Proceedings of the 1992
Program of the Research
Center Administrators Society

February 3 and 4, Lexington, KY

This Society is affiliated with the Southern Association of Agricultural Scientists and has membership from each of the southern states. The Executive Committee is composed of one representative from each state the current officers and the immediate past president (is president of the Executive Committee).

State Representatives (1991-1992)

Alabama
Randy Akridge

Arkansas
Tom Evrard

Florida
David Calvert

Georgia
Ed Worley

Kentucky
Bill Peterson

Louisiana
Roy Constantin

Mississippi
F. T. Withers, Jr.

Missouri
Jake Fisher

North Carolina
Carl Tart, Jr.

Oklahoma
Jonathan Edelson

South Carolina
Ben Kittrell

Tennessee
Dennis Onks

Texas
Jim Reinert

Virginia
Bob Horsburgh

Officers

Will Waters	Immediate past president
James R. Hill, Jr.	President
Joe Musick	First vice president
Dennis Onks	Second vice president
Jim Pitts	Secretary/Treasurer

UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
BRADENTON, FLORIDA 34203

February 24, 1992

GULF COAST RESEARCH AND
EDUCATION CENTER, BRADENTON
5007 60th Street East
Telephone: 813/755-1568
Suncom: 552-7044
Fax: 813/758-7238

Membership
Research Center Administrators Society
Southern Association of Agricultural Scientists

Dear Members:

As outgoing President of the RCAS, it has been an honor and a pleasure for me to serve in the progression of offices from Secretary through the Presidency.

The Society has made very significant improvement in recent years in developing and delivering very high quality programs, refinement of procedures and publication of a high quality Proceedings and the establishment of a new officer post of Executive Treasurer to assist and advise the Society in both business affairs and professional society development.

I challenge the general members to participate in Society business activities, help increase the membership and keep the upper administrators in your respective colleges or institutions apprised of the administrative and leadership training offered through the Society for center directors and other research unit managers.

Thanks again to the membership for giving me the opportunity to serve and learn.

Sincerely,

Will E. Waters
Center Director
1991-1992 President

nk

Acknowledgements

This is the fifth volume of RCAS Proceedings. Preparation of the Proceedings has progressed to where it is a relatively easy task. The authors were in general cooperative this year in providing hard copy text of the talk and word processor diskettes.

We extend our thanks to all participants who prepared talks and those who otherwise helped with the program or Proceedings. We wish to acknowledge the assistance of program, chair, James Riley Hill, who doggedly pursed the few authors who had not provided texts, and again to Rosa Maese who for the fifth year typed the final version and copied and collated all pages.

Although the editors are directly responsible for completing and disseminating the Proceedings, all members of the Society have a role because all of you support the organization. To all the membership we say thank you and continue your work in support of RCAS.

Howard Malstrom
Dennis Onks
Editors

Table of Contents

1992 Proceedings

OVERVIEW OF KENTUCKY AGRICULTURE AND ORGANIZATION OF THE KENTUCKY EXPERIMENT STATION SYSTEM

Dr. James A. Boling
Associate Director Agricultural Experiment Station
and
Dean of Research
University of Kentucky
Lexington, KY 40506

The Kentucky Agricultural Experiment Station has been providing research results to farmers for more than 100 years. The continued growth of Kentucky agriculture attests to the benefits of applying new knowledge and technology to the agricultural production process. Much of the research leading to increased quantity and improved quality of Kentucky's agricultural output was performed by the Experiment Station. Also, college researchers address problems of agribusiness, consumers, international trade, food processing, nutrition, community development, soil and water resources, and the environment.

Although much Experiment Station research has immediate application to agricultural problems, scientists are also involved in basic research, generating new information to help solve present and potential problems. The ability of Kentucky producers to be competitive in domestic and would markets requires an expanded base of knowledge in emerging areas of research applicable to agriculture.

Research activities of the Kentucky Agricultural Experiment Station are conducted at Lexington, Princeton, Quicksand and Owenton. Efforts are constantly made to ensure that the research studies have application to the problems of all Kentucky farmers and other clientele groups. Locations of the experimental facilities provide conditions representative of most regions of the state. Coldstream, Maine Chance and Spindletop Farms, in the Lexington area provide facilities of beef and dairy cattle, poultry, horses, sheep and swine, forages and grain crops, tobacco and turf research. South Farm also in the Lexington area is devoted to research on fruits, vegetables and ornamentals. The Research and Education Center and West Kentucky Substation Farm at Princeton in Caldwell county ar devoted to research on grain crops, beef cattle, swine, fruits and vegetables, forages and tobacco. This location has both research and extension personnel.

The Robinson Substation at Quicksand in Breathitt county is the location of research on fruits and vegetables, ornamentals, forages, grain crops and wood utilization. Strawberries, blackberries and raspberries are primary fruit crops and broccoli, cauliflower, green and red cabbage are emphasized vegetables. The effects of nitrogen fertilizer on no-till corn and phosphorus and potassium starter fertilizers with burley tobacco were also evaluated in 1991. Quicksand is also the headquarters of Robinson Forest, which spreads over parts of Breathitt, Perry and Knott counties and is the site of forestry and watershed management research.

The Eden Shale Farm, located in Owen county near Owenton, is where experimental and demonstration studies are conducted on forage crops, tobacco, fruits and vegetables, and beef management.

THE CONSCIOUS OF A PEOPLE
A LAND GRANT UNIVERSITY

C. B. Slemp
Vice-President (Retired)
Pen-Virginia Resources Corporation
Duffield, Virginia 24244

A mission to improve a society not by wealth and greed, but by intelligence and wisdom was a vision and action of our fore fathers dating to the Congress of 1862.

It was to provide an opportunity for children of humble America to become educated and to become contributors to a better society. It was to provide for research, something which up until then had been practiced only by opportunists. It was to demonstrate the results of research, something resisted by the greedy. It was to take technology to the people, something that was seen as unconstitutional and competitive to free enterprise.

The role of government is to encourage and provide for the general well being of the people. Only by providing incentives has government ever advanced a society. Hand-outs have only contributed to failures. The land grant university was to provide incentive through knowledge, demonstration and research. It was government and people going to work together to improve a quality of life.

The universities have received an "A" for their effort in earlier years. They helped to make it possible for 80% of our people to move from the farm to industry. A higher standard of life was enjoyed by almost everyone in America.

How much effort does it take to educate and re-educate our agriculture community? My real question is, have we educated our agricultural community and why is farming still considered to be associated with poverty and a perpetuation of a poor labor force.

Technology has caused agricultural competitiveness and many farmers have lost their farm to technology. The university made it possible for people to leave the farm, but they did not know where they were going and really did not have a vision for transition to a new world. With the reduction in the % of farmers and farm families, our leaders made a rush to the security of the agency positions. Researchers now owe their soul to industry-sponsored research, educators have become ivy-league, and administrators fear going to the top of the mountain. Students no longer represent rural and urban America, they represent an administration hell bent on admission by test scores only, not achievement and potential contribution to a better society.

As an educator, researcher, demonstrator, and administrator; how can we justify our continued existence? What is the value of our economic return? We cannot live off love. Economics does contribute to happiness. We must take a fresh look at a new world.

1. What are we doing for a new rural-urban society?

2. What are we doing to help industry encourage meaningful employment and profitability?

3. What are we doing to solve environmental problems?

We know solutions but we lack the intestinal fortitude to become involved.

EX. Surface mining, waste management, consumer education, water and air quality concerns.

4. What are we doing to address quality of life issues?

   County planning, educational direction, poverty, transfer incomes, regional employment, disability, drop outs, poor test scores, housing (mobile homes), suicide rate, and drugs.

5. What are we doing about economic diversity?

6. What are we doing about world problems: Population, environmental issues, land use and free trade with responsible economic regulations. A new nation the size of Mexico is born each year and it effects all of us.

7. What are we doing to eradicate the philosophy that "if you keep a people poor and ignorant, you can control them and they will vote for you"?

8. Why does education (administration) take a back seat to ignorance? Any consideration to withhold knowledge and practice is a form of bribery.

9. Why do we allow ultra environmentalists to scare the hell out of society? The longevity of our people is greater today than yesterday.

10. What has happened to Vo-Ag and Home Economics?

11. How do farmers represent themselves:

    EX. A. Marketing methods: Weighing cattle, lack of competitive purchasing (tobacco, cattle)

    B. Farm policy

    C. Land use tax

    D. Materials quality (paint-zinc)

    E. Value purchasing

    F. Agricultural finance, bankers ask for your employment (off farm) before making loams.

    G. Corporate agriculture

12. Religious philosophy (fatalism):

I have worked many days following a horse around a hillside plowing corn. This provided an opportunity for a lot of thinking. The scenery was the same day after day. My interest was to find a better way of life and change the scenery, which required action. The

scenery that our land grant university observes justifies a need for change because our quality of life is in a process of change.

Why as research and extension scientists are you unable to address the needs of America? How long does it take to get a decision from the top administrator? I am often told that the university works slow, be patient. The real answer lies in the fact that administration must check the political pulse of each issue before a decision can be made and this requires time. Time is wasted, frustration develops, expectations and enthusiasm evaporates and we find our self setting our watch, whittling, and praying for patience.

If the land grant university is to fulfill its mission it must return to its mission. It must represent the people. It must address the needs of the people. It must employ professors and staff that believe the land grant concepts. It must develop a curriculum based on needs. Professors must return to teaching. Budgets must be prepared based on need not on available dollars. Universities must share research and technology to solve regional problems. The private industry and businesses must become involved in quality of life issues. The land grant university must expand a vision beyond agriculture and home economics. It is imperative that a new curriculum and program of work be developed including strategies for accomplishment.

There must be a new vision, we must meet the needs of society. We must develop a character that reflects a respect for knowledge. We must divert our attention from partisan policies. We must develop think tanks that incorporate all segments of society. We must encourage a work ethic. We must do research based on need. We must stop attending so damn many meetings and be seen in our respective roles as workers among our people and yes, we must continue to demonstrate that which we know. The scenery will change. Are you going to wind your watch or go to work?

In closing, let me share with you an inscription cross stitched and hanging in my home. This work was a product of my daughter, Martha's, talent. "If you plan to sit in the shade, it would be wise to plant a tree".

Can you and I join together in our land grant universities to provide a larger area of comfort for America?

THE FUTURE OF AGRICULTURAL RESEARCH AND EXTENSION AS VIEWED BY AN ADMINISTRATOR WITHIN THE LAND GRANT SYSTEM

J. R. Fischer
Dean/Director
SC Agricultural Experiment Station
Clemson University
Clemson, S.C. 29634

As directors and superintendents, you are an integral part of one of the biggest success stories in the U.S., the world. The land grant university, the agricultural experiment station system, the cooperative extension service system, have been successful. Research conducted by a Yale university economist, Dr. Robert Evenson, has shown that for each $1 invested in the system, $12 of economic activity in the economy is created. Studies at the University of Minnesota conducted by Dr. Vern Ruttan have identified a return on investment of 40% for the agricultural research system.

This year, approximately 11% of the disposable income of the average U.S. citizen will be spent on food - the lowest percentage in the world. In Japan, the amount is 35%. To look at this another way: we in the U.S. have 24% more of our disposable income to improve our quality of life than the Japanese. On a side note, the cost of health care this year will exceed that for food -- 11% of disposable income for food -- over 12% for health care.

A great, proud, successful history. This success has guaranteed us as a system ONE thing -- it has guaranteed that we are here today.

The future of the Agricultural Experiment Station and Cooperative Extension Service system depends on you - depends on me. The product we produce - knowledge - is needed today and will be needed tomorrow. Knowledge is the foundation of a quality decision. The future of the AES/CES system depends on our ability to successfully accomplish our mission of developing and transferring knowledge to citizens of our state. By doing this, they have the information necessary to make intelligent decisions covering issues of agriculture, natural resources, and the rural environment.

Two key issues:

1. Our clientele - the recipients of this knowledge - is anyone making decisions on issues of agriculture and natural resources and the rural environment. The clientele includes: farmers making decisions on variety selection, people deciding components of a healthy diet, legislators setting environmental policy, and so forth.

2. Researchers and specialists are knowledge developers and suppliers - not the ultimate decision makers. We conduct variety trials so that the farmer can use that information to select the variety he will plant. We conduct research sometimes using biotechnology techniques so that other researchers and farmers have a more complete and enhanced knowledge base from which to make a decision.

Sometimes we in the land grant system, in our zeal to make the final decision on issues, would do well to remember the quote of Emory Bogardus - "An educator does not pour truths or untruths into the minds of others, but draws out of others their latent abilities and

stimulates them to be original and creative." These are questions we need to ask ourselves: Are we stimulating our customers to use the knowledge we generate and transfer to be original and creative? Or are we telling them what to do?

We hear and read much about the Japanese today. Especially since President Bush's trip to Japan. While Bush was in Japan, I read an editorial which I will paraphrase. It went like this: We in the U.S. have developed a propensity to blame. If something doesn't go just the way we would like, we search until we find a likely individual or society or country to blame. For example, the economy in this country is weak at this time. And yet for the 200-plus years the U.S. has been in existence, we know, from this history, that our economy is cyclic with good and bad times. Instead of spending our time and energy on analyzing the economic cycle in order to minimize the impact of the down cycle, we have looked and found someone to blame. We are spending our time and energy on Japanese-bashing. What constructive technique is this? What does this accomplish? Would it not be more reasonable to use our time and energy to analyze the causes of the economic cycles? From this knowledge base we could then make intelligent decisions to minimize its impact.

How often do you and I -- when we are experiencing a difficult situation such as budget problems in the AES and CES systems in the country -- look for something to bash? Do we complain of too many animal programs or too many plant programs or too many biotechnology programs or too many social efforts? Scholarly debate of these issues is healthy. Bashing will tear the system apart. We must develop a strategy for our future. A strategy that has a clear vision and defined goals for the AES/CES system. Without a strategic plan, we in the AES/CES system will resort to bashing due to the lack of vision of the future potential of our system.

During these times of changing paradigms, knowledge is our competitive edge. Society needs knowledge to make intelligent decisions. If the AES/CES system cannot or will not produce the knowledge needed, society will create its successor. Society's need for knowledge development and transfer is eternal. The organization(s) that do it are temporary.

As far as the Japanese are concerned, I contend that knowledge is the United States' competitive edge. If knowledge development and transfer are critical and essential to the future of our society, what should the AES/CES system be doing? One answer, as I have just stated, is to strategically plan our future.

To introduce you to a second suggestion, permit me to take you back to the Missouri family farm where I was raised with my three brothers and three sisters. After the noon meal, I can remember vividly my father leading the four boys out of the house, heading to the afternoon's work activities. As we walked around the corner of the house, with my father in the lead, the oldest next, and I as the youngest last, Dad would ask each of us if we had carried out certain activities in order to get the afternoon's work under way. Invariably, some of the activities - - mowing, raking or baling hay, combining wheat, or cultivating corn -- would be left undone. One of us would not have accomplished what we were supposed to have done, or worst of all, had completely forgotten to do something. Dad would then stop the parade, and make this simple but thoughtful statement, "Boys, if this farm is to be a success, you must join in thinking how it is to operate. I can't do all the thinking around here." Dad's quest was simple. The more minds he could have concentrate on the successful operation of the farm, or continuously improve the operation of the farm, the higher the probability of success.

This is an example of integrated decision making 30 years before we had heard about it in corporate America. It's an example of TQM (total quality management) where all the people are involved in the process of becoming a part of the success of the organization -- where everyone shares the vision of the organization.

Dad didn't use these techniques to create a new management style. He used them because they worked! Those of you who grew up on a family farm can identify with what I am talking about. Don't we in corporate America, in academia, in agriculture, need to "think together?" Don't we need to develop that shared vision of success, and together accomplish our mission? Can we all think together to continuously improve our organization to better serve society? I would suggest these are the underlying reasons for the success of the family farm in the United States. Strategically planning our future and continuously improving our way of doing things will be the underlying long-term success of the AES/CES system.

Recently, I was in Detroit "signing up" Dr. Rosetta Riley, Corporate Director for Continuous Improvement for General Motors, to a position on the SCAES Advisory Board. This board consists of some of our state and national leaders in agriculture. They meet twice a year to give us advice on prominent issues.

But you might wonder: What does General Motors have to do with agriculture? Let me share with you how Dr. Riley presented some of her thoughts: "Ten years ago, we in GM were very proud and sassy, maybe even smug, about our success and world dominant position. We kept doing business as usual until the Japanese came along and started doing our business better. Some of our products needed to be improved, our customers began to lose confidence in our products, different companies within GM -- Chevrolet vs. Oldsmobile vs. Cadillac -- were competing with each other with the same type of product. We had major economic setbacks, cuts and layoffs."

She asked me, "Is your organization experiencing economic trouble? Do you have internal strife between divisions or departments? Is your number one priority serving the needs of your clientele, or are you managing to build the kingdom of your center, department, or Extension Service or Experiment Station system?". These are tough questions that need honest answers. Our customers - society - are beginning to challenge us. Just note a recent front page article in the local paper: "Professors defend time spent on research". Why weren't the headlines more supportive of what we do? Such as: "Research at our universities enhances our global competition".

Last fall, when the SCAES Advisory Board met, we asked them to give us advice on how we could be more successful and enhance the public's trust in what we do. Their answer: Linkages. Don't try to do it all yourself. To help in this process, they suggested that we identify who is setting our agenda and who is advancing our agenda. During the formative years of the AES and CES systems, the agenda setter was the farmer and the agenda advancer was the land grant university. Today, as the board pointed out, the agenda is being set by many entities in addition to farmers and our agenda is being advanced by many more entities than the land grant universities. A partial list of agenda setters and agenda advancers is provided here. I ask that you add to it or identify who is setting and who is advancing your agenda.

Agenda Setters	Agenda Advancers
farmers	land grant universities
environmental groups	community colleges
	state agencies
citizens	industry
animal rights groups	foundations
professional societies	other universities (land grant universities are not the only ones who can do agricultural research and extension)
legislators	
U.S. government	

Society needs knowledge concerning issues impacting agriculture, natural resources and quality environment for living. Knowledge is the competitive edge. The knowledge that is available when a decision is made is proportional to the probability that a quality decision will be made. Quality decisions are the competitive edge in global competition.

The AES/CES systems are the organizations that fulfill the needs of society, and you and I are critical parts of this system. Thinking strategically, working synergistically, and striving for continuous improvement will produce the knowledge needed by society to make intelligent decisions. Society will support the organizations that develop the knowledge needed for quality decisions.

MANAGING A RESEARCH AND EXTENSION UNIT IN FINANCIALLY HARD TIMES

Robert L. Westerman, Regents Professor and Head
Agronomy Department
Oklahoma State University
Stillwater, OK 74078

Managing research and extension units in financially hard times is a very appropriate topic today and it is something that we can all relate to. I'm sure that some of you here may have had more experience with this problem than others. Certainly, this is not an easy problem to deal with when it involves reduction of personnel, services and programs. I think a number of things can be done to help us through some of the difficult times that we are currently facing or will face in the future. Proper planning, self assessment and good management techniques are more essential now than ever before.

Management maybe defined as having control of the movement or behavior of your resources or to use your resources carefully to meet your needs. The failure of banks and savings and loans throughout this country is a bleak reminder of poor management. Early detection of the problems in our budget process is essential to allow for adjustments in management plans. In order to be a good manager you must be well informed regarding the current and projected financial status of your unit. This is becoming more and more difficult due to the uncertainty of appropriated funds.

Detailed self assessment and evaluations of our programs must be made much more frequently than we have in the past. Research and extension units need to constantly ask who they are, what they want to be, and how they intend to get there with current budget restraints. The development of strategic plans that clearly identifies strengths and weaknesses of the units is essential in the overall planning process. We should clearly identify those things that are essential to our operations and establish priorities as to the overall importance of these items to our clientele. Contingency plans need to be developed that clearly address the manner in which programs, service and personnel will be reduced. These plans may be subject to change daily, monthly or annually. In previous years we would develop five year plans, breath a sigh of relief when finished, then place them in our files until it was time to develop another five year plan. We can not operate in this manner today because of the rapid changes that are taking place. The contingency plans that we develop today may have to be implemented tomorrow.

The operation of research and extension units under financial stress is often difficult because of low morale of personnel and the general feeling that dooms day has arrived. Leaders of research and extension units must remain upbeat and display a positive attitude at all times to prevent further reduction of morale. We have to recognize that with limited resources, services, programs and perhaps personnel will have to be reduced. Hopefully, with adequate planning personnel can be reduced if need be by attrition. The general public and the clientele you serve must be informed of your financial status at the earliest opportunity. In addition to help setting priorities, your advisory committee can assist in informing the general public and the clientele you serve that you are operating under financial stress.

Each of us are faced with both unique and common problems and there are no patent answers or solutions. Each situation has to be evaluated separately. The degree of our success will depend on how well we have developed our strategic and contingency plans. We must be prepared to implement our plans, monitor them carefully and revise them accordingly as needed.

We have to accept the fact that we are in a down sizing operation and set our goals to be the best with the limited resources available. Develop your plan, implement it and revise it as needed when situations change. Our productivity with limited resources will play a significant role in whether or not we will be able to place our research stations and extension units in better financial situations in the future.

COMPUTER AND ELECTRONIC SYSTEMS INTEGRATION IN AGRICULTURAL RESEARCH/EXTENSION CENTER OPERATIONS

Paul S. Graff, James A. Reinert
Systems Analyst and Resident Director,
Texas A&M Research and Extension Center at Dallas
and Al Powell
Communications Specialist,
Dept. Agr. Comm., Texas A&M University

Introduction

Agricultural research/extension organizations can benefit greatly from a high level of electronic systems integration. However, there is sometimes a disparity between the level of electronic automation found in university agriculture programs, and levels found in general business and industry. Some would argue the reason for this is a difference in operating capital versus the cost of equipment, within each organization. In general, university agriculture may not have as much "elective" funding as large corporations; however, many small businesses with low and moderate operating revenues are utilizing many of the latest electronic technologies to great advantage. Expense is no longer the issue, with much of this equipment being produced inexpensively and reliably overseas.

To remain competitive, businesses are often *forced* to computerize. Until recently, *cooperation* was the only emphasis inherent among university agricultural research/extension entities, as they viewed other researchers and agencies seeking common funding; however, they must now resolve the dichotomy of having to be cooperative, *and* competitive. While our attitude toward information exchange remains cooperative, our logistical practices should be steered by a desire to be more competitive.

Our purpose is to describe some of the electronic implementations and innovations currently in place at the Texas A&M Research and Extension Center at Dallas (TAMD), as they apply to agricultural research/extension operations, to assist other organizations considering these technologies (Figure 1.).

Administrative Computerization

Computer Network and E-Mail

The "office" of the agricultural researcher might include the greenhouse, field laboratory, satellite farm, or other distant "outpost". Communication among staff and administrative members can be difficult or delayed. A network of computers with an electronic mail (E-mail) system relieves the burden of having to "chase down" a colleague to deliver

---

Use of a trademark or proprietary products does not constitute a guarantee or warranty by the Texas Agric. Exp. Stn. and does not imply its approval to the exclusion of products than may also be suitable. Trademarks mentioned are the sole property of their respective owners.

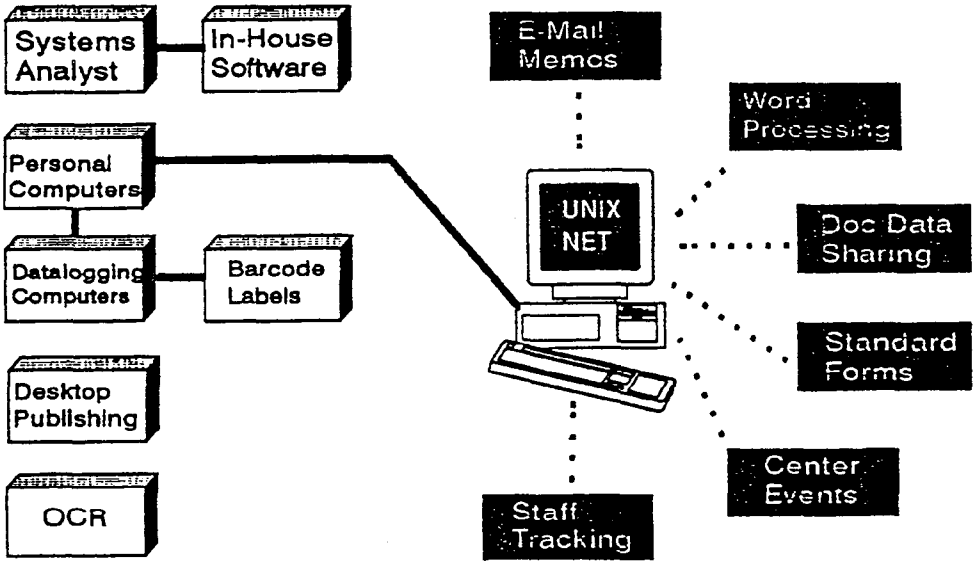

Figure 1. An overview of computer-related technologies and applications in use at Texas A&M Research & Extension Center at Dallas.

information. Time wasted in "phone tag" is eliminated. Electronic mail also forces the sender to organize his/her thoughts to some degree and provides the receiver with a written, dated record. Some argue that E-mail de-humanizes interactions; we believe it makes interchange concise and efficient. An E-mail system is a common meeting place which is available 24 hours a day.

A multi-user, UNIX®-based network of terminals was installed at TAMD in 1986. The installation coincided with a telephone system upgrade which reduced the cost of dedicated network wiring. The UNIX computer is an AT&T® 3B2/400 which is configured to support up to 28 terminals. Our UNIX system currently has three printers including a laser printer and two dot-matrix printers. The system also has four dial-up modems to allow users access after hours, or access from locations which lack direct-connect terminals.

Electronic mail can be sent to single users, all users, or selected groups of users. We have defined common-interest groups in the system, such as Turfgrass Researchers, Field Crop Researchers, or Urban Agriculture Researchers, which can be chosen as mail recipients. Aside from general correspondence, E-mail is used to notify users of Center events, personnel whereabouts, and to deliver phone messages. Researchers and secretaries also use E-mail to notify each other that a document has been made available for revision or review. Mail can also be sent to oneself as a reminder of a future appointments and other events.

UNIX has a "calendar" utility program which allows each user to create a list of dated entries in a special file. Each day the UNIX system checks the user's calendar file for current events such as staff meetings, appointments, anniversaries, birthdays, etc., and mails the user daily messages, beginning two days prior to the event.

The UNIX operating system allows many computer maintenance functions to occur automatically and regularly. For example, automatic tape backups of recently modified documents and data files are run nightly to reduce the risk of data loss. These "nightly", incremental backups are done at 3:00 AM to lessen the chance of user interruption and inconvenience. Because backups remain so current, recent file versions can be restored to minimize data loss. Full-system backups are run on a monthly basis only.

We are in the process of installing a low-cost, DOS-based Local Area Network (LAN) of PCs within the administrative office, using Novell Netware Lite® with ethernet communications protocol. This small PC LAN will allow file and printer sharing among the Director and secretarial staff using DOS software applications.

Manuscript Preparation/Revision

Manuscripts are prepared by the secretarial staff using UNIX terminals connected to the 3B2 multi-user system. Currently, our word processing software is WordPerfect® 5.0 for UNIX. WordPerfect allows secretaries to perform typesetting operations, producing camera-ready manuscripts, and to incorporate graphic images directly into the manuscript, when graphics are supplied by researchers.

Some research staff members also use WordPerfect on the UNIX system to "rough" their own manuscripts or to produce final copy when desired. A major advantage of producing documents on this system, is the ability to share document files with staff members during production and revision. A researcher might produce a rough draft and "mail" it to a secretary for revision. The secretary can print a "hard copy" for the

researcher to review, as well as "mail" him or her back the revised electronic version. Messages and notes regarding the revisions take place by E-mail as well.

Researchers also have the ability to produce documents on their personal computers, using PC software, such as Microsoft Word® or WordPerfect 5.1, save the document in a text-only (ASCII) format or some other format which can be imported by WordPerfect for UNIX, and "upload" the file to the 3B2 hard disk drive. "Uploading" and "downloading" involve data transferred through serial communications from one modem to another. "Uploading" and "downloading" allow two dissimilar devices, such as a UNIX hard disk and an MS-DOS® hard disk to exchange data. Once a document file resides on the 3B2 hard disk, it can be made available to secretarial staff or other researchers for revision. Researchers can also "download" finished document files to their PCs for permanent storage or future reference.

Office Automation

Most of the TAMD computerized business accounting is handled by software systems designed and administered by the Texas A&M University main campus. This software is accessed using data terminals which communicate via a high-speed, T-1 dedicated data line. This same T-1 data line is utilized by the Texas A&M Trans-Texas Videoconference Network to send compressed video and voice data. The Videoconference Network will be discussed later in detail.

In-house UNIX software has been written to automate various tasks such as filling out and printing standardized forms, printing mailing labels, and merging letters onto a computer-generated letterhead. Individual programs have been written to prompt a system user for all the information needed to complete and print travel and leave requests, work requests for maintenance, purchase orders, sales invoices, and memoranda.

In all cases, actual form images are stored on the computer and are merged with the required data before printing. There is no need to place actual forms in the laser printer's paper bin. In some cases exact duplicates of official forms were produced using PC desktop publishing software, and the printer-ready image of the form was transferred from PC to the UNIX system, for use by the UNIX program. The TAMD letterhead image was produced in a similar fashion, and is merged with letter text at the time of printing, eliminating the need to place actual letterhead stationery in the laser printer. By storing form images on the computer, users at remote locations can produce finished documents without requesting that forms be inserted into the printer. This saves time, and the possibility of one user's output being printed on someone else's form.

Users can create electronic memoranda for "mailing" to individual users, or specific-interest groups such as "Urban Agriculture Researchers", "Field Crop Researchers", or "Administrative Office". A "hard copy" of the memorandum can be optionally printed on official letterhead for physical distribution.

Maintenance work requests are completed and submitted without having to leave one's office. A copy of the actual form is printed for the Director's approval, and E-mail notification of the pending request is sent to the Director's secretary and Maintenance Foreman.

A dedicated, mailing labels printer can be accessed by any user on the UNIX system. A simple program was written to produce single labels, or large numbers of duplicate

adhesive labels. Another program was written to intercept output of business letters from the system word processor, and optionally print a mailing label using the addressee information within the letter.

While personal computers are used extensively by TAMD research staff, computer use by the Center Administration has been limited to the UNIX system and the Main Campus mainframe. In 1991, a DOS-based PC was installed in the accounting office to run an internally-developed software package which accrues, tracks, and reports on employee leave time. Another PC-based software package was recently installed to maintain mailing lists and produce adhesive mailing labels, which include Zip+4 barcodes ("Postnet") according to U.S. Postal Service specifications. By including Postnet barcodes on Center correspondence, we are able to reduce postage costs.

A PC-based, telephone usage accounting system was installed in 1990 to monitor and report on Center-wide telephone usage, by individual telephone extension. The system, manufactured by InforText®, includes PC software and a PC interface board, which connects directly to the telephone PBX. The main purpose of this reporting system is to verify long-distance charges assessed by the local phone company, and to appropriately bill individual projects and departments for long-distance calls. Occasionally the accounting system is used to verify telephone abuse when suspected by a supervisor. The system allows on-line viewing, as well as produces a report showing each outgoing call's associated calling station, date, time, duration, number called, city called, and approximate toll charge.

A key element in personal computer usage at TAMD is Microsoft Windows 3.0 software. Windows provides MS-DOS PCs with a software equivalent of the Apple Macintosh's multi-tasking, windowing, operating environment. The advantages of a windowing environment are many, but most notably is the ability to "multi-task" or run several programs simultaneously. Users can quickly switch applications by "clicking" on each application window using the mouse. Windows allows our staff who use PCs as UNIX terminals, to remain "logged in" to the UNIX network in one window, while simultaneously using another window to run a Windows word processor or access a dial-up service using the telephone modem.

RESEARCH DATA ACQUISITION, MANAGEMENT, & ANALYSIS

Data collection in the physical sciences and engineering tend to involve the single-event observation, often utilizing automatic instrument data acquisition. However, agricultural and biological research often involves manual observation and recording of replicated treatments over many weeks or months. Our potential as agricultural researchers to "drown" in our data may be greater.

The availability of computerized data analysis software such as Statistical Analysis System (SAS®) for mainframe and personal computers, has reduced the time required to analyze experimental results; however, data acquisition and management remains, for many agricultural researchers, a persistent "bottleneck" in the research process. At TAMD, data collection efficiency has been improved through use of portable datalogging computers, barcoding for treatment label input, and electronic data transfer from datalogger to personal computer.

Data Acquisition and Management

In 1987, work at TAMD was started on datalogging software for an inexpensive Tandy® 102 laptop computer, to allow electronic data entry. The laptop computer and datalogging program were used for greenhouse data collection in soil chemistry research. The program was modified to accommodate several experimental designs and arrangements. Eventual enhancements allowed data to be "acquired" from electronic laboratory balances using the laptop's serial (RS-232) port. The software was further modified to allow treatment label input using a barcode scanner. The laptop-barcode scanner-electronic balance combination was used in the laboratory to quickly process randomly-ordered plant samples, acquiring sample IDs from barcode labels and dry weights from the electronic balance. The laptop was also used by forage researchers to collect harvest weights on a field harvester, using an on-board electronic balance and load cell. A description of the laptop program and its application was eventually published and made publicly available (Graff and Hipp, 1989).

While the laptop software was under development, work was also started on a PC program to print adhesive identification labels for research. The label software, "A-MP Labels", was developed and test over a two year period and eventually included functions for barcode printing, treatment randomization, field map printing, note sheet printing, and merging of randomized cultivar/treatments with random plot numbers. The labeling software prints labels which include study title, sampling date, treatment ID, replication number (optional), sub-sample ID (optional), and a barcode containing the treatment/rep information (optional), on standard 8.9 cm (3.5 in.) x 2.4 cm (17/16 in.) adhesive labels. A standard, PC dot-matrix printer with graphics capability is used. The program uses "template" files to permanently store an experiment's list of treatments and other information, making re-entry of study information unnecessary for future printing. Users can select from three barcode types (symbologies), including Code-39, UPC, and interleaved 2-of-5. The software was published in 1990 and made available to the public (Graff and Hipp, 1990). A-MP labels is periodically revised and improved according to researcher's requests.

In 1991, new datalogging software was developed by an independent consultant for use on the inexpensive, sophisticated PSION Organiser® LZ hand-held computer. Following testing, the DataBanker™ program and PSION Organiser replaced the Tandy laptop for data collection at TAMD. The PSION Organiser LZ is much smaller and lighter than the Tandy laptop, measuring 14.2 x 7.8 x 2.9 cm (5.6 x 3.1 x 1.1 in.), and weighing 210 g (8.8 oz.). The PSION Organiser costs $299, while the Tandy 102 sells for $599. The PSION also includes personal organizer functions such as a calendar, notepad, calculator, alarm clock, etc. for use by the researcher. DataBanker is used to collect field and laboratory data for turfgrass, forages, and small grains research, using hand-entry or electronic acquisition from digital sensing and laboratory equipment. DataBanker is also used in conjunction with barcode scanners to input treatment IDs. Datasets formatted by DataBanker are SAS-compatible.

Polycorder® dataloggers, manufactured by OMNIDATA, have been used extensively by turfgrass researchers at TAMD, particularly when analog, or non-digital sensors are used. Load cells and thermistors are examples of sensors that require analog to digital (A-D) conversion, performed by the Polycorder datalogger. The cost of the Polycorder is $1500 to $2500. The lower-priced PSION Organiser directly accepts only digital (RS-232) input; however, an A-D accessory is available.

Datalogging computers allow our researchers to enter data once, at the site of observation, and "dump" data using an serial port (RS-232) adapter, directly to the office PC. Data entry from field note sheets is eliminated and large datasets can be analyzed soon after returning from the field. Labor spent in data collection and management is minimized and costs are reduced. Barcodes allow technicians to quickly process lab samples with little or no error. In many ways, the *data management* link between data collection and analysis has been largely eliminated.

There are other examples of electronic data acquisition at TAMD. A soil chemistry researcher is using a personal computer to monitor water runoff and perform fractional sample collection of surface effluent. A multi-channel, data acquisition board installed in a PC receives signals from counting devices triggered by water runoff on 20 separate runoff plots. When an individual plot count reaches a pre-determined number, corresponding to effluent volume, software on the PC sends a signal through the data acquisition board to close the current sampling solenoid and open the solenoid for the next fraction to be collected. The PC is housed in an air-conditioned storage shed. Another PC is used to continually monitor and log prevailing weather conditions using a PC-based weather sensing system.

A turfgrass breeder uses dataloggers extensively to manually input data, perform unattended data collection, and acquire data electronically from sensing instruments. Turfgrass water-use data from field lysimeters are read directly into an Omnidata Polycorder datalogger, which converts load cell voltages (analog) to actual weights. A Polycorder is used to collect data from an infrared sensing "gun" which measures a photosynthetic index on various turfgrasses. The Polycorder was also used for periodic, unattended monitoring of greenhouse mist-bench temperature using a grid of thermistors.

TAMD operates a weather station which includes a datalogging computer for monitoring current conditions and daily data collection. The datalogger, located outdoors at the weather station site, is connected by "short-haul" modem to an office PC which monitors and collects the data. The weather station and datalogger are also used by a turfgrass researcher to control an irrigation switch in response to wind direction and speed.

Data Analysis

While not uncommon at many universities and their agricultural experiment stations, PCs are used almost exclusively at TAMD to perform data analyses, while the main campus mainframe is only occasionally required. Costs associated with data analysis are greatly reduced when PCs are used, relative to the cost of mainframe on-line and CPU time. Most researchers at TAMD use PC/SAS® to perform data analysis, with a few projects using MSTAT®, or other smaller software packages. Because Texas A&M purchases a yearly site-license for PC/SAS, research projects are only required to pay a $40 fee for each PC workstation utilizing the software. MS-DOS, 80386 personal computers are used almost exclusively to run PC/SAS. Occasionally large factorial or other complex experiments require mainframe computing power, though this is rare.

Satellite Communications

Most land-grant universities are newcomers to satellite use. Universities with the most experience are Oklahoma State University, Ohio State University, Virginia Tech University, Iowa State University, Oklahoma State, Ohio State, Virginia Tech and Iowa State; but even their expertise has been developed since 1980, through broadcasting instructional classes and Extension workshops.

The most notable catalyst which for motivating land-grant universities to consider satellite broadcasting is AG*SAT®, the Agricultural Satellite Corporation. AG*SAT was formed in 1989 by 27 land-grant universities with the purpose of supporting all aspects of agriculture. Although initial activity centered on Extension and instructional programs, research programs are on the agenda as well.

AG*SAT Member Sites

In 1990, AG*SAT received a large grant to pay for satellite uplinks at Texas A&M, Penn State, Clemson, Utah State, Nebraska State, and Oklahoma State, which also funded downlinks in a number of other states.

Many universities are "piggybacking" on AG*SAT grants by adding downlinks at numerous locations. A few states currently have downlinks in the majority of their counties, while others only have downlinks at district or regional centers. Satellite equipment acquisition is usually granted to campus and Extension service locations, because they sponsor much public educational activity. AG*SAT expects to receive additional grants which should provide funding for more uplinks and downlinks.

Research and International Programming

Research information exchange and international teleconferencing are two of the next frontiers for satellite programming. While these are identified these as separate projects, they are actually complementary. The opening of eastern Europe and the former Soviet Union offer tremendous opportunities to share research information internationally.

It's easy to visualize Extension producing a satellite conference about 4-H horse projects, or how an Extension Specialist could use the satellite to deliver lectures on agricultural ethics, but how do you convey *research* results effectively over a satellite? Many scientists are not accustomed to disseminating research information using electronic media. This is usually perceived as medium belonging to Extension Services, and breaking that preconception can be difficult.

At the most basic level of use, researchers are interested in satellite teleconferences on professional or technical topics. Although most teleconferences do not deal with research projects outright, many of them do deal with societal issues or governmental programs which affect research.

We believe researchers within institutions will soon use satellite communication for internal staff meetings; not to replace live meetings, but to allow more frequent contact. Satellite feeds from campus can be used to update faculty and staff about research, policy, and legislative matters. While watching a speaker, viewers could also submit questions by telephone or fax.

Satellite communication could play an important role in grantsmanship. Because many granting agencies want information generated through research funding distributed as widely as possible, offering satellite teleconference publicity in research proposals could provide a competitive advantage. While this could never replace written publication, it adds a new medium and a method of sharing information with scientists and extension faculty. This also makes a healthier mix of media; video is a good medium to demonstrate concepts, but a poor one for details. Use satellite in its area of strength, and deliver the fine details through written publication.

No academic institution is a leader in every academic and research area, and satellites offer a way to "borrow" experts from other schools. Long-distance communication is an economic necessity for our professional development. Restricted budgets, available communications technology, and people's lifestyles make satellite communication not only desirable, but necessary as we move into the future.

While no single medium of communication is a total solution, satellite is an important medium in an effective communications program, and this medium is evolving. We still need the personal contact of face-to-face meetings, we need to use telephones, mail, and publications, but time and budgets are increasingly important factors which limit our ability to meet face-to-face as often as we'd like.

Compressed Video Teleconferencing

Compressed video is a medium in which video and audio are fed bi-directionally through telephone lines. This requires expensive equipment at each end, but it allows you to hold "live" meetings whereby both parties can see and hear one another, from distant locations.

On each end of a compressed video system is a video camera and microphone which send video and audio signals to a specialized personal computer (PC) called a CODEC, which stands for COder/DECoder. The CODEC converts the analog audio and video signals to digital data, compresses the data, and transmits them across a fiber optic phone line called a T-1. At the far end, a receiving CODEC decompresses the signal data, converts the data back to an analog signal, and delivers them to a TV monitor. Of course, this process is repeated many times per second to produce animated output. The result is that people at the far end can see and hear those at the originating end.

The Texas A&M University Trans-Texas Videoconference Network (TTVN) is one of the largest in the U.S., with 14 system sites in Texas and new connections proposed to businesses wanting to conference with A&M (Figure 2.). This allows a range of meetings, classes and other activities to occur without the time and expense of traveling across our large state. Our network can also be connected to a large commercial network called the Sprint Meeting Channel, which has similar teleconferencing sites across the US and overseas. For a fee, we can reach any of more than 1500 such sites.

The compressed video signal can also be converted into a satellite feed. For example, a researcher 200 miles away in Dallas could originate a presentation using the compressed video system, and have it converted by the Main Campus, to a satellite uplink for nationwide broadcast.

Compressed video is already a proven medium in terms of its ability to facilitate meetings and limit travel time and expense. However, it is not yet a medium which allows free reception by any interested viewer; it is limited by the expense and availability of a fiber-optic phone line and expensive viewing.

SPECIALIZED IN-HOUSE SERVICES

Scientific Graphics

High-quality scientific graphics for publication and oral presentations are produced at TAMD using various PC software packages. When camera-ready, printed output of scientific charts and graphs is required, we use either Sigma-Plot® 4.0 (Jandel Scientific),

PC/SAS GRAPH, or Harvard Graphics® 3.0. Output is produced on laser printers or pen plotters.

The Center has a PC dedicated to producing professional-quality color slides for presentations. The software used is Harvard Graphics® 3.0 and the output device is a Polaroid Palette®. Scientists generally prepare their charts for presentation using their office PCs, assemble the carts into a "slide show", place the slide show on floppy disk, and transfer the slide show to the dedicated PC for actual slide production. The Palette uses ordinary Ektachrome® slide film and the film is processed locally for a nominal fee. The cost of using an outside slide production service is eliminated, justifying the cost of purchasing the Polaroid Palette and graphics software.

Desktop Publishing and Scanning

Many corporations and small businesses have discovered the excellent benefits of producing professionally-typeset, specialty documents in-house. Examples of such documents are brochures, newsletters, custom business forms, letterheads, business cards, posters, and other advertising and public-relations material. These documents can include various fonts and incorporate photograhics images or computer art. Full-page, or hand scanning devices used to capture images from paper to a computer graphic format for use in desktop publishing.

TAMD has a PC workstation for desktop publishing, which includes an 80386 PC, a full-page scanner, a laser printer (Apple PostScript), and Microsoft Windows® 3.0 software with Aldus Pagemaker® 4.0. This publishing system has been used to produce typeset facsimiles of grant request forms, University forms for use on the UNIX system, generate signage for public meetings, produce specialty memoranda, design employee business cards, and design business forms. The system could easily be used to produce final typeset copy of manuscripts for University publications, complete with illustrations.

The full-page scanner is an integral part of the desktop publishing system, allowing creation of graphic image files from photographs, printed logos, and other printed diagrams for use in documents. Scanned images can be scaled, trimmed, and retouched when appropriate. The Windows 3.0 "Paintbrush" utility is used extensively to produce simple line-art or to edit image pixels ("picture cells"). Image files from Harvard Graphics or SigmaPlot can be incorporated into documents using Pagemaker. Pagemaker is more advantageous for true desktop publishing than WordPerfect because it constantly displays "What-You-See-Is-What-You-Get" (WYSIWYG), complete with imbedded graphic images, and allows you to click-and-drag individual page elements such as shaded boxes, text elements, graphics, etc., using the mouse. Page elements can be manipulated in the same way a graphic artist would arrange items on their paste-board. Shaded boxes, circles, and lines can be "painted" directly onto the page. The software is easy to learn and can benefit even the casual user. Desktop publishing is a technology that can benefit any organization which produces publications.

Optical Character Recognition (OCR)

PC-based OCR is a fairly recent technology which allows typewritten text to be converted to an electronic format for further editing, revision, or incorporation within a PC text editor or word processor. OCR provides a means of having a lengthy printed document "read-in" to the computer so it does not have to be re-typed. OCR is also useful for incorporating printed excerpts or quotations into word processors for inclusion in a new

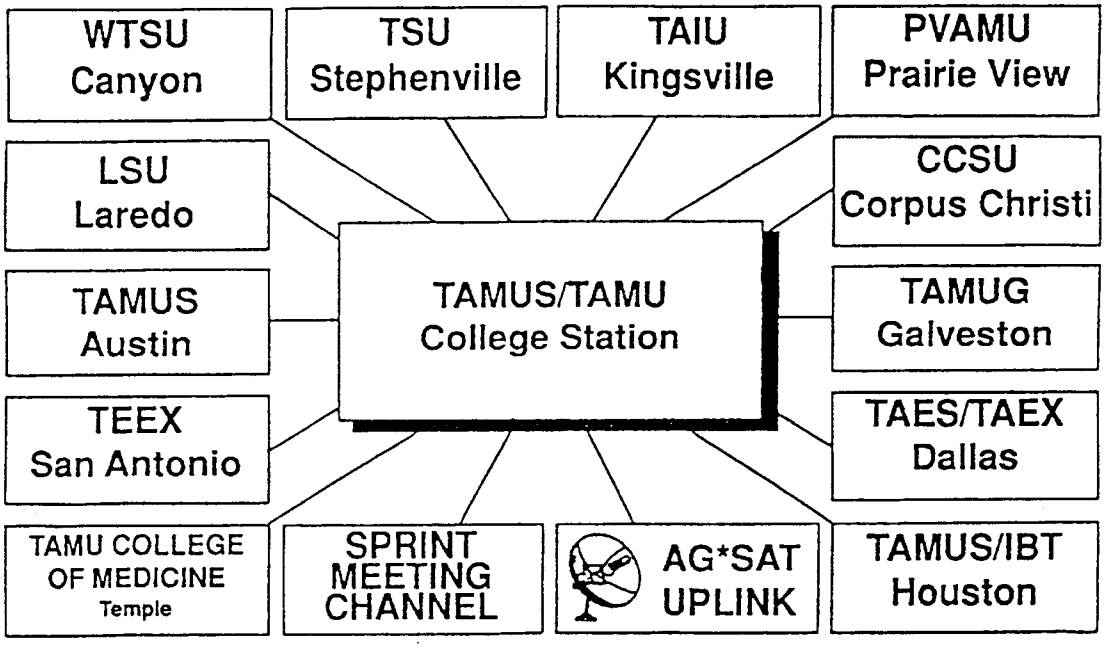

Figure 2. The Trans-Texas Videoconference Network (TTVN) provides teleconference links among 12 state-wide locations in the University System, utilizing compressed video technology.

document without retyping. We have used OCR to "import" printed mailing lists into WordPerfect or database programs, to produce mailing labels.

A scanner identical to that used for desktop publishing can be used for OCR. Aside from a scanner, OCR software is needed to "drive" the scanner and actually perform the character recognition. The software we have purchased is OCR Systems' ReadRight® for Windows. Once ReadRight obtains the document image from the scanner, it proceeds to distinguish text regions from graphics, performs the character recognition, and lets the operator review and correct "questionable" words or characters. When recognition is complete, the document is saved in a file using the operator's choice of word processor formats, such as WordPerfect or Microsoft Word.

Image Analysis

An image analysis (IA) system was purchased by TAMD in 1987. The system includes an 80386 PC (also used for OCR and desktop publishing), a high resolution black-and-white video camera, a Targa® imaging adapter ("frame grabber") board, and other peripheral video equipment. The purpose of the system is to rapidly, accurately, and objectively quantify visually-assessed study parameters such as leaf area, disease infection, object count, perimeter length, or degree of color/contrast. The IA system uses a video camera to capture a subject image, the Targa board converts the image to digital information (digitizes) for the IA software to interpret. Data can be captured and ported to a spreadsheet program, or saved to disk file for statistical analysis.

Systems Analyst

To coordinate and expand uses of electronic technologies, TAMD hired a Systems Analyst in 1990 to serve as UNIX System Administrator, PC "generalist", and software programmer. The Systems Analyst helps project leaders with data acquisition/management solutions, data analysis, and computer equipment purchases. Computer-related problems within research projects can often be solved more quickly and cost-effectively by a staff member dedicated to the task.

In-House Software Development

It is common for businesses and research organizations to identify uses for computer technology, but be unable to implement them because specific software solutions do not exist in the retail market. With the advent of "object-oriented" programming and object module libraries, sophisticated business and research software can be "built" quickly and efficiently. *Object modules* are generalized programming routines that once purchased or developed, can be used extensively, like "universal" building blocks, to write customized software. Examples of object modules are pop-up screen windows and menus, import/export filters for data handling, text editors, user input routines, and screen save/restore routines. Normally, a programmer would have to write these routines as part of the programming effort. Instead the routines are "called" or plugged-in to the program, with the programmer only needing to specify parameters such as screen positioning and colors. Object module libraries can be purchased for almost all PC-based programming software such as Microsoft QuickBasic® and QuickC®. Object oriented programming was used by the Systems Analyst to develop custom PC software at TAMD, such as A-MP Labels for Research, and the employee leave accounting system. Because object-oriented programming is fast and efficient, custom software for agricultural uses can be developed in-house with minimal time and expense.

PC Repairs/Upgrades

The TAMD Systems Analyst is responsible for overseeing approximately 35 MS-DOS personal computers and their peripheral devices. Third-party repair and maintenance contracts are not required, and the majority of repairs and upgrades are performed by the Analyst. Typical PC upgrades have included hard drive capacity augmentation, floppy disk drive additions, processor (motherboard) replacement, RAM (memory) expansion, and backup tape drive installation. Currently, a number of older 8088 processor PCs are being upgraded to 80386 processors by replacing motherboards and installing additional RAM. The cost of such an upgrade is approximately $600, versus $1000 to $1500 for similar, new base units.

Repairs are also performed by the Analyst. Repairs generally involve motherboards, expansion cards, and hard or floppy disk drives, which are simply replaced. Local retail outlets for these modular PC components are common in Dallas and other metropolitan areas.

Product Information and Bid Specifications

Just as researchers are required to remain current on the latest research, the Analyst is expected to be apprised of advances in electronic technologies which might be applicable to agricultural research or the Center Administration. Project leaders often consult with the Analyst before making computer purchases, or they describe needs they have to streamline data acquisition or management. The Analyst assists researchers with bid specifications, bidder qualification, and budgeting projections.

Summary

As funding for agricultural research becomes more competitive and scarce, many researchers and administrators may be *forced* to a higher level of efficiency through electronic automation. Aside from providing a competitive "edge", the technologies described here give the researcher more time to muse and theorize; something many have been "robbed" of. If poorly coordinated or misapplied, however, computerization can become a hindrance.

At the project or departmental research level, the greatest increase in efficiency can be gained through use of electronic datalogging and barcoding (where applicable). We believe the advantage gained through datalogging can be equivalent to a typical project gaining one, full-time staff member. We have also observed that datalogging, and particularly barcode use, are not adopted readily by researchers until they witness the reliability, simplicity, and ease of use of the technology. Though not always financially feasible, an on-site technology group or technician can provide the critical link between success or failure of these implementations.

The autonomous nature of the Research Project allows the Project Leader to determine his or her level of automation. This produces some projects that are highly-automated, and others that refuse to consider electronic options. While we would not argue against project autonomy, Research Directors can encourage automation through informational seminars and demonstrations, and at-large implementations, such as computer networks with electronic mail.

Literature Cited

Graff, P.S. and B.W. Hipp. 1989. A versatile data logging program in BASIC for the laptop computer. J. Range Manage. 42:225-227.

Graff, P.S. and B.W. Hipp. 1990. Computer program to print adhesive identification labels for research. Agron. J. 82:161-164.

Product Information

Product: **UNIX**
AT&T Computer Systems
(800) 634-5177

Product: **Word, QuickBasic, Windows**
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399
(800) 227-4679

Product: **DataBanker**
Peregrine DataLogging Systems
P.O. Box 704
McKinney, TX 75069-0704
(214) 548-8956

Product: **SAS, SAS/PC**
SAS Institute, Inc.
Box 200075
Austin, TX 78720-0075
(512) 258-5171

Product: **Polaroid Palette**
Polaroid Corporation
784 Memorial Drive
Cambridge, MA 02139
(800) 225-1618

Product: **TARGA board**
TrueVision
7531 Shadeland Sta., Ste. 100
Indianapolis, IN 46256

Product: **NetWare Lite**
Novell, Inc.
122 East 1700 South
Provo, UT 84606
(800) 453-1267

Product: **Tandy Model 102**
Tandy Corporation
Fort Worth, TX 76102

Product: **Polycorder**
OMNIDATA International, Inc.
P.O. Box 448
Logan, UT 84321
(801) 753-7760

Product: **SigmaPlot**
Jandel Scientific
65 Koch Rd.
Corte Madera, CA 94925
(800) 874-1888

Product: **Pagemaker**
Aldus Corporation
411 First Avenue South
Seattle, WA 98104-9926
(206) 628-2320

Product: **InforText OS200**
InforText Systems, Inc.
1067 E. State Pkwy.
Schaumberg, IL 60173
(708) 490-8700

Product: **WordPerfect**
WordPerfect Corporation
1555 North Technology Way
Orem, UT 84057
(800) 451-5151

Product: **PSION Organiser**
PSION Incorporated
118 Echo Lake Rd.
Box 790
Watertown, CT 06795
(800) 548-4535

Product: **MSTAT**
Michigan State University
A87 Plant & Soil Sciences Bldg.
East Lansing, MI 48824-1325
(517) 353-1752

Product: **Harvard Graphics**
Software Publishing Corporation
1901 Landings Drive
P.O. Box 7210
Mountain View, CA 94039

Product: **ReadRight**
OCR Systems, Inc.
1800 Byberry Rd., Ste. 1405
Huntingdon Valley, PA 19006
(800) 233-4627

PREVENTING DEER DAMAGE ON RESEARCH STATIONS

Ben U. Kittrell
Clemson University Pee Dee Research & Education Center
Florence, S.C. 29501

Preventing deer damage is probably not the best title for this presentation because I have concluded that we can not prevent deer at our facility. We can try to control them to hopefully decrease the damage, especially to experimental plots.

Let me tell you a little about our Center. It is located about five miles from the city of Florence. There are 2300 acres of land consisting of 1000 acres of forest and 800 acres of open land mostly under cultivation. There are 15 ponds and lakes of various sizes with one 150 acre lake under the control of the S. C. Department of Wildlife where fishing is controlled on Wednesdays and Saturdays during summer months. The rest consists of wetlands, roads, buildings, etc. The surrounding area consists of forest land and farm land providing an excellent habitat for deer and many other forms of wildlife.

A deer is a beautiful animal but there is no place for them on a crops research station where small experimental plots are planted and results can be altered and even lost when even a small number of plants are destroyed by deer. The deer are especially fond of eating soybeans and small grains. They have also browsed on cotton plants and tobacco plants. They are a threat to tobacco seed beds and have destroyed plastic cover used to fumigate tobacco seed beds.

According to Dr. Gregg Yarrow, Extension Wildlife Specialist at Clemson University the following are methods of reducing deer damage:

A. Scare Devices

B. Repellents

C. Fencing

D. Cultural practices and habitat management

E. Herd management

We have tried some of these with varying degrees of success.

A. Scare Devices

1. Gas exploders are effective for two or three days after which the deer get used to the noise and ignore it. They can be set to go off at set intervals and are powered by propane gas.

2. Firecrackers and gunfire - we have not used. Not effective to my knowledge.

3. Dog on a run. We have not used. May be effective for small areas.

4. Rotating lights - no knowledge.

B. Repellents

1. Big Game Repellent

2. Deer Away (37% putrescent egg solids)

3. Hinder (ammonium soaps of higher fatty acids)

4. Thiram

5. Magic Circle (98.8% bone tar oil)

   We have used this around some fields. It must be applied after each rain. It was not effective for us.

6. Millers Hot Sauce (2.5% capsaicin)

   I don't know much about this but it may be good on your Bar-B-Que.

7. Tankage (putrefied meat scraps)

8. Ro-pel

9. Hair Bags (human hair) we have used this around tobacco seed beds. It seems to work for a few days.

10. Other - bar soap, blood meal, feather meal, cat feces, moth balls.

C. Fences

1. Temporary - we put up about 3 strands of wire on an electric fence. It is fairly effective for a small area such as a variety test. Batteries must be checked often. Solar power could be effective. Peanut butter on the wire may attract the deer to touch the fence and get a good shock. Some say to put aluminum pie pans for the same reason.

2. Permanent high tinsel electric fence has given good results where it can be used. Our Center is too large for this since the expense would be prohibitive.

3. Permanent woven wire if high enough may help to change the trail patterns. We plan to use this in some areas where we can afford it.

D. Cultural Practices and Habitat Management

1. Plant more general crop area to lure deer away from experimental plots. Some work is in progress in South Carolina to look at insect resistant varieties of soybeans which deer have not eaten as readily as conventional varieties.

2. Prescribed burning of forest. This is not only good for the trees but it provides new undergrowth for deer to browse and stay in the woods - not in the fields.

E. Herd Management

1. Live removal - we were going to use this but it was not practical

2. Shooting permits - wildlife personnel will issue these under some conditions. Local hunters get very angry about this since they think you are killing "their" deer. Not a good "PR" effort but may be necessary.

3. Hunt Seasons - this method is considered the best technique and was the method suggested to us. Antlerless deer tags must be requested from wildlife officials ahead of hunting season.

4. Lease Land for Hunting - this is good for areas with a lot of deer but it is not good for a research station like ours because it will be hard to control their movements after you allow them on the property.

Our Experience at the Pee Dee Research and Education Center

1. August 1987 - I took job as Resident Director. Letters from researchers complaining of deer damage were directed to me.

2. We called Wildlife Department for help to make live catches and remove them. It was considered impractical.

3. Met with District Wildlife Commissioner and Biologist. They recommended a controlled deer harvest during hunting season with only doe shot using only our permanent employees.

4. October 9, 1987, I called a meeting of all employees and discussed the plan we were going to follow. We stressed the safety of people and buildings. Only one person objected.

5. Rules were drawn up and given to all participants. Harvesting began in October after deer stands were built and erected.

6. After a couple of weeks, uniformed outsiders called the local TV station complaining that we were using government land for our own hunt club. I made calls to some and after explaining our program they seemed to be satisfied especially when they found that we were only killing antlerless deer.

7. 1988 - Clemson employee not employed at the Pee Dee Research and Education Center complained that we were discriminating against other Clemson employees by not letting them hunt. After visiting with him, he was not satisfied and threatened to bring suit against Clemson University. Dean of Extension appointed a committee to decide on a solution. It was decided to get a ruling from the Attorney General's office to see if we had the right to keep others from participating. His ruling was that we had that right based on a precedent set from a Florida ruling. We continued to carry out our program.

8. August 10, 1989, we met with Wildlife Biologist and local land owners and hunt clubs surrounding the Center. Data of our harvests were presented to show that more antlerless deer should be killed by surrounding landowners and they were encouraged to do so. Our program was shown to be helping them get more bucks and if they would kill more doe we would both benefit.

9. September 30, 1991, met again with surrounding owners to discuss progress. Group was much more receptive to our program than first meeting.

10. Results to date.

Year	No. deer killed	Avg. Size (lb)	Avg. Age (yrs)
1987	33	92.4	2.71
1988	40	87.8	2.03
1989	45	78.4	2.18
1990	26	87.5	1.70
1991	33	82.9	--
	177		

We have donated to the local Boys Home 60-80% of the deer killed which is a very good "PR" tactic.

In conclusion, we have in no way eliminated the deer and neither do we want to do that. I believe that we have helped our situation with a combination of the practices mentioned. We will continue and hopefully we can reach a steady state with some deer but little or no damage to research plots.

PREVENTING BIRD DAMAGE ON RESEARCH STATIONS

J. W. Walker
Eastern Research Station
Oklahoma Agricultural Experiment Station
Haskell, OK 74436

Since day one, birds have caused damage to Agronomy Research Station Studies of the Oklahoma Agricultural Experiment Station. The losses due to bird damage is extremely costly when field experiments and property are involved. A field experiment can be lost in the matter of a day or two depending upon the size of the plot and size of the bird population. Over the years many damage control measures have been used to eliminate or at least minimize losses due to presence of birds.

The bird population can cause many forms of damage to the research station program:

1. First and of most concern is destruction of field research planting which prevents the collection of accurate research data.

2. Bird droppings in buildings and on equipment which causes very unsanitary conditions in the work place and causes property deterioration.

3. In many cases birds will gain entrance to buildings through small and unnoticed holes or they will make their entrance by pecking holes thru soft materials and then begin to remove insulation for nest building elsewhere.

At the Agronomy Research Stations in Oklahoma many efforts have been employed to discourage the presence of birds. Among the measures utilized to either eliminate the damage or at least minimize the damage are:

1. Produce gunshot like sounds

2. Use netting material over the top of research plants

3. Bird discouraging objects

4. Shotgun shots into the air near a scattered populations of birds. It is unusual to hit a bird by this method

5. Sling shots into plot areas making a frightening noise

6. Loud rock type music with strange sounds over loud speakers positioned in various locations in the field

Gunshot like sounds have been produced with propane or carbide guns which on a regular time interval produces a loud explosion. This will discourage the presence of birds for a short time, however they will become accustomed to the sound and may light on top of the propane bottle to rest. At this point they may even deposit droppings on top of the propane bottle. In some cases the shot-like sound will cause the birds to fly from their present location to another location only a few feet removed. This method of discouragement can be utilized

for a day or two and then should be replaced with other types of discouragements and then return to the propane gun a week or so later.

Often time when attempting to prevent damage to small plots it is practical to cover the plant material with a netting material. Birds do not like to fly in and under covers of this type.

Bird deterrent objects could be certain types of balloons moored to a rope or heavy cord to a height just above the plant material. Some balloons are colored, however some have painted objects on the sides or those that seem to have the most discouraging effect to birds are those that have small transparent pockets on the side of the balloon into which is inserted a small black disc which resembles a moving eye.

Shotgun blasts into the air has a similar affect as the propane blast however it seems that an occasional accidental dead bird laying in the field has some discouraging effects. It is not the intent to kill a flock of birds in an effort to keep them out of the field. The intent is only to frighten them away and save the research material.

In some cases sling shots are used to shoot a small rock into the standing plant material which normally causes a noise as it hits plant material and at that point catches the attention of the birds and they hopefully will fly out of the field.

A rock music cassette tape thru loud speakers has been used to discourage the presence of birds in research material. This noise seems to be very effective when there are other louder screaming sounds occasionally included.

It should be pointed out that it has been our experience that any one method that seems to have some success in discouraging birds is effective only for a limited time. It is important to rotate the bird discouraging methods from one to another every few days.

PREVENTING COYOTE DAMAGE ON RESEARCH STATIONS

Mike Bourne
Wes Watkins Agriculture Research and Extension Center
Oklahoma Agricultural Experiment Station
Lane, OK 74555

The coyote, a common scavenger, was found originally in south central United States. Today, the coyote has extended its range to include most of the United States and has adapted well to the numerous habitats. The spread of the coyote has been attributed to man's influence and to the ability of the coyote to adapt to new habitats. The easterly spread was assisted by escapes of animals from zoos and from privately owned pets. The migration to the north and west is surmised to have been influenced by man's own migration, with coyotes following man to these areas and feeding on the easily captured domestic animals men had taken with them.

The coyote has a reputation for taking any quick meal. Its normal diet consists of small game such as rabbits, mice, and birds. When necessary, coyotes will kill calves, lambs, deer, and other larger prey. Due to their willingness to scavenge, coyotes will also consume dead animals, grasshoppers, cottonseed meal, cactus fruit, snakes, frogs, watermelons, persimmons, tomatoes, and even okra. Because of this varied appetite, it is very difficult to reduce the coyote population with a control of food sources. Coyote predation problems are increased when small game populations which have previously provided an adequate food supply are suddenly diminished.

Coyotes usually mate for life and have an average of 5 pups each spring but may have a litter of up to 12 pups. A family unit usually consists of a male and female and an additional yearling female who helps in feeding the new pups.

When evaluating damage to crops or livestock it is important to assess what animals are actually causing the problems. Distinction between dog and coyote tracks is often difficult and control techniques for one animal will not always be adequate to control the other. The track of the coyote is more oval than that of the dog, and has less prominent nail marks. The tracks of the front and rear feet of the coyote usually fall in a straight line, while those of the dog do not. In contrast to dogs, coyotes usually kill their prey rapidly, cause little destruction to the carcass, and do not harass the animals before the kill. Since dogs normally do not feed on vegetables, most crop damage can be attributed to coyotes.

Laws affecting coyote control vary by state and the following suggestions reflect the current Oklahoma laws. The only legal lethal controls the public is allowed to use are trapping and calling. Trapping is the most widely used method but can be challenging as the animals are very smart, quickly learn to recognize trapping methods, and will change their behavior patterns for self preservation. The older animals are seldom caught due to their wisdom but pups are relatively easy to catch. Legal traps include 'Offset #4 Leg Hold Steel Traps' which do not break the leg when sprung. Oklahoma Animal Damage Control officials are now testing a rubber jaw trap which may soon be a standard and should relieve certain anxieties of pet owners. Experience with leg hold traps can provide a person the great opportunity to learn how to release angry dogs without being bitten.

Calling, which involves vocally luring the animals into an ambush, is effective when large populations of coyotes are in an area or game is scarce. With both trapping and calling, the end result entails shooting the animal. In Oklahoma the Animal Damage Control Officers may be called upon and they may use neck snares and sodium cyanide baits. These are both

rapid and efficient but cause great concern to local dog owners due to their indiscriminate nature.

Non lethal deterrent methods include fences, electric fences, noise makers, lights, olfactory deterrents, and guard dogs. Fences with a net wire bottom and barbed wire top offer some control but coyotes soon learn to dig under the fence. An electric wire strung 8 inches outside the bottom wire and 6 inches from the ground on the outside of the fence will help deter the coyotes. Fences that have been totally electrified offer the best control with the ideal fence being five feet tall with twelve wires (alternating grounded and charged wires) and with an additional charged wire 8 inches outside the fence and 6 inches off the ground. Electric fences require extra maintenance as most fences will be noneffective when they come in contact with wet vegetation. Electric fences which are less massive may be effective but the coyote will continue to challenge the fence if the reward seems adequate. Noise makers, lights, and olfactory deterrents are not normally effective as the coyote learns to tolerate these intrusions and will soon feed as if there were no deterrents. The best of these deterrents use lights, and sirens or radios on variable timers. This will increase the length of time it takes for the coyotes to adapt to the new sights and sounds and therefore will give longer control. Guard dogs are becoming more popular but cannot provide all the control needed for a research facility. They must be trained to protect the domestic animals or facilities without causing predation to their charges.

Reduction in coyote damage may be achieved by many methods or by a combination of methods. The methods which have worked best for our facility have been a combination of lethal controls (trapping and baiting) in addition to the use of electric fences around individual research plots. We currently use a 3 to 5 wire three foot fence and have been fairly successful in keeping coyotes away from watermelon fields. Usually the coyotes will try the fence one time and will not build up enough courage to try the fence again before the watermelons are harvested. Coyote control is difficult due to the number of pups raised in a year and due to coyotes moving into an area, often as soon as the current residents have been removed. Due to public sentiment against killing coyotes as pests or for pelts, the control methods have not changed and the coyote has reigned in the contest of survival.

References

Dobie, J. Frank. 1949. The Voice of the Coyote. McClelland and Stewart Limited.

Gates, Norman. 1978. Constructing and Effective Anticoyote Electric Fence. United States Department of Agriculture, Bulletin No. 565.

Green, J. S. and R. A. Woodruff. 1990. Livestock Guarding Dogs: Protecting Sheep from Predators. United States Department of Agriculture, Animal Damage Control. Bulletin No. 588.

Harding, A. R. 1973. Wolf and Coyote Trapping. A. R. Harding Publishing Co. 252 pp.

Leland, B. R. 1991. Management Inputs and Nonlethal Control Methods to Reduce Predation Risk. 1991 Iowa Sheep Symposium. pp 65-68.

Leydet, Francois. 1977. The Coyote Defiant Songdog of the West. Chronicle Books.

Pitts, J. J. 1991. Controlling Coyote Problems Using Traps and Snare to Remove Problem Coyotes. 1991 Iowa Sheep Symposium. pp 69-78.

MANAGING SAFETY ON AN AGRICULTURAL RESEARCH FARM

Lyle E. Ziemann
Monsanto Company
St. Louis, MO 63198

Monsanto's Animal Sciences Division operates a farm-animal research center near St. Louis, Missouri. Facilities there were started up in the mid-1980's. During the first several years of operation, injury rates at this site were high by Monsanto standards, and a new safety program was established to address the situation.

This presentation describes the importance of safety at Monsanto, explains some specific safety challenges at this new site, summarizes Monsanto management's response to the situation, and outlines the results achieved.

Safety is very important at Monsanto, starting with the CEO, Richard J. Mahoney. In his book entitled, A Commitment to Greatness, Mr. Mahoney talks about the importance of safety at Monsanto. Among other things, he says, "Go into a factory anywhere in the world that has a good safety record, and you'll find a plant that enjoys high quality standards, meets commitments, and keeps costs under control. Sloppiness toward safety inevitably spills over into other activities, and the cost of business starts to rise. Over the years, I have learned that when the plants are safe, then everything else is usually right."

There were a number of challenges as we addressed the issue of reducing injuries at our annual research center:

- A relatively large number of "contract" employees are employed here.
- The turnover rate for these employees is much higher than for permanent employees, and their level of commitment is often lower.
- Many of the employees come from farm backgrounds and bring with them safety attitudes and behaviors that are inconsistent with Monsanto's expectations.
- Operating a large livestock farm was new to Monsanto in the mid 1980's. Many of the employees at that time, including supervisory personnel, had no prior industrial experience, much less in a major corporation such as Monsanto, with such high expectations regarding safety.
- Our Division previously had an outstanding safety record, and we had grown complacent about safety.

Over the next several years, we put into place a completely new safety program, the principal elements of which are listed below:

- A Safety Steering Committee was established.
- Area Safety Committees were set up.
- A better method was established for reporting injuries, and a detailed log for keeping track of them was created.

- The frequency and regularity of Safety and Housekeeping Inspections were increased.

- New and more stringent policies regarding the use of personal protective gear were issued.

- The scope and intensity of safety training activities were increased.

- Safety was made more visible, and various things were done to keep safety awareness at a high level.

- Participation in safety activities was increased. We believe that participation increases awareness and that it helps establish ownership and commitment.

- More accident investigations were conducted. In addition to investigating the more serious injuries, which we had always done, we began to investigate the less serious ones as well--especially where we felt something could be learned that might prevent future injuries.

- Accountability for safety at the first-line supervisor level was increased.

- Over a period of time, a new level of commitment to safety at all levels was achieved within our organization.

What were the results of these actions? The average number of recordable injuries for the last three years has dropped to one-third the number in 1987. We are not yet where we want to be--at zero injuries--but we have made substantial progress, and we seem to be on the right track.

Our Safety Steering Committee is made up of safety management personnel and the chairmen of all our Area Safety Committees. The Area Safety Committees are made up of people from each of the major functional areas of work. The Safety Steering Committee meets monthly and is responsible for establishing overall policy and direction regarding safety in the Division.

Safety and housekeeping inspections are held a number of times each year throughout the Division. The composition of each inspection team is different. A specific effort is made to involve Division top management and a mix of people both from within and outside the area being inspected.

Employees are required to wear appropriate personal protective gear. This includes safety shoes and safety eyeglasses in all operating areas and bump caps in areas such as feed preparation and the milking parlor.

Videotaping has been used as a training aid, both to analyze jobs from a safety standpoint and to record specific training events for future showing to different audiences and for repeat training.

Safety signs and posters are located at various places around the site to increase safety awareness among employees and visitors alike. A safety suggestion program has been used to identify safety problems and to increase awareness.

We have done many things to reduce injuries. They are all important, but I believe the single most important factor in all this is management commitment. Our supervisors and managers have become committed to safety. It is a top priority for them and that helps make it a top priority for each employee. It has become part of the culture. Safety is part of the job, not just an add-on. There is now an expectation that there will not be injuries as opposed to an expectation that there will.

Our experience has demonstrated that it is possible to work safely in a farm environment. As with any worthwhile endeavor, it takes commitment and lots of work, but it can be done.

FACTORS AFFECTING THE SAFE HANDLING OF LIVESTOCK

Rick Matheson
Oklahoma Agricultural Experiment Station
Perkins, OK 74059

A discussion on safe handling of livestock can go in two directions. First, I could discuss the safety of the people doing the work, or I could discuss the safety of the animals involved. Highlighting the problem areas from each topic may be most beneficial.

Oklahoma State University Agronomy Department has a wide variety of disciplines. Occasionally, there comes a need to maintain livestock for research purposes. Cattle are used to evaluate forage potential on many grasses and small grains. The Range Research Station and the new Klemme Range Station are composed of several thousand acres of native rangeland, on which several projects are underway. The Perkins Station, Marshall Station, and the Haskell Station are composed largely of improved pastures and forges. The common factor between all five locations is the need to have, on hand, a various number of cattle to evaluate ongoing research.

With the anticipated need for livestock, we must first think about the need for controlling and handling animals in a safe and timely manner. Therefore, the need for a good set of working pens is a must. One of the most important objectives of any livestock handling operation should be to reduce stress. This is not only important for the livestock, but also on the people actually doing the work. Stress reduction plays an important part in how well an animal responds to treatment, rather medical or data collection, and can affect your overall research objective.

In this day and age when the animal rights movement is growing rapidly, and the Humane Society is diligently watchful for mistreatment of any animal, it is imperative that the public institutions such as OSU, step forward to set good examples in our care and handling of research animals. Doing everything we possibly can to reduce stress on these animals, and to insure their safety while handling, should be a primary concern.

Likewise, no one likes to walk up behind a five weight steer, (especially a black one), only to find that that animal likes to strike out at anyone or anything that is within leg distance. A strong kick to the shinbone can be very painful, and certainly cause a lot of stress. Therefore, it is important to construct a handling facility that ensures the safety of not only the livestock, but also the cowboy.

There are a lot of corral designs available to an individual. Some are very basic and inexpensive, while others are very elaborate and costly. Likewise, some designs, such as panels wired together to form a square, have no built in safety features for animals or people, while other designs have many safety features built in.

The heart of any corral is the working chute. Desireable characteristics would include a curvature in the chute, totally inclosed sides, overhead restrainers, rough concrete floors, and for efficient utilization of time, should be able to hold three to four head of livestock. The chute should be curved with solid sides to restrict the cattle's vision. Cattle move more easily when they cannot see the cattlemen working outside the chute. It is also helpful for the cattlemen if there is a walking platform running along the chute and crowding area.

Sloping sides on the chute restrict the animals feet to a narrow path. This reduces the ability of an animal to turn around in the chute. It also allows for different sized animals to be worked in the same area. Overhead restrainers are important to prevent cattle from rearing up and turning around, or falling over backwards while in the chute. Without overhead restrainers, it may be necessary to install emergency release panels somewhere along the chute system.

A concrete floor in the chute and crowding areas provide all weather surfaces which can be easily cleaned after working cattle. Cleaning the working area after use helps to prevent the spread of disease. All concrete areas should have a rough finish to them to aid in good traction for the animals.

The crowding area is built much like the chute area. It has solid side panels and is shaped in a circular pattern. It should have a crowding gate which effectively restricts the animals to a smaller area.

The loading chute would have many of the same features as the working and crowding chutes. If possible, the loading chute would be equipped with telescoping side panels and a self aligning dock platform. These features aid in the loading process, and eliminate the need for a truck to be perfectly positioned. If scales are required, they should be placed near the loading area, but should not be placed in line with the loading dock.

In most corrals there is a need for a headgate at the end of the working chute. There are three basic types of headgates, all three have advantages and disadvantages. The selfcatching headgate is easy to operate, works cattle fast without balking, and allows cattle to exit quickly. However, these headgates do not work well where horned cattle are concerned. They usually require some type of nose bar to restrict the head movement of an animal, and also can cause shoulder bruising when cattle lunge at the gate.

The stanchion headgate is also simple and fast to operate.

If properly adjusted, it seldom chokes an animal. It does, however, require a nose bar for restricted head movement, causes possible shoulder bruises, and can allow an animal to slip past without being caught. Cattle often trip and fall while trying to escape through these gates.

Guillotine headgates generally hold an animal's head more securely, and produces very little shoulder bruising. However, the guillotine is difficult to operate, can cause an animal to choke down, and usually cattle balk at entering.

Many of the features listed can be incorporated into any set of corral plans for the convenience and safe handling of cattle. Several features oriented to the safety of personnel can also be incorporated, such as walk ways along the outside of chute areas, and crowding gates to be kept between the cattle and the cattleman. However, for the cattleman's safety, the most important factors which must be used are common sense and experience. There is no place in the corral for horseplay, daydreaming, or stupidity.

Pennsylvania statistics show that animals rank number one in involvement of farm accidents. Causes for animal related injuries are many. Haste, impatience, anger at another person or animal, a preoccupied mind, or lack of knowledge are all potential hazards while working with livestock.

There are three sources of human injuries. Animal caused injuries are a result of lack of knowledge. You must learn and understand animal characteristics, and how they will respond in certain situations. For example, farm animals are color blind. Shadows in and around corral facilities can be confusing. Livestock have no depth perception. Forcing animals into narrow or crowded spaces can become dangerous. Animals have very sensitive hearing. Yelling and screaming for any reason, becomes confusing, and can cause an unfavorable animal response.

Facility injuries are common and can be easily corrected. Poor equipment and hazard areas should be upgraded or repaired. All facilities have their own set of hidden characteristics which must be understood and compensated for. Bumblebee or wasp nests are often undetected until it is to late. Mudholes in or around the pens are also sources of injuries for man and animals.

The majority of accidents are the result of people problems. Know how animals respond in certain situations. With practical experience, you learn to announce your presence, avoid quick movement and loud noises, be patient, provide an escape route, as a supervisor, don't allow horseplay. Above all, always use common sense, most farm animals are larger than you, don't try to manhandle them into your way of thinking. They almost always win.

A safe and efficient corral and working facility for man and animal starts in the planning stage. Though not all hazards will be eliminated, proper planning and personnel training will hopefully eliminate the most dangerous hazards.

A SAFE PESTICIDE STORAGE FACILITY

R. L. Horsburgh
Virginia Agricultural Experiment Station - Winchester
Winchester, VA 22601

My approach to this topic today will be to take you on a walking tour through the pesticide storage facility we have developed at Winchester.

But first, a little background: Urban encroachment at our facilities forced us to abandon the orchards we had within the city limits and establish new plantings at our research farm eight miles away. The university determined that continued evaluation of pesticides would be a part of the station's program in the future. They also decided to abandon the city site and develop a completely new office and laboratory complex at our research farm. The facility we will tour now was the first phase in the development of this new office - laboratory complex.

The move to the new pesticide facility in 1989 provided an excellent opportunity for us to clean up accumulated collections of all kinds of pesticide left-overs which were the legacy of fifty years of tree fruit research in horticulture, entomology, and plant pathology. You can imagine the mess, and the horror stories I could tell about unlabeled bags, bottles, and cans etc. that we found during the cleanup. Needless to say after the expense and tribulations of this chore were behind us we were determined to prevent ourselves from ever getting in such a situation again.

Before any materials were placed in the new building the researchers and the technical staff jointly developed a set of strict safety rules for the building that the technicians felt were reasonable, protected their health, and permitted them to do the jobs expected of them. The classified workers were deeply involved in this procedure and were told that their safety was of paramount importance and that they would be charged with the responsibility of seeing that the rules they developed were followed by everyone, including the professional staff.

The results far exceeded my wildest dreams. Even during the busiest of days of the spray season (when we can have as many as four spray machines in operation) the place is spotless. Weigh-room clean up is done following each person's activities before the next worker begins to work in any given space. It only took harsh disciplinary actions for a couple of slip-ups in the beginning to show the workers that we really meant business and that all the safety measures would be followed by everyone. Their cooperation was assured when one of the backsliders called on the carpet was one of the professionals.

When arriving workers and visitors first enter a small field office where data entry or other paper work can be done. It is important to note that in this office there is a telephone with the emergency numbers posted close by. Also posted are copies of the pesticide applicators licenses for all the workers who will use the building. The MSDS sheets for all materials on hand are in binders on the shelves and readily available if needed. The inventory for the entire building (room by room) is updated weekly on the computer and a copy is posted here as well as in the administrative office.

The next area we enter is a large hall in which we eventually will place two small cold storage rooms to hold experimental trees or fruit. On one wall is an area where boots

or other rubberized spray clothing may be cleaned. There is also a washer and a dryer in which workers can wash the inner garments they wear while spraying. However, nowadays almost all our workers wear disposable outer spray suits when spraying. All the water from the wash goes directly to a disposal unit you will see later. To avoid contamination we emphasize that all spray clothes should be washed on the job site, not taken home and done with the family wash.

Clean, heated washrooms with showers are available for both men and women and all workers have an individual locker in which they are required to maintain a complete set of clothing. This is so they could replace contaminated clothing should an accident occur.

Now we come to a small field lab in which simple pesticide experiments are conducted. It is equipped with; a fume hood that can draw its air supply entirely from outside the building and is vented through the roof; separate hot and cold water; binocular microscopes and many electrical outlets.

Note there are two storage rooms that are designed specifically for storage of research materials for entomology or plant pathology. Each discipline has its own room to which only those directly involved in the research have access. This is done to tighten control on the expensive, scarce, small quantities of each product that is usually available and insure the propriety rights of the manufacturers. On the wall outside each door are a time clock, a clip board, and a light switch. The time clock is used by workers to turn the fans on inside the room to evacuate odors and fumes from the chemicals well in advance of their next anticipated entry. The clip board holds an inventory of all the chemicals, and the amounts of them stored in any given room.

Once inside a room there are many things to note. I will list the most important:

1. All the rooms are equipped with individual heaters and controls so freezing of liquids can be prevented in winter.

2. Each room has its own controls and fans to quickly change the air in the room and replace it with fresh air from outside. Contaminated air is vented through the roof far from any fresh air intake.

3. The shelving is not nailed down so a contaminated shelf can immediately be removed, destroyed and replaced.

4. All shelves, walls, and ceilings are triple coated with epoxy paint. Wall and ceiling joints are sealed as are all ceiling perforations made during installation of lights, fans, heaters, etc. This was done to facilitate cleaning and prevent passage of fumes from one room to another. Such fumes could be a source of contamination and affect experimental results.

5. Carts (or wheeled garbage cans) are used to move materials to the weigh room. This is done to prevent banging (and breaking) bottles or bags on the concrete floors or walls.

6. Open bags are placed in sealed, plastic, labeled containers to reduce odors or fumes.

7. All liquids are placed on plastic backed absorbent shelf liner in aluminum pans. By this method we hope to absorb and trap small leaks of material should they occur.

8. All containers are examined twice a year to detect and eliminate potential leaks or spills.

9. Liquids are stored on the bottom shelves to avoid the contamination that would occur in the case of a spill or a leak if other products were stored on shelves below the liquids.

10. All materials are dated as to the year of receipt.

11. High light intensity is provided so labels can be read accurately and mistakes avoided.

In addition to the two rooms just mentioned the storage building has similarly equipped rooms for handling herbicides, miscellaneous chemicals such as growth regulators or anti-transpirants etc., general farm maintenance products, two rodenticide storages, and a room to hold products scheduled for disposal.

There is also a well lighted and ventilated weighing room, adjacent to the sprayer fill up area. This room is equipped with a large fume hood that has its own air supply and discharge capabilities. There are also counters, drawers for supplies, sinks that connect to the disposal unit, and plenty of electrical outlets available for energizing other equipment.

The sprayer fill up and wash down area has also been designed with safety in mind. It is a roofed over cement slab that drains to a low point where spill or wash down water are directed to a series of three stilling basins. Rain water on the other hand is directed to surface drainage. Points to note about the fill up area are:

1. All water is metered into the sprayers. This avoids mixing up too large an amount and reduces the problem of disposing of surplus mixtures.

2. Mud from the tractor tires is trapped by the stilling basins and will be removed by commercial hazardous waste handlers if too much collects.

3. "Quick connects" are used to connect to the water supply that comes from a swivel type discharge to facilitate filling sprayers.

4. There is a frost free emergency shower by the sprayer fill up area. Other emergency showers are located on the receiving dock and in the center hall outside the storage rooms.

5. "Quick connects" from the sprayers to the stilling basin are being installed so any waste from the sprayers can be flushed directly into the disposal unit.

6. A room is located nearby for the storage of disposable items such as empty bags, or bottles. Empty bottles are triple rinsed and broken, plastic or metal cans are triple rinsed and punctured. This trash is placed in the County landfill dumpsters at the end of each day. Empty bags and other paper products are burned at the station under controlled conditions.

7. Excess materials received from manufacturers are packaged and placed in the disposables storage room for later pick up by company representatives. This is possible because no materials will be accepted at the station without a signed agreement with the company to retrieve all excess materials after our experiments have been completed.

The time has arrived to take a look at the pesticide disposal unit. The plan for the unit was developed by a team of university specialists with much experience in the area of safe hazardous waste disposal. The basis of our system lies in the ability of many micro-organisms to biodegrade pesticides. It is important to recognize that throughout the disposal system the capacity to run two completely different systems has been incorporated. This will make comparisons possible if necessary in the future.

The unit itself consists of two adjacent, highly impermeable, concrete pits that are roofed over with a roof that has the side facing the sun made of heat capturing, clear, plastic panels. The original plan was to use the solar heat thus generated to evaporate water from the waste. The pits are filled with alternating, foot deep layers of soil and gravel. Provision was made so compressed air could be forced through pipes on the bottom of each pit to provide oxygen to micro-organisms if necessary. High temperatures are kept below maximum allowable levels by a thermostatically controlled fan which blows across the surfaces of the pits and is vented to the outside. Vertical, six inch diameter tubes extend to the bottom of each pit so that samples of the contents can be drawn for analysis. The entire unit is surrounded by a drain placed at a lower level than the pit bottoms. This drain runs to a three foot diameter, covered, concrete stand pipe (with a concrete bottom) that is frequently monitored to detect any leakage from the pits if it should occur.

When in operation water from the fill up area flows by gravity to the stilling basins and on to the disposal unit. Records of what materials and the quantity of each entering the digester are kept. At the digester the water flow may be directed by valves to either or both pits. The water leaves the drainage system through perforated pipes located just beneath the surface of the fill medium and seeps down through the alternating layers of soil and gravel.

After one season of operation it was evident that the evaporative capacity of the unit needed to be increased. We took all the ideas we could garner from others, added our own and designed and built our own unit. Our evaporator is a twenty foot long, six foot wide building with a four foot, exhaust fan in one end and four foot corrugated paper filters along each side.

Individual pumps (with filters) are used to pump from the sampling tubes in each of the pits. One pump delivers water from a pit to the top of the pads on one side of the evaporator and the other pump delivers from the other pit to the pads on the other side. Air drawn in through the pads by the fan is able to evaporate about a quart of liquid a minute when both pumps are operating. Any liquid that reaches the bottom of the pads is returned by gravity flow to the pit from which it came. The height of liquid in each pit is systematically monitored with a float gauge that can be observed from outside the digester. The entire unit can be flushed and drained before winter freezes occur.

Our intention is to analyze samples from the evaporator pads if and when they become covered with residue. If possible the pads will be composted or burned. Otherwise they will have to be disposed of by a hazardous waste disposal company. Should it be necessary to remove the soil-gravel medium from the pits that job will also be contracted out.

Only one other important fact needs to be made. The law enforcement officials, fire departments, rescue squads, and emergency response teams have been kept informed through out the planning, construction and operational development of this facility. A tour for all these officials was conducted before any materials were placed in the storage. Furthermore, all of these organizations have plans of the building and response plans on file for reference in case of a fire or accident.

PESTICIDE HEALTH AND SAFETY PROGRAMS FOR EMPLOYEES AT GULF COAST RESEARCH & EDUCATION CENTER, BRADENTON

W. E. Waters[1] and J. P. Jones[2]
IFAS, University of Florida Gulf Coast
Research & Education Center
Bradenton, FL 34203

Florida has a mild temperate to subtropical climate with high humidity and an average rainfall of over 50 inches. Soils are primarily sandy with some being well drained, but many are poorly drained with shallow water tables. These conditions, coupled with a rapidly expanding urban population and an agricultural industry heavily reliant on pesticides, have led in recent years to a variety of regulatory agencies and rules which apply to agricultural research centers and agricultural enterprises dealing with hazardous materials.

The Gulf Coast Research and Education Center is a unit of the Institute of Food and Agricultural Sciences (IFAS) of the University of Florida. The Center, located in a heavily populated area just south of Tampa Bay, represents a medium to large center in the Florida system. This center has about 200 acres of research farm with over 50 buildings, including 14 scientific laboratories, 20 scientists, and 44.5 permanent staff positions. The Gulf Coast Research and Education Center is primarily a horticultural unit dealing principally with research activities; however, some extension programs are located at the Center.

The intensive production requirements of these horticultural crops and programs dictate that many agricultural chemicals, both experimental and labeled, be researched and/or used in general plot production on the research farm. These chemicals include insecticides, miticides, fungicides, bactericides, herbicides, fumigants, and growth regulating chemicals.

IFAS and Center pesticide handling and personnel safety procedures are modified frequently in an attempt to keep pace with federal, state and local laws, rules and regulations. The objective of this report is to enumerate some of the policies, procedures and activities implemented in the area of pesticide handling and human safety at this Center.

The commitment of the central IFAS administration is to keep all units in compliance with changing pesticide, hazardous waste and human safety regulations. An IFAS pesticide "Policies and Procedures" manual has been written as a guide to centers and campus departments and the contents are outlined in Table 1.

---

[1]Center Director, Horticulturist

[2]Plant Pathologist

Table 1. Outline of University of Florida-IFAS Pesticide Policies and Procedures Manual - 1987.

Chapter	Contents	No. of pages
1	Introduction, policy statements, definitions	4
2	Personnel hiring, reassignment, training, disciplinary, certification	3
3	Acquisition, inventory, records and files	3
4	Storage and handling facilities	2
5	Health maintenance and care	6
6	Re-entry intervals	3
7	Transportation and handling spills	2
8	Handling and disposal of pesticides	3
9	Pesticide research on UF and non-UF property	3
10	Pesticide recommendations	
	Appendices-Laws, testing policies, records, forms, testing agreements	16

Most aspects on handling and use of pesticides at centers are covered in this manual and all research centers and other IFAS units are requested to follow the manual guidelines.

Pesticide regulations and other agricultural regulatory matters are administered by the Florida Department of Agriculture and Consumer Services (FDACS). FDACS is administratively separate from the University of Florida. The Department of Agriculture is headed by the State of Florida Commissioner of Agriculture. FDACS initially set forth requirements that IFAS pesticide researchers believed were impossible to follow. Acceptable guidelines were finally developed and our situation with experimental chemicals is now much more tolerable. Generally, chemicals applied to less than one acre per crop, per site, are exempt from some of the guidelines.

Training, licensing and certification are required for research center pesticide applicators. A research and demonstration license is also available, in addition to the general plant or animal science specialty licenses. Supervisors and faculty responsible for pesticide application, even if they do not actually apply material, also must pass the test and be licensed.

Table 2 contains an outline of suggestions from the 1988 IFAS Pesticide Policies and Procedures Manual on handling pesticides at research units. Most of these suggestions have been implemented at IFAS research centers.

Table 2. Guidelines for handling of pesticides and most chemicals - IFAS.

1. Contact Environmental Health and Safety on campus for advice.
2. Keep pesticide and/or lab waste labeled and MSDS sheets.
3. Purchase or accept minimum amount.
4. Return unused experimental pesticides to manufacturer.
5. Keep in original containers.
6. Read and follow the label.
7. Put small amounts in containers with labels for transporting to distant fields.
8. Mix only amount of spray needed - calculate closely.
9. Schedule and spray compatible pesticide mixes.
10. Apply rinsates and excess mixes on an approved crop according to label.
11. Plant extra replications of experimental materials for spray residues.
12. Containers - triple rinse - glass, metal, plastic to landfills.
    Paper - landfill or burn.
13. Clean spray clothing and all equipment used.
14. Do not dump in septic tanks.
15. 180 days for disposal of declared waste - must be identifiable.
16. Advertise availability of excess within IFAS before declaring a hazardous waste.

As a result of monitorial and regulatory mandates, many Florida research centers are having to assign scientists, usually entomologists and plant pathologists, to take leadership in handling pesticide usage and safety regulations at each center. Center directors frequently are unable to keep up with these requirements in addition to their other managerial responsibilities. Consequently, the Gulf Coast Research and Education Center needs at least one half-time professional person to deal with the issues of personnel safety, pesticide handling and licensing, chemical disposal, laboratory reagents, gasoline, and right-to-know rules and regulations.

During the past few years a number of health and safety improvements have been established at the Gulf Coast Research Center and these are outlined as follows:

1. Physical exam for new employees

2. Pesticide Applicators Requirements
   a) Cholinesterase baseline
      1) 2 tests within 10 days
      2) SMAK 25 (Glucose, Cholesterol, Triglycerides, etc.)
   b) Cholinesterase quarterly

3. Applicators Clothing Requirements
   a) Coveralls, gloves, boots
   b) Positive pressure, filtered face mask

4. All Applicators
   a) Restricted pesticide license required
   b) Yearly updates

5. Field personnel provided and required to use where appropriate:
   a) Ear protectors, safety glasses, shields, dust masks, and hard hats

6. Laboratory personnel provided and required to use where appropriate:
   a) Safety glasses and shields, protective clothing
   b) Face masks for dust and organic chemicals
   c) Chemical and biological hoods

7. Eye wash and safety showers installed at:
   a) Laboratories, chemical pesticide storages, seed extraction facilities, maintenance area, and golf cart storage areas

8. Fire and health and safety inspections annually (local, university, state, federal)

9. ALL accidents investigated
   a) Formal report giving details
   b) Remediation suggestions listed

10. Safety messages posted on bulletin boards.

11. Entry warning signs used on fields and greenhouses

In order to make employees aware of safety in the work place, formal health and safety training seminars and programs are conducted periodically for center employees. In general, these sessions generate positive responses and benefits. Outlined below is a list of those sessions conducted over the past two years for employees at Gulf Coast Research and Education Center:

1. Pesticide applicators training
2. Right-to-know law training
3. General health/safety seminar
4. Hearing conservation & evaluations
5. Asbestos abatement
6. HIV/AIDS training classes (2)
7. Maintaining safe and clean work areas (pesticides storage/laboratory emphasized)
8. Methyl bromide applicators training
9. Safe motorized equipment operations
10. Forklift operators school
11. Tractor safety demonstration

Many fire safety programs are available from state and local fire officials. Outlined below is a list of program activities the Center in Bradenton has participated in over the past two years. These have been excellent preventative training programs.

Fire safety programs (conducted by fire department)

1. Seminar on chemical fires and use of equipment
2. Survey of chemical/pesticide storage
3. Formal fire training exercise (weekend, 2 stations)
4. Inspection and demonstration of on site equipment
5. Flammable and explosive chemical removal exercise

Table 3 contains some internal management tips which have been found helpful in managing pesticides and hazardous chemicals at the Gulf Coast Research and Education Center.

Table 3. Some internal management tips for pesticide safety at research centers.

1. Appoint a safety officer/pesticide coordinator.
2. Appoint a safety committee.
3. Keep close check on inventories. Log in - log out.
4. Buy or accept only needed material - plan ahead.
5. Upgrade storage locations.
6. Consolidate storage locations.
7. Keep all pesticides under lock and doors posted.
8. Train and license faculty and other users.
9. Plant "spray off" crops for over-mixes, rinsates.
10. Post fields & observe entry intervals.
11. Upgrade safety equipment and showers.
12. Provide washers and dryers for cleaning spray clothing.
13. Legally dispose of obsolete chemicals and residues every 3 to 6 months.
14. Follow local and state laws and regulations.

Most research centers are subject to a variety of agency inspections depending upon the county and state in which they are located. Some of the local monitoring agencies which may inspect any research center in Florida include: zoning department, county health department, department of building codes, county pollution control, county utilities (water and drainage), fire department and sheriff's department. State monitoring groups include State Fire Marshall, FDER (Florida Department of Environmental Regulations), Industrial Health & Safety section (state OSHA) and State's Attorney's office.

Investigations here are usually initiated following a report of accident, complaints by an employee or nearby resident, news media reports, routine check, or by the center director's request.

In conclusion, those in centers who have not experienced all these activities should not be overly frightened. They will have the advantage of learning from previous experiences and mistakes. We trust that when the regulations and regulators do come to your state and ultimately to your location, you will still find the time to smile as you strive to make your center a safer and more ecologically sensitive work area as well as a demonstration unit for agriculture.

EMERGENCY PROCEDURES FOR HAMMOND RESEARCH STATION

R. J. Constantin
Merlyn H. Wells, Sr.
Hammond Research Station
Hammond, LA 70401

GENERAL INFORMATION

The purpose of this plan is to establish procedures and planning mechanisms for the protection of Hammond Research Station personnel in the event of emergency conditions, such as serious illness, fire, hurricane, tornado, flooding, bomb threat, or explosion. This plan, when completed, will protect lives and property, preserve the organizational structure, and ensure continuity or early resumption of essential services at the Station.

AUTHORITY OF THE PLAN

Chancellor
Louisiana State University Agricultural Center
Vice Chancellor and Director
Louisiana Agricultural Experiment Station
Resident Director
Hammond Research Station
Safety Coordinator
Hammond Research Station

EMERGENCY NOTIFICATION NUMBERS

Resident Director	Office
Hammond Research Station	Home
Safety Coordinator	Office
Hammond Research Station	Home
Assistant Director & Safety Officer	Office
Louisiana Agricultural Experiment Station	Home
Safety Officer	Office
Louisiana State University Agricultural Center	Home

FUNCTIONS AND DUTIES

Resident Director: Responsible for selecting, training, and organizing an adequate staff for conducting emergency operations; for directing and supervising activities of building occupants during an emergency. In the absence of the Resident Director, an alternate supervisor will be appointed. In all duties, the Resident Director will be assisted by the Safety Coordinator. Responsibilities include:

(1) Fire suppression
(2) Disconnection of machines
(3) Medical standby
(4) Protection of flammables or removal of records

(5) Venting or closing doors/windows
(6) Supervising first aid/rescue teams
(7) Barricading

The order of notification in an emergency situation to ensure continuity of supervision:

Resident Director

First Alternate
Safety Coordinator

Second Alternate
Trained First Aid Person

In the office building, Administrative Services Assistant/Secretary was appointed as Fire Monitor with responsibility to:

1. Oversee and report results of emergency evaluations; last person to leave building in case of evacuation; regulate and expedite the orderly flow of personnel.

MEDICAL AND FIRST AID EMERGENCIES

TRAINED FIRST AID PERSONNEL AT HAMMOND RESEARCH STATION:

Four trained personnel at the Hammmond Research Station.

In the event of SERIOUS ILLNESS OR INJURY:

1. Notify Emergency Medical Services for this area by dialing (Number).
2. DO NOT MOVE VICTIM UNLESS ABSOLUTELY NECESSARY!
3. If heart attack occurs or breathing stops, start CPR.
   NOTE: ONLY IF TRAINED PERSONNEL ARE AVAILABLE.

In the event of MINOR INJURIES:

1. Start First Aid, as necessary. First aid kits are located in Office Building and in Research Farm Manager's Office. TRAINED FIRST AID PERSON SHOULD ADMINISTER FIRST AID.
2. Notify Safety Coordinator who will take the following action, if necessary.
   a. Hospital emergency services.
   b. Doctor's office services.
   c. Record information on daily First Aid Log.

In the event of DEATH OR EXTENSIVE PROPERTY DAMAGE, immediately notify:

Resident Director, Hammond Research Station (Office/home phone numbers)

Safety Coordinator, Hammond Research Station (Office/home phone numbers)

Assistant Director, Louisiana Agricultural Experiment Station
(Office/home phone numbers)

Safety Officer, LSU Agricultural Center (Office/home phone numbers)

Vice Chancellor and Director, Administrative Services,
LSU Agricultural Center (Office/home phone numbers)

Area Representative, Office of Risk
Management (Office phone number)

FIRE PROCEDURES

Upon discovering a fire, employees should:

1. If fire is easily extinguishable, attempt to do so. At that time, instruct someone to assist in Steps 2 - 4. If no assistance is available, notify the fire department first.

2. Warn other occupants of building.

3. Notify the Fire Department (Telephone number).

4. If a major fire, notify Resident Director and/or Safety Coordinator.
(Office/home phone numbers)

HURRICANE AND TORNADO PROCEDURES

1. Hurricane or tornado information should be passed without delay to the Resident Director or Safety Coordinator.

   Resident Director (Office/home phone numbers)

   Safety Coordinator (Office/home phone numbers)

2. If time permits, the building will be evacuated, using the emergency evacuation procedures or as directed by the Resident Director, the Safety Coordinator, or Fire Monitor.

3. If time does not permit evacuation, employees should:

   Remain away from windows and outside perimeter rooms; go to a closet, a small room with stout walls (such as the computer room in office building), or the inside of a hallway to give protection from flying debris.

   Groups of employees should stay together until authorized to move back into the building or elsewhere, as directed by Resident Director, Safety Coordinator, or Fire Monitor.

4. If a tornado approaches fields and time does not permit seeking shelter inside a building, employees located in fields should:

Lay down in row, ditch, or depression; protect head with arms/hands; avoid standing or lying under trees.

FLOODING PROCEDURES

In the event of a severe flood, employees should take the following actions:

1. Notify Resident Director or Safety Coordinator.

   Resident Director (Office/home phone numbers)

   Safety Coordinator (Office/home phone numbers)

   Alternate:

   Associate Professor (Office/home phone numbers)

2. Before water enters the house, evacuate family from houses in low-lying areas located near the drainage canal to higher ground near the office/barn complex.

3. Shut off electrical power and gas supply upon evacuation. If water has risen above ground near electrical meter, DO NOT ATTEMPT TO SHUT OFF CURRENT; call Electrical Power and Light Company (Number).

4. Shut off power to potting shed area. If water has risen above ground near electrical meter, DO NOT ATTEMPT TO SHUT OFF CURRENT; call Electrical Power and Light Company (Number).

5. In potting shed, move as much equipment as possible to higher ground or lift equipment onto concrete blocks.

6. Remove furniture from flooding houses and bring to office/barn complex.

7. Do not return to flooded houses until they have been checked out and deemed safe by Resident Director, Safety Coordinator, or other emergency officials.

8. Move chemicals off floor and lower shelf in pesticide building to higher shelves if necessary.

BOMB THREATS AND SEARCH PROCEDURES

Employees receiving or discovering a bomb threat or emergency should immediately notify the Resident Director or Safety Coordinator.

Resident Director (Office/home phone numbers)
Safety Coordinator (Office/home phone numbers)

If the bomb threat is received by telephone: be calm, talk in a normal voice, and show as little fear or nervousness as possible:

ASK:

1. When is the bomb going to explode?
2. Where is the bomb right now?
3. What kind of bomb is it?
5. Did you place the bomb?
6. What is your address?
7. What is your name?

KEEP THE CALLER ON THE TELEPHONE AS LONG AS POSSIBLE!

Record the following information:

1. Time of the call.
2. Date of the call.
3. Exact words of person.
4. Age, sex, adult, child.
5. Speech pattern, accent.
6. Background noises.

AS SOON AS POSSIBLE, NOTIFY TANGIPAHOA PARISH SHERIFF'S OFFICE, 345-6150, OF BOMB THREAT. If possible, ask another employee in building to call Sheriff's office on other phone line while caller is still on telephone and the phone company to attempt to trace phone call.

If the bomb threat is received by mail, employee should:

1. Not handle the letter, package, or envelope.
2. Notify the Resident Director or Safety Coordinator. (Office/home phone numbers)
3. Resident Director will notify Sheriff's office (Number).
4. Resident Director will evacuate applicable area/building and call State Police Bomb Squad (Number).

EXPLOSION PROCEDURES

In the event of an explosion (such as those caused by leaking propane, explosives, gasoline cans or tanks, etc.) in or around any building, employees should perform the following actions:

1. Take cover under tables, desks, or other such objects which will give protection against flying glass or debris.
2. Notify Resident Director (Office/home phone numbers)

Alternates:

Safety Coordinator	(Office/home phone numbers)
Trained First Aid Person	(Office phone)

3. Resident Director will notify:

Sheriff's Office	Number
Fire Department	Number
Emergency Services (EMS)	Number

4. After effects of explosion have subsided, the Resident Director or Safety Coordinator will determine if an evacuation is necessary.

5. If an evacuation is ordered, exit the structure area as instructed by emergency personnel.

6. Upon leaving the building, proceed to evacuation assembly area for head count and await instructions from emergency personnel.

EVACUATION PROCEDURES

1. If an evacuation is deemed necessary by the Resident Director, Safety Coordinator, or Fire Monitor, employees will leave the building immediately and quietly in a normal walking pace by the nearest designated exist or as advised. Emergency personnel will be available to direct employees and ensure that evacuation instructions are carried out.

2. Evacuation of handicapped personnel will be given the highest priority; they will be evacuated by the most expeditious and safest means available.

3. When evacuation is determined to be necessary, employees should use the nearest exit door, walk, and remain quiet. Women should remove high heels if advised to do so. Employees should follow all emergency instructions.

4. Regardless of the exit used, employees will gather in the designated evacuation site--pecan orchard in front of Research Farm Manager's office--where a head count will be taken.

5. After evacuation is complete, police and other emergency personnel will prevent entrance to the building. When the emergency is over, the Resident Director or Safety Coordinator will advise employees to return to the building.

NOTE: The signal for evacuation will be verbal warning from Resident Director, Safety Coordinator, or Fire Monitor.

EXPERIMENT STATION SECURITY AT A RURAL LOCATION

J. M. Anderson and R. J. Carlisle
The University of Tennessee
Ames Plantation
Grand Junction, TN 38039

The Will of Julia Colony Ames established Ames Plantation as a part of the Hobart Ames Foundation in 1950. Mrs. Ames expressed two primary desires: (1) the Foundation function for the benefit of the University of Tennessee; and, (2) grounds be made available for running the National Championship for bird dogs. Each year the Trustees of the Foundation and the Administration of the University of Tennessee enter into a general agreement for guiding plantation operations. With completion of this document, the 18,430-acre plantation is thereby included as a branch location in the Agricultural Experiment Station. Resources are provided for research on major row crops grown in the area (corn, cotton, soybean, wheat, and milo), beef cattle (300 cows); dairy cattle (80 cows), swine (210 sows), wildlife (bobwhite quail, deer, beaver, cottonmouth moccasin, turkey, coyote, raccoon, crow, and rodents), forestry (hardwood and pine), water quality and historic preservation. Educational activities include in-residence educational periods for undergraduate students majoring in forestry, senior students in the College of Veterinary Medicine, graduate students in several technical areas, and in-service training for Extension agents and wildlife specialists. Several events are open to the public--some having as many as 1,500 people present with more than 1,000 on horseback.

Our purpose in this presentation is to discuss maintenance of a reasonable degree of control over a facility which stretches 7 miles by 11 miles in 2 counties and which is crossed in many places by public roads, is bisected by a river, and is situated near a major metropolitan center. In the late 1970's we were faced with instances of:

- abuse of property by 4-wheel drive and all terrain vehicles
- trespassing for:
  - = hunting and fishing
  - = invading historical sites
  - = recreational horseback riding
- theft of:
  - = crop production inputs
  - = fuel
  - = livestock
  - = equipment
- predator losses (especially in swine)

We initiated increased security efforts by establishing and enforcing strict rules for access to the property. Since that time this policy has been advertised in local newspapers on a weekly basis. Individuals must be able to show written permission for access or else be considered as a trespasser. Verbal authority for access is not recognized. Those not responsive to this policy are allowed to explain their position to the applicable court.

However, the success of this procedure is dependent upon adequate enforcement. After unsuccessfully seeking assistance from urban oriented security firms, we were able to employ a part-time security guard who is a commissioned, academy trained law enforcement officer. This officer emphasizes odd hour checks at night, on weekends, during special events, and any time management feels additional attention is warranted. This person has a radio capable of

entering land-line telephones as well as direct contact with law enforcement and emergency agencies in both counties. In a commercial setting, Plantation Security, Inc., of Tallahassee, Florida, has confirmed this to be a successful approach in controlling access and use of large rural land tracts in northern Florida and southern Georgia.[1]

Our observations indicate that a high percentage of potential trespassers will not remove a physical obstruction, regardless of its strength, to enter a property. We have established barricades ranging from gates with locks and chain link fences to those with only a few pieces of wire. However, any physical barrier should be apparent to avoid creating a hazard which might be hidden, even to a trespasser.

To increase the effectiveness of our total security effort and to maintain the lowest possible cost, we have established active coordination with law enforcement agencies, wildlife officers, fire departments, and forestry fire control personnel in the several jurisdictions as well as with adjacent property owners. We emphasize to our employees and neighbors the need for reporting to us, regardless of the time, any unusual activity. We respond to each of these reports and inform the reporting individual of our findings. Our security officer is sensitive to the security and integrity of our neighbors' property.

There are some locations on a branch experiment station which require more active protection than others. In especially sensitive areas we have installed automatic alarm and lighting systems, some with automatic telephone dialing capabilities. Alarm systems are currently available to announce an intrusion by wireless means over limited distances.

In an effort to manage wildlife populations and to collect wildlife research data at a low cost, we allow public access under rigidly controlled conditions. For example, each applicant to hunt deer must attend a seminar on our activities, agree to collect samples and deliver them to the designated location, and complete a state operated hunter safety course prior to receiving permission to hunt. Hunting seasons are broken into blocks to stagger entry and keep hunter numbers manageable.

External theft has been deterred by the above actions. However, we face a significant potential for internal losses, both intentional and inadvertent. For example, we noted that gasoline consumption appeared to be excessive for the amount of vehicle mileage in the operation. Installation of a double locked system with fuel withdrawal tied to specific vehicles has resulted in a decline in annual consumption from 32,000 to 20,000 gallons during a period when vehicle mileage substantially increased. Maintaining a monthly summary helps pin-point potential trouble spots as well as identifying vehicles with unusually low miles per gallon of fuel. Livestock losses have been reduced by increasing once-a-year inventory reconciliations to once-a-month and by installation of high tensile electric fences to reduce invasion by all kinds of predators. Tool misplacement has been reduced by requiring employees to place a tag containing his/her name in the spot where the tool is normally located. Harvesters of residual hardwood (firewood) must have a written permit and are under frequent supervision of the resident forester.

---

[1]Personal Communication, Major Alan Lamarche, President, Plantation Security, Inc., 2322 Kilkenny Drive West, Tallahassee, Florida 32308, October 31, 1991.

In summary, any sizeable operation must define areas which are potentially troublesome. Then, clear rules must be promulgated which specifically address areas of concern. These rules must be well publicized and reliably enforced by properly trained and responsive personnel. Some preventive measures, such as barricades, are often simple to accomplish and reduce headaches later on. Employees should be sensitized to the need for security and specifically included in measures focused within their area of operation. Mutual exchange in a "good neighbor" policy pays premium dividends. In critical areas, highly technical, sophisticated security devices may be appropriate.

No specific action will replace vigilance on the part of management. There must be a willingness to observe and question things that do not appear to be as they should even if these things result from long-standing policy. Finally, any system of securing a large branch experiment station in a rural location is highly dependent on the people associated with the operation: employees, residents, neighbors, and professional law enforcement personnel.

SEXUAL HARASSMENT: A BRIEF REVIEW OF ISSUES FOR EMPLOYERS, MANAGERS, AND SUPERVISORS

Genevieve G. Stubbs[1]
First Assistant General Counsel
The Texas A&M University System
College Station, TX 77843

Introduction

The term "sexual harassment" has received a greater than usual amount of publicity and attention at all levels of American society in the past year. From Senate committee hearings on Capital Hill to the New England Patriots' locker room, men and women have been trying to figure out just what sexual harassment is, and is not, in modern society. Anyone who watched even a fraction of the days of testimony in the confirmation hearings of Justice Clarence Thomas was exposed to the ongoing public debate regarding the proper relationships and interactions between men and women in the work force. Many men have become extremely sensitized to the issue, and are understandably confused about their words and actions around female colleagues and employees. Studies, both formal and informal, continue to find that the majority of American women working outside the home report that they have either witnessed or been the recipient of sexual harassment in the workplace. Just what is sexual harassment, and who decides what is and is not correct behavior for men and women on the job? The lines of demarcation are frequently blurred by social and moral issues that vary from state to state and even from office to office. Nevertheless, there are some points of law and fact that an informed supervisor must learn if he or she is to function within the parameters of the law. This paper will touch on the most salient points as they concern employers, managers, and supervisors.[2]

What is Sexual Harassment?

Federal law[3] makes it an unlawful employment practice for an employer to discriminate against any person with regard to the terms and conditions of their employment because of the person's race, color religion, sex or national origin. Sexual harassment is considered to be a form of illegal sex discrimination. The Equal Employment Opportunity Commission is the federal agency having responsibility for enforcing the provisions of the law. **The EEOC defines "sexual harassment" as follows:**

---

[1]B.A., Texas A&M University 1977; J.D., Baylor University 1980.

[2]A word to the reader: although the author is an attorney practicing in higher education, this paper is written for use by laypersons. For this reason, legal citations and jargon have been kept to a minimum. Specific questions regarding ongoing or potential cases of sexual harassment should be directed to the reader's counsel.

[3]Title VII of the Civil Rights Act of 1964, referred to generally as "Title VII".

Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when (1) submission to such conduct is made either explicitly or implicitly a term or condition of employment, (2) submission to or rejection of such conduct by an individual is used as the basis for employment decisions affecting such individual, or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment.[4]

Ultimately it will be up to the trier of fact in a lawsuit (the judge in a bench trial, the jury in a jury trial) to determine whether sufficient evidence exists to warrant a finding that sexual harassment occurred.

Most sexual harassment cases fall within one of two categories:

1. **Quid pro quo or "tangible job benefit"** harassment in which benefits are granted or withheld based on an employee's response to the sexual request or conduct; and,

2. **Hostile environment** harassment in which the working environment is oppressive because of actions of coworkers, supervisors, or customers.

The responsibility of the supervisor/manager to detect and correct behaviors, customs, policies, or other employment-related activities that constitute sexual harassment is of the highest importance. Frequently these behaviors, etc. are not capable of being detected or are otherwise "invisible" to higher levels of management.

Quid Pro Quo or Tangible Benefit Harassment

If an employee is subjected to treatment that expressly or impliedly would lead him or her to believe that submission to unwelcome sexual conduct is going to be used as the basis for an employment decision affecting him or her, a claim of sexual harassment may be proven. Such decisions may include, among other things, such matters as continued progress up a career ladder, eligibility for job benefits, assignment of more difficult or unpleasant work, raises or bonuses in the future, or firing or refusing to hire a person who will not submit to the sexual advances. This type of sexual harassment generally involves only the complainant and supervisory personnel since coworkers cannot normally make decisions on such matters.

Hostile Work Environment Harassment

A "hostile environment" is generally defined as a relentless and continuing pattern of unwelcome sexual conduct that has the effect of interfering with an employee's work performance, or that creates an intimidating, hostile, abusive, or offensive work environment. Many behaviors that a supervisor may consider to be flattering, or "just for fun" may fall within this category when perceived by or directed at certain employees. These may include flirting, physical sexual innuendo such as gestures, and sexually related joking, pictures, or drawings. An employee making such a claim generally must prove that the conduct was severe and pervasive enough to alter the complainant's working conditions and create an abusive working environment. A single incident will not normally constitute a

[4]Guidelines of the U.S. Equal Employment Opportunity Commission, 1980, p. 74677.

sufficient basis on which to support a claim, but the more severe the harassing conduct is, the less the complainant will have to show repetitive or pervasive incidents. Physical harassment is more susceptible to being viewed as harassment regardless of its frequency if it is sufficiently intimate. Verbal conduct combined with intimate physical touching is most likely to be deemed to be sexual harassment, while verbal conduct alone is generally evaluated on the basis of frequency, nature, and context.

It is not always necessary that the sexual conduct be directed at the complainant. Several cases have held that an employee may successfully assert a claim of sexual harassment based upon the fact that a co-worker who submitted to sexual advances of a supervisor received better treatment and/or benefits.

What are some examples of sexually harassing behaviors or activities in the workplace?

* Displays of posters, pinups, drawings or other graphic depictions of sexually related subjects, or of men or women in sexually suggestive dress or positions.

* Frequent touching or deliberate physical contact unrelated to job responsibilities and functions.

* Frequent telling of sexually related jokes or stories.

* Teasing and horseplay, including gestures, even if the persons doing them did not intend for them to have a sexual connotation.

Even nonsexual conduct can constitute harassment if it occurs because of the particular sex of the recipient of the harassment. "Nonsexual conduct will constitute sexual harassment only if the conduct would not have occurred but for the sex of the plaintiff."[5] For example, if a supervisor consistently assigns women to the dirtiest, most unpleasant, or dangerous work, and subjects them to stricter or more harsh supervision, such behavior is sexual harassment.

Whose standards are going to be used to determine if the conduct is harassment?

Courts, and the EEOC, apply a standard known in the law as the "reasonable person" standard of behavior. This is applied to the facts as seen through the eyes of the **victim** (i.e., the complainant or plaintiff). If the harassment would substantially affect the work environment of a reasonable person, and the conduct complained of was in fact offensive to the complainant and affected his or her[6] ability to work, it will be deemed to be illegal sexual harassment. Some courts have begun to apply the standard of the "reasonable woman" for the reason that the neutral "reasonable person" is considered to be male-biased and tends to ignore or downplay the real-life experiences of women. This based partly on

---

[5]*Sexual Harassment in the Workplace,* 1991, Research Institute of America, Inc., p. 7.

[6]Note that both men and women may file sexual harassment complaints. Note further that sexual advances by a person made to someone of the same sex are also within the definition of sexual harassment if they otherwise meet the tests (unwelcome and interfering with working environment or opportunities).

the fact that men and women generally possess different personal perspectives regarding male-female relationships. Women as a group tend to more often be victims of physical violence in our society, and therefore have a different view of the underlying power issues inherent in most sexual harassment situations. It is anticipated that the "reasonable woman" standard, if applied frequently by the courts will result in a greater number of cases finding that sexual harassment has occurred.

How Does a Manager or Supervisor Know When Sexual Conduct is "Unwelcome" to an Employee?

The most obvious way to know if sexual conduct is "unwelcome" is when the employee takes action to file a complaint or raise a protest. Even informal remarks or comments that indicate the employee's discomfort with the sexually oriented behavior or environment should alert management to investigate the situation. No complaint should be ignored or passed over. Questions do arise, however, if the employee delays in raising the issue for a period of time.

> *For example, a supervisor makes sexual advances toward a female employee beginning in June 1990. The employee does not complain until July 1991. The delay in complaining will not hurt the employee's sexual harassment case if there is no evidence that the conduct was welcome, the employee believed she would lose her job if she did complain, and she thought she could initially handle the situation herself before the advances became more forceful and persistent. She finally realized a complaint to management or the EEOC was necessary to stop the advances.*[7]

This is not to say that in every such case the EEOC would rule the same way, but managers should be aware that the complaint will not necessarily be barred by the passage of time.

An employee may express that sexual advances are unwelcome in a nonverbal manner. Removing his or her hand from the grasp of the person making the advances, stepping back, walking away or otherwise physically avoiding contact are all valid means of communicating disapproval and unwelcomeness of conduct.

Even if an employee has taken part in sexual joking or banter in the workplace, he or she is not necessarily barred from later asserting that sexual harassment has occurred. This is particularly true if an employee previously participated in such behavior, but later stopped and now raises a complaint. When such a complaint is made known, the supervisor should take steps to counsel all employees that such behavior is not appropriate for the workplace. In a few cases, courts have found that an employee who initiated sexual talk and regularly used vulgar language could not succeed on a complaint on a hostile environment claim. Regardless of past verbal conduct, unwelcome or initiate physical contact will almost always be found to be harassment.

What Liability Exposure Does the Employer Have?

In examining the allegations in a sexual harassment case, the EEOC and the federal courts generally ask two questions when determining whether the employing entity or company is liable:

---

[7]*Sexual Harassment Manual for Managers and Supervisors*, Commerce Clearing House, Inc., 1991, p. 12.

1. *Did the company know or should it have known that harassment was taking place?*

2. *Did the company take action to stop the harassment?*[8]

The most serious type of cases wherein employers may be held liable are those involving *quid pro quo* harassment of employees by managers or supervisors. The EEOC will generally consider the harassing manager as the agent of the company, and the courts have imposed a strict liability standard in such cases. Although it may be argued that acts of sexual harassment are beyond the authority of the individual manager and therefore the principal/agent relationship ceased to exist, most authorities continue to hold the employer liable.

In hostile environment cases involving managers and supervisors, the courts will give more weight to traditional agency principals. The question of whether the harassment occurred within the scope of a supervisor's employment becomes critical. "The crucial factors involved in this issue are when and where the alleged harassment took place, and whether it was foreseeable. Even if harassment is forbidden under an employer's policy, it still may be within the scope of supervisory employment if it occurs at the office during working hours, and is committed by someone with the authority to hire, fire, promote, and discipline employees."[9]

Hostile environment cases involving an atmosphere created by fellow employees will be reviewed by the EEOC and the courts looking to see whether the employer (or a member of management) knew or should have known about the improper conduct by the coworkers. The complainant's burden to prove knowledge by the employer is more difficult in such situations than when the actual harasser is a member of management. Nevertheless, a supervisor or manager observing or receiving reports (both formal and informal) that may indicate that improper sexually-oriented behavior is occurring should take immediate steps to remedy the situation.

Employers may even be held liable for sexual harassment by customers and other non-employees. If the employer knew or should have known about the harassment, it will be held liable if it does not take immediate corrective action. The courts will take into account the degree of actual control the employer has over the situation and the harasser.

---

[8]Ibid, p. 28.

[9]*Sexual Harassment in the Workplace*, p. 13.

EFFECTIVE COMMUNICATIONS WITH THE MEDIA

Elizabeth Hall, Agricultural Communications
Clemson University
Clemson, S.C. 29634

The average American spends more time with mass media than with any other activity, according to a communications study by Cornell University. There is no doubt, then, that the news media plays a vital role in providing information to the public and in shaping public opinion. Roper polls show that television is growing in importance as a source of information while newspapers are declining. Currently, 68 percent of the American public gets its news from television; 44 percent gets news from newspapers.

Those of us who work in communications know the importance of getting positive news coverage in broadcast and print outlets. Clearly, having a good working relationship with the news media can serve our institutions by enhancing our credibility and increasing the public's trust. Those two things, in turn, support lobbying efforts, fund-raising and recruitment. But to accomplish these goals, we must be more eager to jump in the limelight and be interviewed by a reporter. And to perform your best during an interview often requires some media training.

What I'd like to share with you today is the course we've designed at Clemson for our scientists, Extension specialists and administrators to help them be successful in an interview with a reporter. It's my hope that this information will help you feel more comfortable when working with reporters, and I hope you will share it with the scientists and Extension specialists at your centers.

What is media training? It provides you with helpful hints in working with reporters. It arms you with a better understanding of the news media industry so that you know why they ask the questions they ask and what topics interest them for a story. Media training will help you feel more comfortable and confident during an interview so that you come across as credible and believable, which helps you gain the public's trust. By putting you at ease during an interview, media training also should encourage you to work more with the media in the future to spread a positive message to the public.

UNDERSTANDING THE MEDIA

The first part of media training is understanding the news media industry. Most reporters deal with news, not education. It's usually the events that make something newsworthy, not the issues or principles involved. The media see as its primary responsibility reporting what the public will read or listen to, regardless of its effect.

A few other tips about the news: Most hard news is fast-breaking, giving the journalist little time to find out about the topic in depth; most journalists turn first to sources they already know and believe to be credible; they see themselves as guardians of the public trust. Freedom of Information is sacred to them.

Reporters ask some common questions on each story they cover:

"How does this affect the public?"
"Does this have an emotional appeal?"
"Does this follow a trend or current event?"
"Does this story have 'gee-whiz' appeal?"

Newspaper is documented information and it's a written record. Newspaper reporters are looking for emotion and simplistic approaches.

Television news is theatre and image. If you want to be on television, you need to be a good performer. The better performer you are, the more often you will be asked for an interview. TV reporters are looking for emotional responses; simplistic approaches and a single event or major breakthrough.

HOW TO TAKE CHARGE OF AN INTERVIEW

There are certain things you should ask a reporter before agreeing to be interviewed. This information, in turn, will help you decide if an interview will work to your advantage and help you get a positive message across.

1. Ask "Why Me?" -- Why has the reporter targeted you for a story or response?

2. Audience -- Who will read this story or see this broadcast? Knowing this will help you decide whether or not to agree to an interview.

3. Ground Rules -- Establish ground rules with the reporter before you agree to an interview.

4. Format -- What is the angle of the story? Is it a feature story or hard news? Will you be on a panel of experts or serve as the "lone ranger" on a certain issue?

5. Interviewer -- What type of reporter is interviewing you. Do you know his work? Is he/she combative, or do they give very fair, unbiased reports?

6. Possible Topics -- What is the nature of this story? Will the reporter ask you things you are qualified to answer?

DO YOUR HOMEWORK

After you agree to an interview, you must do your homework so that you're properly prepared. One major point we try to get across to our researchers is the need to be brief. You need to speak in 20-second sound bites, particularly when you you're being interviewed by a TV reporter. A typical 90-second news story usually contains no more than 20 seconds from any one speaker. Even if a person speaks as fast as they can, 20 seconds only allows about 85 words. And with only 85 words available, you'd better be prepared.

This leads to an important point. We call it K.I.S.S., which means "keep it short and simple." The key to "kissing" is preparation. By establishing two or three main points in advance of an interview, you can be assured that the most important elements of the story get across to the reporter. We also stress the need to keep technical jargon out of the conversation.

It's better to be understandable than impressive--scientific or technical jargon ends up on the editing floor.

Anticipate the difficult questions and come up with a positive way to answer them. Think of analogies and examples that will help illustrate your point. Think visually so that you can suggest photo and video opportunities for the reporter.

KNOWING YOUR RIGHTS

Another area that's very important to cover involves techniques in keeping control of an interview or knowing your rights in an interview. Here are a few:

*If the interview is being taped, you can pause and think before answering or if you blow it, you can just start over.

*Answer one question at a time.

*Correct inaccurate statements or misconceptions stated by the reporter.

*Don't let a reporter put words in your mouth.

*If you're not qualified to answer a question, say so.

In hostile or ambush interview, you must remember to remain calm, and stick to the points you want to get across. Do not get angry or hostile with a reporter; that's the powerful emotion he/she wants for the story. Be confident and positive; it makes you more believable.

IMAGE COUNTS

Since television is image and theatre, how you look can greatly influence the image you project during a television interview. Remember to wear clothes which are neat and clean; if you are in a lab setting, wear a labcoat. Remember body language: make eye contact with the reporter; stand still; don't fidget; and smile. Being enthusiastic and letting that positive emotion show plays well on television.

R.C.A.S. Executive Committee Meeting Minutes

by Joe Musick, Secretary
Fort Worth, Texas
February 3, 1991

Members Attending: Joe A. Musick, Crowley, LA; James R. Hill, Blackville, SC; Dennis Onks, Springfield, TN; Joe High, Springfield, TN; William Loe, Hope, AR; Jere McBride, Shreveport, LA; Johnathon Edelson, Lane, OK; Ron Robbins, Calhoun, LA; Bill Webb, Stillwater, OK; Dave Calvert, Fort Pierce, FL; Will Waters, Bradenton, FL; Mike Schubert, Yoakum, TX; Jake Fisher, Portageville, MO; Jim Dobson, Blansville, GA; Ed Worley, Calhoun, GA; Tom Evrard, Keiser, AR; Jim Pitts, Clanton, AL; Bill Peterson, Lexington, KY; and Ben Kittrell, Florence, SC.

Chairman Loe opened the meeting at 3:30 P.M. He also announced a S.A.A.S. Board Meeting to be held at 5:00 P.M.

Johnathon Edelson, the new Oklahoma Representative was introduced to the committee by Bill Webb.

1. Minutes of the previous meeting were discussed.

   a. Bill Webb moved approval of the minutes.
   b. Dennis Onks seconded.
   c. After noting corrections, minutes were approved.

2. Will Waters reported on the Program for the current meeting.

3. The Report of the Local Arrangements Committee was delayed.

4. The Proceedings Report was presented by Howard Malstrom.

   a. Mike Schubert was to forward manuscripts, discs, or recordings to H. Malstrom.
   b. Howard Malstrom to compile and publish proceedings.
   c. Jere McBride raised a question regarding continuation of publishing proceedings. After some discussion the consensus was to continue publications of the proceedings.

5. Committee Reports:

   a. Nomination, Committee Report
   b. James R. Hill moved that we retain the positions of Secretary and appoint a permanent Treasurer for five years and that the by-laws be changed to accommodate these changes. Second by Dennis Onks.
   c. After much discussion, the motion was withdrawn by James R. Hill.
   d. James R. Hill moved that the by-laws be changed in order to have a secretary's office and a separate office of treasurer who would serve as fiscal officer and collect annual dues. Will Waters read the by-laws governing a change in the by-laws. Motion died for lack of second.
   e. Motion by Jim Pitts to refer question of Secretary-Treasurer to committee. Second by Dave Calvert.
   f. Chairman Loe appointed a committee to develop proposal changes in by-laws:

1. Jere McBride
2. James Riley Hill
3. Joe A. Musick

6. The Report of Historical Data Committee was presented by Bill Webb.

7. A report on Sustainable Membership and appropriate changes in by-laws was given by Jere McBride.

8. Mike Schubert gave the committee report on Definition, Purposes, and Objectives of R.C.A.S. A proposed brochure was distributed for comments and suggestions for the September meeting of the Executive Committee. (see attached)

   Some discussion followed.

9. Dennis Onks gave a report on the proposed Incorporation of R.C.A.S. He recommended that the organization remain as is.

10. A Recognition Committee was appointed by Chairman Loe:

    a. Ben Kittrell
    b. Jake Fisher
    c. Joe High, Chairman

    A report is to be submitted to the Executive Committee meeting in September, 1991.

11. The location of the Executive Committee meeting in September, 1991 was discussed. A general consensus was reached that Asheville, NC would be the site. The date was set as September 24-25, 1991.

12. Other Business: The group recommended that a Membership Committee be appointed to implement a $10 membership fee by appropriate changes in the by-laws.

13. Chairman Loe requested guidance.

14. Chairman Loe appointed a committee to alter changes in the by-laws to permit the organization to charge reasonable membership dues.

    a. James R. Hill
    b. Jim Pitts
    c. Dennis Onks

15. Will Waters assigned individuals to get speakers to meeting room.

    Ed Worley announced Jim Dobson would be retiring.

    The meeting was adjourned at 5:00 P.M.

Annual Business Meeting Minutes
Research Center Administrators Society

by Joe Musick, Secretary
Fort Worth, Texas
February 5, 1991

1. Chairman Worley opened the meeting at 10:45 A.M.

2. The minutes of the previous meeting were read:

   W. C. Loe moved that the minutes be accepted as read.
   Bill Webb second.
   Motion passed.

3. Chairman Worley recognized retiring member James Dobson from Georgia.

4. Chairman Worley expressed appreciation on behalf of R.C.A.S. to:

   a. Jim Reinert for the excellent local arrangements made by his committee.
   b. Will Waters for an excellent program.

5. Past Chairman W. C. Loe presented the report of the nominating committee. The committee recommended the following persons for office in 1991 - 1992:

   a. Will Waters, Chairman
   b. James Riley Hill, First Vice Chairman
   c. Joe Musick, Second Vice Chairman
   d. Dennis Onks, Secretary - Treasurer

6. Jere McBride moved that the report of the nominating committee be accepted. Upon receiving a second, the group approved the report and recommendations of the nominating committee by acclamation.

7. Chairman Worley announced that the R.C.A.S. Executive Committee would meet in North Carolina September 24-25, 1991. Carl Tart reviewed preliminary arrangements for the Executive Committee to meet at Pledger or Asheville, NC.

8. Chairman Worley recognized Chairman-elect Will Waters.

9. The meeting was adjourned by Chairman-elect Will Waters.

R.C.A.S. Executive Committee Meeting

by Dennis Onks, Secretary
Fletcher, North Carolina
September 24, 1991

Committee Members Attending: Randy Akridge, Brewton, AL; Harley Blackwell, Fletcher, NC; Roy J. Constantin, Hammond, LA; Johnathon Edelson, Lane, OK; Jake Fisher, Portageville, MO; James Riley Hill, Jr., Blackville, SC; Bob Horsburgh, Winchester, VA; Ben Kittrell, Florence, SC; Bill Loe, Hope, AR; Dennis O. Onks, Springfield, TN; Bill Peterson, Lexington, KY; Jim Pitts, Clanton, AL; James A. Reinert, Dallas, TX; Ron Robbins, Calhoun, LA; Carl Tart, Raleigh, NC; Will E. Waters, Bradenton, FL; Bill Webb, Stillwater, OK; F. T. Withers, Jr., Mississippi State, MS; Ed Worley, Calhoun, GA.

Chairman Worley opened the meeting promptly at 8:30 A.M. On behalf of the committee, he thanked Carl Tart and Harley Blackwell for hosting the mid-year committee meeting.

Carl Tart welcomed the group to North Carolina and the Mountain Horticulture Experiment Station. He presented the schedule of events, he and Harley had prepared. Also, the group was treated to a taste of this year's apple crop, and were reminded that they would help keep the medical doctor away.

The February Executive Committee Minutes were approved as presented.

The July 1, 1991 financial report was approved as presented by past Secretary/Treasurer, Dr. Joe Musick.

Jim Pitts, State Rep. of Alabama, introduced Randy Akridge, who will be Alabama's incoming State Rep.

Chairman Worley stated that the primary purpose of this committee meeting is to plan the program for the annual meeting in February, with this statement, the floor was opened for potential subject matter areas.

Considerable discussion followed on various topics, with program chairman, James Riley Hill, presiding. One area that received considerable discussion was the use of RCAS funds to hold a special seminar or workshop designed specifically for the society. Suggested themes were: 1) Motivation, 2) Stress Management, 3) Personnel Management, and 4) Future Funding Avenues.
This topic was tabled until the February meeting.

Local Arrangements Chairman, Bill Peterson reported for the committee. The Hyatt will be the headquarters Hotel with room assignments in this Hotel. A tour is scheduled for Tuesday afternoon rather than Monday, to accommodate the tour sites. The experiment station and horse farm tours are planned with the evening meal being at Spindletop Hall. An excellent Spouse Program was presented for Monday and Tuesday.

Officer By-law change committee- Chairman Jere McBride was absent, but the suggested changes were mailed earlier to attending members. James Riley Hill led the ensuing discussion on the proposed By-Law changes. A consensus was reached that the primary necessity for this change is 1) To develop a liaison with the SAAS officers and 2) Provide a home for the fiscal

records of the Society. Following this discussion each Section change was discussed. The following changes to the By-Laws were suggested by the Executive Committee. James Riley Hill will inform the other members of the committee and submit these changes to the state representatives in time for an approval vote by the Executive Committee in Lexington next February.

A motion was made and seconded to make all leadership positions, gender neutral. The By-Laws will be changed with 'person' being substituted for 'man' wherever it is written. This will be incorporated together with the following changes.

Article 4

Section 1 Considerable time was spent on the name of the new officer. Executive Officer and Executive Director motions were denied. The motion was made to delete Secretary/Treasurer and the officers **Secretary and Executive Treasurer.**

Section 2 Accepted as presented with officer name change.

Section 3 Accepted as presented with officer name change.

Section 7 Change title of officer to Secretary.
Delete: 'Serve as fiscal officer;'

ADD Section 9 Duties of Executive Treasurer.

* Maintain the Societies' banking accounts, fiscal records and provide annual reports.
* Issue checks for payment of bills as submitted by Secretary.
* Represent the Society when designated by the Chairperson.
* Maintain current Membership List.
* Maintain current copy of By-Laws.
* Maintain liaison with SAAS Executive Secretary on matters of interest to the society.
* Serve as a voting member and attend Executive Committee Meetings.

Article 7

Section 2

Accepted as presented with officer name change.

(Editor's Note - By-Laws were changed or amended and approval given at the regular business meeting, February 4 in Lexington. The revised bylaws are published in this volume, pp. 74-78).

Dues committee chairman James Riley Hill reported some members were opposed to a dues connotation because of the policies of their respective institutions. The discussion that followed led to a motion of not changing the By-Laws to incorporate a dues structure. This was seconded and carried by the committee.

Jim Reinert reported on the RCAS brochure for Mike Schubert. It will cost $73 for 500 copies in black and white. Discussion followed on changing the language of the application section and the new officer names. The motion as made to accept this brochure and approve the printing following the vote of the committee on the By-Law changes. Motion was carried.

Jim Reinert will report in February on the cost of using colored paper and update the cost change if any.

The Awards committee nominated Gene Morrison and Jere McBride for the Distinguished Service Award. Following the vote of the committee, both will receive the award this year.

Chairman Worley reported on two retirements from Georgia and two from Texas. The ensuing discussion felt that all retirements, regardless of active participation should be announced at the annual meeting.

A motion was made and carried that each State Representative be responsible to notify the Secretary of deaths that occur in their state so it can be announced at the annual meeting.

Bill Webb, Historical Committee chair, reported what had been documented to date. He urged all members to contact their older members for any information prior to 1971. These data will be printed in the proceedings as they are accumulated. Chairman Worley appointed Bill Webb as chairman of the committee for 1992, with Joe High and Bill Loe as members.

Proceedings committee report was made by James Riley Hill. He indicated that all past chairman will be listed as well as the Distinguished Service Awards. Howard Malstrom will continue to process this effort provided the program chairman can get the speakers to digitize their remarks. Howard was commended for his service in making this valuable manuscript available to the membership.

Future Fall meetings were planned as follows:

1992-Middle Tennessee Experiment Station- September 29 and 30.
1993-Virginia Agricultural Experiment Station- Winchester.

The next meeting of the Executive Committee will be in Lexington, Kentucky on February 2, 1992 at 3 P.M. in the Hathaway Meeting Room of the Hyatt Regency Hotel.

BY-LAWS AS AMENDED FEBRUARY 4, 1992

BY-LAWS
OF THE RESEARCH CENTER ADMINISTRATORS SOCIETY
OF THE SOUTHERN ASSOCIATION OF AGRICULTURAL SCIENTISTS

Article I
Name

The name of this organization shall be "Research Center Administrators Society" and for the purpose of this document shall be frequently referred to as "Society".

Article II
Objectives

The objectives of the Research Center Administrators Society shall be to hold educational meetings; to provide opportunities for interaction with colleagues; and to enhance the profession within the scientific community.

Article III
Members

Section 1

The membership shall include superintendents, resident directors, center directors, and other individuals with various titles having administrative responsibilities involving a field station, branch station, research station, research center, or other branch research facility of a state agricultural experiment station or any other public or private agricultural research organization.

Section 2

Membership shall be composed of regular and active members. Any unit head of a branch research facility in any participating state shall be considered a regular member. Any individual, with administrative responsibilities involving a satellite research facility, who attends the annual meeting and pays the designated fees shall be considered an active member with all rights and privileges afforded by the Society.

Article IV
Officers

Section 1

The officers of the Society shall be a President, a First Vice-President, a Second Vice-President, and a Secretary and an Executive Treasurer. These officers shall perform the duties prescribed by these bylaws and by the parliamentary authority adopted by the Society.

Section 2

The officers shall be elected by rising, show of hands, or by voice vote to serve for one year or until their successors are elected, and their term of office shall begin at the close of the annual meeting at which they are elected. The Executive Treasurer shall serve at the pleasure of the Executive Committee and the Society for specified term announced upon the election of the officer. An additional term may be served if deemed in the best interest of the Society.

Section 3

No member shall hold more than one office at a time, and no member shall be eligible to serve more than one consecutive term in the same office. The Executive Treasurer may serve more than one term upon recommendation of the Executive Committee and approval of the Society.

Section 4

Duties of the President shall include:

- o Serve as overall coordinator of Society activities;
- o Preside at annual meeting;
- o Prepare letters for distribution to State Agricultural Experiment Station Directors requesting them to invite and to encourage attendance of membership from their state at annual meeting;
- o Appoint Nominating Committee in accordance with bylaws;
- o Appoint Local arrangements Committee Chair;
- o Serve as a member and attend Executive Committee meetings;
- o As immediate past President serve as Executive Committee Chair.

Section 5

Duties of the First Vice-President shall include:

- o Serve as Chair of the Program Committee;
- o Mail copy of program to Secretary-Treasurer of the Southern Association of Agricultural Scientists at designated time;
- o Mail a copy of program to all Society officers;
- o Serve as a member and attend Executive Committee meetings.

Section 6

Duties of the Second Vice-President shall include:

- o Serve on Program Committee;
- o Perform other duties as President assigns;
- o Serve as a member and attend Executive Committee meetings;
- o Assist Secretary in registration at Annual meeting.

Section 7

Duties of the Secretary shall include:

- o Responsible for registration at annual meeting;
- o Collect fees at annual meeting;
- o Prepare minutes of business session, prepare financial statements; prepare attendance roster from registration cards; and send copies of each to incoming and outgoing President and Executive Committee officers;
- o Mail programs and other appropriate information to membership;
- o Serve as a member and attend and serve as Recording Secretary of Executive Committee meetings.

Section 8

Duties of the Local Arrangements Representative:

- o Survey assigned meeting room well in advance of annual meeting and decide if adequate:
- o Set up and arrange for banquet and/or social;
- o Arrange for coffee breaks at annual meeting;
- o Arrange for visual aid equipment and other needed equipment;
- o Coordinate all of the above with other Program Committee Members;
- o Shall have the option to solicit additional assistance from the membership as needed;
- o Attend the Executive Committee meeting prior to annual meeting at the invitation of the President.

Section 9

Duties of the Executive Treasurer shall include:

- o Maintain the Societies' banking accounts, fiscal records and provide annual reports;
- o Issue checks for payment of bills as submitted by Secretary;
- o Represent the Society when designated by the President;
- o Maintain current Membership List;
- o Maintain current copy of By-Laws;
- o Maintain liaison with SAAS Secretary-Treasurer on matters of interest to the Society;
- o Serve as voting member and attend Executive Committee Meetings.

Article V
Meetings

Section 1

The regular meeting of the Research Center Administrators Society shall be held annually in association with the Southern Association of Agricultural Scientists, unless otherwise ordered by the Society or by the Executive Committee.

Section 2

Special interim meetings can only be called by the President in conjunction with the Executive Committee.

Section 3

Active members in attendance at any regular or special meeting shall constitute a quorum.

Article VI
Executive Committee

Section 1

The Executive Committee shall consist of current officers, the immediate past President, and one representative from each participating state.

Section 2

The Executive Committee shall have general supervision of the affairs of the Society between its annual business meeting, fix the hour and place of meetings, make recommendations to the Society, and shall perform such other duties as are specified in these bylaws. The Committee shall be subject to the orders of the Society, and none of its acts shall conflict with action taken by the Society or the Southern Association of Agricultural Scientists.

Section 3

The immediate past Society President shall serve as Chair of the Executive Committee. In his absence, the current Society President will serve as Chair.

Section 4

State Representatives shall be selected by the regular Research Center Administrators Society membership of their respective state. Each state Representative will serve a minimum of two years.

Section 5

The Executive Committee shall meet at least twice annually. One meeting will be held during the summer and one meeting will be held the day prior to the annual meeting. The Chair of the Executive Committee shall establish the date and place of the summer meeting.

Section 6

Duties of Executive Committee Chair;

- o Preside over Executive Committee meetings;
- o Set date and place of summer meeting;
- o Establish program agenda;
- o Provide committee members with agenda 30 days prior to meeting;
- o Appoint Executive Committee sub-committees.

Article VII
Committees

Section 1

A Program Committee shall be appointed by the President to be headed by the First Vice-President and to include the Second Vice-President and the Local Arrangements Representative. The duties of the Committee shall be to plan the annual program of the Society. This committee shall submit a progress report on the program plans to the Executive Committee at its regular summer meeting.

Section 2

The President shall appoint a Nominating Committee consisting of three immediate past Presidents. The Committee shall be appointed during the Executive Committee meeting held the day prior to the annual meeting. It shall be the duty of this committee to nominate candidates for the offices to be filled except for the office of Executive Treasurer. The

Nominating Committee shall report during the business session and prior to the election of officers. Before the election, additional nominations from the floor shall be permitted. An Executive Treasurer candidate shall be selected by the Executive Committee and the appointment shall be recommended to the Society for approval. The Society may also make nominations from the floor.

Section 3

Special committees shall be appointed by the President as the Society or the Executive Committee shall from time to time deem necessary to carry on the work of the Society. The President shall be ex-officio member of all committees except the Nominating Committee.

Article VIII
Parliamentary Authority

The rules contained in the current edition of "Robert's Rule of Order Newly Revised" shall govern the Society in all cases to which they are applicable and in which they are not inconsistent with these bylaws and any special rules of order the Society might adopt.

Article IX
Amendment of Bylaws

Section 1 - Amendment by Active Membership

The bylaws can be amended by a two-thirds vote of the active membership during the business session of the annual meeting. Notice of the proposed change must be given to the Society President one week prior to the annual meeting. The notice shall include the full text of the amendment.

Section 2 - Amendment by Executive Committee

The bylaws can be amended by action of the Executive Committee provided strict procedures are followed. A member proposing the amendment shall provide the Executive Committee Chair with the full text of the proposed change. The Chair shall distribute copies of the full text to the committee members 45 days prior to the voting deadline. Voting may be by letter, telephone with confirming letter, by roll call if taken during an Executive Committee meeting. State Representatives of the Executive Committee are to review the amendment with their respective delegation and cast one vote reflecting the delegation's view. A two-thirds vote of the Executive Committee members voting is required for adoption of an amendment. The Chair shall announce the results, revise the bylaws to include the amendment and distribute the revised bylaws to the Society membership.

Revised 10-1-85
Revised 2-5-89
Revised 2-6-92

(Membership list compiled by Jim Reinert)

ALABAMA

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Alabama Agricultural Experiment Station	310 Samford Hall Auburn University Auburn, AL 36849-5403 (205) 844-4768 FAX: (205) 844-5511	Dr. Lowell Frobish Director Dr. David H. Teem Assoc Director
Black Belt Substation	60 County Rd 944 Marion Junction, AL 36759 (205) 872-7878 FAX: (205) 872-2013	Mr. James L. Holliman Superintendent Mr. Jim Harris Asst Superintendent
Brewton and Monroeville Experiment Fields	PO Box 217 Brewton, AL 36427 (205) 867-3139 FAX: (205) 867-9433	*Mr. James R. Akridge Superintendent
Chilton Area Horticulture Substation	120 County Rd 756 Clanton, AL 35045 (205) 646-3610 FAX: (205) 646-3607	Mr. James A. Pitts Superintendent Mr. Kenneth Short Assoc Superintendent
Gulf Coast Substation	8300 State Hwy 104 Fairhope, AL 36532 (205) 928-2740 (205) 928-5217 FAX: (205) 990-8912	Mr. Emmett L. Carden Superintendent Mr. N.R. McDaniel Assoc Superintendent Mr. Malcomb Pegues Asst Superintendent
Lower Coastal Plain Substation	PO Box 460 Camden, AL 36726 (205) 682-4662 FAX: (205) 682-4662	Mr. Joe A. Little Superintendent Mr. Paul Rose Asst Superintendent
North Alabama Horticulture Substation	PO Box 1062 Cullman, AL 35056 (205) 734-5820 FAX: (205) 734-5886	Mr. M.H. Hollingsworth Superintendent
Ornamental Horticulture Substation	PO Box 8276 Mobile, AL 36689 (205) 342-2366 FAX: (205) 342-1022	Mr. John W. Olive Superintendent Mr. James Stephenson Assoc Superintendent
Piedmont Substation	PO Box 368 Camp Hill, AL 36850 (205) 896-4422 FAX: (205) 896-4402	Mr. John T. Owen Superintendent
Prattville Experiment Field	713 County Rd 4 East Prattville, AL 36067 (205) 365-7169 FAX: (205) 365-7169	Mr. Don P. Moore Superintendent

* State Representative to RCAS Executive Committee 1992-93.

ALABAMA - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Sand Mountain Substation	Rt 1, Box 20 Crossville, AL 35962 (205) 528-7133 FAX: (205) 528-2224	Mr. John T. Eason Superintendent Mr. Marvin Ruf Assoc Superintendent
E.V. Smith Research Center	Rt 1, Box 138 Shorter, AL 36075 (205) 727-7403 (205) 727-4038 FAX: (205) 727-9450	Dr. James S. Bannon Director Mr. Bobby Smith Supt Dairy Unit Mr. Robert Duffield Supt Field Crops Unit Mr. William Gregory Supt Beef Unit Mr. Walter Hogue Supt Horticulture Unit Mr. Steve Nightengale Supt Plant Breeding Unit
Tennessee Valley Substation	Belle Mina, AL 35615 (205) 353-3978 FAX: (205) 340-9845	Mr. W.B. Webster Superintendent Mr. Ellis Burgess Assoc Superintendent Mr. Chet Norris Asst Superintendent
Turnipseed-Ikenberry Farm	304 Hill 'N' Dale Dr Union Springs, AL 36089 (205) 738-4819	Mr. James Smith Superintendent
Upper Coastal Plain Substation	PO Box 706 Winfield, AL 35594 (205) 487-2150 FAX: (205) 487-3909	Mr. Wallace A. Griffey Superintendent Mr. Randall Rawls Asst Superintendent
Wiregrass Substation	PO Box 217 Headland, AL 36345 (205) 693-2363 FAX: (205) 693-5153	Mr. Henry W. Ivey Superintendent Mr. Brian Gamble Asst Superintendent Mr. Larry Wells Asst Superintendent

ARKANSAS

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Arkansas Agricultural Experiment Station	217 Agricultural Bldg Univ of Arkansas Fayetteville, AR 72701 (501) 575-4449 FAX: (501) 575-7273	Dr. G.J. Musick Dean/Director
Beef Station	PO Box 671 Newport, AR 72112 (501) 523-6131	Mr. Gary Murphy Resident Director
Cotton Branch Station	PO Box 789 Marianna, AR 72360 (501) 295-2839	Mr. Robert Turner Resident Director
Delta Branch Station	PO Box 338 Clarkedale, AR 72325 (501) 739-1318	Mr. Wallace Williams Resident Director
Fruit Substation	Rt 2 Clarksville, AR 72830 (501) 754-2406	Dr. John R. Clark Resident Director
Livestock & Forestry Branch Station	Rt 4, Box 166 Batesville, AR 72501 (501) 793-7432	Dr. Kenneth Harrison Resident Director
Northeast Res & Ext Center	PO Box 48 Keiser, AR 72351 (501) 526-2199 FAX: (501) 526-2582	* Dr. T.O. Evrard Center Director
Pine Tree Station	Rt 1, Box 48 Colt, AR 72326 (501) 633-5767	Mr. Roger Eason Resident Director
Rice Res & Ext Center	PO Box 351 Stuttgart, AR 72160 (501) 673-2661 FAX: (501) 673-4315	Dr. John Robinson Resident Director
South Central Family Farms Res Center USDA/ARS	Rt 2, Box 144-A Booneville, AR 72927 (501) 675-3834 FAX: (501) 675-2940	J.R. Gifford Center Director
Southeast Branch Station	PO Box 155 Rohwer, AR 71666 (501) 644-3101	Mr. M.H. Taylor Resident Director
Southeast Res & Ext Center	PO Box 3508, UAM Monticello, AR 71655 (501) 460-1091 FAX: (501) 460-1415	Dr. Lanny Ashlock Center Director

* State Representative to RCAS Executive Committee 1992-93.

ARKANSAS - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Southwest Res & Ext Center	Rt 3, Box 258 Hope, AR 71801 (501) 777-9702 FAX: (501) 777-8441	Dr. William C. Loe Center Director
Strawberry Substation	PO Box 347 Bald Knob, AR 72010 (501) 724-3368	Mr. Elbert C. Baker Resident Director
Vegetable Substation	PO Box 456 Alma, AR 72921 (501) 474-0457	Mr. Dennis R. Motes Resident Director

FLORIDA

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
University of Florida Institute of Food & Agricultural Sciences	Univ Florida, IFAS 1022 McCarty Hall Gainesville, FL 32611 (904) 392-1784	Dr. Neal Thompson Interim Dean
Agricultural Res & Ed Center, National Weather Service	1408 24th St SE Ruskin, FL 33570 (813) 645-2181	Mr. C.R. Eggelton Center Director
Agricultural Res & Ed Center - Brooksville	PO Box 246 Brooksville, FL 33512 (904) 796-3383 FAX: (904) 796-2930	Mr. E.L. Adams Center Director
Agricultural Res & Ed Center - Dover	13138 Lewis Gallagher Rd Dover, FL 33527-9664 (813) 755-1568	Dr. Will E. Waters Center Director (see Bradenton)
Agricultural Res & Ed Center - Ft. Pierce	PO Box 248 Ft. Pierce, FL 34954 (407) 468-3922 FAX: (407) 468-5668	*Dr. David V. Calvert Center Director
Agricultural Res & Ed Center - Hastings	PO Box 748 Hastings, FL 32045 (904) 692-1792 FAX: (904) 692-1468	Dr. D.R. Hensel Center Director
Agricultural Res & Ed Center - Jay	Rt 3, Box 575 Jay, FL 32565 (904) 994-7373 FAX: (904) 994-9589	Dr. H.A. Peacock Center Director
Agricultural Res & Ed Center - Leesburg	5336 University Ave Leesburg, FL 32748 (904) 787-3423	Dr. G.W. Elmstrom Center Director
Agricultural Res & Ed Center - Live Oak	Rt 2, Box 2181 Live Oak, FL 32060 (904) 362-1725	Dr. J.R. Rich Asst Director
Agricultural Res & Ed Center - Marianna	Rt 3, Box 376 Marianna, FL 32446-9803 (904) 594-3241	Dr. Don C. Herzog Center Director (see Quincy)
Agricultural Res & Ed Center - Monticello	Rt 4, Box 63 Monticello, FL 32344 (904) 997-2596	Dr. W.J. French Asst Director (see Quincy)
Agricultural Res & Ed Center - Ona	Rt 1, Box 62 Ona, FL 33865 (813) 735-1314 FAX: (813) 735-1930	Dr. F.M. Pate Center Director

* State Representative to RCAS Executive Committee 1988-89.

FLORIDA - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Brooksville Subtropical Agricultural Research Station, USDA	PO Box 46 Brooksville, FL 34605-0046 (904) 796-3385 FAX: (904) 796-2930	Dr. A.C. Hammond Director
Central FL Res & Ed Center	2807 Binion Rd Apopka, FL 32703 (305) 889-4161 FAX: (904) 392-9359	Dr. Charles A. Conover Center Director
Central FL Res & Ed Center	PO Box 909 Sanford, FL 32771 (305) 322-4134	Dr. J.M. White Asst Director
Citrus Res & Ed Center	700 Experiment Station Rd Lake Alfred, FL 33850 (813) 956-1151 FAX: (813) 956-4631	Dr. Walter Kender Center Director
Everglades Res & Ed Center	PO Drawer A Belle Glade, FL 33430 (305) 996-3062 FAX: (407) 996-0339	Dr. Van H. Waddill Center Director
Florida Medical Entomology Lab	200 9th St SE Vero Beach, FL 32962 FAX: (407) 778-7205	Dr. R.H. Baker Center Director
Ft. Lauderdale Res & Ed Center	3205 SW College Ave Ft. Lauderdale, FL 33314 305-475-8990 FAX: (305) 475-4125	Dr. David W. Buchanan Center Director
Gulf Coast Res & Ed Center	5007 60th St E Bradenton, FL 34203 (813) 755-1568 FAX: (813) 751-7639	Dr. Will E. Waters Center Director
N Florida Res & Ed Center	Rt 3, Box 4370 Quincy, FL 32351 (904) 627-9236 FAX: (904) 392-5231	Dr. Don C. Herzog Center Director
SW Florida Res & Ed Center	Rt 1, Box 2G Immokalee, FL 33934 (813) 657-2835 FAX: (813) 657-5224	Dr. Calvin E. Arnold Center Director
Tropical Res & Ed Center	18905 SW 280th St Homestead, FL 33031 (305) 247-4624 FAX: (305) 246-7003	Dr. Richard M. Baranowski Center Director

GEORGIA

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Attapulgus Ext & Res Center	Attapulgus, GA 31715 (912) 465-3241	Mr. Stan R. Jones Acting Superintendent
Central GA Branch Station	1508 Godfrey Rd, NW Eatonton, GA 31024	Mr. Vaughn Calvert Superintendent
Coastal Plains Station	Tifton, GA 31794 (912) 386-3339 FAX: (912) 386-7058	Dr. Gale Buchanan Assoc Director & Resident Director
GA Experiment Station	Experiment, GA 30212-1000 (706) 228-7263 FAX: (706) 228-7270	Dr. Gerald Arkin Assoc Director & Resident Director
GA Mountain Branch Station	Rt 1, Box 45 Blairsville, GA 30512 (706) 745-2655	Mr. Dennis Thompson Acting Superintendent
NW GA Branch Station	PO Box 640 Calhoun, GA 30703-0640 (706) 629-2696 FAX: (706) 629-1938	*Mr. Edward Worley Superintendent
SE GA Branch Station	Rt 1, Box 146 Midville, GA 30441 (912) 589-7472	Mr. Charles Perry Superintendent
SW GA Branch Station	Rt 2 Plains, GA 30441 (912) 824-4375 FAX: (912) 824-3664	Mr. Stan R. Jones Acting Superintendent
The University of Georgia College of Agriculture	101 Conner Hall Athens, GA 30602 (706) 542-2151 FAX: (706) 542-1119	Dr. W. P. Flatt Dean College of Agriculture
The University of Georgia GA Agricultural Experiment Station	107 Conner Hall Athens, GA 30602 (706) 542-2151 FAX: (706) 542-1119	Mr. Clive Donoho Director Dr. Charles Laughlin Assoc Director

* State representative to executive committee 1992-93.

KENTUCKY

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
University of Kentucky College of Agriculture	N-3 Agricultural Science Bldg, N Lexington, KY 40506 (606) 257-2983 FAX: (606) 258-5842	* Mr. W.O. Peterson Dir Management Operations
University of Kentucky Res & Ed Center West Kentucky Substation	PO Box 469 Princeton, KY 42445 (502) 365-7541 FAX: (502) 365-2667	Mr. Donnie L. Davis Superintendent
University of Kentucky Robinson Substation	Quicksand, KY 41363 (606) 666-2438 FAX (606) 666-2215	Mr. R. Mason Morrison Superintendent & Area Program Director

* State Representative to RCAS Executive Committee 1992-93.

LOUISIANA

STATION	ADDRESS/TELEPHONE/FAX		ADMINISTRATOR
Burden Research Plantation	4560 Essen Lane Baton Rouge, LA 70809 (504) 766-3471 FAX: (504) 766-3664		Dr. W.A. Meadows Resident Director
Calhoun Research Station	PO Box 539 Calhoun, LA 71225 (318) 644-2662 FAX: (318) 644-7244	*	Dr. M.L. Robbins Resident Director
Central Station	Aquaculture Research Facility Bldg 2410 Ben Hur Rd Baton Rouge, LA 70820 (504) 765-2876 FAX: (504) 765-2877		Dr. G.T. Berggren Resident Director
Citrus Research Station	Rt 1, Box 628 Port Sulphur, LA 70083 504/564-2467 FAX: (504) 564-9353		Mr. A.J. Adams Resident Director
Dean Lee Research Station	8105 E Campus Dr Alexandria, LA 71302 (318) 473-6520 FAX: (318) 473-6535		Dr. J.L. Kreider Resident Director
Hammond Research Station	5925 Old Covington Hwy Hammond, LA 70403 (504) 549-5081 FAX: (504) 549-5080		Dr. R.J. Constantin Resident Director
Hill Farm Research Station	Rt 1, Box 10 Homer, LA 71040 (318) 927-2578 FAX: (318) 927-9505		Dr. W.N. Philpot Resident Director
Iberia Research Station	PO Box 466 Jeanerette, LA 70544 (318) 276-5527 FAX: (318) 276-9088		Dr. H.P. Viator Resident Director
Idlewild Research Station	Drawer 985 Clinton, LA 70722 (504) 683-5848 FAX: (504) 683-3281		Dr. F.J. Peterson Resident Director
Macon Ridge Research Station	Rt 5, Box 244 Winnsboro, LA 71295 (318) 435-2157 FAX: (318) 435-2133		Dr. R.L. Rogers Resident Director
Northeast Research Station	Box 438 St. Joseph, LA 71366 (318) 766-3769 FAX: (318) 766-4278		Dr. R.L. Rogers Resident Director

* State Representative to RCAS Executive Committee 1992-93.

LOUISIANA - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Pecan Research Station	PO Box 5519 Shreveport, LA 71135 (318) 797-8034 FAX: (318) 798-3497	Dr. R.D. O'Barr Resident Director
Red River Research Station	PO Box 8550 Bossier City, LA 71113 (318) 741-7430 FAX: (318) 741-7433	Dr. J.M. McBride Resident Director
Rice Research Station	Box 1429 Crowley, LA 70527 (318) 788-7531 FAX: (318) 788-7553	Dr. J.A. Musick Resident Director
Rosepine Research Station	PO Box 26 Rosepine, LA 70659 (318) 463-7708 FAX: (318) 463-9981	Dr. J.L. Kreider Resident Director
Southeast Research Station	P.O. Drawer 567 Franklinton, LA 70438 (504) 839-2322 FAX: (504) 839-3202	Dr. J.F. Beatty Resident Director
St. Gabriel Research Station	PO Box 34 St. Gabriel, LA 70776 (505) 642-8150 FAX: (504) 642-5339	Dr. G.T. Berggren Resident Director
Sweet Potato Research Station	PO Box 120 Chase, LA 71342 (318) 435-2155 FAX: (318) 435-5298	Dr. R.L. Parish Resident Director

MISSISSIPPI

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Mississippi Agricultural & Forestry Experiment Station	PO Drawer ES Miss. State, MS 39762 (601) 325-3005 FAX: (601) 325-3001	Dr. Verner Hurt Director
Mississippi Agricultural & Forestry Experiment Station	PO Drawer ES Miss. State, MS 39762 (601) 325-3000 FAX: (601) 325-3001	Dr. Fred Tyner Asst Director
Mississippi Agricultural & Forestry Experiment Station	PO Drawer ES Miss. State, MS 39762 (601) 325-3003 FAX: (601) 325-3001	Dr. Tom Helms Asst Director
Alcorn Branch Experiment Station	ASU, PO Box 330 Lorman, MS 39096 (601) 877-6100 FAX: (601) 877-3885	
Animal Research Center	PO Drawer ES Miss. State, MS 39762 (601) 325-3715 FAX: (601) 325-8188	*Mr. F. T. Withers, Jr. Superintendent
Brown Loam Branch Experiment Station	1676 Brownloam Rd Raymond, MS 39501 (601) 857-5952 FAX: (601) 857-2887	Dr. Rick Hardin Superintendent
Central Mississippi Res & Ext Center	1320 Seven Springs Rd Raymond, MS 39154 (601) 857-2284 FAX: (601) 857-2359	Mr. E. G. Morrison Head
Coastal Aquaculture Unit	PO Box 7983 Gulfport, MS 39501 (601) 896-5778 FAX: (601) 388-1375	Mr. Michael Murphy Resident Manager
Coastal Plains Branch Experiment Station	Rt 5, Box 150-D Newton, MS 39345 (601) 683-2084 FAX: (601) 683-6770	Mr. W. A. Brock Superintendent
Delta Branch Experiment Station	PO Box 197 Stoneville, MS 38776 (601) 868-9311 FAX: (601) 686-7336	Dr. C. D. Ranney Head & Asst Dir
Gulf Coast Res & Ext Center	2710 Beach Blvd Suite IE Biloxi, MS 39531 (601) 388-4710 FAX: (601) 388-1375	Dr. David Veal Head

* State Representative to RCAS Executive Committee 1992-93.

MISSISSIPPI - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Main Station Research Centers	PO Drawer ES Miss. State, MS 39762 (601) 325-2390 FAX: (601) 325-8188	Dr. Vance Watson Head
NE Mississippi Branch Experiment Station	PO Box 456 Verona, MS 38879 (601) 566-2201 FAX: (601) 566-2259	Dr. Normie Buehring Superintendent
North Mississippi Branch Experiment Station	Rt 2, Box 82 Holly Springs, MS 38635 (601) 252-4321 FAX: (601) 252-3981	Dr. Joe Johnson Superintendent
North Mississippi Res & Ext Center	PO Box 456 Verona, MS 38879 (601) 566-2201 FAX: (601) 566-2257	Dr. Pat Bagley Head
Plant Science Research Center	PO Drawer ES Miss. State, MS 39762 (601) 325-2273 FAX: (601) 325-8118	Mr. Mitchell Roberts Superintendent
Pontotoc Branch Experiment Station	Rt 4, Box 249 Pontotoc, MS 38863 (601) 489-4621 FAX: (601) 489-6011	Mr. Crofton Sloan Resident Manager
Prairie Research Unit	PO Box 124 Prairie, MS 39756 (601) 369-4426 FAX: (601) 369-9547	Dr. R. R. Evans Superintendent
South Mississippi Branch Experiment Station	PO Box 193 Poplarville, MS 39470 (601) 795-4525 FAX: (601) 795-0653	Dr. Ned Edwards Superintendent
Truck Crops Branch Experiment Station	PO Box 231 Crystal Spr., MS 39059 (601) 892-3731 FAX: (601) 892-2056	Dr. C. P. Hegwood Superintendent

MISSOURI

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
University of Missouri College of Agriculture, Food & Natural Resources at Columbia	2-44 Agriculture Bldg Columbia, MO 65211 (314) 882-7488 FAX: (314) 882-0388	Dr. Bruce Bullock Assoc Dean & Director
University of Missouri South Farm Operations at Columbia	2-44 Agriculture Bldg Columbia, MO 65211 (314) 449-1231	Dr. Bruce Bullock Director
University of Missouri Agronomy Research Center (Bradford Farm) at Columbia	Rt WW Columbia, MO 65201 (314) 442-7945	Mr. John Poehlman Resident Superintendent
University of Missouri Southwest Center at Mt. Vernon	Rt 3, Box 87 Mt. Vernon, MO 65712 (417) 466-2148 FAX: (417) 466-2936	Dr. Richard Joost Resident Superintendent
University of Missouri Dairy Center (Foremost Dairy) at Columbia	S102 Animal Sci Center Columbia, MO 65211 (314) 442-4009	Dr. John Denbigh Interim Manager
University of Missouri Delta Research Center at Portageville	PO Box 160 Portageville, MO 63873 (314) 379-5431 FAX: (314) 379-5875	*Mr. Jake Fisher Resident Superintendent
University of Missouri Forage Systems Research Center at Linneus	Rt 2, Box 80 Linneus, MO 64653 (816) 895-5121 FAX: (816) 895-5122	Dr. Fred Martz Resident Superintendent
University of Missouri Greenley Memorial Center at Novelty	Novelty, MO 63460 (816) 739-4410	Mr. Randall Smoot Supervisor
University of Missouri Horticulture Research Center at New Franklin	1-40 Agriculture Bldg Columbia, MO 65211 (816) 848-2268	Mr. John Shopland Resident Superintendent
University of Missouri North Missouri Center at Spickard	Rt 2, Box 196 Spickard, MO 64679 (816) 485-6576	Dr. Fred Martz Resident Superintendent
University of Missouri Powell Gardens at Kingsville	PO Box 90 Kingsville, MO 64061 (816) 566-2600	Mr. Keith Hawxby Interim Manager
University of Missouri Wurdack Farm at Cook Station	Cook Station, MO 65449 (314) 743-6612	Mr. Brent Booker Resident Manager

* State Representative to RCAS Executive Committee 1992-93.

NEW MEXICO

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
New Mexico State University Agricultural Science Center at Alcalde	PO Box 159 369 Alcalde Alcalde, NM 87511 (505) 852-4241	Mr. Andy Nunez Interim Superintendent
New Mexico State University Agricultural Science Center at Artesia	67 E Four Dinkus Rd Artesia, NM 88210 (505) 748-1228	Mr. Carl E. Barnes Superintendent
New Mexico State University Agricultural Science Center at Clovis	Star Rt Clovis, NM 88101 (505) 985-2292	Dr. Neal B. Christensen Superintendent
New Mexico State University Agricultural Science Center at Corona	PO Box 126 Corona, NM 88318 (505) 849-1218	Mr. Laban Tubbs Superintendent
New Mexico State University Agricultural Science Center at Farmington	PO Box 1018 Farmington, NM 87401 (505) 327-7757	Mr. E. Joe Gregory Superintendent
New Mexico State University Agricultural Science Center at Los Lunas	1036 Miller St SW Los Lunas, NM 87031 (505) 865-7340	Dr. Ron F. Hooks Superintendent
New Mexico State University Agricultural Science Center	HC 30, Box 61 Tucumcari, NM 88401-9602 (505) 461-1620	Mr. Rex E. Kirksey Superintendent
Mora Research Center	PO Box 359 Mora, NM 87732 (505) 387-2319	Mr. John Harrington Superintendent
Clayton Livestock Center	Rt 1, Box 109 Clayton, NM 88415 (505) 374-2566	Dr. Glen P. Lofgreen Superintendent

NORTH CAROLINA

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Border Belt Tobacco Research Station	Rt 1, Box 198 Whiteville, NC 28472-9801 (919) 648-4703	Mr. Ty M. Marshall Superintendent
Central Crops Research Station	Box 1508, Hwy 70W Clayton, NC 27520-2128 (919) 553-2141	Mr. George B. Clark Superintendent
Horticultural Crops Research Station	Rt 2 Box 610 Castle Hayne, NC 28429-9657 (919) 675-2314	Mr. Thomas L. Blake Superintendent
Horticultural Crops Research Station	Rt 5, Box 43 Clinton, NC 28328-9501 (919) 592-7839	Mr. Fred E. Cumbo Superintendent
Lower Coastal Plain Tobacco Research Station	200 Cunningham Rd Kinston, NC 28501 (919) 527-3579	Mr. Sanford T. Barnes Superintendent
Mountain Horticultural Crops Research Station	2000 Fanning Bridge Rd Fletcher, NC 28732-9238 (704) 684-7197	Mr. Harley E. Blackwell Superintendent
Mountain Research Station	516 Test Farm Rd Waynesville, NC 28786-4016 (704) 456-3943	Mr. William L. Teague Superintendent
NC Department of Agriculture Research Stations Division	PO Box 27647 Raleigh, NC 27611-7647 (919) 733-3236	Mr. L.W. Hedspeth, Jr. Engineer
NC Department of Agriculture Research Stations Division	PO Box 27647 Raleigh, NC 27611-7647 (919) 733-3236	Mr. E. Floyd Wiggins Engineer
NC Department of Agriculture Research Stations Division	PO Box 27647 Raleigh, NC 27611-7647 (919) 733-3236	Mr. Paton H. Kelley Director
NC Department of Agriculture Research Stations Division	PO Box 27647 Raleigh, NC 27611-7647 (919) 733-3236	* Mr. Carl V. Tart, Jr. Asst Director
Oxford Tobacco Research Station	300 Providence Rd PO Box 1555 Oxford, NC 27565-1555 (919) 693-2483	Mr. William C. Clements Superintendent
Peanut Belt Research Station	Box 220 Lewiston-Woodville, NC 27849-0220 (919) 348-2213	Mr. J. Stephen Barnes Superintendent

* State Representative to RCAS Executive Committee 1992-93.

NORTH CAROLINA - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Piedmont Research Station	Rt 6, Box 420 Salisbury, NC 28144-9619 (704) 278-2624	Mr. Raymond D. Coltrain Superintendent
Sandhills Research Station	Rt 1, Box 528 Jackson Springs, NC 27281-9505 (919) 974-4673	Mr. Dexter J. Hill Superintendent
Tidewater Research Station	Rt 2, Box 141 Plymouth, NC 27962-9526 (919) 793-4118 FAX: (919) 793-5142	Mr. John W. Smith Superintendent
University Research Unit 1	4616 Reedy Creek Rd Raleigh, NC 27695 (919) 515-2713	Mr. J. Stewart Starr Superintendent
University Research Unit 2	3720 Lake Wheeler Rd Raleigh, NC 27603 (919) 737-2759	Mr. Kenneth M. Snyder Superintendent
University Research Unit 4	4301 Beryl Rd Raleigh, NC 27636 (919) 515-3144	Mr. Paul N. Lineberger Superintendent
University Research Unit 7 Randleigh Farm	Rt 2, Box 299 Raleigh, NC 27610 (919) 772-6711	Mr. Charles G. Campbell Superintendent
University Research Unit 10 Beef Cattle Center	Rt 1, Box 198-B Bahama, NC 27503 (919) 471-6872	Mr. Randall W. Guthrie Superintendent
University Research Units	Box 7601 Raleigh, NC 27695 (919) 515-2823	Mr. Wallace R. Baker Supt-In-Charge
University Research Units	108 Patterson Hall Raleigh, NC 27650 (919) 515-2826	Mr. Ivey Daughtridge Consulting Engineer
Upper Coastal Plain Research Station	Rt 2, Box 400 Rocky Mount, NC 27801-9276 (919) 442-7326	Dr. Clyde R. Bogle Superintendent
Upper Mountain Research Station	Rt 2, Box 33 Laurel Springs, NC 28644-9406 (919) 982-2501	Mr. Joe K. Hampton Superintendent
Upper Piedmont Research Station	Rt 3 Reidsville, NC 27320-9401 (919) 349-8347	Mr. H.O. Gentry, Jr. Superintendent

OKLAHOMA

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Oklahoma Agriculture Experiment Station at Stillwater	OSU 139 Ag Hall Stillwater, OK 74078 (405) 744-5398	Dr. Charles Scifres Assoc Director
Oklahoma Agriculture Experiment Station at Stillwater	OSU 139 Ag Hall Stillwater, OK 74078 (405) 744-5398	Dr. Larry Crowder Asst Director
Agronomy Range Research Area at Stillwater	Rt 5, Box 150 Stillwater, OK 74074 (405) 372-0016	Mr. John Weir Range Manager
Agronomy Research Area at El Reno	Rt 3 Box 29 El Reno, OK 73036 (405) 262-0784	Mr. G.L. Williams Agriculturist
Agronomy Research Station at Perkins	PO Box 110 Perkins, OK 74059 (405) 547-2385	Mr. Rick Matheson Station Superintendent
Caddo Research Station at Ft. Cobb	PO Box 42 Ft. Cobb, OK 73038 (405) 643-2501	Mr. R. Weidenmaier Agriculturist
Eastern Research Station at Haskell	Rt 1, Box 65A Haskell, OK 74436 (918) 482-3822	Mr. J.W. Walker Station Superintendent
Kiamichi Forestry Research Station at Idabel	Rt 1, Box 228 Idabel, OK 74754 (405) 286-5175	Mr. R.A. Heinemann Superintendent
North Central Research Station at Lahoma	PO Box 141 Lahoma, OK 73754 (405) 796-2447	Dr. R.J. Sidwell Station Superintendent
Oklahoma Fruit Research Station at Perkins	Rt 2, Box 1030 Perkins, OK 74059 (918) 866-2320	Mr. Kenneth Karner Station Superintendent
Oklahoma Pecan Research Station at Sparks	Sparks, OK 74869 (918) 866-2320	Mr. H.L. Davis Sr Agriculturist
Oklahoma State University Agronomy Research Station at Stillwater	Agronomy Department 368 Ag Hall Stillwater, OK 74078 (405) 624-7036	Mr. Chris Rice Station Superintendent
Oklahoma State University Department of Agronomy at Stillwater	Agronomy Department 370 Ag Hall Stillwater, OK 74078 (405) 744-6425 FAX: (405) 744-5269	Dr. Bill Webb Superintendent of Agronomy Research Stations

OKLAHOMA - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Oklahoma Vegetable Research Station at Bixby	13711 S. Mingo Rd Bixby, OK 74008 (918) 369-2441	Mr. D.B. Bostian Station Superintendent
Panhandle Research Station at Goodwell	PO Box 429 Goodwell, OK 73939 (405) 3492220	Mr. J.P. Alexander Station Superintendent and Professor
Pawhuska Research Station at Pawhuska	PO Box 1017 Pawhuska, OK 74056 (918) 287-2810	Mr. Roy Ball Herd Manager
South Central Research Station at Chickasha	Rt 3, Box 75 Chickasha, OK 73018 (405) 224-4476	Mr. D.W. Hooper Sr Station Superintendent
Southern Great Plains Field Station at Woodward	2000 18th Street Woodward, OK 73801 (405) 256-7449	Dr. Phillip Sims Superintendent
Southwest Agronomy Research Station at Altus	Rt 1, Box 15 Altus, OK 73521 (405) 482-3459	Mr. Rocky Thacker Station Superintendent
USDA-ARS Forage & Livestock Research Laboratory at El Reno	PO Box 1199 El Reno, OK 73036 (405) 262-5291	Dr. W.A. Phillips Asst Professor
Wes Watkins Agricultural Research & Extension Center at Lane	PO Box 128 Lane, OK 74555 (405) 889-7343	* Dr. Jonathan Edelson Assoc Professor & Center Director

* State Representative to RCAS Executive Committee 1992-93.

PUERTO RICO

STATION	ADDRESS/TELEPHONE/FAX		ADMINISTRATOR
College of Agricultural Sciences, Agricultural Experiment Station	P O Box 21360 Rio Piedras, PR 00928 (801) 767-9705 FAX: (801) 758-5158		Angel A. Custodio Assoc Dean and Deputy Director
Venzuela Contract Station	Rio Piedras, PR 00927 (809) 765-1995	*	Fernando Abruna Superintendent

* State Representative to RCAS Executive Committee 1992-93.

SOUTH CAROLINA

STATION	ADDRESS/TELEPHONE/FAX		ADMINISTRATION
Clemson University Agricultural Support	101 Ag Service Center Cherry Rd Clemson, SC 29634 (803) 656-3477 FAX: (803) 656-0276		Dr. Jack W. Davis Director
Clemson University Coastal Res & Ed Center	2865 Savannah Hwy Charleston, SC 29414 (803) 766-3761 FAX: (803) 571-4654		Dr. Merle Shepard Resident Director
Clemson University Edisto Res & Ed Center	PO Box 247 Blackville, SC 29817 (803) 284-3343 FAX: (803) 284-3684		Dr. James R. Hill, Jr. Resident Director
Clemson University Pee Dee Res & Center	Rt 1, Box 531 Florence, SC 29501 (803) 662-2112 FAX: (803) 661-5676	*	Dr. Ben U. Kittrell Resident Director
Clemson University Sandhill Res & Ed Center	PO Box 23205 Columbia, SC 29224-3205 (803) 788-5700 FAX: (803) 788-8058		Dr. J. K. Golden Resident Director

* State Representative to RCAS Executive Committee 1992-92.

TENNESSEE

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
University of Tennessee Institute of Agriculture Ames Plantation	Rt 1, Box 389 Grand Junction, TN 38039 (901) 878-1067	Dr. Jim Anderson Superintendent
University of Tennessee Institute of Agriculture Dairy Experiment Station	1071 New Lake Rd Lewisburg, TN 37091 (615) 359-1578 FAX: (615) 359-3408	Mr. Henry Dowlen Superintendent
University of Tennessee Institute of Agriculture Forestry Experiment Station	901 Kerr Hollow Rd Oak Ridge, TN 37830 (615) 483-3571	Mr. Richard Evans Superintendent
University of Tennessee Institute of Agriculture Highland Rim Experiment Station	3181 Experiment Stn Rd Springfield, TN 37172 (615) 384-5292 FAX: (615) 384-1987	Dr. Dennis Onks Superintendent
University of Tennessee Institute of Agriculture Knoxville Experiment Station	PO Box 1071 Knoxville, TN 37901-1071 (615) 974-7201 FAX: (615) 974-7448	Dr. John Hodges Superintendent Mr. Bob Reynolds Asst Superintendent
University of Tennessee Institute of Agriculture Martin Experiment Station	131 Brahm Hall Martin, TN 38238-5008 (901) 587-7256 FAX: (901) 587-7841	Mr. Harry Henderson Superintendent
University of Tennessee Institute of Agriculture Middle Tennessee Experiment Station	PO Box 160 Springhill, TN 17174-0160 (615) 486-2129	* Dr. Joe High, Jr. Superintendent
University of Tennessee Institute of Agriculture Milan Experiment Station	205 Ellington Dr Milan, TN 38358 (901) 686-7362 FAX: (901) 687-3558	Mr. John Bradley Superintendent
University of Tennessee Institute of Agriculture Plateau Experiment Station	Rt 9, Box 363 Crossville, TN 38555 (615) 484-0034	Dr. Robert Freeland Superintendent
University of Tennessee Institute of Agriculture Tobacco Experiment Station	Rt 5, Box 113 Greenville, TN 37743-9206 (615) 638-6532 FAX: (615) 638-6458	Dr. Phil Hunter Superintendent
University of Tennessee Institute of Agriculture West Tennessee Experiment Station	605 Airways Blvd Jackson, TN 38301 (901) 424-1643 FAX: (901) 425-4729	Dr. Jim Brown Superintendent

* State Representative to RCAS Executive Committee 1992-93.

TEXAS

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Texas A&M University Agricultural Res & Ext Center at Amarillo (Bushland-Etter)	6500 Amarillo Blvd West Amarillo, TX 79106-1796 (806) 359-5401 FAX: (806) 358-9718	Dr. G. B. Thompson Resident Director
Texas A&M University Agricultural Res & Ext Center at Beaumont	Rt 7, Box 999 Beaumont, TX 77713-8530 (409) 752-2741 FAX: (409) 752-5560	Dr. James W. Stansel Resident Director
Texas A&M University Agricultural Res & Ext Center at Chillicothe-Vernon	PO Box 1658 Vernon, TX 76384 (817) 552-9941 FAX: (817) 553-4657	Dr. Pete Jacoby Interim Resident Director
Texas A&M University Agricultural Res & Ext Center at Corpus Christi	Hwy 44 West Rt 2, Box 589 Corpus Christi, TX 78406-9704 (512) 265-9201 FAX: (512) 265-9434	Dr. Bobby R. Eddleman Resident Director
Texas A&M University Res & Ext Center at Dallas	17360 Coit Rd Dallas, TX 75252-6599 (214) 231-5362 FAX: (214) 783-1723	* Dr. James A. Reinert Resident Director
Texas A&M University Agricultural Research Center at El Paso	1380 A&M Circle El Paso, TX 79927 (915) 859-9111 FAX: (915) 859-1078	Dr. Howard L. Malstrom Resident Director
Texas A&M University Agricultural Res & Ext Center at Lubbock	Rt 3, Box 219 Lubbock, TX 79401-9757 (806) 746-6101 FAX: (806) 746-6528	Dr. John R. Abernathy Resident Director
Texas A&M University Agricultural Research Center at McGregor	Rt 1, Box 148 McGregor, TX 76657 (817) 840-3032 FAX: (817) 840-3544	Dr. David K. Lunt Superintendent
Texas A&M University Agricultural Res & Ext Center at Overton	Drawer E Overton, TX 75684 (903) 834-6191 FAX: (903) 834-7140	Dr. Charles R. Long Resident Director
Texas A&M University Agricultural Research Station at Pecos	PO Box 1549 Pecos, TX 79772 (915) 445-5050 FAX: (915) 445-9231	Dr. Jaroy Moore Superintendent
Prairie View A&M University Cooperative Agricultural Research Center	PO Box U Prairie View A&M University Prairie View, TX 77446 (409) 857-2030 FAX: (409) 857-2325	Dr. A.H. Reine Research Director

* State Representative to RCAS Executive Committee 1992-93.

TEXAS - Cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Texas A&M University Agricultural Res & Ext Center at San Angelo	7887 N Hwy 87 San Angelo, TX 76901 (915) 653-4576 FAX: (915) 658-4364	Dr. Carl S. Menzies Resident Director
Texas A&M University Agricultural Research Station at Sonora	PO Box 918 Sonora, TX 76950 (915) 387-3168	Dr. Charles A. Taylor Superintendent
Texas A&M University Agricultural Res & Ext Center at Stephenville	Rt 2, Box 00 Stephenville, TX 76401 (817) 968-4144 FAX: (817) 965-3759	Dr. Joe McFarland Resident Director
Blackland Research Center at Temple	808 E Blackland Rd Temple, TX 76502 (817) 770-6600 FAX: (817) 770-6561	Dr. C. Allan Jones Resident Director
Texas A&M University Agricultural Res & Ext Center at Uvalde	1619 Garner Field Rd Uvalde, TX 78801 (512) 278-9151 FAX: (512) 278-1570	Dr. J. W. Holloway Resident Director
Texas A&M University Agricultural Res & Ext Center at Weslaco	2415 East Hwy 83 Weslaco, TX 78596 (512) 968-5585 FAX: (512) 968-0641	Dr. Jose M. Amador Center Director
Texas A&M University Plant Disease Research Station at Yoakum	PO Box 755 Yoakum, TX 77995 (512) 293-6326 FAX: (512) 293-2054	Dr. A. Mike Schubert Superintendent

VIRGINIA

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Virginia Polytechnic Institute and State University	Hutcheson Hall Blacksburg, VA 24061 (703) 231-4152 FAX: (703) 231-4163	Dr. L. A. Swiger Interim Dean, College of Agriculture and Life Sciences & Director, VA Agr Exp Stn
Eastern Shore Agricultural Experiment Station	Rt 3, Box 133 Painter, VA 23420 (804) 442-6411 FAX: (804) 787-5824	Dr. Robert E. Baldwin Director
Eastern Virginia Agricultural Experiment Station	Rt 690 Warsaw, VA 22572 (804) 333-3485	Dr. Ras G. Sagaral Superintendent
Hampton Roads Agricultural Experiment Station	1444 Diamond Springs Rd Virginia Beach, VA 23455 (804) 363-3900 FAX: (804) 363-3950	Dr. Peter Schultz Acting Director
Middleburg Agricultural Experiment Station	Rt 2, Box 9 Middleburg, VA 22117 (703) 687 3521	Dr. George A. Morrow Superintendent
Northern Piedmont Agricultural Experiment Station	PO Box 448 Orange, VA 22960 (703) 672-2660	Dr. David E. Starner Superintendent
Reynolds Homestead Agricultural Experiment Station	PO Box 70 Critz, VA 24082 (703) 694-4135 FAX: (703) 694-2791	Mr. Richard E. Kreh Res Assoc in Charge
Shenandoah Valley Agricultural Experiment Station	Steeles Tavern, VA 24476 (703) 377-2255	Dr. Gerald L. Jubb Acting Superintendent
Southern Piedmont Agricultural Experiment Station	PO Box 148 Blackstone, VA 23824 (804) 292-5331 FAX: (804) 292-5623	Dr. James L. Jones Director
Southwest Virginia Agricultural Experiment Station	Rt 2, Box 430 Glade Spring, VA 24340 (703) 944-3668	Mr. Allan Brock Superintendent
Tidewater Agricultural Experiment Station	6321 Holland Rd PO Box 7099 Suffolk, VA 23437 (804) 657-6450 FAX: (804) 657-9333	Dr. Glen Heuberger Director
Virginia Seafood Agricultural Experiment Station	PO Box 369 Hampton, VA 23669 (804) 727-4861 FAX: (804) 727-4871	Dr. Lucina Lampila Superintendent

VIRGINIA - cont'd

STATION	ADDRESS/TELEPHONE/FAX	ADMINISTRATOR
Winchester Agricultural Experiment Station	2500 Valley Ave Winchester, VA 22601 (703) 667-8330 FAX: (703) 667-5692	*Dr. Robert L. Horsburgh Superintendent

* State Representative to RCAS Executive Committee 1992-93.

Past Recipients of the **Distinguished Service Award** for service, leadership, and outstanding contributions to RCAS over an extended period of time.

Year Awarded	Recipient
1987	John Ewing
1988	Robert "Bobby" Moss
1989	Joe High, Jr.
1990	Wallace Griffey and Bill Webb
1991	Norman Justus
1992	Gene Morrison and Jere McBride

PAST PRESIDENTS, RCAS

Years	Chairman
1969 - 1970	Robert Moss
1970 - 1971	Preston Reed
1971 - 1972	Charles Douglas
1972 - 1973	Charles Douglas
1973 - 1974	D. M. Gosset
1974 - 1975	Henry Marshall
1975 - 1976	Tom Corley
1976 - 1977	H. Rouse Caffey
1977 - 1978	E. G. Morrison
1978 - 1979	Robert Moss
1979 - 1980	Joe High, Jr.
1980 - 1981	Julian Craigmiles
1981 - 1982	Freddy Peterson
1982 - 1983	Wallace Griffey
1983 - 1984	Bill Webb
1984 - 1985	Gary Elmstrom
1985 - 1986	Norman Justus
1986 - 1987	Robert Freeland
1987 - 1988	Jere McBride
1988 - 1989	Howard Malstrom
1989 - 1990	Bill Loe
1990 - 1991	Edward Worley
1991 - 1992	Will Waters
1992 - 1993	James R. Hill, Jr.