

EXPLORE THE ISSUE BEING INVESTIGATED

Plotting an Aerial Attack on Marauding Fire Ants

When we think about the evolution of the human race and the migration of humans across the globe, we are brought face-to-face with human activities that have produced global changes. Humans have manipulated the uses of land, water, and air, activities that are altering global climates and biological habitats. A human activity that draws less attention but is probably more significant in disturbing the ecological balance of the planet is the introduction of plant and animal species into new environments. These new “exotic” species often take resources away from native species such that the very existence of the native species can become threatened.

The introduction of an exotic species into a novel environment has often led to drastic changes, local residents unable to adjust to the competing invader. An important example is the zebra mussel. This small mollusk, native to eastern Europe, was first discovered in the Great Lakes in 1988, accidentally brought to the U.S. through commercial shipping. Since then, zebra mussels have spread rapidly, moving down the Mississippi River and into other inland rivers. Because zebra mussels attach themselves to hard surfaces, the invading mollusks have great potential for interfering with commercial activities -- growing populations, for example, soon clog up the pipes of water treatment systems. The zebra mussels also have drastic effects on the community composition of aquatic ecosystems. Spreading rapidly, they soon take over resources which used to be available to other species, causing the elimination of many native species of clams. There seems to be no means of eliminating the zebra mussels once they have entered a water system.

Recently another invading species, the European round goby fish, has been found in the Great Lakes. The good news is that these fish prey on zebra mussels. Could the goby be a means of eliminating the zebra mussels from North American waterways? Unfortunately, they don't live only on zebra mussels, they also devour fish eggs and small fish such as smallmouth bass, walleye, and perch. In this case, the cure could be worse than the cause.

Exotic species aren't always introduced by accident, sometimes they are brought into a new environment intentionally. The Japanese Kudzu vine was brought to America in 1876 at the Centennial Exposition celebrating the 100th birthday of the U.S., where Americans fell in love with this fast-growing vine. The Southeastern U.S. soon proved a perfect climate for the kudzu. Kudzu, which can grow up to sixty feet each year, was planted there to help prevent soil erosion. It soon became evident that kudzu does far more harm than good, destroying valuable forests by preventing sunlight from getting to vine-enshrouded trees. Herbicides seem to have little to no effect against it. It is estimated that kudzu now covers over seven million



Phorid flies and Fire Ants. A phorid fly (*Pseudacteon*, upper right) is attacking a fire ant (*Solenopsis*). These Brazilian red fire ants are a nasty pest in the southern U.S.

acres of the deep South. Unfortunately, when kudzu was brought to the U.S. its natural insect enemies were not. So far, grazing by goats seems to be the only method of kudzu growth control.

Another accidental introduction of an exotic species to the U.S. was the importation of the Brazilian red fire ant (*Solenopsis* spp). These aggressive red fire ants have been thriving throughout the southern U.S. for at least sixty years, having been inadvertently brought over on a ship from South America. These fire ants are able to outcompete many native ant species for resources, and swarm over new-born birds and other animals, killing them. They attack quail and duck hatchlings, young alligators in their nests and even new born calves in the field. Like kudzu in Japan, the Brazilian red fire ants have natural predators that keep the ant populations in check in their native Brazil, but those predators are not present in the U.S.

Larry Gilbert, of the University of Texas, Austin, and colleague Patricia Folgarait have identified a natural predator of the Brazilian fire ant, the phorid fly *Pseudacteon* spp. One of these tiny flies inject an egg into the body of the fire ant. The egg hatches into a larva that burrows into the head of the ant and feeds on the brain. Eventually, the ant's head falls off and the mature fly emerges. The fly's value is not limited to its killing skills; indeed, only a small percent of fire ants are actually killed by phorid flies. Importantly, the phorid flies harass the fire ants so much that the fire ants stay in hiding, opening up the opportunity for native ants to acquire food and survive. Larry Gilbert is testing the feasibility of importing the phorid flies into the U.S. as a means of controlling the Brazilian red fire ant.