioned before, most specimens had been collected on Port Stanley and neighboring areas (see Figs. 5–6). Also, these localities exhibit the higher species and generic richness. The apparent richness of Port Stanley and surrounding areas could be related to the fact that Port Stanley is the main populated place of the islands more than to a biogeographic fact.

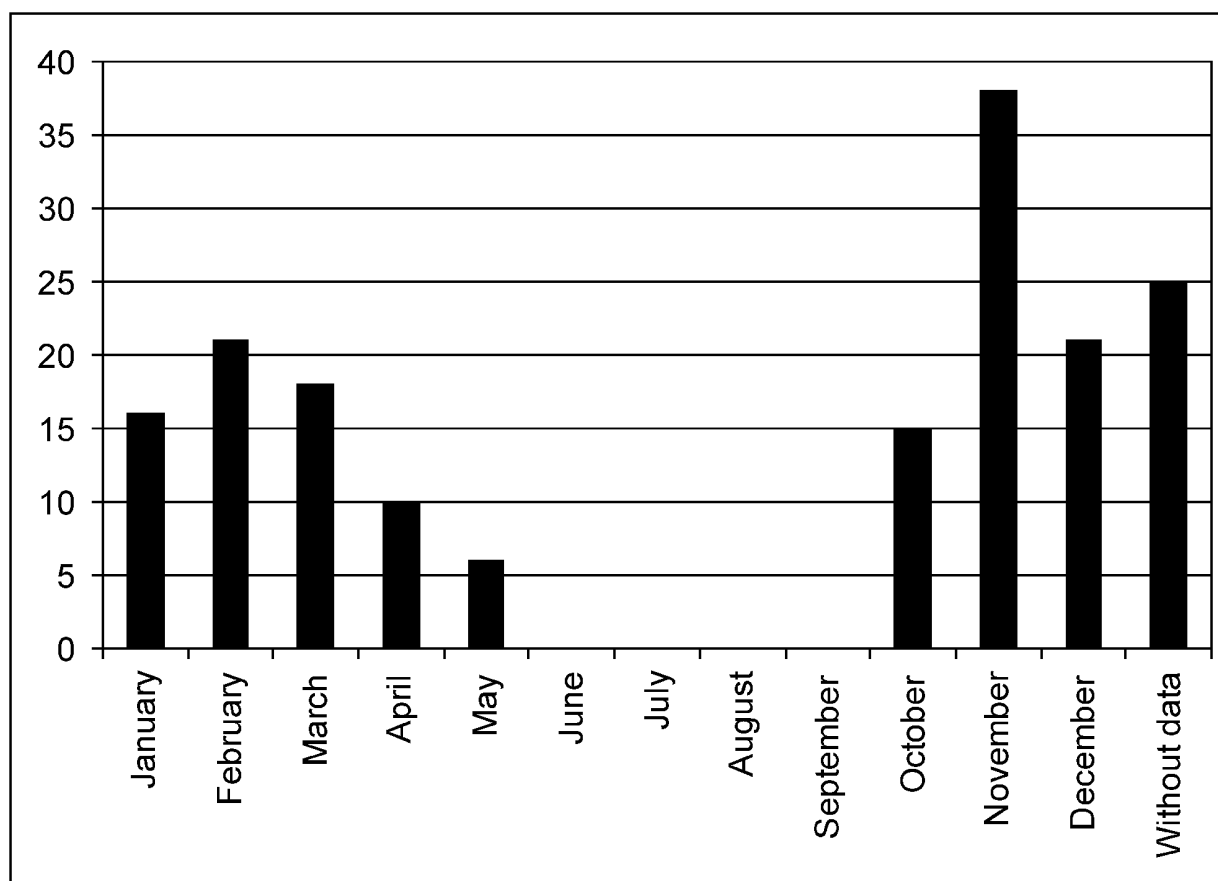


FIGURE 2. Number of specimens collected per month.

Unfortunately, data on collection methods were not registered on labels or literature. Regarding more detailed data on place of collection, only 53 records contain additional information (Table 2). Just three records contain information on plant association: (1) one record of *Falklandius antarcticus* on the Poaceae *Poa flabellata* (“among and under decayed *Poa flabellata*”) and (2) two specimens of *Falklandius turbificatus* on *Myrteola nummularia* (“in berries of *Myrteola nummularia*”). Morrone (1992b) had mentioned that *Falklandius* specimens have been collected under wood, stones or litter of *Nothofagus* (*N. antarctica* and *N. betuloides*) on southernmost South America; also Morrone (1992b) cited specimens related to *Poa flabellata* and *Myrteola nummularia*. According to Broughton & McAdam (2005) *Poa flabellata* is found mainly on tussac, cliffs and slopes, maritime rocks, and dwarf shrub heaths on coastal areas from 0 to 200 m and it is rarely found on inland rocks. *Poa flabellata* is widespread on Malvinas but its abundance had been locally severely impacted by livestock. Regarding *Myrteola nummularia*, Broughton & McAdam (2005) found as habitat of this species acid grasslands, bogs, maritime cliffs and slopes, dwarf shrub heaths from 0 to 700 m and it is widespread across the islands.

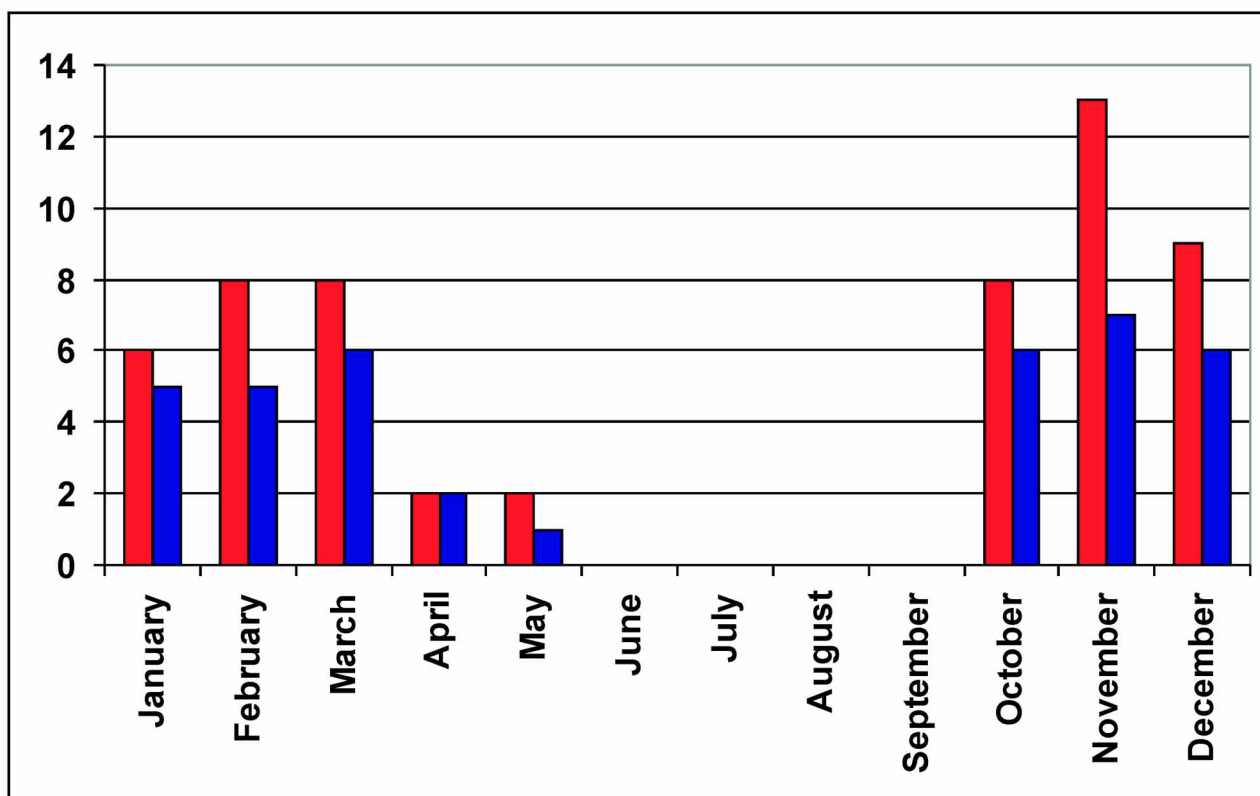


FIGURE 3. Number of species (red) and genera (blue) collected per month.

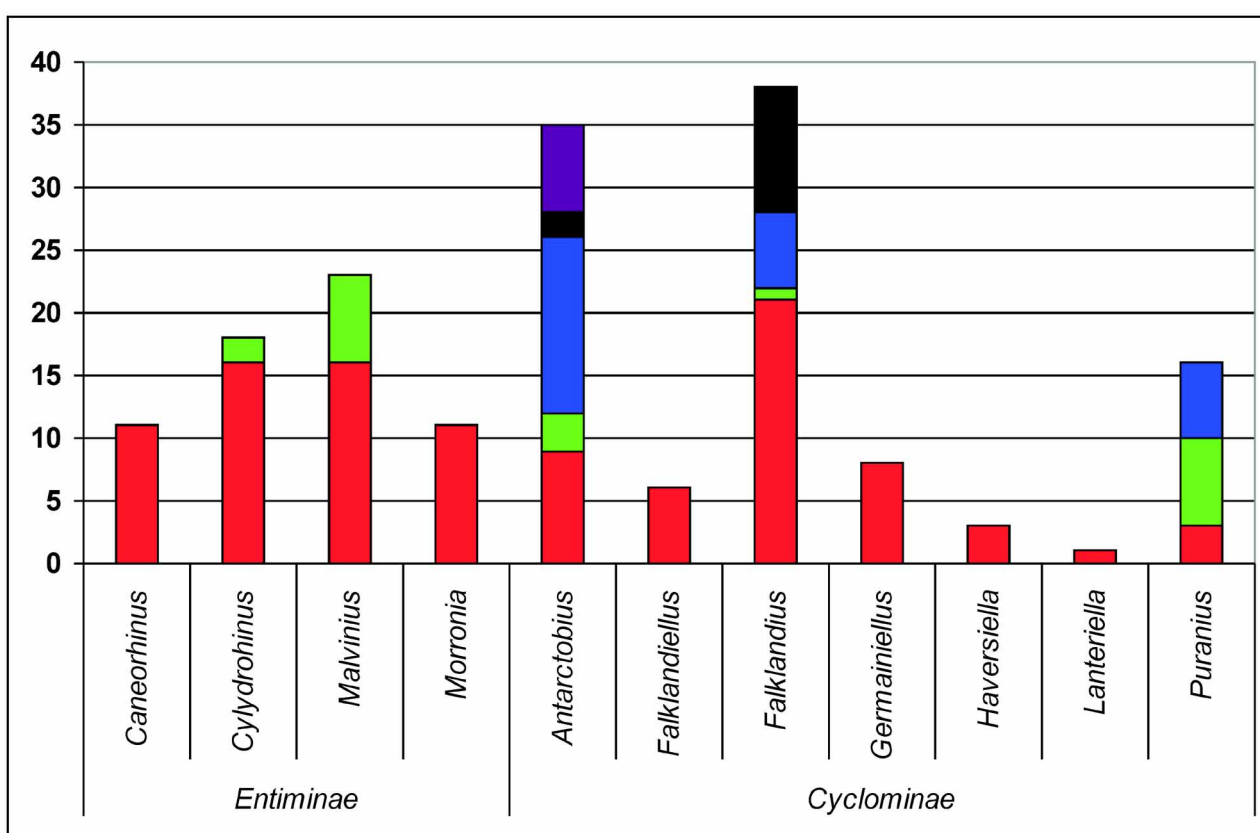


FIGURE 4. Number of specimens collected per genus. Colors indicate different species within each genus.

Finally, in Tierra del Fuego I had collected specimens of *Falklandius antarcticus* and *Falklandiellus suffodens* on dwarf shrub heaths of *Gunnera magellanica* (Gunneraceae). This species of *Gunnera* is also recorded for the Islas Malvinas as a widespread species inhabiting dwarf shrub heaths and acid and neutral grasslands from 0 to 210 m (Broughton & McAdam 2005).

TABLE 2. Number of specimens and species collected on particular habitats according to information available on literature and labels. When more than one specimens of species is collected the number is indicated in brackets.

Habitat	Specimens	Species
Among and under decayed <i>Poa flabellata</i>	1	<i>Antarctobius falklandicus</i>
At base of plant on upper shore	1	<i>Morronia brevirostris</i>
Close to shore line	3	<i>A. falklandicus</i>
Dry grassland with mosses	11	<i>Falklandius kuscheli</i> (6); <i>Antarctobius malvinensis</i> (2); <i>Haversiella albolimbata</i> (3)
In berries of <i>Myrteola nummularia</i>	2	<i>Falklandius turbificatus</i>
Inside leaf of live tussock	4	<i>Falklandius antarcticus</i>
Larvae damaging roots of garden plants	1	<i>A. falklandicus</i>
Under cow dung	1	<i>Puranius scaber</i>
Under diddle-see	1	<i>Germainiellus salebrosus</i>
Under sand at top of a beach	7	<i>Morronia brevirostris</i>
Under stones	13	<i>Malvinus compressiventris</i> (3); <i>Antarctobius abditus</i> ; <i>A. falklandicus</i> (2); <i>Falklandius antarcticus</i> (2); <i>Falklandius turbificatus</i> (2); <i>G. salebrosus</i> ; <i>Puranius championi</i> ; <i>Puranius exsculpticollis</i>
Under wood	5	<i>Falklandiellus suffodens</i> (3); <i>M. compressiventris</i> ; <i>A. falklandicus</i>
Under plant in tussock	3	<i>P. championi</i>

ENTIMINAE

Caneorhinus Kuschel

Caneorhinus Kuschel, 1952: 121 (type species: *Cylindrorhinus lineatus* Blanchard, by original designation).

Caneorhinus biangulatus (Champion 1918)

(Fig. 7)

Listroderes biangulatus Champion 1918:177; Schekling & Marshall, 1931:2 (*Cylindrorhinus*); Kuschel 1952:121 (*Caneorhinus*).

Geographic distribution as in fig. 8

Specimens examined. ISLAS MALVINAS, East Falkland, Port Stanley, III-19-1980 (2 specimens with same data, BMNH); X-16-1963 (BMNH); Eliza Cove, XI-21-1962 (BMNH). West Falkland, Byron Heights, II-8-1983, Prendergast col. (BMNH); Fox Bay, XII-20-1986, Layman col. (2 specimens with same data, BMNH); Saunders Island, Mt. Egmont, II-14-1986 (BMNH); Carcabeias [a possible spelling mistake for Carcass Island] Bennett col., 1933 (3 specimens with same data, BMNH).

Temporal distribution: October to March.

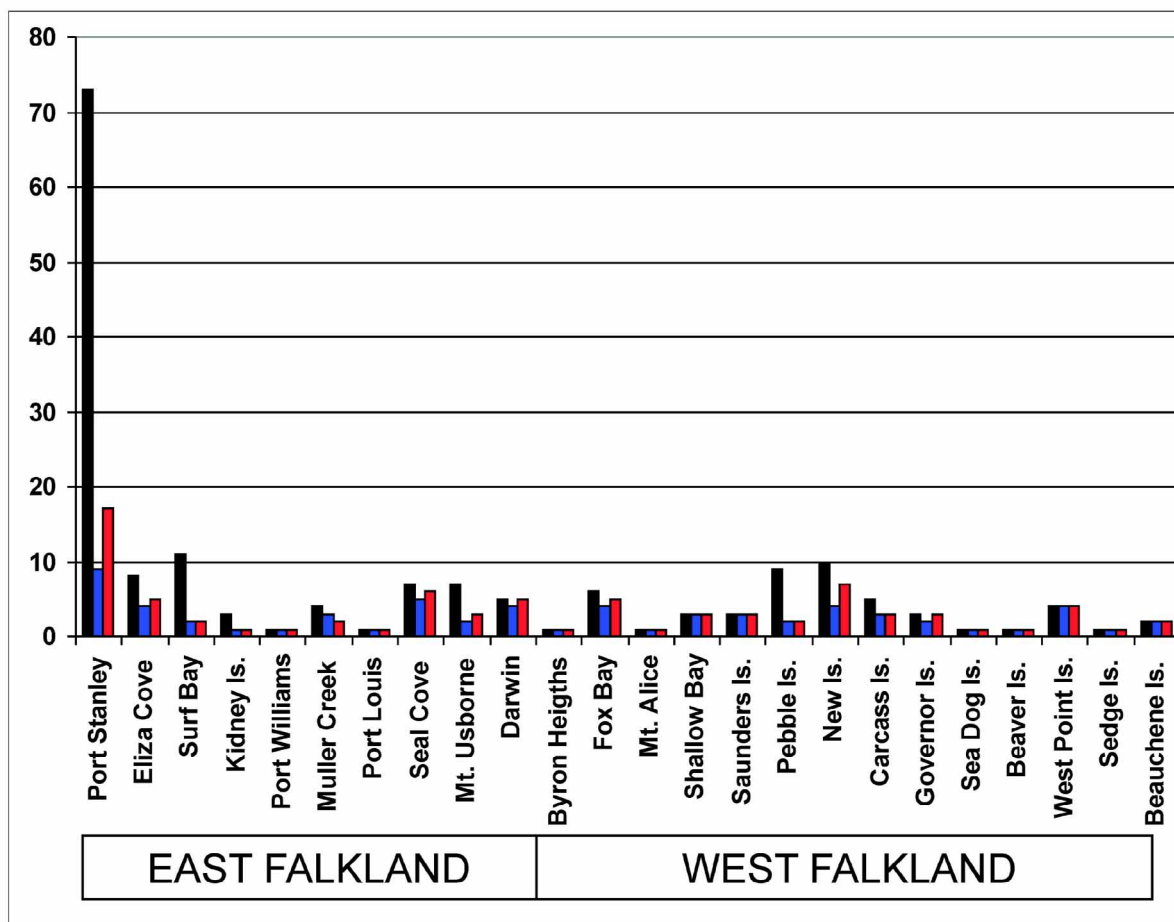


FIGURE 5. Number of specimens (black), genera (blue), and species (red) collected in each locality.

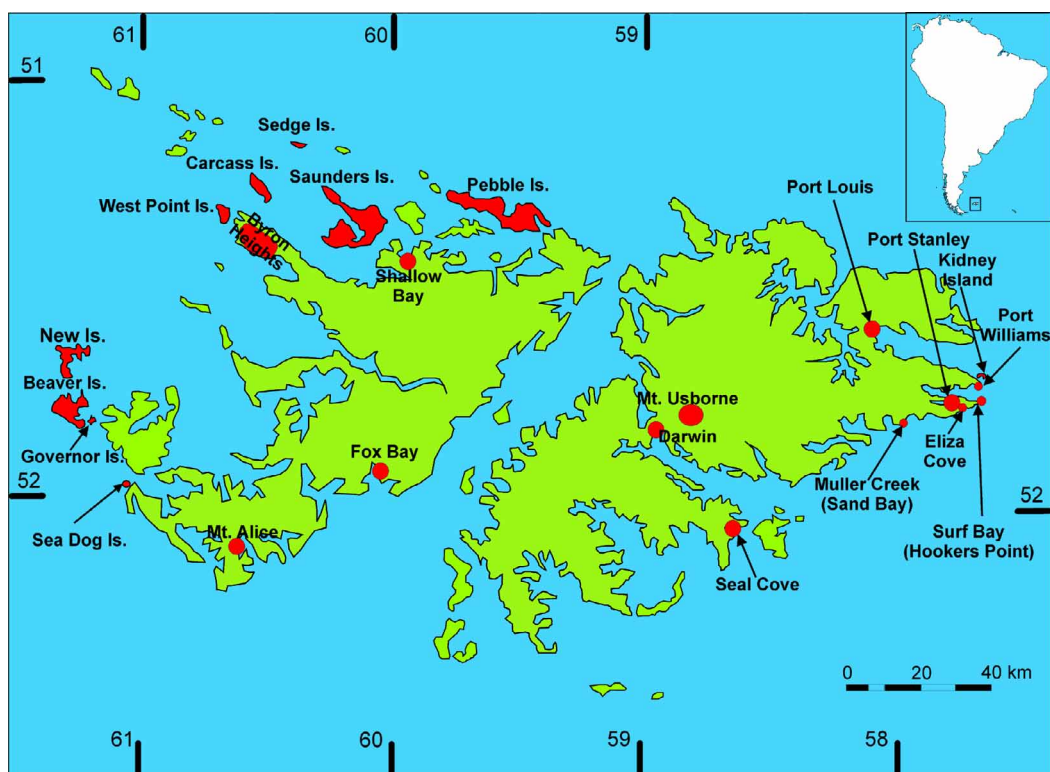


FIGURE 6. Map of Islas Malvinas showing the localities where Curculionidae have been collected.

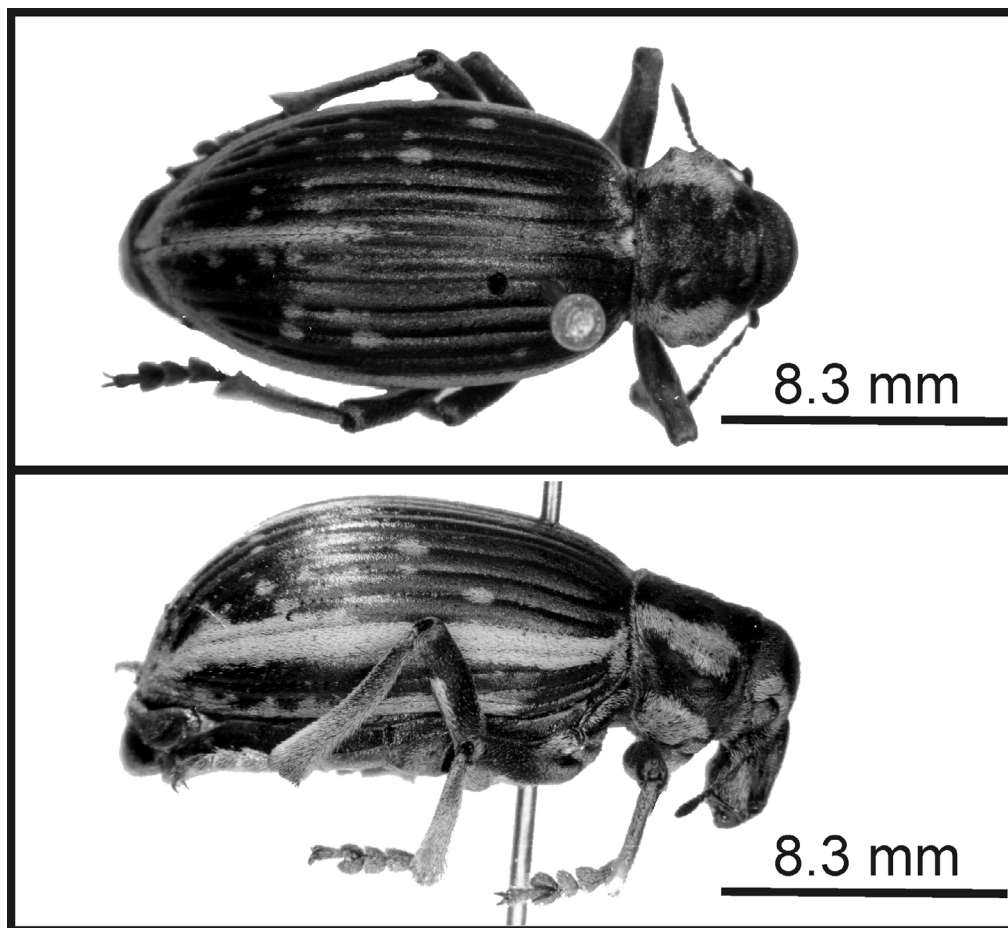


FIGURE 7. *Caneorhinus biangulatus*, dorsal and lateral views.

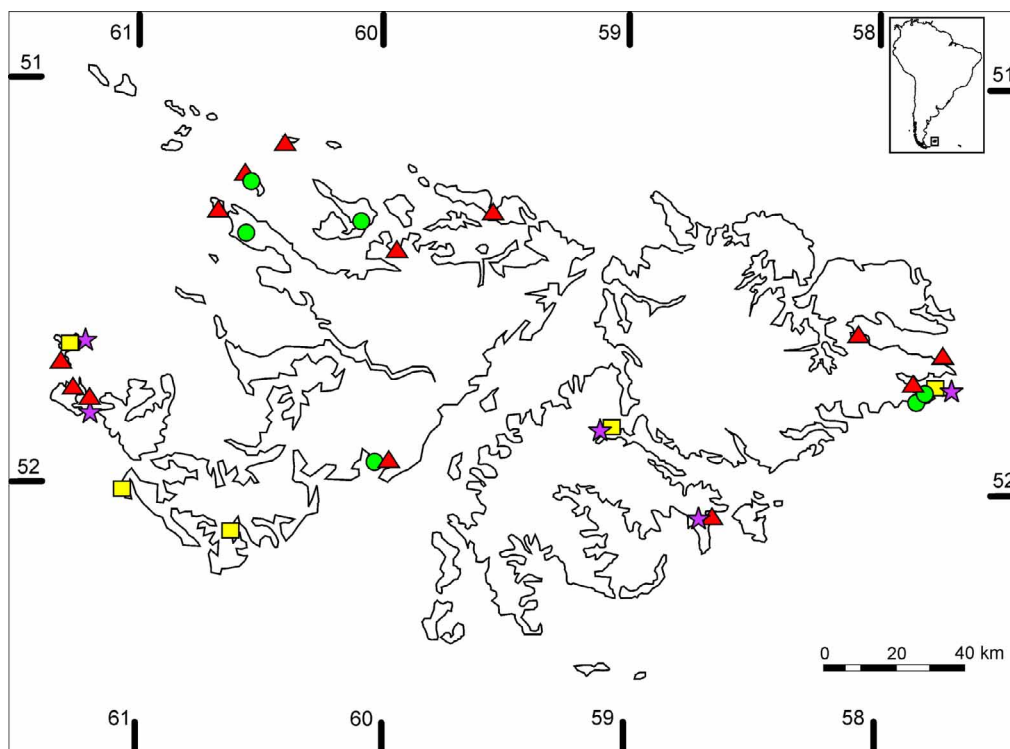


FIGURE 8. Map of Islas Malvinas showing distribution of *Caneorhinus biangulatus* (circles); *Cyldrorhinus lemniscatus* (squares); *Malvinus compressiventris* (triangles); and *M. nordenskiöldi* (stars).

***Cylydrorhinus* Guérin-Méneville**

- Cylydrorhinus* Guérin-Méneville 1830: 119 (type species: *Curculio lemniscatus* Quoy and Gaimard, by indication, monotypy).
Otideres Dejean 1835: 260 (*nomem nudum*).
Adioristus Waterhouse 1841: 124 (not available, type species not designated).
Cylindrorhinus Schoenherr 1842: 336 (lapsus).
Scotoeborus Schoenherr 1843: 97 (type species *S. murinus* Boheman by original designation).
Otideres Fairmaire & Germain 1860: 4 (type species: *O. denticulatus* Fairmaire & Germain, by indication, combined description).
Cylindrorhinus Lacordaire 1863: 343 (lapsus).
Otidoderes Lacordaire 1863:343 (type species *O. inquinatus* Lacordaire [= *C. denticulatus* (Fairmaire & Germain)], by original designation).
Cylindrorhinus Gemminger & Harold 1871: 2358 (unjustified emendation).
Amathynetes Olliff 1891: 70 (type species *A. alticola* Olliff by original designation).
Nahuelius Germain 1895: 318 (type species *Scotoeborus nahuelius* Kuschel, by indication, monotypy).
Paulsenius Germain 1895: 318 (type species *P. frigidus* Germain by original designation).
Nahuelis Germain 1911: 211 (lapsus).
Otidores Germain 1911: 212 (lapsus).
Cylindrorrhinus Bruch 1915: 412 (lapsus).
Otidoderes Bruch 1915: 413 (lapsus).
Listroderes Champion 1918: 178 (misidentification).
Protadioristus Voss 1954: 421 (type species *A. crassirostris* Fairmaire & Germain [= *C. oblongus* Blanchard] by indication, monotypy; subgenus of *Adioristus*).
Peradioristus Voss 1954: 242 (not available, type species not designated; subgenus of *Adioristus*).
Pseudadioristus Voss 1954: 243 (type species *A. squamulatus* Hustache, by indication, monotypy; subgenus of *Adioristus*).

***Cylydrorhinus caudiculatus* (Fairmaire 1884)**

(Fig. 9 A–B)

- Listroderes caudiculatus* Fairmaire 1884: 503; Kuschel 1950: 12 (*Paulsenius*, as variety of *carinicollis*); Kuschel 1986: 104 (*Cylydrorhinus*).
Listroderes carinicollis Germain 1895: 487 (preoccupied).
Listroderes medianus Schekling & Marshall 1931: 6 (replacement name for *L. caudiculatus* Fairmaire); Kuschel 1950: 12 (*Paulsenius*).

Geographic distribution as in fig. 10

Specimens examined. **ISLAS MALVINAS:** East Falkland, Port Stanley, XII-9-1974, Coscarón col. (2 specimens with same data, AMNH); **ARGENTINA:** Tierra del Fuego, Ushuaia, II-24/25-1951, Torres & De Santis col. (8 specimens with same data, MLP); III-16-1979, Solomon col. (USNM). **CHILE:** Magallanes, Cerro Castillo, II-12-1960, Cekalovic col. (USNM); Salto del Payne, I-20-1955, Cekalovic col. (USNM); Chorrillo de la Piedra, II-5-1961, Cekalovic (USNM); Ea. Otway, I-12-1966, Flint & Cekalovic col. (USNM); Magallanes Strait, Sandy Point [English translation for Punta Arenas] (7 specimens with same data, USNM); Punta Arenas, IV-13-1971, Flint & Hevel col. (3 specimens with same data, USNM); X-14-1950, Cekalovic col. (USNM); XII-19-1951 (USNM); 8 km W Punta Arenas, IV-15/16-1971, Flint & Hevel col. (2 specimens with same data, USNM); Río Tres Brazos, I-12-1966, Flint & Cekalovic col. (USNM); **Isla Navarino**, Seno Grandi, 500ft, II-7-1959 (BMNH); Puerto Williams, II-4-1957, Cekalovic col. (4 specimens with same data, USNM). **Picton Island**, grassland, 300ft, II-1-1959 (BMNH).

Temporal distribution: October to April.

***Cylydrorhinus lemniscatus* (Quoy & Gaimard 1824)**
(Fig. 9 E–F)

Curculio lemniscatus Quoy & Gaimard 1824: 549; Guérin-Ménéville [1838]: 119 (*Cylydrorhinus*); Boheman, 1843: 204 (*Erenus arrogans*); Champion 1918: 177 (*Listroderes*); Kuschel 1952: 125 (*Cylindrorhinus*).

Listroderes bicaudatus Enderlein 1907: 47.

Geographic distribution as in fig. 8

Specimens examined. ISLAS MALVINAS: East Falkland, Port Stanley, XI/I-1909, Reid col. (9 specimens with same data, BMNH); New Island, I-5-1987, Kirke col. (7 specimens with same data, BMNH).

Temporal distribution: November to January.

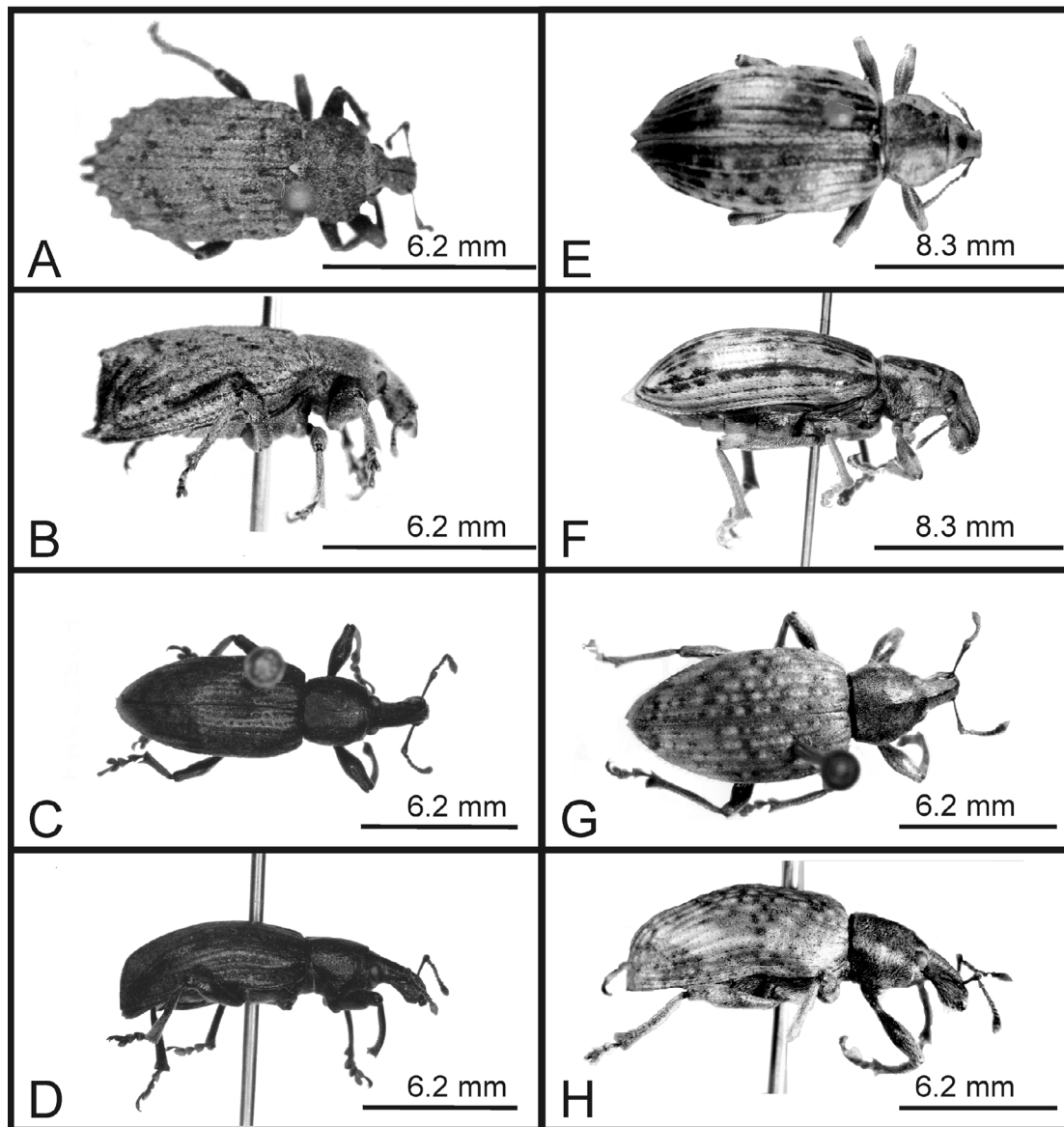


FIGURE 9. Dorsal and lateral views of *Cylydrorhinus caudiculatus* (A–B); *Malvinus compressiventris* (C–D); *Cylydrorhinus lemniscatus* (E–F); and *Malvinus nordenskiöldi* (G–H).

Malvinus Kuschel

Malvinus Kuschel 1950: 11 (type species: *Listroderes compressiventris* Enderlein, by original designation).

***Malvinus compressiventris* (Enderlein 1907)**

(Fig. 9 C–D)

Listroderes compressiventris Enderlein 1907: 58; Kuschel 1950: 11 (*Malvinus*).

Geographic distribution as in fig. 8

Specimens examined. **ISLAS MALVINAS: East Falkland**, Port Stanley, XII-9-1974, Coscarón col. (AMNH); under wood, X-19-1976, Davidson col. (BMNH); under stone, XII-10-1962 (BMNH); XI-8-1962 (2 specimens with same data, BMNH); X-20-1962, Davidson col. (2 specimens with same data, BMNH); **West Falkland**, Fox Bay area, XII-8-1989, Mac Fadyen col. (BMNH); **Pebble Is.**, Betts col. (8 specimens with same data, USNM).

Temporal distribution: October to December.

***Malvinus nordenskiöldi* (Enderlein 1907)**

(Fig. 9 G–H)

Listroderes divaricatus Enderlein 1907: 46.

Listroderes nordenskiöldi Enderlein 1907: 48; Kuschel 1950: 11 (*Malvinus*).

Geographic distribution as in fig. 8

Specimens examined: **ISLAS MALVINAS: East Falkland**, Port Stanley, 9-XII-1974, Coscarón col. (AMNH); 20-X-1962, Davidson col. (BMNH); XII-1964, Davidson col. (4 specimens with same data, BMNH); 25-XI-1962, Davidson col. (BMNH).

Temporal distribution: October to December.

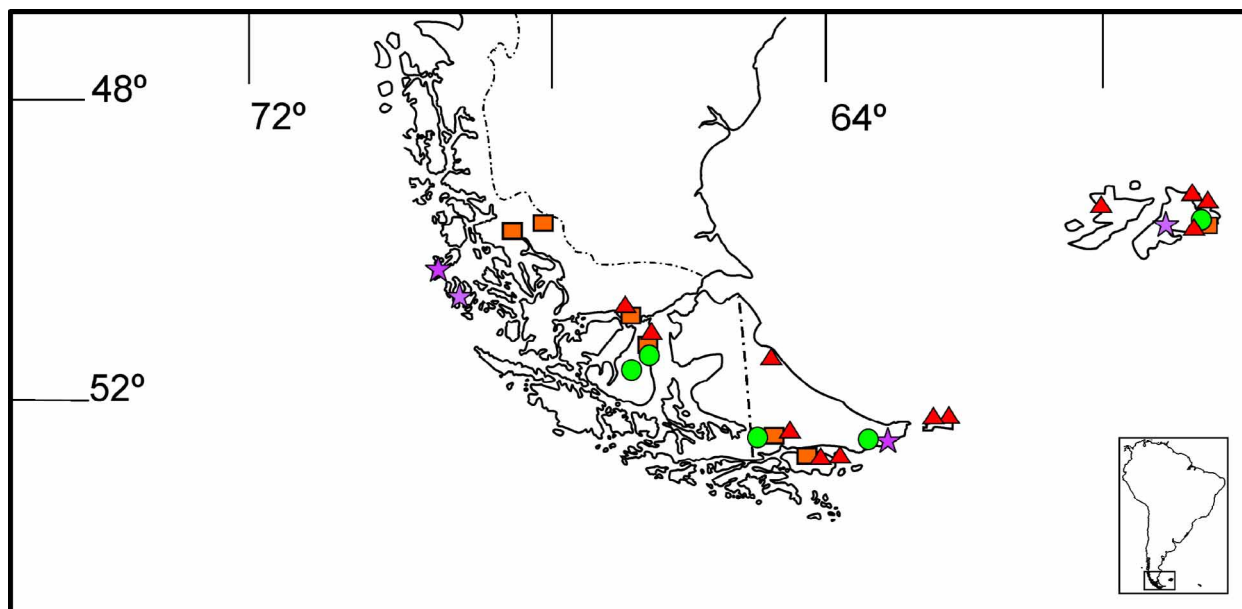


FIGURE 10. Map of southern South America showing distribution of *Cylydrorhinus caudiculatus* (squares); *Falklandiellus suffodens* (circles); *Falklandius antarcticus* (triangles); and *Haversiella albolimbata* (stars).

***Morronia* Posadas & Ocampo**

Morronia Posadas & Ocampo 2001: 147 (type species: *M. brevirostris* Posadas & Ocampo by original designation).

***Morronea brevirostris* Posadas & Ocampo 2001: 150**

(Fig. 11 A–B)

Geographic distribution as in fig. 12

Specimens examined. ISLAS MALVINAS: East Falkland, Surf Bay, IV-16-1986, Bourmby col. (holotype male and six paratypes, BMNH); III-29-1982, Booth col. (paratype, BMNH); near Port Stanley, RAF, II-26-1983, Hann col. (paratype, BMNH); Tussac Clump, Hookers Point, I-28-1983, Prendergast col. (paratype BMNH); Eliza Cove, II-26-1963, Davidson col. (paratype, BMNH).

Temporal distribution: January to April.

CYCLOMINAE

***Antarctobius* Fairmaire**

Antarctobius Fairmaire 1885: 58 (type species : *A. lacunosus* Fairmaire, subsequent designation by Morrone, 1992a).

***Antarctobius abditus* (Enderlein 1907)**

Listroderes abditus Enderlein 1907: 57; Morrone 1992a: 12 (*Antarctobius*); Morrone & Marvaldi 1998: 429 (*Listroderes*); Morrone 2002: 14 (*Antarctobius*).

Geographic distribution as in fig. 12

Specimens examined. ISLAS MALVINAS: East Falkland, Port Stanley, 29-III-1982, Booth col. (3 specimens with same data, BMNH).

Temporal distribution: December to April.

***Antarctobius bidentatus* (Champion 1918)**

Hypera bidentata Champion 1918: 176; *Listroderes bidentatus*; Kuschel 1955: 289 (*Listroderes* subgenus *Antarctobius*); Morrone 1992a: 6 (*Antarctobius*).

Geographic distribution as in fig. 12

Specimens examined: ISLAS MALVINAS: East Falkland, Port Stanley, III-29-1982, Booth col. (2 specimens with same data, BMNH).

Temporal distribution: March.

***Antarctobius falklandicus* (Enderlein 1907)**

Listroderes falklandicus Enderlein 1907: 53; Morrone 1992a: 14 (*Antarctobius*).
Listroderes bracteatus Enderlein 1907: 55.

Geographic distribution as in fig. 12

Specimens examined. ISLAS MALVINAS: East Falkland, Eliza Cove, XII-1963, Davidson col. (2 specimens with same data, BMNH); Port Stanley (under stones), XI-30-1962, Davidson col. (2 specimens with same data, BMNH); New Island, 24-X-1980, Voisin col. (BMNH).

Temporal distribution: October to February.

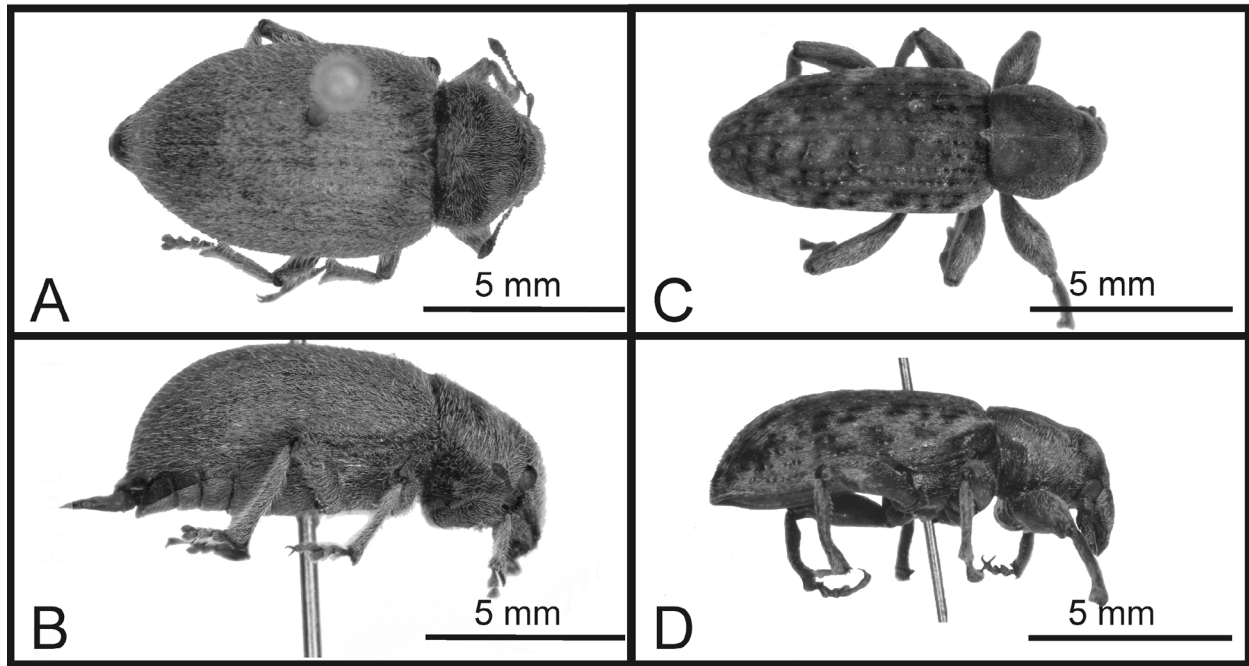


FIGURE 11. Dorsal and lateral views of *Morronia brevirostris* (A–B) and *Antarctobius malvinensis* (C–D).

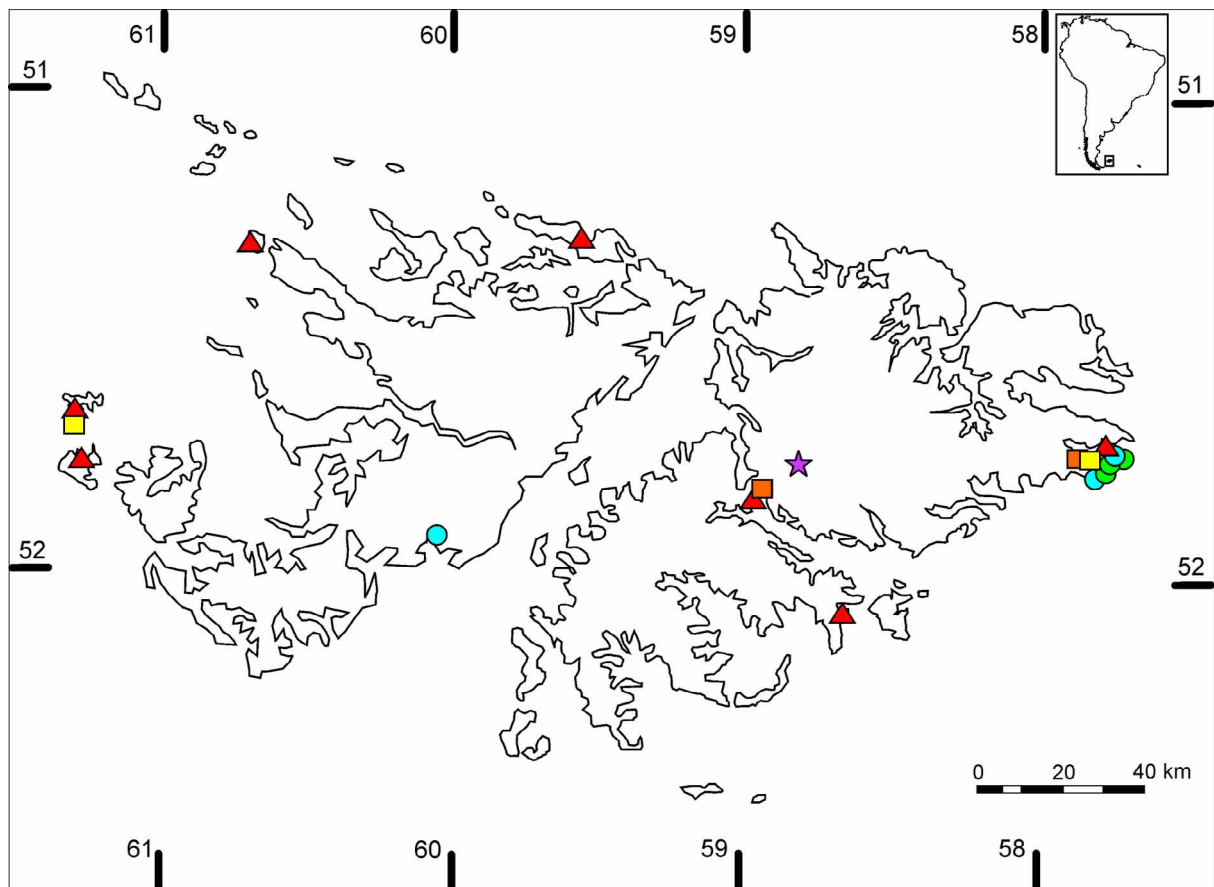


FIGURE 12. Map of Islas Malvinas showing distribution of *Morronia brevirostris* (green circles); *Antarctobius abditus* (blue circles); *A. bidentatus* (yellow squares); *A. falklandicus* (triangles); *A. malvinensis* (stars); and *A. vulsus* (orange squares).

***Antarctobius malvinensis* Posadas & Morrone 2004: 356**

(Fig. 11 C–D)

Geographic distribution as in fig. 12

Specimens examined. ISLAS MALVINAS: East Falkland, Mt. Usborne, II-3-1985 (dry grassland with moss, 700 m) R.I. Lewis Smith col. [1985-160] [167] (2 male specimens with same data, holotype [166] and paratype [167], BMNH).

Temporal distribution: February.

***Antarctobius vulsus* (Enderlein 1907)**

Listroderes vulsus Enderlein 1907: 50; Morrone 1992a: 8 (*Antarctobius*).

Listroderes gibber Enderlein 1907: 51.

Listroderes griseonotatus Champion 1918: 179.

Geographic distribution as in fig. 12

Specimens examined: ISLAS MALVINAS: East Falkland, Port Stanley, X-15-1917, Bennett col. (2 specimens with same data, BMNH); XI-3-1962, Davidson col. (BMNH); Eliza Cove, XII-1964, Davidson col. (2 specimens with same data, BMNH).

Temporal distribution: October to December.

***Falklandiellus* Kuschel**

Flaklandiellus Kuschel 1950: 14 (type species: *Falklandius suffodens* Enderlein, by original designation).

***Falklandiellus suffodens* (Enderlein 1907)**

Falklandius suffodens Enderlein 1907: 69; Kuschel 1950: 14 (*Falklandiellus*).

Falklandius inaequalis Champion 1918: 184.

Geographic distribution as in fig. 10

Specimens examined. ARGENTINA: Tierra del Fuego, PN Tierra del Fuego, arroyo Los Castores, II-26/28-1997, Posadas & Ocampo col. (8 specimens with same data, MLP).

Temporal distribution: October to February.

***Falklandius* Enderlein**

Falklandius Enderlein 1907: 65 (type species *F. brachyomma* Enderlein [= *F. antarcticus* (Stierlin)] by original designation).

***Falklandius antarcticus* (Stierlin 1903)**

Otiorhynchus antarcticus Stierlin 1903: 57; Kuschel 1950: 14 (*Falklandius*).

Falklandius brachyomma; Enderlein 1907: 66.

Geographic distribution as in fig. 10

Specimens examined. ARGENTINA: Tierra del Fuego, Río Grande, Estancia Viamonte, 1940, Rey-

nolds col. (6 specimens with same data, BMNH). **ISLAS MALVINAS: Beauchene Is.**, X-1980, Smith col. (BMNH). **CHILE: Magallanes, Isla Navarino**, Puerto Williams (55°S, 1600 ft, *Nothofagus* forest), I-22-1959 (7 specimens with same data, BMNH).

Temporal distribution: October to June.

***Falklandius goliath* Morrone 1992**

Falklandius goliath Morrone 1992b: 163.

Geographic distribution as in fig. 13

Specimens examined: ISLAS MALVINAS, Saunders Island, Mt. Egmont, II-14-1986 (holotype, BMNH).

Temporal distribution: February.

***Falklandius kuscheli* Morrone, 1992**

Falklandius kuscheli Morrone 1992b: 165.

Geographic distribution as in fig. 13

Specimens examined. ISLAS MALVINAS: East Falkland, Mt. Usborne, 3-II-1985 (holotype, BMNH).

Temporal distribution: February.

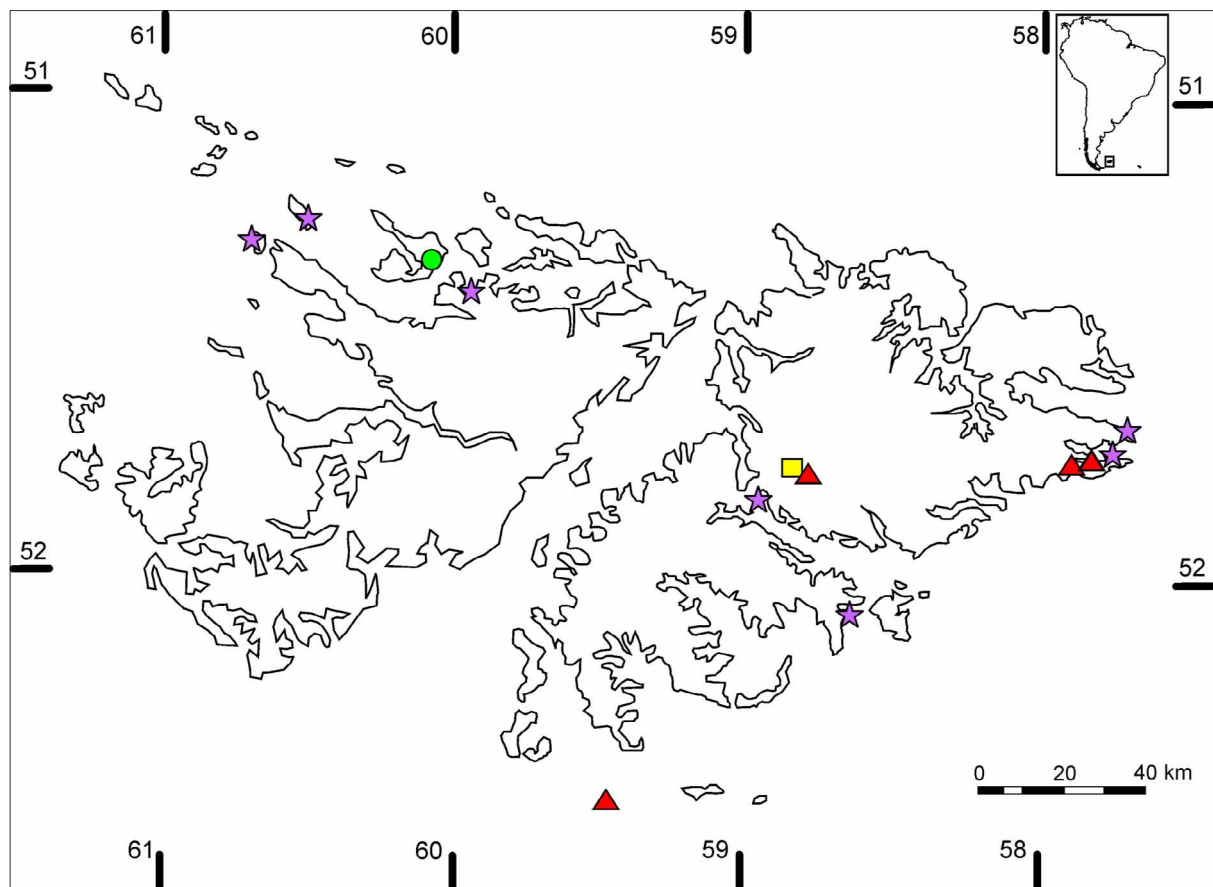


FIGURE 13. Map of Islas Malvinas showing distribution of *Falklandius goliath* (circles); *F. kuscheli* (squares); *F. turbificatus* (triangles); and *Germainiellus salebrosus* (stars).

***Falklandius turbificatus* Enderlein, 1907**

Falklandius turbificatus Enderlein 1907: 67.

Geographic distribution as in fig. 13

Specimens examined. ISLAS MALVINAS: **East Falkland**, Mt. Usborne, II-3-1985, Smith col. (4 specimens with same data, BMNH).

Temporal distribution: February.

***Germainiellus* Morrone**

Germainiellus Morrone 1993a: 125 (type species: *Listroderes dentipennis* Germain by original designation).

***Germainiellus salebrosus* (Enderlein 1907)**

Listroderes salebrosus Enderlein 1907: 44; Kuschel 1952: 128 (*Listroderes* subgenus *Antarctobius*); Morrone 1993a: 132 (*Germainiellus*).

Geographic distribution as in fig. 13

Specimens examined. ISLAS MALVINAS: **Carcass Island**, I-5-1954, Banks col. (BMNH); **East Falkland**, Port Stanley, XI-1964, Davidson col. (BMNH); Port Stanley, III-28-1982, Booth col. (BMNH).

Temporal distribution: November to March.

***Haversiella* Schweiger**

Haversia Champion 1918: 185 (type species: *H. albolimbata* Champion, by original designation; preoccupied).

Haversiella Schweiger 1958: 42 (replacement name for *Haversia* Champion).

***Haversiella albolimbata* (Champion 1918)**

Haversia albolimbata Champion 1918: 185; Schweiger 1958: 42 (*Haversiella*).

Geographic distribution as in fig. 10

Specimens examined. CHILE: **Magallanes, Isla Piazzzi**, Lecky Retreat (25ft.), 26-XII-1958 (4 specimens with same data, BMNH).

Temporal distribution: December to April.

***Lanteriella* Morrone**

Lanteriella Morrone 1992b: 167 (type species: *L. microphthalma* Morrone, by original designation).

***Lanteriella microphthalma* Morrone 1992**

Lanteriella microphthalma Morrone 1992b: 168.

Specimens examined. ISLAS MALVINAS: **Beauchene Is.** XII-1980, (Holotype, BMNH).

Temporal distribution: December.

***Puranius* Germain**

Puranius Germain 1895: 313 (type species: *P. inaequalis* Germain, designated by Morrone, 1994a).

Reichertia Enderlein 1912: 31 (type species: *Listroderes exsculpticollis* Enderlein by original designation).

***Puranius championi* (Kuschel 1952)**

Reichertia exsculpticollis Champion 1918: 182 (preoccupied).

Amathynetes championi Kuschel 1952: 136; Kuschel 1955: 288 (*Puranius*); Kuschel 1986: 116 (*Macrostyphlus*); Morrone 1994a: 44 (*Puranius*).

Geographic distribution as in fig. 14

Specimens examined. ISLAS MALVINAS: East Falkland, Kidney Island, III-15-1963 (3 specimens with same data, BMNH); Port Stanley, XI-30-1962 (4 specimens with same data, BMNH); Rabbit Cove (5 specimens with same data, BMNH).

Temporal distribution: December to March.

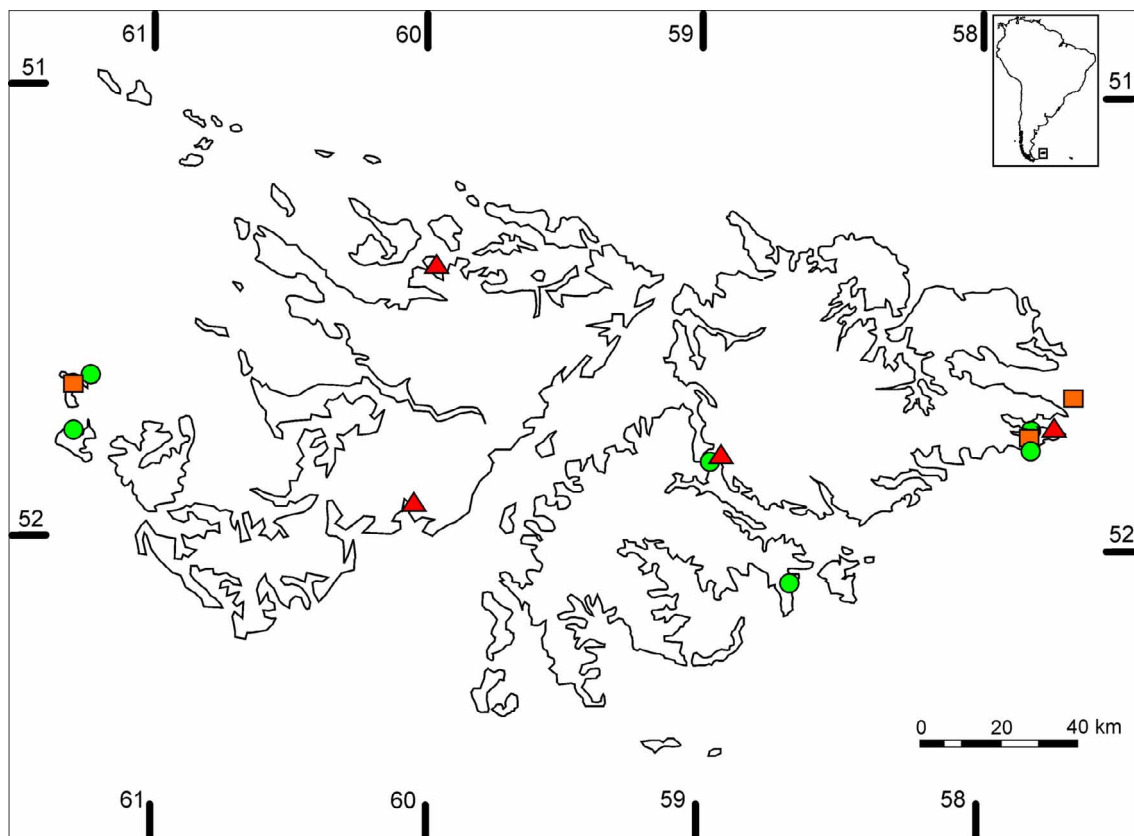


FIGURE 14. Map of Islas Malvinas showing distribution of *Puranius scaber* (circles); *P. championi* (squares); and *P. exsculpticollis* (triangles).

***Puranius exsculpticollis* (Enderlein 1907)**

Listroderes exsculpticollis Enderlein 1907: 60; Enderlein 1912: 32 (*Reichertia*); Kuschel 1949: 45 (*Amathynetes*); Kuschel 1955: 288 (*Puranius*); Kuschel 1986: 116 (*Macrostyphlus*); Morrone 1994a: 47 (*Puranius*).

Listroderes insquameus; Enderlein 1907: 62; Enderlein 1912: 33 (*Reichertia*).

Geographic distribution as in fig. 14

Specimens examined. ISLAS MALVINAS: East Falkland, Port Stanley, XI-30-1962 (8 specimens with same data, BMNH).

Temporal distribution: November.

***Puranius scaber* (Enderlein 1907)**

Listroderes scaber Enderlein 1907: 63; Kuschel 1949: 45 (*Amathynetes*); Kuschel 1955: 288 (*Puranius*); Kuschel 1986: 117 (*Macrostyphlus*); Morrone 1994a: 55 (*Puranius*); Enderlein 1912: 33 (*Reichertia*).

Geographic distribution as in fig. 14

Specimens examined. ISLAS MALVINAS: East Falkland, Port Stanley, XI-30-1962 (12 specimens with same data, BMNH); Falkland Is. (without more data) XII-7-1933, Bennett col. (BMNH).

Temporal distribution: November to December.

Discussion

The Malvinian weevil fauna is characterized by a high level of species endemism (18 endemics of 22 recorded species). All four Malvinian non-endemic species are shared with the southernmost areas of continental South America and Tierra del Fuego archipelago (Posadas & Morrone 2004, see also Fig. 10). Endemism at the generic level is lower but still important (30% of the recorded genera are endemics). Those genera which are not endemic to Islas Malvinas have representatives distributed on southern South America (e.g., *Caneorhinus*, *Falklandius*, *Antarctobius*, and *Germainiellus*) or at most their distributions extend far north on the Andean region following the Andean cordillera (e.g., *Cylydrorhinus* and *Puranius*).

Cladistic information is available for several genera recorded for the Islas Malvinas, especially for those genera belonging to Cyclominae [e.g., *Antarctobius* (Morrone 1992a; Posadas & Morrone 2004); *Falklandius* (Morrone 1992b; Morrone & Anderson 1995); *Germainiellus* (Morrone 1993a); *Puranius* (Morrone 1994a)]. Posadas & Morrone (2004) and Morrone & Posadas (2005) have summarized biogeographic implications of the Malvinian weevil fauna. Only three Malvinian genera, of those for which cladistic information is available, are represented for two or more species in the archipelago (i.e., *Antarctobius*, *Falklandius*, and *Puranius*). *Falklandius* is represented in the Islas Malvinas by four species which constitute a monophyletic group (Morrone & Anderson, 1995). This group is as follows: (*F. antarcticus* (*F. turbificatus* (*F. goliath*, *F. kuscheli*))). The basal species of the clade (*F. antarcticus*) is the only one which has a distribution area exceeding the Islas Malvinas (see table 1), the remaining three species are Malvinian endemics and it could indicate that this clade evolved in isolation in the Islas Malvinas. Regarding *Antarctobius* (five Malvinian species) and *Puranius* (three Malvinian species), all Malvinian representatives of both genera are endemics and Malvinian species did not constitute monophyletic clades in their respective genera (Posadas & Morrone 2004; Morrone 1994a). Also, historical biogeographic analyses have shown that the Islas Malvinas and Tierra del Fuego are connected by a panbiogeographic track (Morrone 1992a, Morrone 1995a) meaning that there was a common ancestral biota which was fragmented by geological events. Furthermore, Posadas & Morrone (2003) using cladistic biogeographic methods based on distributional information of Curculionidae, hypothesized that the Islas Malvinas is the sister area of the clade constituted by the Magellanic Moorland and Magellanic Forest. Based on all these phylogenetic and historical biogeographic information, and considering that Curculionidae species present in Islas Malvinas are apterous or brachypterous, Posadas & Morrone (2004) have hypothesized that the geographical isolation of the Islas Malvinas was broken more than once during southern hemisphere glaciations in Tertiary or Quaternary times allowing land-connection of southern South America and the Islas Malvinas. These land-connections were broken during interglacial episodes. Geological evidence

supports this hypothesis. For example, Coddignoto (1990) postulated that the coastal line during the final Pleistocene glaciation was located between 100m and 150m present day batymetric curves. Thus, most of the southern South American continental shelf (in which Islas Malvinas are located) was an emerged land during glaciations. According to that, Posadas & Morrone (2004) have postulated that the evolution of the Malvinian weevil fauna responded to several geodispersal and subsequent vicariant events related to sea-level variations induced by glacial-eustatic agents.

A remarkable characteristic of the Malvinian weevil fauna is the complete absence of Curculionoidea families other than Curculionidae, whereas in southern South America six Curculionoidea families (including Curculionidae) have been recorded (i.e., Nemonichidae, Anthribidae, Belidae, Attelabidae, Brentidae, and Curculionidae). Also, the Islas Malvinas is inhabited by only two Curculionidae subfamilies, whereas six Curculionidae subfamilies are recorded for southern South America (i.e., Entiminae, Cyclominae, Curculioninae, Cryptorhynchinae, Cossoninae, and Molytinae). The two subfamilies recorded from the Islas Malvinas present a relatively short and stout rostrum not used to prepare oviposition sites (Marvaldi 1997). This rostrum characterizes the so called broad-nosed weevils and it is present in other weevil taxa as for example Ithycerinae. According to Marvaldi (1997), broad-nosed weevils are not a monophyletic group. However, they share an ectophytic oviposition behavior. This oviposition strategy and larval development in soil must have allowed broad-nosed weevils to tolerate extreme climatic conditions (Marvaldi 1997) such as those present in the Islas Malvinas. Furthermore, Anderson (pers. com.) mentioned that Entiminae represents most species of weevil faunas on extreme environments.

As mentioned before, it is important to note that the southernmost part of South America (Tierra del Fuego archipelago) exhibits a weevil fauna which shows similarities with the Malvinian one (Posadas 2002). As was pointed out in the Introduction, the Malvinian flora could be considered as an impoverished version of Tierra del Fuego's. Thus, the Malvinian flora lacks arboreal species present in Tierra del Fuego and it shows a diminished number of other plant species. Similarly, the Malvinian weevil fauna could be considered as an impoverished version of that from Tierra del Fuego at the generic level, but with a very high degree of species level endemism. Figure 15 compares Curculionoidea diversity at different taxonomic levels between Fuegian and Malvinian weevil faunas and Figure 16 shows the composition of the weevil fauna of both archipelagos at the family level.

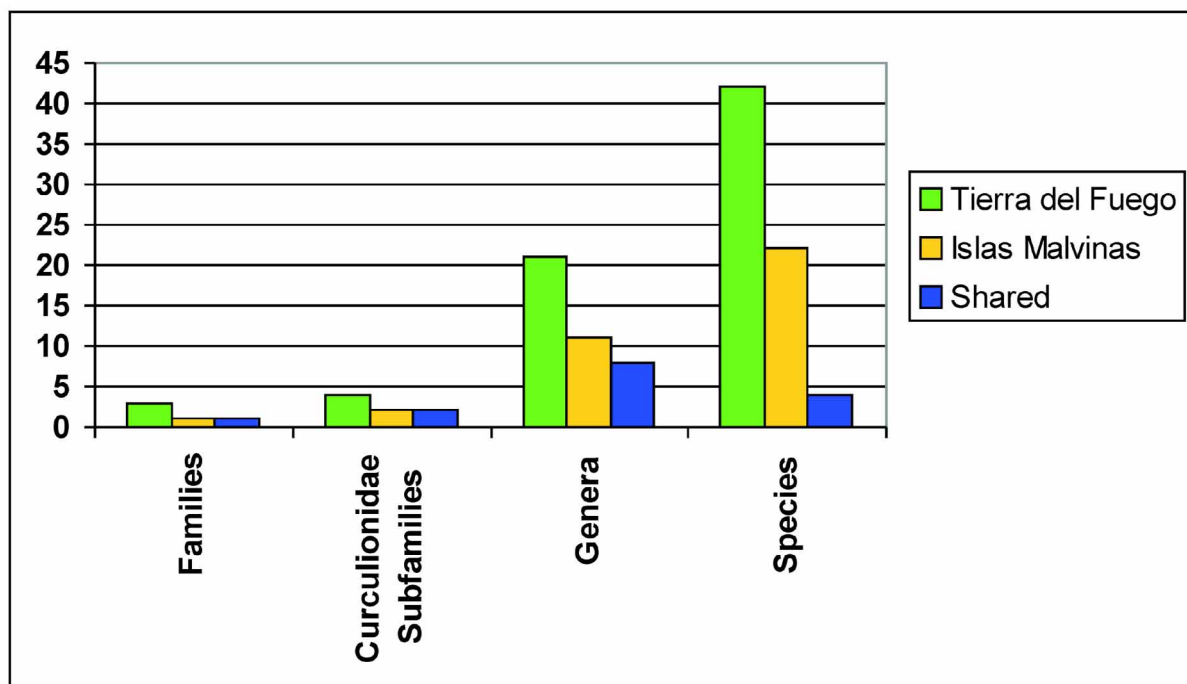


FIGURE 15. Comparison between Malvinian and Fuegian weevil faunas at different taxonomic levels

It is important to note that several Fuegian taxa absent from the Malvinian weevil fauna have been collected from *Nothofagus* forest, a vegetal formation which is not present in the Islas Malvinas (e.g., *Apion* sp., *Aeghorhinus* spp., and *Rhyephenes* sp.). Regarding the presence of Curculioninae in Fuegian areas, the only genus recorded is *Anthonomus* with two species. Clark & Burke (1989) revised the *ornatus* species group of the genus *Anthonomus*, mentioning the presence of *Anthonomus ornatus* and *A. signatipennis* in Tierra del Fuego. Clark & Burke (1989) mentioned that six of the seven species of *A. ornatus* group are known to be associated with one or more species of *Berberis* (Berberidaceae). Furthermore, both *Anthonomus* species recorded for Tierra del Fuego have been associated specifically with *Berberis buxifolia*, a shrub which is absent from Islas Malvinas. Similarly, *Berberidicola* (Curculionidae: Molytinae) recorded from Tierra del Fuego and absent from the Islas Malvinas, have been associated with *Berberis* shrubs. Thus, in most cases the absence in the Malvinian weevil fauna of weevil genera recorded for Tierra del Fuego could be related to the absence of their associated plants.

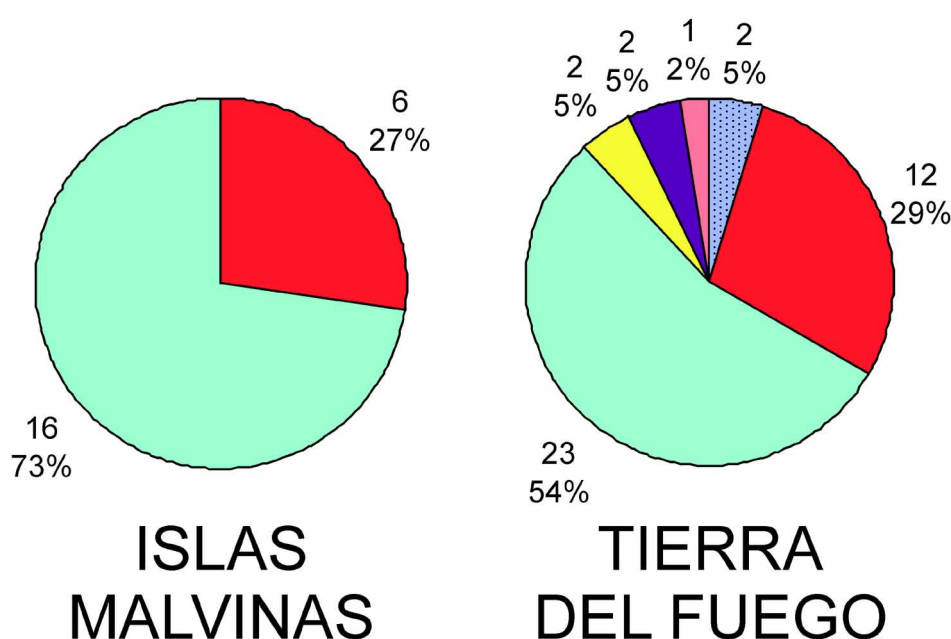


FIGURE 16. Comparative composition of Malvinian and Fuegian weevil faunas at family and subfamily levels. Dotted: Curculionoidea families other than Curculionidae. Red: Entiminae. Sky blue: Cyclominae. Yellow: Curculionidae. Violet: Cryptorrhynchinae. Pink: Cossoninae. Numbers indicate species recorded for each archipelago as total and percentage.

Voisin (1986) remarked that the Curculionidae is the Coleoptera family which is more abundant around Port Stanley and in New Island and Governor Island, whereas in Beaver Island, the coleopterous fauna is scarce and dominated by Carabidae. This author mentioned that this fact could be due to the introduction of Patagonian foxes to Beaver Island which include Curculionidae in their diet.

Finally, it is important to note that collections of Malvinian weevils have been scarce, as shown in Fig. 1. So, further collections would be needed to complete the knowledge of Malvinian weevils and to complete the picture of their geographic distribution. Additionally, information on plant association and biology of Malvinian Curculionidae is necessary to complete our understanding of such a particular fauna.

Appendix

Key to subfamilies of Curculionidae recorded from Islas Malvinas

- 1 Mandible lacking scar Cyclominae
- Mandible with scar Entiminae

Key to the genera of Entiminae from Islas Malvinas

- 1 Rostrum with carinae; fore tibiae lacking spatula-like projection 2
- Rostrum lacking carinae; fore tibiae with a spatula-like projection in its apex
..... *Morronia* (*M. brevirostris*, monotypic)
- 2 Hind tibiae with two spurs, middle tibiae with one spur; transversal prothorax; well developed postocular lobes; rostrum twice longer than wide at apex at maximum, triangular and well developed scutellum 3
- Tibiae lacking spurs; slightly developed postocular lobes; prothorax almost square; rostrum three times longer than its width at apex; slightly developed scutellum *Malvinus*
- 3 Frons markedly convex, clearly separated from rostrum, showing a transversal sulcus
..... *Caneorhinus* (*C. biangulatus*)
- Frons flat, continuing rostrum, lacking transversal sulcus *Cylydrorhinus*

Key to species of *Malvinus* from Islas Malvinas

- 1 Suprascrobal sulcus present; elytra laterally compressed on declivital area; vestiture of small, subcircular, black scales *M. compressiventris*
- Supraescrobal sulcus absent; elytra not compressed on declivital area; vestiture of small, subcircular, mostly white and cooper-coloured scales *M. nordenskiöldi*

Key to species of *Cylydrorhinus* from Islas Malvinas

- 1 Elytra covered by subcircular, costate, cooper-colour scales; elytral apical mucron strongly developed and with acute apex; interval with tubercles located mainly on declivital area; protrudent humeri
..... *C. caudiculatus*
- Elytra covered by white and cooper-colour seta-like scales; elytra apical mucro slightly developed and with rounded apex; intervals lacking tubercles; rounded humeri *C. lemniscatus*

Key to genera of Cyclominae from Islas Malvinas

- 1 Funicular article 2 monilliform 2
- Funicular article 2 elongate 4
- 2 Eyes and scrobes located dorsally 3
- Eyes and scrobes located laterally *Falklandiellus* (*F. suffodens*, monotypic)
- 3 Femora dorsoventrally compressed; tibiae with expanded apex *Lanteriella* (*L. microphthalmia*, monotypic)
- Femora subcylindrical and slightly clavated; tibiae subcylindrical *Falklandius*
- 4 Medium-sized rostrum (as short as half of pronotum); antennal insertion located apical or subapical related to rostrum; tibiae with spurs; head, prothorax, and elytra lacking pale lateral stripes 5

- Long rostrum; antenal insertion at middle part of rostrum; tibiae lacking spurs; head, prothorax, and elytra exhibiting a pale lateral stripe.....*Haversiella* (*H. albolimbata*, monotypic)
- 5 Postocular lobes absent.....*Antarctobius*
- Postocular lobe present.....*Germainiellus* (*G. salebrosus*)

Key to species of *Antarctobius* from Islas Malvinas

- 1 Vestiture of subcircular scales.....2
- Vestiture of seta-like scales.....3
- 2 Antennal scape long (exceeding hind margin of eye when resting in scrobe); flat intervals; tibiae lacking spurs..... *A. bidentatus*
- Antennal scape short (not exceeding hind margin of eye when resting in scrobe); intervals slightly convex; each tibiae exhibiting one spur*A. falklandicus*
- 3 Fore femora markedly inflate and clavate; hind tibia strongly curved toward its inner margin.....
..... *A. malvinensis*
- Fore femora normal; hind tibia not strongly curved toward its inner margin.....4
- 4 Antennal scape short; funicular article 1 short (1.5 times longer than funicular article 2) *A. abditus*
- Antennal scape long; funicular article 2 long (1.9 times longer than funicular article 2) *A. vulsus*

Key to species of *Falklandius* from Islas Malvinas

- 1 Vestiture composed only by thin erected setae; hind tarsi 3 completely bilobated 2
- Vestiture composed by thin erected setae and thick decumbent setae; hind tarsi partially bilobated 3
- 2 Circular eyes; anterior impressed prothorax; striae slightly punctuated.....*F. antarcticus*
- Ovate eyes; prothorax lacking anterior impression; striae strongly punctuated..... *F. turbificatus*
- 3 Funicular articles 3–6 monilliform; prothorax lacking median sulcus; elytral declivital apex oblique
.....*F. kuscheli*
- Funicular articles 3–6 elongate; prothorax exhibiting median sulcus; elytral declivital apex vertical.....
..... *F. goliath*

Key to species of *Puranius* from Islas Malvinas

- 1 Flat intervals; hind tibiae with two spurs..... 2
- Strongly convex intervals; hind tibiae with one spur *P. scaber*
- 2 Vestiture with subcircular scales; middle tibiae with one spur..... *P. championi*
- Vestiture with seta-like scales; middle tibiae with two spurs*P. exsculpticollis*

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