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Article

Three new species of *Eutarsopolipus* (Acari: Podapolipidae) from Australian carabid beetles (Coleoptera: Carabidae)

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Abstract

Three new species of *Eutarsopolipus* Berlese, 1913 (Acari: Podapolipidae) are described from adult females, larviform adult males and larval females collected from under the elytra of pterostichine carabid beetles (Coleoptera: Carabidae) in southeast Queensland: *Eutarsopolipus earnshawi* **sp. nov.** from *Cratoferonia phylarchus* (Sloane, 1900), *Eutarsopolipus lambkinae* **sp. nov.** from *Notonomus angustibasis* Sloane, 1902 and *Eutarsopolipus rutherfordae* **sp. nov.** from *Trichosternus subvirens* (Chaudoir, 1865). All the new species belong to the *ochoai* species group and a key to species of this group is provided.

Introduction

The Podapolipidae (Acari: Tarsonemoidea) is the sister-group of the Tarsonemidae (Lindquist 1986) and represent a radiation of obligate parasites of insects, especially beetles. The largest genus is *Eutarsopolipus* Berlese, 1913, with 64 species (Husband & Kurosa 2013). The genus was organised into seven species groups by Regenfuss (1968) and future authors have used and expanded this informal classification to 14 species groups.

Genera of Podapolipidae show a general pattern of reduction, from mites with four pairs of legs, relatively complete body and leg setation, and fully formed dorsal plates, to mites with fewer legs, reduced setation and fused or fragmented shields (Lindquist 1986; Husband 1991). For this reason, genera showing relatively complete morphology, such as *Chrysomelobia* Regenfuss, 1968, are putative early-branching taxa (e.g., Seeman 2008). In *Eutarsopolipus*, the *ochoai* species group retains pretarsal claws on all legs, setae on all genua, and entire dorsal shields, and are therefore hypothesised to be the sister-group to all other *Eutarsopolipus* (Husband 1995; Husband & Macfarlane 1999). The *ochoai* species group comprises five species: *E. leytei* Husband & Corpuz-Raros, 1989; *E. ochoai* Husband, 1995; *E. scariteus* Husband, 2001; *E. weatherbyi* Husband & Psalmonds, 2004; and *E. dastychi* Husband & Khaustov, 2004.

Herein we describe three new species of *Eutarsopolipus* from the *ochoai* species group, all from Australian Pterostichini (Coleoptera: Carabidae). The Australian fauna of Podapolipidae are barely touched upon, with significant works being those on *Podapolipoides* Regenfuss, 1968 (5 species, Husband 1990), *Podapolipus* Rovelli & Grassi, 1888 (5 species, Husband 1986), and *Chrysomelobia* (16 species; Seeman & Nahrung 2003, 2005, 2013; Seeman 2008). The Australian fauna currently comprises 30 species. *Eutarsopolipus* is represented by two species, *Eu. megacheli* Husband & Macfarlane, 1999 and *Eu. secundus* Husband & Macfarlane, 1999, both collected from *Catadromus lacordairei* Boisduval, 1835. Each of these species was placed in their own species group, indicative of the undiscovered novelty of the Australian fauna of Podapolipidae.

- Adult female: coxal setae *3a* not thickened; tarsal solenidia longer than sockets. Larval female: seta h_2 short, < 15. 5

5. Adult female: gnathosoma elongated, length > 90; cheliceral stylets > 120. Larviform adult male: seta v_1 > 30, sc_1 > 15. Larval female: cheliceral stylets > 60. Host: *Scarites* sp. Country: Argentina . . . . . *E. weatherbyi* Husband & Psalmonds
- Adult female: gnathosoma not elongated, length < 65; cheliceral stylets < 70. Larviform adult male: seta v_1 < 25, sc_1 < 15. Larval female: cheliceral stylets < 45 6

6. Adult female: setae v_1, sc_1 < 15; dorsal and ventral gnathosomal setae < 20; tarsi I–III 8(+ω)-6(+ω)-5. Larviform adult male: dorsal gnathosomal setae < 10, sc_2 < 10. Larval female: setae h_2 small, length 3. Host: *Scarites subterraneus.* Country: USA . . . . . *E. scariteus* Husband
- Adult female: setae v_1, sc_1 > 20; dorsal and ventral gnathosomal setae > 20; tarsi I–III 9(+ω)-7(+ω)-7. Larviform adult male: dorsal gnathosomal setae > 10, sc_2 > 10. Larval female: setae h_2 minute 7

7. Adult female: femur I *l′* long, length > 15; cheliceral stylets < 50; setae v_1 > 35, c_1 and c_2 > 15. Larviform adult male: seta v_1 < 11. Larval female: setae v_1 > 40, sc_1 > 20, c_1 and c_2 > 15. Host: *Calathus fuscipes.* Country: Ukraine . . . . . *E. dastychi* Husband & Khaustov
- Adult female: femur I *l′* short, length < 4; cheliceral stylets > 60; setae v_1 < 25, c_1 and c_2 < 10. Larviform adult male: seta v_1 > 15. Larval female: setae v_1 < 30, sc_1 < 20, c_1 and c_2 < 15. Hosts: *Pasimachus* spp. Country: Costa Rica . . . . . *E. ochoai* Husband

Discussion

These three new species satisfy the broad concept of the *ochoai* species group, being those *Eutarsopolipus* retaining ambulacral claws and genual setae on all legs. However, two of these Australian species—*E. earnshawi* and *E. rutherfordae*—present characters not found in other members of the *ochoa* group: the loss of a solenidion on tarsus II, larviform adult males retaining the genual setation of the adult female, and larval females with separate plates C and D. Furthermore, *E. earnshawi* has a developed plate H, found in no other *Eutarsopolipus.* Although we do not think these species warrant a new species group, they do hint at a diverse Australian fauna of *Eutarsopolipus* that may, with further work, challenge current species group concepts.

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