

**A HISTORY
OF THE
UNIVERSITY OF CALIFORNIA
STATEWIDE IPM PROGRAM**

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I. THE BEGINNING:

July 1, 1979 to June 30, 1980

With \$1.125 million in hand, the UC Division of Agricultural Sciences embarked on the daunting task of establishing the legislatively mandated program. The broad goals were to

- increase the predictability and thereby the effectiveness of pest control techniques;
- develop pest control programs that are economically, environmentally, and socially acceptable;
- marshal agencies and disciplines into integrated pest management programs;
- increase the utilization of natural pest controls;
- prolong the useful life of acceptable pesticides by minimizing development of pesticide resistance; and
- reduce the pesticide load in the environment.

These goals were to be accomplished by establishing four key elements described in the funded proposal:

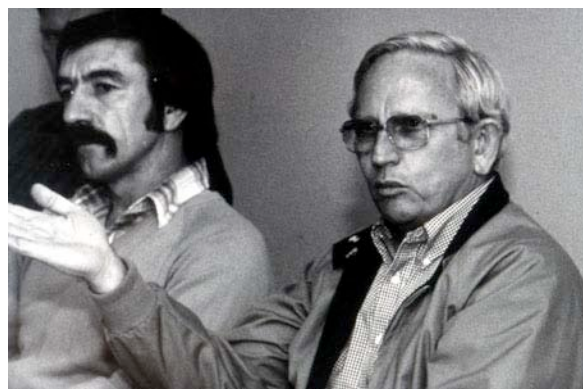
- A grants program;
- A field implementation program;
- A computer network; and
- A program for publication of pest management manuals.

A contemporary philosopher once said, "the only thing more difficult to move than an academic faculty is a cemetery," and each of the four areas of endeavor of the approved new program i.e., the grants program, the field implementation program, the computer network, and the pest management manuals, were about to challenge long-standing institutional and academic paradigms. The process that unfolded provides essentially a case study of institutional change. So, by its very existence, the Statewide IPM Project (later "Statewide IPM Program") immediately antagonized and caused resentment by county directors, farm advisors, campus-based department chairs, AES faculty, and CE specialists. The only reason the process went forward and ultimately succeeded in its mandate, was that Vice President Kendrick, the deans at Berkeley, Davis, and Riverside, the director of AES, and the director of CE were all vested in the program and wholeheartedly supported the IPM Project director and actions that were about to be undertaken.

Organization and Administration

The first issue to be resolved in establishing the program was that of the director. It was not stated, but clearly understood through the process of preparing the proposal and defending it in legislative hearings, that Ivan Thomason, Associate Director of CE for Pest Management, UC Riverside, would become the director. However, Ivan had made plans for and accepted the opportunity to take a sabbatical leave at Michigan State University starting July 1, 1979, the same date the new program was to begin! After some discussion with his Council of Directors, Vice President Kendrick decided to have the three associate deans from UC Berkeley, UC Davis, and UC Riverside initiate the program and manage it jointly until Ivan completed his sabbatical. The first meeting of the joint committee focused on how best to divide up the \$1.125 million between the three

campuses. Upon hearing this result, Dean Hess at UC Davis, one of the authors of the proposal, convinced Vice President Kendrick to change his plan, as it was clear the committee approach was not going to achieve the expected results. He offered to relieve Jim Lyons from his associate dean duties and ask him to serve as director until the return of Ivan Thomason. Kendrick agreed and Lyons was appointed as interim director of the Statewide IPM Project. Lyons' first decision was to ask Andrew Gutierrez, Biological Control, UC Berkeley, to serve as associate director of the program; when Andy agreed, the two of them charged off into unknown waters.



Jim Lyons, right, interim director of the Statewide IPM Project, 1979-80.

Policy Advisory Committee. Because of the history of the Division's close ties to the pesticide industry as cited in the Prologue above, many individuals in environmental groups and some in state agencies were not sure they could trust UC to follow through on its commitment to an integrated approach to pest management. A policy advisory committee (PAC) was mandated in the approved proposal to provide a mechanism for oversight of the funds. The PAC, with broad representation from the agricultural community, government, and consumer and environmental organizations was invited to participate in this effort, discuss general direction of the program, and provide liaison and consultation with a broad segment of the state and private organizations with interests related to IPM. Thirty individuals (listed in appendix V) attended a PAC meeting in Davis on December 11, 1979.

Program Location. As the project was getting organized, Charles Hess, Dean of the College of Agricultural and Environmental Sciences at UC Davis, and one of the individuals involved in preparing the proposal for the Legislature, provided space for the program on the Davis campus. Space for the computer network was made in Wickson Hall in the center of the campus, where an empty laboratory room was remodeled. This remodeling involved walling off a small room to be dedicated to the central computer, and installing a raised floor, additional air conditioning, and a special fire safety system. The remainder of the room was outfitted with desks and cubicles for staff. The manuals group was located in space in a duplex (designated as HD-2) located near the UC Davis airport and several miles from the campus center.

Field Implementation

The primary goal of the IPM program was to have integrated pest management practices implemented in the field. To facilitate that process, the legislatively mandated program called for employment of one IPM specialist/coordinator and six area IPM farm advisors. The notion of having area IPM advisors located in counties, with cross-county assignments to implement IPM practices at the local level by working with other farm advisors, growers, and pest control advisers, immediately challenged the established tradition of advisors not crossing county lines. Crossing county lines made their responsibility somewhat akin to the role of a CE specialist, and that in turn, threatened the turf of existing pest management CE specialists.

Carl Koehler, CE Entomologist on the Berkeley campus, was appointed as acting IPM specialist/coordinator while a committee conducted a national search for a person to fill the position permanently. This search resulted in the hiring of Dr. Frank Zalom, Assistant Professor of Entomology, Fisheries and Wildlife, at the University of Minnesota. He was chosen because of his strong teaching and research record in biology, ecology, computer science, and field entomology. The administration instructed the IPM Project to recruit area IPM farm advisors first from within the existing CE personnel. In April 1980, three qualified, internal applicants were employed by the



Frank Zalom, right, joined the IPM Project in 1980 as IPM specialist/coordinator.

IPM Project through internal transfer within Cooperative Extension. These were Carolyn Pickel, assigned to the central coast area, to be located in Watsonville; Bill Barnett, assigned to the Central Valley, located in Fresno; and Bud Beasley, assigned to the southern desert area, located in El Centro. An external search for additional area advisors was undertaken simultaneous with the IPM specialist/coordinator search. IPM specialist/coordinator Frank Zalom came on board in September 1980 and two additional area IPM advisors, Phil Phillips for the south coast and Craig Weakley for the Sacramento Valley, were hired in October 1980, following this external recruitment.

When area advisors were first hired and located in county offices, the county directors were enthusiastic about having an additional advisor in their county who "will be able to handle all of our backyard and home calls." When they were finally disabused of this notion, they were less enthusiastic of having someone in their county whom they did not completely control. Another puncture in the conventional paradigm.

IPM Manuals

A key mandate in the funding of the Statewide IPM Project was to prepare pest management manuals on specific crops. The crops selected were those in which it was perceived there was the greatest amount of science-based integrated pest control strategies already in place. The strategy outlined in the proposal was to hire experienced scientific writers who would prepare these manuals. The historical paradigm was again challenged. The traditional work product for an AES researcher or CE specialist or advisor was publication of his/her works as a sole or senior author. How were the pest management experts, who most needed to participate in providing the knowledge for these publications, going to get credit towards their merits and promotions?

Facing this challenge, the Project set out to find a director for the IPM manuals group. Andy Gutierrez immediately suggested we seek out and hire Dr. Mary Louise Flint in that position. His recommendation was based on her scientific background and her having obtained her PhD with van den Bosch and the biological control group at UC Berkeley, as well as her writing and editorial experience with the CDFA environmental assessment of pesticides documents (cited earlier), as well as with U.S. Council of Environmental Quality. She readily accepted and commenced to organize the manuals group. The first step was organization of a Pest Management Manual Committee, composed of M. L. Flint as chair, and members Lynn Hawkins, CDFA; Bill Barnett, Fresno County CE; Jack Clark, Davis Campus CE; Mel Gagnon, Davis Campus CE; and Mike

Stimmann, Davis Campus CE. The Project hired two senior writers, Paul Rude and Bruni Kobbe, and the three started work on pest management manuals for alfalfa, walnuts, tomatoes, and rice. These writers were critical in formulating early formats and a structure for developing pest management manuals. Although the pear manual published by Bethel et al. in 1978, with its great color photographs and in-depth pest descriptions, was a starting point, the new IPM manuals aimed to take more of an ecosystem approach with emphasis on crop development and normal cultural practices in relationship to pest problems, and consideration of interactions between pest management practices applied for one pest on other pest populations. Working closely with the alfalfa IPM workgroup—especially Charlie Summers, Dave Gilchrist and Robert Norris—Mary Louise Flint wrote the prototype manual, IPM for alfalfa hay.

In many areas, necessary practical information was not readily available and new monitoring guidelines, identification helpers, or monitoring forms needed to be devised in consultation with experts. Paul Rude, with a strong entomology background, began writing the manual for tomatoes, enhanced the alfalfa manual model by writing keys to lepidopterous pests, and played a critical role in beginning to build the large library of photographs that has been accumulated over the years through the IPM manual production process. Bruni Kobbe drafted the walnut manual, which featured the evolving codling moth IPM program and excellent phenology diagrams. Writers spent substantial time in the field with farm advisors, IPM area advisors, and photographer Jack Clark to obtain the necessary photographs. To develop each of these early manuals, the IPM manual staff worked very closely with the IPM commodity workgroups. Developing a consensus on the best available information and recognize regional differences in problems and efficacy of practices was essential. New research information enhanced the manuals and the manual-writing process stimulated new research projects.



IPM Manual Group staff study book layout. From left, Paul Rude, Director Mary Louise Flint, and Bruni Kobbe.

Computer System

The program was mandated to purchase, install, and utilize a computer-assisted communications system for processing and disseminating information required for effective IPM programs. The system needed to be designed to serve in three different ways: for information storage and management—past history of a field, current label information, and use restrictions of certain pesticides; as a communicator of information where large amounts of information must be communicated rapidly both to and from the farm advisor, grower, or pest control adviser; and for processing crop and pest data through the use of models, mathematical simplifications of biological, physical, or chemical processes.

The contentious issue in this part of the program was the debate between purchasing a central computer with modems and terminals at host locations, or investing in personal computers that could be put in the hands of individual researchers or advisors. The program was leaning toward a

central "midi" computer system, with 200 megabytes of disk storage. However, a vocal minority objected to this approach and strongly advocated the purchase of CompuPro personal computers. Dr. Gary Smith, IPM Analyst, was hired to manage the computer system and worked with outside consultants in developing the final structure and needed equipment.

Two workgroups, one for weather data and one for pesticide information, were established to advise on this part of the program.

The IPM/Weather Workgroup was composed of biometeorologists and IPM core personnel and charged with making recommendations as to the kinds of efforts and weather data that should be considered in the IPM program. The composition of this group was designed to provide coordination and liaison between the IPM Project and the several state and federal agencies involved with collecting and distributing weather data. Members were



IPM Analyst Gary Smith and Biometeorologist Joyce Fox work at an IPM terminal.

L. Myrup, Chair	Biometeorologist	Land, Air and Water Resources (LAWR), UC Davis
J. Goodridge	State Climatologist	Department of Water Resources, Sacramento
R. Hamilton	Meteorologist	National Weather Service, UC Riverside
J. Hatfield	Biometeorologist	LAWR, UC Davis
L. Hawkins	IPM	CDFA, Sacramento
R. Pease	Earth Sciences	UC Riverside
G. Smith	IPM Analyst	UC Davis
L. Tanigoshi	Entomologist	USDA, UC Riverside

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The Computerized Pesticide Information Workgroup, involving both the IPM Project and CDFA, was formed because of the importance of providing current, legal pesticide label information. This workgroup determined format, content, audience, etc., with regard to pesticide information to be included in the system and developed protocols for computer security and operational procedures for handling the pesticide label information. Members were

M. Stimmann, Chair	Pesticide Coordinator	CE, UC Davis
L. Hawkins	IPM	CDFA, Sacramento
G. Reese	Pesticide Registration	CDFA, Sacramento
N. Toscano	Entomologist	CE, UC Riverside
V. Sevacherian	Entomologist	UC Riverside
V. Burton	Entomologist	UC Davis
G. Smith	IPM Analyst	UC Davis
R. Fleck	Food Protection and Toxicology Center	UC Davis

The final design for the initial hardware configuration included one central computer and three district computers, with plans for having at least one user terminal in each agricultural county and on the three agricultural campuses and field stations. The central site hardware included a "processing" computer and associated storage and communication equipment. "Development" terminals for local programmers and for local and remote researchers would attach directly to the central processing computer.

Research Grants Program

Implementing this program with internal state funds ran counter to the traditional process that all University funds from the State were allocated to departments with only general guidelines as to how they were to be allocated to specific tasks. The new IPM program was calling for a grants process that would foster interdepartmental, multidisciplinary research activities, with no departmental control. As soon as it was announced that the IPM Project had been funded, department chairs lobbied their deans. "Take the \$1.125 million, divide it among the three entomology departments and we will do the IPM research." "Just give the \$1.125 million to the plant science departments for the geneticists/plant breeders, as the only way to really reduce the use of pesticides is through genetic modification imparting insect and disease resistance." To have an AES-CE research grants program funded outside the traditional department-county structure was indeed a threatening event, particularly since there would be peer review of proposals and results, and grants would be cancelled if the participants did not deliver as they had proposed.

To initiate the grants program, the IPM Project established a technical committee (members by year are given in appendix XI), chaired by the associate director. Functions of the committee were to identify research needs, evaluate IPM commodity workgroup research proposals for funding and for compliance with grants terms, make recommendations for allocation of funds, and help determine how and when specific research packages should be made available for IPM implementation. The committee organized IPM commodity workgroups and set up formal review criteria for funding research. The Technical Committee also recommended policies on the computer network and IPM manuals production process. The group established a policy that described who had access to the network, what the priorities were for use of the system, and how day-to-day decisions would be made.

A series of IPM commodity workgroups were organized to evaluate the pest management programs in a particular commodity, identify data gaps, solicit research proposals, evaluate these, and make recommendations on funding. Members were drawn



Members of alfalfa IPM commodity workgroup review research needs and priorities. Clockwise from left: Joe Hancock, Benjamin Lownsberry, Mike McKenry, Dave Gilchrist, Robert Norris, and Charlie Summers.

from the University's research and extension staff whose work responsibilities involved that commodity area. Care was taken to provide representation from all the pest control and crop management disciplines among the active committee members. These workgroups were a radical innovation in that it was the first time that researchers working in the same crop, but from different disciplines, had met to discuss pest problems from a systems approach. Major emphasis was placed on development, refinement, and verification of crop-growth and pest-interaction models and on developing field-monitoring techniques and decision-making guidelines, which could be made available to growers in the near future. Interdisciplinary research proposals were encouraged wherever the state of the art permitted such investigation. Special care was taken to consider regional differences in crop development, varieties, and pest problems when developing each research plan, so that resulting information would benefit pest management throughout the state. The Project established workgroups for eight commodities: alfalfa, cotton, grapes, almonds, citrus, rice, tomatoes, and walnuts.

The Technical Committee evaluated the workgroup recommendations, prioritized them, and made recommendations on funding to the director. Much heated discussion took place in these meetings as opinions clashed about how best to define and approach the goals of the program. One of the debated issues was whether the IPM Project should fund research projects in plant genetics and breeding. Because of attempts by the crop departments to hijack the entire research budget, and because the length of time between discovery of some new gene for pest resistance and actually having a commercial variety was so long (typically 8 to 10 years), the decision was made to exclude such proposals from the priority list for the relatively small amount of research funds IPM would have available for grants.

In the first year, 26 projects were funded for a total of \$246,111, including seven projects in alfalfa, five in cotton, and 12 in grapes. The total funds for research were essentially start-up monies, since the grants process involved in establishing the program allowed for only a partial year's funding. Included in the 26 projects were two "cross-commodity" projects, "Simulation Models for Major Vertebrate Pests of California" with Terry Salmon, CE UC Davis as principal investigator (PI), and "Development of Weather Systems for California and Dissemination of Weather Data for IPM," with Jerry Hatfield in Land, Air and Water Resources at UC Davis as PI.

Details of all funded projects can be found on the UC IPM Web site at www.ipm.ucdavis.edu/fundedprojects.html.