CONCEPTS OF INTEGRATED PEST MANAGEMENT IN WASHINGTON

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INTRODUCTION

Integrated pest management (IPM) is the management of pest populations below levels that cause economic damage by using a compatible balance of biological, cultural, chemical, genetic, or other control methods. Control may be aimed at one or more pests depending upon the scope and complexity of the management system. IPM takes into account interactions among pests, environment, and commodity. IPM differs from traditional control approaches where each pest was considered and controlled individually and where emphasis may have been placed on a single measure.

The IPM concept comes from the realization that any disruption of a pest will tend to affect other pests and beneficials in the crop complex. Integrated pest management attempts to develop and use techniques to manage pests, not to eradicate them. In the production of food and fiber, man has learned that more balanced cropping systems with greater diversity tend to undergo fewer disruptive pest outbreaks. For this reason, it has been easier to develop IPM programs in fairly stable environments, such as tree fruits, forest, or alfalfa than in annual crops which represent more disruptive environments.

APPROACH

Integrated pest management systems need to be flexible and broad, and various approaches may be taken when employing an IPM system. One possible approach follows:

1. Identify pests that must be managed. Pests include insects, mites, weeds, vertebrates, and plant pathogens such as fungi, bacteria, viruses, and nematodes that cause economic damage to crops or plants. Diagnosis, incidence, and loss information are relevant factors in this identification process.
2. Define the management unit. A single field may be a unit if a soil-borne nematode with low mobility is the key pest, or a subcontinent may be a unit if a widely disseminated pest, such as leaf rust of wheat, is the key pest.
3. Develop an optimum pest management program which coordinates the use of multiple control tactics. Combinations of control tactics need to be effective and designed to be compatible with beneficial organisms and the environment. The program may vary with time of year and location for a given crop. Biology of the pest and possible interactions are considered. For example, interactions between the pest and the environment, such as an increase in predator populations or the effect of weather on the sporulation of a fungus, may dictate the effective timing or utilization of a control practice.
4. Develop reliable monitoring techniques. Sampling methods must accurately assess numbers of pests and beneficial organisms per unit of field, orchard, or other type of planting. This information is necessary to determine population trends and as a basis for decision making. For example, wireworm numbers in soil samples must be analyzed to determine when and if chemical treatment is necessary.
5. Determine economic injury levels or the relation between the pest population, amount of damage, and cost of control. If a pest population is below a specific level, it may

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cost more to control than the dollar return from the control.

6. Develop descriptive and predictive models. Models are useful tools in predicting pest epidemics and timing pesticide applications, identifying knowledge gaps for research, and organizing an approach for research or a strategy for control.

OBJECTIVES

The objective of Washington IPM is to develop and implement programs and disseminate information on pest management through the approach listed previously. Possible objectives are:

1. Develop effective monitoring techniques for pest and beneficial populations and determine economic injury levels to facilitate management decisions.
2. Optimize pesticide use, reduce impact on non-target organisms, and combine this use with other management practices.
3. Improve crop yields, quality, and economic returns by a multi-tactic pest approach to manage pest populations.

ADVANTAGES OF INTEGRATED PEST MANAGEMENT OVER ROUTINE PESTICIDE APPLICATIONS

Experience has shown excessive pesticide use leads to resistance development in many pests. Hence, pesticides must be employed carefully and sparingly to extend their usefulness. If IPM leads to reduced pesticide usage, the reduction may also lower production costs for growers in terms of materials, equipment, and labor. In addition, most pesticides are petroleum-based chemicals, a fossil energy resource in diminishing supply. Finally, and very importantly, many pesticides are toxic to a variety of beneficial organisms that contribute to man's pleasure in this environment and/or which help control pests. Pesticides should be used only when necessary and they must be applied correctly, as in an IPM schedule, to minimize these problems.

IPM combines complex, biologically based, pest control techniques to provide obvious advantages to the grower and society. It does not necessarily reduce pesticide application, but stresses more logical use of pesticides. The correct selection and timing of a pesticide can be a powerful tool used to improve market grade and greatly increase grower returns. A pesticide used unwisely, however, can actually result in greater production costs for growers and an abuse of the environment that affects all of society.

WASHINGTON IPM PROGRAMS

Washington has ongoing, organized IPM programs on alfalfa seed and tree fruits and new projects on hops and potatoes. The alfalfa seed and tree fruit projects are now largely conducted by consultants, fieldmen, and growers, with Washington State University providing updated information. These programs involve people from both government and private industry for research and dissemination of pest management information.

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