



Pest Management Needs Assessment for Oklahoma Soybean 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.

Soybeans represent a significant row crop for Oklahoma growers. Soybeans are grown predominantly in north-central and northeastern Oklahoma. Acreage devoted to soybean production has remained steady for 10 years at approximately 300,000 acres planted, while yields have increased from 21.5 bushels per acre from 1996 through 2000 to 25.5 bushels per acre from 2001 through 2005 (NASS, 2006). In 2006, producers harvested 215,000 acres to soybean in Oklahoma, which produced an average yield of 17 bushels per acre. The top five counties for soybean production include Kay, Wagoner, Ottawa, Muskogee, and Sequoyah (NASS, 2008).

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 soybean producers and use that information to guide Oklahoma State University's research and Extension programs in addressing their most critical needs. The survey asked Oklahoma soybean producers to provide information about their production management practices in regard to soil fertility, insects, and weeds. The population for the study consisted of 700 Oklahoma soybean producers in 2006 while the sample consisted of a randomly stratified sample ($n = 248$). Fifty (50) of the 248 surveys were returned (20 percent response rate). The 50 survey respondents planted 16,145 acres of soybeans in 2006 (average of 322 acres per producer), representing 5 percent of the total soybean acres grown. It should be noted 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 soybeans 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 soybean production identified by Oklahoma survey respondents.

Issue	High Concern	Moderate Concern	Low Concern	No Concern
Weeds	76.9%	21.2%	1.9%	0%
Harvest	69.2%	23.1%	5.8%	1.9%
Diseases	52.8%	37.7%	9.4%	0%
Soil fertility	49.1%	39.6%	9.4%	1.9%
Insects	44.2%	30.8%	25%	0%

*Other concerns noted by producers (one each) included water and herbicide resistant weeds.

Weeds

Respondents identified weeds as the top issue with growing soybeans (Table 2). They listed Johnsongrass ($f = 41$) as the most frequent weed problem, followed by pigweed ($f = 36$). Table 3 notes the herbicides used by respondents to treat weed problems in soybeans during 2006.

Table 2. Weeds encountered in soybeans by Oklahoma survey respondents.

Weeds	Frequency (f)
Johnsongrass	41
Pigweed	36
Common cocklebur	26
Morningglory	24
Velvetleaf	18
Yellow nutsedge	10
Hemp sesbania	7
Prickly sida	6
Spurge	4
Texas panicum	3
Other	2
Crabgrass	2
Penn. smartweed	1

Table 3. Herbicides and number of applications used for weed control in soybeans by Oklahoma survey respondents.

Herbicide	Air	Ground	Unspecified
Roundup® or generics (<i>glyphosate</i>)	40	1	0
Classic® (<i>chlorimuron</i>)	8	0	0
Cinch® (<i>cinmethylin</i>)	1	0	0
Glystar plus®	1	0	0
Cobra® (<i>lactofen</i>)	1	0	0
Canopy XL® (<i>chlorimuron+</i> <i>metribuzin</i>)	1	0	0
Dual® (<i>metolachlor</i>)	1	0	0
Assure II® (<i>quizalofop P-ethyl</i>)	1	0	0
Storm® (<i>aciflourine+bentazone</i>)	1	0	0
Synchrony® (<i>chlorimuron +</i> <i>thifensulfuron</i>)	1	0	0
2,4-DB® (<i>2,4-D</i>)	1	0	0
Resource® (<i>flumiclorac</i> <i>pentyl ester</i>)	1	0	0
Prowl® (<i>pendamethalin</i>)	1	0	0
Total	59	1	0

*One respondent noted "Roundup® was used after wheat harvest and beans drilled with no-till drill" by all weeds. One respondent noted he would use ground application because he was close to town. None of the producers applied pre-emergent herbicides.

Harvest

Harvest issues were identified as an issue of great concern by a majority of respondents. However, we did not ask them to specify issues associated with harvest. The response shows this issue should be of continued effort for research and Extension educational programs.

Plant Disease

Soybean diseases were listed as a potential problem in soybeans by growers. However, detailed information was not collected on disease problems because of the low likelihood that fungicides (other than fungicide seed treatments) would be applied to soybeans in Oklahoma. It should be noted soybean rust has been detected in Oklahoma and disease management practices may change in the future. It should also be noted several agrochemical companies that produce fungicides are promoting fungicide use for "plant health," which may increase their use in the future. Thus, development of research and Extension programs addressing plant disease problems in soybean would be valuable to soybean producers, based on this survey.

Soil Fertility

Slightly less than 50 percent of the respondents noted several soil fertility issues related to growing soybeans. The most frequent issue was low pH (acid soil) ($f = 22$), followed by phosphorus deficiency ($f = 16$). Table 4 shows other soil fertility issues identified by respondents while growing soybeans.

Table 4. Soil fertility issues associated with growing soybeans as identified by Oklahoma survey respondents.

Element	Frequency (f)
Low pH (acid soil)	22
Phosphorus	16
Potassium	9
Nitrogen	5
Salinity	2
Sulfur	1

Insect and Other Arthropods

Insects were not perceived to be an issue of high concern by a majority of respondents in 2006. However, more than 70 percent indicated that they were an issue of high or moderate concern combined. Producers indicated grasshoppers were the most important problem ($f = 4$), followed by aphids ($f = 3$) (Table 5). It should be noted the invasive soybean aphid has not been detected in Oklahoma at this time. Insecticides used to treat insect problems and the methods of application are specified in Table 6.

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

Insect	Frequency (f)
Grasshoppers	4
Aphids	3
Stink bugs	2
Corn earworms	2
Other	2
Fall armyworms	1
Bean leaf beetles	1
Three cornered alfalfa hoppers	1
Loopers	1

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

Insecticide	Air	Ground	Unspecified
Warrior® (<i>lambda cyhalothrin</i>)	1	2	0
Sevin® (<i>carbaryl</i>)	0	2	0
Lorsban® (<i>chlorpyrifos</i>)	0	2	0
Proaxis® (<i>gamma cyhalothrin</i>)	0	2	0
Other (not noted)	2	1	0
Asana® (<i>esfenvalerate</i>)	0	1	0
Total	3	10	0

*One respondent noted he had bugs but didn't apply chemicals because crop was condemned due to the drought. None of the producers applied insecticides pre-emergent, which includes preplant, seed treatment, banded, and chemigation.

Summary and Conclusions

The average Oklahoma soybean producer who responded to this survey grew 322 acres of soybeans in 2006 and identified weeds and problems with harvest (unspecified) as their top issues of concern. Johnsongrass was the most frequent weed problem encountered and was most commonly treated with Roundup® herbicide. Soil fertility issues included low pH (acid soil), phosphorous, and potassium deficiency. Soybean diseases were of moderate concern, and insect problems were of least concern.

These results suggest soybean producers will benefit from research and Extension programs addressing basic and specific pest management challenges. While they are aware of most of the weed problems occurring in soybeans, they continue to find research-based evaluation of weed control methods useful. They also continue to benefit from information on soil fertility and harvest problems. While less

concerned with insect and plant disease, producers would benefit from up-to-date information on effective 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.
- 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