

## ENTOMOLOGY

# U.S. Fights the Fire Ant

The imported fire ant, native to South America, has become a major insect pest in many southern states. Efforts are being made to check its spread and eliminate it entirely.

ABOUT THE END of World War I an enemy agent entered this country undetected, having stowed away on some South American freighter and jumped ship in Mobile, Ala.

He devoted his first years here to familiarizing himself with his new environment—so his subversive activities started slowly. But by 1940 his influence had spread over large areas of southern Alabama and Mississippi and eastern Florida. By 1957 his sabotage was causing millions of dollars of damage over a ten-state area. And he is still on the loose.

Who is this dangerous agent? How has he managed to operate for so long? What is being done to stop him?

He is the imported fire ant—a modest quarter inch of insect ferocity. Anyone who has felt this ant's sting will agree that it is aptly named; it is called "imported" to distinguish it from its less obnoxious domestic cousins—the three fire ants native to the United States.

*Solenopsis saevissima richteri* Forel, as it is known to scientists, presents one of the toughest pint-sized triple threats in the insect world. It is omnivorous—meaning it eats anything—and destroys many forms of plant life and young animal life. It builds large mounds that become so hard they interfere with crop production. And it stings painfully, sometimes causing serious illness and even death.

All this adds up to an estimated cost to farmers and homeowners in Alabama alone, the most seriously affected state, of \$25,000,000. The ant is also an established pest in Arkansas, Mississippi, Louisiana, Florida, Georgia, North and South Carolina, and Texas.

## Eradication Harms Wildlife

Yet controversy reigns over the wisdom of eradicating the fire ant. There are many conservationists who feel that the powerful insecticides needed to kill off the ant may do more harm to other insects and wildlife than eradication of the fire ant is really worth.

Be that as it may, the fire ant remains feared and detested by those who have suffered at its hand, and control measures to the tune of at least \$10,000,000 are in force.

Principal habitat of the imported fire ant is open land—cultivated fields, pastures, wastelands and recreation areas. It spreads from area to area via the natural mating flight of the winged queen ants and, over longer distances, by being carried in cars, trucks, planes, boats and even on logs and debris floating in streams.

The ant damages vegetable crops by sucking juices from the stems and by gnawing

holes in roots, stalks, buds, ears and pods. It injures pasture grasses, cereal and forage crops, nursery stock and fruit trees. Primarily an out-of-doors insect, it will also invade houses, where its favorite foods are meats, butter, cheese, nuts and bread.

Fire ants often extend their attacks to young, unprotected animals, such as newborn calves and pigs and newly hatched quail and poultry. Often they chase brooding hens off their nests and eat their chicks.

The high, hard-surfaced mounds of the imported fire ant, sometimes numbering up to 100 per acre, make it difficult or impossible to use certain mechanical equipment, tending to break or damage the blades of harvesting machinery. Usually 10 to 18 inches in height and 15 inches in diameter, the mounds are particularly troublesome in hayfields.

If a person disturbs a fire ant mound, thousands of ants launch an immediate attack. Because each ant may sting three or four times, as many as 3,000 to 5,000 stings may be administered in seconds.

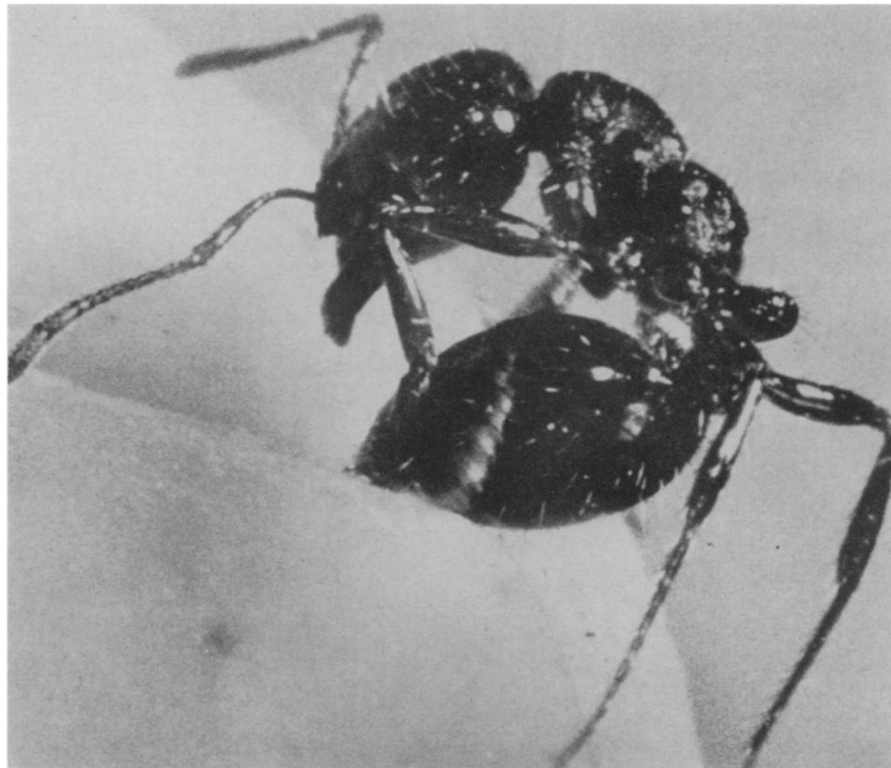
When it reaches the skin, an ant grips it with its mandibles, pulling and raising it slightly. It then arches its back and inserts its stinger. The ant may remove the stinger and reinsert it at different sites, all the while maintaining its mandibular grip on the skin.

The sting of the fire ant brings a brief stabbing pain, comparable to the sting of a honeybee, and the area begins to itch and burn. Afterwards a pimple-like sore forms that often leaves a scar. People who are unusually sensitive to fire ant venom may suffer chest pains and nausea when bitten and may even lapse into a coma, and may die.

## Three Forms of Fire Ants

There are three adult forms of imported fire ants—winged fertile females (queens), which lay eggs; winged fertile males, which mate with queens, and the worker ants, which are wingless females and usually sterile.

Most ants in a well-developed nest are wingless workers and are of about the same color. However, their color may vary, from colony to colony, from dark brown to reddish black. The workers may also vary markedly in size, from one-eighth to one-quarter inch long.



**FIRE ANT STINGS**—An imported fire ant is seen here on a person's finger in the position of stinging. Gripping a piece of skin with its mandibles, it arches its back and inserts its stinger—located in the abdomen—into the skin. Each ant may sting three or four times while clutching the same piece of skin. The bite brings a brief stabbing pain comparable to the sting of a honeybee.

Winged queens and winged males are rarely seen outside the mound, for they live inside until time to leave the mound for their mating flight. After mating, the fertilized queen finds a nesting site, sheds her wings, and digs a brood chamber one to four inches underground.

She lays her first cluster of eggs—10 to 15—usually the day after mating. The winged male, meanwhile, has become homeless and dies within a few days. By the time the first cluster of eggs hatches into larvae (in eight to 12 days), the queen has laid a hundred or more eggs.

The queen cares for the first brood, but workers feed later broods. The larval stage of the workers is six to 12 days. The larvae, helpless dirty-white grubs, then change to pupae that are pale, shiny white, and about the same size and shape as the adults. They gradually darken and adult workers emerge in nine to 12 days.

Workers care for the brood, forage for food, maintain and enlarge the colony and protect the nest from enemies. A mound is formed when workers from the queen's first brood enlarge the underground quarters. Workers of later broods help build a firm mound that is honeycombed with underground passages.

In 1957, Congress enacted legislation setting up a joint Federal-state imported fire ant eradication program. It authorizes the U.S. Department of Agriculture to help interested states, local governments and property owners fight the fire ant on more than 20,000,000 acres. The cost of this program is being shared by all parties involved.

Three coordinated steps are underway—surveys to find infested areas, treatment of infested areas with insecticides, and quarantines to prevent spread of the ant into uninfested areas.

The insecticide phase of the program is to rid infested areas of the ant and to keep these areas free of it. USDA claims every precaution is taken to apply insecticides in such a way that they will not harm people or animals. They are applied only where an immediate need exists and not on an area-wide basis.

A Federal quarantine restricts or prohibits the interstate transportation of the ant and regulates the interstate transportation of articles that may be carriers of the ant in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas. Similar state regulations control transportation of the fire ant and regulated articles from infested to uninfested locations in these states.

The Agricultural Research Service of USDA says individuals can help in controlling the imported fire ant by:

1. Reporting infestations suspected to be imported fire ants to the county agent or state entomologist.
2. Participating in community action designed to wipe out the fire ant.
3. Giving survey and eradication workers free access to property.
4. Following all precautions recommended when insecticides are applied.
5. Treating fire ant mounds in advance of the coordinated program.

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## BIOLOGY

## Animals Ape Each Other

HOW ANIMALS of different species mimic each other in their struggle for survival is being studied at Amherst College, Amherst, Mass., by Dr. Lincoln P. Brower.

Working under a grant from the National Science Foundation, Dr. Brower has furnished a converted greenhouse laboratory with eight bird cages and other equipment to conduct experiments to determine how, by imitating or resembling one species, individuals of another species increase their chances of survival.

Using evening grosbeaks and jays, for instance, he is trying to find some of the conditions that cause a bird to reject a palatable insect that resembles an unpalatable one. Flies that resemble noxious wasps, or butterflies that resemble distasteful butterflies of other species are called mimics. By their resemblance to dangerous or unpalatable species, the mimics tend to escape being eaten by predators such as birds.

## VETERINARY MEDICINE

## Farmers Not Veterinarians

FARMERS ARE WARNED against do-it-yourself treatment of animals in an editorial in the *Journal of the American Veterinary Medical Association*, 136:458, 1960.

The editorial blames pharmaceutical advertising for leading dairymen to attempt vein puncture and other techniques requiring veterinarian training.

The journal reports that indiscreet medication of animals headed for immediate slaughter will result in consumers eating unsafe and adulterated foods made impure

by drug residues in the flesh. Surveys by the Food and Drug Administration since 1957 have proved this danger.

For example, dangerous residues of penicillin found in milk were considered largely due to improper use of mastitis infusion preparations or failure to follow instructions on packaged products requiring that milk from treated cows be withheld from the market for 72 hours.

Dr. Brower is feeding his birds insects brought to varying degrees of unpalatability. "In mimicry theory," he said, "the more distasteful a model is, the greater the number of mimics that will escape being eaten by predators."

To investigate this, one of Dr. Brower's assistants is feeding blue jays beetle larvae dipped in various concentrations of quinine. The concentrations are not dangerous, merely distasteful, to the birds. A definite correlation is being found between the degree of distastefulness of the artificial model and the number of artificial mimics, which taste good, rejected by the birds.

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## PUBLIC HEALTH

## Exhaust-Purification Tried

TWO ATTEMPTS at controlling and eliminating noxious, smog-producing exhaust fumes given off by motor vehicles have won patents.

One is an aluminum filtering attachment that fits on the end of an automobile's exhaust pipe. The other is a method of feeding into the exhaust pipe chemicals that will react with the gases and render them less objectionable.

The filter attachment, invented by Jose L. Villasenor and Raul H. Leon of San Diego, Calif., consists of four connected chambers. One circulates air taken in by the rapid forward motion of the car. A second chamber mixes this air with the gases coming from the exhaust pipe. In a third chamber the noxious fumes are absorbed and reduced by mixing with castor oil. The last chamber provides final purification and cleansing.

This purification attachment is claimed to be easily attached and removed, simply manufactured, effective and durable. The inventors received patent No. 2,932,157 and assigned one-third of the patent rights to

James B. Abbey, also of San Diego.

The method of mixing chemicals with the ejected fumes was invented by Frederick C. Binter of Moorestown, N. J. It is claimed to purify the exhaust from both diesel and gasoline internal combustion engines, and to drastically reduce objectionable odors and irritating substances.

Mr. Binter accomplishes this by injecting into the exhaust pipe, preferably as far from the outlet end as possible, chemical derivatives of ammonium salts, which may be either liquids or solids that are water soluble. If a continuous flow of such chemicals is intimately mixed with the exhaust fumes as both pass through the pipe, he says, they remove or convert the noxious substances in the exhaust gas and result in a product that is neither foul-smelling nor irritating to the eyes.

The chemicals added to the pipe may be held in a refillable container mounted at the rear of the vehicle and fed to the exhaust pipe by direct pipes. The invention earned patent No. 2,932,364.

Science News Letter, May 21, 1960