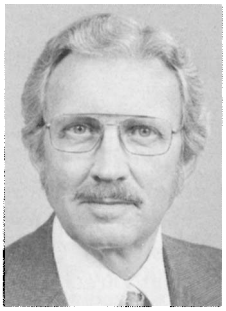

J. B. KENDRICK, JR.
Vice President - Agriculture
and University Services

Director, Agricultural Experiment Station
and Cooperative Extension

Agriculture's most important battle

Integrated pest management, the subject of this special issue of *California Agriculture*, may be an idea whose time has come. It is not a new idea. The concept received some attention even before World War II, and, of course, farmers always have used cultural practices and natural forces to hold down harmful insects, diseases, weeds, and other pests. But the advent of DDT and other pesticides in the 1940s diverted attention from nonchemical control measures.

These new chemical materials were easy to apply and initially so effective and inexpensive that they appeared to be the ultimate control tool. Because recognition of their shortcomings was slow to surface, the use of pesticides increased dramatically over the past two decades and came to be the primary control measure for pests of all kinds. Approximately 45 percent of the total volume was used to protect our food supply—for seed and soil treatment, pre- and post-emergence weed control, protection of plants and animals, and post-harvest protection.

As a basic component of agricultural technology, these materials have played—and will play—an essential role in food and fiber production. But the inherent drawbacks of dependence on this single line of defense have become increasingly apparent. It has introduced problems of pesticide resistance, destruction of natural controls, outbreaks of secondary pests, reduction of pollinators and other beneficial species, potential environmental contamination, and some health hazards.

The unilateral use of any control measure—even the introduction of an insect-resistant plant variety—can have unexpected and undesirable consequences. Integrated pest management is designed to reduce the control failures associated with pest resistance, resurgence, and secondary outbreaks increasingly generated by sole dependence on pesticide use. It is a flexible, multidimensional approach utilizing a range of biological, cultural, mechanical, and chemical techniques as required to hold pests below damaging economic levels without disrupting the agro-ecosystem. The basic premise is that no single arbitrary control method will be successful because of the remarkable adaptive powers of insects, weeds, and plant pathogens and because of the many variables related to location, season, cropping patterns, and individual pests.

The key ingredient of integrated pest management is information. We must know the dynamics of pest populations, be able to predict the pest's occurrence, its population levels, and the potential economic damage. We must know the biology of the pest organism, its natural enemies, the host plant or animal, and their interrelationships in the environment. We must be able to forecast the effects of various control techniques and strategies on each other and on the environment in which they are used. We must know more about the effects on pests of the weather conditions, crop status, and cultural practices such as irrigation, cover-crop management, and harvesting methods.

As the reports in this issue suggest, much has been learned, and the integrated approach is being used on a limited scale with success against specific pests. But, much more knowledge is needed, and its acquisition is a slow and painstaking process. Present research programs must be significantly expanded before coordinated, ecologically sound control programs can be effectively mobilized in the battle against the complex array of pests that damage and destroy our food supplies.

Pest control is a vital part of the food production process, and our goal is to move beyond present stopgap measures to provide a stable and economically sound control system. The objective of our research is to develop a pest management strategy employing all control measures in a system's context to provide the highest practical yields and maximum environmental protection.