Neptihormius gen. nov. (Hymenoptera: Braconidae: Hormiinae), a parasitoid of Nepticulidae (Lepidoptera) from New Zealand

C. van Achterberg & J. Berry

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C. van Achterberg, Afdeling Entomologie (Hymenoptera), Nationaal Natuurhistorisch Museum, Postbus 9517, 2300 RA Leiden, The Netherlands (e-mail: achterberg@naturalis.nnm.nl).
J. Berry, New Zealand Arthropod Collection, Landcare Research, Private Bag 92 170, Auckland, New Zealand (e-mail: BerryJ@landcareresearch.co.nz).

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Neptihormius gen. nov. (type species *Neptihormius stigmellae* spec. nov. from New Zealand) is described and illustrated. It is a parasitoid of Nepticulidae and the first record of Nepticulidae as host for a member of the subfamily Hormiinae and of basal cyclostome Braconidae.

Introduction

The worldwide subfamily Hormiinae Foerster, 1862, s.l. is a diverse assemblage of external parasitoids of larval Lepidoptera, Coleoptera and less commonly of Hymenoptera and Diptera. It is probably a polyphyletic assemblage; the Australasian part of the Hormiinae (here referred to as the tribe Austrohormiini Belokobylskij, 1993, including Canberriini Belokobylskij, 1993) does not fit well in the Hormiinae (van Achterberg, 1995) and with DNA-analysis does not cluster with the tribe Hormiini Foerster (D.L.J. Quicke, pers. comm.) but comes near the most basal group of the family Braconidae Nees, 1811, the subfamilies Mesostoinae van Achterberg, 1975, and Aphidiinae Haliday, 1833 (Belshaw et al., 2000). The biology of the Austrohormiini was previously unknown; in this paper a new genus is described from New Zealand, which has been reared from an undescribed *Stigmella* species (Lepidoptera: Nepticulidae). Nepticulidae have a specialized guild of braconid parasitoids belonging to the subfamilies Gnamptodontinae Fischer, 1970, Miracinae Viereck, 1918, Dirrhopinae van Achterberg, 1984, and part of the Cheloninae Foerster, 1862 (tribe Adeliini Viereck, 1918), and of the Ichneutinae Foerster, 1862 s.l. (tribe Muesebeckiini Mason, 1969); all members are as far as known (almost) exclusively parasitoids of Nepticulidae. Outside these groups (and including the Austrohormiini) very few species of Braconidae seem to use Nepticulidae as hosts, e.g., the records for *Colastes braconius* Haliday, 1833 (subfamily Exothecinae Foerster, 1862) seem to be genuine; it is an extremely polyphagous idiobiont ectoparasitoid that seems to attack any leaf mining larva encountered in trees, shrubs or herbs! However, most or all of the other records (concerning members of the genera *Apanteles* Foerster, 1862; *Aphidius* Nees, 1819; *Bracon* Fabricius, 1804, *Centistes* Haliday, 1835; *Charmon* Haliday, 1833; *Microgaster* Latreille, 1804, and possibly also of *Oncophanes* Foerster, 1862) are erroneous. Many of these are reported in two papers by Szöcs (Szöcs, 1965, 1979).

Neptihormius stigmellae spec. nov. is the second endemic hormiine species described from the poorly known New Zealand braconid fauna, the first is *Austrohormius punctatus* van Achterberg, 1995 (van Achterberg, 1995; figs 15-24). The small genus *Austrohormius* Belokobylskij, 1989, is known from Australia and New Zealand; *Neptihormius* gen. nov. only from New Zealand. It is interesting to note that both the parasitoid described below and its host belong to basal groups within the Braconidae and Lepidoptera, respectively.

The new genus runs in the key by van Achterberg (1995) to the genus *Hormiitis* van Achterberg, 1995, despite the normal scutellar sulcus, the rather weakly sclerotized third metasomal tergite and the comparatively large pronotum. They can be separated from each other as follows:

1. Femora and tibia comparatively robust (fig. 26); posteriorly scutellar sulcus with triangular protrusion (fig. 27); mesonotum protruding over pronotum (fig. 30); pronotum reduced anteriorly and without transverse carina (fig. 30); prepectal carina reduced ventrally; vein r of fore wing oblique (fig. 25); fore basitarsus robust (fig. 31); propodeum shortened (fig. 30); Australia ..... ***Hormiitis*** van Achterberg, 1995
- Femora and tibia slender (fig. 7); scutellar sulcus evenly curved posteriorly, without protrusion (figs 5, 42); mesonotum normal, not protruding over pronotum (fig. 10); pronotum distinctly developed anteriorly and with a strong transverse carina (figs 5, 6, 42); prepectal carina complete ventrally; vein r of fore wing vertical (fig. 1); fore basitarsus slender (fig. 4); propodeum normal (figs 10, 43); New Zealand ..... ***Neptihormius*** gen. nov.

For the identification of the subfamily Hormiinae s.l., see van Achterberg (1993, 1997), for a key to the genera, see van Achterberg (1995) and for the terminology used in this paper, see van Achterberg (1988).

Abbreviations: NZAC stands for the New Zealand Arthropod Collection, Auckland, New Zealand and RMNH for the National Museum of Natural History, Leiden, The Netherlands.

Descriptions

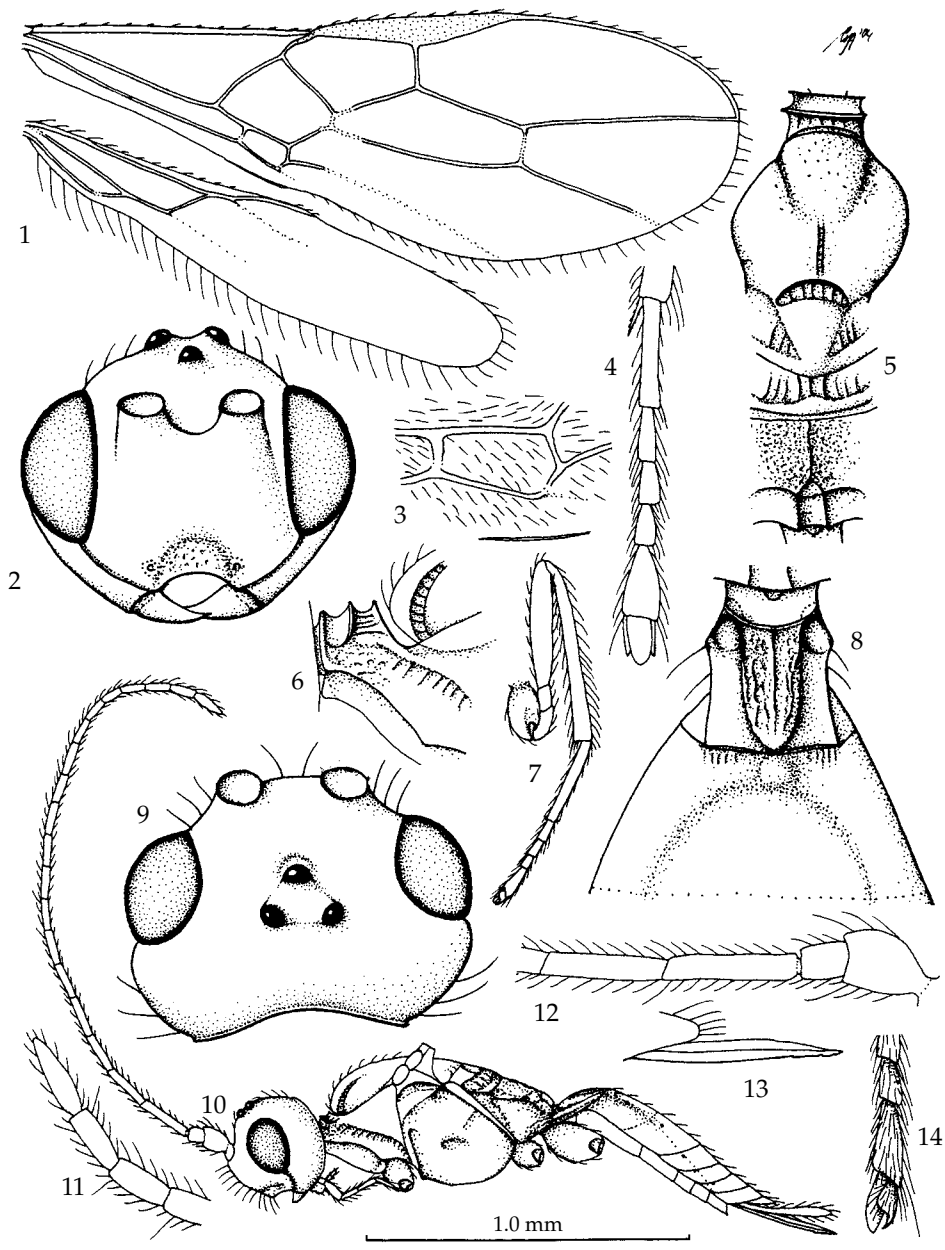
Neptihormius gen. nov.

(figs 1-14, 39-44)

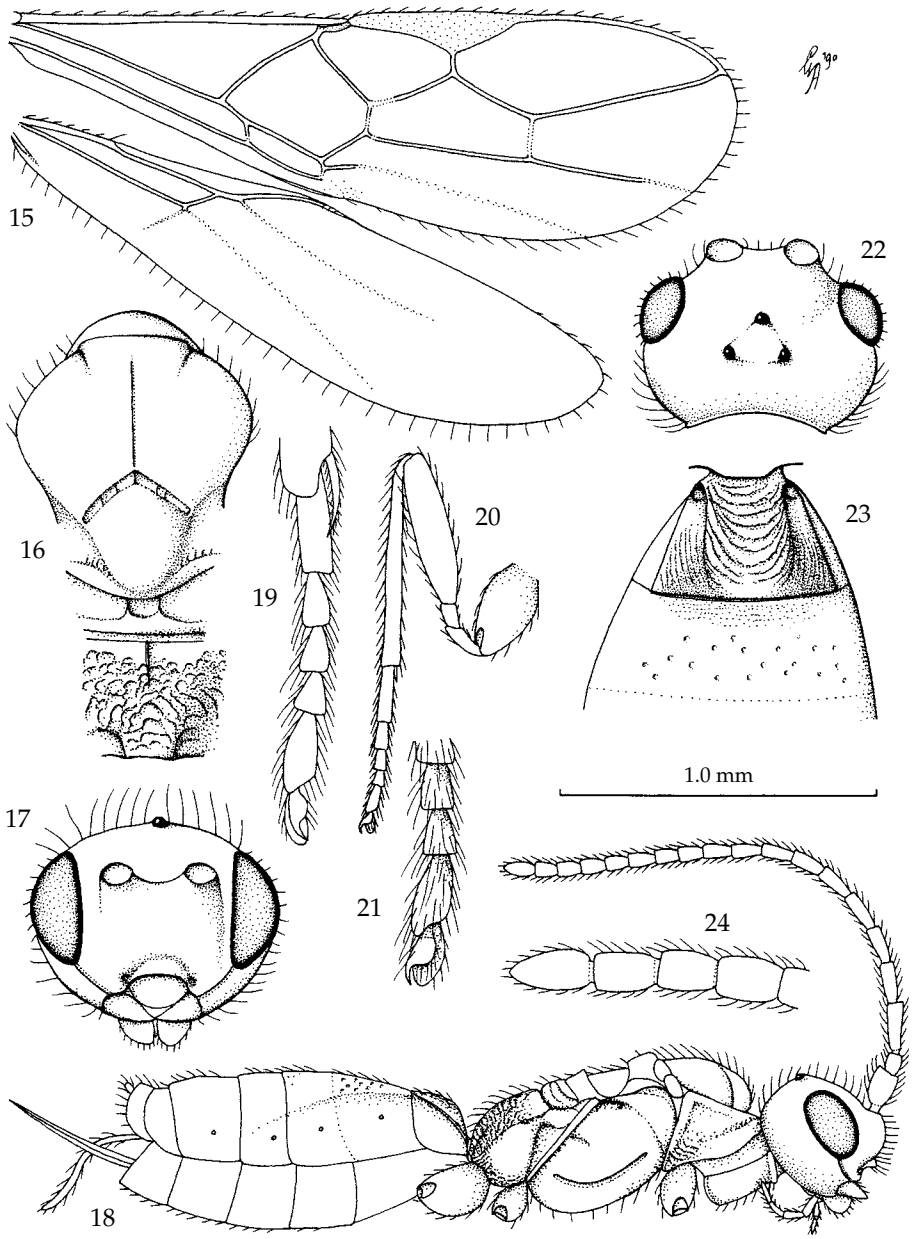
Type species.— *Neptihormius stigmellae* spec. nov.

Etymology.— Combination of the host family name "Nepticulidae" with the generic name "*Hormius*" (= *Hormius* Nees, 1819) for its superficial similarity. Gender: masculine.

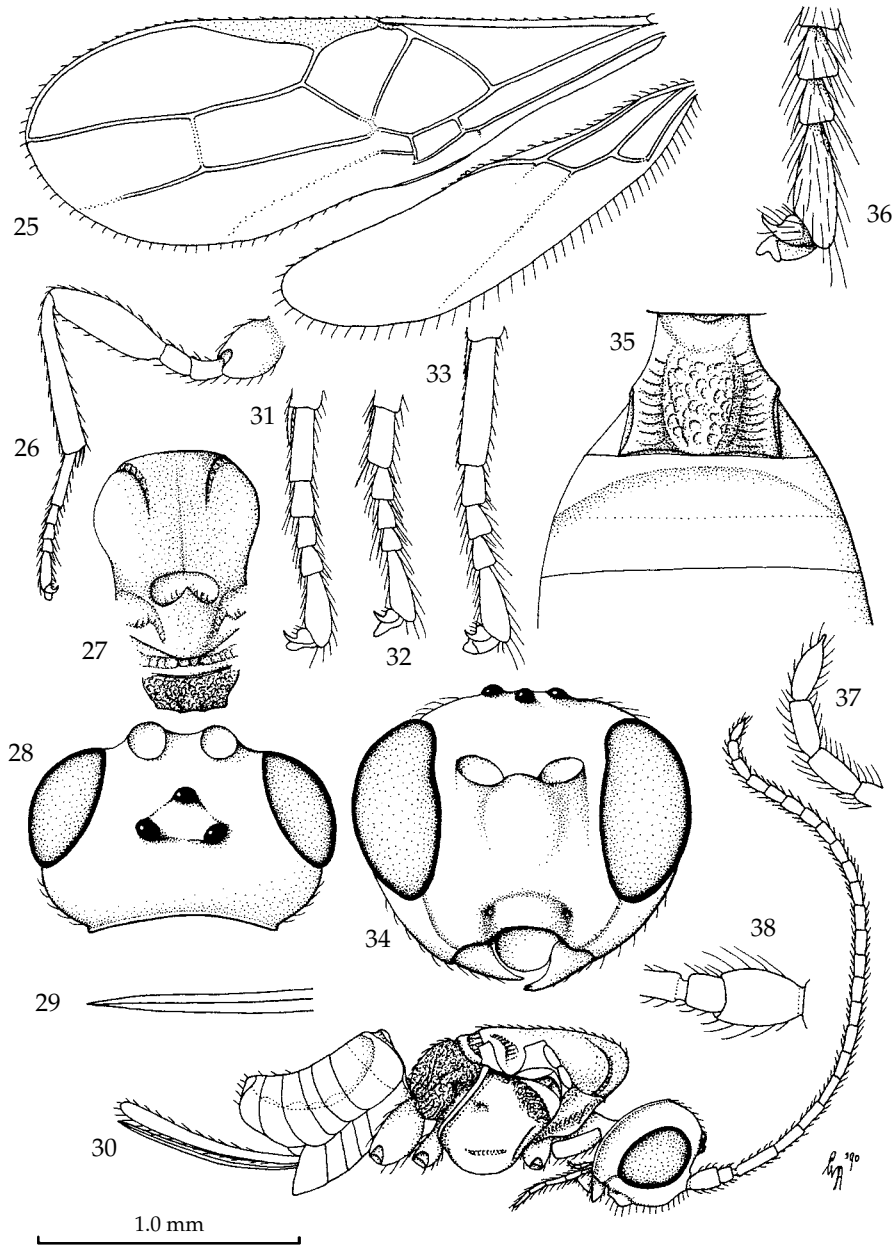
Diagnosis.— Head smooth dorsally; antenna with 21-22 segments; scapus ovoid, distinctly longer than pedicellus (fig. 12); maxillary and labial palpi with 6 and 4 segments, respectively; ocelli in equilateral triangle; eye large and at inner side without emargination (fig. 2); temple roundly narrowed behind eye (fig. 9); ventrally clypeus not protruding outwards (fig. 10); labrum nearly flat, glabrous; occipital carina complete and connected to hypostomal carina ventrally, rather far above and behind base of mandible, with occipital flange narrow (fig. 10) and hypostomal carina weakly developed; malar space medium-sized (fig. 2); malar suture present; pronotum distinctly developed anteriorly and with a strong transverse carina medially (figs 5, 6);



Figs 1-14, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, holotype. 1, wings; 2, head, anterior aspect; 3, first subdiscal cell of fore wing; 4, fore tarsus, dorsal aspect; 5, mesosoma, dorsal aspect; 6, pronotum, lateral aspect; 7, hind leg; 8, first and second metasomal tergites, dorsal aspect; 9, head, dorsal aspect; 10, habitus, lateral aspect; 11, apex of antenna; 12, basal segments of antenna; 13, ovipositor, lateral aspect; 14, outer hind claw. 1, 7, 10: 1.0 × scale-line; 2, 8, 9: 2.3 ×; 3, 4, 6, 11-14: 2.5 ×; 5: 1.6 ×.



Figs 15-24, *Austrohormius punctatus* van Achterberg, ♀, holotype, 15, wings; 16, mesosoma, dorsal aspect; 17, head, anterior aspect; 18, habitus, lateral aspect; 19, fore tarsus, lateral aspect; 20, hind leg; 21, outer hind claw; 22, head, dorsal aspect; 23, first and second metasomal tergites, dorsal aspect; 24, apex of antenna. 15, 18, 20: 1.0 × scale-line; 16, 17, 22, 23: 1.6 ×; 19, 21, 24: 2.5 ×.



Figs 25-38, *Hormiitis brevitarsis* van Achterberg, ♀, holotype. 25, wings; 26, hind leg; 27, mesosoma, dorsal aspect; 28, head, dorsal aspect; 29, apex of ovipositor, lateral aspect; 30, habitus, lateral aspect; 31, fore tarsus, lateral aspect; 32, middle tarsus, lateral aspect; 33, hind tarsus, lateral aspect; 34, head, anterior aspect; 35, first-third metasomal tergites, dorsal aspect; 36, inner hind claw; 37, apex of antenna; 38, detail of scapus and pedicellus, lateral aspect. 25, 26, 30: 1.0 × scale-line; 27: 1.2 ×; 28, 33-35: 2.0 ×; 29, 31, 32, 37, 38: 2.5 ×; 36: 2.9 ×.

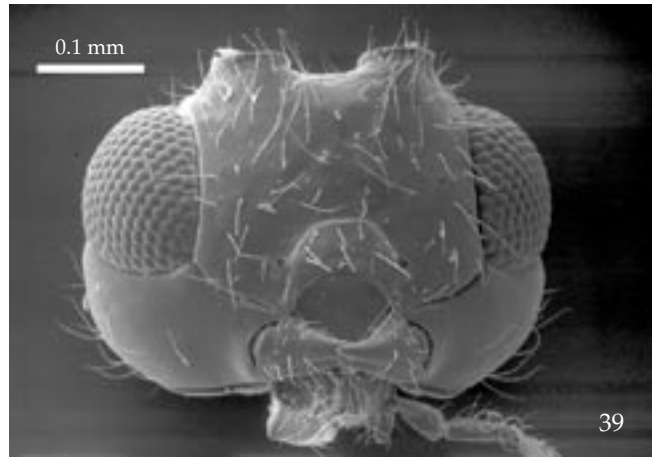


Fig. 39, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, paratype. SEM photograph of head, anterior aspect.

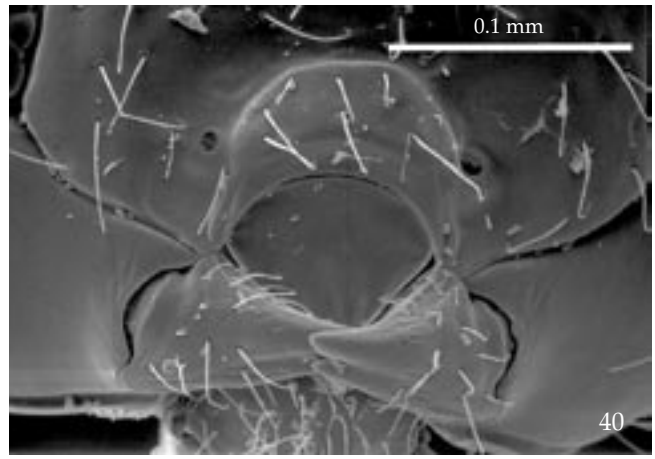


Fig. 40, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, paratype. SEM photograph of clypeus and hypoclypeal depression, anterior aspect.

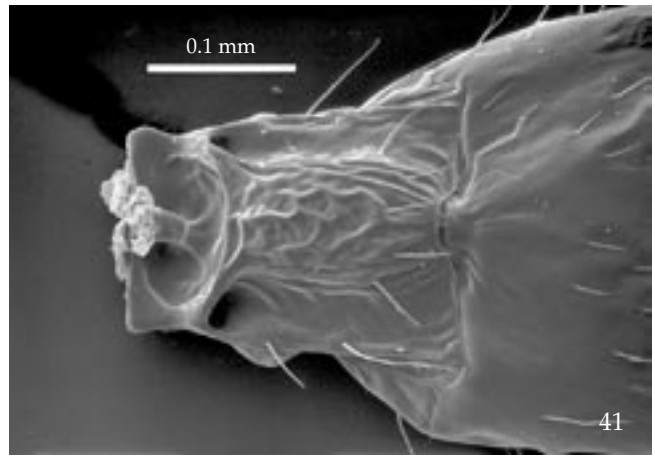


Fig. 41, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, paratype. SEM photograph of first metasomal tergite, dorsal aspect.

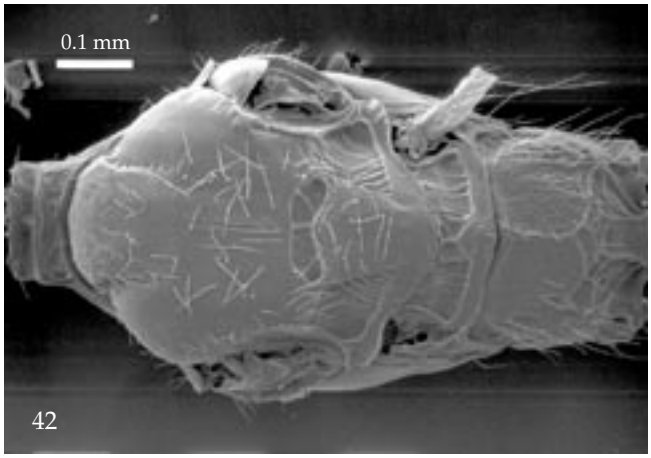


Fig. 42, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, paratype. SEM photograph of mesosoma, dorsal aspect.

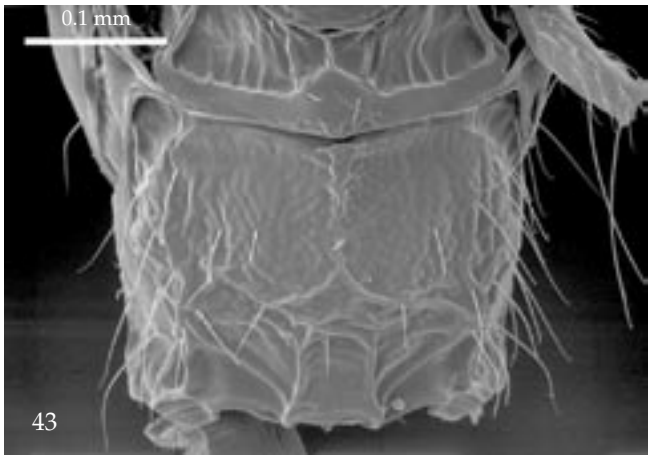


Fig. 43, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, paratype. SEM photograph of propodeum, dorsal aspect.

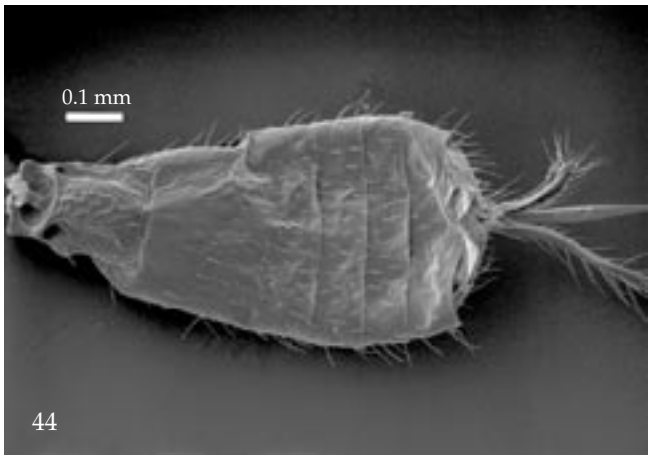


Fig. 44, *Neptihormius stigmellae* gen. nov. & spec. nov., ♀, paratype. SEM photograph of metasoma, dorsal aspect.

antescutal depression deep and narrow (fig. 6); mesonotum normal, not protruding over pronotum (fig. 10); anterior subalar depression with a short carina; prepectal carina complete; pronope absent; precoxal sulcus absent except for a smooth medial depression (fig. 10); pleural sulcus mainly smooth, but ventrally indistinctly crenulate; mesoscutum largely glabrous laterally, notauli only anteriorly distinctly developed, narrow and crenulate; mesoscutum medio-posteriorly with a shallow and narrow groove bordered by a pair of weak carinae (fig. 5); scutellar sulcus rather wide and posteriorly without a protrusion; propodeum normal (fig. 10) and posteriorly areolate (fig. 5); fore wing: vein 1-SR medium-sized, slender (fig. 1), vein r much shorter than vein 3-SR, vein r-m present, vein m-cu postfurcal and slightly converging to 1-M (fig. 1), vein r arising near middle of pterostigma, vein M+CU straight, vein cu-a far postfurcal, resulting in a robust first subdiscal cell (fig. 3), vein 3-M largely sclerotized, vein CU1b shorter than 3-CU1 (fig. 3), vein 2A absent; hind wing: vein cu-a medium-sized and reclivous (fig. 1), vein 1-M about twice as long as vein M+CU, vein m-cu absent; femora, tibiae and tarsi slender (figs 4, 7); fore telotarsus enlarged (fig. 4); hind tibia long setose (fig. 7); inner side of hind tibia without an apical comb of flattened setae; hind tibial spurs indistinct; tarsal claws simple, setose (fig. 14); first tergite with curved transverse basal carina connected to median carina, wide flat lateral areas and with deep dorsope (fig. 8); remaining tergites weak but evenly sclerotized and smooth dorsally; hypopygium of female medium-sized; ovipositor short and straight (fig. 10); ovipositor sheath much shorter than hind tibia and somewhat widened, about 0.1 times as long as fore wing and completely setose (fig. 10); ovipositor robust and with obsolescent teeth ventrally (fig. 13).

Distribution.— Australasian: New Zealand.

Biology.— Parasitoid of *Stigmella* spec. (Nepticulidae) on snowberry (*Gaultheria antipoda* Forst. f.; Ericaceae).

Neptihormius stigmellae spec. nov.
(figs 1-14, 39-44)

Material.— Holotype, ♀ (NZAC), "**New Zealand**, [South Island], BR, St. Arnaud village [alpine village near Blenheim], 5.xii.2003, R. Hoare", "ex *Stigmella* sp. nov. nr *progonopsis* Meyrick (Nepticulidae) ex *Gaultheria antipoda*". Paratypes: 2 ♂♂ + 1 ♀ (NZAC, RMNH), same label data.

Holotype, ♀, length of body 1.8 mm, of fore wing 2.1 mm.

Head.— Antenna 21 segments, third antennal segment 1.1 times fourth segment, length of third, fourth and penultimate segments 4.5, 4.0 and 2.5 times their width, respectively (figs 11, 12); labial palp short (fig. 10) and maxillary palp as long as height of head; length of eye in dorsal view 1.1 times temple; OOL:diameter of ocellus:POL = 11:4:7; length of malar space 1.4 times basal width of mandible; face and vertex smooth; clypeus rather small and sparsely punctate; hypoclypeal depression 0.3 times as wide as face (figs 2, 39, 40).

Mesosoma.— Length of mesosoma 1.8 times its height; side of pronotum medially narrowly crenulate and remainder smooth; mesopleuron smooth; metapleuron smooth except for some rugae ventrally; mesoscutum anteriorly with some punctures and remainder smooth (figs 5, 42); scutellum smooth, surface of propodeum finely granulate

anteriorly, laterally rugulose and with weak and irregular median carina and with a regular areola (figs 5, 43).

Wings.— Fore wing: r longer than width of pterostigma (fig. 1); r:3-SR:SR1 = 8:22:41; 1-CU1:2-CU1 = 7:9; 2-SR:3-SR:r-m = 11:22:7; cu-a short and first subdiscal cell robust (figs 1, 3). Hind wing: M+CU:1-M = 7:3.

Legs.— Hind coxa smooth, telotarsi enlarged, especially of fore tarsus (fig. 4); length of femur, tibia and basitarsus 4.9, 9.8 and 6.0 times their width, respectively; hind tibial spurs obsolescent, about 0.2 times as long as hind basitarsus.

Metasoma.— Length of first tergite 1.1 times its apical width, its surface smooth but with some rugae, dorsal carinae reaching basal half of tergite, with weak median carina; dorsope large (figs 8, 41); second tergite smooth; length of ovipositor sheath 0.11 times as long as fore wing.

Colour.— Dark brown or blackish-brown; face, clypeus, temple ventrally, pronotum laterally, mesopleuron (except dorsally), mesoscutum medio-posteriorly, scutellum and metanotum yellowish-brown; palpi pale yellowish; tegulae, legs (but telotarsi dark brown) brownish-yellow; pterostigma and veins pale brown but veins 1-SR, 1-M, 1-CU1 and C+SC+R apically rather dark brown; wing membrane subhyaline.

Distribution.— New Zealand (alpine area of South Island).

Variation.— One of the male paratypes has 22 antennal segments; length of fore wing of paratypes 2.0-2.1 mm and of body 1.6-1.8 mm. Paratypes are very similar to female holotype: one male has the face somewhat darkened; the basal curved transverse carina of the first tergite may be weakly developed or absent.

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