



A new genus of leaf beetle (Coleoptera: Chrysomelidae: Eumolpinae) from Three Kings Islands, New Zealand

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Abstract

A new genus of eumolpine chrysomelid is described from the Three Kings Islands, New Zealand: *Tyrannomolpus rex* **gen. nov., sp. nov.** *Tyrannomolpus rex* is the largest endemic chrysomelid species from New Zealand, and most closely resembles members of the endemic New Zealand genus *Pilacolaspis* Sharp. A key to genera of New Zealand Eumolpinae is provided.

Key words: Endemic, island fauna, island gigantism, key to genera

Introduction

The subfamily Eumolpinae (Coleoptera: Chrysomelidae) contains approximately 500 genera, and an estimated 7,000 species placed into 11 tribes (Jolivet & Verma 2008a; Jolivet *et al.* 2014). The subfamily is worldwide and can be abundant on isolated islands, especially in situations where other subfamilies of leaf beetles are absent or fewer in numbers. Adults feed externally on leaves, while the larvae are root feeders, mainly on dicotyledonous plants. In New Zealand, the Eumolpinae is represented by four genera in the tribe Eumolpini: *Atrichatus* Sharp (2 species), *Eucolaspis* Sharp (7 species), *Peniticus* Sharp (5 species), *Pilacolaspis* Sharp (5 species). All of these are endemic to New Zealand, apart from *Eucolaspis* that is also known from two species in Fiji (Bryant & Gressitt 1957). All genera require full and detailed revision, and prior taxonomic (Shaw 1957) and genetic work (Doddala *et al.* 2013, 2015) on *Eucolaspis* has complicated exact species identification due to lack of detailed morphological study (Kuschel 1990) and the introduction of *nomina nuda* among other errors. In preparation for a generic review of the New Zealand fauna, we describe a fifth eumolpine genus endemic to the Three Kings Islands, a new monotypic genus with a species that is the largest of all known endemic New Zealand chrysomelids first referred to in a paper on a Mesozoic fossil described by Craw & Watt (1987) who placed this specimen in the genus *Pilacolaspis*.

The Three Kings Islands is a small archipelago composed of one main island (Great Island) and several smaller island or rock stacks just 56 km northwest of the northern tip of mainland and has a large number of endemic genera and species of plants and animals (Buckley & Leschen 2013). In general, the fauna and flora of Three Kings Island is closely connected to the North Cape region and northern mainland of New Zealand, though some species have their closest relatives in New Caledonia, Australia or elsewhere in the Pacific (Buckley & Leschen 2013; Théry & Leschen 2013; Buckley *et al.* 2015). The Three Kings fauna has been dated from 24 Mya to 2.2 Mya (Buckley & Leschen 2013), based on taxa shared with the New Zealand mainland. The disharmonic island biota was structured by the complicated geological history of the Melanesian Rift (Ung *et al.* 2017) and the Three Kings Islands is the only exposed part of the Three Kings Rise (Mortimer *et al.* 1998) which is itself part of the Loyalty Arc composed of the South d'Entrecasteaux Ridge and the Three Kings Rise and linking New Zealand (i.e., the Northland Plateau) to New Caledonia (Schellart 2006). The eumolpine genus described herein represents an

addition to the endemic fauna of the Three Kings Islands that we compare to other members of Eumolpinae in the region. The terminology follows Beutel & Lawrence (2005), Lawrence *et al.* (2010), and Jolivet *et al.* (2014).

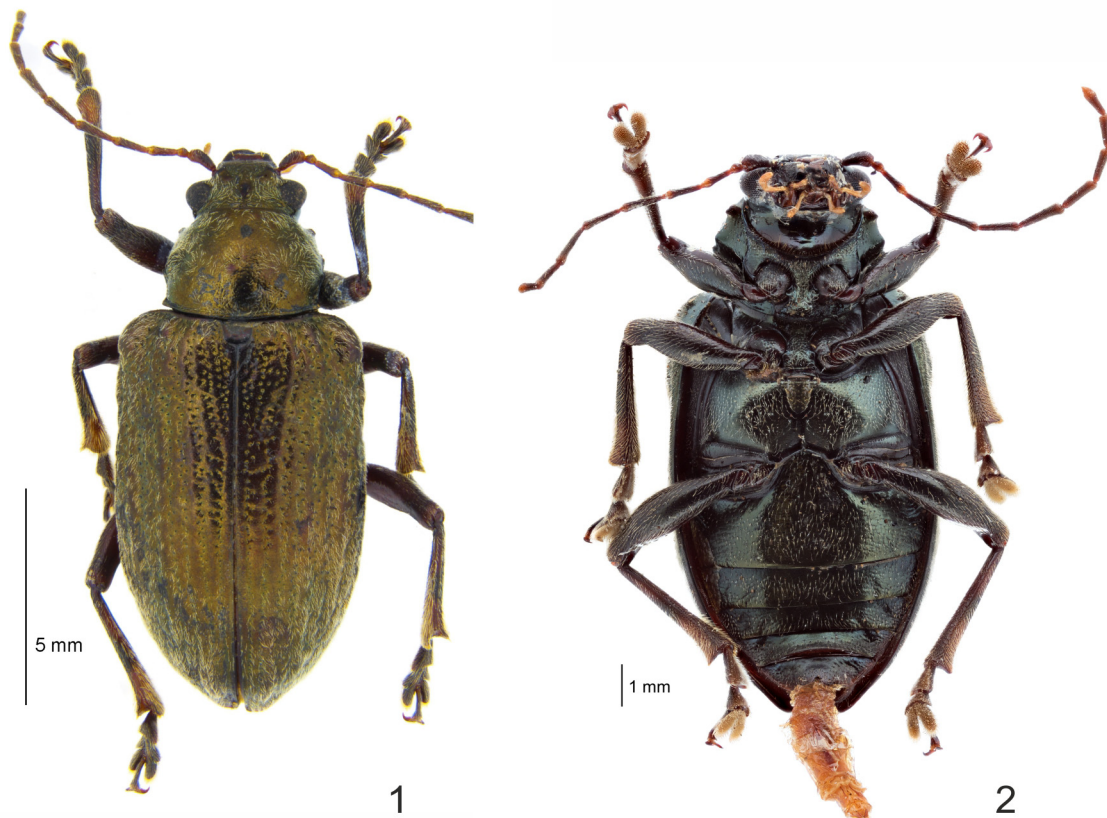
***Tyrannomolpus* gen. nov.**

Figs 1–31.

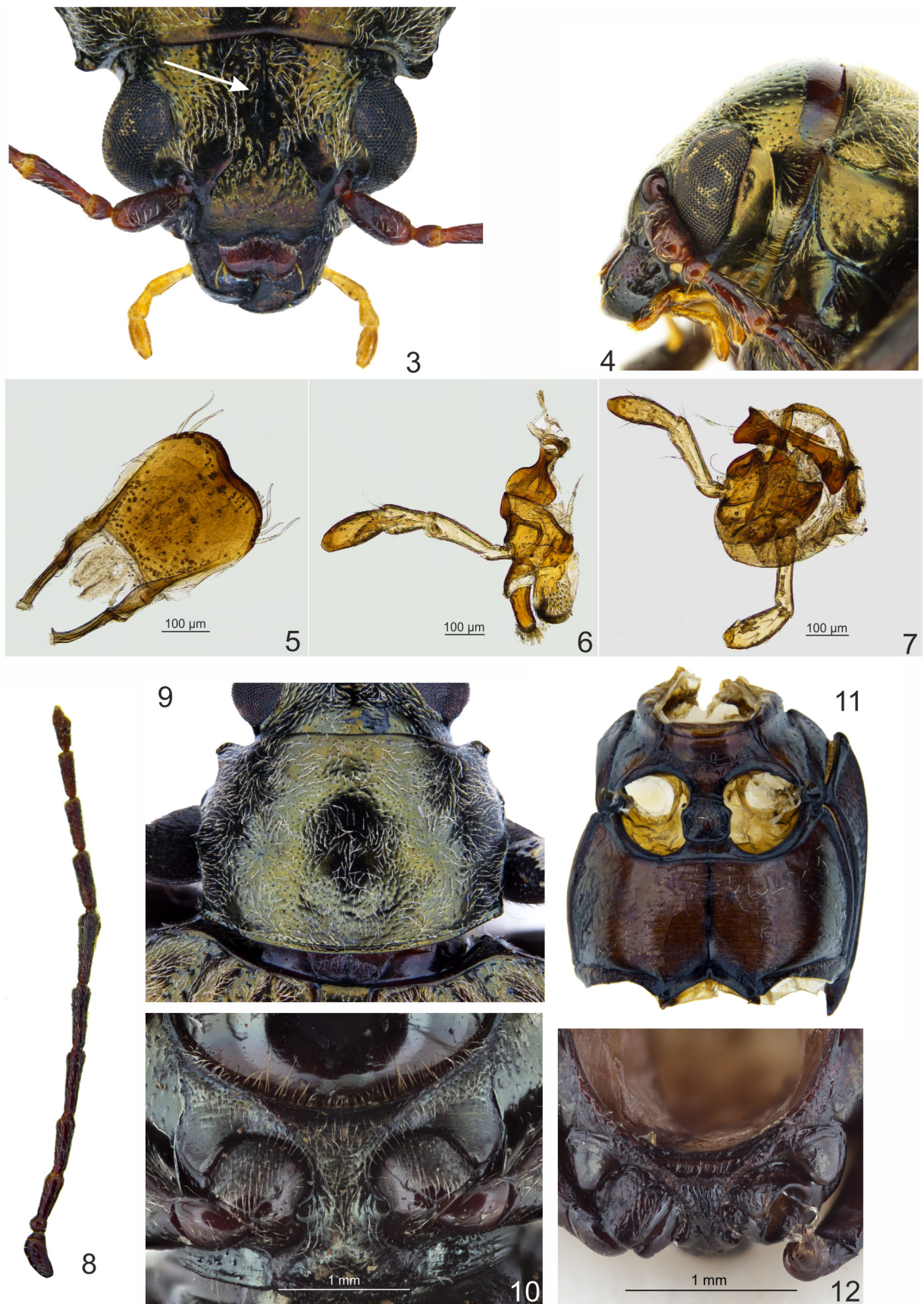
Type species: *Tyrannomolpus rex* spec. nov.

Diagnosis. Colour dark bronzy-greenish with metallic luster (Figs 1, 2). Vertex of head and dorsum setose (Fig. 3). Head with midcranial suture (Fig. 3). Pronotum (Fig. 9) widest at middle, converging anteriorly, lateral margin distinctly undulate; base without a row of dense punctures. Hypomera weakly convex medially. Prosternum anteriorly deflexed with leading edge hidden in ventral view; medially concave with distinct carinae confluent with sides of prosternal process, sexually dimorphic with male having a transverse anterior fovea, prosternal process with well-developed lateral coxal braces, apex expanded behind coxae with sides parallel-sided and depressed apically (Figs 10, 12). Procoxal cavities externally closed (Figs 2, 10). Elytra (Fig. 1) moderately convex, humeral calli present, elytral punctures arranged in 10 partially confused rows with weak carinae. Hind wings fully developed (Fig. 17). Dorsal shaft of meso- and metatibiae (Fig. 22) without groove along entire flank, excavation confined to apex and lacking dorsal carinae, tarsal claws appendiculate (Fig. 21). Pygidium (Fig. 18) medially with deep groove. Aedeagus (Figs 29–31) with tegmenal strut subequal in length to penis, basal hood and main body of penis subequal in length.

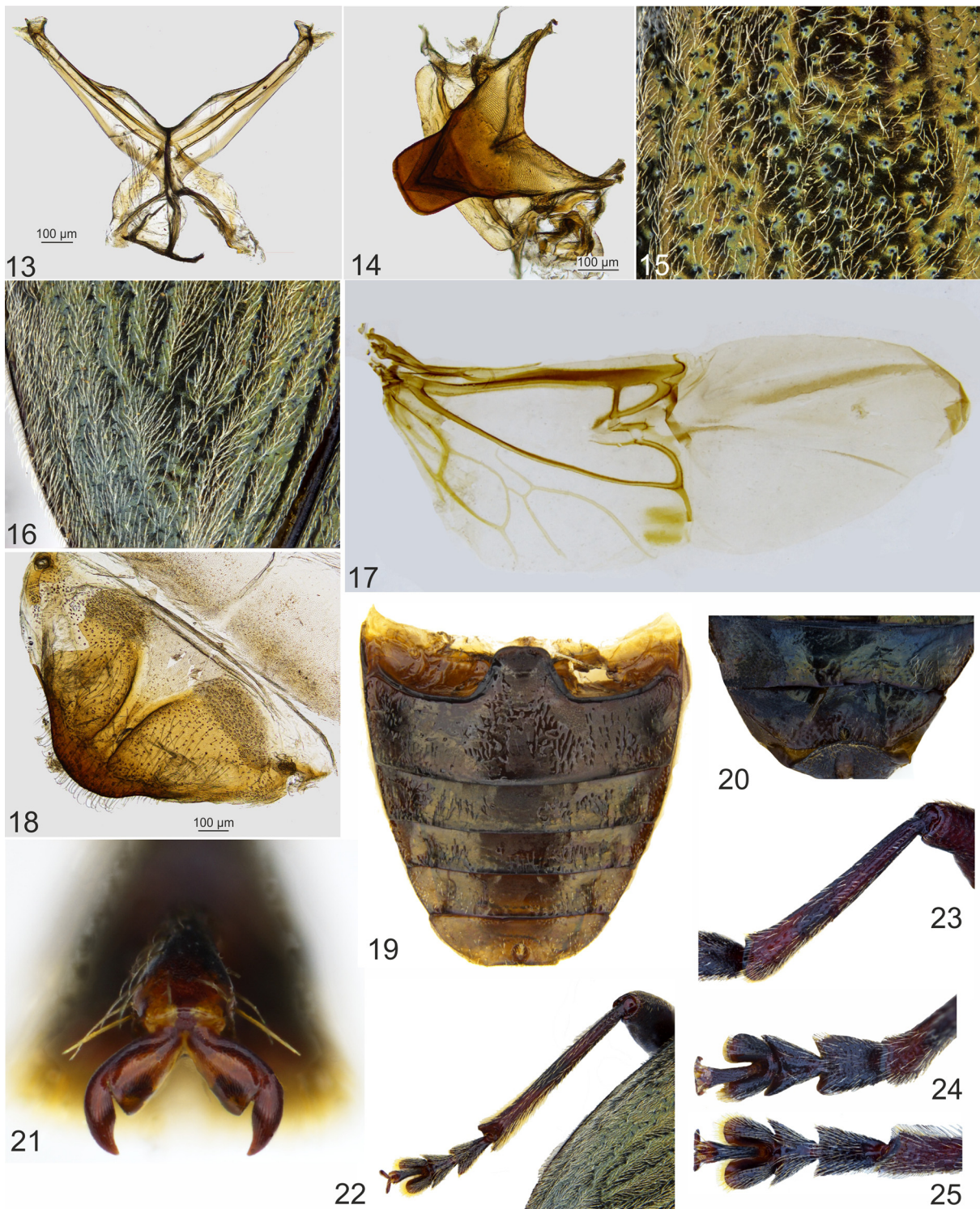
Description. Body (Figs 1, 2) elongate robust and broad, moderately convex; cuticle glabrous and dorsally setose (Figs 1, 9, 15, 16).



FIGURES 1, 2. *Tyrannomolpus rex*, gen. nov., spec. nov. general view; 1: dorsal; 2: ventral.



FIGURES 3–12. *Tyrannomolpus rex*, morphological details; 3: head, midcranial suture marked with white arrow; 4: head, left lateral; 5: labrum; 6: maxilla; 7: labium and labial palpi; 8: antenna; 9: pronotum dorsal; 10: prosternum; 11: mesoventrite, mesanepisternum, mesepimeron, metaventrite, metanepimeron; 12: prosternum, anterior view.



FIGURES 13–25. *Tyrannomolpus rex*, morphological details; 13: metendosternite; 14: mesonotum and scutellary shield dorsal; 15: elytral disc; 16: elytral apex; 17: hind wing right; 18: pygidium (tergum VII); 19: abdomen; 20: abdominal apex; 21: tarsal claws; 22: left hind leg; 23: right protibia; 24: protarsus male; 25: protarsus female.

Head (Fig. 3) with vertex wide, flat, with midcranial suture, covered with long and dense setae. Frons long, trapezoidal, flat, limited by thin grooves, anterior margin of frons emarginate with pair of short and acute processes, small portions of frons above antennal insertions convex; genae short, not longer than diameter of antennal insertion. Eyes (Fig. 4) large, elongate-elliptic, convex. Exposed part of labrum distinctly transverse, entire labrum weakly longer than wide (Fig. 5), anterior margin concave, anterolaterally with three long setae, labral plate with pair of pores; tormae shorter than labral plate. Mandibles large, strongly projecting. Maxillae (Fig.

6) large, lacinia broad, shorter than galea, the latter about twice longer than wide, apically with a bunch of dense setae, maxillary palp long, 4-segmented, palpomere 1 much shorter than following, palpomere 2 longer than following, about 3 times longer than wide, palpomere 3 and 4 equal in length, about twice longer than wide, last palpomere somewhat fusiform with truncated apex. Labium (Fig. 7) small, submentum and mentum short, transverse, labial palpi long, 3-segmented, palpomere 1 shortest, about as long as wide, palpomere 2 the longest, about 3 times longer than wide, palpomere 3 about 2.5 times longer than wide, conical with obtuse apex. Antennal insertions placed at the distance of diameter of insertions from margin of eye and anterior part of frons. Antennae (Fig. 8) long, filiform, 11-segmented, extending to middle of the body; scapus thickened and slightly curved, about twice longer than wide, antennomere 2 small, globose, antennomeres 3–10 long and thin, at least three times longer than wide or longer, last antennomere shorter than previous, hardly three times longer than wide.

Prothorax (Fig. 9) with pronotum transverse (1.20–1.42 times wider than long), convex, widest at middle, converging anteriorly; anterior margin straight in middle, lateral margins with two short angular projections, undulate, posterior margin convex, rounded; hind margin with a distinct bead, anterior angles protruding, with obtuse apex, posterior angles weakly protruding, acute, each angle bear setiferous pore; pronotal surface densely punctate, punctures small, bearing long setae, densest at sides, sparser at disc; base without a row of dense punctures. Prosternum (Figs 2, 10, 12) short in front of procoxae, much shorter than wide; anteriorly deflexed with leading edge hidden in ventral view; medially concave with distinct carinae confluent with the sides of the prosternal process, sexually dimorphic with male having a transverse anterior fovea, prosternal process with well-developed lateral coxal braces, apex expanded behind coxae with sides parallel-sided and depressed apically (Figs 10, 12) hypomera weakly convex medially, hypomeral suture distinct; prosternal process comparatively narrow, between coxae about twice narrower than diameter of coxa, strongly expanded behind coxae laterally and contacting the hypomeral process; procoxal cavities externally closed (Figs 2, 10); anterior margin straight.

Scutellary shield (Fig. 14) transverse and obtuse. Mesoventrite partly hidden by prosternum, T-shaped, flat, intercoxal process (Fig. 11) long and relatively narrow, longer than wide, apical half of process expanded, rectangular and elevated, apex straight; mesanepisternum triangular, nearly medially transversely impressed; mesepimeron narrow and long. Metaventrite long, as long as abdominal ventrite 1, convex, intercoxal metaventral process rather short, wide with nearly straight apex, posterior margin medially angularly and deeply emarginate and impressed; metanepimeron narrow, flat. Metendosternite (Fig. 13) with short and broad stalk, arms long, proximal half about twice wider than distal.

Elytra (Fig. 1) elongate (3.29–3.76 x longer than pronotal length) and broad (1.52–1.62 x the greatest elytral width), moderately convex, base 1.45 times wider than the combined based of the pronotum, lateral sides vertical; humeral calli large and projecting; elytral surface punctate (Fig. 15), punctures larger than those on pronotum, arranged in 10 long rows, punctures in rows somewhat confused and irregular, sutural row short, not reaching middle of elytra, of multiply, dense, confused punctures; intervals between rows convex, finely punctate, surface covered with dense setae (Fig. 16). Epipleura rather narrow and feebly concave, widest at base and visible in lateral view. Hind wings fully developed (Fig. 17).

Abdominal (Fig. 19) ventrite I moderately convex, intercoxal process long and wide, its apex triangularly-rounded; ventrites II–IV short, equal in length, much shorter than ventrite I, last ventrite nearly as long as previous or slightly longer, its margin rounded with straight apex, in male (Fig. 20) and evenly arcuate in female, subapically with a medial deep spherical setose fovea; pygidium (tergum VII) wide and relatively short, medially with wide and deep groove (Fig. 18), not reaching to apex.

Legs (Figs 1, 2, 22, 23) large and somewhat thin, femora lacking teeth, tibiae (Figs 22, 23) thin, gradually widened towards apex, dorsal shaft of tibiae with two thin longitudinal ridges, without groove along entire flank, tibial spur indistinct, apex of middle and hind tibiae weakly expanded in two short and thin blades, with excavation confined to apex and lacking dorsal carinae; tarsomere (Figs 22, 24, 25) I somewhat longer than following, triangular, its apex hardly narrower than apex of following, tarsomere II triangular with wide apex, tarsomere III widest, long, deeply bilobed, last tarsomere as long as first, weakly projecting from third, tarsal claws appendiculate (Fig. 21); tarsi of males (Fig. 24) slightly wider and broader than those of female (Fig. 25).

Aedeagus (Figs 29–31) with tegmenal strut (tegmen) subequal in length to penis, basal hood and main body of penis subequal in length; overall shape long and broad, weakly depressed dorsoventrally, slightly curved in lateral view, basal hood weakly sclerotized.

Ovipositor (Figs 26, 27) long; gonocoxites laterally compressed and somewhat crescent shaped, about 2 times

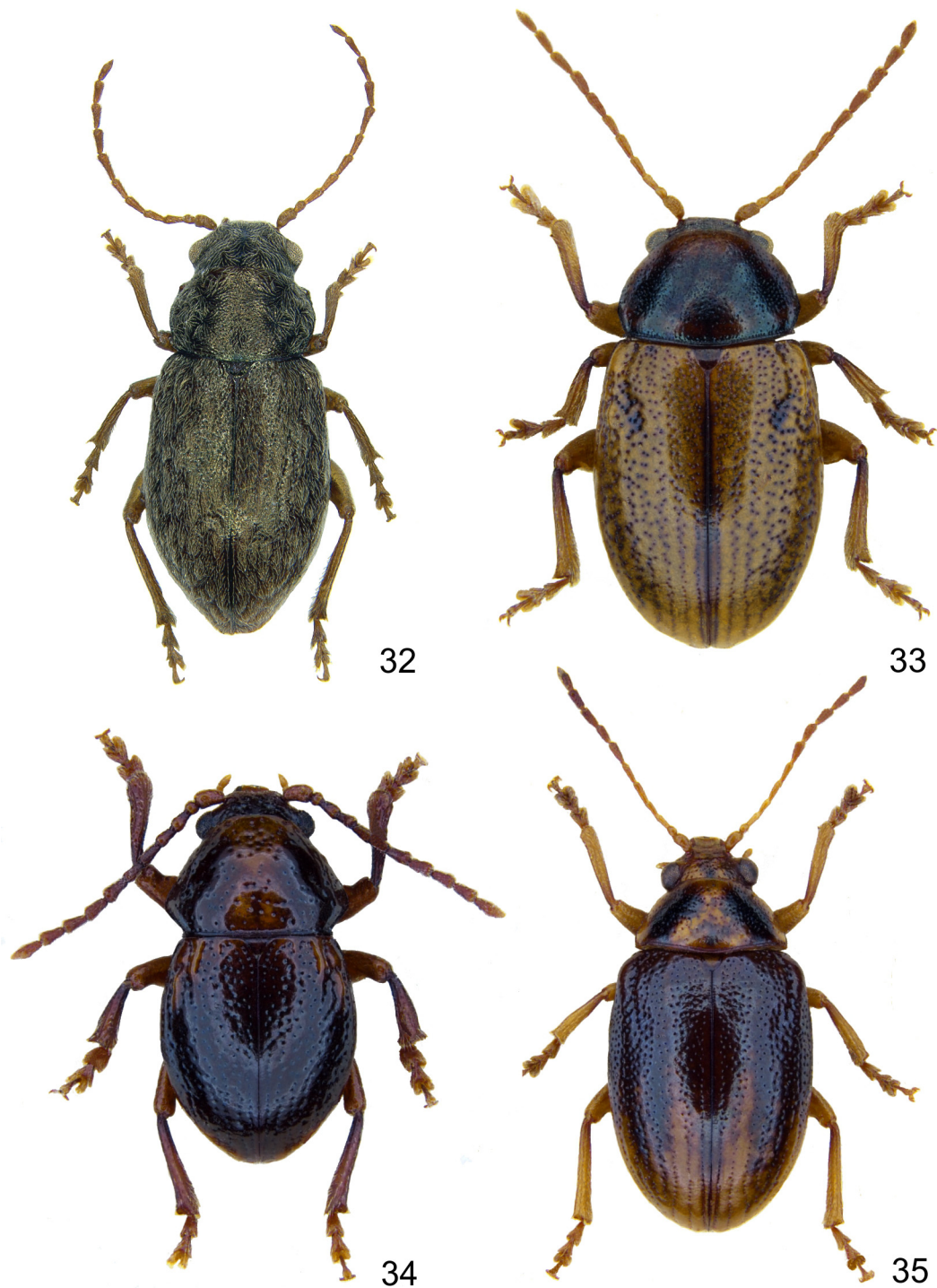
longer than wide and gradually expanded apically with short subapical gonostyli about the length of coxite. Spermatheca (Fig. 28) c-shaped.

Etymology. The genus name combines the dinosaur genus name *Tyrannosaurus* with the suffix “molpus, referring to the relatively large size of the new genus to other chrysomelids endemic to New Zealand. Gender masculine.



FIGURES 26–31. *Tyrannomolpus rex*, morphological details; 26: ovipositor; 27: gonocoxites; 28: spermatheca; 29: aedeagus ventral; 30: aedeagus lateral; 31: main body of penis ventral.

Comments. The attribution of the new genus to the tribe Eumolpini is based on the following combination of characters: simple apices of meso- and metatibiae, carinate and irregularly curved sides of prothorax, appendiculate tarsal claws, pygidium with a longitudinal medial groove, aedeagus with a constriction between a median lobe and a basal hood (after Chen 1940; Selman 1965; Moseyko & Kirejtshuk 2013). The eumolpines are in need in revision from most regions in the Pacific and Australia (Reid 2017), and *Tyrannomolpus* can be distinguished from most Australian (Chapuis 1874), New Caledonian (e.g., Gómez-Zurita & Cardoso 2014; Jolivet *et al.* 2007, 2009; Jolivet & Verma 2010; Samuelson 2010) and New Zealand eumolpine genera (Figs 32–35) by the prothorax that is narrower than the elytral base. This character is also present in at least one species of *Taophila* Heller from New Caledonia, but lacks the setose vestiture present in *Tyrannomolpus*. Morphologically, *Tyrannomolpus* is closest to *Pilacolaspis* (Fig. 32) from the mainland of New Zealand from which it differs by the much larger size (10.3 mm or more versus up to about 5.9 mm in *Pilacolaspis*) and undulate outline of the pronotum (simple in *Pilacolaspis*) as well as the longer eyes (length/width ratio is about 2, in *Pilacolaspis* 1.2), metaventrite as long as abdominal ventrite I (shorter in *Pilacolaspis*) and the vertex of head with a distinct midcranial suture.



FIGURES 32–35. New Zealand Eumolpinae; 32: *Pilacolaspis* sp., body length 5.1 mm; 33: *Atrichatus aeneicollis* Broun, body length 5.5 mm; 34: *Peniticus suffusus* Sharp, body length 4.6 mm; 35: *Eucolaspis* nr. *brunnea* (Fabricius), body length 4.1 mm.

The most notable feature of *Tyrannomolpus* is its large body size, which might be an example of island gigantism well known to vertebrates (e.g., Jaffe *et al.* 2011) and occurs among New Zealand invertebrates, including weevils (Buckley *et al.* 2015; Kuschel & Worthy 1996; Leschen & Rhode 2002). But the exact sister relationships of *Tyrannomolpus* among Melanesian Rift eumolpines is unknown, though it is most similar to *Pilacolaspis* based on similar elytral punctuation and pubescence (especially in the apical half). In a biogeographic analysis of the region, Ung *et al.* (2017) propose a sister relationship of the Three Kings with New Zealand, but

also that Australia is the sister to the Melanesian Rift with New Caledonia and the Loyalty Islands at the base. We may predict that *Tyrannomolpus* may indeed be related to the New Zealand *Pilacolaspis*, but at present, phylogenetic relationships among eumolpines are incomplete (e.g., Papadopoulou *et al.* 2013), though strides in the taxonomic and phylogenetic relationships of the New Caledonia fauna have been made recently (e.g., Gómez-Zurita 2011 and references above) while discussions about its origin are mostly verbal (Jolivet *et al.* 2008a,b) and require a complete phylogenetic backbone to understand the evolution of the group.

Tyrannomolpus is known by only by a few specimens, and the single specimen with plant host data indicate it was collected at night on *Meryta sinclairii*, referred to as Puka, a tree that is endemic to the Three Kings Islands and now planted commonly in gardens on the mainland. Despite further collecting to the islands, including a short visit by the second author in 2008 to Great Island with the intention to re-collect this and other rare endemic species (see Buckley & Leschen 2013), there are no other specimens we know in existence. Additional surveys are needed to determine whether the species is still thriving on the islands.

***Tyrannomolpus rex* spec. nov.**

Figs 1–31.

Description. Length—9.7–11.9 mm ($x = 11.1$ mm; $n = 5$), greatest depth at abdomen - 3.6–3.8 mm. Dorsum (Fig. 1) shining, with dark bronzy-greenish luster; antennae and legs reddish-brown; underside brownish with metallic luster. Vertex and frons (Fig. 3) covered with large and dense punctures with some interstices wrinkled. Pronotum (Fig. 9) covered with punctures of different size, dense, not larger than those on head. Scutellary shield (Fig. 14) covered with small and sparse punctures. Elytral punctation (Figs 15, 16) larger than pronotal, setae sparse at disc and much denser at lateral sides and apical portion. Apical third of tibiae covered with dense and long yellowish setae. Aedeagus (Figs 29–31) long and broad, weakly depressed dorsoventrally, basal hood constitutes the half of aedeagal length, main body of penis gradually widened towards apex, apex nearly straight with well-developed, sharp triangular tip; in lateral view (Fig. 30) slightly curved, apical half with equal width, apex thin, apical tip acute. Spermatheca (Fig. 28) small, c-shaped, strongly curved and thick, proximal and distal parts of spermathecal capsule not delimited.

Etymology. The species name is derived from "rex" (Latin—king), and refers to the only known locality of new genus, the Three Kings Islands.

Host. A single specimen was collected at night from *Meryta sinclairii* (Hook. f.) Seem. (Araliaceae).

Distribution. The Three Kings Islands, northwest of North Island of New Zealand.

Type material. The type material is deposited in the New Zealand Arthropod Collection, Auckland (NZAC).

Holotype: male (NZAC): mounted on large card [left antennomere 11 with missing apex], "Great Island Three Kings / 1–3.1.63 E. S. Gourley / *Pilocolaspis elephantopus* Gourley Det. E. S. Gourley n. sp. 1963 [partly in E. S. Gourley hand] / E.S. Gourley Acc. 1970 Ent. Div.

Paratypes (NZAC): 1, male [pinned with abdomen removed and carded separately with genitalia missing], Three Kings Is. Great I. Nov. 70 NZ. Ent. Div. Ex. / Castaway Camp; 1, female [mounted dorsally, left antennomeres 8–11 and right antennomeres 9–11 missing, same but, J. C. Watt; 1 male [completely dissected with parts on 2 cards and in 2 genitalia vials], same, but G. Ramsay, on *Meryta* leaf at night [G. Ramsay, hand]; 1 male, same but, Tasman Valley / n. gen. Colaspini prob. not *Pilocolaspis* [G. Kuschel, hand].

Key to genera of Eumolpinae of New Zealand

- | | | |
|------|--|---|
| 1 | Dorsum pubescent. | 2 |
| - | Dorsum asetose | 3 |
| 2(1) | Pronotal lateral carina simple in dorsal view, at most weakly angulate and converging posteriorly in some species, eyes shortly-elliptic, elytral base hardly wider than pronotal base, length not exceeding 5 mm, metaventricle shorter than abdominal ventrite 1, colouration brownish-yellowish typically without metallic luster (may be weakly present in some specimens) | <i>Pilacolaspis</i> (Fig. 32) |
| - | Pronotal lateral carina undulate in dorsal view, eyes elongate-elliptic, elytral base much wider than pronotal base, length over 10 mm, metaventricle as long as abdominal ventrite 1, colouration dark-green with metallic luster | <i>Tyrannomolpus</i> gen. nov. (Figs 1, 2) |

- 3(1) Lateral margin of pronotum strongly angularly projected, outline of elytra curved with humeral calli reduced *Peniticus* (Fig. 34)
- Lateral margin of pronotum rounded or narrowed at base, outline of elytra more or less parallel-sided with humeral calli well-developed, base of elytra wider than base of pronotum, elytra weakly convex and, gradually narrowed toward apex 4
- 4(3) Base of pronotum with a row of dense punctures, vertex of head covered with sparse and short setae, meso- and metatibiae generally more deeply and widely excavated *Atrichatus* (Fig. 33)
- Base of pronotum without a row of dense punctures, vertex of head glabrous, meso- and metatibiae generally moderately to weakly excavated *Eucolaspis* (Fig. 35)

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References

- Beutel, R.G. & Lawrence, J.F. (2005) 4. Coleoptera, Morphology. In: Beutel, R.G. & Leschen, R.A.B. (Eds.), *Handbook of Zoology, Arthropoda: Insecta, Coleoptera, Beetles. Vol. 1. Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim)*, Walter De Gruyter, Berlin, New York, pp. 23–27.
- Bryant, G.E. & Gressitt, J.L. (1957) Chrysomelidae of Fiji. *Pacific Science*, 9, 3–91.
- Buckley, T.B. & Leschen, R.A.B. (2013) Comparative phylogenetic analysis reveals long-term isolation of lineages on the Three Kings Islands, New Zealand. *Biological Journal of the Linnean Society*, 106, 361–377.
<https://doi.org/10.1111/j.1095-8312.2012.02009.x>
- Buckley, T.B., Krosch, M. & Leschen, R.A.B. (2015) Evolution of New Zealand insects: summary and prospectus for future research. *Austral Entomology*, 54, 1–27.
<https://doi.org/10.1111/aen.12116>
- Chapuis, F. (1874) *Histoire Naturelle des Insectes. Genera des Coléoptères. X. Phytophages*. Librairie Encyclopédique de Roret, Paris, iv + 455 pp.
- Chen, S.H. (1940) Notes on Chinese Eumolpidae. *Sinensia*, 11, 483–528.
- Craw, R.C. & Watt, J.C. (1987) An Upper Cretaceous beetle (Coleoptera) from Hawkes Bay, New Zealand. *Journal of the Royal Society of New Zealand*, 32, 395–398.
<https://doi.org/10.1080/03036758.1987.10426480>
- Doddala, P.R.C., Minor, M.A., Rogers, D.J. & Trewick, S.A. (2015) Fifteen into three does go: morphology, genetics and genitalia confirm taxonomic inflation of New Zealand beetles (Chrysomelidae: Eucolaspis). *PLoS ONE*, 10 (11), 1–19.
<https://doi.org/10.1371/journal.pone.0143258>
- Doddala, P.R.C., Trewick, S.A., Rogers, D.J. & Minor, M.A. (2013) Predictive modelling of adult emergence in a polyphagous *Eucolaspis* (Chrysomelidae: Eumolpinae) leaf beetle. *Journal of Economic Entomology*, 106 (2), 899–904.
<https://doi.org/10.1603/EC12363>
- Gómez-Zurita, J. & Cardoso, A. (2014) Systematics of the New Caledonian endemic genus *Taophila* Heller (Coleoptera: Chrysomelidae, Eumolpinae) combining morphological, molecular and ecological data, with description of two new species. *Systematic Entomology*, 39 (1), 111–126.
<https://doi.org/10.1111/syen.12038>
- Gómez-Zurita, J. (2011) Revision of New Caledonian species of Eumolpinae described by K.M. Heller (Coleoptera: Chrysomelidae). *Zootaxa*, 3060, 31–46.
- Jaffe, A.L., Slater, G.J. & Alfaro, M.E. (2011) The evolution of island gigantism and body size variation in tortoises and turtles. *Biology Letters*, 7 (4), 558–561.
<https://doi.org/10.1098/rsbl.2010.1084>
- Jolivet, P. & Verma, K.K. (2008a) Eumolpinae—a widely distributed and much diversified subfamily of leaf beetles (Coleoptera, Chrysomelidae). *Terrestrial Arthropod Reviews*, 1, 3–37.
<https://doi.org/10.1163/187498308X345424>
- Jolivet, P. & Verma, K.K. (2008b) On the origin of the chrysomelid fauna of New Caledonia. In: Jolivet, P., Santiago-Blay, J. & Schmitt, M. (Eds.), *Research on Chrysomelidae. Vol. 1*. Brill Publishers, Leiden, pp. 308–319.
- Jolivet, P. & Verma, K.K. (2010) Biogeography and Biology of the New Caledonian Chrysomelidae (Coleoptera). In: Jolivet, P., Santiago-Blay, J. & Schmitt, M. (Eds.), *Research on Chrysomelidae. Vol. 2*. Brill Publishers, Leiden, pp. 211–223.
- Jolivet, P., Lawrence, J.F., Verma, K.K. & Ślipiński, A. (2014) 2.7.3 Eumolpinae C.G. Thomson, 1859. In: Leschen, R.A.B. & Beutel, R.G. (Eds.), *Handbook of Zoology, Arthropoda: Insecta, Coleoptera, Beetles. Vol. 3. Morphology and Systematics (Phytophaga)*. Walter De Gruyter, Berlin, New York, pp. 217–225.

- Jolivet, P., Verma, K. & Mille, C. (2007) New species of Eumolpinae from the genera *Dematochroma* Baly, 1864 and *Taophila* Heller, 1916 from New Caledonia (Coleoptera: Eumolpinae). *Revue Française d'Entomologie*, New Series, 29 (1), 33–47.
- Jolivet, P., Verma, K. & Mille, C. (2009) Eumolpinae recently collected in New Caledonia and Vanuatu (Coleoptera, Chrysomelidae). *Nouvelle Revue d'Entomologie*, New Series, 26 (1), 4–17.
- Kuschel, G. (1990) Beetles in a suburban environment: a New Zealand case study. The identity and status of Coleoptera in the natural and modified habitats of Lynfield, Auckland (1974–1989). *DSIR Plant Protection Report*, 3 (1), 1–118.
- Kuschel, G. & Worthy, T.H. (1996) Past distribution of large weevils (Coleoptera: Curculionidae) in the South Island, New Zealand, based on Holocene fossil remains title. *New Zealand Entomologist*, 19, 15–19.
<https://doi.org/10.1080/00779962.1996.9722016>
- Lawrence, J.F., Beutel, R.G., Leschen, R.A.B. & Ślipiński, A. (2010) 2. Glossary of morphological terms. In: Leschen, R.A.B., Beutel, R.G. & Lawrence, J.F. (Eds.), *Handbook of Zoology, Arthropoda: Insecta, Coleoptera, Beetles. Vol. 2. Morphology and Systematics (Elateroidea, Bostrichiformia, Cucujiformia partim)*. Walter De Gruyter, Berlin, New York, pp. 9–20.
- Leschen, R.A.B. & Rhode, B.E. (2002) A new genus and species of large extinct Ulodidae (Coleoptera) from New Zealand. *New Zealand Entomologist*, 25, 57–64.
<https://doi.org/10.1080/00779962.2002.9722095>
- Mortimer, N., Herzer, R.H., Gans, P.B., Parkinson, D.L. & Seward, D. (1998) Basement geology from Three Kings Ridge to West Norfolk Ridge, southwest Pacific Ocean: evidence from petrology, geochemistry and isotopic dating of dredge samples. *Marine Geology*, 148, 135–162.
[https://doi.org/10.1016/S0025-3227\(98\)00007-3](https://doi.org/10.1016/S0025-3227(98)00007-3)
- Moseyko, A.G. & Kirejtshuk, A.G. (2013) On the taxonomic position of new taxa of the subfamily Eumolpinae (Coleoptera, Chrysomelidae) from Baltic amber. *Terrestrial Arthropod Reviews*, 6, 163–172.
<https://doi.org/10.1163/18749836-06021063>
- Papadopoulou, A., Cardoso, A. & Gómez-Zurita, J. (2013) Diversity and diversification of Eumolpinae (Coleoptera: Chrysomelidae) in New Caledonia. *Zoological Journal of the Linnean Society*, 168 (3), 473–495.
<https://doi.org/10.1111/zoj.12039>
- Reid, C.A.M. (2017) Australopapuan leaf beetle diversity: the contributions of hosts plants and geography. *Austral Entomology*, 56 (2), 123–137
<https://doi.org/10.1111/aen.12251>
- Samuelson, G.A. (2010) Review of *Taophila*, a genus endemic to New Caledonia (Coleoptera: Chrysomelidae: Eumolpinae). *Zootaxa*, 2621, 45–62.
- Schellart, W.P. (2006) Fitting Northland, New Caledonia and d'Entrecasteaux geology into the Late Cretaceous–Cenozoic Southwest Pacific tectonic framework. In: AESC Extended Abstracts 2006, Melbourne, Australia. Available from: <http://www.publish.csiro.au/ex/ASEG2006ab157> (accessed 10 February 2017)
- Selman, B.J. (1965) A revision of *Nodini* and a key to the genera of Eumolpidae of Africa (Coleoptera: Eumolpidae). *Bulletin of the British Museum of Natural History, Entomology*, 16, 141–174.
<https://doi.org/10.5962/bhl.part.21864>
- Shaw, S. (1957) A revision of the New Zealand genera *Eucolaspis* Sharp and *Atrichatus* Sharp (Coleoptera: Chrysomelidae) with descriptions of two new species. *Annals and Magazine of Natural History*, 12 (10), 641–655.
<https://doi.org/10.1080/00222935708656008>
- Théry, T. & Leschen, R.A.B. (2013) Pselaphinae (Coleoptera: Staphylinidae) of the Three Kings Islands. *New Zealand Entomologist*, 36 (1), 37–64.
<https://doi.org/10.1080/00779962.2012.758028>
- Ung, V., Michaux, B. & Leschen, R.A.B. (2017) A comprehensive vicariant model for Southwest Pacific biotas. *Systematic Botany*, 29 (60), 424–439.