

NOTE

EVIDENCE FOR SEVERAL SIBLING BIOLOGICAL SPECIES CENTRED ON
MYRMECIA PILOSULA (F. SMITH) (HYMENOPTERA: FORMICIDAE)M. W. J. CROSLAND, R. H. CROZIER and H. T. IMAI¹*School of Zoology, University of New South Wales, Kensington, N.S.W. 2033.*¹ *National Institute of Genetics, Mishima, Shizuoka-ken 411, Japan.*

Abstract

Chromosome numbers of $2n = 2, 9, 10, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 30, 31$ and 32 were found for *Myrmecia pilosula* (F. Smith). Karyotypic and morphological evidence indicates the presence of a "*M. pilosula*" complex with at least 3 biological species.

The common black Australian jumper ant *Myrmecia pilosula* (F. Smith) has been taxonomically discussed as a single biological species (Clark 1951; Brown 1953). However, recent studies have shown that these ants, found in all states of Australia (except Queensland and the Northern Territory), are not actually a single species but instead contain a range of chromosome numbers suggesting the presence of sibling species (Imai *et al.* 1977; Crosland and Crozier 1986).

Here we report new chromosome numbers for "*M. pilosula*" of 18-27 with all intermediate chromosome numbers being present (Table 1). Chromosome preparations were made from pupal and prepupal cerebral ganglia using the technique described by Imai *et al.* (1977). Voucher specimens from all colonies karyotyped have been deposited in the Australian National Insect Collection, Canberra.

The "*M. pilosula*" complex contains at least 3 species.

The $2n = 2$ species is karyotypically distinct from the other species and C-banding evidence (Imai unpubl. data) indicates no direct chromosomal homology with the $2n = 10$ karyotype. Specimens from the only known $2n = 2$ colony are morphologically distinguished from other "*M. pilosula*" species karyotyped by their especially strong dorsal sculpturing particularly on the node.

The $n = 5$ species is also distinct from the other species. It was found in lowlands (altitude 120 m), whereas all other "*M. pilosula*" species karyotyped were from higher elevations (620-1200 m). The $2n = 9$ and 10 karyotypes reported by Imai *et al.* (1977) were from another lowland population of "*M. pilosula*" (altitude 80 m). Both populations of this species are morphologically distinguished from all other karyotyped "*M. pilosula*" (except the Black Mountain population) by the presence of pilosity on the head giving a slight greenish tinge.

Table 1. Chromosome numbers of *Myrmecia pilosula* from different populations (♂ indicates male and ♀ indicates worker)

Population	Altitude (metres)	Chromosome number (n), 2n	Number of colonies observed	Number of individuals observed	Total cell number observed
Tidbinbilla 35°26'E 148°56'S	820	(1), 2	1	55♂, 34♀	>1000
HMAS Albatross 34°56'E 150°32'S	120	(5)	1	4♂	28
Nerriga 35°05'E 150°10'S	730	21, 22, 23	3	14♀	59
Tidbinbilla 35°26'E 148°56'S	820	22, 23, 24	5	14♀	56
Black Mtn 35°17'E 149°06'S	620	18, 19	2	14♀	68
Wentworth Falls 33°33'E 150°22'S	870	(9, 10), 18, 19, 21	4	5♂, 14♀	41, 93
Lawson 33°43'E 150°26'S	670	(10, 11), 20, 21, 22, 24	6	12♂, 14♀	68, 63
Mt Victoria 33°36'E 150°16'S	980	(10, 11, 13, 15) 24, 25, 26, 27	4	5♂, 11♀	35, 71
Piccadilly Circus 35°22'E 148°49'S	1200	(16), 30, 31, 32	6	1♂, 16♀	3, 50

C-banding evidence (Imai unpubl. data) indicates that "*M. pilosula*" with chromosome numbers of 18-32 might all belong to the same species. Morphologically, however, all colonies of Tidbinbilla and Nerriga "*M. pilosula*" (with $2n = 21-24$) were noticeably smaller than karyotyped "*M. pilosula*" from other populations.

Variation in chromosome number commonly occurs within single "*M. pilosula*" nests. Four different karyotypes ($2n = 20, 21, 22, 24$) were found out of 6 ants examined from a single nest at Lawson. The presence of multiple functional queens within single nests would contribute to the increased karyotypic variability of individual nests.

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References

- BROWN, W. L. (1953)—Revisionary notes on the ant genus *Myrmecia* of Australia. *Bull. Mus. Comp. Zool. Harvard* **3**: 1-35.
- CLARK, J. (1951)—*The Formicidae of Australia*. Vol. 1 Subfamily Myrmeciinae. CSIRO. Morris and Walker: Melbourne.
- CROSLAND, M. W. J. and CROZIER, R. H. (1986)—*Myrmecia pilosula*, an ant with only one pair of chromosomes. *Science* **231**: 1278.
- IMAI, H. T., CROZIER, R. H. and TAYLOR, R. W. (1977)—Karyotype evolution in Australian ants. *Chromosoma* **59**: 341-393.

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