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## **Reproductive development and ontogeny of queen pheromone production in the fire ant *Solenopsis invicta***

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**Short title:** Ontogeny of queen pheromone production

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**Abstract.** Queens of the fire ant, *Solenopsis invicta* Buren, produce several releaser and primer pheromones. Using bioassays, the ontogeny of three of these pheromones related to reproductive development was investigated. Virgin queens, in which the process of wing-shedding (dealation) serves as an indicator of the initiation of reproductive development, were studied. First, the production of two queen pheromones produced in the poison gland was examined. The pheromone responsible for initiation and maintenance of retinue formation, a releaser effect, was found to be produced in detectable quantities two days after dealation, at which time queens showed significant ovary development and many (30%) had started laying eggs. A primer pheromone that inhibits alate virgin queens from dealating was detected in queens three days following wing-shedding, when 80% of the queens were ovipositing. Second, I examined the onset of a pheromone of unknown glandular origin produced by reproductively active virgin queens which leads to their destruction in queenright colonies by stimulating workers to attack and kill them. This pheromone is secreted in quantities detectable by bioassay two days after dealation. Thus in *S. invicta*, the ontogeny of three distinct queen pheromones is tightly linked with ovary development and initiation of egg laying. These results demonstrate reproductive and communicative functions are closely associated during the transition from potential to functional queen.

**Key words.** Reproduction, virgin queen, poison gland, *Solenopsis invicta*