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A new species of *Lusius* (Hymenoptera: Ichneumonidae) from New Zealand

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Abstract

A new species of *Lusius* (Hymenoptera: Ichneumonidae) is described, *Lusius malfoyi*. It is an endemic species to New Zealand and is the first species in the genus to be described from the Australasian region.

Zoobank:

Key words: biodiversity, conservation, species description, taxonomy.

Introduction

The New Zealand Hymenoptera fauna is estimated to contain at least 3,000 species (Berry, 2010). In New Zealand, parasitoid wasps dominate much of this diversity, and are characterised by unusual patterns of diversity, and high levels of endemic and evolutionarily distinctive taxa (Noyes & Valentine 1989; Early et al. 2001; Ward 2011; Fernandez-Triana et al. 2011; Ward & Edney-Browne, 2015; Buhl 2017). However, only a fraction of New Zealand's total parasitoid fauna has been described (Berry, 2010).

Lusius Tosquinet (Hymenoptera: Ichneumonidae: Ichneumoninae) is a genus of parasitoid wasps with a widespread distribution, including Neotropical (*L. anguinus*, *L. ferrugineus*); Afrotropical (*L. flummox*, *L. tenuissimus*); and Oriental regions (*L. aborensis*, *L. apollo*, *L. gracilis*, *L. macilentus*). However, they appear to be naturally uncommon, because few specimens have been collected from any single location (Rousse et al., 2013).

Lusius is one of the few genera of the subfamily Ichneumoninae in New Zealand (Ward & Schnitzler, 2013), otherwise represented by endemic genera (*Aucklandella*, *Degithina*, and *Levensa*), the accidentally introduced *Ctenochares bicolorus* (Linnaeus 1767), and the biocontrol agent *Diadromus collaris* (Gravenhorst 1829). Here we present a description of a new species from the genus *Lusius*, the first species of this genus to be described from New Zealand.

Methods

Characters used in the species description follow Rouse et al (2013) who have recently revised the Afrotropical Phaeogenini (Ichneumonidae: Ichneumoninae) including a new species of *Lusius*:

Body length (mm): Measured from toruli to metasomal apex.

Forewing length (mm): Measured from tegula to wing apex.

HdWi (head dorsal width index): maximal width / central length of head in dorsal view.

HfWi (head frontal width index): maximal width / central height of head in frontal view.

Mi (malar line index): malar line / basal mandibular width.

IOi (inter-ocellar index): shortest distance between posterior ocelli / ocellus diameter.

OOi (oculo-ocellar index): shortest distance between eye and posterior ocellus / ocellus diameter.

F_n (length index of flagellomere n): length / width of flagellomere n.

OTi (ovipositor sheath-tibia index): length of ovipositor sheath / length of hind tibia.

Ti (tergite index): length tergite 1 / length tergite 2.

Rsi (Rs/1m-cu index): length Rs vein / length 1m-cu vein in forewing.

Wing venation follows Gauld (1984). Fore and hind wings were dissected from a single specimen and slide-mounted in Canada balsam before being imaged. All microscope work was conducted using a Leica MZ6 stereomicroscope fitted with a micrometer-calibrated ocular scale bar. Images were taken using a Leica M205A stereomicroscope fitted with a Nikon Digital Sight DS-Ri1 camera. Images were captured from different focal planes in NIS Elements F v4.00.00 and then 'stacked' together in Zerene Stacker 1.04 (zerenesystems.com) using the 'Pmax' function.

New Zealand Region codes follow Crosby et al (1998). The material examined is drawn from the New Zealand Arthropod Collection (NZAC) and Lincoln University Entomology Research Collection (LUNZ), and represents the only known species of *Lusius* in New Zealand.

***Lusius* Tosquinet, 1903**

Diagnostic features of the genus include: unidentate mandibles; hemispherical head; males with elongate gonoforceps; open areolet; and missing the 3Rs-m vein in the forewing.

***Lusius malfoyi* Saunders & Ward, sp. nov.**

Figure 1-7.

Diagnosis

Lusius malfoyi sp. nov. can be distinguished from the other described species of *Lusius* by the following characters. The light-brown to light-orange body colouration of *Lusius malfoyi* sp. nov., is distinct from the predominantly black colouration of *L. aborensis*, or the pale white colouration of *L. anguinus*. The antennae of *L. malfoyi* are light-brown, with no white band, distinguishing it from *L. gracilis*, *L. macilentus*, *L. tenuissimus*, and *L. apollo*s. The evenly rounded clypeal margins in *L. malfoyi* are distinct from *L. flummox*, where they are strongly pointed apico-laterally.

Description

Female. Body length 4.7-7.8mm; Forewing length 4.1-5.3mm, Rsi 0.9-1.1.

Colour. Head generally pale yellow but with variable patches of light brown on the vertex, occiput, interocellar space, and often with markings extending from toruli to margin of the clypeus, frons sometimes brown. Clypeus pale yellow. Scape, pedicel, and flagella light brown. Mesopleuron pale yellow, with a dark brown band that extends from the lower pronotum to the upper mesopleuron. Mesoscutum light brown with pale yellow strip following notauli. Mesosternum and propodeum light to dark brown. Wings hyaline with infusate venation. Fore, mid coxae, and trochanter pale yellow; hind coxae pale yellow, with light brown on the ventral surface. The rest of the legs and tarsi light brown. Tergites light to dark brown. Ovipositor brown with black tip.

Head. Face quadrate, lightly punctate, head wider than long (HdWi 1.6-2.6, HfWi 1.0-1.3); clypeus apical margin transverse, with evenly rounded lateral margins, lightly punctate with few hairs; malar line long (MI 1.5-1.8); maxillary palpus reaching almost to epicnemium; frons and vertex smooth; ocellar triangle wider than long (IOi 1.8-2.1, OOi 1.8-2.1); occiput

smooth, swollen behind eyes; antenna very long and slender, 30-34 flagellomeres; flagella rectangular, Fli1 4.5-6.3; Fli2 4.8-6.7; Fli3 4.5-6.3; Fli15 1.2-2.0.

Mesosoma. Polished; pleurae densely punctate to punctate-reticulate; pronotum with epomia weak-moderate; sternaulus weak, extending one fifth length of mesopleuron; epicnemial carina long, straight, reaching above midpoint of mesopleuron, and almost to propleuron; notaulus moderately deep, wrinkled; mesoscutum smooth and polished with few apical striations; scutellum strongly convex, mostly smooth, some lateral striations; propodeum weakly rugose with transverse striations; apical transverse carinae typically absent or faint but occasionally distinct; posterior transverse carinae absent; hind tibia narrowed basally.

Metasoma. Tergite 1 slender and smooth, its posterior third slightly swollen dorsally; tergite 2 finely and densely reticulate; tergite 1 and tergite 2 approximately the same length (Ti 0.9-1.1); gastrocoelus long but very shallow, within anterior quarter of tergite; ovipositor straight and short, OTi 0.20.

Male. Follows description for female.

Material Examined

Holotype. Female (NZAC). New Zealand, Birkenhead, Jan 1981, J.F. Longworth, Malaise trap in second growth bush, Photographed by F-R Schnitzler 31 Aug. 2012, (NZAC04054629).

Paratypes. NZAC. 1 Female (NZAC). NZ, AK, Birkenhead, Dec. 1980, J.F. Longworth, Malaise trap in second growth bush (NZAC04054523). 4 Females. NZ, AK, Birkenhead, Jan. 1981, J.F. Longworth, Malaise trap in second growth bush (NZAC04054216, NZAC04053831, NZAC04054418, NZAC04054398). 1 Female. NZ, AK, Birkenhead, Feb. 1981, J.F. Longworth, Malaise trap in second growth bush (NZAC04053912). 1 Female. NZ, AK, Birkenhead, Mar. 1981, J.F. Longworth, Malaise trap in second growth bush (NZAC04054123). 1 Female (NZAC). NZ, AK, Lynfield, 19 Oct. 1980, G. Kuschel, Malaise trap (NZAC04053893). 1 Female (NZAC). NZ, AK, Lynfield, 21 Sep. 1980, G. Kuschel, Malaise trap (NZAC04054497). 1 Female (NZAC). NZ, HB, Puketitiri, Little Bush, 20 Dec. 1998, T.H. Davies, Cyanide, Malaise trap (NZAC04054066). 2 Females (NZAC). NZ, NN, Cobb Reservoir, Jan. 1981, A.R. Curtis, Malaise trap on edge of Nothofagus forest

(NZAC04053926, NZAC04054499). 1 Female (NZAC). NZ, NN, Cobb Reservoir, Feb. 1981, A.R. Curtis, Malaise trap on edge of Nothofagus forest (NZAC04054539). 1 Female (NZAC). NZ, DN, 422 Pinehill Rd, Dunedin, 6-20/12/2011, D. Ward, Malaise trap in resident native garden. BOLD NZHYM1350-12 DNA Sequenced (NZAC04044699). 1 Male. NZ, AK, Birkenhead, Nov. 1980, J.F. Longworth, Malaise trap in second growth bush. *Lusius* det. Gauld 1988. (NZAC04054534). 1 Male. NZ, CO, Kawarau Gorge, 1600', 20 Mar. 1975, J.C. Watt, Malaise trap. (NZAC04053849). 1 Male. NZ, NN, Cobb Reservoir, Jan. 1981, A.R. Curtis, Malaise trap on edge of Nothofagus forest. (NZAC04053851).

Paratypes. LUNZ. 1 Female. NZ, TK, Mt. Egmont E Side, 850m, 16.xii.1983, J.W. Early, sweeping in kamahi forest. 1 Female. NZ, TK, Mt Egmont, 610m, East side Stratford Mtn Rd, 16.xii.1983, sweeping in mixed Kamahi/podocarpus forest, J.W. Early. 1 Female. NZ, FD, Fiordland NP, Deep Cove, 3.ii.83, S. Worner, sweeping ferns in forest. 1 Female. NZ, BR, Lewis Pass Scenic Res nr Marble Hill, 5.iv.1983, J.W. Early, sweeping ground cover in Nothofagus forest. 1 Female. NZ, BR, Cobb V., 820m, Trilobite Hut, 8-11.ii.1985, J.W. Early, Malaise trap at Nothofagus forest edge.

Etymology. Noun in the genitive case. This species is named after Lucius Malfoy, a character in J. K. Rowling's Harry Potter stories, for two reasons. First, the study of parasitoid wasps can be described as an enjoyable and 'magical' experience. Second, the fictional namesake and his family have a sinister reputation in the Harry Potter stories. However, in the end their reputations are salvaged. This parallels the way in which many people view "wasps" in a fearful way, even though only a small proportion of wasp species cause damage or harm. We hope that a more nuanced understanding of wasps can be achieved through educating people about their diversity, ecology, and behaviour.

Distribution. *Lusius malfoyi* is widespread on the New Zealand mainland (North Island: AK, BP, GB, HB, TK, TO, and South Island: NN, BR, CO, FD, MB, MK, OL, WD) but has not been collected from offshore islands.

Comments. Despite being geographically widespread, collected during the spring–late summer period (September to March), and from a range of different habitats, it appears to be a naturally uncommon species, as few specimens have been collected from any one area. For

example, only five specimens were captured from two months of Malaise trapping at four sites in the Dunedin City area, all from one site. Host records for *L. malfoyi* are unknown.

The genus *Lusius* has a widespread distribution, including from Neotropical (*L. anguinus*, *L. ferrugineus*); Afrotropical (*L. flummos*, *L. tenuissimus*); and Oriental regions (*L. aborensis*, *L. apollo*, *L. gracilis*, *L. macilentus*). Records of undescribed species have been reported from Brazil (Graf, 2000), Argentina (Reguilón, 2014), and Mexico (Ruíz-Cancino, 2015). The genus has not previously been reported from the Australasian region (Gauld, 1984), however, we suggest this represents a lack of sampling effort and subsequent recognition in collections, rather than true absence.

Acknowledgements

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Figure 5. Lateral mesosoma. Scale bar 0.5mm.

Figure 6. Dorsal metasomal tergites I and II. Scale bar 0.5mm.

Figure 7. Forewing (top) and hindwing (below). Scale bar 1mm.

Figure 8. Ovipositor

Figure 9. Hind tibia



















