Corn Insect Management

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Introduction and Principles

Integrated pest management is a concept proposed for use by growers to prevent or limit pest damage by planning and making decisions that balance the positive and negative aspects of the tactics used to limit pest damage. In application, IPM systems are tailored for specific situations, such as groups of crop fields or whole farms, and should embrace all considerations of the pest management tactics used, including, but not limited to, effectiveness, cost, risks, and potential for environmental contamination.

The IPM concept originally focused upon insect management, emphasizing a reduction in the use of insecticides by relying first upon biological control, cultural practices, and other nonchemical tactics for pest management and by basing the application of insecticides on need. Later, IPM was expanded to include weeds, plant pathogens, and nematodes as well as the integration of pest management practices for different types of pests. Successful IPM programs allow producers to maintain profitable crop production and minimize the undesirable effects of pest management practices. This section describes the principles of IPM applied to insects in field corn.

Integrated pest management programs typically are based upon four fundamental strategies: *prediction, prevention, detection,* and *remedial action*, if necessary. These strategies provide a systematic approach for implementing IPM.

Prediction of pest occurrence involves anticipation of the kinds of pests that might develop within a field or on the farm and the likelihood that pest densities will reach or exceed economically damaging levels. Prediction of pest occurrence can be based upon past experience; counts of insects from the previous season; knowledge of pest biology, weather patterns, and cropping circumstances (e.g., no-till, crop rotation); and computer models that generate projections of insect pest populations. Management plans can be developed for the pests that are most likely to cause crop loss. The management plan should be appropriate for all pests, their potential to cause economic damage, and their likelihood of occurrence. Pest management tactics range from application of a costly preventive insecticide treatment for an insect expected to cause serious economic losses to monitoring during the growing season for pests that cause economic damage occasionally. Doing nothing when the pest density is below an economically damaging level is a legitimate pest management tactic.

Prevention enables a grower to avoid the pest or the injury it causes. Prevention may be accomplished completely or partially by moving the crop (crop rotation), planting an insect-resistant variety, increasing the tolerance of the crop to the pest with good agronomic practices, planting a hybrid with a different maturity, or otherwise creating a situation where the crop escapes the pest or its damage. Nonchemical preventive tactics for pest management are encouraged because they often are cheap, have few negative consequences, and are compatible with farming practices.

Detection is the process of discovering pests in a field or on the farm and estimating their potential to cause economic damage. Scouting and monitoring for pests enable a grower to observe the seasonal dynamics of pest populations. Economic thresholds have been developed to indicate when the density of a pest is large enough to cause economic damage to the crop and, therefore, justify a control action (e.g., an insecticide application).

Remedial action is taken when detection reveals that an economic pest problem exists. The intent of remedial action is the reduction of a pest density to a level below the economic threshold. Insecticide application currently is the most commonly used remedial tactic.

Growers should consider the consequences of selecting certain IPM tactics. Some considerations are obvious, such as availability, cost, effectiveness, and ease of use of the selected tactic. However, other important considerations include environmental safety, potential effect on human health, impact on beneficial insects, worker protection issues, legal limitations, and social consequences. All important factors should be evaluated to determine the best IPM plan for both short- and long-term impacts.

Integrated pest management must be an integral component of crop management. Management of the corn crop affects pest populations and crop tolerance to insect