Further Review of the Genus
Maoraxia Obenberger
(Coleoptera: Buprestidae)

C. L. Bellamy
Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Abstract
The buprestine genus Maoraxia Obenberger is reviewed. Two species of Anthaxia, A. cordicollis Fauvel and A. excavata Fauvel, from New Caledonia are transferred to Maoraxia with lectotypes designated for each. A third specimen of M. storeyi is recorded. A brief discussion of the Maoraxiina is given with comments on the known distribution of the species and historical biogeographical inferences. A key to the species and complete synonymies are given. A preliminary phylogeny for the species of Maoraxia is discussed.

Introduction
The small buprestid genus Maoraxia continues to receive attention following the revision by Bellamy & Williams (1985). Holynski's (1984) description of Maoraxiini was not available at the time of the revision and this tribal taxon was subsequently synonymised by Bellamy (1986). More recently, Holynski (1988) has resurrected his taxon at the subtribal level and this has been validated cladistically by Bellamy (1990). At the same time, Bellamy (1990) described a sixth species, M. purpurea, from the Philippine island of Mindanao, a tremendous range extension for the genus which was previously thought to be restricted to the Australasian region.

The unexpected discovery of syntypes of two species of Anthaxia Eschscholtz, described by Fauvel (1891) from New Caledonia, in the collections of the Zoological Institute, Academy of Science of U.S.S.R., during a recent trip to Leningrad, led to the subsequent loan of the remaining type series of these two taxa from the Institut Royal des Sciences Naturelles de Belgique, Bruxelles. Fauvel's two species are not Anthaxia but are congeneric with Maoraxia and, not unexpectedly, show transitional character states between the two species from eastern Australia and the two from Fiji and Tonga.

With this continued limelight being cast upon this interesting group of species, and with the two new combinations proposed herein now bringing the species count to eight, it was thought that a review of the genus with a new key and a preliminary phylogenetic scenario was warranted.

Abbreviations
The following abbreviations or acronyms are used in the text:
(h) = handwritten
(p) = printed
CLBC = C. L. Bellamy research collection
IRSN = Institut Royal des Sciences Naturelles de Belgique, Bruxelles
ZILU = Zoological Institute, Academy of Sciences of U.S.S.R., Leningrad
Subtribe MAORAXIINA Holynski

Maoraxiiini Holynski, 1984: 106 (as tribe of Mastogeniinae).

Type genus: Maoraxia Obenberger, 1937: 1449.

Buprestinae; elongate, ovoid, flattened; vestiture obvious; frontoclypeus short, with oblique carinae extending from above antennal cavities to distal margin; antennal sensory pores concentrated in single distal fovea on each serrate antennomere; pronotum constricted laterally between base and middle; metacoxal plate oblique, dilated; tarsal pulvilli restricted to 4th tarsomere; hindwing with radial cell very small; radiomedial crossvein not entire to M; median vein atrophied to very short branch; anal cell absent.

Subtribal status was defended by Holynski (1988) and then subsequently demonstrated to be cladistically tenable by Bellamy (1990). With the Australian buprestine fauna still poorly defined due to the lack of precisely delimited generic units and also with a few contentious taxa (e.g. Neotorresita Obenberger) still lurking about, no conclusive statements about the relationships of Maoraxia can be made.

Genus Maoraxia Obenberger

Maoriella Obenberger, 1924: 19.—Théry, 1925: 225; Obenberger, 1926: 98; Carter, 1926: 57; Obenberger, 1928: 78; 1936: 142; Dumbleton, 1939: 256 (name proccupied).

Type species: Maoriella novae-zeelandia Obenberger, 1924 (by monotypy).

The genus was adequately described by Bellamy & Williams (1985) and, since nothing about the species added recently or herein to Maoraxia affects the generic parameters, the description will not be repeated here. As this is the only genus currently placed in the Maoraxiina, the comments made about putative relationships under the subtribal taxon above and earlier (Bellamy 1990) are referred to.

Nothing about the transfer of Fauvel's two New Caledonian Anthaxia species to Maoraxia is surprising since that large island is such an obvious midway point between the Australian and Polynesian species. The explanation of the breakup of the Australian plate provided by Raven & Axelrod (1972) may indeed provide the reasoning by which we can understand the distribution of the species of Maoraxia presently known from Australia, New Zealand, New Caledonia, Fiji and Tonga. However, the discovery of M. purpurea from Mindanao indicates that the genus is probably much older than the Late Cretaceous dating used by Raven & Axelrod and also suggests that further members of this group may be found in the large intermediate zone between Australia and Mindanao, with New Guinea, New Britain, the Solomon Islands and Vanuatu being areas worth surveying.

Following the key to species, each species is briefly diagnosed and discussed with a complete synonymy. The five species treated in the revision (Bellamy & Williams 1985) and the recently described M. purpurea Bellamy (1990) were fully described in those works and these will not be repeated here. The two Fauvel species will be briefly described to contrast them to the other Maoraxia species. The key is artificial to allow the inclusion of M. purpurea, which is known only from the damaged holotype.

Key to the Species of Maoraxia

1. Body subcylindrical; integument colour generally brunneus (New Zealand) ................................................................. M. eremita (White)
   Body more flattened; integument colour generally black with various iridescent reflected colours ........................................................................................................................................................................................................ 2
2(1). Dorsal integument black with strong purple and greenish blue reflections (Philippines: Mindanao) ..................................................................................................................................................................................................................... M. purpurea Bellamy
   Dorsal colouration otherwise, generally black, sometimes with reflected blue or blue-green (south of 10°S. latitude) ........................................................................................................................................................................................................ 3
Review of Genus *Maoraxia*

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3(2). Distal antennomeres 2× or more longer than wide ................................................. 4
Distal antennomeres with length less than 1.5× width ............................................. 5

4(3). Dorsal integument uniformly shining metallic green; punctuation larger and more dense; basal angle of pronotum slightly obute (Fiji) ........................................... *M. viridis* Bellamy
Dorsal integument shining black, iridescent green laterally on pronotum, basally on elytra; punctuation smaller and less dense; basal angle of pronotum acute (Tonga) ............. ................................. *M. tongae* Bellamy

5(3). Antennae serrate from antennomere 4 ................................................................. 6
Antennae serrate from antennomere 5 or 6 ............................................................... 7

6(5). Integument blue-black (♂), iridescent blue or blue-green (♀) (Australia: SE. Qld & NE. N.S.W.) ................................................................. *M. littoralis* Bellamy & Williams
Strikingly sexually dichromatic: (♂) head, pronotum, lateral portion of metathoracic sternites and metememora iridescent green, remainder nitid black; (♀) completely nitid black; sparsely covered with long fine recumbent white setae (New Caledonia) ................................. *M. excavata* (Fauvel)

7(5). Antennae serrate from antennomere 5; pronotal disc flattened, surface between large punctures shagreened; margin of eyes confluent with outline of head; surface sparsely covered with shorter, finer semi-erect testaceous setae (New Caledonia) ........ *M. cordicollis* (Fauvel)
Antennae serrate from antennomere 6; pronotal disc transversely convex, surface between punctures subglabrous; margin of eyes convex beyond outline of head; surface moderately covered with stout semi-erect testaceous setae (Australia: N. Qld) ................................. *M. storeyi* Williams & Bellamy

*Maoraxia eremita* (White)

(Fig. 7)


*Nascio eremita*.—Hutton, 1904: 153.

*Maorielia novae-zeelandiae* Obenberger, 1924: 19, pl. 1, fig. 7, pl. 2, fig. 18.—Théry, 1925: 225; Obenberger, 1926: 98; Carter, 1926: 57; Obenberger, 1936: 143; Dumbleton, 1939: 256.

*Maorielia strandi* Obenberger, 1936: 143.

*Maorielia eremita*.—Obenberger, 1936: 143.

*Maoraxia eremita*.—Obenberger, 1937: 1449; Bellamy & Williams, 1985: 151, figs 1, 7, 15.

*Maoraxia novae-zeelandiae*.—Obenberger 1937: 1449; Bellamy & Williams, 1985: 151.

*Maoraxia strandi*.—Obenberger 1937: 1449; Bellamy & Williams, 1985: 151.

Diagnosis

Size, ♂, length 3.0–4.5 mm, width 1.5–2.0 mm; ♀, length 4.0–6.0 mm, width 2.0–2.8 mm; elongate ovoid, subcylindrical, slightly flattened above; brown to black, male with frontovertex green, green reflections at posterolateral angles of pronotum; coarsely densely punctate; moderately densely clothed with semierect white setae.

Remarks

This widespread and oft-described New Zealand species is generally the largest member of the genus and differs by the subcylindrical body. It is also the only species, where both sexes are known, that shows sexual dichromatism on the frontovertex, a fairly common occurrence in the Buprestinae.

The character state of the posteromedial angle of the metacoxal plate is significant at the species level and is illustrated for *M. eremita* (Fig. 7) to show the arcuate condition.

Hosts

The host plants that were recorded in Bellamy & Williams (1985) (*Ciprosma robusta, Knightisia excelsa, Suttonia salicina, Weinmannia sylvicola*) suggest a generalist feeding strategy which would corroborate the suspected age of this lineage.

Distribution

New Zealand: North Island and northern part of South Island (Fig. 9).
Maoraxia littoralis Bellamy & Williams

Maoraxia littoralis Bellamy & Williams, 1985: 154, figs 2, 6, 10, 12, 13, 14, 16.

Diagnosis

Size, \( \sigma \), length 3.0–3.5 mm, width 1.2–1.5 mm; \( \varphi \), length 4.5–4.9 mm, width 2.0–2.4 mm; elongate ovoid, somewhat flattened; nitid black with dark blue to shining blue-green reflections; surface moderately punctate; moderately covered with semierect grey-black setae.

Remarks

The sexual dichromatism discussed at the time of description and in the key above is more probably allometric as the females tend to be larger and only the largest specimens show a fundamentally different integument colour.

Hosts

The adult and larval host plants that were recorded by Bellamy & Williams (1985) (i.e. Acronychia sp., Elaeodendron australe, Podocarpus elatus) also suggest generalist feeding habits, but no botanical connection with M. eremita.

Distribution

Australia: coastal south-eastern Queensland to north-eastern New South Wales (Fig. 9). This species was recently mentioned by Williams (1990) as being restricted to littoral rainforest; with such habitat threatened and already reduced to remnants, it may truly be an endangered species.

Maoraxia tongae Bellamy


Diagnosis

Size, \( \sigma \), length 3.2–4.0 mm, width 1.2–1.5 mm; \( \varphi \) unknown; elongate, flattened above; nitid black with greenish reflections, frontovertex, pronotal margins, elytral base iridescent green; surface densely punctate, clothed with semierect, short brunneus setae dorsally, semi-recumbent white setae ventrally.

Remarks

This and the following species are closely related both to each other and also to M. purpurea (as demonstrated by the cladistic reasoning illustrated in Fig. 10). They share the synapomorphies of the acute posterolateral angle of the pronotum and the angulate condition of the metacoxal plate. They are also the species most distantly separated from the putative centre of origin (see below).

With only a single sex known for all three of these species, some possibly significant data are unavailable which might help refine the phylogenetic predictions.

Host

Unknown.

Distribution

Tonga: Eua, Tongatabu and Vavau islands (Fig. 9).
Maoraxia viridis Bellamy


Diagnosis
Size, $\sigma$, length 3·5 mm, width 1·5 mm; $\varphi$ unknown; elongate, flattened above; frontal portion of head and dorsal surface of pronotum and elytra nitid iridescent green with slightly darker tints on pronotum and along elytral margins; ventrally black with greenish reflections along lateral margins; surface densely punctate; clothed with dense semierect, short white setae with brunneous tinge.

Remarks
As discussed above, this species is related to both M. tongae and M. purpurea.

Host
Unknown.

Distribution
Single male from Fiji: Ringold Isles (Fig. 9).

Maoraxia purpurea Bellamy

(Fig. 8)

Maoraxia purpurea Bellamy, 1990: 188, figs 1, 2.

Diagnosis
Size, $\varphi$, length 3·8 mm, width 1·6 mm; $\sigma$ unknown; elongate, flattened above; head and pronotum iridescent greenish blue with purple reflections, elytra purple with greenish blue reflections at humeri, underside black with greenish blue reflections laterally; surface moderately punctate; clothed with short, semierect white setae with brunneous tinge.

Remarks
As mentioned above, this recently described species is most closely related to M. tongae and M. viridis (as shown by Fig. 10). The discovery of a species of Maoraxia on Mindanao is further evidence of a generalised distribution track between that island and Borneo and further indicates the possibility of a heterogenous origin to the Philippine archipelago.

The angulate condition of the posteromedial angle of the metacoxal plate is illustrated in Fig. 8.

Host
Unknown.

Distribution
Single male from Philippines: Mindanao, Zamboanga del Sur (Fig. 9).

Maoraxia storeyi Williams & Bellamy


Material Examined
A third specimen is recorded: $\sigma$, Australia, north-east Qld, Conway Range N.P., E, from Proserpine at light, 17-23.ii.1981 (CLBC).

Diagnosis
Size, $\sigma$, length 3·7-3·8, width 1·4-1·6; $\varphi$, length 5·4 mm, width 1·7 mm; elongate ovoid, flattened above; subnitid black, with slight viridocupreous reflections; surface moderately punctate; covered with moderately long, recurved silver setae.
Remarks
As shown in Fig. 10, *M. storeyi* shows a connecting relationship between the New Caledonian species and *M. littoralis*.

Host
Unknown.

Distribution
Australia, northern Queensland (Fig. 9).

*Maoraxia cordicollis* (Fauvel), comb. nov.

(Figs 1, 3 5)


*Notographus cordicollis*. — Obenberger, 1930: 557.

Types
Lectotype (here designated).  ♂, New Caledonia, Tonghoué, Savès (IRSN) [with a red label: LECTOTYPE (p) Anthaxia cordicollis ♂ Fauvel (h) C. L. Bellamy (p)].

Paralectotypes. 3♂, 1♀ (IRSN), 2♂ (ZILU), New Caledonia, Tonghoué, Savès [each with a yellow label: Paralectotype Anthaxia cordicollis Fauvel det. C. L. Bellamy 1990 (p)].

Redescription
Lectotype ♂. Size, length 2.8 mm, width 1.1 mm; elongate ovoid, strongly flattened above; nitid black above and below; head and shagreened portion of pronotum with dark aeneous reflections; elytra with brunneous tinge; antennae testaceous; tibiae and tarsi brunneous; surface moderately coarsely punctate; pronotum shagreened in spaces between punctures; elytra irregularly rugose; head and pronotum sparsely clothed with semi-erect, short, white setae; elytra and central surface with white setae more sparse, recumbent.

Head. Transverse, narrower than pronotum; eyes large, ovoid, convex, inner margins slightly converging dorsally; frontovertex slightly convex between eyes; a sharply elevated carina extends from dorsal to antennal cavities ventrally and shallowly arcuate across frontoclypeal disc; frontoclypeus as in Fig. 3, very short and shallowly triangularly emarginate distally, carinae forming two small elongate ovoid depressions; gena transversely depressed ventral to eyes for antennae in repose; antennae serrate from fifth antennomere.

Pronotum. 1.9 x wide as long, widest at middle; lateral margins arcuate rounded to slight constriction at base; postero-lateral angles obtuse; anterior margin feebly arcuate medially; posterior margin moderately bisinuate; lateral margins well developed. Strongly elevated and explanate dorsally, entire from posterior to anterior margin; disk flatly convex, slightly transversely depressed posterolaterally; scutellum small, triangular, impunctate.

Elytra. Slightly wider than pronotum, widest anterior to apical 1/3; lateral margins subparallel from opposite humeri to widest point, then gradually narrowing to separately rounded, serrulate apices; epipleura separated from disk by carina, epipleura broad basally, carina extends parallel to margin, becoming confluent at apical 1/3; broadly rounded pygidium visible past, between elytral apices.

Underside. Prosternum with anterior margin straight; metacoxal plate oblique, with posterior margin arcuately emarginate, strongly dilated internally; suture between 1st and 2nd abdominal sternites feebly indicated; last visible sternite broadly rounded.

Legs. Femora fusiform; tibiae slender; 1st tarsomere of protarsi subequal to 2nd; 1st tarsomere of meso- and metatarsi as long as following 3 taken together; 4th tarsomere with expended deeply bilobed pulvilli; tarsal claws broadly appendiculate; entire left hind leg missing.
Genitalia. As in Fig. 5 (drawn from paralectotype).

Variation. Size, $\sigma$ ($n=5$), length 3.2-4.2 mm, width 1.3-1.7 mm; $\varphi$ ($n=1$), length 4.4 mm, width 1.8 mm; on the larger specimens the reflected colour on the frontovertex has a bluish tinge and that on the rugosities in the basal 2/3 of the elytra has a purplish tinge.

Remarks

$M. \text{cordicollis}$ is most strongly allied to $M. \text{stroreyi}$ and $M. \text{excavata}$ as indicated in the key and demonstrated in the cladograms (Fig. 10).

Host

Unknown.

Distribution

New Caledonia (Fig. 9).

Maoraxia excavata (Fauvel), comb. nov.

(Figs 2, 4, 6)

Anthaxia excavata Fauvel, 1891: 180.—Kerreman, 1892: 120; 1903: 176.

Anilara excavata.—Obenberger, 1930: 555.

Types

Lectotype (here designated). $\sigma$, New Caledonia, Tonghoué, Savès (IRSN) [with a red label: LECTOTYPE (p) Anthaxia excavata $\sigma$ Fauvel (h) C. L. Bellamy (p)].

Figs 1-8. 1, 3, 5, Maoraxia cordicollis (Fauvel), $\sigma$ paralectotype; 2, 4, 6, Maoraxia excavata (Fauvel), $\sigma$ lectotype (shaded portion of head and pronotum indicates extent of iridescent green area); 1, 2, dorsal habitus; 3, 4, frontoclypeal margin, frontal aspect; 5, 6, male genitalia, dorsal aspect; 7, 8, postero-medial angle (arrows) of metacoxal plate; 7, M. erimita (White), arcuate; 8, M. purpurea Bellamy, angulate. Scale lines = 1 mm; equal for Figs 1, 2, 7, 8 and Figs 3-6.
Paralectotypes. 2♂ (ZILU), 2♀♀ (IRSN), New Caledonia, Tonghoué, Savès [each with a yellow label: Paralectotype Anthaxia excavata Fauvel det. C. L. Bellamy 1990 (p)].

Redescription

Lectotype ♂. Size, length 2·9 mm, width 1·2 mm; elongate ovoid, strongly flattened above; most of head and pronotum nitid iridescent green (indicated by shading on Fig. 2); base of vertex and narrow longitudinal discal area of pronotum black; elytra and underside nitid black; femora with strong greenish reflection; tarsi brunneous; surface moderately coarsely punctate; pronotum shagreened in spaces between punctures; elytra irregularly subrugose; head and pronotum sparsely clothed with semi-erect, short, white setae; elytra moderately covered with longer setae; ventral surface with setae shorter, more sparse, recumbent.

Head. Transverse, narrower than pronotum; eyes large, ovoid, convex, inner margins slightly converging dorsally; frontovertex slightly convex between eyes; a sharply elevated carina extends from dorsal to antenal cavities ventrally and shallowly arcuate across frontoclypeal disc; frontoclypeus as in Fig. 4, very short and arcuately convex, without discal carinae, moderately impressed before carinate margin; gena transversely depressed ventral to eyes for antennae in repose; antennae serrate from fourth antennomere, most of both antennae missing.

Pronotum. 1·8 x wide as long, widest at middle; lateral margins arcuately rounded to slight constriction at base; posterolateral angles subacute; anterior margin feebly arcuate mediay; posterior margin moderately bisinuate; lateral margins well developed, strongly elevated and explanate dorsally, entire from posterior to anterior margin; disk flatly convex, slightly transversely depressed posterolaterally; scutellum small, triangular, impunctate.
**Elytra.** Slightly wider than pronotum, widest anterior to apical $\frac{1}{3}$; lateral margins sub-parallel from opposite humeri to widest point, then gradually narrowing to separately rounded, serrulate apices; epipleura separated from disk by carina, epipleura broad basally, carina extends parallel to margin, becoming confluent at apical $\frac{1}{4}$; broadly rounded pygidium visible past, between elytral apices.

**Underside.** Prosternum with anterior margin straight; metacoxal plate oblique, with posterior margin arcuately emarginate, strongly dilated internally; suture between 1st and 2nd abdominal sternites feebly indicated; last visible sternite broadly rounded.

**Legs.** Femora fusiform; tibiae slender; 1st tarsomere of protarsi subequal to 2nd; 1st tarsomere of meso- and metatarsi as long as following 3 taken together; 4th tarsomere with expended deeply bilobed pulvilli; tarsal claws broadly appendiculate; entire left foreleg missing.

**Genitalia.** As in Fig. 6, mounted on point with specimen.

**Variation.** Size, $\sigma$ ($n=2$), length 2·8–3·2 mm, width 1·7–1·8 mm; $\varphi$ ($n=2$), length 3·0 mm, width 1·7 mm; the females are entirely nitid black but have very small areas of reflected colour at base of pronotum.

**Remarks**
As mentioned above, this species comes nearest to *M. cordicollis* and *M. storeyi*.

**Host**
Unknown.

**Distribution**
New Caledonia (Fig. 9).

**Phylogeny of *Maoraxia***
With the addition of three species since the revision of Bellamy & Williams (1985) from either intermediate or divergent localities, a preliminary sketch of the interspecific relationships within *Maoraxia* is now possible.

Table 1. Adult characters examined for *Maoraxia* spp. and an out-group, *Australorhipis aphanochila* Bellamy

<table>
<thead>
<tr>
<th>Character</th>
<th>P = plesiomorphic</th>
<th>A, A2, A3 = apomorphic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Coloration, integument</td>
<td>black/brown (P); bicolorous (A); entirely iridescent (A2).</td>
<td></td>
</tr>
<tr>
<td>2. Coloration, frontovertex</td>
<td>sexually equal (P); sexually dichromatic (A).</td>
<td></td>
</tr>
<tr>
<td>3. Coloration, pronotal</td>
<td>sexually equal (P); sexually dichromatic (A).</td>
<td></td>
</tr>
<tr>
<td>4. Vestiture</td>
<td>glabrous (P); setose (A).</td>
<td></td>
</tr>
<tr>
<td>5. Vestiture, sparse</td>
<td>(P); moderate density (A).</td>
<td></td>
</tr>
<tr>
<td>6. Frontoclypeal margin</td>
<td>simple (P); carinate (A); carinate-foveate (A2).</td>
<td></td>
</tr>
<tr>
<td>7. Antennae: flabellate</td>
<td>(P); serrate (A).</td>
<td></td>
</tr>
<tr>
<td>8. Antennae: serrate from 3</td>
<td>(P); serrate from 4 (A); serrate from 5 (A2); serrate from 6 (A3).</td>
<td></td>
</tr>
<tr>
<td>9. Antennae: sexually equal</td>
<td>(P); sexually dimorphic (A).</td>
<td></td>
</tr>
<tr>
<td>10. Serrate antennomeres: width greater than or just subequal to length</td>
<td>(P); length approximately twice width (A).</td>
<td></td>
</tr>
<tr>
<td>11. Pronotum, posterolateral angle: obtuse</td>
<td>(P); acute (A).</td>
<td></td>
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<tr>
<td>12. Pronotum, disc: flattened</td>
<td>(P); convex (A).</td>
<td></td>
</tr>
<tr>
<td>13. Pronotum, punctuation: simple</td>
<td>(P); simple + shagreened (A); alveolate (A2).</td>
<td></td>
</tr>
<tr>
<td>14. Elytra, punctuation: simple</td>
<td>(P); rugose (A).</td>
<td></td>
</tr>
<tr>
<td>15. Metacoxal plate, postero medial angle</td>
<td>arcuate (Fig. 7) (P); angulate (Fig. 8) (A).</td>
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<tr>
<td>16. Tarsal claws: simple</td>
<td>(P); appendiculate (A).</td>
<td></td>
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<tr>
<td>17. Male genitalia, parameres shape: slender</td>
<td>subparallel (P); expanded distally (A).</td>
<td></td>
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<tr>
<td>18. Male genitalia, sensory setae on parameres</td>
<td>present (P); absent (A).</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Matrix of character states for examined taxa and considered characters (Table 1)

0 = plesiomorphic; 1, 2, 3 = progressively apomorphic; − = unknown state

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Character</th>
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<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8</td>
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<tr>
<td>Australorhipis aphanochila</td>
<td>0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0</td>
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</tr>
<tr>
<td>Maoraxia cordicollis</td>
<td>1 0 1 0 0 2 1 2 0 0 0 0 1 1 0 0 1 0 1 0 1</td>
</tr>
<tr>
<td>Maoraxia storeyi</td>
<td>0 0 0 1 1 1 1 3 0 0 0 0 0 0 1 0 1 1 0</td>
</tr>
<tr>
<td>Maoraxia littoralis</td>
<td>0 0 0 1 1 1 1 1 0 0 0 0 0 0 1 1 1</td>
</tr>
<tr>
<td>Maoraxia eremita</td>
<td>1 0 1 0 1 1 1 1 1 0 1 0 0 0 1 1 1</td>
</tr>
<tr>
<td>Maoraxia viridis</td>
<td>2 0 − 1 1 1 1 1 0 1 1 0 0 1 1 1 1</td>
</tr>
<tr>
<td>Maoraxia tongue</td>
<td>1 0 − 1 1 2 1 1 0 1 1 1 0 0 1 1 1 1</td>
</tr>
<tr>
<td>Maoraxia purpurea</td>
<td>0 0 0 1 1 2 1 − 0 − 1 1 0 0 1 1 −</td>
</tr>
</tbody>
</table>

Australorhipis aphanochila Bellamy (1986) was demonstrated to be the most likely choice for sister-group by Bellamy (1990). This sister-group status between Maoraxia and Australorhipis is suggested by the synapomorphic reduction of the radial sector vein. Monophyly of Australorhipis is supported by the sexually dimorphic antennae, with the flabellate antennae of the male possibly representing an apomorphic atavism rather than a long-retained plesiomorphic feature. Maoraxia is defined as monophyletic due to the autapomorphies of the reduction to a single tarsal pulvillus (4th tarsomere) and loss of the 2dA3 vein. The sister-group of these two genera is Notographus Thomson with the relationships discussed in Bellamy (1990).

Following general cladistic and out-group comparison methods, the examination of all eight species of Maoraxia and A. aphanochila with respect to the list of characters in Table 1 yielded the matrix of character states shown in Table 2. The matrix was run through the Implicit Enumeration routine of the Hennig86 parsimony program (Farris 1988; Fitzhugh 1989) which produced four equally parsimonious trees [length 29; consistency index (CI) 75; retention index (ri) 69] after the initial calculation. In line with the reasoning of Carpenter (1988), the a posteriori Successive Weighting routine of Hennig86 was used (see Farris 1988) to reduce the number of possible trees, resulting in the two trees shown in Fig. 10 (length 178; CI 90; ri 88).

These phylogenies should be understood to be preliminary considering the discussion above regarding the better-than-reasonable chance that additional species await discovery somewhere within the large triangular area defined by Cape York, Fiji and Mindanao. Any additional species of Maoraxia will doubtlessly affect the character state polarity definitions used herein as well as the number of branches and branch topography of the resultant tree(s).

The phylogeny portrayed in Fig. 10 corroborates the late Cretaceous reconstruction of the south-western Pacific Gondwanaland by Griffiths (1971, 1974) with both New Caledonia and New Zealand connected to the eastern coast of Australia by the now submerged Lord Howe Rise and Norfolk Ridge. Further commentary on tectonic evolution and disassociation of these areas is given by Crook (1981) and Powell et al. (1981). This particular region and geologic time is predicted as the centre of origin for Maoraxia because the species occupying the descendant regions retain the most primitive character states and are most closely related, whereas those from the more distant areas to the north and east are the most derived.

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Tree 1

Fig. 10. Equally parsimonious trees showing relationships of *Maoraxia* species [length 178; consistency index (CI) 90 and retention index (RI) 88].

References
Carter, H. J., 1926. A revision of the Australian species of *Anilara* (Buprestidae) and *Helmis* (Fam. Dryopidae) with notes and descriptions of other Australian Coleoptera. *Proceedings of the Linnean Society of New South Wales* 51, 50-71.


Hutton, F. W., 1904. 'Index faunae Novae Zealandiae.' (Dulau & Co.: London.)


Obenberger, J., 1936. Eine Festarbeit zum sechzigjährigen Jubiläum meines Freundes Univ.-Prof. Dr. Embrik Strand. *Festschrift zum 60. Geburtstage von Professor Dr. Embrik Strand* 1, 97-145.


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