



Pest Management Needs Assessment for Oklahoma Canola Producers

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Introduction

Canola production in the United States totaled 1,460,000 planted acres in 2002 while there were 45,519,976 acres of wheat planted in the same year (NASS, 2002). Canola offers several advantages as a rotational crop for winter wheat. Thus, canola has great potential for increased production in Oklahoma because wheat is grown on approximately 6.5 million acres (NASS, 2002).

Canola is an attractive rotational crop for Great Plains wheat producers because it is a broadleaf crop adapted to winter production and may be sold for vegetable oil in the U.S. (Stamm, 2006). A wheat/canola rotation would allow wheat producers an opportunity to control problematic weeds common in continuous wheat production systems. Thus, increased production of canola varieties adapted to Oklahoma would allow wheat producers to not only manage difficult weed problems, but also sell an alternative crop at a premium price.

Faculty at Oklahoma State University (OSU) and Kansas State University are collaborating to develop winter canola varieties adapted for production in the Great Plains. However, producers are encountering unfamiliar pest problems because it is a novelty crop. To profitably produce canola in Oklahoma, producers must become familiar with the crop's associated pests, and OSU and Oklahoma Cooperative Extension Service (OCES) must proactively develop and deliver research-based Integrated Pest Management (IPM) programs to assist Oklahoma producers who plan to grow canola.

Methodology

This study was held to meet OSU's land-grant mission by providing relevant, cutting edge research and Extension support to canola growers. An assessment of producers' critical canola pest management needs was conducted using direct survey methods (Dillman, 2007). A self-administered mailed survey was developed by T. Franke and K. Kelsey in

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consultation with OCES faculty who had expertise in entomology, plant pathology, and plant and soil sciences. The survey asked canola producers to report on their canola production management practices including soil fertility, weeds, diseases, insects, and harvesting.

The sample group who received the survey included all known canola producers and randomly selected wheat producers in Oklahoma who were potential canola growers (N=193). The population of known canola producers was supplemented with an additional 113 randomly selected wheat producers. Of the 193 participants in the sample, 68 surveys were returned for a response rate of 35 percent. Thirty of the 68 surveys received were from the targeted audience (canola producers). The findings are reported from the 30 respondents who reported growing canola between 2002 and 2006.

Findings

The number of respondents who grew canola from 2002 to 2006 ranged from 2 to 27. Canola production acres ranged from 41 to 3,653 acres per producer. The peak number of canola growers and canola acres occurred in 2005.

Ten respondents (33 percent) indicated 11 percent to 25 percent of their total farming acreage was last planted with canola, and two (7 percent) respondents indicated 26 percent to 40 percent of their total farming acreage was last planted with canola.

Respondents indicated they produced canola for a variety of reasons: rotational crop benefits (86 percent); crop diversification (66 percent); soil fertility (13 percent); other reasons (13 percent); and bio-fuels (10 percent). Several respondents indicated they grew canola for weed control, as a source of oil (energy) for feed rations, for assistance to help fields grow newly worked varieties, and as an experiment. When asked if they would produce canola in the future, 26 of the 30 respondents (87 percent) said "yes."

Respondents rotated other crops with canola. Twenty-eight (93 percent) respondents grew wheat and other small grains, 10 (33 percent) grew sorghum, four (13 percent) grew soybeans, four (13 percent) grew alfalfa, two (7 percent) grew sunflowers, two (7 percent) grew other hay, and two (7 percent) grew cotton. Two (7 percent) grew none of the above.

To address the Extension educational needs of producers, various questions were posed to inquire about problems faced with their canola crop. Table 1 lists these problems.

Table 1. Producer identified production-related problems while growing canola.

<i>Production Problem</i>	<i>Frequency (f)</i>
Drought	26
Insects	25
Shattering	24
Low yield	20
Weeds	12
Diseases	2
Lodging	1

Since canola was a novel crop for most producers, they were asked about their level of concern with specific issues while producing canola. Insects were the most frequently cited concern (Table 2).

Table 2. Producer levels of concern with production issues (frequency of concerns are noted).

<i>Issue</i>	<i>High Concern</i>	<i>Moderate Concern</i>	<i>Low Concern</i>	<i>No Concern</i>
Insects	17	9	2	1
Harvest	10	15	2	1
Weeds	8	9	11	0
Soil Fertility	2	10	14	3
Diseases	2	9	15	3

In addition, a few respondents noted getting a stand, even and timely maturity, heavy residue, and soil ventilation as were concerns.

To understand what may influence producers' decisions to grow canola, we asked "how important are the following issues to your canola operation?" Most of the issues addressed in the survey were found to be important with the exception of transportation costs, availability of credit, and availability of government commodities (Table 3).

Table 3. Importance of canola production issues.

<i>Issues</i>	<i>Very Important</i>	<i>Somewhat Important</i>	<i>Not Important</i>
Maximizing yield	93%	7%	0%
Maximizing income	86%	14%	0%
Commodity prices	76%	16%	8%
Minimizing costs	64%	32%	4%
Long-term sustainability	61%	39%	0%
Market delivery	50%	43%	7%
Cost of inputs	47%	47%	7%
Transportation Costs	37%	41%	22%
Availability of credit (interest rate)	23%	23%	54%
Availability of government commodities	14%	39%	46%

*Additional canola production issues added by participants included: rotational issues, harvesting and shattering (noted as somewhat important), and purchasing seed at \$5.00 per pound while selling it for \$0.08 per pound.

Soil Fertility

In regards to soil fertility, respondents noted they experienced the most problems with a lack of nitrogen and sulfur (Table 4).

Table 4. Soil fertility problems encountered by canola growers.

<i>Soil Element</i>	<i>(f)</i>
Nitrogen	14
Sulfur	10
Low pH (acid soil)	9
Phosphorus	5
Zinc	2
Potassium	1

*Comments added by producers relating to soil fertility problems included water and the ground being too dry.

Insects

Aphids were the most common insect problem, followed by cabbageworms and grasshoppers (Table 5). Respondents also indicated which insecticides they used and the method of application (ground and/or air) (Table 6), followed by the number of producers who applied insecticides and years of use (Table 7).

Table 5. Insects encountered by canola producers.

<i>Insect</i>	<i>(f)</i>
Aphids (Cabbage, Turnip, Green peach)	25
Cabbageworms	11
Grasshoppers	9
Loopers (Cabbage/Southern)	5
Cutworms	4
False Chinch Bug	4
Diamondback Moth Larvae	4
Don't know	4
Thrips	3
Flea Beetles	2
Root Maggots	2
Harlequin Bugs	2
Lygus Bugs	1

Table 6. Insecticides used in canola.

<i>Insecticide</i>	<i>Ground</i>	<i>Air</i>	<i>Air & Ground</i>
Warrior® with Zeon	12	7	4
Capture® 2EC	3	2	0
Proaxis®	3	1	0
Methyl Parathion® 4EC	1	2	0

Table 7. Fields treated with insecticide.

<i>Year insecticides applied</i>	<i>(f)</i>
2005 crop	17
2006 crop	10
2004 crop	10
2003 crop	3

Crop Diseases

Crop diseases were not a major problem for canola producers between 2002 and 2006. Crop diseases experienced by producers are listed in Table 8. The only chemical used for crop diseases was the seed treatment Prosper® (Clothia nidin+Thiram+Carboxin+Metalaxyl). Table 9 notes the years and frequency of fungicide application.

Table 8. Crop diseases encountered by canola producers.

<i>Crop Diseases</i>	<i>(f)</i>
Aster Yellows	7
Powdery Mildew	4
Alternaria	1
Seedling Disease Complex	1
Nematodes	1
Downy Mildew	1
Black Rot	1
High Leg	1

Table 9. Fields treated with fungicide.

<i>Year fungicides applied</i>	<i>(f)</i>
2006 crop	3
2005 crop	2
2003 crop	1

Weeds

The panel of experts recommended only two weeds be listed on the survey, Downy Brome and Italian (Marshal) Ryegrass, because not many weeds are known to affect canola in Oklahoma. Respondents reported a variety of weeds they experienced in their canola fields (Table 10) along with herbicides applied and method of application (Table 11). Respondents applied these herbicides to their canola crops in 2003, 2004, 2005, and 2006 by one of two methods (ground or air) (Table 12). Other problems producers experienced are listed in Table 13.

Harvest

Three (10 percent) canola producers identified their methods of harvest as "swathing, then combining" while 29 (97 percent) noted they "combine only."

Comments made by Participants

Participants were invited to "tell anything else about your experience growing canola that would help OSU better serve

Table 10. Weed encountered by canola producers.

<i>Weed</i>	<i>Producers experiencing weed</i>
Downy Brome	13
Italian (Marshal) Ryegrass	8
Mustard	5
Don't know	4
Rye	4
Marestail	4
Cheat	4
Joint grass	3
Wheat	3
Henbit	2
Broadleaves	2
Black rye	1
Buckwheat	1
Cutleaf primrose	1
Flax	1
Kochia	1
Pigweed	1
Other	20

Table 11. Herbicides used in canola.

<i>Herbicide</i>	<i>Ground</i>	<i>Air</i>
Glyphosate®	18	0
RT Master®	4	0
Gramoxone Max®	2	1
Select®	3	1
2, 4-D®	2	0
Assure® II	1	1
Surefire®	0	1

Table 12. Canola fields treated with herbicides.

<i>Years herbicides applied</i>	<i>(f)</i>
2005 crop	17
2004 crop	12
2006 crop	8
2003 crop	6

you." Comments made regarding how OCES could better serve producers' canola production needs included establishing conventional minimum till, harvesting, insecticides, planting depth studies, on-farm storage practices, marketing canola, and continuing field days and tours at experiment stations and producer fields.

One respondent noted, "We are very young to this crop and many of the practices that could be involved." Another producer stated, "There are very few canola producers in my area, so I depend on information coming from OSU. Most of what I have learned about canola production has come from OSU's conferences and field days. The information provided and the opportunity to communicate with the OSU representatives has been very helpful. The *Great Plains Production Handbook* has also been useful. Thanks for your interest, and keep up the good work!"

Table 13. Other problems encountered with producing canola.

<i>Problem (1 each)</i>	
2	Getting a good stand.
1	Getting a stand with no-till, but rain would aid in that.
1	Roundup Ready® seed is expensive.
1	Harvest timing; must stop everything and harvest when it's ready.
1	Short planting window.
1	Lack of crop herbicides.
1	No chemicals labeled for use as a harvest aid.
1	Need more varieties suitable for the South Plains growing area.
1	The stand does not survive under no-till farming.
1	Very poor price for the seed.
1	Water.
1	No-till stacking, no-till residue, consistent stand-drilling.
1	Harvesting.
1	Drought, low yield, harvesting problems (shatter too easily).
2	Too dry.
3	Winter kill.
1	Need to learn how to get a stand.
1	Planting, depth, and harvesting were biggest problems.
1	Drought resistance, shattering.
1	Plant survivability, harvest dry down.
1	Harvest losses
1	Price.

Conclusions and Recommendations

This study was conducted to ascertain the research and extension education needs of Oklahoma canola producers so OCES faculty and staff could develop and deliver high priority Integrated Pest Management (IPM) programs for canola stakeholders. Most of the respondents (93 percent) were wheat growers who indicated canola was a novel crop for them. These producers would benefit from more research-based educational materials (fact sheets, booklets, and websites) and experiences (field days and workshops) hosted by OSU to improve canola production management and marketing.

Drought, the top problem respondents faced while growing canola, should be addressed by providing more educational programs regarding cultural and irrigation practices to preserve and use soil moisture effectively.

Insect management was the second most important problem according to survey results. Producers indicated aphids (cabbage, turnip, green peach) were the most troublesome. Slightly more than half of the respondents applied insecticides to their 2005 crop. Proper methods of insecticide application and/or choice of seeds (whether Roundup Ready® or other) should be discussed with canola producers to help them

eliminate unnecessary costs associated with insecticide application. Educational programs should continue to teach producers proper methods for managing insect pests.

Eighteen (60 percent) of the respondents planted on to 10 percent of their total farming acreage in canola. Problems with soil fertility should be addressed by establishing canola research plots in different areas of the state with different soil types to test nutrient treatments under varying soil conditions and types.

Crop diseases did not appear to be a problem for respondents. However, producers may not be able to identify the presence of canola diseases in their fields due to the novelty of the crop. Workshops demonstrating scouting and assisting with disease identification would be useful to help producers recognize and manage crop diseases.

Weeds that cause problems in canola fields are unfamiliar to most producers because canola is new to Oklahoma. Almost half of the respondents encountered problems with downy brome while a majority (20) of the respondents noted additional weeds were problematic. While producers were aware of some weeds in their fields, the survey findings show herbicide use was fairly limited and peaked in 2005. Therefore, OSU faculty should address producers' weed problems with training in proper herbicide application and herbicide/crop compatibility.

Five participants indicated no-till and shattering were problems, while several respondents mentioned stand establishment was a problem. OSU faculty should address these and other areas noted by producers during future workshops regarding canola production.

Harvesting issues centered on drought and the short time period in which canola must be harvested. One respondent noted, "[canola fields] need to [be] scout[ed] a lot more than wheat, and harvesting issues must be overcome to have a good crop. Shatter[ing] and sucker pods were [an] issue this year." Another producer offered, "when harvesting directly with a combine, some combine loss is to be expected. Just set the combine, check once or twice, and go. You lose way less than it looks. In [sowing] no-till canola into wheat stubble, harrowing the stubble on a dry, hot day will shatter straw and help early canola seedlings off to a better start." Additional tips for harvesting should be addressed due to the reoccurring problems with harvesting noted by respondents throughout the survey.

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