



ON-LINE PEST MANAGEMENT OF SELECTED FIELD AND VEGETABLE CROPS

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A new pilot project in pest management has been started by the Michigan State University Cooperative Extension Service. It deals with insect, disease, weed and nematode problems of selected field and vegetable crops (sugar beets, small grains, alfalfa, potatoes, asparagus, onions and carrots). The purpose of the project is to enhance Michigan crop productivity through the use of modern principles of pest management and computer technology. This publication is designed to explain how the program operates. We believe the project will provide economic and environmental benefits to a broad range of people within the Michigan agricultural community and outside it.

1. What is "on-line pest management"?

"On-line" is a term used to describe a system that combines modern communication techniques with data processing (computer) technology to make more efficient use of information. The most commonly used piece of equipment associated with on-line processing is the computer terminal known as the teletype. When an airline takes your flight reservation, or a car rental agency arranges in advance for a car at your destination, they are very likely using their computers in an on-line fashion.

"Pest management" refers to the whole collection of practices relating to crop pests. It includes such things as biological control (for example, introduction of beneficial insects), cultural techniques (intercropping, crop rotation, etc.), introduction of resistant varieties, as well as use of pesticides. On-line pest management is designed to use current information from the field, plus historical information and data gathered from scientific experiments, in order to increase the efficiency and effectiveness of pest management techniques.

2. What is the purpose and scope of the pilot project?

Pest management can be said to have gone through a series of stages, beginning with control of individual pest species as problems arose. The next stage has been to develop strategies to deal with an entire range of pests affecting a single crop, and the next logical step is to consider a collection of related crops and their pests. There are many projects currently underway in various parts of the country that use on-line techniques for pest management, most of which can be described by one of the first two stages mentioned above. The apple pest management project in Michigan is one of the most successful of these, and it is evolving into a multiple-crop system--a fruit pest management project.

The purpose of our present project is to demonstrate that on-line techniques can be applied to a wide range of vegetable and field-crop pest problems. It includes work on four pest groups - insects, weeds, diseases and nematodes - and seven crops - alfalfa, sugar beets, small grains, asparagus, carrots, onions and potatoes. Taken together, these crops are worth over 400 million dollars to Michigan farmers every year. As the costs of producing these crops is increasing (including increased pesticide prices), more efficient and economical pest management can provide substantial savings to growers, while reducing losses due to pests. An additional benefit from using pesticides more efficiently is that environmental risks may also be reduced.

Like the wide range of crops, the geographical range of this project is also broad. It covers most of the southern half of the lower peninsula: from Lake Michigan on the west to Lenawee, Washtenaw, Livingston, Lapeer and Tuscola counties on the east; from the Indiana-Ohio borders on the south to Oceana and Bay counties on the north. Four county agents' offices, located in St. Joseph, Newaygo, Ingham and Bay counties, will be equipped with teletypes and staffed with pest management field assistants to serve areas of 8 or 9 counties each. Additional teletypes located in the fruit belt will also be available for use in other county agent's offices.

3. What kinds of services will the project provide?

On-line processing is especially suitable for rapid sending, receiving and "digestion" of information. Depending on the level of knowledge associated with each pest and crop, several types of services are possible.

- (a) Pest Alerts. Through a message-sending and receiving program, pest management assistants can report the occurrence of pests as they appear, and all other users of the system can get the message within hours or even minutes, and then notify growers through tape-recorded telephone messages to be on the lookout for the pests. This is useful, for instance, with an insect that occurs a few days earlier in the south than in the north. When the pest appears in St. Joseph or Berrien County, the assistant in St. Joseph sends a message saying that it has been spotted, and extension personnel in Newaygo county can tell growers to expect it to occur within a few days in their area.
- (b) Monitoring summaries. More detailed information on actual numbers of pests - obtained from traps, visual counts on plants and other sampling procedures - can be relayed through the on-line system, in order to help make decisions as to the extent of pest problems and the best time to use control measures.
- (c) Prediction. Through the use of mathematical models, it is often possible to predict--from monitoring information, weather data and other information--the time of emergence of particular pests, the numbers of pests to be expected, and the expected damage due to the pests. Such models are based on past observations of pest populations and from an understanding of the basic biology of the pests and their control. These predictions may help in the timing of control practices.

- (d) Control recommendations. The on-line techniques will enable extension workers at MSU to update control recommendations more frequently and more rapidly than is now possible with extension bulletins. The county agent can be certain of having access to the most up-to-date set of recommendations for each pest.
- (e) Historical data. In many cases, historical knowledge of a farm or a region--regarding crops planted, pests found, and control practices used--can be helpful in making predictions and recommendations for the present and future. Computer storage of the large amounts of data involved can be combined with on-line processing to make historical information available quickly and in a fashion that is easily read and used. Weather data is often crucial in pest management decision making, and the ability to obtain past and present information about the weather in a particular area can be very helpful in making predictions about pest problems.

All of this computer activity depends on an extremely important human activity: biological monitoring. It is necessary to keep close track of the times of appearance of pests and beneficial species, and of their numbers. As this information comes in from the field, the tools made available by the computer can be put to use to aid in making pest control decisions. To help set up and maintain these monitoring activities, and to assist in the use of the computer, a pest management field assistant has been assigned to each of the four geographic areas described earlier. The assistant will also be responsible for communicating to growers the results and recommendations stemming from the on-line system. Growers will thus be in contact with the on-line system through their county agents and the pest management field assistants. If problems or criticisms arise, these are the people to contact, since they will be familiar with field conditions and with what the on-line system can deliver. Only by effective communication, between growers and the county agent and field assistant, can the on-line system be of any value.

4. How long will this project last?

This is a pilot project, with funds provided by the Cooperative Extension Service of the United States Department of Agriculture, for a three-year period. Success of the project depends on the growth of state and local support for continuation beyond these three years. Growers' associations, industry and state organizations will be asked to evaluate the usefulness of this project to the agricultural community in Michigan, and to plan on providing financial support, after the first three years, to allow this project to continue. For this reason, growers are encouraged to communicate with their county agents and pest management assistants as to any problems or criticisms that they have, so that the project can be improved to serve them. If growers are happy with the service provided, we would appreciate knowing that, too, and especially would like them to tell their local growers' association, county agent or industry representative if they would like the service continued.

5. How do growers participate in the project?

Growers interested in learning more about the project, and those interested in being participants, should contact their county agent, who will make sure that they are contacted by the pest management field assistant. The exact form of participation will depend on the region, the crop and pests involved, and to a small extent, the amount of time the grower is able to spend in pest management-related activities (this will never be more than a few minutes a day). All communications between growers and the project will be through the county agent, since he is most familiar with local conditions and pest and crop problems.

The success of this project depends on the cooperation of as many people as possible in the Michigan agricultural community: growers, county agents, industry representatives, researchers. By "cooperation" we also mean criticism where necessary, to help us to improve the quality of service that we wish to provide. The larger the number of participants, the more we will be able to know how well the project is serving the needs of the community, and the better we will be able to improve these services. We urge you all to participate to the fullest extent possible.