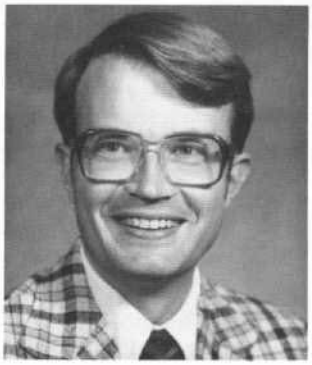
How Computers Aid Growers in Crop Management Systems



By Dr. Walter R. Stevenson

The rapidly increasing use of computer technology has significant implications for management of crops and reducing input costs. A variety of computer applications are in use today in agriculture. These include soil testing/fertilizer recommendations, feed rationing, pest management, irrigation scheduling, weather forecasts, market information, and record keeping programs. This article will briefly discuss a few of these computer applications.

DISEASE PREDICTION MODELS: If a grower could predict when a certain disease was going to become serious, then control measures could be applied at the proper time rather than on a weekly schedule. An important component of such a system is to have the necessary environmental data which would allow one to determine when a certain disease is going to be important. This usually involves such factors as temperature, period of time relative humidity is above a certain value, leaf wetness, etc. Once this information is available, then it can be incorporated into a model. Such a crop management model is being used in potato production in Wisconsin. Growers monitor maximum and minimum daily temperatures, the daily duration of relative humidity 90% or above, the maximum and minimum temperatures during this high relative humidity period, and the daily rainfall or irrigation. This information can be collected on a simple instrument, the recording hygrothermograph. This information is transmitted to a computer at the University of Wisconsin—Madison and the grower is given specific control recommendations. Growers who have used this disease prediction program have reduced their disease control fungicide applications by 10 to 30%. While these savings may not be possible every year, they are indicative of the potential value of disease forecasting systems. The program is also available on a floppy disk for use on microcomputers by growers, crop consultants and county extension agents.

ELECTRONIC MAIL: Electronic mail allows the direct communication between two computers. Extension agents and specialists routinely correspond with an increasing number of growers who use the State computer network. Questions about production practices, pest problems, travel plans, etc. can be quickly answered without having to go through the inconvenience of locating the other party by telephone.

ELECTRONIC NEWSLETTERS: During the course of each growing season, newsletters entitled "Diagnostic Clinic Update" and "Vegetable Disease Update" are prepared weekly by UW—Madison personnel. These newsletters give an update on plant disease problems identified from around the State, information on pest control programs, and other items that seem timely. Information is prepared on a microcomputer and sent statewide over the computer network.

WEATHER INFORMATION: The weather program currently available on the University Extension Computer, WISPLAN, is a program in its early stages of development. Weather information from the National Weather Service is placed on the computer and includes extended weather forecasts, radar summaries, temperature and precipitation tables for various parts of the State, local weather information for four regions of the State, and frost warnings. Another feature of the weather that is being developed is a statewide monitoring system to give a weather summary from each of the University Research Farms on a 24 hour delay.

PEST CONTROL AND PESTICIDE INFORMATION: Growers, consultants, and extension agents have a need for quick access to pest control and pesticide information. Computer databases have been developed over the past several years that contain information on pest and pesticide topics. The National Pesticide Information Retrieval System is a database that allows extension workers to access registration information from the Environmental Protection Agency. For example, a golf course manager has a question concerning the chemicals registered for use on turf to control dollar spot. A trained operator could obtain a list of fungicides including active ingredients, rates, and registration information in a few minutes. Another example of a database at UW—Madison is the Pest Profile Program which has information on weeds, insects, and diseases of turf and vegetable crops. Included is information on life cycles of pests, host ranges, pest identification, the effect of environment on the pest development, and control information. The database is about 1500 pages long and allows the user to access information by specific topic. An up-to-date database assures that growers receive the best information possible.

PEST CALENDAR: The Pest Calendar program was developed to serve as quick reference of current pest problems for extension agents, growers, and Integrated Pest Management personnel. The program allows the user to select the plant type, month, and pest type and to print a paragraph on the selected topic.

Computers have become a necessary tool for many crop production specialists and the future will bring even more applications for their use.

Editor's Note: Dr. Walt Stevenson is the Department of Plant Pathology vegetable extension specialist and is particularly interested in the diseases of potatoes and mint. Educated at Cornell (B.S., 1968) and Wisconsin (Ph.D., 1972), Walter spent six years on the faculty at Purdue University before coming to the UW—Madison in 1979.