

Digital supplementary material to

BUSCHINGER, A. 2009: Social parasitism among ants: a review (Hymenoptera: Formicidae). – Myrmecological News 12: 219-235

Appendix 1: Names, taxonomy, type of parasitism, and range of the ants mentioned in the text. dDul = degenerate dulosis; Dul = dulosis, slave-maker; In = inquilinism; Tp = temporary parasitism; Xen = xenobiosis, guest ant.

Scientific name	Author / year	Subfamily / tribe	Type	Range	Remarks
<i>Acromyrmex insinuator</i>	SCHULTZ, BEKKEVOLD & BOOMSMA, 1998	Myrmicinae	In	Panama	"Incipient" social parasite
<i>Anergates atratulus</i>	(SCHENCK, 1852)	Myrmicinae	In	Europe	Queen-intolerant
<i>Bothriomyrmex</i>	EMERY, 1869	Dolichoderinae	Tp	Old World, Australia	Ca. 38 species + many subspecies
<i>Bothriomyrmex decapitans</i>	SANTSCHI, 1911	Dolichoderinae	Tp	N-Africa	
<i>Camponotus universitatis</i>	FOREL, 1890	Formicinae	In	S-Europe	
<i>Cataglyphis hanna</i>	AGOSTI, 1994	Formicinae	In	N-Africa	
<i>Chalepoxenus</i> spp.	MENOZZI, 1923	Myrmicinae, Formicoxenini	Dul, dDul	S-Europe to Turkmenistan	Ca. 9 species
<i>Chalepoxenus brunneus</i>	CAGNIANT, 1985	Myrmicinae, Formicoxenini	dDul	N-Africa	Workerless
<i>Chalepoxenus kutteri</i>	CAGNIANT, 1973	Myrmicinae, Formicoxenini	Dul	S-Europe	
<i>Chalepoxenus muellerianus</i>	(FINZI, 1922)	Myrmicinae, Formicoxenini	Dul	S-Europe	
<i>Ectatomma parasiticum</i>	FEITOSA & FRESNEAU, 2008	Ectatomminae	In	Mexico	Host <i>E. tuberculatum</i>
<i>Formica dirksi</i>	WING, 1949	Formicinae	In	N-America	
<i>Formica rufa</i>	LINNAEUS, 1761	Formicinae	Tp	Eurasia	Facultative Tp
<i>Formica talbotae</i>	WILSON, 1977	Formicinae	In	N-America	
<i>Formica (Coptoformica)</i> spp.	MÜLLER, 1923	Formicinae	Tp	Eurasia	Facultative Tp
<i>Formica (Raptiformica) sanguinea</i>	LATREILLE, 1798	Formicinae	Dul	Eurasia	Facultative Dul
<i>Formicoxenus</i>	MAYR, 1855	Myrmicinae, Formicoxenini	Xen	holarctic	7 species
<i>Formicoxenus nitidulus</i>	(NYLANDER, 1846)	Myrmicinae, Formicoxenini	Xen	Eurasia	
<i>Formicoxenus provancheri</i>	(EMERY, 1895)	Myrmicinae, Formicoxenini	Xen	N-America	
<i>Formicoxenus quebecensis</i>	FRANCOEUR, 1985	Myrmicinae, Formicoxenini	Xen	N-America	
<i>Harpagoxenus canadensis</i>	SMITH, 1939	Myrmicinae, Formicoxenini	Dul	N-America	
<i>Harpagoxenus sublaevis</i>	(NYLANDER, 1849)	Myrmicinae, Formicoxenini	Dul	Eurasia	

<i>Lasius fuliginosus</i>	(LATREILLE, 1798)	Formicinae	Tp	Eurasia	Hyperparasite
<i>Lasius reginae</i>	FABER, 1967	Formicinae	Tp	Europe	
<i>Lasius umbratus</i>	(NYLANDER, 1846)	Formicinae	Tp	Eurasia	
<i>Leptothorax goesswaldi</i>	KUTTER, 1967	Myrmicinae, Formicoxenini	In	Europe	Host-queen-intolerant
<i>Leptothorax kutteri</i>	BUSCHINGER, 1966	Myrmicinae, Formicoxenini	In	Europe	Host-queen-tolerant
<i>Leptothorax pacis</i>	(KUTTER, 1945)	Myrmicinae, Formicoxenini	In	Europe	Host-queen-tolerant
<i>Leptothorax paraxenus</i>	HEINZE & ALLOWAY, 1992	Myrmicinae, Formicoxenini	In	N-America	
<i>Leptothorax pocahontas</i>	(BUSCHINGER, 1979)	Myrmicinae, Formicoxenini	In?	N-America	Parasitism questionable
<i>Leptothorax wilsoni</i>	HEINZE, 1989	Myrmicinae, Formicoxenini	In	N-America	
<i>Megalomyrmex mondabora</i>	BRANDÃO, 1990	Myrmicinae	–	Central and S-America	Agro-Predation
<i>Megalomyrmex symmetochus</i>	WHEELER, 1925	Myrmicinae	Xen?	Panama	
<i>Myrmecocystus</i> spp.	WESMAEL, 1838	Formicinae	Dul?	N-America	Intraspecific!
<i>Myrmica hirsuta</i>	ELMES, 1978	Myrmicinae	In	Europe	
<i>Myrmica schenckioides</i>	BOER & NOORDIJK, 2005	Myrmicinae	In	Europe	
<i>Myrmica semiparasitica</i>	FRANCOEUR, 2007	Myrmicinae	Tp	Canada	Not confirmed
<i>Myrmica vandeli</i>	BONDROIT, 1920	Myrmicinae	Tp?	Europe	Not confirmed
<i>Myrmoxenus</i> spp.	RUZSKY, 1902	Myrmicinae, Formicoxenini	Dul, dDul	Europe, N-Africa	Ca. 12 species
<i>Myrmoxenus adlerzi</i>	(DOUWES, JESSEN & BUSCHINGER, 1988)	Myrmicinae, Formicoxenini	dDul	Greece	Workerless
<i>Myrmoxenus algerianus</i>	(CAGNIANT, 1968)	Myrmicinae, Formicoxenini	Dul	N-Africa	
<i>Myrmoxenus bernardi</i>	(ESPADALER, 1982)	Myrmicinae, Formicoxenini	Dul	S-Europe	
<i>Myrmoxenus birgitae</i>	(SCHULZ, 1994)	Myrmicinae, Formicoxenini	dDul	Tenerife	Workerless
<i>Myrmoxenus corsicus</i>	(EMERY, 1895)	Myrmicinae, Formicoxenini	dDul	S-Europe	Workerless
<i>Myrmoxenus kraussei</i>	(EMERY, 1915)	Myrmicinae, Formicoxenini	dDul	S-Europe	Workers few to none
<i>Myrmoxenus ravouxi</i>	(ANDRÉ, 1896)	Myrmicinae, Formicoxenini	Dul	Europe	
<i>Plagiolepis</i> spp.	MAYR, 1861	Formicinae	In	Europe, N-Africa	Many independent
<i>Plagiolepis ampeloni</i>	(FABER, 1969)	Formicinae	In	S-Europe	(= <i>Aporomyrmex</i> FABER, 1969)
<i>Plagiolepis grassei</i>	LE MASNE, 1956	Formicinae	In	S-Europe	Few own workers
<i>Plagiolepis regis</i>	KARAVAIEV, 1931	Formicinae	In	Turkestan	(= <i>Paraplagiolepis</i> FABER, 1969)

<i>Plagiolepis xene</i>	STAERCKE, 1936	Formicinae	In	S-Europe	(= <i>Paraplagiolepis</i> FABER, 1969)
<i>Pogonomyrmex anergismus</i>	COLE, 1954	Myrmicinae	In	N-America	
<i>Pogonomyrmex colei</i>	SNELLING, 1982	Myrmicinae	In	N-America	
<i>Polyergus</i>	LATREILLE, 1804	Formicinae	Dul	Holarctic	6 spp., several ssp.
<i>Polyergus breviceps</i>	EMERY, 1893	Formicinae	Dul	N-America	
<i>Polyergus lucidus</i>	MAYR, 1870	Formicinae	Dul	N-America	
<i>Polyergus nigerrimus</i>	MARIKOVSKY, 1963	Formicinae	Dul	E-Asia	
<i>Polyergus rufescens</i>	(LATREILLE, 1798)	Formicinae	Dul	Europe	
<i>Polyergus samurai</i>	YANO, 1911	Formicinae	Dul	Japan	
<i>Polyrhachis lama</i>	KOHOUT, 1994	Formicinae	Xen	SE-Asia	
<i>Polyrhachis lamellidens</i>	SMITH, 1874	Formicinae	Tp?	SE-Asia ??	
<i>Polyrhachis loweryi</i>	KOHOUT, 1990	Formicinae	Xen	Australia	
<i>Pheidole</i> spp.	WESTWOOD, 1839	Myrmicinae	In	World-wide	Many independent
<i>Protomognathus americanus</i>	(EMERY, 1895)	Myrmicinae, Formicoxenini	Dul	N-America	
<i>Pseudoatta argentina</i>	GALLARDO, 1916	Myrmicinae	In	S-America	
<i>Pseudomyrmex inquilinus</i>	WARD, 1996	Pseudomyrmecinae	In	S-America	
<i>Rossomyrmex minuchae</i>	TINAUT, 1981	Formicinae	Dul	Spain, Turkey	
<i>Rossomyrmex proformicarum</i>	ARNOL'DI, 1928	Formicinae	Dul	Central to East Asia	
<i>Solenopsis enigmatica</i>	DEYRUP & PRUSAK, 2008	Myrmicinae	Tp?	West Indies	Not confirmed
<i>Strongylognathus</i> spp.	MAYR, 1853	Myrmicinae	Dul, dDul	Eurasia	Ca. 25 species
<i>Strongylognathus afer</i>	EMERY, 1884	Myrmicinae	Dul	N-Africa	
<i>Strongylognathus karawajewi</i>	PISARSKI, 1966	Myrmicinae	dDul	Europe	Host-queen-tolerant
<i>Strongylognathus minutus</i>	RADCHENKO, 1991	Myrmicinae	Dul?	Europe	
<i>Strongylognathus pisarskii</i>	POLDI, 1994	Myrmicinae	Dul?	Europe	
<i>Strongylognathus potanini</i>	RADCHENKO, 1995	Myrmicinae	Dul?	China	
<i>Strongylognathus testaceus</i>	(SCHENCK, 1852)	Myrmicinae	dDul	Europe	Host-queen-tolerant
<i>Strongylognathus tylonum</i>	WEI, XU & HE, 2001	Myrmicinae	Dul?	China	
<i>Teleutomyrmex kutteri</i>	TINAUT, 1990	Myrmicinae	In	S-Europe	Host-queen-tolerant
<i>Teleutomyrmex schneideri</i>	KUTTER, 1950	Myrmicinae	In	Europe	Host-queen-tolerant
<i>Temnothorax duloticus</i>	(WESSON, 1937)	Myrmicinae Formicoxenini	Dul	N-America	
<i>Temnothorax minutissimus</i>	(SMITH, 1942)	Myrmicinae, Formicoxenini	In	N-America	Host-queen-tolerant
<i>Temnothorax</i> sp.	S. Cover, in litt.	Formicoxenini	Dul	N-America	
<i>Vollenhovia nipponica</i>	KINOMURA & YAMAUCHI, 1992	Myrmicinae	In	Japan	

Appendix 2: Caste definitions.

The term "caste" is often used to mean either the physical or behavioural and physiological phenotype of a eusocial individual, or both, cf. HÖLLDOBLER & WILSON (1990, Glossary). Some authors, e.g., BUSCHINGER & WINTER (1976, 1978), define castes according to function alone, whereas others (e.g., PEETERS & CREWE 1984, PEETERS & CROZIER 1988) prefer a merely morphological definition. Polymorphism of female reproductives in ants has been reviewed by HEINZE (1998).

Males of parasitic ants, as well as of most independent ants, usually are winged. Deviations are found both in parasitic and independent species. Males may be polymorphic, or more or less workerlike, ergatoid, as in certain guest ants of genus *Formicoxenus*, or pupoid as in the workerless inquiline *Anergates atratulus*. For a recent review of the diversity of social systems in ants see HEINZE (2008).

References

- BUSCHINGER, A. & WINTER, U. 1976: Funktionelle Monogynie bei der Gastameise *Formicoxenus nitidulus* (NYL.) (Hym., Form.). – *Insectes Sociaux* 23: 549-558.
- BUSCHINGER, A. & WINTER, U. 1978: Echte Arbeiterinnen, fertile Arbeiterinnen und sterile Wirtsweibchen in Völkern der dulotischen Ameise *Harpagoxenus sublaevis* (NYL.) (Hym., Form.). – *Insectes Sociaux* 25: 63-78.
- HEINZE, J. 1998: Intercastes, intermorphs, and ergatoid queens: who is who in ant reproduction? – *Insectes Sociaux* 45: 113-124.
- HEINZE, J. 2008: The demise of the standard ant (Hymenoptera: Formicidae). – *Myrmecological News* 11: 9-20.
- HÖLLDOBLER, B. & WILSON, E.O. 1990: The ants. – The Belknap Press of Harvard University Press, Cambridge, MA, 732 pp.
- PEETERS, C. & CREWE, R. 1984: Insemination controls the reproductive division of labour in a ponerine ant. – *Naturwissenschaften* 71: 50-51.
- PEETERS, C. & CROZIER, R.H. 1988: Caste and reproduction in ants: not all mated egg-layers are "queens". – *Psyche* 95: 283-288.