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A Morphological and Molecular Revision of the *Camponotus nigriceps* Group (Hymenoptera: Formicidae) from Australia

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Abstract

The *nigriceps* group of the formicine genus *Camponotus* is revised using both morphological and allozyme techniques. Nine species from southern Australia are recognised. Four new species are described: *C. dryandrae*, *C. eastwoodi*, *C. loweryi* and *C. longideclivis*. Two subspecies are raised to specific status: *Camponotus nigriceps clarior* and *C. nigriceps pallidiceps*. Two new synonyms have been determined: *C. consobrinus* = *C. nigriceps obniger* and *C. nigriceps* = *C. nigriceps perthiana*. A key for separating species in the group and known distributions is presented.

Introduction

Ants of the formicine genus *Camponotus* are amongst the most common in Australia both in number of individuals and species, yet little is known of their taxonomy. The genus occurs on most continents in a wide range of habitats. Emery (1925) proposed 34 subgenera and many subsubgenera for the world. One of Emery's subgenera was '11me. Groupe *nigriceps*' which comprised eight named forms from Australia possessing a clypeus that was 'deeply notched in the middle of its anterior border'. The character is so distinctive that Emery's *nigriceps* group is generally accepted as a natural grouping within *Camponotus*, although this has yet to be confirmed by modern cladistic methods. Although species can be readily assigned to the *C. nigriceps* group, commonly called sugar ants in Australia (Froggatt 1905), it has not been possible to identify species within the group to any degree of certainty.

More than ever there is an urgent need for accurate knowledge of the taxonomy of members of the *C. nigriceps* group, which are amongst the most commonly encountered ants in survey work in southern Australia. Ants are often used as major biological indicators of the 'environmental health' of an area, an endeavour that requires a sound systematic framework and an accurate taxonomic key. Unfortunately, neither is currently available for this group, and, as a consequence, field biologists are often forced to classify ants as 'species A', 'species B' and so on (e.g. Andersen 1991). Such a system is unsatisfactory, particularly given that different castes in this group, even when taken from the same nest, display such wide differences in size, form and pilosity that they could conceivably be considered to be different species. However, the morphological complexity shown by members of the *C. nigriceps* group has itself dissuaded taxonomists from tackling a revision of the group.

The past 10–20 years have seen the emergence of a more holistic approach to systematics, involving the integration of both morphological and molecular analyses on the same sets of individuals. This integrated approach is more powerful than either component used alone, with the strengths of each technique complementing the relative weaknesses of the other. A variety of molecular techniques is now used routinely in systematics; some of these centre directly on the genetic material DNA, whilst others measure genetically determined variation in proteins (Hillis and Moritz 1990). Of the latter, the most widely used technique has been allozyme electrophoresis, a process in which the enzymatic products of different alleles at a single gene

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