Pesticide Application and Stewardship

The Philosophy of Integrated Pest Management

The U.N. Food and Agriculture Organization's (FAO's) panel of experts on Integrated Pest Control (1976) defined IPM as:

> A pest management system that, in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible and maintains the pest populations at levels below those causing economic injury.

The Council of Environmental Quality (CEQ) in its publication *Integrated Pest Management* (1972) defined IPM as:

> An approach that employs a combination of techniques to control the wide variety of potential pests that may threaten crops. It involves maximum reliance on natural pest population controls, along with a combination of techniques that may contribute to suppression – cultural methods, pest-specific diseases, resistant crop varieties, sterile insects, attractants, augmentation of parasites or predators, or chemical pesticides as needed.

The working definition at PLU for Integrated Pest Management (IPM):

> An ecologically based pest control strategy that relies heavily on natural mortality factors such as natural enemies and weather and seeks out control tactics that disrupt these factors as little as possible. IPM uses pesticides, but only after systematic monitoring of pest populations and if natural control factors indicate a need. Ideally, an IPM program considers all available pest control actions, including no action, and evaluates the potential interaction among various control tactics, cultural practices, weather, other pests, and the crop to be protected.

Any action taken will follow these guidelines:

1. Conceive the managed resource as a component of a functioning ecosystem.

2. Understand that the presence of an organism of pestiferous capacity does not necessarily constitute a pest problem.

3. Automate consideration of all possible pest control options before any action is taken.

4. Understand the biology of the crop or resource, especially in the context of how it is influenced by the surrounding ecosystem.

5. Identify key pests, know their biology, recognize the kind of damage they inflict, and initiate studies on their economic status.

6. Consider and identify as quickly as possible the key environmental factors that impinge (favorably/unfavorably) upon pest and potential pest species in the ecosystem.

7. Consider concepts, methods, and materials that used individually and/or in combination will help to retain or suppress permanently pest and potential pest species.

8. Structure the program so that it will have the flexibility required adjusting to change. In other words, avoiding a rigid program that cannot be adjusted to variations from field to field, area to area, or year to year.

9. Anticipate unforeseen developments; expect setbacks; move with caution; above all, be constantly aware of the complexity of the resource ecosystem and the changes that can occur within it.

10. Seek the weak links in the life cycle of the key pest species, directing deliberate control practices as narrowly as possible at these weak links, thus avoiding broad impact on the resource ecosystem.

11. Whenever possible, consider and develop methods that preserve, complement, and augment the biotic and physical mortality factors that characterize the ecosystem.

12. Whenever feasible, attempt to diversify the ecosystem.

13. Assume and insist that technical surveillance for programs be available (i.e., monitoring).

A Strategy for the Future

The goal of PLU's program is not to eradicate pests entirely, but rather to manage the population so that economic damage does not occur. Due to the complexity of ecological systems, total elimination of pest populations has proven to be environmentally unsound; the balance is sensitive and intricate, and manipulation of one variable profoundly affects all other variables. Therefore, the entire system must be regarded holistically, with extreme consideration given to the impact on the delicate interplay within it.

Another goal of our program is to reduce the usage of chemical pesticides. Whereas chemical pesticides are efficient, cost effective, and convenient, they may also create a

multitude of complications. These include environmental threat, overuse, immunity, and extermination of desirable species.

A major strategy of our program is cultural control: proper plant selection based on knowledge of a plant's origin, habitat, and environmental requirements. It also means choosing species and varieties that possess the most resistance and inhibit the rise of potential pest populations. Included in this concept are the use of indicator plants, soil preparation techniques, and crop rotation. All these methods work in conjunction with the natural environment, reducing the need for chemical application or other unnatural and potentially disruptive methods of pest elimination.

Biological control of pests involves introducing anything of a living origin (such as predators, parasites, or diseases) into the environment for the purpose of reducing or controlling an antagonistic species. An advantage to this method is that the effects are long-range rather than temporary. Another advantage is that as the pest population is reduced, the host density is usually also reduced. A final advantage is that it is often species specific, attacking the unwanted organism rather than all organisms. Although biological control is slower than chemical treatment, the benefits merit its implications.

Our program is an approach that employs an extensive variety of methods, techniques and strategies, with consideration to all environmental factors and conditions. It is highly sophisticated and refined, requiring comprehensive knowledge and expertise. Despite the complexities, it is an important and necessary science that will be further developed and utilized in the future. This is because our program recognizes and appreciates the imperative balance of nature, while at the same time allowing for manipulation of the environment.