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TITLE:

Genetics of social behaviors in fire ants.

ABSTRACT:

The fire ant *Solenopsis invicta* is characterized by a remarkable form of social polymorphism, with the presence of one or several queens per colony being completely associated with allelic variation at a single Mendelian factor marked by the gene *Gp-9*. Because additional phenotypic differences in physiology, fecundity, and behavior are also completely associated with *Gp-9*, it has been hypothesized that the locus is actually comprised of multiple genes that form a supergene. To test this possibility, we mapped the monogyny/polygyny social polymorphism to higher resolution using restriction-site associated DNA (RAD) tag sequencing, which is a recently developed method that permits rapid SNP discovery and genotyping at low cost. By taking advantage of the recently completed draft genome sequence for fire ants, we were able to anchor many of the RAD tags to the genome, and we found that *Gp-9* is associated with a non-recombining region covering ~14 Mb and corresponding to ~2/3 chromosome 8. Thus, variation in colony social form in fire ants is associated with a very large supergene which we propose to be a social chromosome.