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Description and conservation status of a new species of *Australotomurus* (Collembola: Entomobryidae: Orchesellinae) from urban Perth remnant bushland

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Abstract

A new species of the Australian endemic genus *Australotomurus* Stach, 1947 *A. morbidus* **sp. nov.**, is described from four urban remnants in Perth**.** *Australotomurus morbidus* **sp. nov.** is the first species in the genus found to possess male secondary sexual characters on antennal segment III as well as I. The males of all other described species in the genus occurring in south-eastern Australia have secondary sexual characters on antennal segments I and II rather than I and III. Typical habitats for *Australotomurus* species are long undisturbed native grasslands and heathland at low and high elevations. The new species extends the known distribution of the genus *ca*. 2,000 km west. *Australotomurus morbidus* **sp. nov.** is the only species in the genus currently vulnerable to extinction because of its restricted distribution to only four localities, all of which are subject to considerable human disturbance. This species was listed as critically endangered when it was known (but not yet described) from only one locality but was delisted a few years later when three other locations for the species were found. The history and records of *A. morbidus* **sp. nov.** suggest that listing species using current Western Australian legislation does not necessarily protect vulnerable species. The new species is described here and new records for some other Australian species of Orchesellinae provided, including the first Australian record of *Heteromurus major* (Moniez, 1889).

Key words: Swan coastal plain, *Banksia* heath, male secondary sexual characters, short range endemic, listing and delisting species

Introduction

The Orchesellinae fauna of Australia, unlike that of the Northern Hemisphere, is poor both in species and genera and the largest genus in the Northern Hemisphere, *Orchesella* Templeton, with 107 described species, is absent (Bellinger *et al.* 1996–2014). So far, five genera and subgenera in the subfamily have been identified from Australia, two without described species. Three of them, *Dicranocentrus* Schött, 1893, *Alloscopus* Börner, 1906 and an undescribed marine littoral genus near *Dicranocentrus,* are entirely tropical and also occur in Indonesia and elsewhere in the south-east Asian region (P. Greenslade, unpublished data). *Heteromurus* Wankel, 1861 has a southern distribution in Australia and is represented by a single introduced species, *H. major* (Moniez, 1889), **new record.** It is found in southeast Australia in disturbed grassy areas. In addition, two unidentified species of *Heteromurus* are found on Christmas and Cocos and Keeling Islands. The fifth genus, *Australotomurus* Stach, 1947 is endemic to Australia and contains six described species (Mari Mutt & Greenslade 1985). All described species are only known from south eastern Australia and are distributed patchily in native heathland, grassland or dry sclerophyllous woodland habitats at low and high altitudes. *Australotomurus* species are allopatric and most abundant in summer. As they are surface-active they fall readily into pitfall traps. Individuals can be suctioned

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Discussion

It is well known that much of the Swan Coastal Plain has been drastically modified since European settlement. Populations of the diverse fauna of plants and animals that at one time inhabited this area of around 1,800 km^2 have been severely reduced and many species are likely to be locally or completely extinct. This effect has been best documented for birds such as Black Cockatoos (Johnstone and Kirkby 2014). The importance of this fauna has been appreciated by governments in the past by funding surveys of the plants, vertebrates and invertebrates in remnants (How 1978; How *et al*. 1996) and in establishing the "Bush Forever" programme in 2000, which documented 287 sites of significance covering 51,000 ha. However, there is no legislation requiring land owners to protect sites and manage them appropriately. Legislation is essential as "Bush Forever" sites are likely to suffer increasing pressures from urban development increases. For instance, the South Guildford Bushland site is currently badly weed-infested, fences are broken, incomplete or completely absent, signage is non-existent, rubbish has been dumped in parts and some areas are being mown. There currently appears to be no effort made to protect its natural values.

Although legislation to list endangered and vulnerable species was enacted in Western Australia as early as 1950, it does not seem to have provided long-term protection for their critical habitats at least as far as *A. morbidus* is concerned. It has failed because the species was so easily delisted and removed without a requirement for ongoing monitoring. There has clearly been a very large reduction in the distribution of this species since settlement as, assuming the current populations were once continuous; it would have inhabited at least 80 times the current known area. Three of the populations known (How *et al*. 1994) are small and vulnerable to elimination through any number of processes including fire, climate change, and invasive exotic species including human intervention, intentional or not. Although *A. morbidus* was listed for ten years no management programme was prepared.

Based on current knowledge, *A. morbidus* fulfils the criteria not only for listing again under the WA legislation but also for listing as critically endangered with the IUCN as it complies with several of the required criteria: reduction of population of more than 90% and occurrence in an area of less than 100 km^2. Fjellberg (2010) was the first to list Collembola species successfully with the IUCN using the standard criteria. He assessed seven species as endangered and 26 as vulnerable in Norway.

As it is 20 years since the last collections of this species were made, it is recommended that a new survey be carried out to include some sites not previously sampled, such as the John Forrest National Park, and the species be relisted as critically endangered under the Western Australian legislation.

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