PROJECT DETAILS

- **Title**: Top canola growers' survey
- **Funders:** Agriculture and Agri-Food Canada, Canola Council of Canada, Alberta Canola, SaskCanola and Manitoba Canola Growers
- **Research program:** Growing Forward
- **Principal investigator:** Elwin Smith, Agriculture and Agri-Food Canada (AAFC) Lethbridge
- **Collaborators/additional investigators:** Richard Carew, Danny LeRoy, and Scott Jeffrey
- **Year completed:** 2013

Final report

A survey of canola growers in 2011-2012 was done to determine: canola production practices, how practices impact productivity (efficiency), extension/information needs of canola producers, and regional and farm characteristic that influence canola production. There were 996 surveys obtained from the contractor.

The contractor provided a summary report of the grower responses, question by question. Further analyses of the data included specific requests associated with the Canola Council of Canada (CCC), and analyses of yield and decision making. Summaries of selected survey data were provided to a CCC contractor used in estimating energy balances for canola production for an application to the European Union to allow Canadian canola to be used in biofuel production, and for a life-cycle analysis of canola production in Alberta. Data were provided to a project at the University of Alberta (3.7.2) studying efficiency of canola production. Reports of analyses were provided to the CCC. Some specific findings from the survey were:

- The use of Liberty and Round-up weed systems were about equal across the prairies, but Liberty dominated in Manitoba and Round-up in northern Saskatchewan
- Nitrogen application per unit of yield was similar across the prairies (2.4 lb N/bu. yield)
- Over one-half of the canola in northern Manitoba was in canola two years previous and 11% in canola the previous year; for northern Alberta about one-half was in canola two years previous
- No-till seeding dominates the prairies, except for Manitoba and northern Saskatchewan
- An air-drill with shank openers is the most common seeding implement (60%)
- Most producers use 'experience' as the main criteria to determine fertilizer rate, not soil testing
- Factors that positively contributed to canola yield included: nitrogen, irrigation, calibrating the seeder, swathing when seed colour changed, soil testing for fertilizer requirements, good-excellent moisture, and good-excellent temperatures during flowering

- Factors that reduced canola yield included: growing a specialty oil, seeding late, adverse growing conditions, salinity problem in the field, and being a grower in the Brown soil zone
- Factors common for growers who used recommended practices (soil testing, seeder calibration, conservation tillage, keeping production records) included: higher levels of formal education, larger farm units, experience growing canola, and being a grower in the Black soil zone. Younger farmers were more likely to use seed colour change to determine when to swath.

BACKGROUND:

The Canola Council of Canada has undertaken surveys of canola growers to obtain a measure of agronomic practices. Other surveys have also been done, such as the Albert Canola Production Survey for the 1991 crop (AAFRD 2003). Canola producers use many different practices and technologies, including: seed, seeding and seed bed preparation, pest monitoring and control, fertility, fertilizer application, harvest management and seed storage. Previous surveys have tabulated the techniques and technologies used by producers that attain high yields and identified barriers that exist to attaining highly productive yields.

The benefits of the survey will provide producers and the industry with information on production systems that producers are using which are efficient and profitable, and to identify production or technical barriers that need to be overcome. The barrier identification will provide direction for future research and demonstration that will have the greatest benefit to producers and the industry. Identification of the practices used by the top growers that obtain top yields, versus those with much lower yield, will help to focus extension and information needs for producers. The Canola Council of Canada will be provided with the survey data, reports of survey results, and materials from the survey analysis that can be used to develop producer fact sheets and web based materials for producers and to help set agronomic research priorities. The survey results will also be used as a benchmark for production practices prior to the introduction of the AgriScience initiative. Analyses from the survey data will be published in peer reviewed journals.

A sample of questions to be answered with the survey data include:

1) What are the barriers limiting canola yield improvement?
2) What practices are the top canola growers using to attain high yields?
3) What are the “best” practices for seeding, soil fertility, pest control, harvesting, and storage?
4) What are the most used information sources, and the most informative sources?
5) How technically efficient are canola producers, and what production factors contribute to efficient production?
6) What are the characteristics of a farm and farmers who produce canola in a technically efficient manner?

METHODS:

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The survey builds on previous survey work that was done for the Canola Council of Canada. The first step was, in consultation with the Canola Council of Canada, to determine the information required from the survey. This was then be used to set the survey questions. Some of the same set of questions was from the previous survey, but there was a need to modify them as technologies have changed and some of the objectives of this survey differ from the previous survey. General agronomic areas in the survey were seed, fertility, pest control and harvest. There was also information collected about information sources (included in the previous survey) and some characteristics of the farm and the producer. There was a need to obtain a representative sample of producers from across the three prairie provinces. The sample covers the canola growing regions of the prairies and insures there was no selection bias when selecting the sample. The survey was pre-tested to ensure the question interpretation was correct, the length of time to complete the survey was appropriate, and that there were not questions producers might view as too personal and either not respond to or not complete the survey.

After a competitive bidding process, the survey was contracted to Blacksheep Strategy Inc. to contact producers, collect the required survey data from the set of questions, and provide a summary tabulation of the results. The data will be used to determine significant factors that explain differences in yield, using standard statistical techniques such as analysis of variance. The data will also be used in a project (3.7.2) to evaluate the technical efficiency of canola producers in the survey and relate efficiency to farm characteristics and to production techniques. This analysis will use econometric analyses and possibly data envelopment analysis.

EXPERIMENTAL DESIGN AND DATA ANALYSIS:

The survey design was built on the Canola Council of Canada survey for the 2008 crop production year. The survey was representative of canola producers with coverage in terms of area and types of producers. Data analyses included tabulations and analysis of variance to determine the impacts of practices and production techniques on canola yield and efficiency. Econometric techniques were used to analyze the factors that influence the technical efficiency of production.

DATA COLLECTION:

Data were collected by Blacksheep Strategy Inc. There was close collaboration with Blacksheep Strategy Inc., the Canola Council of Canada and the project team to make sure the information being collected was is the required data.

REFERENCES

Alberta Agriculture, Food and Rural Development. 2003. Alberta Canola Production Survey. Field Crop Development Centre, AGDEX 149/10-1, Edmonton, Alberta.

RESULTS

The Canola Research Hub is funded through the substantial support of the Canadian Agricultural Partnership and the canola industry, including Alberta Canola, SaskCanola, Manitoba Canola Growers and the Canola Council of Canada.

A summary of selected inputs used by producers was developed based on Reconciliation Units (RU) that fallow the provincial zone zones. The RUs 23(Gray) and 24 (Black) are in Manitoba, 28 (Gray), 29 (Black) and 30 (Dark Brown and Brown) in Saskatchewan, and 34 (Gray), 35 (Black) and 37 (Dark Brown and Brown) in Alberta. Discussion of the results is available from the reports listed in the Achievements section of this report.

Table 1.

		Reconciliation Unit							
	Western Canada	R_23	R_24	R_28	R_29	R_30	R_34	R_35	R_37
Conventional	11.9	36.4	26.3	12.5	5.5	2.6	9.1	9.1	10.0
Minimum/Reduced	30.4	54.6	47.5	44.4	23.4	11.4	26.0	31.2	26.7
Direct Seed	17.0	3.6	9.4	20.8	17.2	17.5	26.6	14.3	20.0
No-till/Zero till	40.0	5.5	16.9	20.8	53.7	67.5	37.0	45.5	41.1
Mix (1)	0.6	0.0	0.0	1.4	0.0	0.9	1.3	0.0	2.2

(1) No well-defined tillage system

Table 2.

		Reconciliation Unit							
	Western Canada	R_23	R_24	R_28	R_29	R_30	R_34	R_35	R_37
Yield (bu/ac)	38.4	35.4	32.8	39.0	36.5	35.4	42.8	45.0	46.2
N/Yield (lb/bu)	2.54	3.36	3.47	2.24	2.38	2.40	2.34	2.07	2.09
Seed Rate (lb/ac)	4.9	4.9	4.9	4.9	4.9	4.8	5.0	4.9	5.0
Reseeded (%)	0.5	0.0	0.2	0.0	0.2	0.1	0.0	0.0	0.0
Irrigated (%)	2.7	0.0	0.1	0.0	0.1	0.5	0.0	0.0	2.0

Table 3.

		Reconciliation Unit							
	Western Canada	R_23	R_24	R_28	R_29	R_30	R_34	R_35	R_37
2010	%								
Cereals	63.4	72.7	72.5	44.4	54.4	32.5	82.5	77.9	77.8
Pulses	7.5	0.0	0.6	2.8	8.4	29.8	4.6	9.1	1.1
Canola	3.3	10.9	0.6	4.2	2.9	3.5	7.1	0.0	0.0

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Summer fallow	12.1	5.5	2.5	36.1	17.9	19.3	2.6	7.8	7.8
Other	13.7	10.9	23.8	12.5	16.4	14.9	3.3	5.2	13.3
2009									
Cereals	39.7	23.6	21.3	38.9	39.8	54.4	33.1	48.1	67.8
Pulses	13.1	0.0	3.8	9.7	19.7	23.7	11.7	14.3	7.8
Canola	32.8	58.2	46.3	38.9	29.9	7.9	47.4	28.6	7.8
Summer fallow	1.8	1.8	0.0	2.8	1.8	3.5	1.3	2.6	2.2
Other	12.7	16.4	28.8	9.7	8.8	10.5	6.5	6.5	14.4

Cereals includes wheat, barley, durum wheat and oats; pulses includes peas and lentils; other includes flax, forages, potatoes, canary seed, other crops and unsure.

Table 4.

			Reconciliation Unit							
	Western Canada		RU_23		RU_24		RU_28		RU_29	
	Farms	lb/ac	Farms	lb/ac	Farms	lb/ac	Farms	lb/ac	Farms	lb/ac
Nutrients:										
Average N	913	89.3	50	106.9	148	103.2	69	83.3	248	82.4
Average P_2O_5	819	25.5	41	30.9	132	30.2	60	31.9	217	27.3
Average K	382	12.3	19	16.5	50	14.2	30	13.7	91	7.1
Average S	794	20.4	42	21.3	132	20.9	57	24.0	223	21.6
Total producers	996		55		160		72		274	

(Continued)	Reconciliation Unit							
	RU_30		RU_34		RU_35		RU_37	
	Farms	lb/ac	Farms	lb/ac	Farms	lb/ac	Farms	lb/ac
Nutrients:								
Average N	105	76.9	134	90.3	74	86.7	85	95.5
Average P_2O_5	97	27.0	131	31.2	65	27.9	76	33.0
Average K	37	8.9	79	16.0	43	15.8	33	10.3
Average S	90	14.6	119	20.8	66	21.4	65	17.9

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Total producers	114	154	77	90

N source for western Canada is weighted by application rate. The Count is the number of producers reporting use of that fertilizer type (not all producers applied all the fertilizer types listed). The product is the amount of product (not actual nutrients) reported by those producers who reported use of the fertilizer. Averages are of nutrient amount (N, P_2O_5, K and S) for those applying the nutrient.

Table 5. Alberta: Seeding Date

	RU34	RU35	RU37
	(%)		
Early (April 20 - May 8)	8.4	10.4	34.4
Mid (May 9 - May 21)	79.9	79.2	61.1
Late (May 22 - June 1)	11.7	10.4	4.4
Total	100.0	100.0	100.0

Table 6. Alberta: Last Year of Soil Test and Last Year Canola Grown

	Year of Last Soil Test			Year Canola was Last Grown		
	RU34	RU35	RU37	RU34	RU35	RU37
	(%)			(%)		
2011	10.4	19.5	18.9	0.0	0.0	0.0
2010	31.2	29.9	33.3	5.2	1.3	0.0
2009	12.3	7.8	7.8	48.1	28.6	10.0
2008	9.1	2.6	5.6	24.7	36.4	41.1
2007 or Earlier	9.1	10.4	4.4	15.6	26.0	34.4
Never or Unsure	27.9	29.9	30.0	6.5	7.8	14.4

Table 7. Alberta: Input Usage Trends

	Nitrogen			Phosphate			Potash		
	RU34	RU35	RU37	RU34	RU35	RU37	RU34	RU35	RU37
	(%)								
Increasing	41.2	53.3	54.5	24.8	27.0	27.3	18.4	24.2	16.0
Stable - No Change	54.9	42.7	44.3	73.2	67.6	70.5	72.1	68.2	81.3
Decreasing	3.9	4.0	1.1	2.0	5.4	2.3	9.6	7.6	2.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

	Sulphur	Micronutrients	Herbicides

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	RU34	RU35	RU37	RU34	RU35	RU37	RU34	RU35	RU37
	(%)								
Increasing	27.2	38.4	36.5	18.2	24.5	11.3	15.0	24.3	22.2
Stable No Change	70.7	58.9	63.5	81.8	73.5	87.1	82.9	72.9	76.5
Decreasing	2.0	2.7	0.0	0.0	2.0	1.6	2.1	2.9	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

	Insecticides			Fungicides			Fuel		
	RU34	RU35	RU37	RU34	RU35	RU37	RU34	RU35	RU37
	(%)								
Increasing	17.3	13.7	19.2	20.2	32.1	40.8	10.9	23.9	22.6
Stable - No Change	77.3	70.6	74.0	71.2	58.5	56.3	63.3	56.3	64.3
Decreasing	5.5	15.7	6.8	8.7	9.4	2.8	25.9	19.7	13.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The yield data were used to estimate yield using a regression model. The regression model simultaneously accounts for a multitude of input factors to determine individual impacts. Yield was higher with additional nitrogen, irrigation, no adverse growing conditions, excellent to fair moisture, excellent to fair temperatures at flowering, not growing a specialty oil, determining fertilizer rate by soil test, swathing at the recommend stage of seed colour change, calibrating the seeder, and the planting a Liberty hybrid. Many other factors were considered, but did not have a significant impact on yield.

Table 8. Estimated canola yield (bu/ac).

Variable	Type	Parameter Estimate	Standard Error	t Value
Intercept		16.027	2.117	7.57
Total nitrogen		0.047	0.008	5.54
Rainfall		-0.128	0.057	-2.24
Soil Zone	1= Br./Dk.Br.	-2.459	0.695	-3.54
Irrigation	1= irrigated	10.907	1.900	5.77
Adverse conditions	1= no	2.436	0.632	3.86
Moisture_1	1= good/ex.	11.912	0.912	13.07
Moisture_2	1= fair	8.073	1.055	7.65
Flower temp._1	1= excellent	14.142	1.633	8.66
Flower temp._2	1= good/fair	7.951	1.337	5.95

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Soil limitations	1= salinity	-1.689	0.762	-2.22
Specialty oil	0= specialty oil	2.476	1.034	2.39
Fertilizer rate	1= by cost	-4.350	1.153	-3.77
Fertilizer rate	1= by soil test	2.093	0.711	2.94
Seeding date	1= late	-3.561	0.740	-4.81
Harvest/Swath	1= green seed	-4.995	1.671	-2.99
Harvest/Swath	1= field color	-4.051	1.059	-3.82
Weed technology	1= Liberty Link	3.665	0.654	5.6
Calibrate seeder	1= no	-1.226	0.659	-1.86
R^2		0.460		

The size of farm, formal education level, farm structure, and location were used to estimate the impact these characteristics of the farm and farmer have on making recommended production decisions. Farm size and formal education level were then primary factors that increased the likelihood that growers would use recommended practices.

Table 9. Marginal effects of farm and farmer characteristics on using the optimal decision criteria for five decisions.

Variables	Tillage	Record-Keeping	Fertilizer	Swathing	Fungicide
Farm size	0.021	0.019	0.012		
University Grad	0.120	0.113	0.120		
High School Grad	-0.075		-0.075		
Black Soil Zone	0.069		0.069		0.107
Brown Soil Zones	-0.064		-0.064		-0.075
Univer.+ Black Soil	0.188		0.188		
High Sch. + Brown Soils	-0.133		-0.020		
Young + Univer.				0.118	
Young + High Sch.				0.070	
Old + Univer.				-0.176	
Old + High Sch.				-0.270	
Family Corporation					0.067
Fam. Corp. + Black Soil					0.177
Fam. Corp. + Brown Soil					-0.014

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