

## **APPENDIX IV**

Britton, E.B. 1949.

Transactions of the Royal Society of New  
Zealand 77: 533-581.

(Pages 543-8; Plate 68 reproduced)

1-3 setiferous punctures on each side of the vertex; a seta usually present in the mandibular scrobe. *Pronotum*: each lateral margin with 7-10 setiferous punctures; disc smooth, median line faintly impressed. *Elytra*: the absence of shoulders accentuates the pedunculate form; striae not, or only very faintly, impressed, but distinctly punctured; punctures of the inner striae more obvious than those of the outer striae; the 8th striae shows a tendency to bifurcate near the middle, sometimes forming an extra stria between striae 7 and 8. *Ventral surface*: prosternum smooth and unpunctured, proepisterna smooth, faintly punctured near the inner margin; metepisterna closely, strongly and irregularly punctured; remainder of the ventral surface smooth and unpunctured. *Microsculpture*: absent from the head, except in the shallow depression at the vertex; absent or very faint on pronotum, except near the lateral margins and in the lateral depressions; elytra with distinct isodiametric microsculpture along the striae, sometimes covering the intervals.

SOUTH ISLAND. *Nelson*: Motueka, 3 ex. *Canterbury*: Mt. Algidus, 1 ex.; Temuka, 1 ex. *Otago*: Wedderburn, 1 ex.; Eyre Mts. N. of Lumsden, 2 ex.; Taieri, nr. Dunedin, 1 ex.; Dunedin, 8 ex.; Port Chalmers, 2 ex.; Moeraki, 1 ex.; Invercargill, 1 ex.

6. *Oregus inaequalis* Castelnau 1867, *Notes on Australian Coleoptera*, p. 76 (*Mecodema*); *Trans. R. Soc. Victoria*, VIII, 1868, p. 162; Putzeys, *Ann. Mus. Civ. Genova*, IV, 1873, p. 317; Broun, M., I, 1880, p. 13.

Figs. 21, 25. *Length*: 17-19 mm. *Colour*: black, slightly aeneous; tibiae and tarsi dark-brown or black; femora and pro- and meso-coxae dark-red; metacoxae black; antennae with the basal 3½ segments dark-brown or black and the remainder reddish. *Head*: eyes not hemispherical, much less prominent than in *O. aereus*; two setiferous punctures present above each eye and 2-3 setiferous punctures on each side of the vertex in a transverse line; a seta usually present in the mandibular scrobe. *Pronotum*: as in *O. aereus*. *Elytra*: slightly more transverse than in *O. aereus*; striae 11 in number on each elytron, distinctly impressed and punctured; striae 7-9 fainter and somewhat irregular so that the intervals are not uniform in width; the supernumerary stria is placed between the normal striae 7 and 8 and it does not reach the base. *Ventral surface*: prosternum smooth and unpunctured, the inner half of the proepisterna distinctly marked with punctures of two separate sizes; mesepisterna closely punctured and wrinkled; remainder of the ventral surface smooth and unpunctured. *Microsculpture*: absent, surface shining.

Type in the Genoa Museum.

SOUTH ISLAND. *Otago*: Dunedin, 2 ex.; Port Chalmers, 7 ex.; Waitati, 1 ex.; Invercargill, 1 ex.

#### GENUS *Mecodema* Blanchard

Blanchard, *Voy. Pole Sud.*, IV, 1853, p. 34; Putzeys, *Ent. Zeit. Stettin*, XXIX, 1868, p. 306, p. 315; Broun, M., I, p. 7.

#### *Generic Characters.*

*Head*: frons often wrinkled and vertex often punctured; eyes prominent, almost hemispherical; a single supraorbital puncture on each side, bearing more than one seta; mandibles large, uniformly

narrowed to the pointed apex, sharply curved in the apical third; mandibles with a number of dorsal grooves and without a seta in the scrobe; mentum with a median tooth, usually bifid; usually with 2 setiferous punctures below the tooth and with 6 setiferous punctures on the submentum; labial palpi with 2 setae on the penultimate segment; terminal segments of all palpi slightly compressed, sub-cylindrical, truncate; ligula chitinous with a median carina and two apical setae; the membranous paraglossae extend well beyond the apex of the ligula; antennae with 4 or 5 basal segments glabrous, the remainder covered with yellow setae except for a small patch on each side of the base of each segment; segments 1-3 are subcylindrical, segments 4-7 subglobose and slightly compressed. *Pronotum*: lateral margins distinct with 6 or more setiferous punctures on each side, the last seta never at the posterior angle; median groove and lateral basal depressions always present; the disc often with a shallow depression on each side in the apical half. *Elytra*: always striate; soldered together along the suture; hind-wings absent; a row of setiferous punctures on the 7th elytral interval and another row near the lateral margin. *Legs*: slender, the anterior tibiae with a pointed apical prolongation on the outer side; male and female tarsi identical, the basal 4 segments of the anterior tarsi as broad as they are long, and slightly asymmetrical.

Genotype: *Mecodema sculpturatum* Blanchard.

Eighty-two species have been described in this genus. In the following revision this number is reduced to 58.

*Mecodema*—KEY TO THE SPECIES GROUPS.

- 1 Elytral intervals 3, 5 and 7 relatively smooth and convex, in contrast to intervals 2, 4 and 6, which are depressed, granular, punctured or dull, the contrast between alternate intervals visible to the naked eye (e.g. Figs. 2, 5, 82-90); length always more than 20 mm., often more than 30 mm. . . . . *costellum* group  
(11 species, p. 545)
- Elytral intervals 3, 5 and 7 not distinguishable from intervals 2, 4 and 6 in convexity and sculpture, although sometimes differing in width (e.g., Figs. 4, 6-14, 91-123); length sometimes less than 20 mm., very rarely over 28 mm. long . . . . . 2
- 2 (1) The 7th and 8th elytral striae much more strongly impressed and/or punctured than striae 1-4; the difference usually visible to the naked eye (e.g., Figs. 3, 6-10, 91-107); striae 1-4 sometimes faint or absent, never represented by rows of unconnected coarse punctures; length always more than 20 mm., usually more than 25 mm. . . . . 3
- All elytral striae equally strongly impressed and, if punctured, with punctures of about equal size and depth: striae sometimes represented by rows of unconnected coarse punctures (Figs. 4, 11-13, 108-123); striae 1-4 never fainter than striae 5-8 or absent; length usually less than 20 mm., always less than 30 mm. . . . . 5
- 3 (2) Lateral margins of the pronotum strongly crenulate; pronotum usually with deep transverse wrinkles, at least at the sides; lateral margins of the pronotum obviously parallel behind the situation (Figs. 91-93); striae 5-8 obliterated or made indistinct by the very coarse, confused puncturation of the sides of the elytra . . . . . *ducale* group  
(3 species, p. 553)

- Lateral margins of the pronotum smooth or only slightly crenulate; pronotum smooth or with weak transverse wrinkles; lateral margins of the pronotum rarely parallel behind the sinuation; all striae clearly defined. sides of the elytra never with coarse, confused puncturation .. .. . 4
- 4 (3) Lateral margins of the elytra broadly reflexed; elytral intervals dull, covered with minute, transverse, much-branched wrinkles, even at the base; intervals 1-4 flat on the disc; pronotum (Fig. 6) with posterior angles sharp, acute and slightly recurved; head, pronotum and elytra unusually depressed (Figs. 6, 94) .. *laterale* group (2 species, p. 555)
- Lateral margins of the elytra only very narrowly or not at all reflexed; elytral intervals not covered by branching wrinkles, at least at the base; intervals 1-4 flat or convex; pronotum with posterior angles never acute and recurved (Figs. 7-10, 95-107) .. .. *spinifer* group (16 species, p. 556)
- 5 (2) The vertex of the head, the pro- and mes-episterna distinctly punctured .. .. . 6  
The head, pro- and mes-episterna unpunctured .. .. . 7
- 6 (5) Length between 17 and 30 mm.; colour black (Figs. 4, 11-13, 16-20, 108-113) .. .. . *alternans* group (15 species, p. 565)
- Length less than 17 mm.; colour shining aeneous-brown (Figs. 114-117) .. .. . *infimate* group (4 species, p. 573)
- 7 (5) Posterior coxae without setiferous punctures; larger species, length more than 19 mm.; sides of the pronotum with a long pronounced sinuation (Figs. 14, 118-120); vertex of head with a deep transverse depression; shoulders of the elytra quite distinct .. .. *curvidens* group (4 species, p. 575)
- Posterior coxae with a setiferous puncture near the middle of the anterior margin; smaller species, length less than 19 mm.; pronotum with sides not, or only moderately, sinuate in front of the posterior angles which are obtuse and blunt; vertex of head with only a faint transverse depression; shoulders rounded (Figs. 121-123) .. .. . *sulcatum* group (3 species, p. 577)

THE *costellum* GROUP OF SPECIES.

*Group Characters.* Size large, length 20-39 mm.; elytral intervals 3, 5 and 7 clearly distinguishable from intervals 2, 4 and 6 by their greater smoothness and convexity; intervals 2, 4 and 6 depressed, granular, punctured or dull. All eleven species occur in the South Island, including Stephen's Island.

KEY TO THE *costellum* GROUP OF SPECIES.

- 1 Prosternum usually unpunctured, at most with a few obsolescent punctures around the coxal cavities; usually over 30 mm. long; pronotum usually unpunctured (Fig. 2), at most with a very few scattered punctures near the anterior margin, never having both prosternum and pronotum punctured (Figs. 82-87) .. .. . 2
- Prosternum always punctured at the sides from the anterior margin to the coxal cavities: less than 26 mm. long; pronotum with at least a transverse band of punctures near the anterior margin (Fig. 5), sometimes with the sides or the whole disc punctured (Figs. 88-90) .. .. . 8

- 2 (1) Elytra with the surface of intervals 2, 4, 6 and 8 dull, with very strong reticulate microsculpture ( $\times 60$ ); intervals 1, 3, 5 and 7 usually shining (Figs. 82-85) .. 3  
 Elytra with the surface of intervals 2, 4, 6 and 8 shining between punctures, without or with very faint microsculpture ( $\times 60$ ); intervals 1, 3, 5 and 7 shining (Figs. 86, 87) .. 7
- 3 (2) Head and pronotum black, elytra reddish-brown; elytral intervals 3, 5 and 7 greatly reduced, very narrow and irregular, but still visible to the naked eye; intervals 2, 4, 6 and 8 proportionately enlarged, the surface irregular with obsolescent puncture; all intervals covered with reticulate microsculpture (Fig. 82) .. 7. *lewisii* Broun  
 Head and pronotum black, elytra usually black, at most with alternate intervals brown; elytral intervals 1, 3, 5 and 7 shining, without or with relatively faint microsculpture .. 4
- 4 (3) Sides of the pronotum not sinuate in front of the posterior angles which are almost completely rounded off; intervals 1, 3, 5, 7 and 9 costate; alternate intervals flat, with coarse obsolescent punctures (Fig. 83) .. 8. *costipenne* Broun  
 Sides of the pronotum strongly sinuate in front of the posterior angles .. 5
- 5 (4) Elytral intervals 1, 3, 5, 7 and 9 strongly costate; black; alternate intervals 2, 4, 6 and 8 flat, reddish-brown, with a few minute scattered punctures; head with transverse depression of vertex broad and very shallow, unpunctured or with up to 6 very faint punctures on each side (Fig. 84) .. 9. *chiltoni* Broun  
 Elytral intervals 1, 3, 5, 7 and 9 only slightly to moderately convex; alternate intervals 2, 4, 6 and 8 unpunctured, or very strongly and coarsely punctured; head with transverse depression of the vertex narrow and distinctly impressed and punctured (Stephen's Island) .. 6
- 6 (5) Elytral intervals 1, 3 and 5 at least twice as wide as intervals 2 and 4; intervals unpunctured; striae closely and regularly punctured; intervals almost flat on the disc, the 1st, 3rd, 5th and 7th more convex at the base (Stephen's Island), (Fig. 2) .. 10. *punctellum* Broun  
 Elytral intervals 1, 3 and 5 in general narrower than intervals 2 and 4, but outlines of intervals are very irregular, due to the very coarse puncturation of intervals 2, 4, 6 and 8; the surface of the intervals between the punctures with irregular microsculpture leaving shiny patches (Fig. 85), (Stephen's I., Cook Strait) .. 11. *costellum* Broun
- 7 (2) Larger, length more than 30 mm.; elytral intervals 3, 5 and 7 distinctly convex in the basal half; head with vertex coarsely punctured and wrinkled (Fig. 86) .. 12. *gordonense* Broun  
 Smaller, length less than 30 mm.; elytral intervals 3 and 5 flat except at the base; head with vertex unpunctured, or faintly punctured, smooth or faintly wrinkled (Fig. 87) .. 13. *howitti* Castelnau

- 8 (1) Posterior coxa with a large puncture or pit near the posterior outer angle; the 7th elytral interval broken into six or more short lengths by the depressions in which the setiferous punctures are set; the resulting catenulate appearance visible to the naked eye .. .. . 9  
 Posterior coxa without a puncture in the posterior half; the 7th elytral interval not broken into short lengths by the setiferous depressions .. .. . 10
- 9 (8) The third elytral interval with one or more setiferous punctures in the basal half; vertex of the head and the anterior and posterior margins of the pronotum closely punctured; intervals 3, 5 and 7 broken into short lengths or bullae by the larger depressions of the setiferous punctures .. 14. *bullatum* Broun  
 The 3rd elytral interval without setiferous punctures in the basal half; vertex of the head, anterior and posterior margins of the pronotum not, or only sparingly, punctured; intervals 3 and 5 appear continuous to the naked eye (Fig. 5) .. .. . 15. *litoreum* Broun
- 10 (8) Disc of the pronotum sometimes transversely wrinkled, but not, or only faintly and very sparsely, punctured; head with no punctures anterior to the level of the front margin of the eyes; clypeus never punctured (Fig. 88) .. .. . 16. *rectolineatum* Castelnau  
 Disc of the pronotum strongly punctured, sometimes wrinkled; head strongly punctured, the punctures extending on to the clypeus .. .. . 11
- 11 (10) Head and pronotum coarsely punctured and strongly wrinkled (Fig. 89) .. .. . 17. *sculpturatum* Blanchard  
 Head and pronotum coarsely punctured, but only faintly wrinkled (Fig. 90) .. .. . var. *puncticolle* Broun

7. *Mecodema lewisi*\* Broun 1908, A., (8), II, p. 337.

Figs. 42, 82. *Length*: 34–36 mm. *Head*: vertex with only a slight depression, marked by a few obsolescent punctures; the lateral clypeal punctures bearing two setae and the supraorbital punctures four setae; mentum with two setiferous punctures; submentum with three on each side. *Pronotum*: ratio 1.0/1.70/1.50/1.35, rather straight and parallel sided in the anterior half; base and apex straighter than in other species; each side with 9–11 setiferous punctures; surface faintly wrinkled. *Elytra*: intervals 1, 3, 5, 7 and 9 less than half as wide as the alternate intervals, just visible to the naked eye; intervals 2, 4, 6 and 8 each marked by about four irregular rows of obsolescent punctures, the punctures often connected by wrinkles, especially in the outer intervals; colour reddish, especially at the sides. *Microsculpture*: faint, isodiametric on the whole upper surface. *Ventral surface*: prosternum and proepisterna unpunctured; mesepisterna with about 5 large shallow punctures. Male genitalia with both parameres setiferous.

SOUTH ISLAND. *Canterbury*: Broken River (tributary of Waimakariri River), holotype ♂, paratype, and 1 ex.

8. *Mecodema costipenne*\* Broun 1914, B., ii, p. 82; Hudson, N., p. 32.

Fig. 83. *Length*: 25–33 mm. *Head*: vertex coarsely punctured. *Pronotum*; with sides curved outwards from apex to base without

sinuation before the posterior angles which are very obtuse or rounded off; lateral margins with 6-9 setiferous punctures; disc sometimes transversely wrinkled or with a few punctures around the ends of the median groove. *Elytra*: intervals 1, 3, 5, 7 and 9 strongly convex and shining; alternate intervals rather flat, dull, with strong isodiametric microsculpture and widely separated (ca. 5 diameters) obsolescent punctures; the 7th interval with three setiferous punctures in the basal half on the middle or the inner side of the interval, and three setiferous punctures in the apical half on the outer side of the interval. *Ventral surface*: pro- and mes-episterna quite faintly, sparsely and irregularly punctured. *Microsculpture*: distinct, isodiametric on head and pronotum; strong, isodiametric, on elytral intervals 2, 4, 6 and 8, especially strong in punctures.

SOUTH ISLAND. *Otago*: Routeburn, Lake Wakatipu (*G. V. Hudson*), holotype ♀; Lake Paradise, Wakatipu, 17.ii.03 (*G. V. Hudson*), 1 ex.; Mount Alfred, Lake Wakatipu, 5 ex.; Bold Peak, i.45 (*E. S. Gourlay*), 1 ex.; Mt. Earnslaw, 4 ex., 6.ii.43 (*J. T. Salmon*), 1 ex.

Hudson states that this species is occasionally found under logs in the forest at the head of Lake Wakatipu.

9. *Mecodema chiltoni*\* Broun 1917, B., v, p. 351.

Fig. 84. *Length*: 36-38 mm.; width of elytra 10.5 mm. *Head*: vertex with the transverse depression and punctures almost obliterated; mentum without setiferous punctures; submentum with 3 setiferous punctures on each side. *Pronotum*: with sides rather straight in front, sinuate in front of the posterior angles; each lateral margin with 8 setiferous punctures, disc unpunctured; ratio (holotype) 1.0/1.62/1.33/1.24. *Elytra*: striae marked by faint punctures separated by more than three times their own width; the 7th interval bearing in the basal half 4 or 5 setiferous punctures which are clearly visible to the naked eye, and are situated on the middle of the interval; the 5 setiferous punctures of the apical half of the 7th interval situated on the outer side of the interval. *Ventral surface*: prosternum unpunctured; first three abdominal sternites punctured in their basal halves. *Microsculpture*: strong, isodiametric on head, pronotum and the flat elytral intervals, absent from the convex intervals. Male genitalia with both parameres setiferous.

SOUTH ISLAND. *Otago*: Mount Dick, S. end of Lake Wakatipu (*T. Hall*), holotype, ♀ only; Nevis, 2,900 ft., 19.xii.38 (*M. R. Renn Poord*), 1 ex. and elytra of 4 others.

10. *Mecodema punctellum*\* Broun 1921, B., vii, p. 596; Hudson, N., p. 33.

Fig. 2. *Length*: 38.5 mm., greatest width of the elytra 11.7 mm. *Head*: vertex with transverse depression strongly impressed in the middle and distinctly punctured; lateral setiferous puncture of the clypeus bearing 3 setae instead of the normal one; supraorbital setiferous puncture bearing 8 setae; mentum without setiferous punctures; submentum with 3 on each side. *Pronotum*: ratio (holotype) 1.0/1.82/1.58/1.25, i.e. more contracted at the base than in *M. chiltoni*. Sides sinuate in front of the posterior angles; each lateral margin with 12 or 13 setiferous punctures. *Elytra*: broad and depressed; intervals 1, 3, 5 and 7 are about three times as wide as intervals



FIG. 82—*Mecodema lewisi* Broun



FIG. 83—*Mecodema costipenne* Broun



FIG. 84—*Mecodema chiltoni* Broun



FIG. 85—*Mecodema costellum* Broun



## APPENDIX V

Townsend, J.I. 1965.

Notes on the genus *Mecodema* (Coleoptera:  
Carabidae) with descriptions of new species from the South  
Island of New Zealand.

New Zealand Journal of Science 8: 301-318.

(pages 305-6 reproduced)

known from Mt Richmond, Mt Starveall and Ben Nevis, intermediate areas where specimens exhibit variations in these characters of the genitalia. Other characters are also variable. The prosternum usually has a few punctures in front of the coxae, but in some specimens it is unpunctured. The setiferous punctures on the mentum can be either present or absent, and the number of setae on the submentum varies between 6 and 8.

This subspecies appears to be restricted to altitudes above 3,000 ft and is most common around 3,500 ft.

*Mecodema costellum lewisi* Broun n. status

Broun 1908, *Ann. Mag. nat. Hist.* (8), ii, p. 337.

Until recently this subspecies was known only from the type locality (Broken River, Canterbury) and three other areas (near the junction of the Harper and Avoca Rivers; the Poulter River area; forest near the road to Mt White Station, Cass) in the near vicinity. Although these areas are almost one hundred miles from the nearest known locality of the other subspecies, *M. c. lewisi* proved to be closely related to them. Confirmation of this was provided recently by the discovery at the Upper Hodder River, Inland Kaikoura, of a colony of *M. c. lewisi* which extended the distribution of this subspecies to within thirty miles of the area where *M. c. gordonense* occurs.

The mentum of *M. c. lewisi* sometimes lacks the usual two setae. The aedeagus is similar to that of *M. c. gordonense* and in some specimens it also tends to become more slender with a more expanded apex. Specimens from Broken River have elytra tinged redish brown, but those examined from the other areas have black elytra.

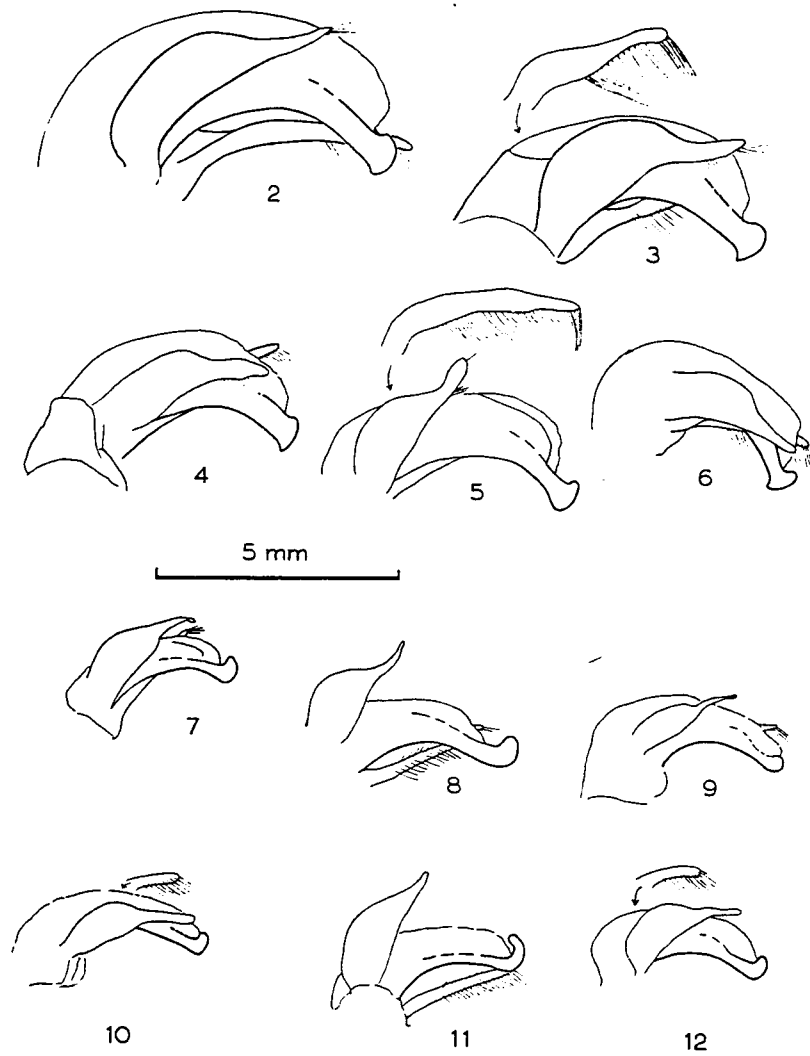
The four subspecies can be separated by the following key:

- |   |                   |
|---|-------------------|
| 1. Punctures between elytral costae deep and pit-like ..... | <i>gordonense</i> |
| Punctures between elytral costae shallower .....            | 2                 |
| 2. Elytral costae narrow, thread-like .....                 | <i>lewisi</i>     |
| Elytral costae more obvious .....                           | 3                 |
| 3. Aedeagus expanded at apex .....                          | <i>obesum</i>     |
| Aedeagus not expanded at apex .....                         | <i>costellum</i>  |

*Mecodema chiltoni* Broun

Broun 1917, *Bull. N.Z. Inst.* 1, v, p. 351.

The rediscovery of a colony of *M. chiltoni* has made it possible to illustrate the male genitalia (Fig. 3). This insect was known previously by the type specimen collected in 1914 from Mt Dick, Lake Wakatipu, and a few other broken fragments from the Nevis Valley. Live specimens were recently found sheltering under beech logs in the Irthing Valley, Southern Eyre Mountains. An illustration of the genitalia of *M. costipenne* Broun is also provided for comparison (Fig. 4).



FIGS 2-12—*Aedeagi of Mecodema*  
 2. *M. costellum obesum* n. subsp.  
 3. *M. chiltoni* Broun  
 4. *M. costipenne* Broun  
 5. *M. pulchellum* n. sp.  
 6. *M. brittoni* n. sp.  
 7. *M. dunense* n. sp.  
 8. *M. integratum* n. sp.  
 9. *M. pavidum* n. sp.  
 10. *M. angustulum* Broun  
 11. *M. metallicum* Sharp  
 12. *M. rugiceps anomalum* n. subsp.