where the surveyor introduces some sort of bias in either the questioning or the sample selection process and invalidates the results. Systematic error is the most common and hardest to eliminate. Be sure to have a specialist critique the work as it progresses. Soliciting Specialists’ participation and input from the initial stages of development heightens their interest in the subject matter and intensifies the quality of the survey tool.

Correctly selecting the sample of interviewees can be infinitely simple or infinitely complex. For example: For a cotton survey, the required method of selecting participants to be interviewed merely meant obtaining a list of the Florida Boll Weevil Eradication Program members and mailing each of them a survey. Conversely, however, for an Ornamentals survey it was necessary to first consult with a Resource Economic Analyst. It was determined that to obtain statistical quality, 260 was the number of target firms to survey selected from a list of more than 7200 eligible firms. Survey pool firms were stratified into 3 size classifications (small, medium, and large), with primary and secondary survey firm lists (for when the primary firms declined to participate in the survey, it was possible to defer to the secondary firm), and for three regions of the state. Required sample numbers were calculated to achieve a target precision of 10 percent in estimating the true mean of continuous variables at a statistical confidence level of 90 percent.

Pretesting is an absolute essential for every survey project attempted. It is the only way to find out if everything works. Pretesting activities are pilot studies to test feasibility of wording and techniques. No matter how many perspectives you use to interpret the survey tool, rarely is it possible to foresee all potential misunderstandings. Pretesting is not complicated and is well worth the minor time investment. Verification too is an essential part of every major step of the survey process. For example, be sure there is a backup plan of secondary interviewees in place to satisfy necessary sampling requirements, should the need arise. Remember that the proxy respondent may not always be knowledgeable about the facts, and the interviewer may have to solicit input from other appropriate individuals. For verification of question design, be careful not to “load” questions so as to influence the respondent’s answer. Also, do not expect too much from sensitive questions, such as gross value or actual sales type questions. Conversely, however, growers are more than happy to express management costs. For word type answers, have a defined selection available to choose from or check off. The less wording the respondent has to “fill-in” the better. For numerical type answers, suggest open-ended answers and not ranges. In this way it is possible to calculate an actual number statistically, rather than end up with a range of respondents who reported on another range.

**Literature Cited**


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**IPM IN FLORIDA: PERSPECTIVES OF THE PRESENT AND FUTURE FROM THE UNIVERSITY OF FLORIDA-IFAS IPM DIRECTOR**

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**Abstract.** The University of Florida-IFAS appointed an Integrated Pest Management (IPM) Director as a halftime position in April of 1997. This paper provides some background on the current pest management situation in Florida and the U.S. and summarizes the philosophy, objectives and activities of the IPM Director to date. The current objectives are to develop a “systems approach” and teamwork among UF/IFAS faculty, develop new approaches to manage key pests, promote and publicize Florida IPM efforts, and provide representation and leadership in IPM to IFAS, the University, state, region and nationally.

**Introduction**

During the industrial age, U.S. agriculture was asked to develop technology to decrease labor needs so that people could move away from the land to industry. To foster agricultural enterprises, Abraham Lincoln and the U.S. Congress developed the Land-grant University and the Cooperative Extension Service followed. The results were an unprecedented success, where today, less than 2% of our population is di-
rectly involved in agricultural production. Those 2% provide an abundant, safe and inexpensive food supply for the U.S. and much of the world, and an agriculture that also serves as ca. 25% of our balance of trade. Coincident with our success came a down side, however. The agriculture we developed required greater reliance on fossil fuel and petroleum based inputs—mechanization and specialization led to fewer, larger farms with falling food costs but rising environmental costs. Presently, approximately 1.9 million farms remain, 20% of them produce 80% of the food and fiber.

Unfortunately, few members of the general public appreciate the great accomplishments agriculture has made. Fewer still understand the tremendous management problems and risks faced everyday by producers. While they are not directly aware of agriculture, nevertheless, citizens are greatly concerned about food safety, the environment and the conservation of natural resources—particularly water quality.

Previously, farm legislation was determined by producers and agribusiness. It is clear that, from now on, other interest groups with broader and often conflicting perspectives will have a greater say in farm policy. Indeed, in policy clashes between producers and the rest of the population, producers may be destined to lose, simply because they are outnumbered. The new paradigm for agriculture is that: production agriculture must have a foundation with the social objectives of sustainability, environmental compatibility, and stewardship of natural resources upon which agriculture and rural-urban society are dependent on for their sustenance, economy, and ecological well being.

Where does Integrated Pest Management (IPM) fit into this context? While the determination of farm policy by interests outside agriculture is relatively recent, the problems inside agriculture surrounding pesticide use are not. The tenets of IPM were formalized and implemented in response to the issues articulated by Rachel Carson’s *Silent Spring*. Since that time much has been done to develop a different philosophy and biologically-based technology under the IPM rubric. Much new biologically-based technology for management of pests has been developed. However, agriculture has not received the desired recognition and rewards for this effort on the one hand, but on the other hand, IPM technology has not been embraced by producers to the degree it should have been. Certainly the average citizen knows very little if anything about IPM concepts. Moreover, we can make a distinction within agriculture between those who have adopted the technology and those who only adopted the terminology.

Several things have happened recently to dramatically change the climate for change. First, President Clinton has mandated that IPM be practiced on 75% of crop acreage by the year 2000. Congress has responded by increasing IPM related funding. The Food Quality Protection Act of 1996 (FQPA) when enacted gave EPA a mandate to implement IPM. The states of New York and California have had IPM coordinators for over 20 years. The states of Texas, Michigan and a few others also have very aggressive programs. Several states have a line item for IPM funds in their budgets which fluctuates around an average of $1 million. Florida has had a half-time IPM coordinator since April 1997 and exactly zero funding.
states its measured in days. When the local effects of soil, water and weather are considered, it becomes clear how the soil conservation service came up with 26 different ecological communities in Florida. Climate—both the conventional and the political—is extremely important, because for us to insure a profitable future for Florida agriculture, we need to develop new technology, to do that requires greater funding. To get the required and ‘our fair share’ of funding, we need political clout at the state and national level to attract outside funding to go along with funds contributed by industry. Garnering support for agriculture with an urban legislature is difficult.

The position of IPM Director was created as the result of recommendations by an IPM committee convened by the Deans in 1994-95 and chaired by Dr. Harold Browning. As part time IPM Director, my charge is to develop and promote University of Florida, IFAS (UF/IFAS) philosophy, policy, and practice on pest management within IFAS and the University of Florida, the state, the region, and nationally. My activities fall into the categories of leadership, advocacy, resource development and training. The following is a discussion of some of my objectives and activities as IPM Director.

**Objective: Promote and develop a ‘Systems Approach’ and teamwork relative to crop production and pest management in IFAS research and extension.**

A. Organized and chaired a workshop in May concerning IFAS research on crop rotations/cover crops. In all surveys of producers of any type and from any region in the U.S., crop rotations are identified as the one of the top three research priorities needed for a variety of applications. A large amount of related research is being done in IFAS by campus and Center faculty. The eminent withdrawal from use of methyl bromide has stimulated even more interest. Another reason for emphasizing rotations/cover crops was to bring the horticulturists and agronomists together with faculty from the pest disciplines to foster systems research. Ten speakers presented short talks on their research and 25 people attended. Some excellent work has been done and is ongoing evaluating rotations/cover crops that suppress pests, provide nutrients and perform other useful functions. A web site with IFAS information on the subject along with others in the Southeast will be developed.

B. Organized and participated in a July trip with IFAS faculty and organic producers to the Center for Environmental Farming Systems at Goldsboro, North Carolina operated by North Carolina State University and the North Carolina Department of Agriculture. It is funded by the state of North Carolina and by SARE grants. They are developing integrated systems research. This trip was developed to determine what is being done in systems research in the Southeast. The efforts at North Carolina State are quite impressive and at the cutting edge in the Southeast. We were given the grand tour by about 10 faculty members conducting research there. We learned how they planned the farm, how it is administered and funded and its long range plans. The farm has dairy, beef, conservation tillage and organic farm subunits. UF/IFAS needs to develop something similar, particularly to enable research that will develop and compare actual production systems and demonstrate new techniques. We need to develop more activities that address the development, implementation and comparison of sustainable production practices to conventional practices. We are currently discussing possible development of some type of farming systems initiative with Department Chairs and other interested parties. Within UF/IFAS, Dr. Mickie Swisher is leading an effort to develop new programming for ‘small farmers’ and her sabbatical with the small farms section of the USDA-CSREES in Washington should give some impetus to this effort.

C. Pest control recommendations are one of the major services UF/IFAS personnel provide to producers. Development of educational materials is in a state of flux as we begin to develop a comprehensive systems emphasis for the future. Timely paper and electronic publications require a great deal of effort by faculty as well as support personnel. Structuring information content to include alternatives to chemicals and background pest biology and culture and management practices is difficult. With the retirement or impending retirement of key entomology, plant pathology and other faculty, responsibility for the management guides and their format have been in question. The first action taken was to cooperate on a successful grant from the USDA Telecommunications Grants program with UF/IFAS Education and Media Services Department and the new Information Technology group to revise the electronic format of the guides into a searchable, database format. Dr. Howard Beck (IFAS-IT) is working with key UF/IFAS faculty to develop the beta electronic versions of the management guides and other UF/IFAS publications. Secondly, Dr. George Hochmuth, Professor of Horticulture and I will be co-chairing a new effort building from SP170, the vegetable management guide, to eliminate publication duplication and to develop the management guides into true crop production guides.

**Objective: To develop new statewide approaches to pest management that will enable large scale reduction in pesticide use by suppressing wide spread key pests.**

A. The USDA has developed a funding program for management of key pests over large geographical areas that employ multiple suppression tactics. Examples currently in progress are the boll weevil eradication program and the codling moth areawide suppression program. The screwworm eradication program eliminated the screwworm fly from Florida in the sixties and eventually from the continental U.S. In Florida I helped initiate and participated in a symposium at the 1998 Florida Entomology Society meeting that discussed the possibility of areawide pest management of Caribbean fruit fly, fall armyworm and the diamondback moth. All are major key pests causing large amounts of damage in Florida and other states but are limited in distribution in Florida at certain times of the year. Fall armyworm alone causes on average $60 million in damage per year in the Southeast. In the past it has caused as much as $400 million in damage east of the Mississippi. It migrates from south Florida to Canada every year attacking over 60 host species, mostly grasses. As a result of the symposium, we (USDA and IFAS scientists) have agreed to further evaluate which species to tar-
Objective: To promote and publicize Florida IPM efforts.

A. We are remodeling the IPM web site and adding new information and links. One new section will be discussion and links on granting agencies that support IPM research and extension. I am soliciting IPM success stories from IFAS faculty to put on the web site.

B. I have received grant funds to write up a historical account of the implementation of tomato IPM in Florida as a brochure for publicity and education. This resulted from a meeting hosted in Gainesville in March for the Southeast IPM coordinators where we presented the IPM research done in Florida tomato. We hope to proceed from this project to more formally evaluate research needs and plans with the tomato industry.

C. Wrote and received a grant from Southern Region IPM along with other IFAS and UGA faculty to upgrade the WOODYBUG software with data on all pests and culture and management practices for woody landscape plants. Other research grants submitted to NBCI and PMAP were not funded. I am a cooperator on a successful grant that Glades Crop Care submitted to PMAP this year to develop better methods to assess the benefit of IPM practices in vegetables.

D. Currently working on the design of a brochure and poster on Florida IPM for use by county faculty and others.

E. Continue to participate in extension programs with county faculty and other specialists as requested. Speeches to various producer organizations promoting IPM have also been given.

Objective: Provide leadership and visibility for IFAS and Florida IPM efforts in the southeast region and nationally.

A. Will be chairman of the southeastern region IPM coordinator organization next year and have worked to develop grant guidelines that are more favorable to Florida.

B. Represented IFAS/UF at several national meetings on IPM, FQPA and biological control. I am also participating in development of the new reporting standards (GPRA) for USDA-CSREES.

Objective: In-state visibility for IFAS with other agencies and within IFAS in relation to IPM concerns.

A. Participating in the Natural Resource Conservation Service State Board, UF/IFAS Invasive Plant Task Force, the Small Farms Design Team, the Environmental Landscape Management Design Team, the Nursery Management Design Team, the Precision Agriculture Design Team development, the Digital Sample Submission Network and the effort to redesign the IFAS FAIRS-EDIS system.

B. The digital sample submission network is an electronic methodology in development to enable submission of electronic samples from county faculty to extension specialists as well as to foster communication among extension personnel. The system is up and running in a beta version and should enable much faster turn around on sample submission as well as reduce work for some of the diagnostic clinics. I have been cooperating with other IFAS extension faculty and UF/IFAS - IT on developing this methodology.

C. Initiated a pilot IPM scout program with the Tampa Bay Wholesale Growers Association.

The FQPA, withdrawal of methyl bromide, invasive pests, general environmental concerns of the public and development pressure in Florida are dramatically changing agricultural production problems. All professionals need to dedicate their efforts towards solving the short and long term problems faced by producers. Many new problems will be addressed with simple, common sense ecological or biological solutions. When in the minority as producers are now, it behooves us to present a united front standing for principles that are practically and scientifically defensible. IPM within the sustainable model for Florida agriculture and an integrated ‘systems approach’ to research and extension concerning management of pests. I look forward to developing additional programs and partnerships with private consultants, industry and other government and non-government agencies.