Implementing integrated pest management in California

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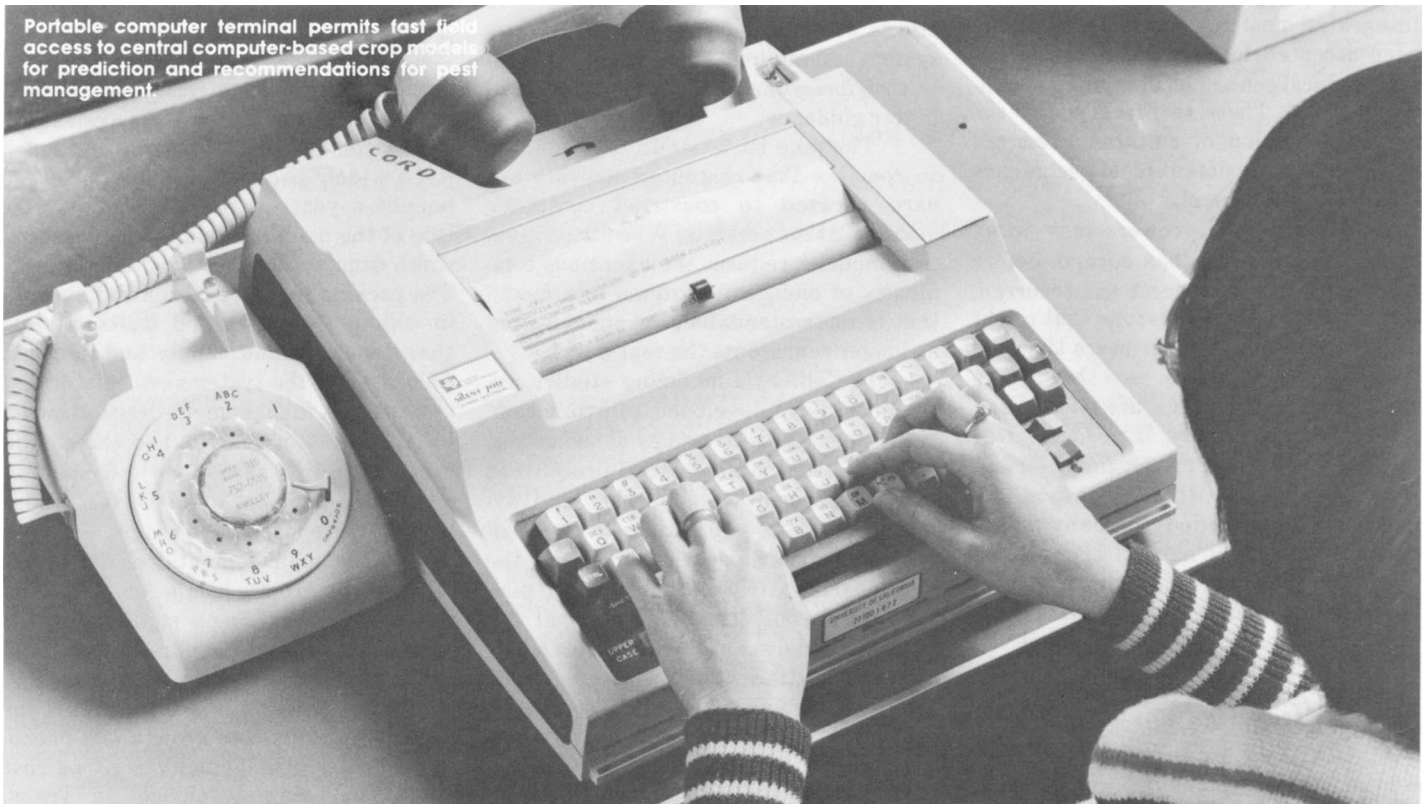

Portable computer terminal permits fast field access to central computer-based crop models for prediction and recommendations for pest management.

Pest control in California must change if the state is to maintain high quality crops. Besides causing environmental and biological problems, pesticides may become so restricted in number, and their costs may rise so sharply, that chemical controls by themselves may never again be valid pest management strategies. An integration of chemical, biological, and all other control strategies is the only practical alternative.

New methods of monitoring pests and a more quantitative approach to describe agricultural ecosystems promise to provide the tools for intelligent decision-making in integrated pest management (IPM) and make the outcome of IPM actions more predictable. New, more effective ways of implementing IPM programs are now being developed, and farmers have become more willing to accept integrated control strategies because of past difficulties with total reliance on chemical control.

Certain components are common to most successful IPM programs presently in operation. These include the monitoring of pests, their natural enemies, the crop, and the weather. More generally these activities can be described as biological and environmental monitoring to provide the necessary input for computer-based pest crop models. Pest management experts interrogate these models, obtain predictions, and recommend specific actions for pest management. Biological monitoring follows the effect of the action taken and updates model predictions.

Because time is a very important element in pest management, an essential feature of an IPM system is the capability to respond quickly to changing situations and return recommendations in time for remedial action. Modern communication technology makes the models accessible to the pest manager in the field.

Weather network

The great diversity of California's topography, weather, and agriculture makes the development and implementation of pest management systems a complicated endeavor. A much-needed component for such programs will be an agricultural weather network to provide fundamental climatic information. Past and current weather information can help in predicting spring frosts, fall rain, yield and harvest, irrigation needs, and pest problems. Several states already have operational networks that are either completely automated or have cooperators reporting observations to a central location. In California, existing weather stations could be organized into such networks. For effective pest management, observations must be taken and reported at least once a day. New agricultural weather sites will be necessary in some areas to describe the local climate adequately. Cooperators—farm advisors, growers, agricultural advisors, and pest managers—could serve as weather observers. Where costs are not prohibitive, automated weather sites could transmit climatic measurements more frequently.

Agricultural meteorologists and the National Weather Service could collaborate to develop such an agricultural weather network.

Communications

Perhaps the biggest challenge will be to develop an efficient method of communication between pest managers in the field and the data processing center. For predictions to be of value, monitoring data must be processed quickly and the pest management recommendations delivered to the grower with minimum delay.

Computer terminals at Cooperative Extension offices could form a communications network connected by telephone to a central facility. Because of differences in the crops and climate of some agricultural areas, and the large distances between them, smaller IPM networks with computing facilities in key counties might supplement the statewide network.

Much pest management information besides pest crop model analysis and predictions will be instantly accessible through this communication network: (1) Pest alerts and monitoring summaries—IPM personnel could report pest problems as they occur and notify growers. (2) Pesticide registry and control recommendations—information could be instantly available about legal control procedures, and control recommendations could be more frequently updated than is now possible with leaflets and circulars. (3) Climatic information—station summaries on temperatures, degree days and precipitation, and agricultural weather advisories could be provided. (4) Coordination of IPM activities—surveys for new pests and monitoring of pesticide use could be more effectively organized and supervised through this IPM network. Furthermore, the network will enable pest managers and applied researchers to communicate with each other and relay critical current observations on pests, their damage, and control. And the network can establish links with other states through a national data network, TELENET, for exchange of additional IPM information.

Other sources of computer-based information related to agricultural production could also be made available—programs dealing with agricultural economics, farm management, and so on. Researchers could utilize a two-way communication network for coordination of projects and data collection, and relay the research results to the growers more quickly.

Some IPM programs, particularly those dealing with larger crops and with forests, will rely heavily on advanced data collection, systems analysis, and sophisticated models. Many other programs, however, will remain less sophisticated. In any case, the IPM information system will be able to deliver the best information available on pests and their control, with constant updating.

The most important measure of success of an IPM program is grower acceptance. In the past, inadequate information, communication problems, and too little supervision have led to poor implementation. The new information system will greatly improve the IPM information delivered to the field, and will contribute to better and more economical pest management practices.

Some growers may not have easy access to the system. Simpler methods of conveying quantitative information, using charts or tables, should be made available for easy interpretation of field data without a computer. Farmers should be provided with the tools and training to practice IPM on their own.

This information system should be viewed as a complement to the various ways IPM information is presently delivered by Cooperative Extension: bulletins, circulars, weekly or monthly pest alerts, and so on. Extension will be an essential component of the overall pest management system. Extension personnel will be involved in monitoring pests, reporting data, and operating the information system. It will be Extension's responsibility to maintain open communication and relay IPM information through various channels to pest management services and the growers (see figure). The private sector, the various services, and the growers may be involved not only as intermediaries or receivers of IPM recommendations but also as active participants who can contribute to the monitoring of weather and pests.

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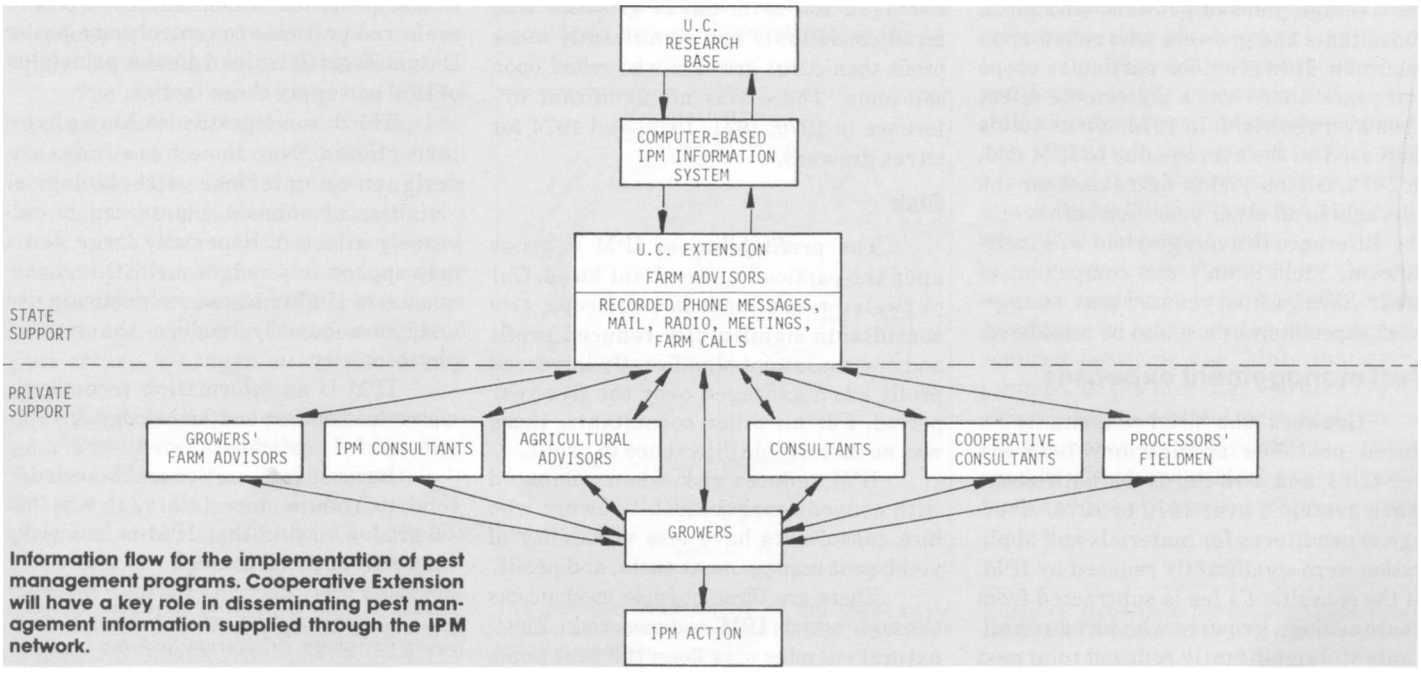

Information flow for the implementation of pest management programs. Cooperative Extension will have a key role in disseminating pest management information supplied through the IPM network.