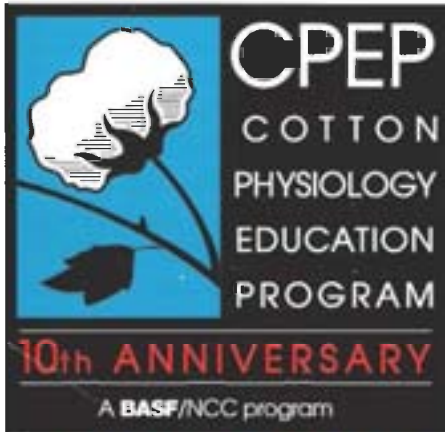


10th Anniversary

OF THE COTTON PHYSIOLOGY EDUCATION PROGRAM



CELEBRATING A TEN YEAR PARTNERSHIP WITH CPEP & BASF



Kater Hake gives CPEP presentation in Oklahoma.

Cotton Physiology Education Program Celebrates 10 Years of Grower Education

In 10 short years, the Cotton Physiology Educational Program (CPEP) has been credited with changing how an industry does business.

In 1998, CPEP marks a decade of helping cotton producers improve yield and quality by increasing their understanding of how a cotton plant grows.

CPEP popularized plant mapping — the practice of monitoring and managing a cotton plant's physical development for maximum productivity — with cotton producers across the United States. The program also has helped university researchers and extension specialists across the cotton belt share information on cotton growth and development.

Introduced Jan. 4, 1989, at the Beltwide Cotton Production Conference in Nashville, this "special project" started out as a three-year program funded by a grant from BASF Corp. to The Cotton Foundation. Today, CPEP continues to thrive.

During the past decade, BASF has supported the program with more than \$1.75 million, funding the position of a program manager and related activities. The National Cotton Council, which

operates CPEP from its Memphis headquarters, contributes in-kind services such as housing, equipment and staff support.

"CPEP has helped the entire industry be more competitive, efficient and profitable by giving growers a better understanding of the cotton plant and how it grows," says Scott Gibson, BASF market manager for cotton.

Andrew Jordan, executive director of The Cotton Foundation, echoes this sentiment: "I believe practically every cotton producer in this country has been enriched in some form by the introduction of plant mapping and the wealth of knowledge made possible by this program."

CPEP has given growers the tools to adjust soil fertility, plant spacing, pesticide application, growth regulation and harvest techniques — all necessary to improve yield and quality at lower cost, says Gibson.

"Producers who know how the cotton plant grows and develops and who monitor its growth and development are better able to intervene with changes that will improve their crop before harvest," says Gibson.

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A N N E W R O N A

Leads CPEP Into

Knowledge, believes Anne Wrona, is more than power. To a cotton grower, it is a survival tool. Little wonder that the newest manager of CPEP has marked her two years with the BASF-sponsored program by gathering, interpreting and dispensing knowledge vital to a cotton farmer's profitability.

Her strategy has been one of tapping into a knowledge base of established and emerging industry experts, sorting through reams of research to find fresh new data and ideas, and finally, delivering it in non-technical jargon. Her platform for dissemination of this knowledge has been in the form of CPEP's newsletter, *Cotton Physiology Today*, and in the programs she organizes for the Beltwide Cotton Conferences. Most recently, she has added to that list the *Journal of Cotton Science*, an electronic journal disseminated through the Internet.

While the original mission of CPEP was to raise producer awareness of cotton plant physiology, Wrona sees the program now in broader terms.

"CPEP has made plant mapping a common language and practice among cotton growers. Now we must take that

knowledge and apply it in ways that further reduce the grower's cost of production," she says. "We want to highlight new developments and applications and how they work hand-in-hand with a cotton plant's physiology for maximum success."

For example, take the introduction of Ultra Narrow Row Cotton (UNRC) and Bt cotton. Both of these new technologies bring on physiological changes in a cotton plant that alter plant development and require new management techniques for optimum production. Reporting on research and control measures is essential to a grower's success with these new techniques and products. And the new developments are many.

"All kinds of interesting new genetics are coming on board to increase yield and profitability in the field. Exciting developments are occurring with varieties that are resistant to insects and nematodes and are earlier. Also new are those with a different quality of cotton fiber, either colored fiber or having stronger fiber linked through it," Wrona says.

While the scope of CPEP's educational role has broadened, so has the role of CPEP at the Beltwide Cotton Conferences.

A significant change in 1998 was made by introducing a

CPEP Manager Well-Grounded to Take on Challenges

The rare times Anne Wrona is not behind her computer at the National Cotton Council or traveling on business, the CPEP manager might be found in-line skating around Rhodes College or lakeside at Shelby Farms, places near her Memphis home with plenty of open space and blacktop.

More than likely, however, she is busy restoring her house in historic mid-town Memphis and keeping up with her four charges: Alfalfa, an Alaskan Husky who wandered out of a California alfalfa field;

Rugby, a Collie/Saint Bernard mix that looks like a walking carpet; Sassafra, a Münsterlander, which is a noble German gun dog; and Penelope, a homeless Labrador who had the good luck of finding Wrona on a walk.

A native of Pennsylvania, Wrona attended college at Pennsylvania State University, receiving her

B.S. in biology. She received her masters in botany from the University of Rhode Island and completed her doctorate in plant physiology at the University of California in Davis.

Before joining CPEP in January 1996, Wrona was agronomy farm advisor for the University of California Cooperative Extension in Imperial County, Calif. While there, she worked with cotton growers facing a devastating influx of a new insect pest, the silverleaf whitefly. The sticky cotton and yield losses suffered as a result of this pest threatened to annihilate the region's cotton industry.

Cotton acreage had dropped from 140,000 acres to fewer than 4,000 — barely enough to keep the one remaining gin open. By gathering plant mapping information from 30 grower fields for three seasons and designing experiments to test the effect of timing of irrigation on cotton growth and development, she was able to correlate the



Next Decade

new format for the Beltwide Production Conference. In the past, general sessions composed one full day of 15 minute talks. Wrona says in 1998, there are two morning sessions with four panel discussions featuring growers talking about their own experiences with new applications and techniques. In the afternoon, there are hands-on technical workshops in which experts answer questions and give demonstrations.

"The format is very interactive. The ultimate goal is to get successful farmers sharing their techniques with others so they can learn how to cut production costs," she adds.

For Wrona, this type of presentation is challenging to put

together because of the many hours organizing panelists and topics, each with a different regional perspective, and keeping to a tight

schedule. Topics for panel discussions are Ultra Narrow Row Cotton (UNRC) production, Managing Production Costs, Update on Irrigation Techniques, New Approaches to Insect Control and Weed Management: Transgenics & New Technologies. The hands-on workshops will feature crop monitoring and modeling, emerging technologies, cotton improvement and optimizing production practices.

CPEP's role at the Beltwide is to deliver programs in an interesting manner, Wrona says. "Growers

are active people who, like me, don't want to sit still for very long. They are entrepreneurs who want to interact with panelists, then in the afternoon get up and create."



Anne Wrona and NCC graphic design artist, Charlie Yarwood, work on the next issue of the newsletter.

positive effect of an early first irrigation on stand establishment, yield, fiber quality and decreased whitefly numbers throughout the growing season. Growers readily adopted this new irrigation practice and increased their average yields 136 percent.

Before her time as farm advisor, she was a plant physiologist with the U.S. Salinity Laboratory in Riverside, Calif., and did research at the Department of Plant Pathology, Cornell University and at the Boyce Thompson Institute, both in Ithaca, N.Y.

Wrona's background includes more than 15 years in productive biological research, specializing in plant pathology and physiology, cell and molecular biology, mineral nutrition and plant biochemistry. She conceived

a research project utilizing the sun's energy to sterilize the soil of disease-causing organisms.

Wrona's knowledge of science and research techniques brings a unique dimension to CPEP

Her background and interest in plant physiology were an ideal fit with CPEP, says Scott Gibson, BASF cotton product manager. "Anne's knowledge of science and research techniques brings a unique dimension to CPEP.

Her enthusiasm and energy with projects like the newsletter, *Cotton Physiology Today*, are done with the goal of communicating information that will help the whole cotton industry improve profitability."

Wrona's education and career have taken her from coast to coast. As a child growing up in Pennsylvania, and later while living and working in Ithaca, N.Y., Wrona picked up the sports of figure skating, ice dancing and downhill skiing. But her career has moved her to places that aren't conducive to those interests. First in Imperial County, Calif., and now in Memphis, about the closest she comes to ice anymore is her freezer. These days, between work and travel, she is contented with an occasional jaunt on a sailboat.

CPEP in the Era of "Practical Physiology"

By David Guthrie, CPEP Manager, 1993-95

During the early years, CPEP laid the educational groundwork for the basic tools and concepts associated with cotton physiology. From 1993 to 1995, David Guthrie stepped in as manager to move the program to the next level by showing how this knowledge could be incorporated into successful production strategies.

Although a native Californian, Guthrie says he's "coast to coast" when it comes to cotton production. Having been educated at the University of California and the University of Arkansas, he also served as the extension specialist in North Carolina for nine years. Guthrie remembers his tenure with CPEP as the era of "practical physiology." He shares those thoughts in the following self-authored commentary. Dave Guthrie is currently director of technical services for Stoneville Pedigreed Seed Co.

CPEP was an established program when I arrived at the National Cotton Council. The cotton community was familiar with the basic concepts and recognized them as being potentially powerful.

My intent was to get 90 percent of the value of the monitoring with only 50 percent of the effort

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KATER HAKE Remember



Kater Hake

Kater Hake has the distinction of being the first manager of CPEP, serving from 1989-93. In a recent interview, Hake reflects on cotton producers' needs during the early years of the Cotton Physiology Education Program (CPEP), his responsibilities as manager, the popularization of plant mapping

and other accomplishments of CPEP under his leadership. As many in the ag community will testify, Hake used a wide variety of methods and industry expertise to make "the finer points of cotton physiology" as user-friendly as possible. Hake received his Ph.D. in botany at the University of California, Riverside, and served as Farm Advisor for Kern County before beginning his tenure with CPEP in 1989. Hake is currently vice president of agronomic services for D&PL International.

Q. In the late '80s, producers were getting out of their pickups to see what was really happening in their cotton fields. What was the motivation behind this "up close and personal" attitude?

A. Cotton growers were realizing that they could improve their decision-making in the field if they had a better understanding of how the whole system actually worked. For example, there was a lot of interest in Integrated Pest Management (IPM) systems, which explained how beneficial pesticides and harmful insects fit together with popular insecticide programs. Growers also wanted to improve their understanding of the cotton physiology/agronomy system to help them make better in-season decisions regarding plant growth regulators, irrigation, harvest aids and fertilization.

The use of Pix® plant regulator, which had been released eight years before the initiation of CPEP, clearly required a greater understanding of the system, the plant and its environment. To optimize PIX and other in-season tools, growers needed to look at the plant in a different way in terms of assessing how it was growing and progressing toward that final yield. CPEP was designed to help them achieve a better understanding of the plant system and ultimately improve yield and quality.

s E a r l y B e g i n n i n g s

Q: What role did plant mapping play in the program?

A: Plant mapping had been used extensively by cotton scientists as a research tool for more than 20 years. CPEP popularized plant mapping as a grower tool, shifting the emphasis from an end-of-the-season autopsy of the crop — what went wrong and what went right — to an in-season inspection of the plant. However, if a grower was going to make a decision on a field or even part of a field, he had to look at enough plants to be representative. The only way to get him to do that was to focus on the plant mapping components that not only provided him with useful information but also were more rapid and effective in terms of his time.

Q: Specifically, how did plant mapping help growers assess their cotton crop during the growing season?

A: Plant mapping helped growers train their eyes to focus more efficiently on the parts of the plant that are most critical for success. For example, it encouraged them to look at first position fruit set — the moneymakers — down at the bottom of the plant. Instead of looking at the distance between fruiting positions, look at whether or not there is fruit sitting at the first position.

Q: What were some of your responsibilities as manager of CPEP?

A: My major responsibility was to pull together existing information in a framework that the grower could use. *Cotton Physiology Today*, the CPEP newsletter, was the main vehicle to accomplish this goal. We observed that farming practices change from one region to another and there were underlying reasons for these changes. Take seeding depth, for example. Across the United States, cotton seed is planted between 1/2 inch and 2 inches deep based on factors such as moisture and disease. We tapped into the expertise that was out there, not to conduct research, but to find out how differing or common practices affect the way the plant grows.

Q: In reviewing past *Cotton Physiology Today* articles, you had quite an impressive list of authors. Who were some of your major contributors?

A: In Texas and out West, I relied heavily on James Supak, Bob Metzger, Dan Krieg, Tom Cothren, Juan Landivar, Charles Stichler, Tom Kerby, Jack Mauney, Jeff Silvertooth and Bruce Roberts. In other regions, Will McCarty, Tom Burch, Bill Meredith, Bill Mayfield, Derrick Oosterhuis, Lawrence Harvey, Dave Guthrie and Fred Bourland were major contributors. We also published articles by key growers across the Belt. All of these guys put in a lot of time and hard work.

Q: In addition to publishing *Cotton Physiology Today*, what other educational opportunities did CPEP offer?

A: In addition to producing several detailed publications on plant mapping, fiber quality and managing for earliness we held cotton physiology symposiums across the United States. At this time, there was a lot of extension activity in plant and crop management. CPEP complemented these on-going programs that helped growers be better in-season plant managers. Even if we made just a small contribution there, increasing the caliber of grower decision-making was a lasting benefit that could be passed on to others.

We also got involved in helping members of the ag media improve their expertise about cotton and cotton production so they were better prepared to ask tough questions and communicate certain topics to producers.

Q: In retrospect, what else did CPEP accomplish under your leadership?

A: We continuously looked for novel ways to get people's attention. For example, the Cotton Comics often brought humor to what could be a dry subject.

Seriously, though, CPEP's major accomplishment during that time period was improving grower expertise in conjunction with the efforts of other industry leaders and programs. It wasn't so much the specifics of the information that CPEP imparted as that it encouraged growers to get out in their fields and let the plant teach them. The plant is the best teacher out there, but you've got to come to class. That means getting out in the field on a regular basis and observing what's going on with the physiology of the plant — understanding what makes it all happen. That's what CPEP was about.



CPEP Celebrates 10

Many milestones represent the Cotton Physiology Education Program's road to success.

1989

1989

- CPEP introduced at Beltwide Cotton Conferences (BCC)
- Manager Kater Hake appointed
- Research on grower awareness
- Steering committee recruited
- "Beginnings Plant Map Program" created
- First *Cotton Physiology Today*

1990

1990

- Grower advisory board created
- Field seminars held beltwide
- Publicity in ag media
- Speakers bureau formed
- First physiology seminar at BCC
- *Cotton Physiology* reference book created
- Newsletter grows from 3,500 to 15,000
- Manuals and video created

1993

1993

- David Guthrie becomes CPEP manager
- First readership survey conducted
- Seminar for ag journalists
- *Cotton Monitoring Across the Belt* continues
- Publicity in ag media (by-lined articles by Guthrie)

1994

1994

- *Cotton Monitoring Across the Belt* continues
- Computer-Aided Cotton Management project launched
- Publicity in ag media
- Newsletter readership now exceeds 25,000
- Publishing of *Narrow Row* handbook

1997

1997

- Newsletter is redesigned
- Workshops/seminars at BCC
- Readership survey
- *Ultra Narrow Row Cotton* manual created

1998

1998

- CPEP enters 10th year
- Interactive seminars at BCC
- Strengthening focus on new technology
- Continued commitment to helping cotton producers meet production challenges

Years of Growth

1991

1991

- *Applied Plant Mapping* handbook series created
- *Late Planted Cotton: Situation, Physiology and Management* created
- *Weeds of Cotton: Their Characterization and Control* book created

1992

1992

- *Cotton Monitoring Across the Belt* gets its start
- Publicity in ag media

1995

1995

- Physiology training for National Association of Farm Broadcasters
- Consultants training program
- Publicity in ag media
- *Computer Software Project* launched at BCC
- Newsletter readership survey repeated

1996

1996

- Anne Wrona appointed CPEP manager
- Newsletter includes color photographs
- Technical workshops at BCC



1998

10th Year Anniversary

Committed to Cotton



Ten years ago, the Cotton Physiology Education Program (CPEP) was founded on the premise that, "Better knowledge of cotton plant physiology, properly packaged, is beneficial to cotton growers everywhere — and the industry."

Knowledge transforms growers into top crop managers. Knowledge helps the U.S. cotton industry become more efficient, competitive and profitable. In this way, knowledge benefits us all.

Clearly, CPEP has succeeded in its mission to provide knowledge to producers. In 1996, BASF commissioned an independent research firm to gauge what importance cotton producers placed upon the program. Ninety-five percent of cotton producers interviewed reported that CPEP was "extremely valuable" or "somewhat valuable" to the success of their cotton farming business. Almost 98 percent thought the CPEP newsletter, *Cotton Physiology Today*, was valuable.

For 10 years now, CPEP has provided producers knowledge of innovative production systems such as Ultra Narrow Row Cotton and new plant monitoring techniques. Yet, despite all of our advances, we enter the second decade of CPEP with so much more to learn.

BASF Agricultural Products is pleased to have sponsored CPEP in its first decade because BASF, in partnership with U.S. cotton growers and CPEP, is on a quest for knowledge. Our grant to fund CPEP is a reflection of our corporate vision, which is: "To be the best provider of knowledge and innovative solutions for crop protection." We believe that knowledge —

in combination with the right products, such as **Pix[®] plant regulator** — forms the foundation for building the U.S. cotton industry.

We are confident the next 10 years will demonstrate that knowledge is more critical to good crop management than ever before.

Consider how the face of the cotton industry is changing:

- The promises of biotechnologies are finally becoming a reality — witness the new genetically engineered seed.
- The lines separating growers' partner companies are fading, exemplified by mergers in the seed and chemical industries.
- Sophisticated equipment is being used at every stage of production, from more precise applications to satellite mapping of fields.
- Communication technology has expanded the "backyard fence," where farmer once talked to neighboring farmer, into a global backyard, with access to a wealth of information via the Internet.

Knowledge clearly will be indispensable for producers to thrive in this evolving environment. CPEP and its expertise in the form of one-on-one meetings, hands-on workshops and *Cotton Physiology Today* undoubtedly will prove an increasingly vital source of knowledge.

Our vision of the cotton industry beyond the 20th century is limited only by our ability to dream of innovative production systems. CPEP is producers' gateway to knowledge that will power production breakthroughs and provide a means to success in the vibrant industry of the future.

Kudos for CPEP

For the past 10 years, CPEP has been helpful not only to producers, but also to others involved in the business of cotton. Following are highlights from CPEP as remembered by some of the ag media, extension, university affiliates and researchers.

"Standing around in a cotton field — under a blazing sun, with humidity approaching

100 percent and nary a cloud in sight — was not, I thought at the time, an auspicious way to indoctrinate media representatives on the finer points of cotton physiology. But Kater Hake and the experts he'd gathered for the session managed to

overcome the 'classroom' obstacles and make what I'd expected to be a pretty boring subject quite fascinating. Their hands-on approach to teaching the subject was quite effective."

— **Hembree Brandon,**
Editorial Director,
Delta Farm Press

"The newsletter and programs that CPEP coordinated were outlets for information from one state to reach another state."

"To me, *Cotton Physiology Today* is one of the most effective educational tools that

has come out of the program. Even when the newsletter has a regional flavor, it addresses useful topics on a Beltwide

(continued on page 12)

NEWSLETTERS, PUBLICATIONS SUPPORT

CPEP's Mission

Remember the dancing, surf-board riding cotton plant that sang, "Sunshine on my cotyledons makes me happy?" You do if you were an early reader of *Cotton Physiology Today*, CPEP's official newsletter. These fun and simple "Cotton Comics" were just one way CPEP Manager and Newsletter Editor Kater Hake made otherwise dry and technical information come alive for readers during the late 1980s and early 1990s.

The newsletter and the many other publications, handbooks and reference materials produced by CPEP during the past 10 years

give growers a better understanding of a cotton plant's physiology and how that understanding can be applied to improve yields, quality and cut production costs.

Cotton Physiology Today is well read and respected. Independent research conducted among 500 cotton producers in 1996 found almost 98 percent thought the CPEP newsletter provided valuable information.

A readership survey of the newsletter, also conducted in 1996, attracted about 1,000 responses. That survey showed between 81 and 85 percent said the information in *Today* was very useful and nearly all the rest found the information somewhat useful. When asked if past topics applied to their operation or situation, about 90 percent replied either "all of the time" or "most of the time."

A true test of any newsletter is how often it is read. In the *Cotton Physiology Today* readership survey, nearly 80 percent of all respondents said they read each issue and read it very thoroughly. More than 75 percent said they keep the newsletter for future reference.

Some readers have been keeping their issues since the first one was published in October 1989 by Hake. The feature article in that issue was "Effect of Cold Weather on Yield and Quality," a report written by Hake and extension specialists Tom Kerby and Will McCarty. Contributions from top extension and private researchers were then, and still are, a constant feature in the newsletter.

The goal of the current CPEP Manager and Newsletter Editor Anne Wrona is to encourage even more experts from different disciplines to become involved with contributing to the newsletter all bringing their own unique regional approach. It is not unusual for Wrona to have more than 20 contributors recognized per issue from Florida to Virginia to New Mexico.

"Different disciplines add new dimensions to the newsletters," she says.

Over the past two years, *Today* has tackled issues that delve into new technology products

like "Bt Cotton Requires Vigilant Management," "News Ways to Manage Weeds (by region)" and "Varieties: Development & Selection."

Color was added to the newsletter in 1996 under Wrona's editorship. In 1997, *Cotton Physiology Today* revamped its looks with a new "flag" at the top and switched from a two-column format to three-columns.

The newsletter has served to publicize

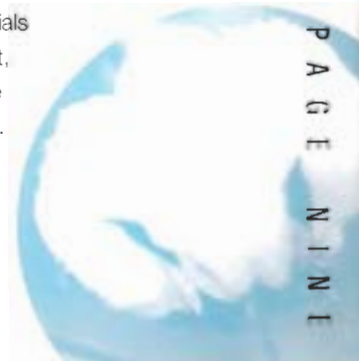
CPEP's unique educational packages, like the free mapping program first introduced in January 1990. This plant map program helped the producer determine fruit retention, plant vigor, nodes above white bloom and plant development. Thousands of these plant map programs were freely given to producers in the early 1990s.

In 1994, the *Narrow Row Cotton Handbook* was produced by CPEP and BASF as a primer for making the transition to narrow row production. The *Ultra Narrow Row Cotton (UNRC) Manual* was created in 1997. Thousands of these handbooks have been published and distributed.

The future holds many opportunities to expand the dissemination of CPEP information and materials through modern-day avenues like the Internet, says Wrona. "Whether by mail or satellite, the means doesn't matter as much as the material. CPEP will continue to turn out information useful to a cotton grower's bottom line in a manner that's easy to comprehend and visually attractive," she adds.



Progression of newsletters.



A Look Back, A Step Ahead

By Andrew Jordan, Executive Director, The Cotton Foundation

In October 1989, I wrote an article in the first *Cotton Physiology Today* newsletter introducing the Cotton Physiology Education Program (CPEP). The program would "assist growers in understanding the plant and utilizing that knowledge for improved production practices."

CPEP continues to be true to its mission. Few would dispute that CPEP has done more to introduce U.S. cotton growers to the use of plant physiology in management decisions than any other initiative. A direct result has been increased profitability in several areas, including the ability to better manage new production practices and varieties, even environmental conditions like late-season cotton.

Grower interest in cotton physiology, previously seen as very academic and maybe even a little impractical, has skyrocketed. Grower subscription requests have increased the *Cotton Physiology Today* newsletter's circulation from 3,600 initially to more than 25,000 today. Major physiology seminars during the Beltwide Cotton Conferences and

grassroots seminars conducted throughout the Cotton Belt always attract record attendance. Crop data gathered from the first Beltwide cotton monitoring program from all cotton growing regions over multiple seasons have been unprecedented and extremely valuable.

What started out as a three-year program now enters its second decade. No doubt that as the cotton industry continues to evolve, so will CPEP. We still have much to learn and teach about plant physiology in relationship to biotechnology products like transgenic plants, new production techniques like Ultra Narrow Row Cotton and sophisticated plant mapping computer programs.

The more we know how the inner workings of the cotton plant adjust to this new technology revolution, the more we know how to manage our crops for better profitability. That is CPEP's mission for the next decade. We thank BASF, sponsor of CPEP, for its ability to look ahead and move an industry forward.



Celebrating Ten Years continued from cover page

Another important objective of CPEP is to help growers successfully adopt innovative cultural practices. Through its activities, growers can learn management techniques associated with new practices such as Ultra Narrow Row Cotton (UNRC), early-season cotton and transgenic varieties.

A primary communications vehicle associated with CPEP is the distribution of *Cotton Physiology Today*. With a readership of more than 25,000, this newsletter covers topics ranging from new products like Bt cotton management to new weed control techniques.

CPEP's focus has been on raising producer awareness of cotton plant physiology through regional and beltwide seminars, reference materials, newsletters, videos, speakers and other activities. "Today, new tools like the Internet and electronic transmission of information are helping us spread the CPEP message in ways we did not think possible 10 years ago," says Anne Wrona, manager of CPEP since January, 1996.

Former CPEP managers are Kater Hake, who served as the first manager from 1989-93, and David Guthrie, who served from 1993-95. CPEP has involved thousands of people in its development over the years — innovative growers, extension cotton specialists and other industry leaders throughout the U.S. Cotton Belt.

Jordan echoed sentiments of the CPEP founders of a decade ago. "Ten years ago when we introduced CPEP, we said that cotton farmers were the best managers in U.S.

agriculture today, but they had to do an even better job of managing their crops to survive in today's global marketplace.

"This is even truer today, partly because of the wonderful new technology driving the marketplace. Cotton producers need knowledge of plant physiology and how it can be practically applied with today's cotton varieties and production practices."

Some highlights in the history of CPEP include:

Research into growers' awareness of cotton plant physiology and innovative production systems.

The creation of the newsletter *Cotton Physiology Today*. Reference materials, workbooks, bulletins and research papers to cover the "how" and "why" of plant physiology basics and new production techniques as described in the "Ultra Narrow Row Cotton Manual."

On-going cotton monitoring across the Belt, which enabled the creation of a management software program.

- Speakers, telecommunications and news conferences to aid in disseminating cotton physiology information to producers, especially during the annual Beltwide Cotton Conferences.
- Regional grassroots and Beltwide Cotton Conference seminars and workshops summarizing cotton physiology topics in easily understood language.

Era of "Practical Physiology" continued from page 4

However, consultants and growers were looking for practical and usable techniques that were less time consuming. I routinely heard growers say that they didn't have the time for extensive in-field monitoring.

Consultants liked the power of plant monitoring but were having difficulty passing those costs on to the client. Monitoring techniques had to be developed that significantly reduced time in the field without sacrificing their interpretive, corrective or ameliorative power.

Improving in-season decisions

I took several approaches to expand the utility of production physiology and plant monitoring. One initiative was directed at focusing on a time during the season when plant monitoring and its interpretation could empower a cotton grower to reach a new plateau in management refinement. For example, some key decisions that have to be made during the growing season involve seeding rate, planting date, **Pix[®] plant regulator** application, irrigation, crop protection and harvest aid techniques.

Questions that were investigated in *Cotton Physiology Today* included how high or low plant densities develop and mature, why early or late planting introduces risks that have season-long consequences and why Multiple Low Rate Applications of PIX were worthwhile in some areas — but less so in other regions.

In other instances, we discussed the physiology of defoliation;

the pros and cons of vigor indices such as Height-to-Node Ratio (HNR), growth rate and length of recently formed internodes; whether or not high square retention is always good, and if not, why. The objective in covering these varied topics was to illustrate how the lay reader could utilize a knowledge of production physiology to make better production decisions at specific junctures during the production season.

My operating principle in these discussions was to position the crop to optimize its response to environmental conditions while maintaining management flexibility. For example: Plant at a lower density under dry-land conditions to create greater resiliency to transient drought stress; make multiple nitrogen applications

depending on the conditions rather than one preplant treatment. If in doubt, better too much water during bloom than too little — if started on time.

Streamline field monitoring techniques

A second initiative was to streamline field monitoring techniques through fewer plants and/or fewer measurements. For instance, take a crop height measurement for a group of plants from the soil line rather than multiple crop heights from the cotyledons of many plants, concentrating on heights and nodes and Nodes at First Fruiting Branch (NFFB) prior to bloom (with square retention left to the insect scouts or general measures of poor to excellent). My intent was to get 90 percent of the value of the monitoring with only 50 percent of the effort.



David Guthrie

“The objective in covering these varied topics was to illustrate how the lay reader could utilize a knowledge of production decisions at specific junctures during the production season.”

Communicate with the audience

My third approach was to agree to talk everywhere — from the turn rows with growers in Georgia and the Carolinas to BASF-sponsored workshops for summer interns, to seminars on cotton monitoring for the National Association of Farm Broadcasters.

We conducted PIX or defoliation presentations in Tennessee and Alabama, extension-sponsored talks in Missouri and Louisiana and Beltwide presentations at workshops and general sessions. Although each group had a different interest and background, the goal was always to communicate with the audience and to leave no one scratching his head or panting under his breath at the end.

Another tack was to write popular articles in addition to the more formal *Cotton Physiology Today*. Normally, these articles were topical and offered suggestions on specific actions to take. Their

short-and-to-the-point format was particularly appropriate during the heat of the season when time for reflection is nonexistent.

In looking back, I hope that "practical physiology" was the hallmark of my tenure at the helm of CPEP. My interest has always been to educate growers and their advisors on how the cotton plant grows and how they can make that knowledge useful in their businesses.

Kudos continued from page 8

basis and draws together the people who have expertise in those areas. I think we've needed that all along. The articles are a nice blend of technical information in an extension-type format. The newsletter speaks to people who work in the production community."

— **Jeff Silvertooth, Arizona Extension Cotton Specialist**

"Perhaps the most important challenge facing cotton producers today is finding ways to reduce production costs. Certainly a major help has been CPEP, an innovative educational effort that has promoted a better understanding of how the cotton plant grows and develops. This is a key to reducing costs: producers who monitor plant development can adjust soil fertility, pesticide application and use of plant growth regulators to improve yield and provide quality at a lower cost.

"Plant mapping has had a major impact on the industry and has been the basis of numerous production articles published in *Cotton Grower*. In addition, the *Cotton Physiology Today* newsletter has been enormously important to the *Cotton Grower* staff in helping us understand plant physiology, as well as providing leads for articles to present. CPEP has therefore been instrumental in the effort to develop, write and publish articles on production strategies

explaining how to make key in-season management decisions. It's all a part of the overall effort to reduce production costs."

— **Bill Spencer, Editor, Cotton Grower**

"The *Cotton Physiology Today* newsletter served a good purpose in getting pertinent information out to a massive number of people all across the Cotton Belt from a central location. CPEP provided help to the state extension staffs in that there was a resource person associated with that program — someone who had a perspective of the cotton industry from one side of the Belt to the other — that we could call on to help us with programs in our state."

— **Will McCarty, Mississippi Extension Cotton Specialist**

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