



Role of social environment in the control of larval development

Author(s): Romain Honorio, Romain Honorio , Claudie Doums , Mathieu Molet

Institution(s): Institute of Ecology and Environmental Sciences, Paris, France ; Institut de Systématique Evolution Biodiversité, Paris, France ; Institute of Ecology and Environmental Sciences, Paris, France ; Institute of Ecology and Environmental Sciences, Paris, France

Phenotypic plasticity plays a major role in ants where individuals with the same genotype can develop into queen or worker within a colony. The highly divergent and complementary phenotypes of these castes allow an efficient division of tasks, key to the ecological success of ants. Another characteristic of ants is their biodiversity. This is linked to multiple and independent evolutions of new castes such as queens without wings or soldiers, or of discrete or discontinuous morphological diversity within worker caste, which have given access to new ecological niches. Developmental and evolutionary origins of these phenotypes remain poorly understood, and their frequent evolution suggests facilitating mechanisms potentially related to sociality. The aim of our study is to determine role of social environment in the control of larval development. Queens and workers are classically described as a polyphenism. The dichotomous view of development has recently been questioned in bees by observation under artificial conditions without social environment of a continuum of intermediate phenotypes production between queen and worker. In some ants species, there is in fact a continuum of adult intermediate phenotypes, called intercastes, which are rare and often considered as anomalies in the literature. Our hypothesis proposes that their scarcity is caused by social environment which generate a discrete environment to the larvae. By raising larvae in laboratory with reduced workers presence and manually feeding them a variable and continuous supply of food, we wish to demonstrate that we can obtain a continuum of intermediate phenotypes between queens and workers. First results show a significant difference between self-feeding larvae and larvae fed by workers. Larvae that can feed by themselves without worker interference grow larger. This would indicate that workers play a major role in discretizing the environment and produce only the extreme phenotypes of a reaction norm.