

Weapons to Fight Insects

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ports. Should the khapra beetle reach our vital Midwest grain stores it could do incalculable damage.

Predatory insects are also being used against harmful pests. A world-wide search has been going on for insects which will attack destructive American insects and not harm other plants or helpful insects.

In the last few years, entomologists have imported 400 species of insects which might help in this war. At least 100 have proved effective and able to adjust to our climate and vegetation. "Mites Versus Spider Mites" and "Helpful Wasp Goes East" are only two in a long series of reports issued by USDA describing the helpful insects.

Scale on citrus trees has found an adversary in the Vedalia beetle. Aphids are attacked by the ladybug beetle. Thirteen species of insects attack the cottony-cushion scale.

Parasites Have Parasites

Parasites also play their role in the increasing biological warfare tactics employed by our side. The cabbage worm is succumbing to internal and external parasites. Even the parasites have parasites.

Bacteria and other microorganisms are being thrown at the alfalfa caterpillar, tobacco hornworm and budworm and the Japanese beetle.

Electronics also plays an important part in destroying insect pests. Radio and ultrasonic waves are used in granaries to kill many of the stored-grain insects. Blacklight traps are used both for counting and identifying species on the upswing around the country and for attracting the pests into electric grids for electrocution.

Chemical "perfumes" made to smell like

the attractant of several female insects are used to lure male insects to their deaths. The gypsy moth, a long-time enemy of forest and shade trees, is "psychologically" fooled by the smell of its mate, which turns out to be a synthetic compound on a trap. But the present gypsy moth campaign, for some unknown reason, is not working to the satisfaction of USDA.

The melon fly and the imported fire ant are also under the spell of synthetic "perfume," at least experimentally.

One of the most unusual techniques devised to ward off destructive insects is the cross-breeding of plants which can resist attack.

Cotton and grain sorghums have been developed which are not as attractive to, or resist in some way the bites of, the insects which normally prey on them.

Along the same lines, entomologists are studying the makeup of many of the infective insects. Cholesterol, nerves, sight and smell, all are being studied to lead to extermination techniques.

Federal inspection and quarantine and customs regulations of all imported plants and animals are, of course, main reasons for the lower number of dangerous insects invading this country annually.

Insecticides will also continue to find a place in the war. Many new and different chemicals are being added to the already large list of available sprays and powders to combat man's number one enemy. But total eradication of harmful pests is a long way in the future, and many of the new weapons will fail as others come into existence.

The battle against insects is continuous, and new methods, techniques and weapons resulting from much research are the answers protecting man's acquisitions from the insects.

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ENTOMOLOGY

Chemosterilants Tested In Anti-Fly Research

► GOVERNMENT scientists are searching for a deserted tropical island with lots of pesky flies.

Two isolated Pacific island groups are already being used for testing some of the most unusual weapons ever used against flies, Dr. L. D. Christenson, Agricultural Research Service entomologist, told SCIENCE SERVICE. These islands are ideal for testing the effectiveness of fly-killing devices and methods because flies do not migrate in from other places.

Radiation and chemical sterilization of male flies are perhaps the most effective methods under study. "Perfumes" and stomach poisons teamed together are also proving effective.

With the controversy over the possible harmful effects of insecticides caused by Rachel Carson's series of articles in the New Yorker magazine, ARS scientists are now emphasizing other insect-destroying methods which could "safely" eradicate harmful pests. But thorough testing is required before these techniques can be approved and applied in the United States.

Sterilization by radiation is being tested against the tropical and Oriental fruit flies and melon fly on the small island of Rota, a few miles north of Guam in the Pacific. This atomic attack has already proven its merit in the screwworm fly campaign in the southeastern United States. It is now a large project in Texas.

Chemosterilants (chemicals that de-sex) have been successfully tested on a Florida island against the common housefly by ARS scientists. Further testing is required before final approval, however.

In the Bonin Island group, several hundred miles southeast of Japan, an artificial attractant or "perfume" and a strong stomach poison have been teamed in a "highly successful" campaign against the large Oriental fruit fly population, according to Dr. Christenson.

Methyl eugenol and a small quantity of dibrome are soaked into small, two-inch-square porous cane fiber boards which are dropped on the several small islands, some 70 to 80 for each square mile. The boards hold enough of the chemicals to attract and kill flies for three weeks, he explained.

Three small islands down the Atlantic Missile Range are also being used for fly-control testing, SCIENCE SERVICE learned. But details of the programs are withheld.

Uninhabited and remote desert islands are not as easy to find as motion pictures indicate, the scientists discovered. Even if humans cannot easily reach them, flies can. Flies can migrate many miles if the wind is in the right direction, completely spoiling scientific counting of kills.

Anyone knowing of a beautiful and remote tropical island with lots of pesky flies, contact the Agricultural Research Service insect scientists in Washington.

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INSECTS GASSED—Methyl bromide gas is introduced into tarpaulin-wrapped storage facilities infested with khapra beetle at five pounds per 1,000 cubic feet. The wrapping and treatment of each storage facility requires individual study.