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Biologie

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Born in 1978 in Brugg, Switzerland
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FELLOWSHIP
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ARBEITSVORHABEN

Faktoren der Kastendeterminierung bei sozialen Insekten

Understanding how a single genome can produce a variety of different phenotypes is of fundamental importance in genetics and developmental biology. One of the most striking examples of phenotypic plasticity is the female caste system found in ants and other eusocial insects, in which different phenotypes are associated with reproduction (queen caste) or helping behavior (worker castes).
A longstanding paradigm for caste determination was that female eggs are always totipotent with the important morphological and physiological differences between queens and workers stemming solely from a developmental switch during the larval stage under the control of nutritional and other environmental factors. However, there are an increasing number of examples showing genetic components in caste determination, as well as maternal effects influencing the developmental fate of females.
I will write a review on the evolution of genetic caste determination in social insects. In this review, I will present a broad overview of the studies providing strong direct and indirect evidence of a genetic component to caste differentiation and discuss factors that may have led to the evolution of genetically hardwired caste systems. In addition, I will argue that purely environment-controlled caste systems are very difficult to demonstrate and probably unlikely to occur in genetically heterogeneous societies. Detailed molecular analyses are likely to uncover additional cases of genetically-determined queen and worker determination and various degrees of genetic predispositions toward a particular caste.

Recommended Reading

Schwander, T., J. Y. Humbert, C. S. Brent, Cahan S. Helms, L. Chapuis, E. Renai, and L. Keller. 2008. "Maternal effect on female caste determination in a social insect." Current Biology 18: 265-269.
Schwander T. and L. Keller. 2008. "Genetic compatibility affects queen and worker caste determination." Science 322: 552.
Schwander T. and B. J. Crespi. 2009. "Twigs on the tree of life? Neutral and selective models for integrating macroevolutionary patterns with microevolutionary processes in the analysis of asexuality." Molecular Ecology 18: 28-42.

PUBLIKATIONEN AUS DER FELLOWBIBLIOTHEK

Schwander, Tanja (2011)

Genes as leaders and followers in evolution

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=10293319O1

Schwander, Tanja (Amsterdam [u.a.],2010)

Nature versus nurture in social insect caste differentiation

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=104621828X