

Three New Genera of New Zealand Sychitini (Coleoptera: Zopheridae: Colydiinae)

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THREE NEW GENERA OF NEW ZEALAND SYNCHITINI (COLEOPTERA: ZOPHERIDAE: COLYDIINAE)

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ABSTRACT

Three new genera of Synchitini are described from New Zealand, including two monotypic genera, *Oparara* Leschen and Lord, **new genus** (type species *Oparara marskeae* Leschen and Lord, **new species**) and *Tarphionivea* Leschen and Lord, **new genus** (type species *T. lindsayae* Leschen and Lord, **new species**). The New Zealand *Bitoma* Herbst comprise members of multiple genera, and six are here transferred to *Zebitoma* Leschen and Lord, **new genus** (type species *Bitoma nana* Sharp, 1876), resulting in the following: *Zebitoma brouni* (Hetschko, 1928), **new combination**; *Zebitoma discoidea* (Broun, 1880), **new combination**; *Zebitoma guttata* (Broun, 1886), **new combination**; *Zebitoma lobata* (Broun, 1886), **new combination**; *Zebitoma nana* (Sharp, 1876), **new combination**; *Zebitoma novella* (Hetschko, 1929), **new combination**; *Zebitoma picicornis* (Broun, 1909), **new combination**; *Zebitoma rugosa* (Sharp, 1876), **new combination**; *Zebitoma scita* (Broun, 1886), **new combination**.

Key Words: taxonomy, Tenebrionoidea, new species, *Bitoma*

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New Zealand currently contains the largest diversity of zopherid species per land area in the world, with 191 species placed into 17 genera (Lord and Leschen 2014). Two of three subfamilies (Colydiinae and Pynomerinae) and two tribes (of 12) exist in New Zealand (Ślipiński and Lawrence 2010, 1997). The Synchitini (Colydiinae), the focus of this paper, are particularly rich and indicative of disharmonic species diversity (Buckley *et al.* 2015). They are also rich in habit, being saproxylic and epixylic and may be mostly fungus-feeding specialists, with species present in leaf litter and above ground. The synchitine genera, however, require full revision in New Zealand, with vexing taxonomic problems ranging from generic assignments of named species, widespread synonymies, transfers of species among genera, and many new species.

A significant step towards clarifying the fauna was a fully illustrated catalogue of the valid species (Lord and Leschen 2014). With the key provided by Ślipiński and Lawrence (1997), identification of many taxa can now be made at least to genus. However, even with the tools in hand, generic assignments are not straightforward (Makita and Leschen 2017). Presently, we are working on

phylogenetic treatments locally and globally that, alongside revisionary projects with other co-workers (Turco *et al.* 2012a, b; Makita and Leschen 2017), describe and correct the classification of south temperate zopherids. Based on a comprehensive sampling for a molecular study of the New Zealand fauna (T. R. Buckley, personal communication), preliminary data demonstrate that many changes in generic assignments are required. Some, however, are too complex to deal with at the local level. Critical morphological examination for most species and a denser taxonomic sampling of species for phylogenetic studies are needed to affirm genus-level limits. In this paper, we describe three new genera, two that are monotypic and a third for a group of species currently included in the diverse and worldwide genus *Bitoma* Herbst.

As inherently beautiful and bizarre as the zopherid species are, the New Zealand fauna also provides excellent models for reconstructing the history of the biota (Marske *et al.* 2011, 2012; Buckley and Leschen 2013). However, to continue the evolutionary and natural history work, baseline taxonomic studies are needed to help clarify the identity of even the most widespread species. For

example, *Epistranus lawsoni* Sharp is New Zealand-wide and exhibits deep haplotype lineages that do not correlate well with geography, leading to the conclusion that it is a highly variable species (Marske *et al.* 2011) and suggesting that the eight names under the genus could be treated as synonyms. *Pristoderus bakewellii* Pascoe, also studied by Marske *et al.* (2011), is similar but composed of five valid names that may also be synonyms. Reasons for the great variation in external morphology exhibited in these and many other New Zealand zopherids may be that the majority of species are wingless with limited dispersal ability and the larvae are saproxylic/mycophagous such that they may develop into adults of different sizes and shapes depending on resource abundance. These phenomena can be addressed more accurately when problems in classification are resolved.

MATERIAL AND METHODS

Material Examined. Specimens were examined from the Auckland War Memorial Museum (AMNZ), Natural History Museum, London (BMNH), and New Zealand Arthropod Collection (Auckland, NZAC). Generic assessments in *Bitoma* were based on external examination (* = mouthparts not examined on types held in the BMNH), external examination of pinned (♂) or dissected (♀) material, and molecular phylogenetic placement (⊔ = T. R. Buckley, personal observation). The following nine species form a new genus separate from *Bitoma*: *B. browni* (Hetschko, 1928)*[⊔] (Fig. 4a), *B. discoidea* Broun, 1880*[⊔] (Fig. 4b), *B. guttata* Broun, 1886*[⊔] (Fig. 4c), *B. lobata* Broun, 1886* (Fig. 4d), *B. nana* Sharp, 1876* (Fig. 4e), *B. novella* Hetschko, 1929*[⊔] (Figs. 4f, 5a–m), *B. picicornis* Broun, 1909*[⊔] (Fig. 4g), *B. rugosa* Sharp, 1876* (Fig. 4h), *B. scita* Broun, 1886*[⊔] (Fig. 4i). The remaining species are maintained in *Bitoma*: *B. auriculata* Sharp, 1886*; *B. costicollis* (Reitter, 1880)*; *B. distans* Sharp, 1876*[⊔]; *B. distincta* Broun, 1880*; *B. insularis* White, 1846*[⊔]; *B. morosa* Broun, 1921*; *B. mundula* Sharp, 1886*; *B. serraticula* Sharp, 1886*; and *B. vicina* Sharp, 1876*[⊔].

Measurements. Length was measured from the midline of the anterior pronotal margin to the tip of the abdomen, and width was measured from the greatest width of the pronotum and the elytra. Morphological terms are based on Lawrence *et al.* (2010, 2011).

Imaging and Illustrations. Color habitus images were captured using a Visionary Digital™ Passport II imaging system equipped with a Canon 6D DSLR camera. Image stacks were montaged in Zerene Stacker v.1.04 (Zerene Systems LLC, Richland, WA, USA). Images were edited in Adobe

Lightroom CC 2015 and Adobe Photoshop CC 2015. Line drawings were digitally rendered in Adobe Illustrator CC 2015 (Adobe Systems, Inc., San Jose, CA, USA).

TAXONOMY

Oparara Leschen and Lord, new genus

(Fig. 1a–c)

Type Species. *Oparara marskeae*, Leschen and Lord, new species.

Diagnosis. Surfaces glabrous, encrustations present. Head strongly dorsoventrally flattened. Antenna 11-segmented with 2-segmented club. Antennal groove well-developed, extending beyond posterior margin of eye. Labial palpi absent. Pronotum explanate, anterior margin deflected dorsally, lateral lobes absent, anterior angles extending forward to level of anterior pronotal margin. Prothorax without distinct antennal cavities. Abdominal ventrites well-separated by transverse grooves, ventrite V with preapical groove. Elytron with well-developed costae; epipleuron absent. Metacoxal cavity laterally closed by metaventrite and abdominal ventrite I. Legs generally flattened in cross-section. Tarsal formula ?-4-4; tarsi filiform, not strongly lobed below.

Description. Length 2.4 mm; depth 0.9 mm. Dorsal and ventral surfaces glabrous, lacking agglutinate scales; cuticle uneven, with irregularly formed verrucae, weakly developed on elytra and more regular ventrally; encrustations present, especially within punctures. Head dorsoventrally compressed, not strongly constricted behind eyes; temples present, subequal to length of eye; vertex and frons depressed at middle, with sides distinctly raised above antennal insertions; supraorbital carina absent. Antennal groove well-developed, extending beyond posterior margin of eye; subgena not expanded laterally. Eye weakly developed, consisting of about 10 facets, interfacetal setae absent. Antenna short, inserted below frons, extending to about midline of pronotum, 11-segmented with 2-segmented club; setation of antennal segments II–IX sparse, consisting of a single row of short setae at middle or base of segment; club segments more densely setose, setae longer, not arranged in rows; scape subcylindrical, wider than pedicel; pedicel narrowed toward base, not expanded distally, slightly longer than wide, shorter than 1, longer than 3; antennomeres 3–9 of subequal width; antennomere 3 longer than all others, as long as 4–6 combined; antennal club slightly flattened, strong, abrupt, with antennomere 11 about 2X as long as 10, with antennomere 10 transverse. Labrum short, not strongly transverse, anterior margin weakly rounded, fringed with sparse setae. Mandibles hidden in repose

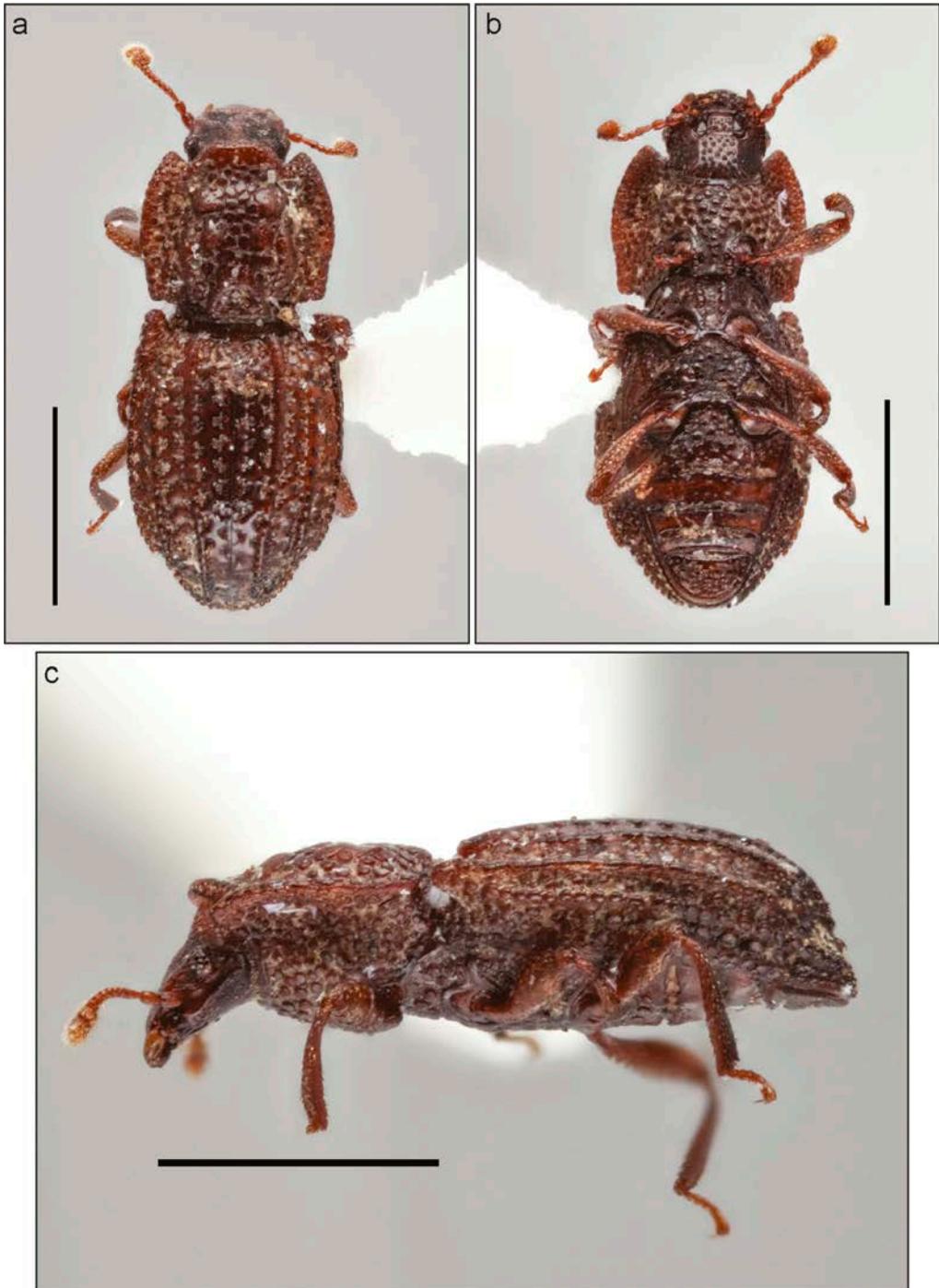


Fig. 1. *Oparara marskeae*. a) Dorsal habitus, b) Ventral habitus, c) Lateral habitus. Scale bar = 1 mm.

[not dissected]. Maxillary palpus 4-segmented, last maxillary palpomere digitiform, about 3X as long as wide, concave on inner surface. Mentum strongly

transverse, with apical margin straight; labial palpi absent. Submentum rectangular, slightly wider than long, lacking median carina. Gular region with

sutures, tentorial pits not discernible [dissection required], broadly and weakly vaulted at middle. Prothorax constricted at base, with a broad cowling fitting dorsally into and ventrally over the mesothorax. Pronotum 1.1X wider than long, explanate, lacking lobes, widest at middle, with base narrower than combined (greatest) width of elytra; anterior margin produced at middle into a hood covering a portion of the head while in repose, deflected apico-dorsally; anterior angles strongly extending forward to level of anterior pronotal margin; posterior angles of lateral carina broad, more or less right, without a tooth; lateral carina more or less sharp-edged; surface of disc uneven, longitudinally depressed at sides, with a distinct \cap -shaped furrow baso-medially, lacking well-developed tubercles and carinae. Prothoracic venter without distinct antennal cavities, though weakly excavate. Notosternal suture not discernible. Prosternum not produced anteriorly into a chin-piece, anterior margin more or less straight, medially not raised above level of procoxae; prosternum long in front of the procoxae, about 1.3X as long as prosternal process; prosternal process wider than coxal cavity, slightly expanded at middle and weakly emarginate at apex, apex not expanded apically or laterally. Procoxal cavities externally separated by more than 2X coxal cavity diameters; externally open, postcoxal process rounded, not extending posteriorly the coxae. Lateral portions of elytra more or less explanate. Scutellary shield absent, not visible externally. Elytra 1.25X as long as combined width and 1.6X as long as pronotum, subparallel-sided; scutellary striae absent, punctation coarse, with large, irregularly-shaped punctures arranged into 5 rows, punctures well-separated; elytral disc with 3 well-defined costae; humeral carinae absent; apex rounded in dorsal view; epipleuron absent. Hindwings absent [elytra solidly fused]. Mesoventrite with pair of tuberculate carinae; mesocoxae separated by about 2/3 width of coxal cavity; mesocoxal cavity laterally closed. Meta-ventrite about 1/5 shorter than abdominal ventrite I; metacoxae separated by about 2/3 width of coxal cavity; metacoxal cavity laterally closed by meta-ventrite and abdominal ventrite I. Legs generally flattened in cross-section; posterior surfaces of protibia and meso- and metafemora and tibiae slightly concave; protibia with outer apical angle not expanded and edge with lateral teeth or spines. Tarsal formula ?-4-4 [holotype damaged]; tarsi filiform and not strongly lobed below, tarsomeres I–III about equal lengths, their combined length subequal to tarsomere IV. Abdominal ventrites well-separated by transverse grooves, intercoxal process of ventrite I broad; ventrite V with pre-apical groove.

Comments. *Oparara* keys to couplet 24 in Ślipiński and Lawrence (1997), leading to *Heteragus*

Sharp, a diverse, endemic New Zealand genus composed of 17 species, that is not easy to characterize and is likely polyphyletic. Like *Oparara*, members of *Heteragus* also lack labial palpi and have closed metacoxal cavities. The following characters distinguish *Oparara* from *Heteragus*: antennomere 3 longer than antennomeres 2 and 3 combined; general lack of scales on the dorsal surface; pronotum at middle deflected dorsally; and presence of anterior elytral projections. Most *Heteragus* species are more broad-bodied than *Oparara*, with a transverse pronotum and the elytra about 2X as long as the pronotum. Also, about half of the described species of *Heteragus* do not have elytral costae, and if they do, the costae are not as sharp and polished and the elytral punctures are not as well separated as in *Oparara*.

Etymology. A place name epithet, Oparara Arches is a Northwest Nelson locality located near the township of Karamea.

Oparara marskeae Leschen and Lord,
new species
(Fig. 1a–c)

Type Material. Holotype: sex unknown, "NEW ZEALAND: NN, Oparara Basin, Oparara Arches Track, mixed *Nothofagus* and podocarp forest, 27 Feb 2007, K. Marske, sifted wood and leaf litter, S 41.09.075', E 172.11.455', 171 m, KM026".

Description. Cuticle dark reddish brown; legs and mouthparts light red-brown. Vestiture very sparse, small, silver scales, present on edges of pronotum and elytra, very sparse on ventral surfaces [seen under high magnification]. Surfaces rugose to verrucate, glabrous; head with dorsal punctures impressed, separated by 1–2X puncture width, ventrally punctate with irregular impressed punctures of various widths; pronotum verrucate, dorsally with 4 suboval and 2 longitudinal verrucae; mesoventrite verrucate, with 2 rows of tubercles forming longitudinal carinae; metaventrite irregularly verrucate, with premetacoxal impressions; abdomen irregularly verrucate, ventrites II–III smooth; elytral punctures large, deeply impressed, forming 6 rows separated by less than 0.5X puncture width. Ratios among antennomere lengths: 2.5/1.5/2.5/.90/.70/.80/.80/.90/1.2/1.5/2.5. Elytral disc with middle striae polished and sharp, outer striae verrucate and or partially verrucate.

Comments. Despite four attempts to re-collect this species at the type locality, *O. marskeae* may be one of New Zealand's most elusive beetles. The type specimen was collected from secondary forest adjacent to extensive primary forest by sifting a mix of leaf litter and rotten branches in a location near a cave system; we do not believe that this species is a

troglophile because it was not sampled proximal to the cave entrance. We recommend that *O. marskeae* be placed on the Department of Conservation Threatened Species List (Leschen *et al.* 2012) and treated as “range-restricted” and “sparse” using the criteria of Stringer and Hitchmough (2012). This formality will facilitate further collecting activity to discover more about the biology and distribution of *O. marskeae*.

Etymology. The species is named for Katie Marske to acknowledge her “Midas touch” at collecting this and other rare species, as well as her contribution towards understanding the evolution of New Zealand’s biota.

***Tarphionivea* Leschen and Lord, new genus**
(Figs. 2a–c, 3a–n)

Type Species. *Tarphionivea lindsayae* Leschen and Lord, new species.

Diagnosis. Surfaces scalate, agglutinate, encrustations weakly present. Head not strongly dorsoventrally flattened; temples relatively short. Antenna 11-segmented with 2-segmented club. Antennal groove well-developed, extending to posterior margin of eye. Labial palpi absent. Pronotum weakly explanate, anterior margin not deflected dorsally; lateral margin with a broad lobe extending from anterior 1/4 to posterior 1/3, with rounded anterior angles that do not extend forward to level of anterior pronotal margin. Prothorax without distinct antennal cavities. Abdominal ventrites well separated by transverse grooves, ventrite V with preapical groove. Scutellary shield present, well-developed. Elytron lacking strongly developed costae; epipleuron present to level of edge of metaventrite. Metacoxal cavity open laterally. Legs generally weakly flattened in cross-section. Tarsal formula 4-4-4; tarsi filiform, not strongly lobed below.

Description. Length 3.7–4.7 mm, greatest depth 1.0–1.4 mm. Dorsal and ventral surfaces agglutinate (Fig. 2a, b), scalate, rugose-punctate, densely tuberculate, with scales arising from tubercles that are generally grouped into raised areas dorsally or singular and well separated ventrally; weakly encrusted. Head not flattened (Fig. 2c), strongly constricted behind eyes; temples not strongly produced laterally (Fig. 3a), length in dorsal view about length of eye; frons depressed at middle with sides distinctly raised above antennal insertions; supra-orbital carina absent. Antennal groove well-developed, deep, extending to posterior margin of eye; subgena expanded laterally to form ventral shelf of antennal groove. Eyes well-developed (Fig. 3c), weakly protruding, convex, interfacetal setae present. Antenna short, inserted below frons, extending to level just beyond midline of pronotum,

11-segmented with 2-segmented club (Fig. 3e); setation of antennal segments 2–9 sparse, consisting of a single row of short, hair-like setae at apical 1/3 of segment; club segments more densely setose, setae not arranged in rows; scape subcylindrical, same width as pedicel; pedicel subovate, slightly longer than wide, shorter than 1 and equal to 3; antennomeres 3–9 of subequal width, becoming gradually shorter, more transverse; antennomere 3 distinctly longer than 4; antennal club not flattened, strong and abrupt with segments transverse, of equal lengths, well-separated. Labrum short, transverse, anterior margin straight, apicolateral angles somewhat rounded, fringed with sparse setae (Fig. 3h). Mandibles (Fig. 3b) hidden in repose [not dissected]. Maxillary palpus 4-segmented, last maxillary palpomere digitiform, about 3X as long as wide (Fig. 3d); galea narrowest at base, expanded apically, apical margin truncate, fringed with setae; lacinia narrower, with single, curved spine at apex, apical margin fringed with setae. Mentum somewhat transverse, with shallow median impression, bearing several short setae, anterior margin arcuate; labial palpus present and inserted ventrally, 3-segmented, terminal palpomere fusiform, about 2.5X as long as wide (Fig. 3c); submentum somewhat trapezoidal, slightly longer than wide, lacking median carina. Gular region with convergent sutures and deep tentorial pits, not broadly vaulted at middle. Prothorax constricted at base, with a narrow cowl fitting dorsally into and ventrally over the mesothorax (Fig. 3g). Pronotum about 0.8X wider than long, widest at apical third, narrowest at base, with base narrower than combined width of elytra; lateral margins explanate, with a broad lateral lobe extending from anterior 1/4 to posterior 1/3, lobes with rounded anterior angles that do not extend forward to level of anterior pronotal margin; anterior margin produced at middle into a hood covering a portion of the head while in repose, not deflected dorsally; posterior angles rounded, without a tooth; lateral carina not sharp-edged; surface of disc uneven, with weak depressions and elevations, lacking well-developed tubercles and carinae, depressed sublaterally above anterior lobe. Prothoracic venter without distinct antennal cavities, though weakly excavate. Notosternal suture present. Prosternum not produced anteriorly into a chin-piece, anterior margin evenly curved, medially not raised above level of procoxae; prosternum long in front of procoxae, about 2X as long as prosternal process; prosternal process wider than coxal cavity, slightly expanded subapically, narrowing at apex, apex subacute and slightly expanded apically or laterally. Coxal cavities externally separated by about 1 coxal diameter, narrowly separated internally; externally narrowly open, postcoxal process extending to about mid-length of coxae. Lateral portions of

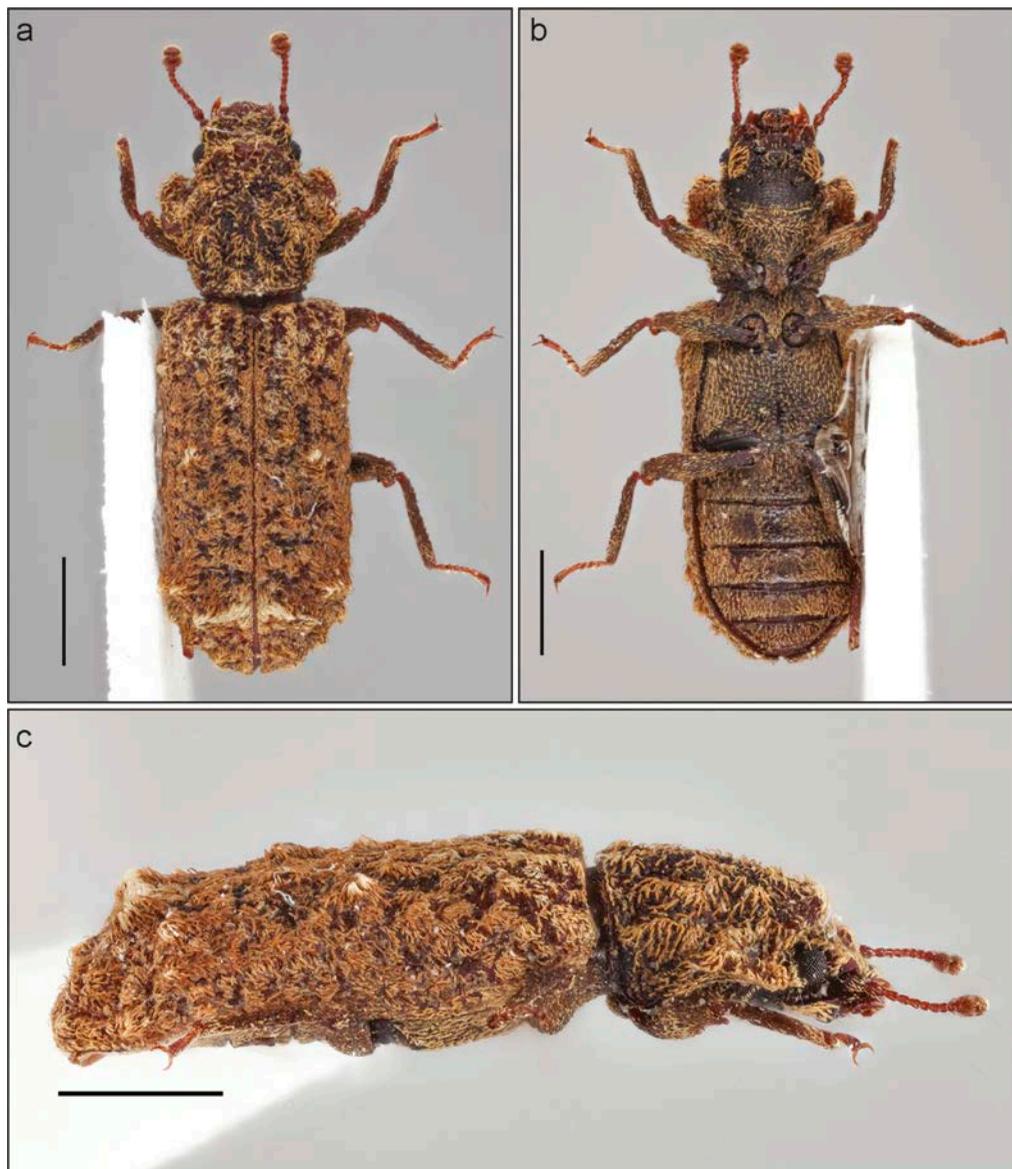


Fig. 2. *Tarphionivea lindsayae*. a) Dorsal habitus, b) Ventral habitus, c) Lateral habitus. Scale bar = 1 mm.

elytra not explanate. Scutellary shield present, visible externally. Elytra 1.9X as long as combined width, 1.6X as long as pronotum; parallel-sided; scutellary striae present, punctation obscured by rugose, carinate surface; disc tuberculate, with 3 or more low costae that are more prominent apically, 3rd costa terminating apically at a tubercle; costa present at humeral angle, with a large tubercle that may be more or less transverse, located subapically; apex subrounded, in dorsal view declivate, with 3 tubercles; epipleuron oblique, visible in lateral view,

incomplete, present to level of about edge of metaventricle. Hindwings present (Fig. 3l). Mesoventricle ecarinate; mesocoxae narrowly separated by less than 1/2 width of coxal cavity (Fig. 3i); mesocoxal cavity laterally closed. Metaventricle 2X as long as abdominal ventrite I; metacoxae separated by about 1/5 width of coxal cavity (Fig. 3i); metacoxal cavity laterally open. Legs generally weakly flattened in cross-section; outer apical angle of protibia not expanded; edge of protibia simple, without teeth or spines (Fig. 3f). Tarsal

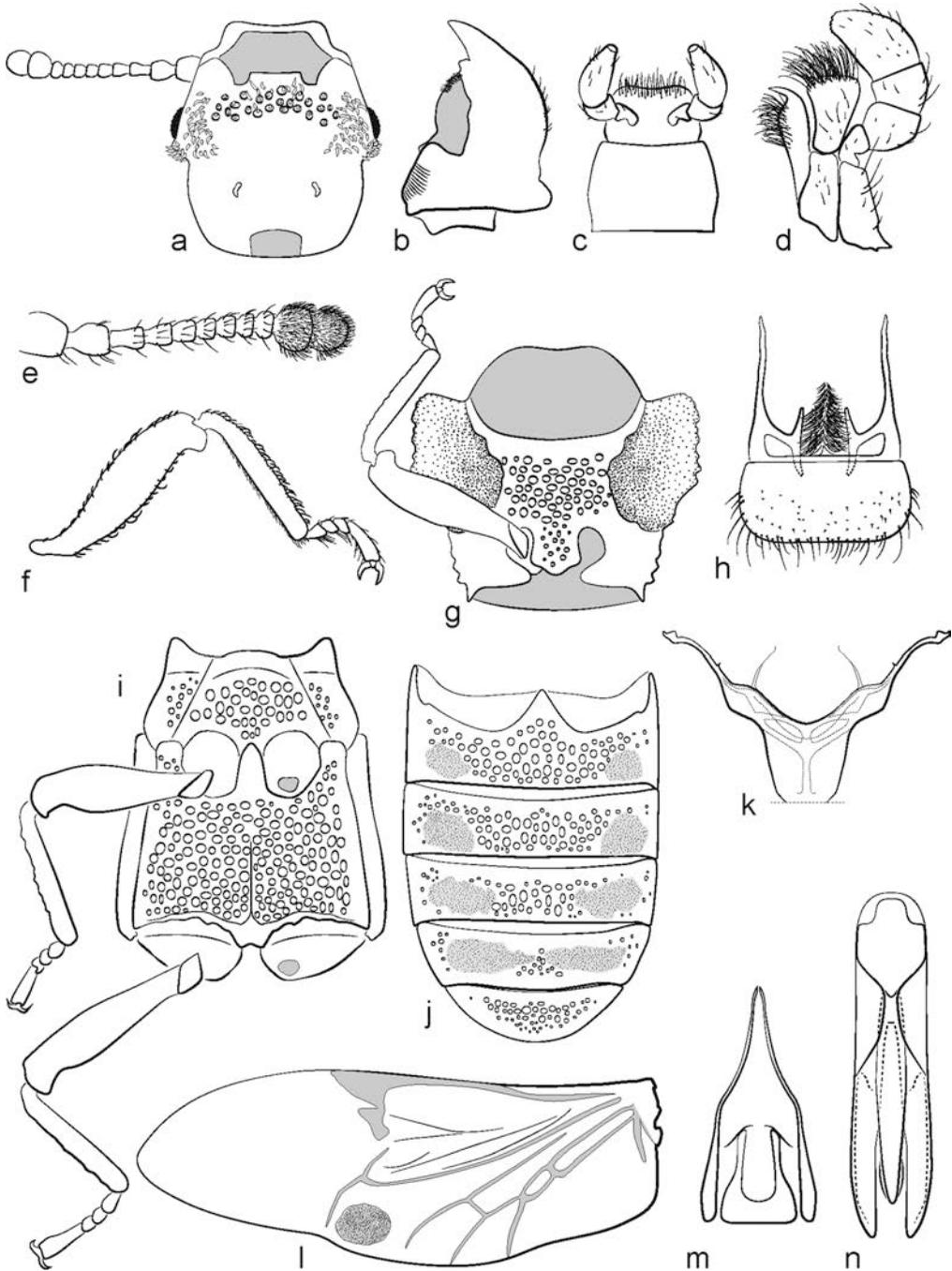


Fig. 3. *Tarphionivea lindsayae*. a) Head, ventral view, b) Mandible, ventral view, c) Labium, ventral view, d) Maxilla, ventral view, e) Antenna, f) Fore leg, g) Prothorax, ventral view, h) Labrum, dorsal view, i) Pterothorax, ventral view, j) Abdominal ventrites I–V, ventral view, k) Metendosternite, ventral view, l) Metathoracic wing, dorsal view, m) Spiculum gastrale, dorsal view, n) Aedeagus, ventral view.

formula 4-4-4; tarsi filiform and not strongly lobed below; tarsomeres I-III about equal in length, their combined length equal to tarsomere IV. Abdominal ventrites well separated by transverse grooves, intercoxal process of ventrite I acute (Fig. 3j); ventrite V with preapical groove. Male sternite VIII with baculae, well-separated, not meeting at midline; sternite IX with slender and acute spiculum gastrale (Fig. 3m). Aedeagus with tegmen dorsal to penis (Fig. 3n).

Comments. *Tarphionivea* resembles no other genus in New Zealand and its only species can be distinguished from all other species by the elongate and relatively large body with an anteriorly widened prothorax. *Tarphionivea* keys to couplet 40 in Ślipiński and Lawrence (1997), leading to *Trachypholis* Erichson, a widespread genus found in Africa, Asia, and New Guinea, which contains species with a broader body form, a broad intercoxal process, and an antennal groove on the head that extends beyond the eyes, features separating it from *Tarphionivea*. Outside of the Australo-Pacific region, *Tarphionivea* resembles the Malagasy genus *Trigonophloeus* Dajoz, 1980, with the main difference in the structure of the tarsi (tarsomere IV over twice the length of tarsomeres I-III combined). It is conceivable that *Tarphionivea* may eventually be synonymized with *Trigonophloeus*, a geographic distribution that is rare (present in the cleroid family Chaetosomatidae); but the generic issue is complicated by the inclusion of *Trigonophloeus*-like forms from the African region in *Bitoma*.

Etymology. The name combines the prefix “*tarphio*” used in the zopherid literature and the suffix “*nivea*” (G., = snow), which refers to the near-alpine habitat of the genus.

***Tarphionivea lindsayae* Leschen and Lord,
new species**

(Figs. 2a-c, 3a-n)

Type Material. Holotype: male [missing left metatibia and tarsus, genitalia removed], “NEW ZEALAND, NN, Mt Arthur Hut, 23 Jan 2012, R. Leschen, L. Dunning, H. Lindsay, 41.197494S, 172.715921E, beating beech trees with white lichen at night, RL1627”. Paratypes: 2, same data as holotype; 1, AMNZ [missing left protarsus and left metatarsus]: “Balloon Hut Mt Arthur Plateau 2-1-48 C.E.C. [handwritten in pencil]/ C. E. Clarke Collection”.

Description. Cuticle dark to light reddish brown; tarsi and mouthparts red-brown to light brown. Vestiture consisting of elongate scales that form agglutinate patches dorsally, especially dense on the genae, more or less evenly distributed ventrally; mostly golden and silver scales in patchworks on anterior portion of elytra and more or less white in small median spot and 1 subapical spot and a

subapical transverse row on the subapical transverse ridge; scales of legs dark brown to black, tibial apices paler. Surfaces rugose; irregular punctures on surfaces distinct, forming weak semi-seriate rows on elytra, connected by channels interrupted by tubercles and carinae; ventral surfaces with distinct verrucae. Ratios among antennomere lengths: 2.3/3.0/2.5/2.0/2.4/1.1/1.2/1/1.1/2.0/2.5. Elytra with up to 5 basal costae including the humeral costa, outer subhumeral costa may be tuberculate and/or may fuse with the humeral (4th) costa, which extends posteriorly to basal 1/4, terminating on a tubercle; with discal tubercles present at basal 1/3 and 2/3, with a large subapical tubercle at apical 1/4 that may be transverse and form a carina, with 2 smaller tubercles just in front of and laterad of large subapical tubercle. Aedeagus about 4X as long as wide, parallel-sided and slightly expanded apically; parameres slender, about as long as phallobase, each paramere somewhat flattened; penis narrow and approximately 1.3X as long as parameres, apex subacute, with thin subapical flanges, notched at base.

Comments. *Tarphionivea lindsayae* is known from four specimens, three of which were beaten at night from a dry, rotten *Nothofagus* tree high in the canopy level reached along the edge of a track above Mt. Arthur Hut and skirting the margin of the alpine tussock zone. The locality at Mt. Arthur is well known among entomologists and visited relatively frequently, indicating that the species may be a canopy specialist. Balloon Hut is at a slightly lower altitude than Mt. Arthur Hut but of similar habitat and located in tableland.

We recommend that *T. lindsayae* be placed on the Department of Conservation Threatened Species List (Leschen *et al.* 2012) and treated as “range-restricted” and “sparse” using the criteria of Stringer and Hitchmough (2012). This formality will facilitate further collecting activity to discover more about the biology and distribution of *T. lindsayae*.

Etymology. Patronymic for conservationist Helen Lindsay, in recognition of her leadership in habitat restoration throughout New Zealand and who was a participant in the fieldwork that led to the discovery of *Tarphionivea*.

***Zebitoma* Leschen and Lord, new genus**
(Figs. 4a-i, 5a-m)

Type Species. *Bitoma nana* Sharp, 1876 (Fig. 4e).

Diagnosis. Surfaces scalate, agglutinate or not; with or without encrustations. Head not strongly dorsoventrally flattened; temples relatively long. Antenna 11-segmented with 2-segmented club. Antennal groove short and well-developed at anterior margin of eye. Labial palpi absent. Pronotum

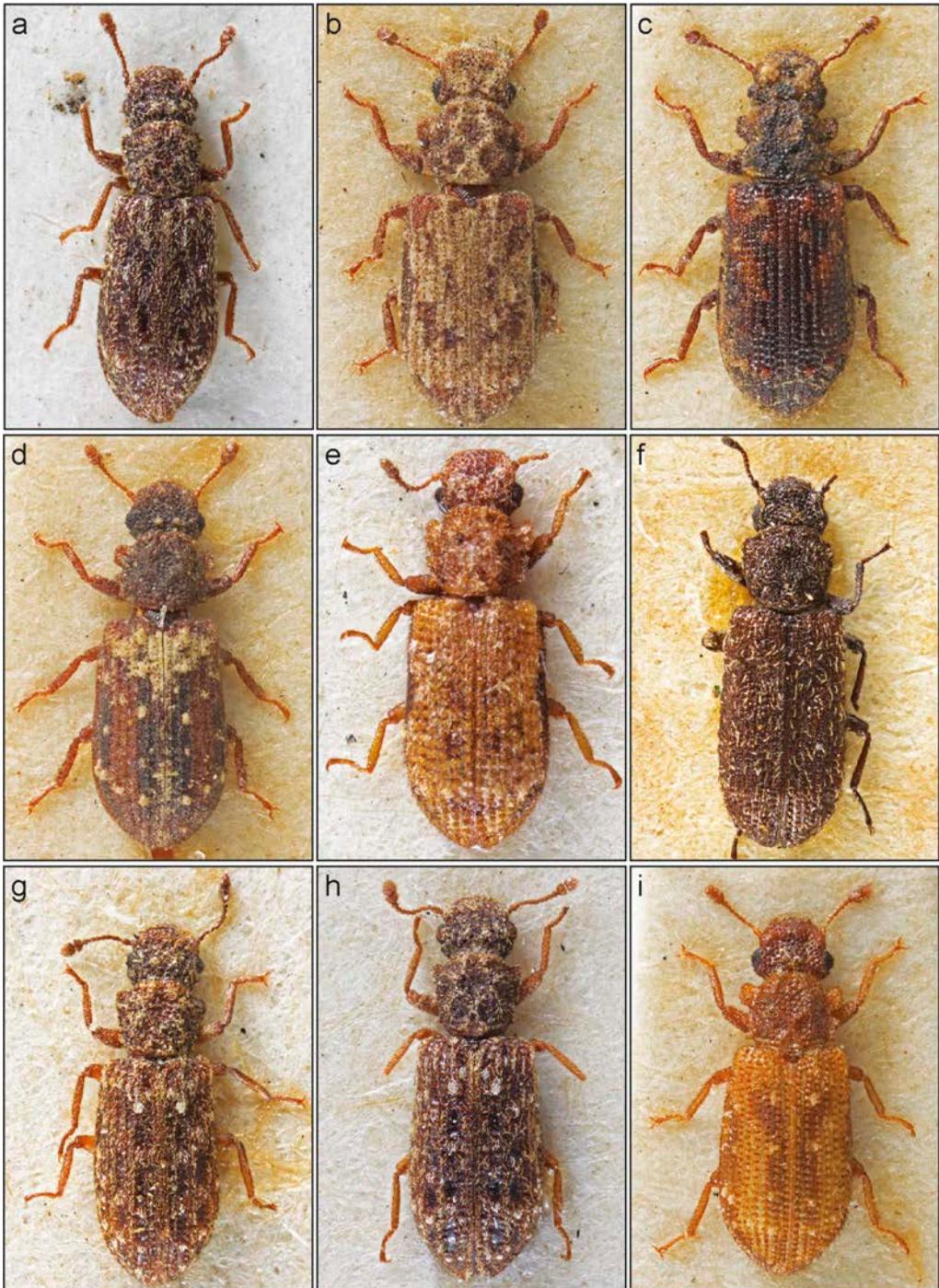


Fig. 4. *Zebitoma* species, type images and dorsal habitus. a) *Z. brouni*, holotype (BMNH), b) *Z. discoidea*, lectotype (BMNH), c) *Z. guttata*, holotype (BMNH) d) *Z. lobata*, holotype (BMNH), e) *Z. nana*, holotype (BMNH), f) *Z. novella*, holotype (BMNH), g) *Z. picicornis*, holotype (BMNH), h) *Z. rugosa*, lectotype (BMNH), i) *Z. scita*, holotype (BMNH).

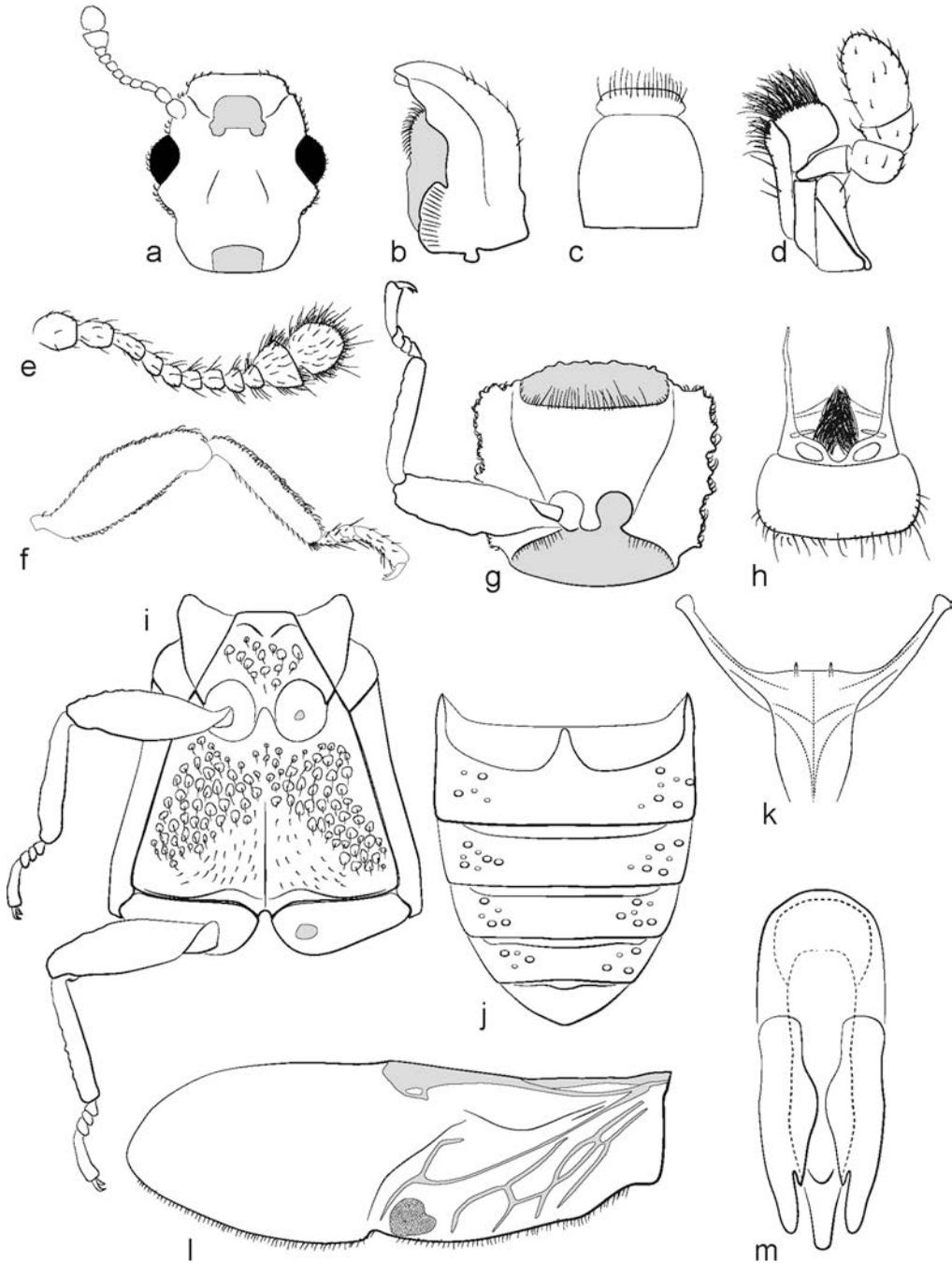


Fig. 5. *Zebitoma picicornis*. a) Head, ventral view, b) Mandible, ventral view, c) Labium, ventral view, d) Maxilla, ventral view, e) Antenna, f) Fore leg, g) Prothorax, ventral view, h) Labrum, dorsal view, i) Pterothorax, ventral view, j) Abdominal ventrites I-V, ventral view, k) Metendosternite, ventral view, l) Metathoracic wing, dorsal view, m) Aedeagus, dorsal view.

explanate or not posteriorly, anterior margin not deflected dorsally, lateral lobes present or not with anterior angles absent or present and not extending forward to level of anterior pronotal margin. Prothorax without distinct antennal cavities. Abdominal ventrites well separated by transverse grooves, ventrite V with or without well-developed preapical groove. Scutellary shield present and well-developed. Elytron with or without costae; epipleuron present to apex. Metacoxal cavity open laterally. Legs generally weakly flattened in cross-section. Tarsal formula 4-4-4; tarsi filiform, not strongly lobed below.

Description. Length 1.6–2.9 mm, greatest depth 0.5–1.1 mm. Dorsal and ventral surfaces scalate, often agglutinate, rugose-punctate, often tuberculate, with scales sometimes arising from tubercles; encrustations present or absent. Head not flattened, strongly constricted behind eyes (Fig. 5a); temples not strongly produced laterally, length, in dorsal view, equal to length of eye or slightly longer; frons typically depressed at middle, with sides distinctly or weakly raised above antennal insertions; supra-orbital carina absent. Antennal groove well developed only at anterior margin of eye, never extending below; subgena not expanded laterally to form ventral shelf. Eyes well-developed, weakly protruding, convex, interfacetal setae present. Antenna short, inserted below frons, extending to level just beyond midline of pronotum, 11-segmented with 2-segmented club (Fig. 5e); setation of antennal segments 2–9 sparse, consisting of a single row of short, hair-like setae at base of segment; club segments more densely setose, not arranged in rows; scape subcylindrical, narrower than pedicel; pedicel not strongly constricted at base and weakly expanded distally or not, slightly curved, slightly longer than wide, shorter than antennomeres 1 and 3; antennomeres 3–9 of subequal width, becoming gradually shorter and weakly transverse; antennomere 3 distinctly longer than 4 or not; club not flattened, strong and abrupt, with antennomere 10 transverse and 11 subequal to 2X length of antennomere 9, well-separated. Labrum moderately long, quadrate, anterior margin slightly to moderately arcuate or more or less straight with apicolateral angles rounded, fringed with sparse setae (Fig. 5h). Mandibles symmetrical, bidentate, with well-developed hyaline protheca; mola present and striate (Fig. 5b). Maxillary palpus 4-segmented, last maxillary palpomere apically truncate, about 2.5X as long as wide (Fig. 5d); galea narrowest at base, expanded apically, apical margin truncate, fringed with setae; lacinia narrower, with single, curved spine at apex, apical margin fringed with setae. Mentum transverse, without shallow, median impression, bearing a few short setae, anterior margin straight; labial palpi absent (Fig. 5c). Submentum

somewhat trapezoidal, slightly wider than long; lacking a median carina. Gular region not broadly vaulted at middle, with visible sutures and tentorial pits. Prothorax constricted at base, with a narrow cowling fitting over the mesothorax. Pronotum about 1.2X wider than long, explanate (or not posteriorly in some species), anterior margin not deflected dorsally, lateral lobes present (up to three) or not, with anterior angles absent or present and do not extend forward to level of anterior pronotal margin (Fig. 5g); pronotum of most species widest at apex or apical 1/3, in most species narrowest at base with base narrower than combined width of elytra; anterior margin produced at middle in some species, but not forming a hood and not deflected dorsally at the anterior margin; posterior angles rounded to angulate, with or without a tooth; lateral carina sharp-edged in most species; surface of disc typically uneven, with weak depressions and elevations, sometimes with tubercles and distinctive costae. Prothoracic venter without distinct antennal cavities, though weakly excavate. Notosternal suture present. Prosternum not produced anteriorly into a chin-piece, anterior margin straight, medially not raised above level of procoxae; prosternum long in front of procoxae, about 2X as long as prosternal process; prosternal process narrower than coxal cavity, slightly expanded apically, apex subacute, weakly expanded apically or laterally, extending just beyond coxal cavities. Procoxal cavities externally separated by at most 1/3 coxal diameter, narrowly separated internally; externally narrowly open, postcoxal process acute and extending to about mid-length of exposed part of coxae. Lateral portions of elytra weakly to moderately explanate. Scutellary shield present, visible externally. Elytra 1.3X as long as combined width, 2.6X as long as pronotum; parallel-sided or weakly expanded towards apex; scutellary striole present, punctuation sometimes obscured by rugose agglutinate surface; disc weakly or not tuberculate, sometimes with low costae that are more prominent apically or at humeral angles; apex subrounded in dorsal view; epipleuron more or less horizontal and visible slightly (especially anteriorly) in lateral view, complete to apex. Hindwings present (Fig. 5l). Mesoventrite ecarinate; mesocoxae very narrowly separated by less than 1/2 width of coxal cavity; mesocoxal cavity laterally closed (Fig. 5i). Meta-ventrite 1.5X as long as abdominal ventrite I; metacoxae separated by about 1/4 width of coxal cavity; metacoxal cavity laterally open (Fig. 5i). Legs generally weakly flattened in cross-section; outer apical angle of protibia not expanded; edge of protibia simple, without teeth or spines (Fig. 5f). Tarsal formula 4-4-4; tarsi filiform and not strongly lobed below, tarsomeres I–III subequal in length, their combined length subequal or shorter than

tarsomere IV. Abdominal ventrites well separated by transverse grooves, intercoxal process of ventrite I acute (Fig. 5j); ventrite V with or without well-developed preapical groove, with apex abruptly, obliquely deflected ventrally in some species. Male sternite VIII with baculae well-separated, not meeting at midline; sternite IX with elongate and acute spiculum gastrale. Aedeagus with tegmen dorsal to penis (Fig. 5m).

Comments. The New Zealand members of *Bitoma* are highly variable. We have examined externally the relevant type material, but a majority of the species, including new ones, require full dissection and detailed morphological study. *Zebitoma* is described for nine species of New Zealand *Bitoma* that are easily separated from members of *Bitoma sensu stricto* by the absence of labial palpi and the anterior angles of the prothorax absent, or when present, the angles do not extend forward to the same level of anterior pronotal margin. *Zebitoma* can also be distinguished from New Zealand *Bitoma sensu stricto* by having a relatively smaller and subquadrate prothorax that is narrower than the combined width of the elytral bases and the presence of 1–3 lateral lobes in some species. Species of *Zebitoma* also tend to be smaller in size than members of *Bitoma sensu stricto*.

Apart from three species that we currently consider are valid members of *Bitoma* (*B. costicollis*, *B. insularis*, and *B. vicina*), *B. mundula* (and possibly the similar-looking *B. auriculata*) may eventually be placed in *Ablabus* Broun based on the presence of a declivate elytral apex and lateral lobes on the pronotum, features present in the type species, *Ablabus ornatus* Broun and other members of *Ablabus* (preliminary molecular data also supports this placement of *B. mundula* in *Ablabus*). These two species, and the remaining four species of *Bitoma sensu stricto*, lack the distinctive discal ridges on the pronotum as are present in the type species of the genus, *Bitoma crenata* (Fabricius), and in *B. costicollis* and *B. insularis* (these latter two species are probably synonyms, compare color patterns in figs. 478 and 59 in Lord and Leschen 2014). Five species, *B. auriculata*, *B. distincta*, *B. morosa*, *B. mundula*, and *B. serraticula*, have explanate pronota, while *B. auriculata* also has a wide apical lobe reminiscent of some taxa placed in the polyphyletic genus *Pristoderus*. Lastly, *B. distans* has a relatively convex and narrow prothorax, resembling *Zebitoma*, but with a complete labium; its phylogenetic placement is likely derived from within *Bitoma sensu stricto* as sister taxon to *B. insularis*. Reliance on prothoracic characters alone is problematic for generic-level diagnostics. The absence of discal carinae, which is distinctive in many *Bitoma* species, also occurs in *B. morosa* and *B. serraticula*. Thus, more comprehensive morphological

investigations will be required to place these remaining species.

Members of *Bitoma* and *Zebitoma* are active at night, presumably saproxylic, and can be beaten from branches of various tree species or taken from fungus (e.g., Kuschel 1990), under bark, or hand collected from the surfaces of standing trees. Detailed natural history information is sparse, and at least one montane species of *Zebitoma* is regularly collected at night on white, thin-layered lichen.

Etymology. The name combines the prefix “Ze-” referring to New Zealand and the name *Bitoma*.

Included Species. *Z. brouni* (Hetschko, 1928), **new combination** (Fig. 4a); *Z. discoidea* (Broun, 1880), **new combination** (Fig. 4b); *Z. guttata* (Broun, 1886), **new combination** (Fig. 4c); *Z. lobata* (Broun, 1886), **new combination** (Fig. 4d); *Z. nana* (Sharp, 1876), **new combination** (Fig. 4e); *Z. novella* (Hetschko, 1929), **new combination** (Fig. 4f); *Z. picicornis* (Broun, 1909), **new combination** (Fig. 4g); *Z. rugosa* (Sharp, 1876), **new combination** (Fig. 4h); *Z. scita* (Broun, 1886), **new combination** (Fig. 4i).

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