

Powerful Queen Influence on Conspecific Fire Ant, *Solenopsis invicta*, Aggression

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Monogyne fire ant colony workers are territorial and are aggressive toward members of other fire ant colonies. In contrast polygyne colony workers are not aggressive toward non-nestmates, presumably due to broader exposure to heritable and environmentally derived nestmate recognition cues (broad template). Workers from both monogyne and polygyne fire ant colonies execute newly mated queens after mating flights. We discovered that monogyne and polygyne queens have a remarkable effect on conspecific recognition. After removal of their colony queen, monogyne worker aggression toward non-nestmate conspecifics quickly drops to merely investigative levels; however, heterospecific recognition/aggression remains high. Queenless monogyne or polygyne worker groups were also not aggressive toward newly mated queens. Queenless worker groups of both forms that adopted a monogyne-derived newly mated queen became aggressive toward non-nestmate workers and newly mated queens. We propose that the powerful effect of fire ant queens on conspecific nestmate recognition is caused by a queen produced recognition primer pheromone that increases the sensitivity of workers to subtle quantitative differences in nestmate recognition cues. This primer pheromone results in the regulation of exogenous reproductive competition in *S. invicta* and when absent allows queenless workers to readily adopt a new queen. This extraordinary discovery has broad implications regarding monogyne and polygyne colony and population dynamics.

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