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ENTOMOLOGY OF THE AUCKLANDS AND OTHER ISLANDS SOUTH OF NEW ZEALAND: COLEOPTERA: CARABIDAE: BROSCINI

By **J. I. Townsend**[1]

Abstract: Three genera and 3 species of Broscini occur on the subantarctic islands of New Zealand, 2 on the Snares and 1 on the Bounty. The 2 genera from the Snares are related to the fauna of different parts of New Zealand—*Diglymma* to the fauna of western Fiordland and *Mecodema* to that of Stewart Island and the southern part of the South Island. *Bountya insularis* n. gen., n. sp. from the Bounty Is is placed in the subtribe Creobiina which has not been previously recorded from the New Zealand biogeographical area, but has related genera occurring in Australia and South America. Figures of genitalia and photographs of adults and larvae are given.

INTRODUCTION

Although Broscini are most abundant in the temperate zones, they are not as cold-tolerant as Trechini and Migadopini, and in the New Zealand area do not appear to exist south of latitude 48°S. The tribe is represented by three species, two on the Snares (110 km SW of Stewart Island) and one on the Bounty Islands (810 km E of Stewart Island).

Prior to this study two species were known from the subantarctic islands, *Diglymma castigatum* Broun and *Mecodema hudsoni* Broun, both from the Snares. The *Diglymma* species is endemic to the Snares and is more closely related to Fiordland species than to the species from Otago, Southland and Stewart Island. The species of *Mecodema* occurs also on the mainland from Otago southwards as well as on to the Chathams, but the populations on the Snares are considered distinct at subspecific level.

The third species is endemic to Bounty and belongs to a new genus with relatives outside the New Zealand biogeographical boundary, in mainland Australia, Tasmania and South America. The presence of this genus on Bounty with its relatively mild climate suggests a relict element of a group that may have been more abundant in the area prior to the glaciations.

CLASSIFICATION

The higher classification of the group has been rather fluid in recent years, as the tribal name Broscini has been used more or less synonymously with the subfamily name Broscinae (Britton 1949, 1964, 1970; Darlington 1965). Jeannel (1941) elevated the tribes to family rank and proposed a classification of his "subfamilies" based on the position and shape of the basal orifice of the aedeagus and on the presence or absence of setae on the left paramere. Both the change of status and the classification have been critically examined by Britton (1949) and Ball (1956). Ball divided the Broscini into three subtribes, Barypina containing *Barypus* from South America; Creobiina containing *Creobius* and *Cascellius* from South America and *Promecoderus*, *Parroa*, *Gnathoxys* and *Cerotalis* from Australia; and Broscina containing the largest number of genera (14), *Broscus* and others from the northern hemisphere, *Percosoma* and *Eurylychnus* from Australia and *Diglymma*,

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Oregus, *Metaglymma*, *Mecodema* and *Brullea* from New Zealand. He based his classification on internal parts of the male genitalia, using the terms "sclerites X and Y" for chitinous areas near the base of, and partly surrounding, the internal sac. These sclerites have been used to determine phylogenetic relationships of the New Zealand genera which comply with the general terms of Ball's classification, summarised in the following key:

1. Aedeagus with a basal keel and completely sclerotized on the dorsal surface.....**Barypina**
   Aedeagus without a basal keel, partly sclerotized or completely membranous dorsally.....2
2. Sclerites X and Y present near base of internal sac (Fig. 4, 5, 8, 9).....**Broscina**
   Sclerites X and Y absent (Fig. 24–26).....**Creobiina**

The genera found on the New Zealand subantarctic islands are *Mecodema* and *Diglymma* of the subtribe Broscina and *Bountya* n. gen., subtribe Creobiina.

Key to species

1. Pronotum markedly wider at anterior than at posterior margin; sides abruptly and sinuately constricted in the basal 1/2; basal foveae well marked. Aedeagus with sclerites X and Y present. Snares.....2
   Pronotum not markedly wider at anterior than at posterior margin; sides gradually narrowed posteriorly in an almost straight line to basal angles; basal foveae almost entirely absent. Sclerites X and Y absent. 13.0–15.5 mm. Fig. 34. Bounty.....**Bountya insularis** n. sp.
2. Head with the single supraorbital puncture on each side bearing a single seta; anterior tibiae not prolonged externally to a point at the apex (Fig. 1). 9.0–10.5 mm. Fig. 32.....
   .....**Diglymma castigatum** Broun
   Head with supraorbital puncture bearing 2 or more setae; anterior tibiae prolonged externally to a point at apex (Fig. 13). 27.0–34.0 mm. Fig. 33.....**Mecodema alternans hudsoni** Broun

BROSCINA

The New Zealand Broscina form a distinct group within the subtribe characterised by the following features: ligula keeled; aedeagus partly sclerotized on dorsal surface, with basal orifice closed dorsally; sclerite X of elongate form without lateral upturned projections.

Genus **Diglymma** Sharp, 1886

Sharp, 1886, *Trans. R. Dubl. Soc.* (**2**)3: 360.—Broun, 1893, *Man. N.Z. Col.* (**5**): 980.—Broun, 1908, *Ann. Mag. Nat. Hist.* (**8**)2: 340 (as *Snofru*).—Britton, 1949, *Trans. Roy. Soc. N.Z.* **77:** 539.

Type-species: *Diglymma clivinoides* (Laporte de Castelnau, 1867).

ADULT: Head with the single supraorbital puncture on each side bearing a single seta; terminal segments of palpi slender, widest in middle, tapering towards apex; antennae with 3.5 basal segments glabrous, the remainder pubescent (Fig. 3). Elytra with 7th interval lacking setae; scutellar striole present, although only weakly developed in some species. Anterior tibiae not prolonged externally to a point at apex (Fig. 1). Male genitalia with sclerite X elongate, gradually tapering to insertion of ejaculatory duct at its basal extremity (Fig. 4); armature of internal sac consisting of dense groups of small spines (Fig. 4), with or without an additional chitinous tooth.

♀ genitalia (Fig. 2) with spermathecal duct entering bursa copulatrix beyond median oviduct. Spermatheca a simple, short, curved tube showing annular striations, but lacking an accessory gland. Bursa copulatrix with a separate accessory gland connected by a thin duct. Styli with setae at apex.

LARVA: Distinguished at generic level by the 10th abdominal segment being of cylindrical form, relatively long and possessing only a few long setae (Fig. 15).

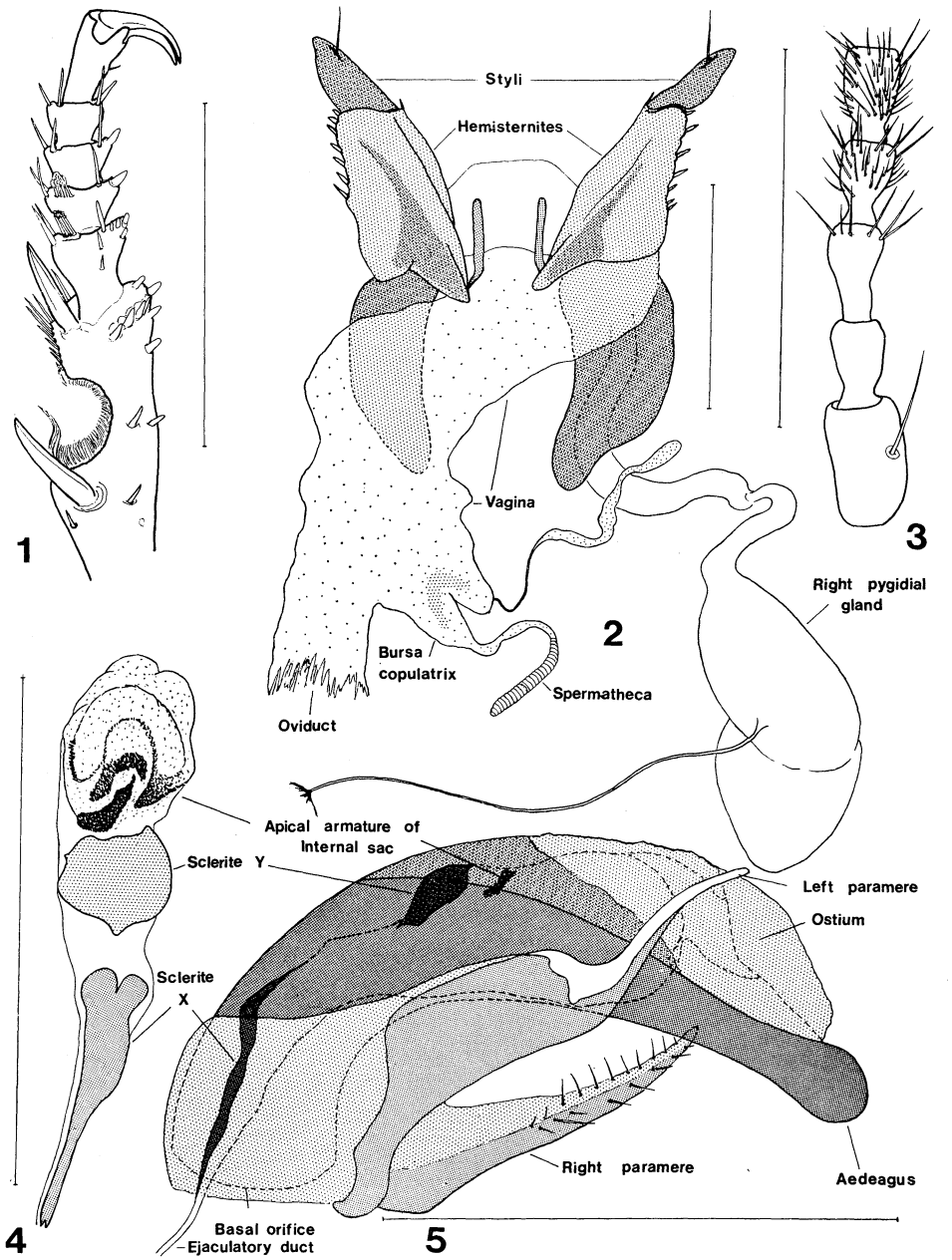

Fig. 1–5. *Diglymma castigatum* Broun—all comparison lines represent 1 mm. 1, Distal portion of left fore tibia and tarsus, ♂; 2, ♀ genitalia, ventral aspect; 3, 5 basal segments of antenna, dorsal aspect; 4, Internal sac and sclerites of ♂ genitalia, dorsal aspect; 5, ♂ genitalia, lateral aspect.

Remarks: The genus *Diglymma* contains four species from the South Island, one of which also occurs in the North Island and *D. castigatum* Broun which is endemic to the Snares. The species fall into two very distinct groups based on internal structures of the male genitalia.

Diglymma castigatum Broun, 1909 Fig. 1–5, 14–18, 32.

Broun, 1909, Subant. Is. N.Z. **1:** 84.—Britton, 1949, *Trans. Roy. Soc. N.Z.* **77:** 540.

Britton re-described the external characters for this species. Additional features are as follows:

♂ GENITALIA: (Fig. 4–5). Aedeagus slightly expanded at apex. Internal sac without a chitinous tooth, but the highly convoluted walls armed internally with many small spines which are grouped more densely in some parts giving the appearance of solid structures. Sclerites X and Y asymetrical, X being more heavily chitinized than Y.

♀ GENITALIA: (Fig. 2). Structures in general appear to be of more value at generic level although length of spermathecal duct and shape of accessory gland are characteristic of the species.

Some characters are surprisingly variable. A seta is usually present in the scrobes of the mandibles, but sometimes it is absent (also the pore from which it arises). Of 16 specimens examined, 9 ♂♂ and 3 ♀♀ had a seta in both scrobes, 3 ♀♀ had a seta in 1 scrobe only and 1 ♀ was completely without setae. The tooth on the mentum is usually simple, although on some specimens it is emarginate and slightly hollow at the apex, appearing obscurely bifid. Pits on the mentum vary from round and fairly deep, to merely shallow depressions.

In this species the anterior tarsi of the ♂ have the 2 basal segments expanded asymetrically, with small spongiose pads beneath (Fig. 1). Britton (1949) considered this to be a generic character but it is in fact shared by only 1 other species *D. obtusum* (Broun), in which it is more strongly developed. In the type-species the ♂ anterior tarsi are without pads.

SNARES, 2 ♀♀, 15.XI.1907 Hudson; West Ridge, 6 ♂♂, 3 ♀♀, 7.II.1967, *Olearia lyallii* forest logs, Johns; near Station Point, 3 ♂♂, 2 ♀♀, 8.I.1967, *Olearia lyallii* forest logs, Johns.

Remarks: Endemic to the Snares. Although the general appearance and the pads on the male anterior tarsal segments may indicate that *D. castigatum* is related to *D. obtusum* from Southland, Stewart Island and surrounding islets, any similarity between these two species should be regarded as superficial, as internal structures plainly show that these two species belong to different phylogenetic lines. In *D. obtusum* the male internal sac contains a complex system of internal structures which are completely absent from *D. castigatum*, also the shape of sclerites X and Y are vastly different. The internal structures figured for *D. castigatum* are closely paralleled in *D. marginale* Broun, 1914 of western Fiordland with minor differences of shape indicative of the species.

LARVA: (3rd instar). Length: 12.8 mm, width of head-capsule 1.26 mm. Color: Head reddish brown, mandibles darker; antennae, mouthparts and legs brown; pronotum pale reddish brown; tergites, sternites and urogomphi pale brown. Head as broad as long (excluding mouthparts); sides subparallel, a little curved outwards in the middle; frontal sutures slightly sinuate (Fig. 17); the 6 ocelli and prominent setiferous puncture above partly surrounded by a sulcus posteriorly and dorsally. Nasale truncated along frontal margin which is irregularly denticulate; adnasale with a single seta near base of each mandible. Antennae (Fig. 16) 4-segmented, shorter than mandibles; 3rd and 4th segments each with 1 internal and 2 external setae, the 4th with an additional fine apical seta. Mandibles falciform, with 1 external seta, a strong retinaculum, but no penicillus. Maxillae with stipites attaining the base of 2nd segment of labial palpi, bearing 3 large setae externally, and 1 large subapical seta and many fine setae internally (Fig. 18). Maxillary palpi 4-segmented, proximal segment with a ventral seta, 2nd joint shorter than 3rd; galea 2-segmented, joints subequal in length, 1st with a small apical seta. Labium with prementum bearing 1 ventro-lateral and a series of lateral and dorsal setae on each side; ligula recessed between lobes of prementum, bearing 1 apical seta; labial palpi 2-segmented. Pronotum with 2 large lateral setae on each side, 2 smaller setae near anterior margin and

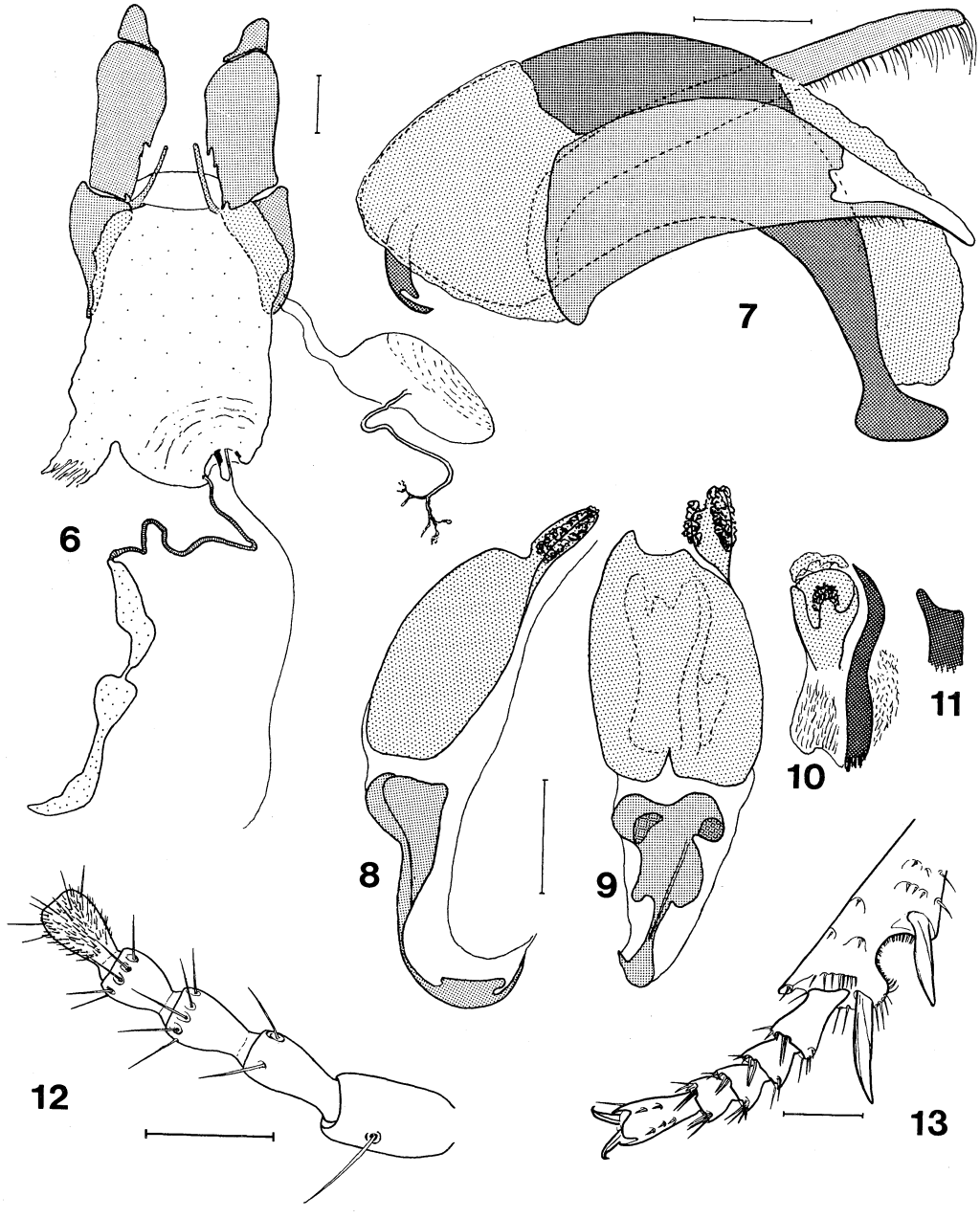

Fig. 6–13. *Mecodema alternans hudsoni* Broun—all comparison lines represent 1 mm. 6, ♀ genitalia, ventral aspect; 7, ♂ genitalia, lateral aspect; 8, Internal sclerites, ♂ genitalia, lateral aspect; 9, Internal sclerites, dorsal aspect; 10, Details of structures within the internal sac; 11, Tip of chitinous tooth, lateral aspect; 12, 5 basal segments of antenna, dorsal aspect; 13, Distal portion of left fore tibia and tarsus, ♂.

2 near posterior margin. Mesonotum and metanotum and abdominal tergites not as heavily chitinised as pronotum, chaetotaxy as in Fig. 14. Urogomphi slightly longer than anal tube, continuous with the 9th tergite, tapering in a series of setiferous nodes. Abdominal spiracles circular, subequal in size, almost 1/2 the shortest diameter of the oval mesothoracic spiracle. Tarsi with single claw bearing 2 short setae near base. 2nd joint of legs with 2 distal, ventrally placed setae of unequal length, the posterior seta at least 4 × as long as the anterior.

SNARES, Station Point, 1 specimen, 6.I.1967, *Olearia* roots with tipulid larvae, P. M. Johns.

Remarks: The larva of *Diglymma castigatum* follows the characters set for the Broscini by van Emden (1942) except for two features. The second segment of the galea ("outer lobe" of maxilla) is not shorter than the first, and the second segment of the maxillary palpi is not twice as long as the third, it is in fact shorter.

Genus **Mecodema** Blanchard, 1853

Blanchard, 1853, Voy. Pole Sud. 34.—Putzeys, 1868, *Stettin, Ent. Ztg.* **29:** 306 and 315.—Broun, 1880, *Man. N.Z. Col.* (**1**): 7.—Britton, 1949, *Trans. Roy. Soc. N.Z.* **77:** 543.

Type-species: *Mecodema sculpturata* Blanchard, 1853.

ADULT: Head with the single supraorbital puncture on each side bearing more than 1 seta; mandibles without a seta in the scrobes; terminal segments of palpi slightly compressed, subcylindrical, truncate; antennae with 4 or 5 basal segments glabrous (Fig. 12). Elytra with row of setiferous punctures on 7th interval; scutellar striole absent. Anterior tibiae prolonged externally to a point at apex (Fig. 13). ♂ genitalia with sclerite X elongate, abruptly narrowed, curved, and then expanded near insertion of ejaculatory duct at its basal extremity (Fig. 8, 9); armature of internal sac consisting of groups of small spines, and usually a chitinous tooth and pad of longer spines and other chitinous structures (Fig. 10, 11). ♀ genitalia with spermathecal duct and a long, flagellate accessory gland entering the bursa copulatrix beyond the median oviduct (Fig. 6). Styli without setae.

LARVA: Distinguished at generic level by the 10th abdominal segment being of cylindrical form, relatively short and possessing many setae of varying length (Fig. 20).

Mecodema alternans hudsoni Broun, 1909 new status Fig. 6–13, 19–23, 33.

M. hudsoni Broun, 1909, Subant. Is. N.Z. **1:** 83.—Britton, 1949, *Trans. Roy. Soc. N.Z.* **77:** 568.

Britton redescribed the external characters of *hudsoni*.

Additional notes: The tooth on the mentum was clearly bifid in all 58 specimens examined in this study, although its shape and the depth of the apical incision showed considerable variation.

♂ GENITALIA: (Fig. 7–11). The aedeagus is abruptly expanded at its apex. The internal sac contains a strong chitinous tooth, a group of small spines and a pad of longer spines; there is also a chitinous cup-like structure with a nodular mass at its center. Sclerites X and Y are asymetrical, X being more heavily chitinized than Y. Sclerite Y has a nodular structure on its inner side near the apex.

♀ GENITALIA: (Fig. 6). Main structures have been mentioned at generic level. The shape of the spermatheca and its gland is of specific importance.

SNARES, 2 ♀♀, 1.XII.1947, in tussock roots, Fleming; Station Point, 1 ♂, 1 ♀, 22.I.1967, *Olearia lyallii* forest logs, Johns; 14 ♂♂, 4 ♀♀, 27.I.1969, Pit-trap; 22 ♂♂, 14 ♀♀, 21.II.1969, Pit-trap.

Remarks: *Mecodema hudsoni* from the Snares and *M. trailli* Broun, 1917 from Stewart I are conspecific with *M. alternans* Laporte, 1867 from the Otago coast and Pitt I, Chathams, but further study is needed to determine whether *M. trailli* and *M. philpotti* Broun, 1923 (a synonym of *trailli*) are of subspecific rank. Specimens from intermediate areas such as Big South Cape Island, Codfish I, islets in Foveaux Strait and Bluff (Southland) belong to populations which resemble one another more closely than other species of the genus. Although external differences can be found in the sculpture of the elytra, the width and convexity of the intervals and the punctation of the pronotum,

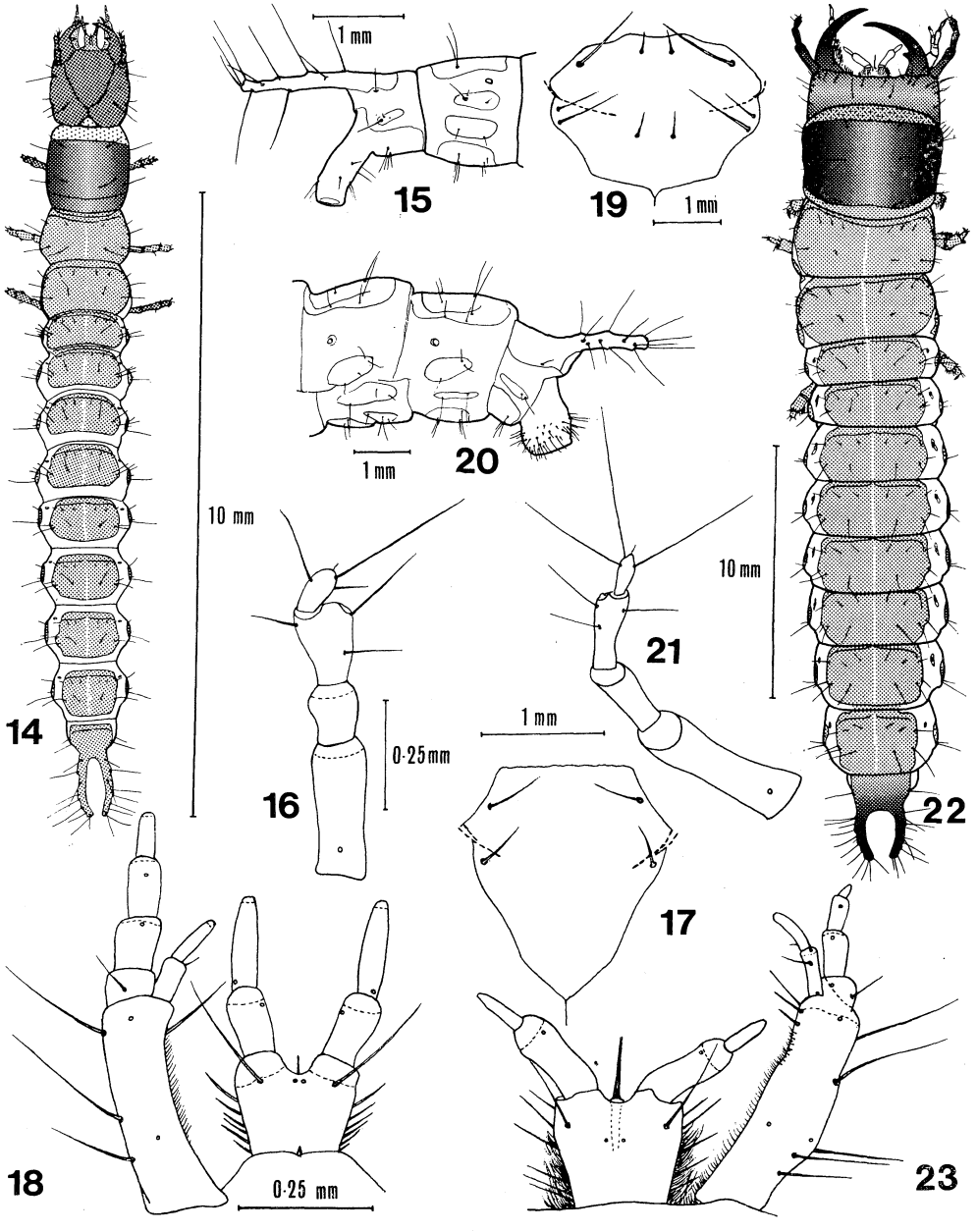

Fig. 14–23. Larvae. 14–18, *Diglymma castigatum* Broun. 14, Full dorsal view; 15, Terminal abdominal segments and anal tube, lateral aspect; 16, Antenna, dorsal aspect; 17, Nasale and frontal sutures; 18, Right maxilla and labium, ventral aspect. 19–23, *Mecodema alternans hudsoni* Broun: 19, Nasale and frontal sutures; 20, Terminal abdominal segments and anal tube, lateral aspect; 21, Antenna, dorsal aspect (to same scale as Fig. 17); 22, Full dorsal view; 23, Labium and left maxilla, ventral aspect (to same scale as Fig. 17).

the male genitalia show the whole complex to have clinal tendencies, with *hudsoni* from the Snares the most extreme and worthy of subspecific recognition. Such distribution of slightly differing populations from the Chathams to Stewart Island with the Snares population more divergent can be found in other insects, for example the weevil *Catoptes brevicornis* (Broun).

LARVA: (3rd Instar).

Length: 34 mm, width of head capsule 4.75 mm. (2nd instar head capsule width = 3.12 mm).

Color: Head and mandibles dark brown, antennae, mouthparts and pronotum reddish brown, other tergites of thorax and abdomen, also sternites brownish yellow; legs and urogomphi brown. Head broader than long, maximum width middle length, 1.75:1; sides almost parallel; frontal sutures strongly sinuate (Fig. 19); the 6 ocelli with a setiferous puncture above and 1 below at termination of sulcus around base of antenna; a lateral seta near base of mandible and a dorso-lateral one at base of antenna. Nasale with frontal margin bisinuate, center slightly concave (Fig. 19). Antennae (Fig. 21) 4-segmented, almost as long as mandibles; 3rd and 4th segments each with 1 internal and 2 external setae, the 4th with an additional fine apical seta. Mandibles falciform, with 1 external seta, a strong retinaculum, but no penicillus. Maxillae with stipites attaining the apex of 2nd segment of labial palpi, bearing 5 large setae externally, and 3 large subapical setae and many fine setae internally (Fig. 23). Maxillary palpi 4-segmented, proximal segment with a ventral seta, 2nd joint longer than 3rd; galea 2-segmented, segments subequal in length, 1st with a ventral seta, 2nd with a minute basal seta. Labium with prementum bearing 1 ventro-lateral and a series of lateral and dorsal setae on each side; ligula recessed between lobes of prementum, bearing 2 apical setae; labial palpi 2-segmented. Pronotum with heavily chitinised area not reaching anterior or posterior margins or posterior lateral angles; sides with 2 oblique lateral folds and a marginal series of 4 setiferous punctures; anterior and posterior margins each with 4 setae and also a group of 3 or 4 setae in the anterolateral areas; 2 median setae on dorsum. Mesonotum, metanotum and abdominal tergites not as heavily chitinised as pronotum, chaetotaxy as in Fig. 22. Urogomphi longer than anal tube which has a series of setae at its extremity, (Fig. 20). Mesothoracic spiracle oval, its shortest diameter approximately twice that of the largest abdominal spiracle on 1st segment which is in turn larger than those on segments 2–8. Tarsi with singe claw bearing 2 fine setae of unequal length at base.

SNARES, 1 specimen, I. 1961, Mannering; 2 specimens, 10.XII.1968, *Olearia* forest floor, about 25 cm deep in soil, Bennington.

CREOBIINA

Ligula keeled; aedeagus completely membranous on dorsal surface, with basal orifice open dorsally, without basal keel. Sclerites X and Y absent. Female genitalia with spermathecal duct opening directly into the vagina; there does not appear to be an accessory gland to the spermatheca nor a separate gland opening into the bursa copulatrix.

Bountya new genus

(Derived from Bounty Island, gender feminine)

Head with a single puncture behind each eye from which arises 1 or 2 setae. Antennae with 2.5 basal segments glabrous. Clypeus with a single seta on each side; labrum with 6 prominent setae along frontal margin, the outer ones largest and a few minor curved setae at each side. Mentum emarginate, with a simple tooth and 2 setae below; submentum with 8 setae. Palpi with terminal joints subcylindrical, slightly compressed, distinctly oval in longitudinal outline, not truncate at their extremities. Maxillary palpi with penultimate segment short, curved, rapidly expanded towards apex to become almost as wide as long. Penultimate segment of labial palpi with 2 setae. Ligula chitinous, with a median carina, the apical margin broad, with 4 setae. Paraglossa membranous, extending beyond apex of ligula (Fig. 30). *Pronotum* with lateral margins narrow, not crenulate, with 2 setiferous punctures on each side. Sides almost straight, not sinuately contracted in basal 1/2, the prominent posterior angles almost without trace of foveae (Fig. 34). Scutellum

reduced to small semi-circular plate often covered by pronotum. Hindwings vestigial, reduced to small pads. *Elytra* fused along suture, flattened on disc, without trace of basal emargination; 2nd stria with 1 setiferous puncture near base; 7th interval without setiferous punctures. *Legs:* Tibiae without apical prolongations. Anterior tarsi (Fig. 27) without spongiose pads beneath, basal segment asymetrically expanded in both sexes

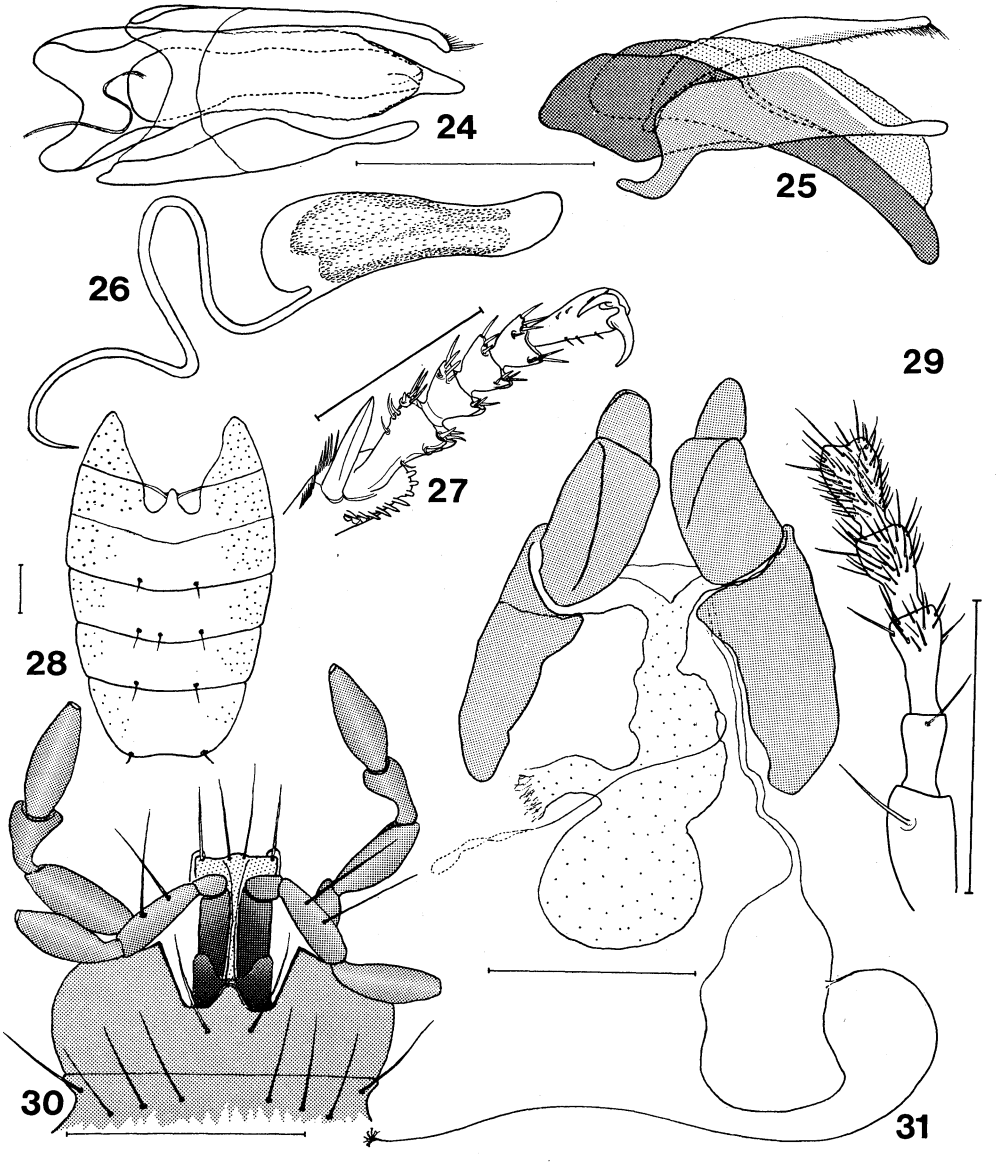

Fig. 24–31. *Bountya insularis* n. sp.—all comparison lines represent 1 mm. 24, ♂ genitalia, dorsal aspect; 25, ♂ genitalia, lateral aspect; 26, ♂ internal sac, lateral aspect; 27, Distal portion of left fore tibia and tarsus, ♂; 28, Abdominal sternites; 29, 5 basal segments of antenna, dorsal aspect; 30, Mouthparts, ventral aspect; 31, ♀ genitalia, ventral aspect.

but inner side more excavate in the ♂ when viewed dorsally. *Ventral surface:* Abdominal sternites 1 and 2 fused, but boundary between them distinct; sternites 2 and 3 completely fused, their junction almost invisible (Fig. 28). Sternites 3–6 with 2 or 3 setiferous punctures near their posterior margins. Metacoxae with both an anterior and a posterior setiferous puncture. *Genitalia:* ♂ with armature of internal sac reduced to fine spines on the inner wall. ♀ with bursa copulatrix consisting of a simple sac without convolutions or accessory glands. Styli without setae.

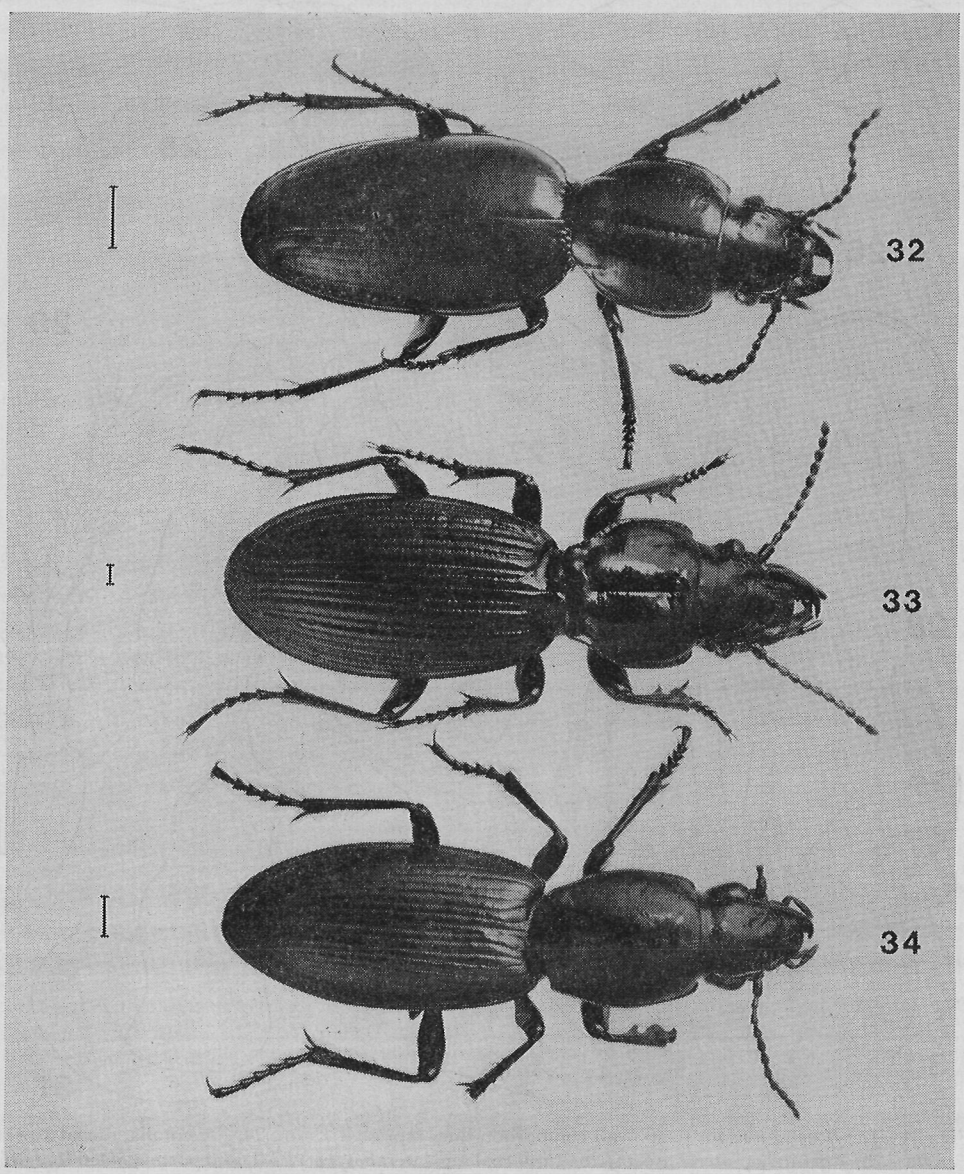

Fig. 32–34.—all comparison lines represent 1 mm. 32, *Diglymma castigatum* Broun; 33, *Mecodema alternans hudsoni* Broun; 34, *Bountya insularis* n. sp.

Remarks: *Bountya* belongs with a group of genera within the Creobiina (including *Cascellius* and *Promecoderus*) which have 4 setae on the ligula. On the basis of internal parts of the male and female genitalia, *Bountya* is closest to *Promecoderus* Dejean, 1829 from Australia. In the type species of *Promecoderus* the internal sac is folded longitudinally, is armed internally with small spines and near the ostium has a patch of larger spines. In *Bountya* the internal sac is of a very similar nature but even simpler as it lacks the spines near the ostium. The female genitalia are of a similar type to *Promecoderus* but again simpler. *Promecoderus brunnicornis* Dejean has a long vagina and a complicated bursa copulatrix strongly convoluted near the junction of the median oviduct, whereas *Bountya* has a much shorter vagina and the bursa copulatrix is a simple sac. External characters show such striking differences that the association of the 2 genera would scarcely be discernible. The general shape of *Promecoderus* is distinctly convex when compared with *Bountya*. In *Promecoderus* the male has the 4 basal segments of the anterior tarsi and the 2 basal segments of the middle tarsi bearing dense spongiose pads. In *Bountya* all tarsi are without spongiose pads.

Bountya insularis Townsend new species Fig. 24–31, 34.

Length: 13.0–15.5 mm. Form narrow, elongate, flattened dorso-ventrally.

Color: Head, thorax and elytra dark pitchy black; legs reddish black; antennae red; palpi piceous red; under surface reddish black.

Head: Elongate, finely and irregularly punctured from clypeus to behind eyes and into the shallow transverse depression of the vertex, with a distinct groove from above antennal insertion to behind eyes. Eyes prominent, enclosed behind. The single supraorbital puncture on each side usually with a single seta, rarely 2. First segment of antennae (Fig. 29) with a single strong dorsal seta; 2nd segment with a single ventral seta; 3rd and subsequent segments progressively more setose; 5th and following segments have 2 sensory areas of dense setae which become larger towards the terminal segments until in the apical half of the 11th segment they coalesce. *Pronotum:* flat, longer than broad, middle length 1.13–1.24 × maximum width. Sides a little expanded from anterior margin to approximately mid-point then contracted in an almost straight line to the obtuse basal angles. Marginal groove narrow, extending from apex to base, with 2 setae on each side, at approximately anterior 1/4 and posterior 1/3. Anterior margin almost straight; posterior margin bisinuate. Surface smooth except for small wrinkles near anterior margin, and sometimes a few obscure punctures near the basal angles; median line weakly impressed, not reaching anterior or posterior margins. *Elytra:* elongate-oval slightly wider than pronotum, shoulders distinct. Intervals flat, striae weakly and a little irregularly impressed, impunctate. Marginal groove narrow, curving around the shoulders and becoming obsolete along the base interior to the 5th stria. A small setiferous puncture near base of 2nd stria. Punctures in marginal series reduced to 1 near the shoulder and 3 near the apex of the 8th stria. *Ventral Surface:* Prosternum smooth, sometimes with a few fine punctures on proepisterna; meso- and metasterna feebly punctured near the lateral margins, the punctures continuing on to the episterna and lateral margins of the sternites. *Surface sculpture:* Fine, reticulate, covering elytra, episterna and base of pronotum. *Genitalia:* (Fig. 24–26). Apex of aedeagus not expanded; right paramere setiferous. ♀—Fig. 31.

BOUNTY ISLAND, 4 ♂♂, 1 ♀, 11.XI.1950, under stones, Turbott.

Types: Holotype ♂, 15 × 4.2 mm, data as above, and 2 paratypes in Auckland Museum; 2 paratypes in Entomology Division, D.S.I.R.

Remarks: The presence of setae in the scrobes of the mandibles is a variable character in this species. Two males and one female have a seta in each scrobe, the holotype male has a seta in the right scrobe but none in the left, and one male has no setae.

DISCUSSION

Ball (1956) stated that the simple apex of the anterior tibia, the presence of a seta in the mandibular scrobe, the supraorbital puncture bearing only one seta, the presence of a scutellar striole

and the basally flattened elytra are characters that suggest *Diglymma* is more primitive than *Mecodema*.

The following characters relating in particular to *D. castigatum* may also be primitive: the relatively simple internal sac lacking complex armature, the longer duct to the pygidial glands and the fewer specialised setae on the basal segments of the antennae. Excluding these specialised setae, *Mecodema* has four basal segments glabrous while *Diglymma* has only three, showing a greater predominance of simple setae (compare Fig. 3 and 12).

If these characters are indicative of a primitive condition, then *Bountya* is more primitive than *Diglymma*. The male and female genitalia are very simple, the duct to the pygidial glands is almost twice the length of that in *Diglymma* and greatly in excess of that in *Mecodema* (Fig. 31, 2 and 6), and the simple setae of the antennae extend on to the third segment (Fig. 29).

The larvae of *Diglymma* and *Mecodema* agree with the characters for the Broscina as mentioned by Moore (1964). That is they lack a penicillus on the mandible, the inner lobe of the maxilla is absent and replaced by a stout seta and the cervical keel is not strongly developed. They can be separated from *Eurylychnus* by the mandibles not being incurved at their tips and the presence of a well developed retinaculum.

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REFERENCES

Ball, G. E. 1956. Notes on the genus *Zacotus* Le Conte, 1869, and on the classification of the tribe Broscini (=Broscidae *sensu* Jeannel, 1941. Coleoptera, Carabidae). *Coleopt. Bull.* **10**(3): 33–52.

Britton, E. B. 1949. The Carabidae (Coleoptera) of New Zealand. Part 3—a Revision of the Tribe *Broscini*. *Trans. Roy. Soc. N.Z.* **77**(4): 533–81.

1964. New Carabidae (Coleoptera) from Three Kings Islands, New Zealand. *N.Z. J. Sci.* **7**(4): 521–27.

1970. Chapter 30, Coleoptera. *In* Insects of Australia, sponsored by Div. Ent., C.S.I.R.O. Canberra. Melbourne Univ. Press, p. 495–621.

Darlington, P. J. Jr. 1965. Biogeography of the southern end of the world—Distribution and history of far-southern life and land, with an assessment of continental drift. 236 p. Harvard Univ. Press.

Dejean, P. F. M. A. 1829. Species général Coléoptères, de la collection de M. le Comte Dejean. 4, 1–520. p. 26. Paris.

Emden, I. F. van. 1942. A key to the genera of larval Carabidae (Col.). *Trans. R. Ent. Soc. Lond.* **92**(1): 1–99.

Jeannel, R. 1941. Coléoptères carabiques, premier partes. *Faune de France* **39:** 1–571, fig. 1–213. Paul Lechevalier et fils, Paris.

Moore, B. P. 1964. Australian larval Carabidae of the Subfamilies Broscinae, Psydrinae and Pseudomorphinae (Coleoptera). *Pacif. Ins.* **6**(2): 242–46.