

## **Changes to the classification of ants (Hymenoptera: Formicidae)**

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### **Introduction**

This short note aims to update the reader on changes to the subfamily classification of ants (Hymenoptera: Formicidae). Although the New Zealand ant fauna is very small, these changes affect the classification and phylogeny of both endemic and exotic ant species in New Zealand.

Bolton (2003) has recently proposed a new subfamily classification for ants. Two new subfamilies have been created, a revised status for one, and new status for four. Worldwide, there are now 21 extant subfamilies of ants.

The endemic fauna of New Zealand is now classified into six subfamilies (Table 1), as a result of three subfamilies, Amblyoponinae, Heteroponerinae and Proceratiinae, being split from the traditional subfamily Ponerinae.

Bolton's (2003) classification also affects several exotic species in New Zealand. Three species have been transferred from Ponerinae: *Amblyopone australis* to Amblyoponinae, and *Rhytidoponera chalybaea* and *R. metallica* to Ectatomminae. Currently there are 28 exotic species in New Zealand (Table 1). Eighteen species have most likely come from Australia, where they are native. Eight are global tramp species, commonly transported by human activities, and two species are of African origin. Nineteen of the currently established exotic species are recorded for the first time in New Zealand as occurring outside their native range. This may result in difficulty in obtaining species-specific biological knowledge and assessing their likelihood of becoming successful invaders.

In addition to the work by Bolton (2003), Phil Ward and colleagues at UC Davis have started to resolve the phylogenetic relationships among subfamilies and genera of all ants using molecular data (Ward *et al.* 2005). Results show that although the subfamilies proposed by Bolton (2003) appear monophyletic, Bolton's (2003) subfamily groupings are not supported (Ward *et al.* 2005).

**Table 1.** Endemic and exotic ant species recorded from New Zealand. Subfamily groupings follow Ward *et al.* (2005), subfamily classification follows Bolton (2003) and generic classification follows Bolton (1995). \* - refers to previous history of being exotic in another country. <sup>AF</sup> - of African origin, <sup>T</sup> - tramp species; all others are of Australian origin.

Subfamily	Genus + species	Authority	Biostatus
<b>Poneromorphs</b>			
Amblyoponinae	<i>Amblyopone australis</i>	Erichson 1842:261	Exotic
	<i>Amblyopone saundersi</i>	Forel 1892:336	Endemic
Ponerinae	<i>Hypoponera eduardi</i>	(Forel) 1894:15	Exotic*, <sup>AF</sup>
	<i>Hypoponera punctatissima</i>	(Roger) 1859:246	Exotic*, <sup>T</sup>
	<i>Pachycondyla castanea</i>	(Mayr) 1865:69	Endemic
	<i>Pachycondyla castaneicolor</i>	(Dalla Torre) 1893:38	Endemic
	<i>Ponera leae</i>	Forel 1913:175	Exotic
Proceratiinae	<i>Discothyrea antarctica</i>	Emery 1895:266	Endemic
<b>Formicoids</b>			
Dolichoderinae	<i>Doleromyrma darwiniana</i>	(Forel) 1907:28	Exotic
	<i>Iridomyrmex</i> sp.	undescribed	Exotic
	<i>Linepithema humile</i>	(Mayr) 1868:164	Exotic*, <sup>T</sup>
	<i>Ochetellus glaber</i>	(Mayr) 1862:705	Exotic*, <sup>T</sup>
	<i>Technomyrmex albipes</i>	(Fr. Smith) 1861:38	Exotic*, <sup>T</sup>
Ectatomminae	<i>Rhytidoponera chalybaea</i>	Emery 1901:51	Exotic
	<i>Rhytidoponera metallica</i>	(Fr. Smith) 1858:94	Exotic
Formicinae	<i>Paratrechina</i> sp.A	undescribed	Exotic
	<i>Paratrechina</i> sp.B	undescribed	Exotic
	<i>Prolasius advenus</i>	(Fr. Smith) 1862:53	Endemic
Heteroponerinae	<i>Heteroponera brounii</i>	(Forel) 1892:335	Endemic
Myrmicinae	<i>Cardiocondyla minutior</i>	Forel 1899:120	Exotic*, <sup>T</sup>
	<i>Huberia brounii</i>	Forel 1895:41	Endemic
	<i>Huberia striata</i>	(Fr. Smith) 1876:481	Endemic
	<i>Mayriella abstinentis</i>	Forel 1902:452	Exotic
	<i>Monomorium antarcticum</i>	(Fr. Smith) 1858:167	Endemic
	<i>Monomorium antipodum</i> †	Forel 1901:377	Endemic
	<i>Monomorium fieldi</i> †	Forel 1910:30	Exotic
	<i>Monomorium pharaonis</i>	(Linnaeus) 1758:580	Exotic*, <sup>T</sup>
	<i>Monomorium smithii</i>	Forel 1892:342	Endemic
	<i>Monomorium sydneyense</i>	Forel 1902:442	Exotic
	<i>Orectognathus antennatus</i>	Fr. Smith 1853:228	Exotic
	<i>Pheidole megacephala</i>	(Fabricius) 1793:361	Exotic*, <sup>T</sup>
	<i>Pheidole proxima</i>	Mayr 1876:104	Exotic
	<i>Pheidole rugosula</i>	Forel 1902:423	Exotic
	<i>Pheidole vigilans</i>	Fr. Smith 1858:166	Exotic
	<i>Solenopsis</i> sp.	undescribed	Exotic
	<i>Strumigenys perplexa</i>	(Fr. Smith) 1876:491	Exotic
	<i>Strumigenys xenos</i>	Brown 1955:182	Exotic
	<i>Tetramorium bicarinatum</i>	(Nylander) 1846:1061	Exotic*, <sup>T</sup>
	<i>Tetramorium grassii</i>	Emery 1895:37	Exotic <sup>AF</sup>

†For additional information on the status of *M. antipodum* and *M. fieldi* see Gunawardana (2005).

Two major lineages of ants emerge from the molecular data of Ward *et al.* (2005): an early diversification of poneromorphs and then a later emergence of a formicoid clade. This latter clade contains over 90% of extant ant species, including all ecologically and behaviourally dominant species. However, of most interest to New Zealand is the poneromorph clade which previously contained half of our endemic fauna. The traditional Ponerinae has now been split into several new subfamilies, and two subfamilies (Heteroponerinae and Ectatomminae) have been removed from the poneromorphs into the formicoid clade. Results from molecular data appear to show morphological convergence from several lineages of ants, which has historically led to confusion in morphological classifications.

## References

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- Bolton B. 2003. Synopsis and classification of Formicidae. *Memoirs of the American Entomological Institute* 71: 1-370.
- Gunawardana D. 2005. *Monomorium fieldi* Forel (Hymenoptera: Formicidae) is the current name to use for ants previously known as *Monomorium antipodum* Forel and *Monomorium orientale* Mayr in New Zealand. *The Weta* 30: 14-15.
- Ward PS, Brady SG, Fisher BL, Schultz TR. 2005. Assembling the ant “Tree of Life” (Hymenoptera: Formicidae). *Myrmecologische Nachrichten* 7: 87-90.