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The demography of worker and male size in bumblebee colonies

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Worker polymorphism in highly advanced social insect societies can take very different shapes. In some ant societies, size polymorphisms are strongly correlated with the tasks performed by the respective workers. This demography may change across the development of colonies. For example, during the very early stages of colony foundation, when a single queen or multiple queens together produce the first offspring without the aid of workers, much smaller workers, nanitics, are produced than in later colony stages. Much less is known about size demography in social insects other than ants. In bumblebees, queens found new colonies each spring completely on their own, and therefore we might expect worker size demography to change similarly over the development of a bumblebee colony. We studied two closely related bumble species, *Bombus terrestris* and *Bombus lucorum*, over the course of the colony cycle. Interestingly we found marked differences between the two species. *Bombus terrestris* workers increased in size over time, whilst the size of *Bombus lucorum* workers decreased over the lifespan of a colony. We also, for the first time, examined male size demography. In *Bombus terrestris* we found no tradeoff in male production, however in *Bombus lucorum* the number of males produced was traded off against male size; the more they produce, the smaller they get. We discuss these results in the light of the different life histories of the two bumblebee species.