



## **Social and genetic structure of *Monomorium triviale*, a clonal ant with queen-worker dimorphism**

Author(s): Naoto Idogawa, Naoto Idogawa , Shigeto Dobata

Institution(s): Graduate School of Agriculture, Kyoto University, Japan ; Graduate School of Agriculture, Kyoto University, Japan ; Graduate School of Agriculture, Kyoto University, Japan

In social insects, unorthodox reproductive systems such as parthenogenesis allow unusual genetic structures in their societies and provide us a unique opportunity to address basic evolutionary issues, including cooperation and conflict between relatives and the significance of sex. In the past decade, several types of parthenogenesis have been reported in various taxa of ants. The life history of these species should be clarified before testing theoretical hypothesis. Here, we provide basic ecological information of *Monomorium triviale* with genetic evidence for thelytokous parthenogenesis. This species is characterized by distinct queen-worker dimorphism and striking reproductive division of labor: queens produce both workers and new queens without mating, whereas workers are completely sterile. Field observation showed that their nests were usually headed by multiple queens (average of 7.26 and maximum of 34 queens per nest) and were likely to be founded by fission because the new queens are wingless. Gyne broods were produced in July to August, while no males were found. Laboratory rearing confirmed that these gynes produced workers without mating. Furthermore, we developed microsatellite markers and genotyped the mother-daughter pairs. The virgin queens and their daughter workers share the same genotypes, suggesting lowered rates of recombination. Population genetic analyses indicated that almost all of the field nests were monoclonal and that the levels of genetic diversity were lower within populations than between populations, with the latter probably reflecting low dispersal ability of this species.