
Just say Formicidae

The taxonomy of ants is Phylum Arthropoda (joint-footed animals such as spiders, ticks, crabs, and insects), Class Insecta, Order Hymenoptera, Family Formicidae. Ants are an absolutely fascinating family of insects. Their organization and cooperation are legendary. Some species undertake incredible specialization. There are species that harvest and store seeds, ones that farm aphids, others that cultivate and harvest fungus, and ones that attack other species and make slaves of them. There are few animals that segregate the reproductive function the way ants do with their queens, so most of the individuals of the species lack natural selection pressure. Yet they are truly successful organisms. Their success can be measured by their ability to populate environments. In fact according to Edward Wilson's book *The Insect Societies* as quoted by Robert Rhoades,¹ "On several counts ants can be regarded as the premier social insects. They are the most widely distributed of the major eusocial groups, ranging from the arctic tree line south to Tierra del Feugo, to the tip of South Africa, and to Tasmania and occurring on virtually every oceanic island between Iceland and the Aleutians in the north and Tristan da Cunha and Campbell in the south. They are numerically the most abundant of social insects. At any given moment there at least 10¹⁵ living ants on the earth, assuming that C. B. Williams (1964) is correct in estimating a total of 10¹⁸ individual insects – and taking 0.1% as a conservative estimate of the proportion made up of ants. The ants contain a greater number of known genera and species than all other eusocial groups combined."

The only other species of animal that can match this success is our own. It is interesting how interdependent our species and ants have become. Some studies have shown ants to be more important for soil mixing and aeration than earthworms.² Others have shown ants to be important for pollination, dispersal, and protection of various plants, including some we cultivate.² An example of this is the use of the imported fire ant to reduce sugarcane borer populations in areas where fire ants are endemic to reduce the sugarcane borer's destruction of sugarcane plants.³ On the other hand, we are extremely important in moving ants into new areas and providing them with new environments to inhabit. In fact, the diversity and abundance of ant species have been proposed as a measure of habitat disturbance, which we as a species are so good at providing.²

Despite this interdependence, or perhaps because of it, ants and humans are frequently found in conflict with each other. From our prospective, the most important events involve ants stinging humans and the reactions that occur. Klotz and colleagues⁴ have done a yeoman's job of reviewing the liter-

ature and summarizing these interactions for us. Not surprisingly, they have found or described 23 cases in 6 subfamilies of ants besides the well-described reactions to imported fire ants.⁴ This clearly reminds us that imported fire ants are not our only problem. In fact, in other areas outside the southeastern United States, imported fire ants are not even the major player. For example, Klotz et al note that some of the worst reactions reported were due to *Myrmecia pilosula* or the jack jumper ants. In Australia, these are of major concern, and Brown and colleagues⁵ reported a study that demonstrated the potential effectiveness of venom immunotherapy for this species in *The Lancet* in 2003. Klotz et al mention the cases of 2 US servicemen stationed in Guam and Okinawa who experienced severe reactions after a *Solenopsis geminata* sting.⁴ This highlights the interdependence between humans and ants. *Solenopsis geminata* are native to the United States but were displaced by *Solenopsis invicta* when *S. invicta* were accidentally imported to the United States from South America by humans. We then transported the nonnative *S. geminata* to the islands of the Pacific, where eventually some humans were stung.

The negative effects are not unidirectional. We often work hard in our own self-interest to rectify inadvertent importation of nonnative species. A case in point is the imported fire ant species. Attempts to rectify this importation go back to the late 1950s where ill-advised chemical spraying programs resulted in significant environmental damage. Rhoades¹ claims that this resulted in Rachel Carson writing *Silent Spring*, which resulted in the environmentalist movement. In turn, this spawned a long program of study supported by the US Department of Agriculture (USDA) that looked at environmentally friendly ways of controlling the imported fire ant. Eventually, a few years ago the final phase of this study began.

The Agricultural Research Service of the USDA undertook the Areawide Fire Ant Suppression project where they released the phorid fly (*Pseudacteon tricuspis*), which lays eggs in imported fire ants, and *Thelohania solenopsae* (a microsporidia specific for fire ants) in multiple locations of the southeastern United States.⁶ In several areas, these have become established and resulted in an approximately 90% reduction of the imported fire ant population that appears to be permanent.⁶ The phorid fly is slowly spreading from the established areas at approximately 10 miles per year.⁶ The USDA estimates the potential benefits to the United States by this program to be \$4.6 billion per year.⁶

So, whether you are looking for a fascinating animal to study, a medically important one that causes significant re-

actions where immunotherapy has been shown to be useful, or even a historically unique contributor to the environmentalist movement, just say Formicidae.

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