



Plasticity and constraint in task allocation: How and why do workers take on new tasks?

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An important feature of task allocation in social insect colonies is the ability to dynamically respond to changes in demand for work. It is surprising, therefore, that considerable variation exists in the extent and effectiveness of colony-level worker plasticity. This variation occurs at multiple levels such as across tasks, individuals, colonies and species. We discuss the mechanisms through which colonies can achieve flexibility and the constraints, both internal (e.g. worker age, morphology, neural development) and external (task switching, learning, collective dynamics) that may limit it. Using the ant *Temnothorax rugatulus* as a model system, we explore the mechanisms colonies use to allocate workers to increased workloads and replace lost workers and how these differ between tasks. We discuss the speed and effectiveness with which colonies are able to adjust to changing conditions and their evolutionary basis. It is clear that worker task choices can be flexible, allowing colonies to respond to changes in the demand for work in tasks. However, plasticity may be limited by constraints at proximate and evolutionary levels, giving rise to variation in the potential for individual and colony level flexibility in behavior.