



Pest Management Needs Assessment for Oklahoma Cotton Producers

Tanya C. Franke
Research Associate

Kathleen D. Kelsey, Ph.D.
Professor

Tom A. Royer, Ph.D.
Professor & IPM Coordinator

Acknowledgement

Funding for this guide was made available by the Oklahoma State University IPM Program.

Cotton represents a significant row crop for Oklahoma growers. Cotton is grown predominantly in southwestern Oklahoma. Acreage devoted to cotton production has slightly declined during the past 10 years, averaging 234,000 acres planted during 1996 through 2000 and declining to an average of 225,000 acres planted from 2001 through 2005. Yields have increased, averaging 458.4 pounds per acre during 1996 through 2000, and increasing to an average of 625.4 pounds per acre during 2000 through 2005 (NASS, 2006). For instance, cotton acres in Kay County (north-central Oklahoma) increased from 600 acres in 1995 to more than 6,400 acres in 2005 (NASS, 2006). In 2006, producers harvested 220,000 acres of cotton, which produced an average yield of 805 pounds per acre. The top five counties for cotton production included Jackson, Tillman, Harmon, Caddo, and Comanche Counties.

A self-administered mailed survey was developed (Dillman, 2007) by T. Franke and K. Kelsey in consultation with OCES faculty who had expertise in entomology, plant pathology, and plant and soil sciences. The objective of this survey was to identify pest management needs of Oklahoma cotton producers and use the information to guide Oklahoma State University's research and Extension programs in addressing their most critical needs. The survey asked Oklahoma cotton producers to report information regarding their production management practices in regards to soil fertility, insects, and weeds. The population for the study consisted of 1,900 Oklahoma cotton producers in 2006 and the sample consisted of a randomly stratified sample ($n = 320$). Eighty (80) of the 320 surveys were returned (25 percent response rate). Cumulatively, the 80 respondents grew cotton on 53,309 acres in 2006 (averaging 666 acres per respondent) representing about 17 percent of the total cotton grown. It should be noted that 2006 was a severe drought year, following several drought years, which may have affected the responses to the survey.

Oklahoma Cooperative Extension Fact Sheets are also available on our website at:
<http://osufacts.okstate.edu>

Findings

The issues identified by respondents of greatest concern with growing cotton are listed in Table 1. Additional issues listed by respondents are listed in Table 2.

Table 1. Top concerns with cotton production identified by Oklahoma survey respondents.

Issue	High Concern	Moderate Concern	Low Concern	No Concern
Weeds	76.1%	18.5%	3.3%	2.2%
Harvest	65.2%	31.5%	2.2%	1.1%
Fiber quality	60.2%	30.7%	4.5%	4.5%
Soil fertility	55.4%	39.1%	4.3%	1.1%
Insects	55.4%	35.9%	6.5%	2.2%
Diseases	38%	38%	21.7%	2.2%

Table 2. Other concerns identified by Oklahoma survey respondents.

Issue (1 each)

2, 4-D damage
Marketing and loan
Yield (marked high concern)
Hormone herbicide drift damage
Irrigation
Fertilizer banding equipment
Nematodes (economical control)
Seed cost
Yield numbers per acre

Weeds

Respondents identified weeds as the top issue with growing cotton. They listed pigweed ($f = 62$) as the most frequent weed problem, followed by Johnsongrass ($f = 50$), and morning glory ($f = 45$) (Table 3). Table 4 notes the herbicides used by respondents to treat weed problems in cotton during 2006.

Table 3. Weeds encountered in cotton by Oklahoma survey respondents.

Weed	Frequency (f)
Pigweed	62
Johnsongrass	50
Morning glory	45
Common cocklebur	31
Devil's claw	30
Silverleaf nightshade	28
Field bindweed	27
Yellow nutsedge	15
Red sprangletop	9
Texas panicum	7
Other	4
Crabgrass	5
Marestail	4
Golden crownbeard	2
Amarath	1
Bloodweed	1
Purslane	1
Thistle	1
Kochia	1
Flatweed	1

Table 4. Herbicides and number of applications used for weed control in cotton by Oklahoma survey-respondents.

Herbicide	Air	Ground	Unspecified
Roundup® or generics (glyphosate)	4	58	6
Prowl® (pendamethalin)	0	10	1
Aim® (carfentrazone-ethyl)	0	10	0
Staple® (pyrothrobac-sodium)	1	7	1
Cotoran® (fluometruon)	0	4	0
Dual® (metolachlor)	0	2	0
2, 4-D® (2, 4-D)	0	0	2
Karmex DF® (diuron)	0	1	1
Treflan® (trifluralin)	0	1	0
Caparol® (prometryn)	0	1	0
Total	5	94	11

Harvest

Harvest issues were identified as an issue of high concern by a majority (65.2 percent) of the respondents. However, specific issues associated with harvest were not requested. The response shows harvest issues should be a continued effort for research and Extension educational programs.

Soil Fertility

More than 50 percent of the respondents identified soil fertility as an issue of high concern (Table 5). The most frequent issue was with nitrogen deficiency ($f = 55$), followed by phosphorus ($f = 40$).

Table 5. Soil fertility issues associated with growing cotton as identified by Oklahoma survey respondents.

Element	Frequency (f)
Nitrogen	55
Phosphorus	40
Potassium	21
Low pH (acid soil)	11
Sulfur	11
Zinc	10

Insect and Other Arthropods

It should be noted the area-wide boll weevil eradication program has effectively eliminated boll weevil from Oklahoma, and many cotton producers are adopting transgenic *Bacillus thuringiensis*, or Bt, cottons, which produce a natural insecticide for control of the bollworm/budworm complex. Despite these changes, insects were perceived as an issue of high concern by a majority of respondents. Survey respondents specified thrips ($f = 41$) as the most frequent insect problem, followed by flea hoppers ($f = 11$) (Table 6). Various insecticides were used to treat insect problems with cotton during 2006. Insecticides used to treat insect problems and the methods of application are specified in Table 7.

Table 6. Arthropod pests encountered in cotton by Oklahoma survey respondents.

Insect	Frequency (f)
Thrips	41
Fleahoppers	11
Flea beetles	10
Aphids	9
Nematodes	5
Grasshoppers	4
Other	3

Table 7. Insecticides used in cotton for insect control by Oklahoma survey respondents.

Insecticide	Air	Ground	Unspecified
Orthene® (acephate)	2	21	3
Vydate® (oxamyl)	2	12	0
Temik® (aldicarb)	0	7	1
Bidrin® (dicrotofos)	1	5	0
Cruiser® (thiamethoxam)	0	3	1
Other (not noted)	0	2	1
Karate® (lambda cyhalothrin)	0	2	0
Asana® (esfenvalerate)	2	0	0
Furadan® (carbofuran)	0	1	0
Di-Syston® (disulfoton)	0	1	0
Centric® (thiamethoxam)	0	1	0
Dynasty® (clothianidid)	0	0	1
Avicta® (thiamethoxam)	0	0	1
Total	5	55	8

Plant Diseases

While plant diseases were not listed as an issue of high concern by a majority of cotton growers, it should be noted cotton root rot is a significant cotton disease problem throughout the cotton belt. However, more than 75 percent listed diseases as an issue of high or moderate concern combined. Detailed information was not collected on disease problems because of the low likelihood that fungicides would be applied (other than fungicide seed treatments) to cotton in Oklahoma. Nonetheless, development of research and Extension programs addressing plant disease problems in cotton would be valuable to cotton producers, based on this survey.

Summary and Conclusions

The average Oklahoma cotton producer who responded to this survey grew 666 acres of cotton in 2006 and had weed, harvesting (unspecified), fiber quality, soil fertility, and insect concerns. Pigweed, Johnsongrass, and morning glory were the most frequent weed problems encountered. Soil fertility issues included nitrogen and phosphorus deficiency. Insects were of high concern, and thrips were considered the most important insect pest. Cotton diseases were of least concern.

These results suggest cotton producers will benefit from research and Extension programs addressing basic and

specific pest management challenges. While Oklahoma cotton producers are aware of most of the weed problems occurring in cotton, they would continue to benefit from research-based information on effective weed management methods. They also could use information on soil fertility and harvest problems. While Oklahoma cotton producers are less concerned with insect and plant disease management, they would benefit from up-to-date information on management of these pests.

References

- Cronbach, L. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(4), 297-334.
- Dillman, D. A. (2007). Mail and Internet surveys: The tailored design method. (2nd ed.). John Wiley & Sons, Inc.: Hoboken, NJ.
- Lindner, J. R., Murphy, T. H. & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education*, 42(4), 43-53.
- Oklahoma Cooperative Extension Service. "History of Cotton in Oklahoma." (n.d.). Retrieved from May 20, 2007, from http://www.okstate.edu/ag/oces/cotton_ipm/history.htm
- NASS Fact Finders for Agriculture. USDA (Washington, D.C.) 2006 Census of Agriculture State Profile. Retrieved May 18, 2007 from http://www.nass.usda.gov/QuickStats/PullData_US.jsp

The Oklahoma Cooperative Extension Service

Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

The pesticide information presented in this publication was current with federal and state regulations at the time of printing. The user is responsible for determining that the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label directions. The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 0309