Alberta 2003 Specialty Crop Report

Economics & Competitiveness




Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

Acknowledgments

We gratefully acknowledge the participation of producers of specialty crops across the province. Without their cooperation, this report would not have been possible.

As well, the participation of the Survey Services Team of Alberta Agriculture, Food and Rural Development, including Maureen Wenger, Shukun Guan, Guangzhi Liu, and Brenda Kerychuk, who conducted the Alberta 2002 Specialty Crop Survey, is appreciated.

In addition, contributions to this report from Alberta Agriculture, Food and Rural Development staff, including Chuanliang Su, Reynold Jaipaul, Gail Atkinson, Charlie Pearson, Nabi Chaudhary, Dr. Stan Blade, Jackie Teulie, Chunyu Jiao, R. Bok-Vischer, Neil Clarke, K. Ampong-Nyarko, Manjula Bandara, Carina Weisbach, Andrew Fox, Judy Webber, and Elizabeth Russell is very much appreciated.

Contacts

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This report is also available on the Internet at:

http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sdd6834

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Alberta 2002 Specialty Crop Survey

Purpose of Survey:

By Maureen Wenger, Survey Operations Manager

To address some of the data and information needs of the Specialty Crop industry in Alberta, the Statistics and Data Development (SADD) Unit has been conducting an annual Specialty Crop Survey. Now into its twentieth year, the survey attempts to capture data on area (seeded and harvested acres), yield and production, for the various types of specialty crops grown in Alberta.

Data gathered from the survey are used primarily to generate related provincial and sub-provincial estimates by the SADD Unit. In turn, these estimates are used to validate some of the Alberta estimates generated by Statistics Canada, as well as to provide industry and other stakeholders with benchmark statistics for some of the "new" and emerging crops grown in the province.

Methodology

The Alberta Specialty Crop Survey, which is provincial in scope, collects data through a non-probability sampling procedure. In December 2002, survey questionnaires were mailed out to 4,177 specialty crop producers across Alberta. The questionnaires specifically asked survey participants to provide, at their earliest convenience, information on the type of specialty crop grown, area (seeded and harvested acres), yield and production for the year 2002. Survey participants were also made aware that participation in the survey was voluntary. Moreover, all individual responses would be kept confidential under the provisions of the Federal Statistics Act, as well as under the Provincial Freedom of Information and Protection of Privacy (FOIP) Act, by which the SADD Unit is governed and operates. As of March 13, 2003, a total of 1,242 questionnaires were returned. Of this total, 1,086 were usable and formed part of the basis in the generation of the Alberta 2002 specialty crop estimates.

Survey responses received were reviewed for data completeness, validated and entered into an electronic database. The data was then subjected to some computerized analyses, the results of which were rolled up into group summaries, to preserve data confidentiality of individual survey respondents. In turn, the group summaries, in conjunction with consultations with industry, published sources (e.g. Statistics Canada) and Alberta Agriculture, Food and Rural Development (AAFRD) subject area/provincial specialists were used to generate the provincial and sub-provincial (Census Division) estimates, where appropriate.

It cannot be over emphasized that extensive consultation is done with AAFRD's subject area/provincial specialists and industry, in the derivation of the provincial/sub-provincial estimates, especially in instances where specialty crop production tended to be localized/regionalized. For example, mustard and lentils are grown mainly in the Southern Region and eastern areas of the Central Region. Largely due to proximity and familiarity with local conditions, provincial specialists in district/regional offices tend to offer useful information and valuable insights on crop conditions and yields, particularly when attempting to firm up some of the sub-provincial estimates generated from the survey. Likewise, administrative data showing yield and crop area grown under private contracts also tend to add value to some of the estimates.

It should be noted that the derived estimates are subject to error. Some of the possible causes of error include data coding, entry editing and tabulation. Nonetheless, we believe that the statistics published in this report are reliable estimates for Alberta.

Survey Results

By Chuanliang Su

Area, Yield and Production in Alberta

The 2002 crop season will be remembered as one of the worst in Alberta's farming history. Drought conditions and other adverse factors experienced in much of Alberta during the 2002 crop season significantly reduced production of specialty crops.

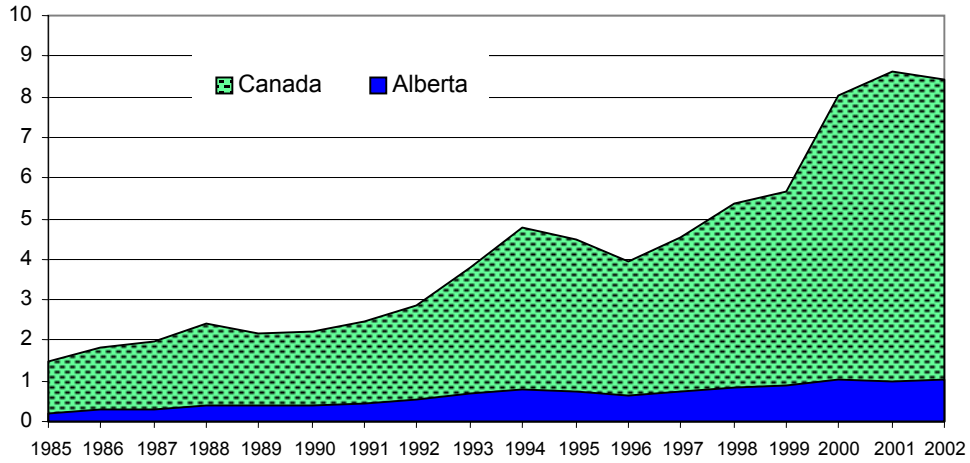
Due to needs for crop rotation and diversification, many Alberta producers continued to grow specialty crops in 2002. Total seeded area of specialty crops in the province in 2002 was estimated at 1.04 million acres - Figure 1 (excluding potatoes and forage seeds). Of this total, about 30 percent or 315,000 acres were not harvested due to damage from drought conditions, insect problems and other adverse factors (e.g., heat in July, early frosts and poor harvesting conditions). The adverse factors also resulted in a reduction in specialty crop yields.

In southern Alberta, however, moisture conditions for dryland crops were more favorable in 2002 than in 2001. As a result, yields of mustard, lentils and chickpeas improved significantly, which are grown primarily in the southeastern parts of Alberta (see Tables 2 and 3).

Crops under irrigation in southern Alberta, including potatoes, sugar beets and dry beans, had below or well below average yields in 2002, due to cool temperatures and excessive moisture from heavy rainfall.

On June 26, 2003, Statistics Canada is expected to release estimates of 2003 seeded area for major crops as well as some specialty crops by province.

Figure 1 Specialty Crop Seeded Area, Alberta and Canada 1985-2002 (million acres)



Source: Statistics Canada and Alberta Agriculture, Food and Rural Development

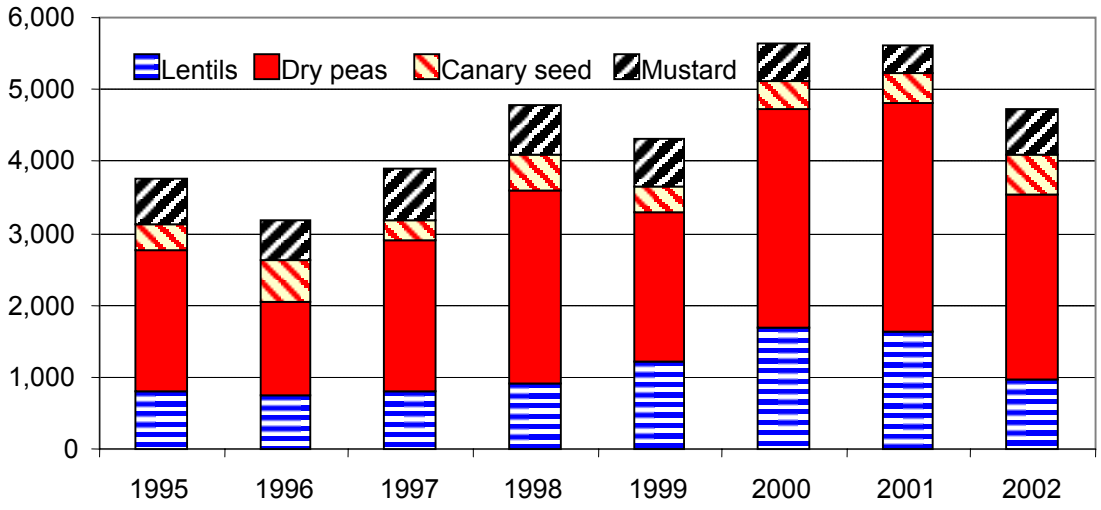
Specialty Crops in Western Canada

According to Statistics Canada's November Production Estimate of 2002 Field Crops and the Alberta 2002 Specialty Crop Survey, about 7.79 million acres were seeded to specialty crops in Western Canada in 2002. This was down about three percent from the seeded area of 8.01 million acres in 2001. Only 6.11 million acres of specialty crops were harvested in 2002. Drought conditions and other adverse factors were the reasons for significant reduction in harvested area and yields in Western Canada.

In 2002, dry peas remained the largest specialty crop in Western Canada. Total seeded area of dry peas was estimated at 3.21 million acres, of which, 2.60 million acres were harvested with a production of 1.78 million tonnes. A total of 0.36 million tonnes of lentils were produced from 0.96 million acres harvested. Total production of chickpeas was estimated at 0.18 million tonnes and harvested area at 0.40 million acres. Mustard production in 2002 was 0.16 million tonnes from a total harvested area of 0.64 million acres. In addition, about 0.16 million tonnes of canary seed were produced from 0.53 million acres harvested.

Saskatchewan remained the largest producer of specialty crops in 2002. Nearly three-quarters of total seeded area of specialty crops in Western Canada are grown in Saskatchewan. Manitoba and Alberta account for about one half each of the remaining area. There is a minimum acreage of specialty crops grown in British Columbia. Harvested area of major specialty crops in Western Canada are shown in Figure 2. Related statistics on seeded area and production of selected specialty crops are presented in Table 5.

Figure 2 - Harvested Area of Specialty Crops
Western Canada ('000 acres)

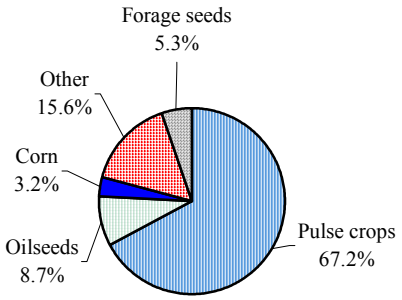


Source: Statistics Canada and Alberta Agriculture, Food and Rural Development

Table 1 Alberta 2002 Specialty Crops

		Seeded Area (acres)	Harvested Area (acres)	Yield (per acre)	Production (tonnes)
Pulse crops	Dry peas, green	235,000	160,000	19.5 bu	84,912
	Dry peas, yellow	400,000	270,000	19.5 bu	143,289
	Dry peas, other	15,000	10,000	22.5 bu	6,123
	Total dry peas	**650,000**	**440,000**	**19.6 bu**	**234,324**
	Chickpeas, desi	5,000	4,500	1,540 lbs	3,143
	Chickpeas, kabuli	50,000	45,500	1,615 lbs	33,331
	Total chickpeas	**55,000**	**50,000**	**1,608 lbs**	**36,474**
	Dry beans	60,000	40,000	20.5 cwt	37,195
	Fababeans	3,000	2,500	1,450 lbs	1,644
	Lentils	15,000	12,000	900 lbs	4,899
Oilseeds	Brown mustard	16,000	13,000	660 lbs	3,892
	Yellow mustard	66,000	59,000	625 lbs	16,726
	Oriental mustard	13,000	8,000	350 lbs	1,270
	Total mustard	**95,000**	**80,000**	**603 lbs**	**21,888**
	Sunflowers	3,500	2,000	1,500 lbs	1,361
	Safflowers	3,000	-	-	-
Corn	Grain corn	2,000	-	-	-
	Silage corn	35,000	30,000	16.00 ton	435,453
Other	Potatoes (1)	62,000	55,800	280 cwt	708,700
	Triticale	80,000	35,000	50.0 bu	44,452
	Canary seed	10,000	7,000	520 lbs	1,651
	Sugar beets (2)	29,670	27,754	15.22 tonne	422,389
Forage seeds (3)	Alfalfa seed	12,709	12,709	265 lbs	1,528
	Alsike clover	2,360	2,360	125 lbs	134
	Brome grass	11,717	11,717	140 lbs	744
	Red fescue	10,845	10,845	360 lbs	1,771
	Timothy	7,220	7,220	160 lbs	524
	Other	16,633	-	-	-

Figure 3 Percentage Distribution of Specialty Crop Seeded Area, Alberta, 2002 (Total area: 1,164,700 acres)



Source:Alberta 2002 Specialty Crop Survey, AAFRD

Except for:

(1) Statistics Canada, Canadian Potato Production by Province, January 2003

(2) Alberta Sugar Beet Growers' Marketing Board

(3) Canadian Seed Growers' Association - Inspected Pedigreed Acres of Grass and Legume Seed; Yield estimates are generated from the Alberta 2002 Specialty Crop Survey, including pedigreed and common seeds

cwt - hundred weight (hundred pounds)
ton = 2000 lbs tonne = 1.1023 tons = 2204.6 lbs
- Not available

Figure 4

Alberta Census Divisions
ID, MD and Counties

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eMapGIS 2000(c) 07/25/2000

Table 2 Alberta 2002 Specialty Crops by Census Division

C.D.	Dry Peas	Mustard	Lentils	Dry Beans	Chickpeas
			Harvested Area (acres)		
1	14,131	12,170	-	16,812	6,950
2	27,325	32,277	5,616	22,309	30,219
3	24,021	7,057	3,187	-	-
4	4,215	11,747	797	-	852
5	89,912	12,949	-	879	11,624
6	26,106	674	-	-	355
7	52,363	3,127	-	-	-
8	18,786	-	-	-	-
9	-	-	-	-	-
10	69,493	-	-	-	-
11	25,790	-	-	-	-
12	8,870	-	-	-	-
13	18,944	-	-	-	-
17	31,418	-	-	-	-
18	3,010	-	-	-	-
19	25,618	-	-	-	-
Alberta	**440,000**	**80,000**	**12,000**	**40,000**	**50,000**
			Yield Per Acre		
	(bushels)	(pounds)	(pounds)	(cwt)	(pounds)
1	26.5	515.0	-	21.0	1,700.0
2	38.8	695.0	1,170.0	20.2	1,600.0
3	34.1	1,085.0	-	-	-
4	9.6	215.0	-	-	-
5	16.6	685.0	-	-	1,450.0
6	27.5	-	-	-	-
7	7.9	-	-	-	-
8	22.6	-	-	-	-
9	-	-	-	-	-
10	9.6	-	-	-	-
11	19.5	-	-	-	-
12	13.0	-	-	-	-
13	23.1	-	-	-	-
17	20.9	-	-	-	-
18	35.2	-	-	-	-
19	30.2	-	-	-	-
Alberta	**19.6**	**603.0**	**900.0**	**20.5**	**1,608.0**
			Production (tonnes)		
1	10,173	2,843	-	16,014	5,359
2	28,834	10,175	2,980	20,441	21,932
3	22,288	3,473	-	-	-
4	1,095	1,146	-	-	-
5	40,662	4,023	-	-	7,645
6	19,541	-	-	-	-
7	11,296	-	-	-	-
8	11,572	-	-	-	-
9	-	-	-	-	-
10	18,062	-	-	-	-
11	13,674	-	-	-	-
12	3,135	-	-	-	-
13	11,915	-	-	-	-
17	17,883	-	-	-	-
18	2,887	-	-	-	-
19	21,040	-	-	-	-
Alberta	**234,324**	**21,888**	**4,899**	**37,195**	**36,474**

Note: Totals may not add up due to rounding or insufficient data for generating estimates for some census divisions.
cwt - hundred weight (hundred pounds) - Not available
Source: Statistics Canada; and Alberta Agriculture, Food and Rural Development (AAFRD)

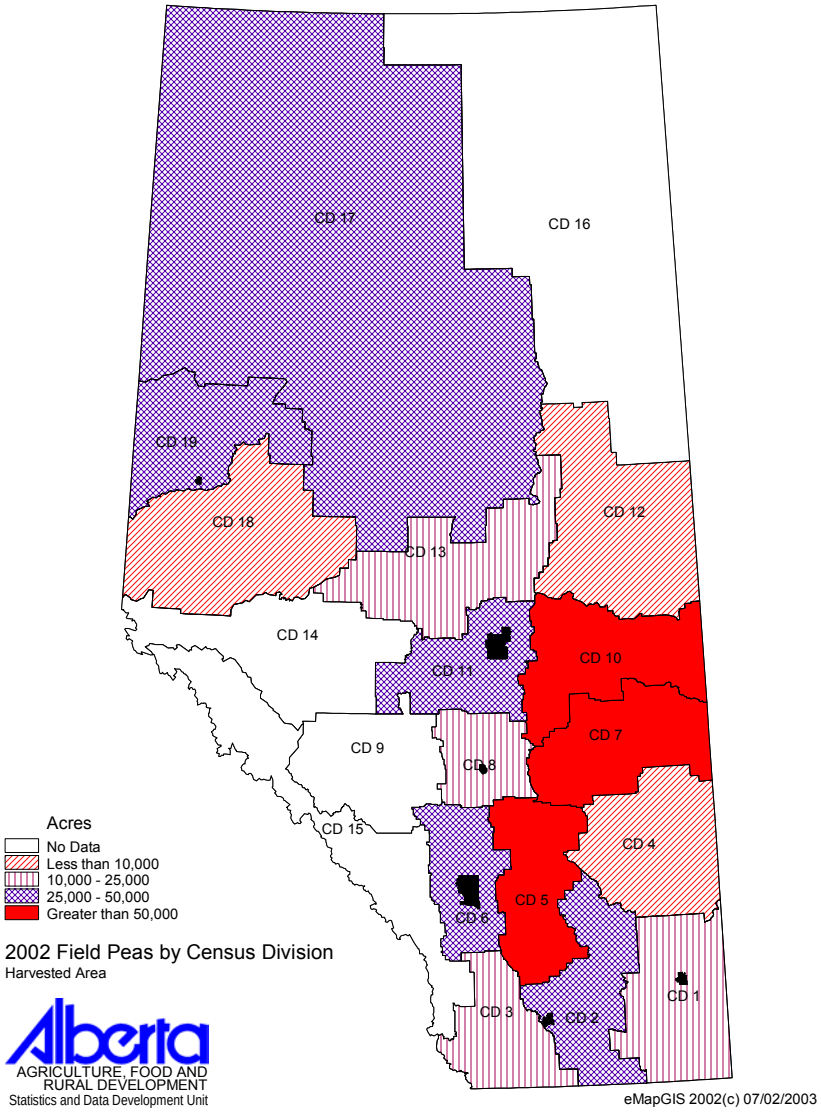
Table 3 Alberta 2001 Specialty Crops by Census Division

C.D.	Dry Peas	Mustard	Lentils	Dry Beans	Chickpeas
	Harvested Area (acres)				
1	18,454	3,980	2,591	24,916	20,134
2	33,631	10,397	5,378	31,129	32,636
3	14,545	2,090	-	-	1,928
4	18,343	19,254	3,831	1,116	12,989
5	89,504	9,780	581	544	15,943
6	21,916	-	-	117	896
7	88,598	-	-	-	474
8	18,576	-	-	-	-
9	-	-	-	-	-
10	129,426	-	370	1,178	-
11	22,755	-	-	-	-
12	9,634	-	-	-	-
13	22,910	-	-	-	-
17	37,637	-	-	-	-
18	1,960	-	-	-	-
19	42,111	-	-	-	-
Alberta	**570,000**	**50,000**	**15,000**	**59,000**	**85,000**
	Yield Per Acre				
	(bushels)	**(pounds)**	**(pounds)**	**(cwt)**	**(pounds)**
1	5.5	250.0	-	22.2	360.0
2	19.0	260.0	-	23.2	552.0
3	18.0	-	-	-	-
4	17.5	310.0	-	-	600.0
5	24.2	640.0	-	-	690.0
6	38.5	-	-	-	-
7	35.5	-	-	-	-
8	51.8	-	-	-	-
9	-	-	-	-	-
10	37.2	-	-	-	-
11	36.5	-	-	-	-
12	37.5	-	-	-	-
13	39.5	-	-	-	-
17	38.5	-	-	-	-
18	-	-	-	-	-
19	41.0	-	-	-	-
Alberta	**32.6**	**373.0**	**722.0**	**22.3**	**533.0**
	Production (tonnes)				
1	2,762	451	-	25,090	3,288
2	17,391	1,226	615	32,758	8,172
3	7,125	-	-	-	-
4	8,736	2,707	-	-	3,535
5	58,948	2,839	-	-	4,990
6	22,963	-	-	-	-
7	85,598	-	-	-	-
8	26,188	-	-	-	-
9	-	-	-	-	-
10	131,032	-	-	-	-
11	22,604	-	-	-	-
12	9,832	-	-	-	-
13	24,629	-	-	-	-
17	39,435	-	-	-	-
18	-	-	-	-	-
19	46,989	-	-	-	-
Alberta	**506,200**	**8,500**	**5,000**	**59,700**	**20,500**

Note: Totals may not add up due to rounding or insufficient data for generating estimates for some census divisions.
cwt - hundred weight (hundred pounds) - Not available
The 2001 census division data were revised based on the 2001 Census of Agriculture data.
Source: Statistics Canada; and Alberta Agriculture, Food and Rural Development (AAFRD)

Dry Peas

Alberta producers seeded a total of 650,000 acres of dry peas in 2002 (see Table 1), of which only 440,000 acres were harvested due to damage from severe drought conditions and insect problems. The average yield of dry peas in 2002 was estimated at 19.6 bushels per acre, compared to the ten-year average of 35.6 bushels per acre. Total production of dry peas was 234,324 tonnes in 2002, 54% below the 2001 level. Poor yield and a significant reduction in harvested area in 2002 were the primary reasons behind the production decline.



Although dry peas are grown across Alberta, higher acreage is concentrated in central and northeastern Alberta, particularly in census divisions 5 (Drumheller area), 7 (Provost area) and 10 (Vermilion area) (see Tables 2 and 3). Severe drought conditions resulted in abnormally poor yields of 7.9 bushels per acre in census division 7 and 9.6 bushels per acre in census divisions 4 and 10. However, more favorable moisture conditions in southern Alberta resulted in much better yields in census divisions 1, 2 and 3 in 2002 compared to 2001.

Dry peas are grown primarily on dryland in Alberta. There were 5,569 acres under irrigation in 2002 (Source: Alberta Irrigation Information 2002, Irrigation Branch, AAFRD).

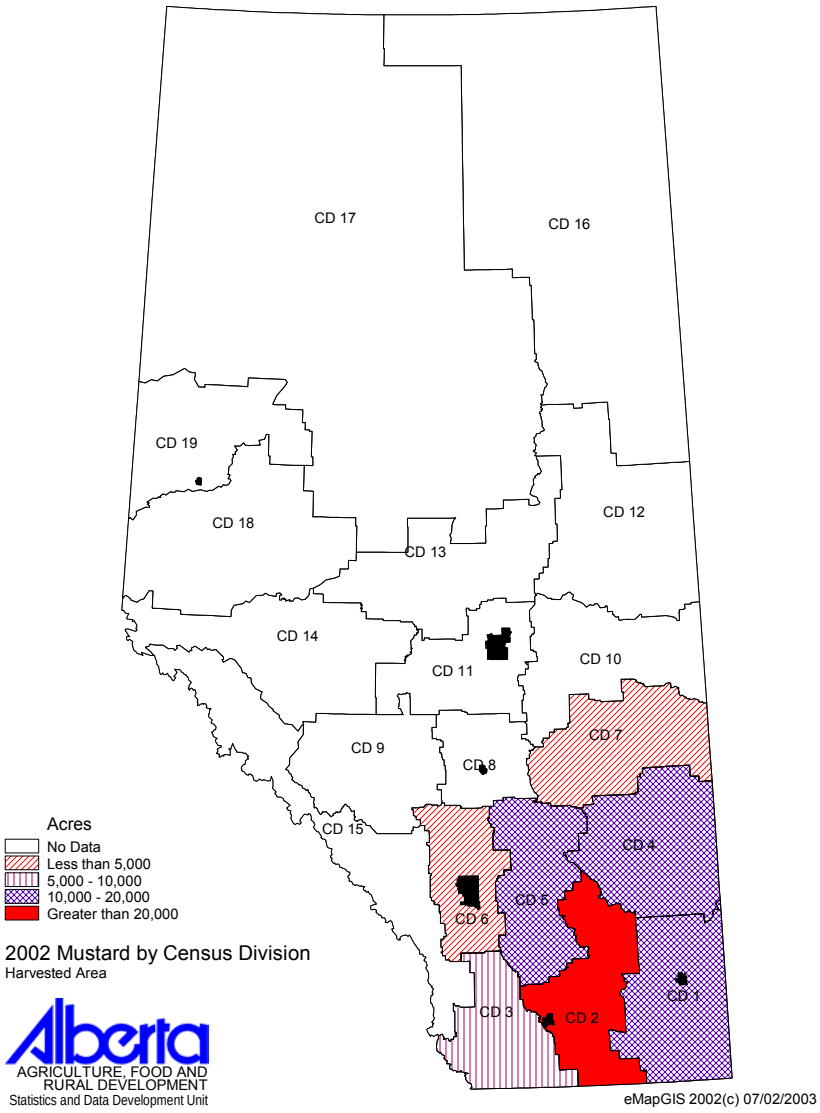
Please note that census division estimates were generated from a small sample, therefore, caution is advised when using this data.

Mustard Seed

Mustard seed is grown on dryland in the southeastern parts of Alberta. In 2002, more favorable moisture conditions in Southern Alberta contributed to higher yields in census divisions 1, 2 and 3 compared to yields in 2001 (see Tables 2 and 3). Census division 4, however, had a poor yield of 215 pounds per acre due to consistent dryness in the area through the 2002 crop season.

Total production of mustard seed was estimated at 21,888 tonnes in 2002, 33% below the ten-year average, but 158% higher than the 2001 level (see Table 5). Alberta producers seeded a total of 95,000 acres of mustard seed in 2002, of which, 80,000 acres were harvested with an average yield of 603 pounds per acre. Mustard yield in Alberta was 373 pounds per acre in 2001 compared with 819 pounds per acre for the ten-year average.

Yellow mustard continued to dominate, accounting for 74% of the provincial total harvested acreage in 2002. Brown and oriental mustard represented the remaining 16% and 10% of the harvested area, respectively.



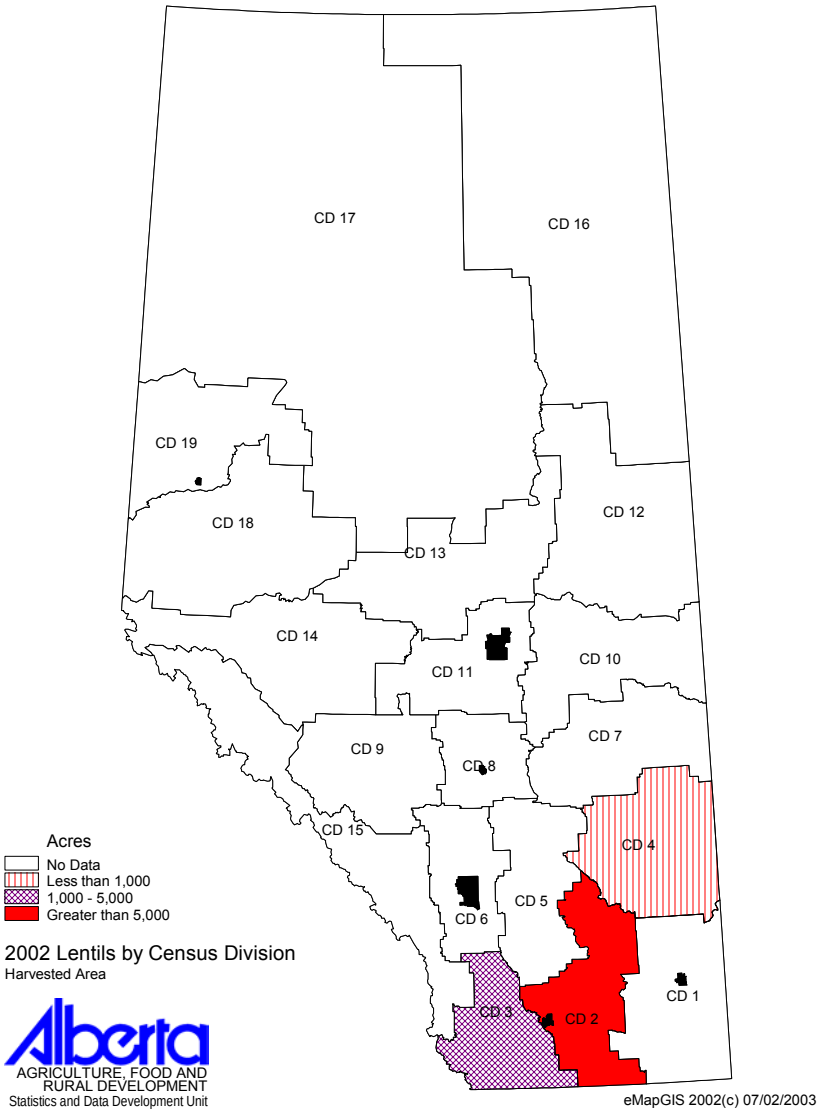
Canada is one of the largest mustard seed producers in the world and provides about three-quarters of the total world mustard seed exports.

Lentils

Total 2002 production of lentils in Alberta was estimated at 4,899 tonnes, relatively unchanged from 2001. Total area seeded to lentils was estimated at 15,000 acres in 2002, of which, 12,000 acres were harvested, with an average yield of 900 pounds per acre. This is compared to a total harvested area of 15,000 acres and a lower average yield of 722 pounds per acre in 2001.

The higher lentil yield in 2002 was the result of improved moisture conditions in Southern Alberta. Lentils are grown mostly on dryland in the southeastern parts of Alberta (Tables 2 and 3).

There is limited lentil acreage under irrigation in the province.

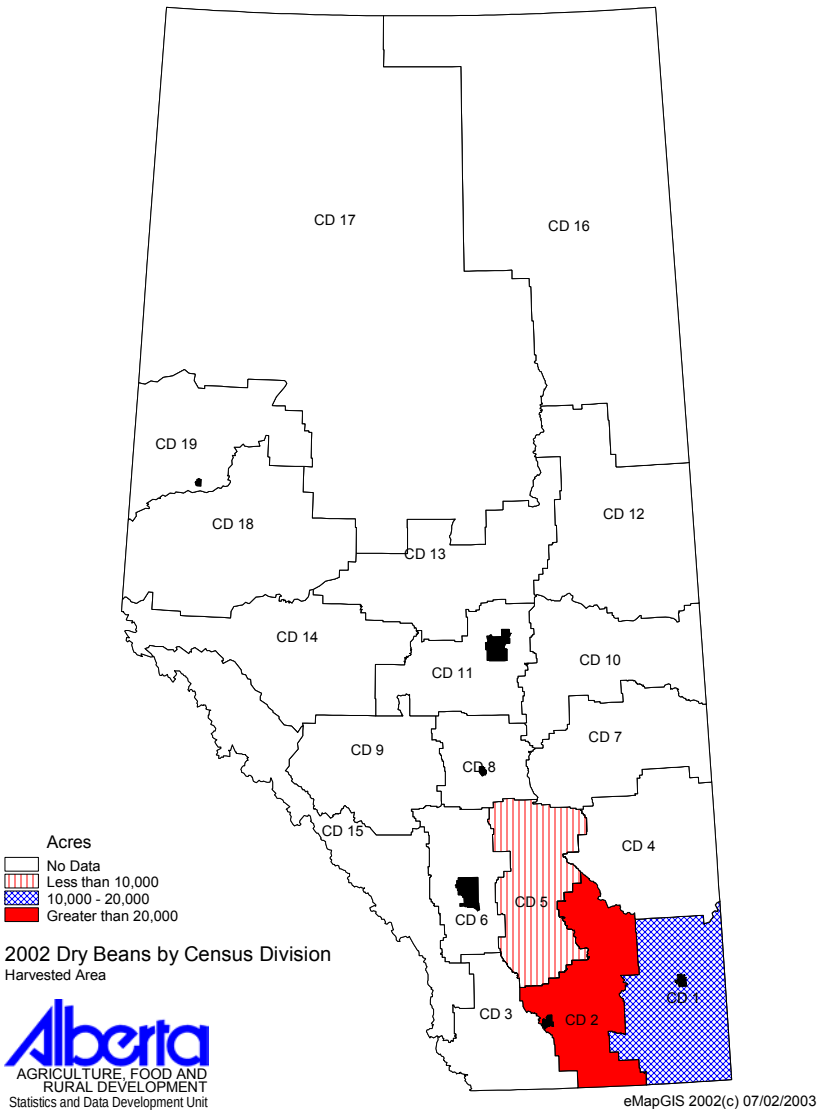


Dry Beans

Alberta total production of dry beans in 2002 was estimated at 37,195 tones, down 38% from 59,700 tonnes in 2001. The much lower 2002 production was attributed mainly to a smaller harvested area and lower yields. Total area seeded to dry beans was 60,000 acres in 2002, of which, only 40,000 acres were harvested with an average yield of 20,500 pounds per acre (see Table 1).

Dry beans are grown mostly under irrigation in Southern Alberta. Census divisions 1 and 2 jointly accounted for almost all of the dry bean area in 2002 (see Table 2). A total of 50,589 acres of dry beans were irrigated in 2002, representing 84% of total dry bean acreage in Alberta (Source: Alberta Irrigation Information 2002, Irrigation Branch, AAFRD).

Please note, dry beans are grown under contract in Alberta.



Chickpeas

In 2002, total area seeded to chickpeas in Alberta was estimated at 55,000 acres, down significantly from 100,000 acres in 2001. However, total chickpea production in 2002 was much higher than in 2001, as higher yields more than offset the lower harvested area. A total 36,474 tonnes of chickpeas were produced from 50,000 acres harvested with an average yield of 1,608 pounds per acre in 2002 (see Table 1).

Chickpeas are grown in the southeastern parts of Alberta. Census divisions 1, 2 and 5 accounted for over 95% of total harvested area in 2002 (see Table 2).

A total 1,499 acres of chickpeas were irrigated in 2002 (Source: Alberta Irrigation Information 2002, Irrigation Branch, AAFRD).

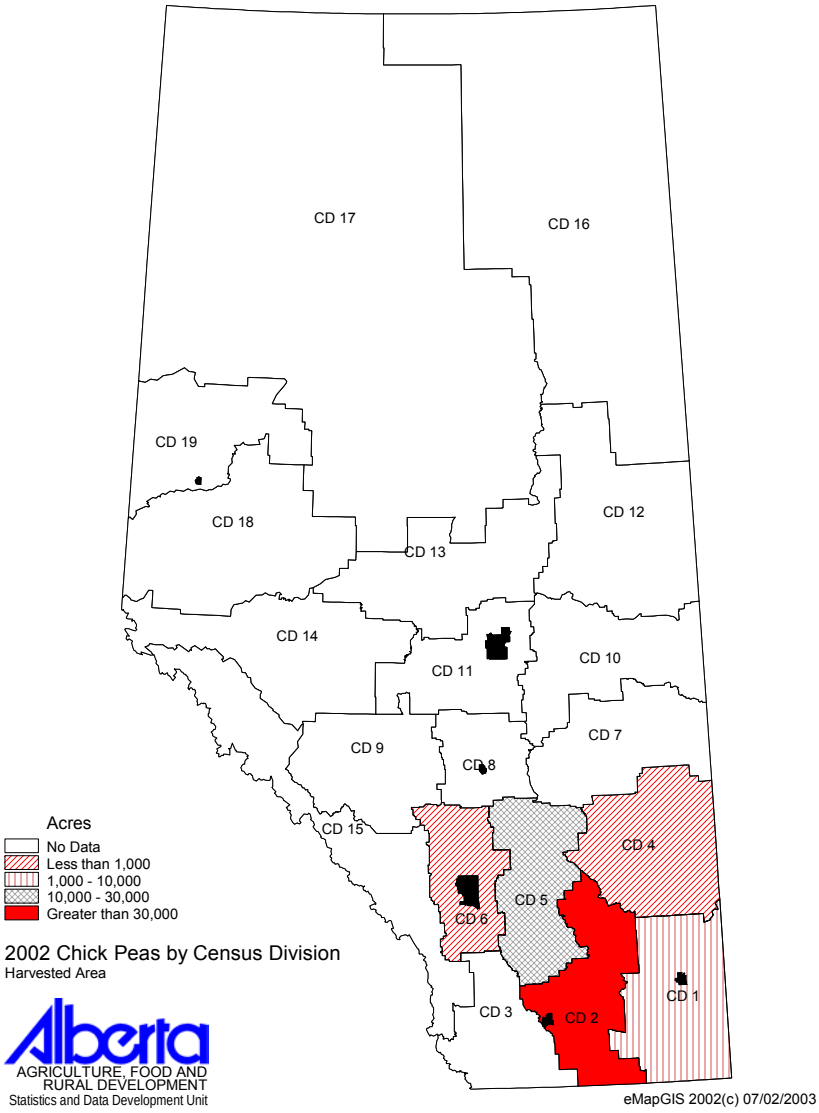


Table 4 Alberta Specialty Crops Historical Series

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002 *
Alfalfa Seed (1)											
Inspected area	(acres)	13,369	13,116	12,851	10,355	10,376	12,069	16,461	17,117	15,381	12,709
Yield	(lbs/acre)	83	340	265	265	300	425	200	525	385	265
Production	(tonnes)	503	2,023	1,545	1,245	1,412	2,327	1,493	4,076	2,686	1,528
Buckwheat											
Harvested area	(acres)	400	500	850	850	400	400	400	-	-	-
Yield	(bu/acre)	-	-	-	-	-	-	-	-	-	-
Production	(tonnes)	-	-	-	-	-	-	-	-	-	-
Canary Seed											
Harvested area	(acres)	-	-	10,000	25,000	10,000	20,000	10,000	10,000	4,000	7,000
Yield	(lbs/acre)	-	-	990	960	810	950	1,400	1,100	775	520
Production	(tonnes)	-	-	4,500	10,900	3,700	8,600	6,400	5,000	1,400	1,651
Corn for Grain											
Harvested area	(acres)	5,000	5,000	5,000	2,600	4,000	5,000	10,000	10,000	3,000	-
Yield	(bu/acre)	100.0	100.0	100.0	96.2	100.0	90.0	80.0	110.0	86.7	-
Production	(tonnes)	12,700	12,700	12,700	6,400	10,200	11,400	20,300	27,900	6,600	-
Corn Silage											
Harvested area	(acres)	10,000	10,000	10,000	10,000	15,000	15,000	15,000	30,000	30,000	30,000
Yield	(tons/acre)	13.0	20.0	16.0	19.5	12.0	20.0	13.3	17.0	16.0	16.0
Production	(tonnes)	117,900	181,400	145,100	176,900	163,300	272,200	181,400	462,700	435,400	435,453
Fababeans											
Harvested area	(acres)	1,000	-	-	200	1,000	2,000	-	-	3,000	2,500
Yield	(lbs/acre)	1,650	-	-	1,300	2,000	2,500	-	-	1,700	1,450
Production	(tonnes)	700	-	-	120	900	2,300	-	-	2,300	1,644
Dry Beans											
Harvested area	(acres)	30,000	25,000	30,000	25,000	35,000	45,000	47,000	45,000	59,000	40,000
Yield	(cwt/acre)	15.0	32.0	20.0	18.0	22.9	22.2	20.0	21.3	22.3	20.5
Production	(tonnes)	20,400	36,300	27,200	20,400	36,300	45,400	42,700	43,500	59,700	37,195
Dry Field Peas											
Harvested area	(acres)	280,000	390,000	445,000	280,000	385,000	500,000	455,000	640,000	570,000	440,000
Yield	(bu/acre)	39.3	35.3	34.0	40.4	40.3	35.9	42.9	35.6	32.6	19.6
Production	(tonnes)	299,400	374,200	412,300	307,500	421,800	488,000	530,800	620,500	506,200	234,324
Lentils											
Harvested area	(acres)	30,000	40,000	38,000	20,000	25,000	15,000	22,000	32,000	15,000	12,000
Yield	(lbs/acre)	690	1,075	1,250	845	732	1,180	1,245	684	722	900
Production	(tonnes)	9,400	19,500	21,500	7,700	8,300	8,000	12,400	9,900	5,000	4,899
Mustard Seed											
Harvested area	(acres)	60,000	90,000	100,000	85,000	145,000	110,000	90,000	50,000	50,000	80,000
Yield	(lbs/acre)	1,180	889	1,125	753	769	795	1,100	606	373	603
Production	(tonnes)	32,100	36,300	51,100	29,000	50,600	39,700	44,800	13,800	8,500	21,888
Safflower											
Harvested area	(acres)	2,000	2,000	2,000	800	-	12,000	5,000	3,000	1,000	-
Yield	(lbs/acre)	240	500	870	760	-	1,020	900	625	750	-
Production	(tonnes)	500	1,100	2,000	700	-	1,400	2,000	900	300	-

Source: Statistics Canada; and Alberta Agriculture, Food and Rural Development (AAFRD) - Not available

(1) Inspected pedigreed acres are from Canadian Seed Growers' Association; yield and production data are from the Alberta Specialty Crop Survey

Note: * Data shown in 2002 are from Alberta 2002 Specialty Crop Survey, AAFRD.

Table 4 Alberta Specialty Crops Historical Series (Cont'd)

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002 *
Sugar Beets (2)											
Harvested area	(acres)	32,432	34,836	33,656	33,463	33,124	41,132	44,522	42,017	28,457	27,754
Yield	(tonnes/acre)	16.72	21.17	20.46	20.22	19.64	23.32	18.86	21.90	18.38	15.22
Production	(tonnes)	542,253	737,774	688,498	676,611	650,423	959,310	839,773	920,252	523,110	422,389
Sunflowers											
Harvested area	(acres)	5,000	5,000	5,000	2,000	5,000	5,000	5,000	5,000	5,000	2,000
Yield	(lbs/acre)	1,000	2,000	1,900	1,675	1,400	1,900	1,600	2,240	1,250	1,500
Production	(tonnes)	2,300	4,500	4,300	1,500	3,200	4,300	3,600	5,100	2,800	1,361
Triticale											
Harvested area	(acres)	15,000	10,000	10,000	15,000	15,000	50,000	60,000	50,000	20,000	35,000
Yield	(bu/acre)	40.0	40.0	50.0	33.3	36.7	38.0	53.3	41.0	37.0	50.0
Production	(tonnes)	15,200	10,200	12,700	12,700	14,000	48,300	81,300	52,100	18,800	44,452
Potatoes											
Harvested area	(acres)	27,700	29,000	29,500	31,000	30,500	32,200	42,300	47,700	57,300	55,800
Yield	(cwt/acre)	269.0	277.8	297.7	268.0	290.0	295.0	290.0	310.0	315.0	280.0
Production	(tonnes)	338,000	365,500	398,400	376,900	401,200	430,900	556,400	670,700	818,700	708,700

Source: Statistics Canada; and Alberta Agriculture, Food and Rural Development (AAFRD) - Not available

(2) Alberta Sugar Beet Growers 2002, 78th Annual Report

Note: * Data shown in 2002 are from Alberta 2002 Specialty Crop Survey, AAFRD.

Table 5 Western Canada Specialty Crops Area and Production

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Mustard Seed					**Seeded Area '000 acres**						
Alberta	45.0	60.0	90.0	100.0	90.0	145.0	110.0	100.0	50.0	60.0	95.0
Saskatchewan	240.0	400.0	700.0	550.0	490.0	560.0	580.0	585.0	465.0	330.0	600.0
Manitoba	10.0	10.0	10.0	10.0	11.0	17.0	10.0	7.0	10.0	20.0	30.0
Western Canada	295.0	470.0	800.0	660.0	591.0	722.0	700.0	692.0	525.0	410.0	725.0
					Production '000 tonnes						
Alberta	20.1	32.1	36.3	51.1	29.0	50.6	39.7	44.8	13.8	8.5	21.9
Saskatchewan	109.7	180.0	278.9	190.6	196.9	186.5	195.5	259.7	185.1	91.2	125.2
Manitoba	3.5	3.8	4.1	2.6	4.9	6.3	3.4	1.9	3.3	5.1	10.0
Western Canada	133.3	215.9	319.3	244.3	230.8	243.4	238.6	306.4	202.2	104.8	157.1
Sunflowers					**Seeded Area '000 acres**						
Alberta	4.0	5.0	5.0	5.0	2.0	5.0	5.0	5.0	5.0	5.0	3.5
Saskatchewan	20.0	80.0	60.0	40.0	25.0	35.0	40.0	65.0	25.0	20.0	30.0
Manitoba	160.0	125.0	140.0	75.0	63.0	85.0	125.0	140.0	155.0	155.0	210.0
Western Canada	184.0	210.0	205.0	120.0	90.0	125.0	170.0	210.0	185.0	180.0	243.5
					Production '000 tonnes						
Alberta	1.1	2.3	4.5	4.3	1.5	3.2	4.3	3.6	5.1	2.8	1.4
Saskatchewan	8.4	29.0	25.9	18.4	15.7	14.3	21.3	35.4	12.4	8.1	17.2
Manitoba	55.3	47.2	86.6	43.5	37.7	47.6	86.2	82.9	101.8	92.9	136.1
Western Canada	64.8	78.5	117.0	66.2	54.9	65.1	111.8	121.9	119.3	103.8	154.7
Lentils					**Seeded Area '000 acres**						
Alberta	50.0	40.0	40.0	40.0	20.0	25.0	20.0	25.0	32.0	20.0	15.0
Saskatchewan	475.0	750.0	830.0	735.0	690.0	780.0	900.0	1,210.0	1,660.0	1,720.0	1,470.0
Manitoba	165.0	130.0	115.0	50.0	40.0	8.0	15.0	16.0	35.0	10.0	0.0
Western Canada	690.0	920.0	985.0	825.0	750.0	813.0	935.0	1,251.0	1,727.0	1,750.0	1,485.0
					Production '000 tonnes						
Alberta	15.6	9.4	19.5	21.5	7.7	8.3	8.0	12.4	9.9	5.0	4.9
Saskatchewan	254.0	315.2	381.0	381.9	373.8	365.2	465.9	702.6	888.1	557.9	351.9
Manitoba	79.4	24.1	49.9	28.5	21.0	5.3	5.9	8.8	16.1	3.4	0.0
Western Canada	349.0	348.7	450.4	431.9	402.5	378.8	479.8	723.8	914.1	566.3	356.8
Dry Field Peas					**Seeded Area '000 acres**						
Alberta	200.0	300.0	400.0	465.0	290.0	385.0	510.0	470.0	660.0	610.0	650.0
Saskatchewan	350.0	750.0	1,110.0	1,350.0	900.0	1,500.0	1,900.0	1,520.0	2,240.0	2,550.0	2,350.0
Manitoba	125.0	200.0	210.0	180.0	145.0	205.0	260.0	105.0	155.0	150.0	200.0
Western Canada	675.0	1,250.0	1,720.0	2,025.0	1,345.0	2,097.0	2,680.0	2,104.0	3,065.0	3,320.0	3,205.0
					Production '000 tonnes						
Alberta	151.0	299.4	374.2	412.3	307.5	421.8	488.0	530.8	620.5	506.2	234.3
Saskatchewan	244.9	585.1	898.1	868.2	729.4	1,158.1	1,613.8	1,623.4	2,072.4	1,366.2	963.5
Manitoba	108.9	85.7	168.7	147.0	132.0	178.3	225.9	92.0	160.5	146.1	176.9
Western Canada	504.8	970.2	1,441.0	1,454.7	1,173.0	1,762.3	2,336.8	2,251.9	2,864.3	2,023.0	1,378.2
Canary Seed					**Seeded Area '000 acres**						
Alberta	-	-	-	10.0	25.0	10.0	20.0	15.0	10.0	5.0	10.0
Saskatchewan	215.0	300.0	480.0	330.0	520.0	250.0	450.0	340.0	360.0	360.0	600.0
Manitoba	18.0	12.0	25.0	25.0	70.0	20.0	50.0	15.0	40.0	55.0	70.0
Western Canada	233.0	312.0	505.0	365.0	615.0	280.0	520.0	370.0	410.0	420.0	680.0
					Production '000 tonnes						
Alberta	-	-	-	4.5	10.9	3.7	8.6	6.4	5.0	1.4	1.7
Saskatchewan	116.8	124.7	226.8	137.9	240.0	102.1	201.8	152.0	148.6	101.2	137.9
Manitoba	7.3	3.1	13.6	12.2	33.7	9.2	24.9	7.6	17.2	11.3	23.6
Western Canada	124.1	127.8	240.4	154.6	284.6	115.0	235.3	166.0	170.8	113.9	163.2

Source: Statistics Canada; Saskatchewan Agriculture and Food; and Alberta Agriculture, Food and Rural Development (AAFRD)

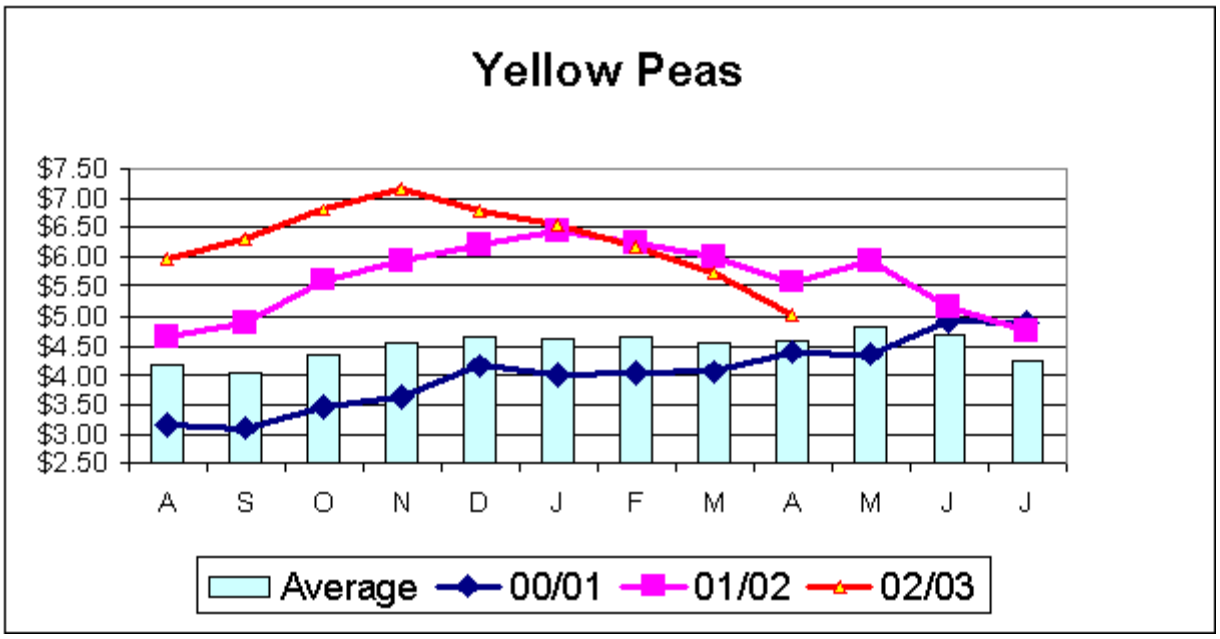
* Data shown in 2002 for Alberta are from Alberta 2002 Specialty Crop Survey, AAFRD - Not available

MARKET OUTLOOK FOR SELECTED SPECIALTY CROPS

By Charlie Pearson

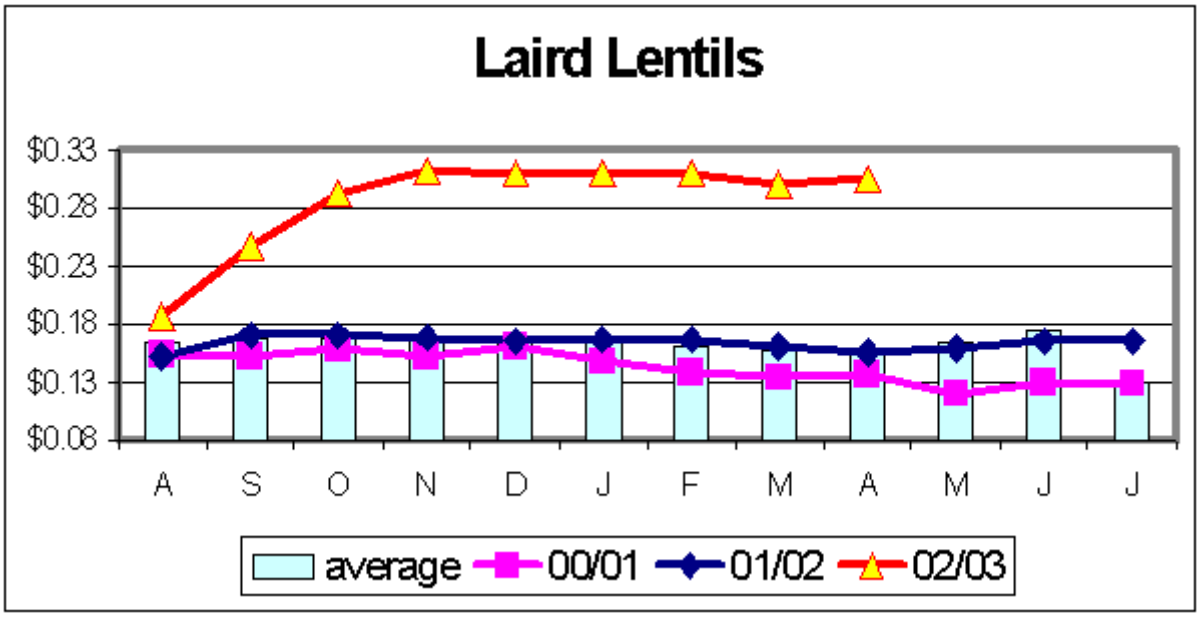
Dry Field Pea Markets

Edible pea prices (both greens and yellows) have remained above levels of both the past two years and five year average values. A combination of the smaller Canadian field pea crop and good demand out of India this past fall/early winter have all been factors that have served to keep human consumption pea prices in the $6.00 to $7.00/bu range for yellow peas and $8.00 to $9.00/bu for green peas over the early winter. Prices for both have slipped by over $1.00/bu into early spring with further weakness likely.



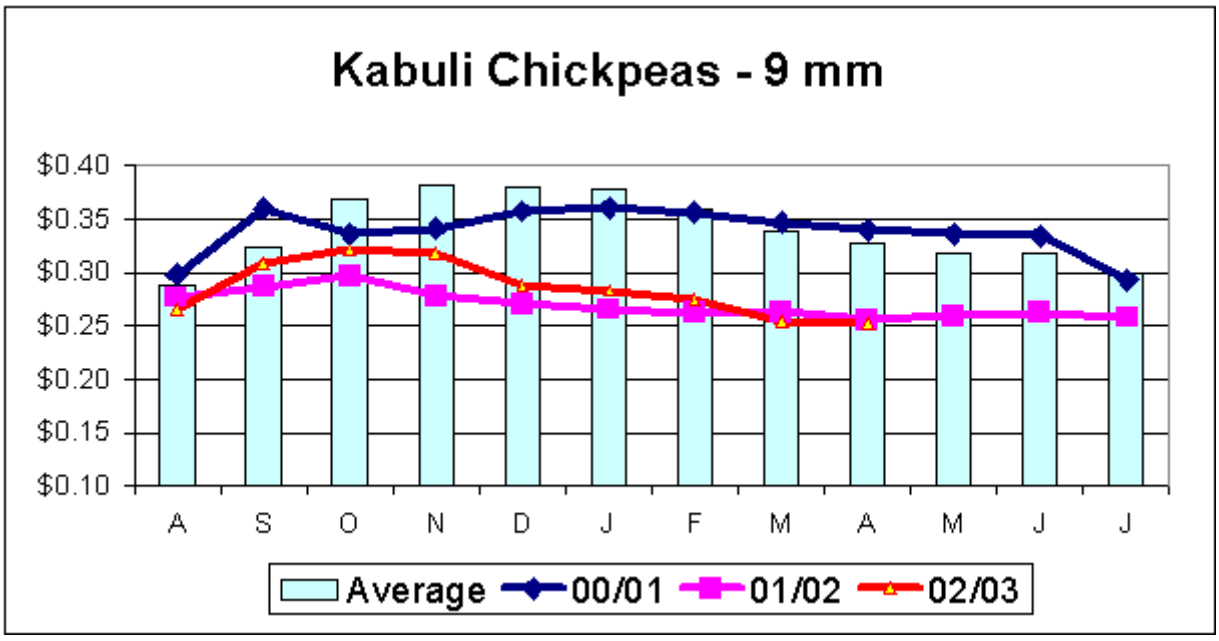
Lentil Markets

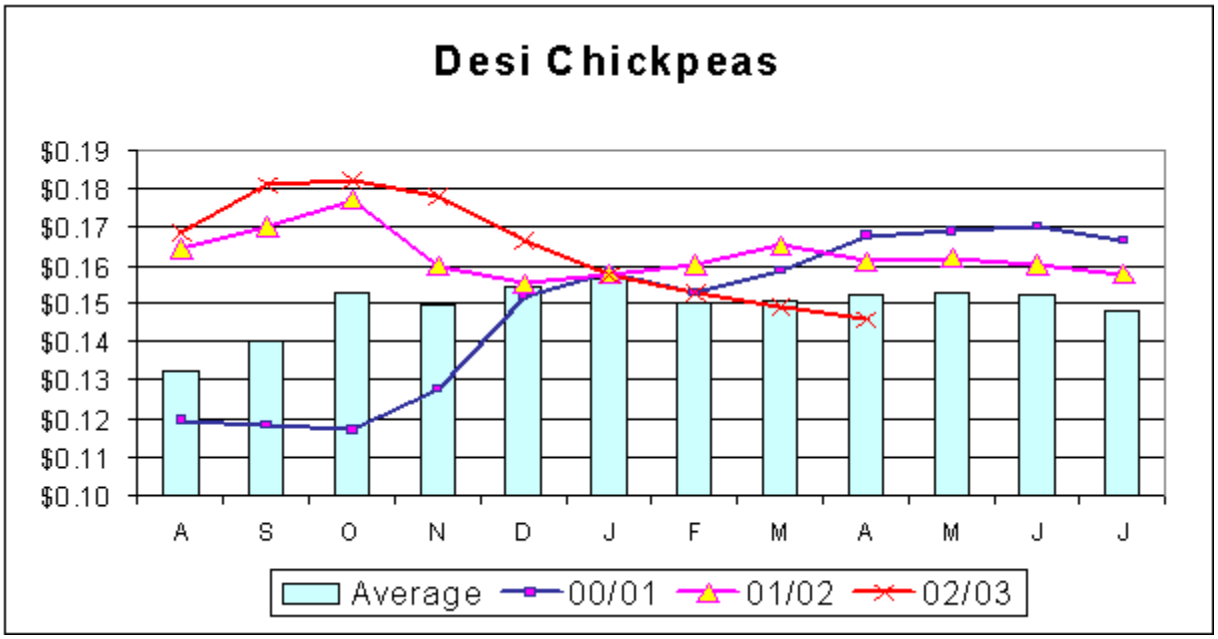
Smaller Canadian and world lentil production has pushed prices higher with a range of 30 to 32 cents/lb for lairds. Canadian lentil production dropped to 354,000 t (5 year average production 600,000 t) reflecting both a drop in acreage and the impact of drought on yields. The quality of this past year's crop was also poorer than normal as a result of the difficult harvest.



Chickpea Markets

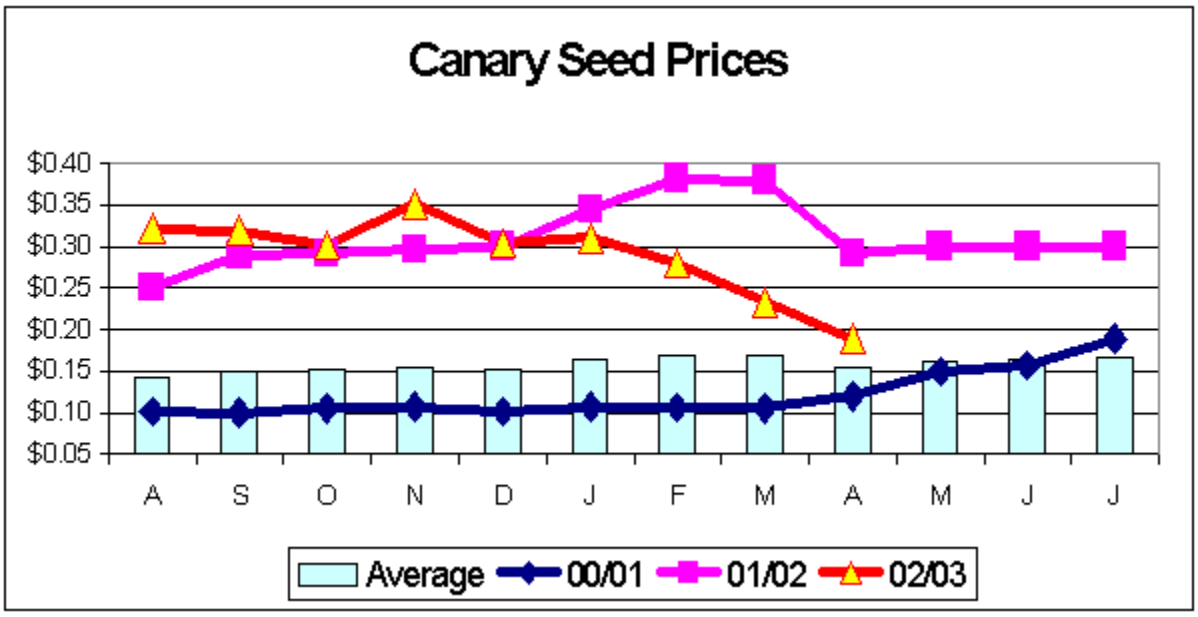
World chickpea production has returned to more normal levels after the previous year's smaller crop. Chickpea production in India, the world's major chickpea producing country, is in the process of harvesting a larger chickpea crop after last year's drought reduced one. Canadian chickpea production in 2002 is estimated to be 156,500 t, down from the record 455,000 t produced in 2002. A combination of drought and disease pressure reduced both the yield and quality of this past years crop. Chickpea prices for premium quality kabuli chickpeas have ranged from 26 to 28 cents/lb for 9 mm size, 20 to 23 cents/lb for 8 mm and 15 to 18 cents/lb for 7 mm. Desi chickpeas have stayed in the 15 to 18 cents/lb area.


Kabuli Chickpeas - 9 mm
$0.40
$0.35
$0.30
$0.25
$0.20
$0.15
$0.10
A
S
O
N
D
J
F
M
A
M
J
J
Average
00/01
01/02
02/03


Desi Chickpeas
$0.19
$0.18
$0.17
$0.16
$0.15
$0.14
$0.13
$0.12
$0.11
$0.10
A
S
O
N
D
J
F
M
A
M
J
J
Average
00/01
01/02
02/03

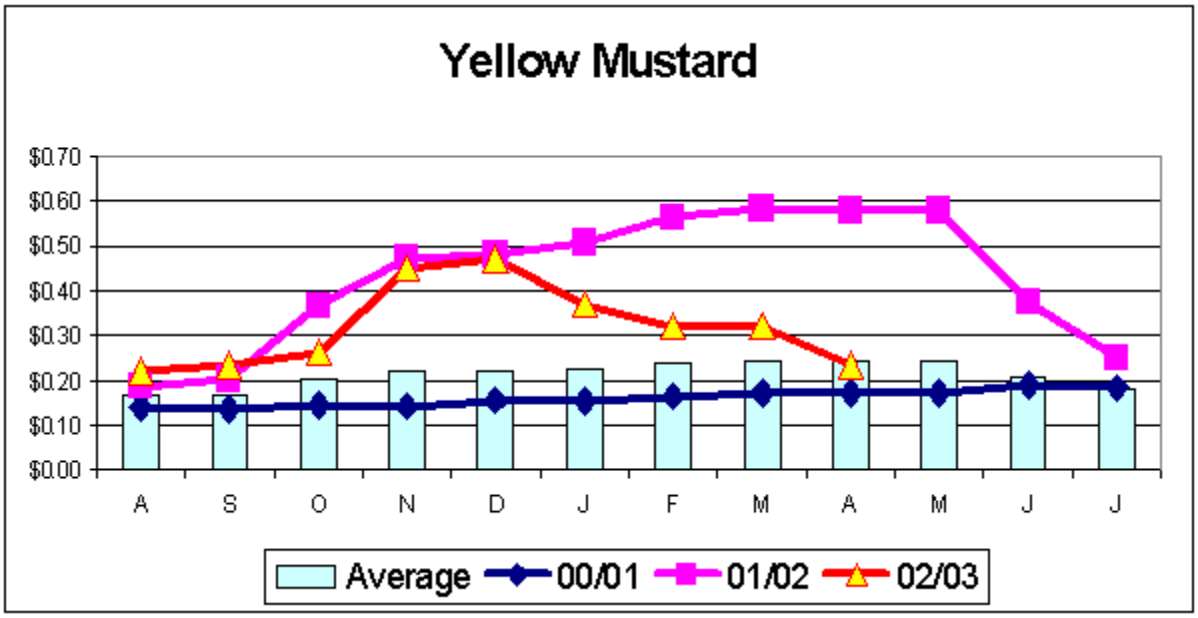
CANARY SEED

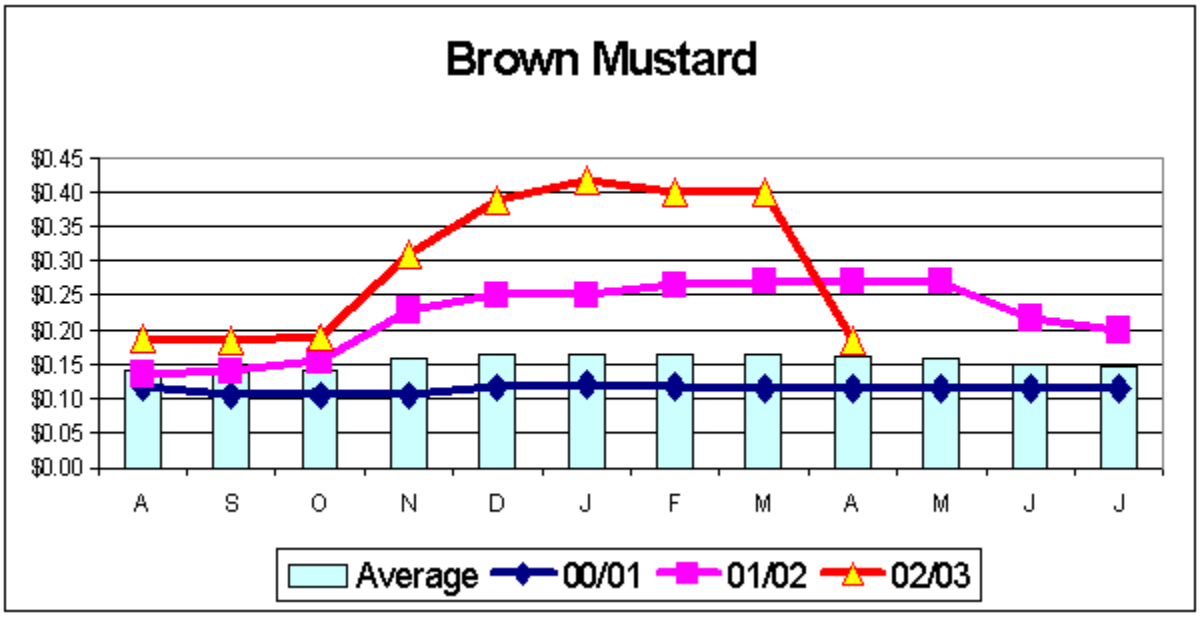
Canary seed prices rallied over the past winter into the 35 to 40 cents/lb, well above the 10 to 12 cents/lb range it has held for most of the past 5 years. Saskatchewan is the major canary seed producing region in the world (70 to 80 % of world canary seed production). A combination of reduced acres/poor yields resulted in extremely tight supplies for birdseed markets.



MUSTARD

A combination of reduced seeded acreage this spring and the drought this summer severely cut back on Canadian mustard seed production in 2002. Canadian mustard seed production in 2002 was around 154,000 t, two-thirds the average over the previous five years, but above the 90,000 t produced in 2002. Given Canada represents over 50 % of world mustard production, this had a major impact on prices – particularly for yellow and brown mustards, with less impact on oriental. Brown mustard production was the most impacted by this past year's drought as indicated by both the premium over yellow mustard and the fact prices are over double the five year average.


Yellow Mustard
$0.70
$0.60
$0.50
$0.40
$0.30
$0.20
$0.10
$0.00
A
S
O
N
D
J
F
M
A
M
J
J
Average
00/01
01/02
02/03


Brown Mustard
$0.45
$0.40
$0.35
$0.30
$0.25
$0.20
$0.15
$0.10
$0.05
$0.00
A
S
O
N
D
J
F
M
A
M
J
J
Average
00/01
01/02
02/03

Economics of Specialty Crop Production

By Nabi Chaudhary

Costs and returns for livestock, crops and several other enterprises have been monitored in the province in an extensive way since the 1960's. These studies have been viewed as an important tool for assisting producers in their cropping decisions and the federal and provincial governments in developing policies and programs for different farm enterprises. Where information gaps existed in other provinces, results from these studies have served as the basis to fill those gaps.

The Economics Unit (formerly known as Production Economics Branch) in the Economics and Competitiveness Division of Alberta Agriculture, Food and Rural Development has been conducting economic studies on various farm enterprises for the last several decades. Since the early nineties, much greater emphasis has been placed on developing costs and returns data on specialty crops for farm and crop diversification purposes.

Continued depressed prices and volatile markets for traditional cereals and oilseeds have forced producers to seriously look into diversifying their operations into new and emerging specialty crops. As mentioned above, results from these studies have been very helpful to primary producers when making cropping decisions. Furthermore, individual producers have also used the results from these studies to compare costs and returns and profitability margins of their farms with the group averages from the respective areas in order to develop better management practices. Agri-businesses and other stakeholders have used the results of the economic studies for feasibility purposes.

During the last five to seven years, area under special crops has increased significantly. Field peas acreage has almost quadrupled since 1991. Dry beans and lentils production has also doubled. Dry beans are grown under contract on irrigated land. Interest in chickpeas (the new Cinderella crop on the prairies – desi and kabuli) production, caraway, buckwheat, coriander, borage, herbs and spices, and other emerging specialty crops continues to grow.

The following Tables provide information on production costs and returns for dry field peas, dry beans and chickpeas (desi and kabuli).

Table 6: Production Costs and Returns For Dry Peas in Dark Brown Soil Zone, 2002

	$ per Acre	$ per Bushel
Revenue per Acre		
Yield per Acre (bushels)	18.5	
Market Price/bushel ($)	5.50	**5.50**
(a) Gross Revenue per Acre	**101.75**	
Expenses per Acre ($)		
Seed and Seed Cleaning	26.85	1.45
Fertilizer Rates: 2N 16P 1K 3S	5.93	0.32
Chemicals	29.35	1.59
Hail/Crop Insurance Premiums	7.43	0.40
Trucking and Marketing	1.39	0.08
Fuel	8.11	0.44
Repairs - Machinery & Buildings	10.58	0.57
Utilities & Miscellaneous Expenses	11.42	0.62
Custom Work & Labour	7.20	0.39
Operating Interest Paid	2.33	0.13
Unpaid Labour	3.28	0.18
(b) Variable Costs	**113.87**	**6.16**
Cash/Crop Share Rent	15.95	0.86
Taxes, Licence & Insurance	8.80	0.48
Equipment & Building – Depreciation	16.70	0.90
Paid Capital Interest	6.85	0.37
(c) Capital Costs	**48.30**	**2.61**
(d) Total Production Costs (b+c)	**162.17**	**8.77**
Gross Margin	**-36.87**	**-1.99**
Return to Investment (a-d+capital interest)	**-53.57**	**-2.90**
Return to Equity (a-d)	**-60.42**	**-3.27**

Source: Economics Unit, Alberta Agriculture, Food & Rural Development
Edmonton, Alberta (780) 422 – 4054

Table 7: Production Costs and Returns For Dry Beans in Dark Brown Soil Zone, 2002

	$ per Acre	$ per pound
Revenue per Acre		
Yield per Acre (pounds)	1805	
Expected Market Price/pound ($)	0.31	
(a) Gross Revenue per Acre	**559.55**	**0.31**
Expenses per Acre ($)		
Seed and Seed Cleaning	48.31	0.03
Fertilizer Rates: 2N 16P 1K 3S	39.02	0.02
Chemicals	84.77	0.05
Hail/Crop Insurance Premiums	10.67	0.01
Trucking and Marketing	7.38	0.00
Fuel	31.92	0.02
Repairs - Machinery & Buildings	45.28	0.03
Utilities & Miscellaneous Expenses	11.56	0.01
Custom Work & Labour	11.23	0.01
Operating Interest Paid	6.90	0.00
Unpaid Labour	85.79	0.05
(b) Variable Costs	**382.83**	**0.21**
Cash/Crop Share Rent	90.55	0.05
Taxes, Licence & Insurance	27.68	0.02
Equipment & Building - Depreciation	63.27	0.04
Paid Capital Interest	11.45	0.01
(c) Capital Costs	**192.95**	**0.11**
(d) Total Production Costs (b+c)	**575.78**	**0.32**
Gross Margin	262.51	0.15
Return to Investment (a-d+capital interest)	-4.78	0.00
Return to Equity (a-d)	-16.23	-0.01

Source: Economics Unit, Alberta Agriculture, Food & Rural Development
Edmonton, Alberta (780) 422 - 4054

Table 8: Production Costs and Returns For Desi and Kabuli Chickpeas, 2002

	Desi Chickpeas	Kabuli Chickpeas
Revenue Per Acre		
Yield per Acre (lbs)	670	1160
Price per Pound ($)	0.18	0.27
(a) Gross Revenue per Acre ($)	**120.60**	**313.20**
Expenses per Acre ($)		
Variable Expenses per Acre		
Seed	21.76	50.79
Fertilizer	11.95	13.25
Chemicals	18.05	20.45
Machinery Expenses (Fuel & Repair)	14.50	14.50
Custom Work & Hired Labour	6.00	6.00
Utilities & Miscellaneous	4.75	4.75
Interest on Variable Expenses	2.20	3.05
(b) Total Variable Expenses	**79.21**	**112.79**
Other Expenses per Acre		
Building Repair	1.30	1.30
Property Expenses, Insurance & Licences	5.50	5.50
Machinery & Building Depreciation	16.85	16.85
Machinery & Building Investment	11.54	11.54
Land Investment	20.00	20.00
Labour & Management	15.70	17.00
(c) Total Other Expenses	**70.89**	**72.19**
(d)TOTAL PRODUCTION COSTS (b+c)	**150.10**	**184.98**
Gross Margin		
Return Over Variable Expenses (a-b)	41.39	200.41
Return Over Total Production Costs (a-d)	-29.50	128.22

Note: Returns per acre can vary with yield and price.

Source: Economics Unit, Alberta Agriculture, Food & Rural Development
Edmonton, Alberta (780) 422 - 4054

Special Crops Program 2002
(Crop Diversification Centre North – Edmonton, AB)

S. F. Blade, K. Ampong-Nyarko and N. Clarke

Research Projects

The special crops program at CDCN has been active in the identification and development of promising economic crops since 1995. The focus has been research on several categories of new crops: pulse, herb (medicinal, culinary and aromatic), non-food industrial crops

Pulse Crops

Western field pea co-operative trial - In 2002, Western Field Pea Co-operative Trial, Cutlass field pea, which was released last year by Stan Blade, did well in 2003 regional trials. It also out-yielded the checks in both northern and southern Saskatchewan trials by 19%.

Field pea breeding and germplasm evaluation CDC Advance - To jumpstart the field pea breeding program CDCN staff have established a strong collaboration with the Crop Development Centre in Saskatoon to obtain early-generation lines from crosses which were targeted to the cool, moist conditions of Alberta.

The original non-replicated screening in 1996 was followed by a replicated preliminary yield trial in Edmonton and Grande Prairie in 1997. The elite material was put into an ongoing yield test in several locations in Saskatchewan and Alberta. We planted 1000 F3s in Edmonton and Namao in 2002. We observed their performance under extreme dry conditions that prevailed during the 2002 drought.

AAFRD/AAFC Breeding Agreement - In 1997 an agreement was signed between CDCN and the Agriculture and Agri-Food Canada Field Pea Breeding Program based in Morden, Manitoba. Approximately 200 lines were tested in 2000; the best lines were evaluated in 2002.

CDCN - Pea lines crossed in the greenhouse were planted in the field for the 2002-growing season. These new materials were evaluated with several objectives in mind: plant maturity, height, harvestability, plant architecture, disease resistance, seed vigor, and yield.

Narrow leafed lupins (*Lupinus angustifolius)* **Yield and yield parameters -** One specific outcome of the collaboration that Stan Blade developed with European researchers at the 4th European Grain Legume Research Network in Cracow last year was that he initiated research on lupins in 2003. Lupins are a pulse crop, which has very high protein (32-40%) and energy levels (due to 6-7% oil). Preliminary trials in 2002 indicated some promise for this crop using genetics from northern Europe, rather than the Australian cultivars, which have failed in our earlier tests across the province. Lupins could be a viable alternative to soy imports; we need to do some additional work to make a realistic assessment of their potential.

Yield Potential and Constraints Analysis of Field Pea Crops

The Trial was originally set up in 1998 as the Intensive Pea Management Trial to evaluate the impact of four major management practices in the production of field pea across Alberta. Results indicates that rate of seeding and date of fungicide application were the two important variables affecting this study, which led to a shift in focus for the 2002 season, allowing us to concentrate on issues that have a direct affect on the growers: improve use efficiency of crop production inputs.

In 2002, on station experiments were conducted at CDCN (Edmonton) and CDCS (Brooks) to establish the potential dry pea yields, the contribution of water, plant density, and nitrogen to the final yield. The experiment was 2x 2x3 factorial combination of density (75 plants/m^2, 150 plants/m^2), water (irrigation, rain fed), fertilizer (inoculants only, inoculants + 50 kg N/ha, 65kg N/ha). There was general lack of response of pea to input under rain fed conditions. Experimental comparisons of farming technologies such as high plant density, extra nitrogen had only small impact on yield.

Irrigation accounted for most of the yield variation. The average irrigation yield of (5096 kg /ha) was double that of rain fed (2504 kg/ha). Pea is described as a low input crop, and relatively unresponsive to fertilizers, particularly nitrogen. It is therefore reasonable that drought related research should be given priority in order to raise Alberta peas yields, improve efficiency, competitiveness, and profits.

Medicinal Herb Research

Echinacea was selected as one of several crops that Alberta has an advantage to grow and market. During the year, research on Echinacea was emphasized.

Echinacea Field Production System Trials

We initiated studies to answer growers' questions on plant density, spacing, time of planting and winter survival. We tested six plant densities: 10, 20, 40, 80, 160 and 320

plants/m^2. We used *Echinacea angustifolia* and were replicated 4 times. Assessments will be carried out in 2003 growing season.

Echinacea Time of Planting and Winter Survival Trial

Echinacea bare roots seedlings were field transplanted at CDC North on June 6, June 26, July 17, August 7, August 28, September 18, October 9 to study effects of time of planting on establishment and winter survival. Plant assessments will be carried on in the second year of establishment.

Greenhouse production of Echinacea

We are also examining possibilities of greenhouse production of Echinacea as an additional production system alongside conventional field production to reduce the length of the production cycle from three years to 10 months. The ability to adopt greenhouse production technology for the cultivation of echinacea is seen as a key step in advancing the status of the echinacea industry. Growing echinacea in the greenhouse will have several advantages: Production time will be reduced dramatically, weed control that is a main bottleneck to field grown crops will be reduced, aster yellows will also be less of a problem. Harvesting will be made easy and can be timed to coincide with off-season of European and North American field-grown echinacea. Farmers could better forecast prices and take advantage of rising world prices.

Greenhouse echinacea was established in June 2002 to determine optimum density, length to economic maturity by harvesting at different growth periods, yield, root age and size on echinacoside content in echinacea. The experiments will be harvested in March and April 2003.

Preliminary comparative agronomic evaluation of new crops

We established an observation plot to compare adaptability between different major and minor special crops (cereals and pseudocereals, grain legumes, forages, oilseeds, aromatic, spice, medicinal) and also serve as demonstrations at CDC North. We grew Yarrow (*Achillea millefolium),* Dill (*Anethum graveolens)* Arnica (*Arnica chamissonis),* Borage (*Borago officinalis),* Mustard (*Brassica hirta (Sinapis alba),* Safflower (*Carthamus tinctorius),* Caraway (*Carum carvi),* Quinoa (*Chenopodium quinoa),* Black Cohosh (*Cimicifuga racemosa),* Teff (*Erogrostis tef (Zucc.),* Buckwheat (*Fagopyrum esculentum (A),* Jerusalem artichoke (*Helianthus tuberosus),* Lathyrus (*Lathyrus sativus),* Basil (*O.basilicum).* The crops were seeded late and were grown with supplementary irrigation to help in establishment. All crops flowered but did not reach physiological maturity before first frost. Under this preliminary observation Proso millet (*Panicum miliaceum* L.) was rated as having good potential and warrants further research. It can be used as feed grain or birdseed. Forages from proso millet are palatable, high quality feedstuff for cattle. Proso millet is especially well suited to dry climates and is a short season crop.

CDCN - Alberta New Crops Network Medicinal Herbs Trial

We collaborated with Alberta New Crops Network by participating in their field trial. We planted Clary sage (*Salvia sclarea*), Perilla (*Perilla frutescens*), Lady's Mantle (*Alchemilla vulgaris*), Joe Pye Weed (*Eupatorium purpureum*), Wild Indigo (*Baptisia tinctoria)* Senega (*P. tenufolia*), Maralroot (*Rhaponticum carthamoides*). The trial was discontinued because of poor germination.

Technology Transfer

Echinacea Forum: A very successful Echinacea Forum was held on September 26 and 27 2002 at the CDC North. Crop Diversification and Business and Innovation Divisions jointly organized the forum. Sixty participants of whom 44 were active echinacea growers attended. They reported a combined acreage of 50 with an estimated dollar value of 2 million at $20 per pound dry roots. The forum identified lack of production information, market information as the main constraints limiting the growth of the industry. The forum also discussed organic certification, botanical certification and laboratory test for active ingredient. At the end of the meeting, the Alberta Echinacea Growers Group under the umbrella of the Alberta New Crops Network was formed with the secretariat based at CDCN to champion the growth of the industry.

The special crops program will like to acknowledge the contribution of Jackie Teulie, Chunyu Jiao and R. Bok-Vischer.

Special Crops Program 2002
(Crop Diversification Centre South - Brooks, AB)

Manjula Bandara, Carina Weisbach, Andrew Fox, Judy Webber and Elizabeth Russell

The special crops program at the Crop Development Centre South (CDCS), Brooks, AB is primarily responsible for the evaluation, introduction, and development of alternative or new crops for southern Alberta through applied and adaptive research. Some study projects are conducted in collaboration with other research programs at CDCS, other divisions of Alberta Agriculture, Food and Rural Development, University of Alberta, University of Saskatchewan, Agriculture and Agri-Food Canada, Applied Research Associations and industry partners. Different funding sources such as Farming for the Future Matching and Direct Funding Grants, regional and cooperative varietal testing programs and also several industry partners provide the financial support for the programs.

Research Study Projects

Chickpea and lentil crop improvement program

In 2002, a five-year crop improvement program for chickpea and lentil was initiated at the Crop Diversification Centre-south, Brooks in collaboration with the Crop Development Centre, University of Saskatchewan, Saskatoon, Saskatchewan where new crosses of both crop species are performed. The main objective of this project is to develop new chickpea and lentil cultivars for southern Alberta under dryland conditions with specific selection criteria of high seed yield, early flowering early and uniform maturity, resistance to common foliar and root diseases and desired market traits. Each year, 500 pre-selected F_3 lines from each crop species are grown in micro-plots at the Bow Island substation and two test sites in F_4. Promising lines will be selected in F_5 and subsequent generations in multi-location trials in southern Alberta. Superior lines will be released as varieties to Prairie pulse growers. In 2002, the lentil plots experienced a fairly strong disease pressure combined with drought causing complete loss of some of the new lines. Nevertheless crop establishment was satisfactory. In 2002, the crops were exposed to excessive soil moisture conditions, frequent cold period and severe weed pressure (The June precipitation was 159.0 mm, more than twice the normal of 69.6 mm). Excessive available soil moisture encouraged the indeterminate growth habit, particularly in chickpeas. Despite the adverse growing conditions in southern Alberta, the ascochyta leaf blight incidence was very low at the test site, and line selection for desired crop and seed characteristics was performed.

Fall vs. spring seeding of desi chickpea

Fall seeding, or dormant seeding, refers to the planting of spring crop species in the fall, prior to freeze up. A field study was conducted in 2002/2002 cropping season at CDCS using the desi chickpea cultivar Myles. Treatments included two seeding dates in late fall (Oct. 23 and Nov. 2, 2002) and one seeding date in early spring (May 02, 2002) with different seeding rates for each fall seeding treatment (1 time, 2 times and 4 times the recommended seeding rates for uncoated seed and the recommended seeding rate for plastic polymer-coated seed - Grow Tec Inc. Edmonton, Alberta, Canada) and the recommended seeding rate for the early spring seeding treatment. Treatments were arranged in a randomized complete block design (RCBD) with 3 replications. Each plot was 6.0 m long and consisted of 6 rows, spaced 17.5 cm apart. The crop was grown under dryland conditions. Data collection included stand establishment at 5 weeks after spring seeding, date of first flowering, date of maturity, plant height at harvest, 1000-seed weight, number of seeds per plant at harvest, harvest index and plot seed yield after eliminating borders.

On average, the fall-seeded chickpea crop was shorter than the spring-seeded crop. Increasing seeding rate increased plant population density in both fall-seeded treatments. The plant population density of the fall-seeded polymer-coated treatment was only 57% of the actually seeded density (55 seeds per m^2), similar to that of the other fall-seeded treatments with the recommended seeding rate. This indicates that the polymer seed coat treatment had no beneficial effect on seedling establishment of fall-seeded desi chickpea. Plants from the fall-seeded treatments flowered and attained maturity 10 days and 7 days, respectively earlier than spring–seeded over all seeding dates and rates.

In summary, our results indicate late fall seeding of desi chickpea can be practiced in southern Alberta. The early and uniform crop maturity from fall seeding is critical in years with above normal precipitation in August. Since our conclusions are based on result of one season single-site study, comprehensive studies covering a wide range of soil and climatic conditions in the Brown and Dark Brown soil zones, are required before fall seeding can be recommended in southern Alberta.

Fall-seeded spice crops

Fall seeding of small-seeded spring crops such as canola is becoming popular among growers in the Prairies because of improvement in crop quality and yield compared to that of spring-seeded crops. Using the canola seeding model, fall seeding studies were established at CDCS with four spice crop species, anise, coriander, dill and mustard. Different seeding rates (1 time, 2 times and 4 times the recommended rate) of uncoated seed and polymer-coated seed at 1 time the recommended rate were used as treatments. Crop growth performances and seed yield of the fall-seeded crops were compared with those of spring-seeded crops.

Anise *(Pimpinella anisum)*

On average, fall-seeded anise crop was shorter than the spring-seeded crop. Increasing seeding rate consistently increased plant population density of the fall-seeded crop, but had no significant impact on fruit yield. Polymer-coated seed treatment improved the stand establishment, particularly in the early November-seeded treatment. On average, fall-seeded crop matured three week earlier than the spring seeded-crop.

Coriander (*Coriadrum sativum*)

Increasing seeding rate of the fall-seeded uncoated treatment significantly increased the plant density and fruit yield, but had no impact on the final plant height or crop maturity. The polymer-coated treatment had no significant effect on over-wintering ability of coriander. The seeding date during the late fall had no significant impact on plant density or fruit yield in coriander indicating that the crop can be seeded with a wide window in the fall without having a significant impact on the crop stand. In summary, results indicate that dormant seeding of coriander can be practiced in southern Alberta and seeding rate should be increased to 2 times the recommended seeding rate to obtain a satisfactory crop stand.

Dill (*Anethum graveolens*)

In general, seeding rate of the uncoated fall-seeded treatment had no significant impact on final plant height or crop maturity of dill. However, seeding rate consistently increased fruit yield by improving stand establishment. The polymer-coated treatment had no significant impact on either plant density or fruit yield. In summary, these results indicate that dormant seeding of dill can be practiced in southern Albert, but seeding rate should be increased to 2 times the recommended seeding rate to obtain a satisfactory crop stand.

Yellow Mustard (*Sinapis alba*)

In general, the crop of the uncoated fall-seeded treatment produced taller plants when grown at higher seeding rates compared to those grown at lower seeding rate. On average, the spring-seeded crop was significantly taller than the fall-seeded crop. Irrespective of date of seeding, increasing seeding rate of the fall-seeded crop consistently increased the seed yield. On average, the seed coat treatment produced significantly higher (over 52%) seed yield than the corresponding uncoated treatment. These results indicate that dormant seeding of mustard can be practiced successfully in southern Alberta. When using uncoated seed for fall seeding practice, the seeding rate should be increased to 2 times the recommended seeding rate to obtain a satisfactory crop stand. The fall-seeded crop

matured about one month earlier than the spring-seeded crop, thus early crop maturity would be considered the main beneficial impact of this practice.

Impact of size of the seed planted on crop phenology and seed yield

The size of the seed planted has been shown to have a significant impact on seedling establishment, seedling vigor and crop growth of several small-seeded field crops such as jute, mustard, coriander and carrot. In contrast, other studies have revealed that size of the seed had no significant impact on plant growth and development, and the final seed yield of large-seeded crops such as chickpeas. Two studies were conducted at CDCS to examine the effect of size of seeds planted on seedling growth, seed yield and seed size profile of the resulting crop of four kabuli chickpea cultivars and four pinto bean cultivars under field conditions in southern Alberta.

Kabuli Chickpeas

Three large-seeded kabuli chickpea cultivars, Sanford, Evans and CDC Xena, and one small-seeded kabuli cultivar, CDC Chico were used for this study. Seeds of each chickpea cultivar were screened into two size categories and size of the screens used was cultivar-dependant (For example large-seeded cultivars, <8.7 mm and >8.7mm and for small-seeded cultivar, < 8.1, and > 8.1 mm). The treatments were arranged in a RCBD with 4 replications. Each plot was 6.0 m long and consisted of 6 rows, spaced 17.5 cm apart. The crop was grown dryland conditions. Data collection included stand establishment at 5 weeks after seeding, date of first flowering, plant height at first flowering, date of maturity, number of seeds per plant at harvest, 1000-seed weight, harvest index, plot seed yield after eliminating borders.

The chickpea cultivars differed in plant height, seed yield components, seed yield and seed size distribution, but the size of the seed planted had no significant impact on most of the parameters measured. The large-seeded chickpea cultivars, Sanford and Evans were taller than CDC Xena (large-seeded cultivar) and CDC Chico (small-seeded cultivar). All three large-seeded cultivars flowered simultaneously, but 5 days later than CDC Chico and the same three cultivars matured simultaneously, but 3 days later than CDC Chico. All three large-seeded chickpea cultivars produced fewer seeds per plant compared to CDC Chico. Among chickpea cultivars, only Sanford plants generated from larger seed treatment produced significantly heavier seeds compared to that of the smaller seed treatment. CDC Chico produced highest dense seed, the seed yield and harvest index among the chickpea cultivars. These observations suggest that among the yield components, the number of seeds per plant is the main yield component contributing to the high seed yield of CDC Chico. Despite the phenological differences, the lack of a significant impact of size of the seed planted, on plant growth, seed yield components and seed yield suggests that smaller seed sizes of kabuli chickpea can be used for planting without affecting seed yield or the

seed size profile of the resulting crop. This assumes that the reduction in seed size not due to disease infected seed or immature seed. A germination test should be done, if smaller seed category is used for planting purpose, the grower could reduce their seed cost due to reduced seeding rate and transportation cost. At the same time, the larger-seeded portion of the crop can be sold at a premium for human consumption purpose.

Pinto Bean

Seeds of four pinto bean cultivars (Othello, Fargo, CDC Pintium and CDC Pinnacle) were screened into four size categories (<7.1 mm, 7.1-7.9 mm, 7.9-8.7 mm and > 8.7 mm in diameter). The crop was seeded at a spacing of 0.18 m between rows (narrow- row seeding) on May 25, 2002 and was grown under irrigation using recommended cultural practices. Treatments were arranged in a 4 (cultivar) x 4 (seed size) factorial structure in a Randomized Complete Block Design (RCBD) with 4 replications. Plant population density at five weeks after seeding, plant height at harvest, 1000-seed weight, test weight, plot seed yield and seed size distribution of the resulting crop were determined. Data were subjected to ANOVA and treatment means were compared using an LSD test.

Results indicated that pinto bean cultivars differed in plant height, mean seed weight, seed density, number of seeds plant and seed yield. On average, CDC Pintium produced the tallest plants while Fargo produced the shortest plants. Regardless of cultivar or size of the seed planted, all the bean cultivars flowered on July 16, 2002. There was a difference in crop maturity among cultivars, but size of seed planted had no impact on crop maturity. Among bean cultivars, CDC Pintium matured 105 days after seeding (earliest) whereas CDC Pinnacle matured 118 days after seeding (latest). Both Othello and Fargo matured 112 days after seeding. On average, CDC Pinnacle produced the heaviest seed (318 mg/seed) whereas Othello produced the lightest seed (297 mg/seed). On average, the size of seed planted had a significant impact on seed yield of the resulting crop, but had no impact on final plant height, test weight, mean seed weight, plant population density or number of seeds per plant. Seed yield of CDC Pintium, Othello, and Fargo plants raised from larger seed categories (> 7.1 mm) produced significantly higher seed yield than that of the smallest seed category (< 7.1 mm). However, increasing seed size from 7.1 mm to 8.7 mm had no significant impact on seed yield. For CDC Pinnacle, size of the seed planted, had no significant impact on seed yield of the resulting crop except for the largest seed category (>8.7 mm). These results indicate that medium size seed (>7.1-7.9 mm) can be used for seed purpose without having any adverse impact on seed yield, while larger seed categories can be used for human consumption purpose. The seed size profile of the resulting crop, however, was significantly different among cultivars. On average, Othello, Fargo, CDC Pintium and CDC Pinnacle produced seed lots with 45.9%, 54.1 %, 56.7 and 68.8 % in the >7.9 mm in diameter category, respectively.

Impact of growing condition on plant growth and medicinal quality of rosemary

Rosemary (*Rosmarinus officinalis* L.), a member of the *Labiatae* or mint family, is a slow growing, cold sensitive, woody perennial cultivated for the aromatic foliage. Rosemary is used primarily as a culinary herd with meats, vegetables and soups. In traditional medicine, the plant is used as an astringent and diuretic and to increase menstrual flow. Interest has been directed at using rosemary extracts as anti-oxidants in commercial food preparations. This study was conducted to evaluate the possibilities of growing rosemary as an annual crop under field conditions at CDCS, Brooks and to compare the productivity and product quality of the crop with those grown under different growing conditions in controlled environments. This study included ten cultivars of rosemary, namely Apr, Blue Boy, Benenden Blue, Golden Rain, Majorca, Pink, Santa Barbara, Severn Sea, Standard and Rex. The rooted stem cuttings were transplanted in early May in the field at a spacing of 90 cm x 20 cm. The crop was grown under irrigation and harvested in late September. In the controlled environment study, the rooted stem cuttings of all ten cultivars of rosemary were grown in 3 different growing conditions (day/night: 12h/12h at 24^0C/12^0C, 12h/12h at 24^0C/6^0C and 16h/8h at 24^0C/6^0C) for eight months. The plants were grown in 1 L pots. Seven plants from each cultivar were included in each growth chamber. Data collections included were aboveground biomass production (fresh and dry weights), leaf dry weight/plant, total phenolic activity (TPA =carnosic acid, carnosol and 12-methoxy carsonic acid content, expressed as a percentage of the total extract) and carnosic acid (CA) / carnosic acid (CA) +carnosol (C) ratio. All the extractions were performed at the Norac Technologies Inc., Edmonton, AB using the super-critical fluid extraction method.

Growth and product quality of rosemary under different growing conditions were cultivar-specific. Under short-day conditions (12h), night temperature (6^0C vs. 12^0C) had no impact on productivity or product quality of Standard, Arp, Pink, Benenden Blue and Severn Sea. Under the same short-day conditions, lower night temperature conditions (6^0C) improved productivity and product quality of Majorca, Rex, Santa Barbara, Golden Rain and Blue Boy. Conversely, long-day conditions (16 h) improved both productivity and product quality of rosemary cultivars Standard, Majorca, Rex, Arp, Pink, Benenden Blue and Severn Seas, compared to short-day conditions (12 h).

Under field conditions, rosemary cultivars produced aboveground biomass ranging from 116.5 to 242.0 DW g/ plant, which was 6 to 18 times higher than that of rosemary cultivars grown under controlled environments. These results suggest that rosemary can be successfully grown under field conditions in southern Alberta, as an annual crop. Under field conditions, rosemary cultivar Pink produced the highest aboveground biomass (242 g DW/plant) whereas Arp produced the lowest (116.5 g/plant). Rosemary cultivars Pink, Rex, Blue Boy and Severn Sea were the highest biomass producers (> 190.0 g/plant), followed by Santa Barbara, Standard and Benenden Blue (> 135.0 g/plant), and Majorca, Golden Rain and Arp (> 116.0 g/plant). The total phenolic activity (TPA) and ratio of carnosic

acid/carnosic acid+carnosol are considered quality parameters of the rosemary extract. The rosemary culitvar Standard produced the highest TPA (5.96 %), followed by Pink (5.65%), Blue Boy (5.63%) and Arp (5.17%) and the cultivar Severn Sea contained the lowers TPA (4.14%). Severn Sea contained the highest CA/(CA+C) ratio (98.1%), whereas Golden Rain contained the lowest ratio (94.8%). The imported rosemary generally contains TPA within a range of 2.5- 3.0% and the minimum CA/(CA+C) ratio should be > 75%. Since these quality standards are much higher than those of imported rosemary, it can be concluded that the Alberta-grown rosemary are higher in quality compared to the imported rosemary.

Crop selection and improvement

Seed of *Echinacea angustifolia*, *E. pallida, E purpurea and* borage and stolons of peppermint, spearmint and Alaskan mint were treated with mutagenic compound, Ethyl Methanesulphonate (EMS). Treated seeds and stolons were planted in plugs or pots and placed in a greenhouse. In early spring of 2000, both *Echinacea* and mint species were transplanted in the field at CDCS. *Echinacea* species are being evaluated for aster yellows disease resistance and medicinal quality whereas mint species for over wintering ability and essential oil contents. Foliage of individual mint plants raised from the treated stolons was used to extract essential oil and crop selection based on essential oil content, oil composition and over-wintering ability is in progress.

The seed harvested from borage plants raised from the EMS-treated seed were planted in spring 2002 in the field for selection and seed multiplication. Based on maturity, borage plants were categorized into several groups and further selection is in progress based on seed shattering, and seed oil content and quality.

Regional/Co-op Trials:

Newly developed breeding lines and promising cultivars of chickpeas, drybeans, fieldpeas, fenugreek and fababean received from various crop breeding programs are evaluated under dryland and irrigated conditions in southern Alberta, to select suitable cultivars for the region.

Drybean cultivar/line evaluations

The emphasis in the drybean cultivar testing in southern Alberta is on yield performance, early maturity and architecture of a drybean plant that allows for narrow row configurations, direct combining and consequently an expansion of the present drybean production area. Breeding programs at the Lethbridge Research Center, Agriculture and Agri-food Canada and the Crop Development Centre at the University of Saskatchewan are developing promising lines of this type of drybean. Information generated from these

studies will be used for further evaluation, cultivar registration and recommendation purposes.

Four yield tests (two coop and two regional tests) with various drybean lines/varieties were established on May 31, 2002, at the Bow Island sub station under irrigated conditions. All the dry bean tests at the Bow Island site were abandoned due to poor seedling emergence caused by excessive rainfall received in mid June of 2002.

Field pea cultivar/line evaluations

Three fieldpeas cultivar trials were conducted at CDCS (dryland and irrigated) and Bow Island (dryland) to evaluate varieties/lines for screening and regional adaptation. Only two test sites (CDCS-irrigated and Bow island) were harvested. The dryland test at CDCS was abandoned due to severe crop damage caused by the Sencor (Metribuzin) application.

Other special crop cultivar evaluations

Different lines and registered varieties of other pulse crops such as chickpea, faba bean and soybean, were evaluated for regional adaptation. Three kabuli and three desi type chickpea regional tests were established under dryland conditions at Bow Island, Brooks (CDCS) and Carmangay. The trials at Bow Island and Carmangay were harvested, but crop yields at the Bow Island test site were very low (333–1391 kg/ha) due to excessive secondary crop growth combined with later crop maturity caused by excessive soil moisture conditions. Crop yields at the Carmangay site, however, were satisfactory (893-3788 kg/ha). The test site at Brooks was abandoned due severe crop damage by the Sencor application. Several cultivars/lines of silage and grain corn, soybean and faba bean were established for regional adaptation. Both silage and grain corn performed very well under both Bow Island and Brooks growing conditions. The soybean and faba bean tests were abandoned due to poor seedling emergence caused by excessive soil moisture conditions at the Bow Island site.

Extension and industry development activities

Program staff continued to answer numerous inquiries on the production of special crops, particularly on herb, spice and essential oil crops. Information was contributed on special crops to producer newsletters and the news media. Program staff participated in courses, seminars, conferences and field tours. Demonstration plots of various special crops, including pulse crops, herbs, spices, essential oil, medicinal plants and other new crops at Brooks and Bow Island were visited by a large number of interested individuals and groups. Extension staff and other interested parties were provided with planting materials for demonstration and field testing to assist herb, essential oil and spice producers evaluate new crops and to develop agronomic practices.