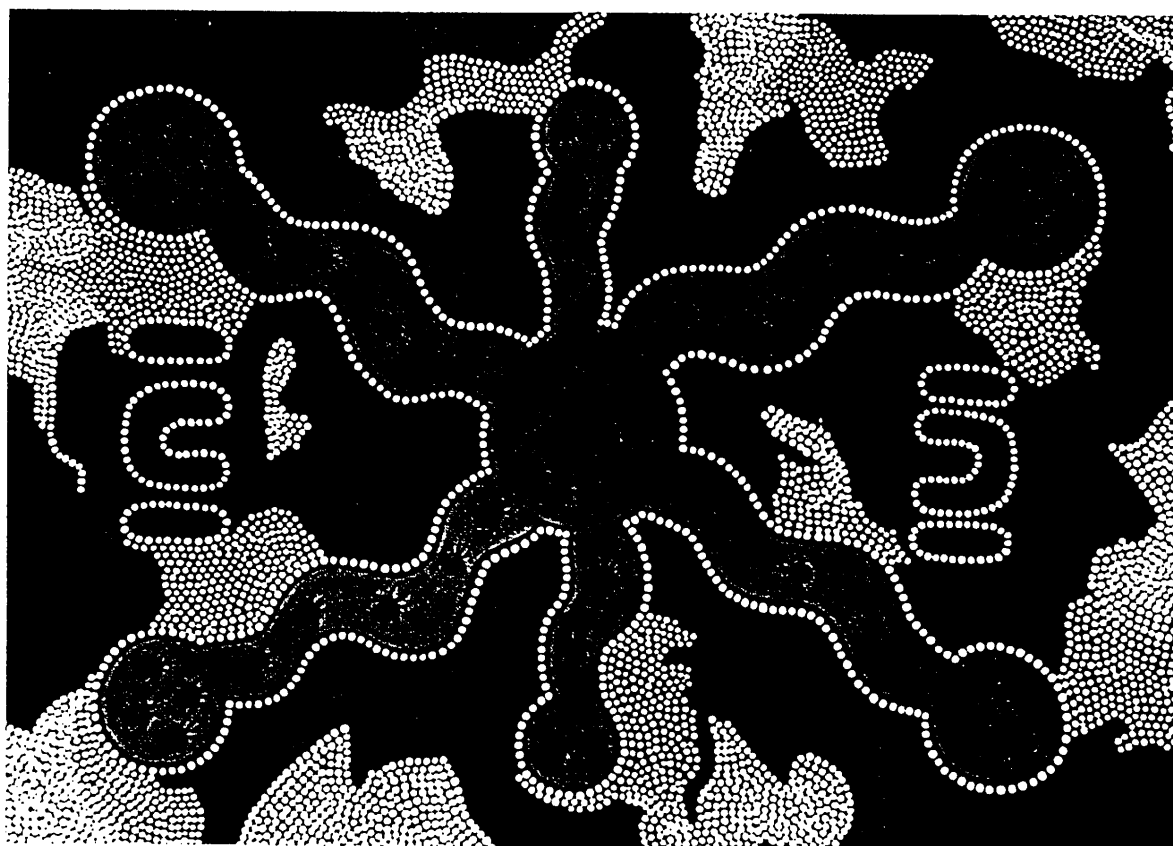


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THE INFLUENCE OF THE QUEEN ON CONSPECIFIC RECOGNITION OF WORKERS AND FEMALE SEXUALS

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Nestmate recognition is of prime importance in maintaining colony integration and organization (Hölldobler and Michener 1980). Nestmate recognition cues consist of odor signals that originate either intrinsically (genetically controlled) and/or extrinsically (environmentally-derived). Environmentally-derived cues are acquired from food, nest material and the general environment, while genetically determined odor signals (discriminators) may originate from either workers, queens or both (Hölldobler and Michener 1980). These odor cues are apparently present on the cuticle of individuals, since recognition responses are elicited following the sweep of the antennae over the surface of another individual. In large colony species, as is the case for *S. invicta*, the individual cue discriminators are distributed to other colony members through grooming and trophallaxis. Each worker continuously updates a learned cue template. If the template of a resident individual does not match the cues of an intruder, then aggression occurs. In the case of unicolonial polygyne fire ants, the lack of intraspecific nestmate recognition is attributed to a broad worker template due to the presence of multiple matrilines and patrines, as well as the distribution of a wider variety of environmentally-derived cues (Vander Meer and Morel 1998) than would be expected for the territorial monogyne form.

Monogyne fire ants are characterized by their territoriality and aggressiveness toward conspecific non-nestmates, whereas polygyne fire ants are not territorial nor are they aggressive toward conspecific workers. However, both social forms are highly aggressive toward newly mated queens. We discovered that both the monogyne non-nestmate aggression and the general aggression toward newly mated queens breaks down within days after the colony queen(s) is removed. Queenless worker groups readily fuse to form a new queenless group, where the workers now experience a broader variety of heritable cues. Thus, it appears that conspecific worker/worker aggression fits the template/cue paradigm; however, the queen(s) produces a primer pheromone that strongly influences conspecific worker/worker aggression and very importantly, the behavior of workers toward newly mated queens. We will investigate how this phenomenon may impact the creation and maintenance of polygyny and our current thinking on control of fire ants with baits. The chemical elucidation of this pheromone system will provide incite to the formation and maintenance of polygyny and how to better control the fire ant in a biologically-based integrated management program.

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