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## AREA-WIDE MANAGEMENT OF CORN ROOTWORMS

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Knipling (1980) proposed a concept termed "regional management," now being referred to as "area-wide pest management," to manage a key pest throughout a large geographical area that is delineated by biological criteria associated with pest colonization and dispersal. The suggested advantages of a coordinated approach to managing a mobile insect are: 1) by coordinating its application throughout an area, the most environmentally benign management strategy can be utilized, 2) when interfaced with integrated pest management, a long-term solution to agricultural problems is possible which might be more efficient and sustainable, and 3) if the production system is released from the constraints of managing the key pest, other more environmentally sustainable tactics may be used for secondary pests.

The concept of managing corn rootworms on an area-wide basis has been tested in Nebraska (Pruess *et al.* 1974). Insecticides were applied to a 16 square mile area to kill adults before they laid their eggs and the impact on the rootworm population in the center four square miles was determined. The authors demonstrated that controlling the beetles prevented larval damage the following season. The cost of the program was similar to soil insecticides, however, because while treatment costs were half that of soil insecticides, all of the cropland was treated even though only half was planted to corn.

More recently corn rootworms were managed in a similar sized area (16 square miles) in South Dakota with a semiochemical-based bait (Sutter and Hesler 1993). The baits contain an attractant to stimulate beetle feeding and only 2-5% of the insecticide on a per acre basis as do the soil treatments. In South Dakota, the insecticidal baits have been applied only to corn fields that have enough adult corn rootworms to produce an economic larval population the following year. Prescription application has reduced the number of fields treated (L. Chandler, personal communication) and, therefore, the financial and environmental costs. The results seem to demonstrate that the prescription use of semiochemical-based baits will provide a management strategy for corn rootworms that is more efficient and sustainable over the long term.

The 1985 Iowa pesticide use survey documented that nearly 10% of the continuous corn acreage was treated with a soil insecticide primarily to control black cutworms. By removing the incentive of using prophylactic broad-spectrum soil insecticide treatments from continuous corn by targeting the key pest, corn rootworms, with a highly specific treatment, black cutworm management can also become more targeted. The untreated corn can be scouted after it has emerged and if cutworms are present, an insecticide specific for the cutworm can be applied. This would encourage the use of pyrethroid insecticides that have a lower mammalian toxicity.

To date the area-wide, semiochemical-based approach to corn rootworm management has been evaluated only one time in South Dakota. Before it can be judged successful in generally accepted production practices, it must be evaluated under regional production practices. The USDA has proposed a project whose purpose is to evaluate the suitability and acceptability of the area-wide approach to managing corn rootworms in three regions of the Corn Belt.

The project will be divided into three phases. During Phase I, community attitudes will be surveyed and the acceptability of the management approach will be ascertained. If area-wide management appears acceptable, a study site will be selected. The study site will include at least 16 square miles of cropland that has a consistent corn rootworm infestation and has the support of local agricultural industries. During Phase II, insect populations will be monitored in the corn planted within the study site. Corn rootworm populations will be managed using cultural methods and semiochemical-based insecticidal treatments. Other insect pests will be managed using the best management practices as

prescribed by crop management specialists. During Phase III, the success of the project will be assessed. Success will be judged by measuring changes in the attitude of the farming community, the economics of coordinated management tactics compared with those employed individually in a companion area, and the environmental impact of the semiochemical-based approach versus the traditional prophylactic application of insecticides to the soil.

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