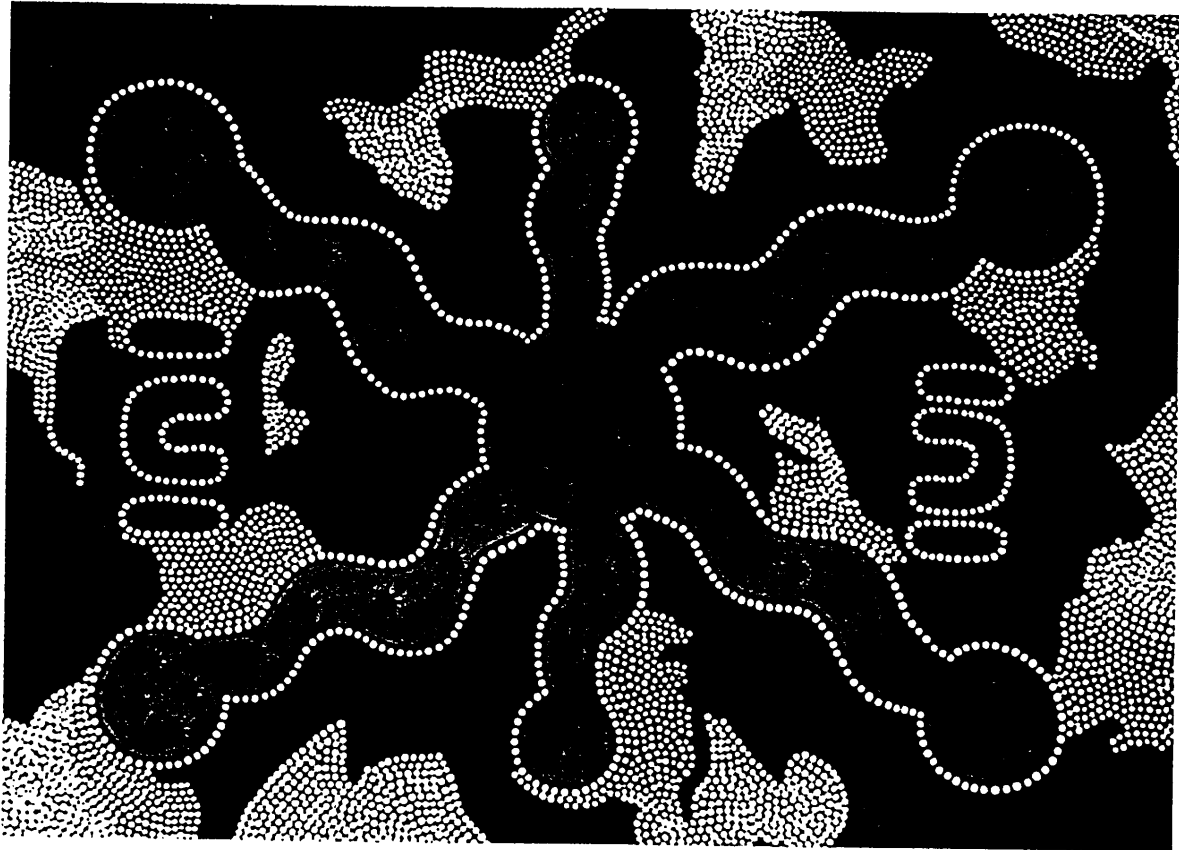


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EGGS OF THE SLAVE-MAKER ANT *Polyergus breviceps* AND THEIR HOST SPECIES (*Formica gnava* & *Formica occulta*): DO THEY ELICIT BROOD TENDING BEHAVIOR FROM HETEROSPECIFIC WORKERS?

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Eusocial insects maintain closed societies by recognizing and accepting related individuals through a complex system of chemical cues. Social parasites, however, are able to integrate themselves among heterospecific workers and surreptitiously receive beneficial actions normally reserved for kin. Studies have shown that mixed-species ant nests can be formed by cross-fostering pupae or larvae. Thus, it has been suggested that parasite/host nests may be easy to form particularly among species that are phylogenetically, closely related. However, mixed-species adoption using eggs has not been reported. This is especially important as some naturally occurring parasite-host ant colonies are initiated through the adoption of a parasite queen and the tending of the parasite/host eggs. By neglecting the potential for species-specificity among egg signals, an accurate understanding of the mechanism for brood integration has been ignored, as has an important selective force in the evolution of closed societies. The work presented here investigates the adoption of con- and heterospecific eggs for two *Formica* species and their *Polyergus* social parasite. Newly-mated *Polyergus breviceps* queens usurp adult *Formica* when founding new colonies by entering *Formica* nests and killing the host queen. To test whether *P. breviceps* eggs normally elicit tending behaviors from host species, parasite or host species eggs were placed outside artificial nests containing workers of either host species, and worker responses were recorded. Nests were censused daily for alive immatures inside nests until adults emerged or no immatures were found. Whereas alien conspecific eggs were reared to eclosion (83% of obs), eggs from the alternate host species were rejected (95%) (Fisher Exact test = 0.0001). *P. breviceps* eggs were also rejected by free-living host workers regardless of whether the parasite eggs were taken from nests in which the host workers were conspecific (92%) or heterospecific (100%) to the workers used in trials (FE = 0.2611). Newly-enslaved workers also rejected *P. breviceps* eggs (100%) during the first 6 months of enslavement, but then began tending them. These results provide behavioral evidence that eggs of the host or social parasite are not easily transferred between species, even if congeneric. This also suggests that eggs possess a species-specific stimulus which has likely played a role in the evolution of closed societies. Egg hydrocarbon profiles indicate quantitative and qualitative differences between species at all immature stages. Relative quantitative changes appear to occur from egg to larval to pupal stages in all three species, with a particularly noticeable increase in the relative proportion of a higher molecular weight peak and the decrease in relative proportion of a lower molecular weight peak. Interestingly, profiles of newly-mated *P. breviceps* queens appear more like the profiles of *F. gnava* pupae than of *P. breviceps* eggs or host eggs. Established *P. breviceps* queen profiles on the other hand resemble profiles of the host queens. Significance of behavioral and hydrocarbon findings will be discussed.

Keywords: HETEROSPECIFIC EGG CARE, *POLYERGUS BREVICEPS*, HYDROCARBONS