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## Expectations of integrated pest management

There is such widespread support nowadays for integrated pest management, one wonders why it has taken so long for the program to develop. So extensive is the support from groups which at times have been adversaries that I am concerned that serious disappointments will arise in the years ahead among some of the present proponents unless there is clearer understanding of what is meant by the IPM approach. It is important that the potential achievements of integrated pest management not be oversold or misunderstood.

Farmers expect IPM to reduce their costs of pest control. Environmentalists expect it to replace chemical pesticides in agriculture. Chemical companies expect IPM programs to permit the continued use of pesticides under conditions that will reduce their potential hazards to people and our surroundings. Regulatory agencies see IPM as precise prescriptions for pest control actions which would replace present application schedules. Scientists see IPM programs as a way to integrate the specific information of their individual research projects into a system which increases the predictability of optimum crop production with reduced threats to the quality of the environment. Politicians welcome the concept of integrated pest management because there is almost no factional opposition to it.

There are degrees of validity in each group's expectations about the benefits of IPM, but those close to the program recognize clearly that it is still in its infancy and does not offer a panacea for pest control. It will take time and much dedicated work to accumulate and analyze new data before we can expect to see the adoption of integrated pest management across the entire spectrum of crop and livestock production. And then, it will be more than "pitting the good bugs against the bad bugs," as one public commentator put it recently. Chemical pesticides will continue to be necessary in most IPM programs. Prescriptions for pest control must be adaptable to a number of factors which influence plant and pest development.

A basic principle of IPM that requires increased understanding is that it is a different concept of pest and disease control. It places the plant or animal we are interested in protecting at the center of attention—rather than the pest or disease affecting that plant or animal. It recognizes that

there are numerous factors of the environment and the host itself which make the host more or less susceptible to damage by the pest or disease and recognizes that these factors are largely influenced by all other factors in a way which result in changing the hosts' susceptibility to attack. IPM takes into account that a plant or animal is a part of a community of plants or animals which also influences the potential disease or pest occurrence. It acknowledges that weather plays a significant role in this interacting environment and that its influences must be thoroughly understood before predictive models of control systems can be devised.

Integrated pest management recognizes that pests include all agents (i.e., insects, mites, nematodes, weeds, bacteria, fungi, viruses, parasitic seed plants, and animals) which adversely affect plant and animal production. It recognizes that a plant or animal may be affected by a variety of pests and diseases simultaneously or sequentially, each potentially influencing the course of events. Above all, IPM accepts the premise that some damage to plant and animal production may be economically tolerable.

It is easy to see that much needs to be accomplished before fully operative IPM systems can be implemented. Nevertheless, progress can be achieved incrementally and much-improved pest and disease control practices can be achieved before total systems are fully activated.

One of the biggest challenges before the scientific community will be the acceptance of a different system of research management. The academic community traditionally grants its highest recognition to individual creativity. Successful achievement of the goals of IPM will only come through the integrated participation by our creative scientists working as a team toward a common goal of developing management strategies and tactics for individual crops and animals.

Careful planning can preserve the scientific integrity of individual scientists, but ultimately they must recognize the indispensable value of the team and its mission. Much of the future of the agricultural research system will rest on the ability of that system to meet this challenge and produce effectively. Expectations are high from all quarters. We have a marvelous opportunity to justify most of them.