

A new spider wasp from Western Australia, with a description of the first known male of the genus *Eremocurgus* (Hymenoptera: Pompilidae)

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Abstract – *Eremocurgus linnaei* sp. nov. is described from Western Australia. The female of this new species is brachypterous, a unique feature within *Eremocurgus* Haupt and rare within the Australian pompilid fauna. The fully-winged male is the first recorded for the genus. The diversity of *Eremocurgus*, its distribution and brachyptery among the Pompilidae are discussed.

INTRODUCTION

The Australian pompilid fauna is particularly diverse (Austin *et al.* 2004) and displays a high level of endemism. However, although the first Pompilidae for the continent were described by Fabricius in 1775, the group is generally poorly known for Australia, and it is likely that significantly less than half the fauna has been described. Further, the group is taxonomically difficult because of the morphological conservatism among numerous genera, in addition to the often extreme sexual dimorphism and complex mimicry associations seen in many species (e.g. Evans 1968, 1982; Harris 1987; Day 1988). Elliott (2007) lists 258 pompilid species for the Australian region of which the majority have been described from the eastern parts of the continent. Despite comprising one-third of the continent's landmass, Western Australian Pompilidae have been little studied. Only 18% of all pompilid species (47 of 258 species) are described from Western Australia, while for the subfamily Pepsinae only 12% (11 of 91 species) have type localities in that region (data from Elliott 2007). Of the four recognised subfamilies (Pitts *et al.* 2006; Elliott 2007), the Pepsinae comprise the least known Australian genera, many of which are monotypic or contain only few species. Several of these genera have not been revised since their original description (Elliott 2007), as is the case for *Eremocurgus* Haupt which is currently known from two species from south-eastern Australia.

Here we describe a remarkable new species of the Australian endemic genus *Eremocurgus* from Western Australia, and thus record the first brachypterous

female and the first male of the genus. At the same time, we present an overview of the diversity and distribution of the genus, and discuss the occurrence of brachyptery within the Australian Pompilidae.

TERMINOLOGY AND METHODS

Terms for morphological structures follow Day (1988) and Goulet and Huber (1993). Specimens were borrowed from and/or are deposited in the following collections (acronyms used throughout the text): Australian Museum, Sydney, Australia (AM); Australian National Insect Collection, CSIRO, Canberra, Australia (ANIC); California Academy of Sciences, San Francisco, U.S.A. (CAS); The Natural History Museum, London, England (NHM); Museum Victoria, Melbourne, Australia (NMV); State Museum of Natural History Stuttgart, Germany (SMNS); Western Australian Museum, Perth, Australia (WAM); Waite Insect and Nematode Collection, University of Adelaide, Australia (WINC).

Images of the specimens were taken with a Leica DXM 1200 digital camera attached to a Leica MZ 16 APO microscope and processed using Auto-Montage (Syncroscopy) software.

SYSTEMATICS

Family Pompilidae Latreille 1805

Eremocurgus Haupt 1937

Eremocurgus Haupt 1937: 127, 133.

Type species

Priocnemis ephippiata Smith 1868, by original designation.

Diagnosis

Both sexes with fore-wings spotted or bifasciate, propodeum with relatively weakly defined declivity. Female with tooth-like scales (=Haupt's 'Schuppenornen') developed at bases of hind tibial spines. Male subgenital plate medially with distinct posteriorly-directed spine.

Remarks

In his work on Australian Pepsinae, Haupt (1937) described nine new genera (including six genera with males unknown to him) in which he accommodated just 18 species. Two of these species were placed by Haupt (1937) in *Eremocurgus*: *E. ephippiatus* (Smith 1868) and *E. pictipennis* (Smith, 1855). In recent years it has become apparent that *Eremocurgus* and other pepsine genera putatively related to it require extensive reinterpretation to recognise more natural groups, and this will likely involve synonymy of some genera and an expansion of the limits of *Eremocurgus*. Such a study is currently being undertaken by the authors as part of a larger generic revision of Australian Pomplilidae, and the description of the present species makes a small contribution in this respect. The diagnosis of *Eremocurgus* sensu Haupt presented above has been modified to include both the brachypterous female and first recorded male for *E. linnaei*.

Based on this species, *Eremocurgus* exhibit a striking level of sexual dimorphism, which led to the males of *E. linnaei* remaining unrecognised in the ANIC collection. Our postulated sex association is supported by the close geographic occurrence of males and females.

Eremocurgus linnaei is only known from Western Australia, while *E. ephippiatus* has a broad distribution covering Victoria, South Australia and Western Australia (collection data), whereas *E. pictipennis* is apparently restricted to Victoria.

Eremocurgus linnaei Krogmann,

Day and Austin, sp. nov.

Figures 1a–j

Material examined

Holotype

Australia: Western Australia: ♀, Stirling Range National Park, S. face of Pyungoorup Peak, 330m, 34°22'17"S, 118°19'20"E, 27 April–4 September 1996, wet pitfall traps ex spirit collection, M.S. Harvey, J.M. Waldock, B.Y. Main (WAM Entomology Reg. No. 68761).

Paratypes

Australia: Western Australia: 1 ♀, same collection data as holotype (WAM Entomology Reg. No. 68760); 6 ♀, same data as holotype, but:

Wedge Hill, 34°23'17"S, 118°10'18"E, 2 May–17 Dec 1996 (1 specimen SMNS, 5 specimens WAM Entomology Reg. No. 68633–68637); 1 ♀, same data as holotype, but: Mt Magog, 34°23'59"S, 117°56'35"E, 25 April–3 September 1996 (NHM); 1 ♀, same collection data as holotype, but: The Cascades, 34°22'29"S, 118°14'17"E, 4 September–17 December 1996 (WAM Entomology Reg. No. 69771); 19 ♀, same data as holotype, but: Toolbrunup Peak track, 34°23'32"S, 118°03'32"E, 23 April–3 September 1996, J.M. Waldock, B.Y. Main (WAM Entomology Reg. No. 69744–69762); 3 ♀, same data as holotype, but: Talyuberlup picnic site, 34°24'56"S, 117°57'18"E, 25 April–3 September 1996, J.M. Waldock, B.Y. Main (1 specimen SMNS, 2 specimens WINC); 3 ♀, same data as holotype, but: Porongurup National Park, south end of Millinup Pass, 34°41'43"S, 117°53'51"E, 28 April–2 September 1996 (1 specimen ANIC, 2 specimens WAM Entomology Reg. no. 68631–68632); 1 ♀, Porongurup National Park, Yate Flats, malaise, 13 November 1987, M.E. Irwin, E.I. Schlinger (CAS); 1 ♀, Stirling Range National Park, Bluff Knoll at Cascade Track, malaise, 17–20 November 1987, M.E. Irwin, E.I. Schlinger (CAS); 2 ♂, 7 km N. of Kent River Bridge, 34°54'S, 117°02'E, 19 April 1983, E.S. Nielsen, E.D. Edwards (ANIC).

Diagnosis

The female of *E. linnaei* differs from the previously described species of *Eremocurgus* by the following characters: head with red-golden pubescence (Figure 1e), fore- and hind-wing brachypterous (Figure 1a, c), propodeum elongate, with transverse striae, that are medially weakly indicated (Figure 1f), toothed scales on hind tibia only weakly developed (Figure 1g). The male is the first described for the genus and characterized by the following diagnostic features: head black, face with orange area extending laterodorsally from level of toruli (Figure 1h). Male with metapostnotum well developed, reaching three quarters of the median length of the metascutellum (Figure 1i).

Description

Female (Figure 1a, c, e–g)

Body length: 13.0–17.1 mm, head plus mesosoma: 6.5–8.3 mm. **Colour:** Body and legs brownish-purple. Antennae brown. Conspicuous red-golden pubescence present on head, tibiae, tarsi and dorsal surfaces of meso- and metasoma. Two patches of silvery pubescence present on anterolateral portions of metasomal tergites 2 and 3.

Head (Figure 1e): Inner eye margin only very slightly incised, eye 1.9–2.1 times as long as wide. Clypeus 3.1–3.3 times as long as wide and as

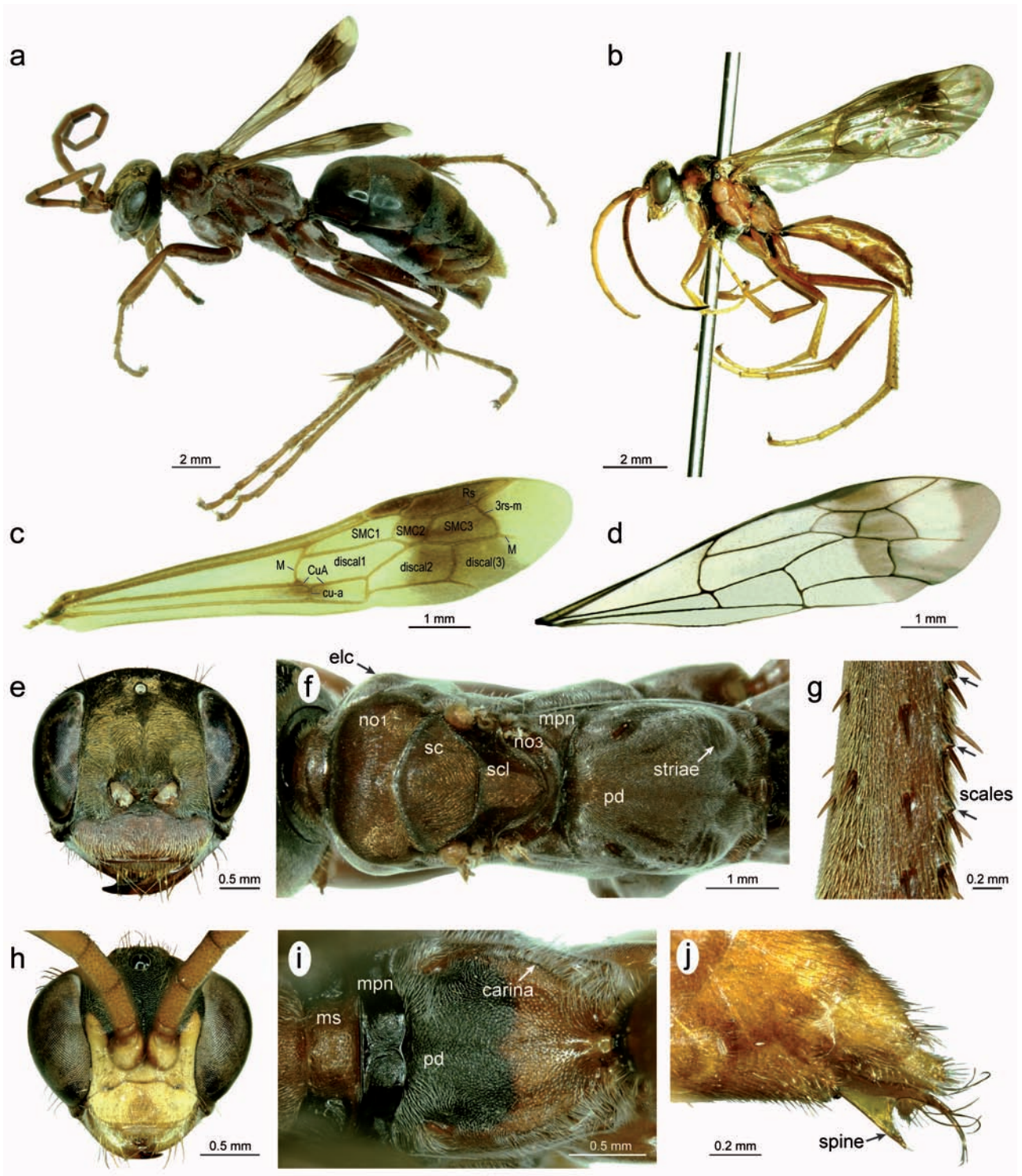


Figure 1 *Eremocurgus linnaei* sp. nov., paratypes – a, habitus female, lateral view; b, habitus male, lateral view; c, forewing female; d, forewing male; e, head female, frontal view; f, mesosoma female, dorsal view; g, hind tibia female, dorsolateral view; h, head male, frontal view; i, posterior mesosoma male, dorsal view; j, metasoma with subgenital plate male, lateral view. Abbreviations: elc=extended lateral corner; no1=pronotum; no3=metanotum; mpn=metapostnotum; ms=metascutellum; pd=propodeum; sc=mesoscutum; scl=mesoscutellum; SMC=submarginal cell.

wide as distance between bottoms of orbits. First flagellomere 3.7–4.2 times as long as wide and 1.1–1.2 times as long as second. Ocello/ocular-distance 1.7–1.8 times as wide as interocellular-distance, ocelli not enlarged.

Mesosoma (Figure 1f): Pronotum transversely divided by distinct groove (=streptaulus), anteriorly with extended lateral corners. Mesonotum narrower than pronotum, paraspinal sulcus present, reaching half the length of mesoscutum. Propodeum elongate, nearly as long as combined length of pro- and mesonotum. Propodeal surface with transverse striae covering anterior half of declivity. Most striae only laterally distinct.

Wings: Brachypterous, forewing 6.3–7.8 mm, hindwing 5.0–6.1 mm. Forewing (Figure 1a, c) orange with black infuscation around crossvein cu-a, and black band covering marginal cell and running to inner wing margin, covering third and most of second submarginal cell, great proportions of discal₂, discal (3) and subdiscal (2). Vein M distad of crossvein 3rs-m very short, terminating well before wing margin. Third submarginal cell enlarged, approximately twice the size of second. Crossvein cu-a relatively strongly postfurcal of M on CuA. Hindwing with full venation, subdiscal cell proximally with unpigmented vein.

Legs: Hind femur 5.9–6.3 times as long as wide; inner hind tibial spur 0.4 times as long as basitarsus. Hind tibia with weakly developed toothed scales (Figure 1g). Tarsal plantulae present.

Male (Figure 1b, d, h–j)

Body length: 9.8–10.6 mm, head plus mesosoma: 4.6–5.2 mm. *Colour*: Head bicoloured, clypeus and face below toruli light orange, coloured area also extends laterodorsally from toruli, rest of head black. Antennae and legs orange. Mesosoma bicoloured, mainly dark orange, with the following areas black: anterior portion of propleura, ventral mesepisternum and small anterior portion of mesepisternum, adjacent to pronotum, mesoscutum, lateral panels of metanotum, metapostnotum and anterior portion of propodeum between and anterior to propodeal spiracles. Metasoma orange with anterior portion of petiole black.

Head (Figure 1h): Inner eye margin convergent, eye 1.9–2.1 times as long as wide. Clypeus 2.6 times as long as wide and as wide as distance between bottoms of orbits. First flagellomere 2.0–2.1 times as long as wide and 0.8–0.9 times as long as second. Ocello/ocular-distance 0.9–1.0 times as wide as interocellular-distance, median ocellus slightly enlarged.

Mesosoma: Pronotum short, with long pubescence. Mesonotum with fine punctuation, parapsidal sulcus present, reaching close to anterior mesoscutal margin, notaulus absent. Metapost-notum well developed, posterior margin only slightly incised medially (Figure 1i). Median length of metapostnotum reaching three quarters of the median length of the metascutellum (Figure 1i). Propodeal surface without transverse striae, but two strong dorsolateral carinae reaching from posterior margin to about half the length of propodeum (Figure 1i).

Wings: Fully developed. Forewing (Figure 1d) with less conspicuous black band originating from marginal cell and without black infuscation around crossvein cu-a. Black infuscation present along wing tip. Vein M distad of crossvein 3rs-m longer than in female; third submarginal cell only slightly larger than second, with 3rs-m strongly bent towards Rs. Crossvein cu-a not strongly postfurcal of M on CuA. Hindwing very similar to female, but subdiscal cell proximally with pigmented vein.

Legs: Hind femur 7.1 times as long as wide; inner hind tibial spur elongate, 0.7 times as long as basitarsus. Tarsal plantulae present.

Metasoma: Subgenital plate with distinct posteromedian spine (Figure 1j).

Etymology

The new species is described and named in honour of Carl von Linné and published 250 years after the tenth edition of his *Systema Naturae*.

Remarks

Brachyptery in Australian Hymenoptera

Brachyptery is a rare phenomenon within the world Pompilidae (Goulet and Huber 1993). In Australia wing-reduced pompilids have only been described in the *Iridomimus violaceus* group (Evans 1970), where both sexes have strongly reduced, strap-like wings and greatly resemble ants. *Eremocurgus linnaei* is the first described pompilid from Australia, in which wing reduction only occurs in the female. Interestingly, we have found this phenomenon also in two undescribed Australian species from the genera *Epipompilus* Kohl and *Sphictostethus* Kohl (Krogmann, Day and Austin, unpublished data). The Australian Hymenoptera fauna includes a number of families, in which brachypterous species occur more frequently than in other parts of the world. These include doryctine Braconidae (75% of all known brachypterous species; Iqbal *et al.* 2003) and Rhopalosomatidae (70% of all known brachypterous species; Krogmann *et al.* in prep.).

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