

## Australian species of the ant genus *Diacamma* (Hymenoptera: Formicidae)

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### Abstract

The Australian species of the ant genus *Diacamma* (subfamily Ponerinae) are revised. Four species occur in Australia: *Diacamma australe* (FABRICIUS, 1775), *D. colosseense* FOREL, 1915, *D. leve* CRAWLEY, 1915, and *D. schoedli* sp.n. They are limited to northern Queensland and the Top End of the Northern Territory. *Diacamma colosseense* and *D. leve* are removed from synonymy with *D. australe*, and a lectotype designation is proposed for *D. colosseense*.

**Key words:** Formicidae, *Diacamma*, Queensland, Northern Territory, lectotype designation, new species, revision, taxonomy.

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### Introduction

*Diacamma* MAYR, 1862 are large ants occurring from India and south-eastern Asia east to Vanuatu and south to northern Australia (BOLTON 1995). They are found in areas of high and monsoonal rainfall in wet or dry forests or savanna woodlands (SHATTUCK 1999). There are currently 42 described species and subspecies world-wide (SHATTUCK & BARNETT 2001). Colonies are small to intermediate in size with less than 100 adult workers up to as many as 500, and are queenless (reproduction being undertaken by mated workers called gamergates). Nests are generally found in loose debris on the ground's surface or less commonly in soil with a mound around the entrance. Non-Australian species are known to nest beneath stones or logs; in termite nests; in rotting logs and in arboreal sites in dead branches, rotten sections of trunks and under bark or moss. Many nests lack special structural features and are only used for a short period before the colony moves to a new site. In contrast, nests in soil can be used for many years and can develop into large mounds with a single large entrance. As far as known, these ants are generalised predators on a variety of small invertebrates, including termites, and forage singly.

*Diacamma* is notable for the development of gamergaty. This involves a unique system in which the gemma plays an important role in reproductive biology. The gemma is the reduced, seed-like mesothoracic wing which fits snugly in a small pocket, the gemmarium (Fig. 1), on the side of the mesosoma. It contains exocrine gland cells and their pores and produces a secretion that is attractive to other workers and to males seeking a mating partner. Removal of the gemmae by other workers, usually during the callow stage just after emergence from the pupal stage, leads to the regression of the reproductive function, while workers retaining the gemmae are capable of mating and oviposition. Workers which retain the gemmae are termed gamergates, or "married workers," and function as the colony's queen. For details concerning the biology of these ants see HÖLLDOBLER & ENGEL-SIEGEL (1982, exocrine glands), PEETERS & HIGASHI (1989, behaviour), BILLEN &

PEETERS (1991, thoracic glands), BITSCH & PEETERS (1991, thoracic glands), PEETERS & BILLEN (1991, thoracic glands), PEETERS & al. (1992, reproductive behaviour), PAUL (2001, mandibular movement), CUVILLIER-HOT & al. (2002, regulation of reproduction) and RAMASWAMY & al. (2004, reproductive behaviour).

**Current taxonomic status:** The species-level taxonomy of *Diacamma* is currently in a state of confusion, a situation that has impeded research on many aspects of this important taxon. This has been caused by a number of reasons, including lack of crucial material (including males) and, to a lesser extent, the earlier reliance on a limited range of morphological character systems including sculpture, pubescence, and petiolar form. The difficulty has been that these character systems often vary significantly within and among nest series and this variation hides gaps and similarities corresponding to species differences. Add to this the insular distribution of many forms, some careless descriptive taxonomy that includes the naming of many varieties, and it is easy to understand why WILSON (1958: 368-371) threw up his hands and summarily cast many of the Melanesian taxa into the synonymy of *D. rugosum* (LE GUILLOU, 1842).

Fortunately the situation within Australia is less bleak than for other regions. A careful morphological and biogeographic analysis suggests four species are present in Australia. These species possess morphological diagnostic characters and are readily identifiable as outlined below. It is quite likely that similar studies in other regions will bring clarity to the entire genus.

### Methods

Size and shape characters were quantified and are reported as lengths or indices. Measurements were made with a Zeiss Stemi SV8 stereo microscope at various magnifications using a dual-axis stage micrometer wired to digital readouts. All measurements were recorded in thousandths of millimetres, but are expressed here to the nearest hundredth as a range from minimum to maximum across all measured specimens.