

Small farms forum

Insect control provides good news for tomato farmers

The future outlook for controlling the destructive Colorado potato beetle looks brighter now that two U.S. Department of Agriculture entomologists have found a bacterium deadly to the beetle grubs.

George E. Cantwell of USDA's Agricultural Research Service reported that a variety of the bacterium *Bacillus thuringiensis* killed more than 85 percent of the beetle grubs in two experimental field tests—one on potatoes, the other on tomatoes.

Weekly spraying prevented the young grubs from developing into destructive older grubs and provided almost complete protection to the plants, he said. Adult beetles were not killed but stopped feeding after about a week.

Several commercial B.t. preparations are being used to control gypsy moths, cabbage loopers and cotton pests, among others. Another species of this bacterium, commonly known as milky spore, has been used for over 35 years to control Japanese beetle grubs in lawns. However, none of these products is effective against the Colorado potato beetle, Cantwell said.

Cantwell and colleague William W. Cantelo reported their efforts to solve the Colorado potato beetle problem at the symposium on small farms research.

The beetle causes millions of dollars in annual losses to potato fields in the Northeast and Northwest and to tomato and other related vegetable plants as well.

Tomatoes are one of the leading

cash crops of small farms in the Northeast, and the beetle is the insect pest of greatest concern to growers because it is rapidly becoming resistant to insecticides. Some farmers are spraying weekly when beetles are abundant, Cantelo says. While frequent spraying may protect the standing crop, it serves to accelerate beetle resistance, he cautioned.

To postpone this resistance, Cantelo is developing a model that will predict returns in yield from several different starting populations of the beetle.

"This information may enable growers to reduce pesticide treatments," he said.

The brightly colored adult beetles emerge from the ground in May and live about 30 days, feeding and producing offspring which produce more offspring. By the middle of August, the progeny of one pair of beetles could consume 45 square feet of tomato foliage a day according to

laboratory feeding studies, says Cantelo.

In field studies, he used the data obtained in these feeding studies to simulate beetle damage to tomato plants. By removing foliage at the same escalating rate, he found that one pair of beetles infesting garden variety tomatoes in late May would completely defoliate 20 plants by the end of July and 60 points by mid-August.

In both cases the seasonal yield was reduced by at least 50 percent. One pair of beetles would also cause substantial seasonal losses in commercial variety tomatoes. However, beetle feeding would not be so destructive to the commercial grower because most of these varieties are generally plowed under after they produce the bulk of their crop in mid-summer before the beetle population peaks, Cantelo explained.

"Getting control over the first generation of beetles would help keep their population below damaging levels for the rest of the growing season," says Cantelo.

Farmers may soon have the option to using a biological insecticide to get early control and, at the same time, stem the insect's resistance.

Although B.t. products have not been widely accepted by farmers, probably because they are slower acting than chemical insecticides, they have several other advantages over chemical insecticides.

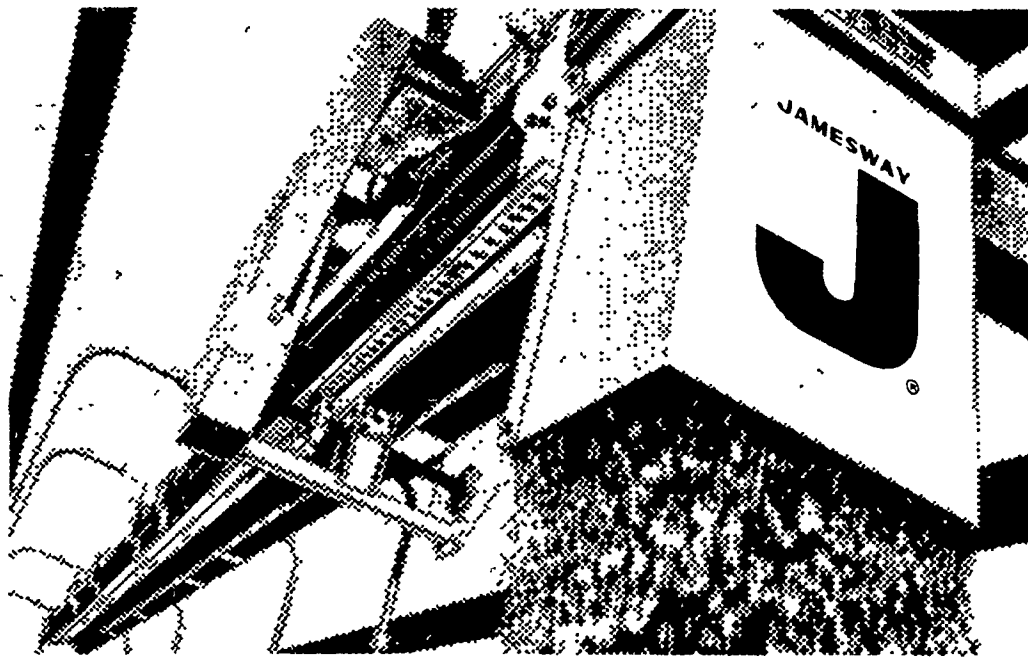
They are nonpolluting and can be sprayed on crops up to the time of harvest. And fruits and vegetables can be eaten right after spraying, says Cantwell. During the course of these experiments, Cantwell learned from a visiting Russian

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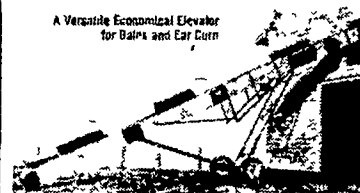
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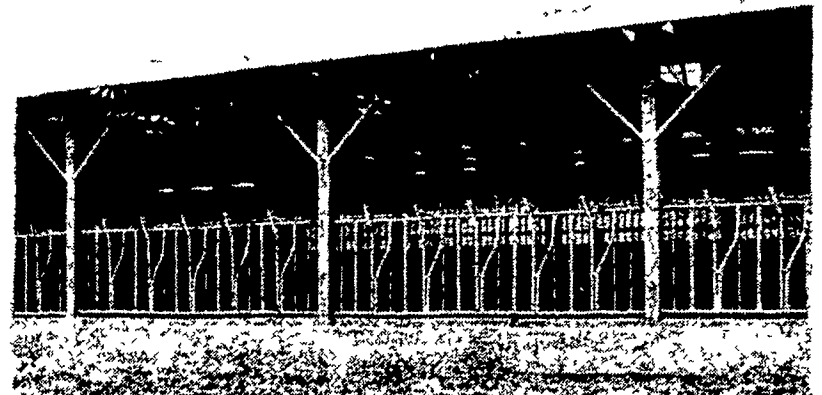
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