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Microgynous queens in ants: social parasites or dispersal morphs?

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In a small number of ant species, queen size is reported as dimorphic, with small “microgynes” and large “macrogynes”, that only differ in size. This polymorphism correspond with alternative reproductive strategies that could potentially evolve into social parasitism. A short review will be presented and a new case will be described in the ant *Manica rubida*. This species lives mostly in mountainous regions. Its colonies are either monogynous or contain a few large, macrogynous queens. Colony foundation is semi-claustral and takes place after a nuptial flight. In the Alps (Morillon, Haute-Savoie, 700 m a.s.l.), we discovered in 1998 a colony containing many small alate microgynes, which did not engage in a nuptial flight and stayed in the nest the following winter. We found these microgynes in this nest throughout the following years. The size of all the gynes indicated a completely separate polymorphism. The microgynes had a normal spermatheca and could be fecundated, but rarely (1 of 38 cases). They generally behaved like workers in brood care, though they had wings which they lost with time. One of the gynes presumably tried to found a new colony near the mother colony, with aggressive encounters between the workers of the two parts. In June 2003, we observed a new colony with microgynes 4 km away from the first one. In June 2004, the “mutation” appeared to have spread to the entire valley of 10 km, with colonies having both macrogynes and microgynes, some colonies containing still only macrogynes. The significance of these microgynes is not yet clear, but there are at least two hypotheses for their existence. (1) The microgynes are social parasites of *M. rubida*. A preliminary phylogenetic analysis indicates that *M. rubida* microgyne differs from its host with a few base pairs in the mitochondrial genes COI and COII, suggesting that there is some reproductive isolation between the two morphs. This difference is similar to what has been found between the social parasite *Myrmica microrubra* and its host *Myrmica rubra*. (2) The microgynes are part of a dispersal strategy. The small microgynes spread locally from the mother nest, whereas the large macrogynes establish new colonies after a nuptial flight. This kind of dispersal strategy has been shown in *Myrmica ruginodis*. The presumed dispersal strategy is not totally efficient, however, as the colonies produce many microgynes which stay in the home nest as workers.