



Pest Management Needs Assessment for Oklahoma Corn 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.

Corn represents an important row crop for Oklahoma growers. Field corn is grown predominantly in the Oklahoma Panhandle, north-central and eastern Oklahoma. Acreage devoted to corn production has slightly declined during the past 10 years, averaging 286,000 acres planted, from 1996 to 2000 through 252,000 acres planted from 2001 through 2005. Yields have declined slightly, averaging 140 bushels per acre from 1996 through 2000 and 129 bushels per acre from 2001 through 2005 (NASS, 2006). In 2006, 210,000 acres of corn were harvested (NASS 2008), which produced an average yield of 105 bushels per acre. The top five counties for corn production included Texas, Cimarron, Kay, McCurtain, and Ottawa (NASS, 2006).

A self-administered mailed survey was developed (Dillman, 2007) by T. Franke and K. Kelsey in consultation with Oklahoma Cooperative Extension Service 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 corn producers and use that information to guide Oklahoma State University's research and Extension programs in addressing the most critical needs. The survey asked Oklahoma field corn producers to report information regarding their production management practices in regard to soil fertility, insects, and weeds. The population for the study consisted of 1,250 Oklahoma field corn producers in 2006, while the sample consisted of a randomly stratified sample ($n = 297$). Seventy-four (74) of the 297 surveys were returned (25 percent response rate). The 74 respondents planted 21,758 acres of field corn (average of 294 acres per producer) representing about 8 percent of the total corn 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.

Findings

The issues identified by respondents that were of greatest concern with growing corn are listed in Table 1.

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

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

Issue	High Concern	Moderate Concern	Low Concern	No Concern
Soil fertility	79.1%	20.9%	0.0%	0.0%
Weeds	73.1%	25.4%	1.5%	0.0%
Harvest	55.2%	25.4%	14.9%	4.5%
Insects	47.8%	29.9%	19.4%	3.0%
Diseases	43.1%	36.9%	16.9%	3.1%
Aflatoxin	36.5%	25.4%	31.7%	6.3%

Other concerns with growing field corn mentioned by producers included: feed, water, and fuel prices for irrigation (listed once each).

Soil Fertility

Respondents (79.1 percent) identified soil fertility as the top issue with growing corn. They listed nitrogen deficiency ($f = 46$) followed by phosphorus deficiency ($f = 30$) as the most important fertility problems. (Table 2).

Weeds

A majority of respondents (73.1 percent) identified weeds as an issue of high concern with growing field corn. Johnsongrass ($f = 53$), followed by kochia ($f = 28$) and field bindweed (Table 3). Various herbicides were used to treat weed problems with field corn during 2006. Table 4 notes the herbicides used and the application methods.

Table 2. Soil fertility issues associated with growing corn as identified by Oklahoma survey respondents.

Element	Frequency (f)
Nitrogen	46
Phosphorus	30
Low pH (acid soil)	18
Potassium	17
Zinc	16
Sulfur	13
Salinity	5
Calcium	3

Table 3. Weeds encountered in field corn by Oklahoma survey respondents.

<i>Weed</i>	<i>Frequency (f)</i>
Johnsongrass	53
Kochia	28
Field bindweed	27
Common cocklebur	23
Field sandbur	21
Morning glory	17
Palmer amaranth	17
Common waterhemp	14
Shattercane	11
Yellow nutsedge	7
Pigweed	4
Nutgrass, Crabgrass, Copperleaf, & Other	1

Harvest

Harvest issues were identified as an issue of great concern by more than half of the respondents (55.2 percent). However, respondents were not asked to specify issues associated with harvest. The response shows this issue should be of continued effort for research and Extension educational programs

Insect and Other Arthropods

Less than half of the respondents (47.8 percent) considered insects to be a problem of high concern. Producers noted Southwestern corn borers as the most important insect problem ($f=16$) followed by corn rootworms ($f=13$) (Table 5).

It should be noted transgenic corn produces a natural insecticide to corn borers and is being widely adopted. Insecticides used to treat insect problems and the methods of application are specified in Table 6.

Table 5. Arthropod pests encountered in corn by Oklahoma survey respondents.

<i>Insect</i>	<i>Frequency (f)</i>
Southwestern corn borer	16
Corn rootworms	13
Corn earworm	9
Cutworms	6
Chinch bug	5
Armyworm	3
Wireworm	3
Seed corn maggot	2
Grasshopper	2
Other	2
Western bean cutworm	1

Plant Diseases

Less than half of the respondents (43.1 percent) considered plant diseases to be a problem of high concern. However, more than 60 percent listed plant 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 (other than fungicide seed treatments) would be applied to corn in Oklahoma. However, development of

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

<i>Trade Name (chemical name)</i>	<i>Air</i>	<i>Ground</i>	<i>Other</i>
Roundup® (<i>glyphosate</i>)	1	40	6
Atrazine® (<i>atrazine</i>)	0	11	1
2, 4-D® (<i>2, 4-D</i>)	0	3	1
Expert® (<i>atrazine</i>)	0	2	0
Cinch ATZ® (<i>cynmethylin + atrazine</i>)	0	2	0
Bicep® (<i>atrazine + metolachlor</i>)	0	2	0
Steadfast® (<i>nicosulfuron</i>)	0	2	0
Harness® (<i>acetochlor</i>)	0	2	0
Callisto® (<i>mesotrion</i>)	0	1	1
Brawl II ATZ® (<i>atrazine + s-methoachlor</i>)	0	1	0
Option® (<i>formasulfuron</i>)	0	1	0
Braw®I (<i>s-methoachlor</i>)	0	1	0
Accent® (<i>nicosulfuron</i>)	0	1	0
Dicamba® (<i>dicamba</i>)	0	1	0
Basis gold® (<i>thifensulfuron + rimsulfuron</i>)	0	1	0
Distinct® (<i>sodium salt</i>)	0	1	0
Bicep lite® (<i>atrazine + metolachlor</i>)	0	1	0
Lightning® (<i>imazthapyr</i>)	0	1	0
Dual® (<i>metolachlor</i>)	0	1	0
Banve® (<i>dicamba</i>)	0	1	0
Liberty® (<i>glufosinate-ammonium</i>)	0	0	1
Clarity® (<i>diglycolamine salt</i>)	0	0	1
Total	1	76	11

Table 6. Insecticides used in field corn for insect control by Oklahoma survey respondents.

<i>Trade Name (chemical name)</i>	<i>Air</i>	<i>Ground</i>	<i>Other</i>
Capture® (<i>bifenthrin</i>)	7	1	
Furadan® (<i>carbofuran</i>)	3	1	
Mustang MAX® (<i>zeta cypermethrin</i>)	3	0	1
Warrior/Karate® (<i>lambda cyhalothrin</i>)	2	0	1
Lorsban® (<i>chlorpyrifos</i>)	1	2	
Poncho 250® (<i>clothianidin</i>)	0	1	2
Cruiser® (<i>thiamethoxam</i>)	0	0	3
PennCap-M® (<i>methyl parathion</i>)	1	0	
Methyl parathion® (<i>methyl parathion</i>)	1	0	
Force® (<i>lambda cyhalothrin</i>)	0	1	
Total	18	6	7

research and Extension programs addressing plant disease problems in corn would be valuable to corn producers. It should be noted aflatoxins were identified by respondents as an issue of high or moderate concern combined, which can affect the salability of corn as livestock feed. Thus, development of research and Extension programs addressing plant disease problems in corn would be valuable to corn producers, based on this survey.

Summary and Conclusions

The average Oklahoma field corn producer who responded to this survey grew 294 acres of corn in 2006 and more than half identified soil fertility, weeds, and harvest (unspecified) as issues of high concern. Soil fertility problems consisted of nitrogen and phosphorus. Johnsongrass was the most frequently reported weed problem. Insects and plant diseases were of least concern.

These results suggest corn producers will benefit from research and Extension programs addressing basic and specific pest management challenges. Oklahoma corn producers continue to need information on effective soil fertility,

weed management, and harvest issues. While they 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. 0509 GH.