

**PROCEEDINGS OF THE 2000
COTTON RESEARCH MEETING**

AND

**SUMMARIES OF COTTON
RESEARCH IN PROGRESS**

Edited by Derrick M. Oosterhuis

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PREFACE

The 1999 cropping season was one of the most stressful and disappointing in recent history. The extremely hot, dry weather experienced during the boll development period resulted in an average state yield of 715 lb lint per acre from 970,000 acres. Lint quality was also a little disappointing with trends toward short fiber and high micronaire. However, insect pressures were not as high as expected.

The season began with good crop development up to flowering, and producers were optimistic for high yields. However, extremely hot, dry conditions during July and early August (see Fig.1) affected boll growth, particularly seed and fiber development, so that low yields resulted despite good management efforts. Irrigation only partially offset the extreme heat and excessively dry conditions. Although cotton originates from hot climates, it does not grow best at excessively high temperatures. Reports in Arkansas indicate that across years high average temperatures are associated with low yield and low temperatures with high yields. The ideal temperature range for cotton is reported to be from 68 to 86°F. However, from a physiological point of view, the ideal temperature range for cotton for optimal metabolic activity is 74-90°F with the optimum for photosynthesis at 82°F. Average daily maximum temperatures in July and August in the Mississippi Delta *are usually above 90°F*, i.e. above the optimum for photosynthesis.

There are no obvious immediate remedies to the problems associated with high temperature. Suggestions include genetic selection for cultivars more tolerant to high temperatures during boll development. Crop management should focus on producing an early crop (e.g. effective and timely insect and weed control, attention to water availability, and judicious fertility) by using an effective crop monitoring system, i.e. COTMAN. Plant growth regulators should be used to enhance early fruit set and early maturity. However, in spite of best management efforts, the occurrence of untimely severe weather, coupled with insect attacks, can still adversely affect cotton growth and yield.

Cotton yields in Arkansas increased steadily during the eighties, but in recent years there has been a leveling off and possibly even a decrease in yield. Of more significance, however, is that the last five years have provided extreme year-to-year variability in yields which is a major point of concern with cotton producers. Yield stability for Arkansas cotton producers has become a major focus for new in-state collaborative research projects.

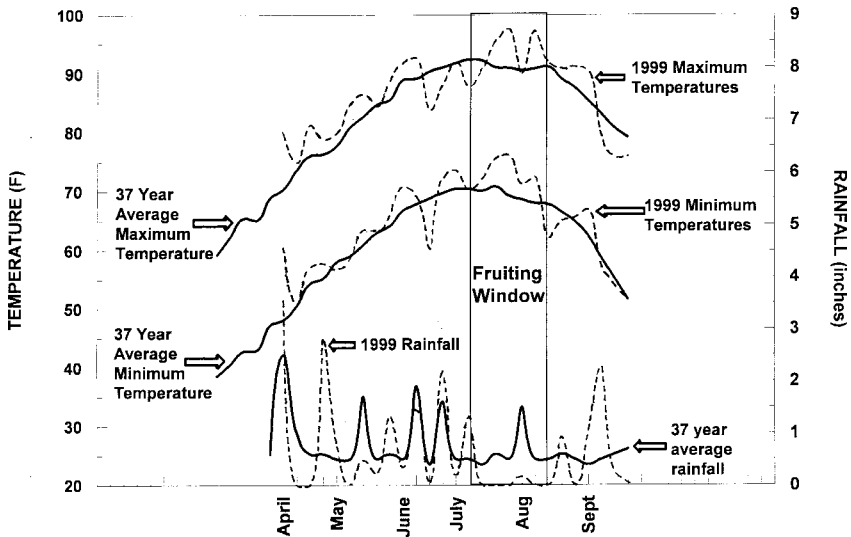


Figure. 1. Weekly maximum and minimum temperatures and rainfall for 1999 compared with 37-year averages at Rohwer, Southeast Arkansas.

ARKANSAS COTTON RESEARCH GROUP 1999/2000

The University of Arkansas Cotton Group is composed of a steering committee and three sub-committees representing production, genetics and pest management. The group contains the appropriate representatives in all the major disciplines as well as representatives from the Cooperative Extension Service, the Farm Bureau, the Agricultural Council of Arkansas, and the State Cotton Support Committee.

The objective of the Arkansas Cotton Group is to coordinate efforts to improve cotton production and keep Arkansas producers abreast of all new developments in research.

Steering Committee: Fred Bourland, Gus Lorenz, Gene Martin, Keith Martin, Robert McGinnis, Derrick Oosterhuis (Chm.), Don Plunkett, Bill Robertson, Craig Rothrock, Mac Stewart, Cecil Williams, David Wildy, Jerry Williams

Pest Management: Charles Allen, Gary Felton, Don Johnson, Terry Kirkpatrick, Tim Kring, Gus Lorenz, Bill Robertson, Craig Rothrock (Chm.), Ken Smith, Don Steinkraus, Glen Studebaker, Tina Teague, Phil Tugwell, Seth Young

Production: Bill Baker, Ray Benson, Mark Cochran, Dennis Gardisser, Terry Keisling, Gus Lorenz, Scott McConnell, Derrick Oosterhuis (Chm.), Lucas Parsch, Don Plunkett, Bill Robertson, Cal Shumway, Phil Tacker, Earl Vories

Genetics: Fred Bourland, Hal Lewis, Bill Robertson, Mac Stewart (Chm.)

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COTTON INCORPORATED AND THE ARKANSAS STATE SUPPORT COMMITTEE

The 2000 Proceedings of the Arkansas Cotton Research Meeting has been published with funds supplied by the Arkansas State Support Committee of Cotton Incorporated.

The principal purpose of Cotton Incorporated is to increase the profitability of cotton production by building demand for U.S. cotton. The Arkansas State Support Committee of Cotton Incorporated is a board whose voting members are cotton growers from Arkansas. Advisory members include representatives of Arkansas' certified producer organizations, the University of Arkansas, the Cotton Board and Cotton Incorporated. Five percent of Cotton Incorporated's total budget is allocated for research and promotion activities, as determined by the State Support Committees of the cotton producing states. The sum allotted to Arkansas' State Support Committee is proportional to Arkansas' contribution to the total U.S. cotton fiber production and value in the five years previous to the budget.

The Cotton Research and Promotion Act is a federal marketing law. The objective of the act is to develop a program for building demand and markets for cotton. The Cotton Board, based in Memphis, Tennessee, was created to administer the act and empowered to contract with an organization with the capacity to develop such a program. Cotton Incorporated, with its world headquarters and research center in Cary, North Carolina, is the contracting agency. Cotton Incorporated also maintains offices in Basel, Switzerland; Osaka, Japan; Mexico City, Mexico; Shanghai, China; and Singapore to foster international sales. Both the Cotton Board and Cotton Incorporated are non-profit entities, with governing boards comprised of cotton growers and cotton importers. The budgets of both organizations are annually reviewed and approved by the U.S. Secretary of Agriculture.

Cotton production research is supported in Arkansas both by Cotton Incorporated directly from its national budget and by the Arkansas State Support Committee from its formula funds. Several of the projects described in these proceedings, including the publication of these Proceedings, are supported wholly or in part by these means.

Arkansas Cotton State Support Committee / Cotton Incorporated Funding 1996-2000.

Project	Principal Investigator	Amount Funded (\$)				
		1996	1997	1998	1999	2000
Manipulation of the effective fruiting window	Bourland	24,550	-----	-----	-----	-----
Proceedings annual Arkansas research meeting	Oosterhuis	6,000	6,000	5,000	5,000	5,000
Cottonseed pool — Arkansas	Cotton Inc.	11,000	10,000	14,200	14,200	13,700
Conditions for successful use of foliar nitrogen	Baker	21,400	21,400	-----	-----	-----
Weed control in conservation tillage	McClelland	7,000	7,000	-----	-----	-----
Early irrigation management	McConnell	19,500	19,500	-----	-----	-----
Petiole monitoring sampling evaluation	Oosterhuis	8,100	8,100	-----	-----	-----
Management of early season pest damage	Rothrock	22,000	22,000	-----	-----	-----
Support of boll weevil eradication in Arkansas	Alexander	15,000	15,000	10,000	10,000	-----
Boll weevil eradication: implementation and evaluation	Yearian	123,450	123,450	89,800	89,800	85,656
Research on the cotton aphid fungus	Steinkraus	8,000	11,000	13,800	-----	-----
Integration of weed control programs	Baldwin	10,000	10,000	10,000	-----	-----
Terminating squares after physiological cutout	Bourland	-----	-----	3,500	3,500	3,500
Control of reniform nematodes	Kirkpatrick	-----	-----	16,300	16,300	16,300
COTMAN: Economics	Cochran	-----	-----	16,000	16,000	16,000
Validation of COTMAN termination	Allen	-----	-----	10,000	10,000	10,000
Plant growth regulator evaluation	Oosterhuis	-----	-----	16,000	16,000	16,000
Breeding and evaluation of host plant resistance	Bourland	-----	-----	20,000	20,000	20,000
Control of spider mite	Steinkraus	-----	-----	13,700	13,700	13,700
Boll weevil overwintering sites	Johnson	-----	-----	30,200	30,200	30,200
Roundup Ready and Bt evaluation	Allen	-----	-----	15,000	15,000	15,000
Cotton graduate student award	Oosterhuis	-----	-----	500	500	5,000
Natural enemies	Kring	-----	-----	-----	6,800	9,430
New Stress Index	Tugwell	-----	-----	-----	-----	10,000
Root Problem Handbook	Oosterhuis	-----	-----	-----	-----	2,000
New Petiole Sampling	Oosterhuis	-----	-----	-----	-----	6,370
Plant Bug Feeding	Allen	-----	-----	-----	-----	8,000
Totals:		276,000	278,000	283,500	267,000	281,356

**PROCEEDINGS OF THE 2000
COTTON RESEARCH MEETING**

**Arkansas Cotton Research/Extension/Production
and Marketing Group
University of Arkansas**

Theme: Research for Efficient and Profitable Cotton Production

Proceedings of a Conference held at the
Phillips County Community College, Helena
February 15, 2000

