Alberta 2002
Specialty Crop Report

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. In addition, the contributions of Alberta Agriculture, Food and Rural Development staff, including Chuanliang Su, Reynold Jaipaul, Shukun Guan, Guangzhi Liu, Melodie Mynzak, Gail Atkinson, Marion Harry, Brenda Kerychuk, Charlie Pearson, Nabi Chaudhary, Michael Clawson, Dr. Stan Blade, Neil Clark, L. Maskewich, Ken Lopetinsky, Manjula Bandara, Collin Wildschut, Carina Weisbach, Liz Russell, Judy Webber, Travis Simo, Rachid El Hafid, Lynda Ost and J. Thibodeau, is very much appreciated.

For additional information relating to the various sections of this report, please do not hesitate to contact the subject area specialist referenced under each section.

This report is also available on the Internet at:
http://www.agric.gov.ab.ca/navigation/economics/crops/index.html

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Alberta 2001 Specialty Crop Survey

Purpose of Survey:

By Reynold Jaipaul

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 nineteenth year, the survey attempts to capture data on area (seeded and harvested acres), yield and production, for the various types of specialty crops grown.

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 Specialty Crop Survey, which is provincial in scope, collects data through a non-probability sampling procedure. In December 2001, survey questionnaires were mailed out to 4,583 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 2001. 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 February 25, 2002, a total of 1,269 questionnaires were returned. Of this total, 1,121 were usable and formed part of the basis in the generation of the Alberta 2001 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

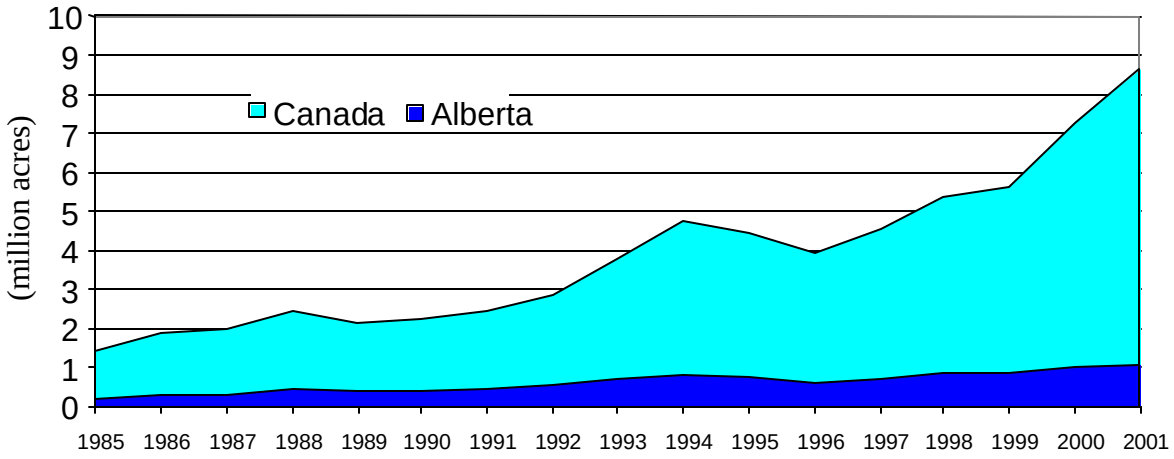
Relatively low prices for major grains/oilseeds and high farm input costs in the spring of 2001, in addition to need for diversification and crop rotation, had many Alberta producers seeding specialty crops in 2001.

Slightly over one million acres were seeded to specialty crops in Alberta in 2001, as seen in Figure 1, of which, 954,800 acres were harvested (excluding potatoes and forage seeds). About 118,500 acres were not harvested due to drought conditions, insect problems and other adverse factors experienced during the 2001 crop season. These adverse factors generally reduced yields and area harvested for specialty crops grown on dry land. As a result, 2001 production for most specialty crops was lower than in 2000.

Record or near record low yields were reported for mustard, lentils and chickpeas in 2001. These crops are primarily grown on dry land in the southeastern parts of Alberta, where drought conditions and insect problems prevailed through most of the 2001 crop season. However, specialty crops under irrigation, including potatoes, sugar beets, dry beans and forage corn, had near average to above average yields, though supply of irrigation water was a major concern in 2001.

Specialty crop seeding intentions for 2002 are not available (from the survey) due to a lack of data to generate appropriate estimates. Statistics Canada's March Intentions of Principal Field Crop Areas 2002 will be released on April 24, 2002, which will cover major crops and some specialty crops.

Figure 1 Alberta and Canada Specialty Crop Area Seeded Acreage 1985-2001 (million acres)



Specialty Crops in Western Canada

In 2001, specialty crop area in Western Canada continued to increase, thanks to a much higher acreage in Saskatchewan. About 8.25 million acres were seeded to specialty crops in Western Canada in 2001, of which, 7.80 million acres were harvested, according to Statistics Canada's November Production Estimate of 2001 Field Crops and the Alberta 2001 Specialty Crop Survey. Adverse weather conditions experienced during the 2001 season reduced yields and area harvested for specialty crops in Western Canada.

In 2001, dry peas remained the largest specialty crop in Western Canada, with harvested area estimated at 3.45 million acres and production at 2.20 million tonnes. Only 0.58 million tonnes of lentils were produced from 1.71 million acres harvested due to yields that were significantly below average. Harvested area for chickpeas was estimated at 1.18 million acres and production at 0.47 million tonnes. Mustard production in 2001 was 94,300 tonnes from 359,000 acres harvested. Also, about 91,500 tonnes of canary seed were produced from 0.34 million acres harvested in 2001.

Saskatchewan remained the largest producer of specialty crops in 2001. Saskatchewan harvested 6.08 million acres of specialty crops in 2001, compared to 5.42 million acres in 2000. Total harvested area in Saskatchewan was estimated at 2.65 million acres for dry peas, 1.69 million acres for lentils, 1.10 million acres for chickpeas, 285,000 acres for mustard seed, 285,000 acres for canary seed and 20,000 acres for sunflower seed in 2001.

In 2001, a total of 735,000 acres of specialty crops were harvested in Manitoba. Sunflower harvested area in Manitoba was estimated at 130,000 acres in 2001, accounting for 83% of total sunflower area in Western Canada. In addition, Manitoba harvested 190,000 acres of dry beans, 175,000 acres of dry peas, 70,000 acres of grain corn, 55,000 acres of canary seed, 25,000 acres of buckwheat and 4,000 acres of lentils in 2001.

Figure 2 - Western Canadian Acreage of Specialty Crops

Harvested Area ('000 Acres)

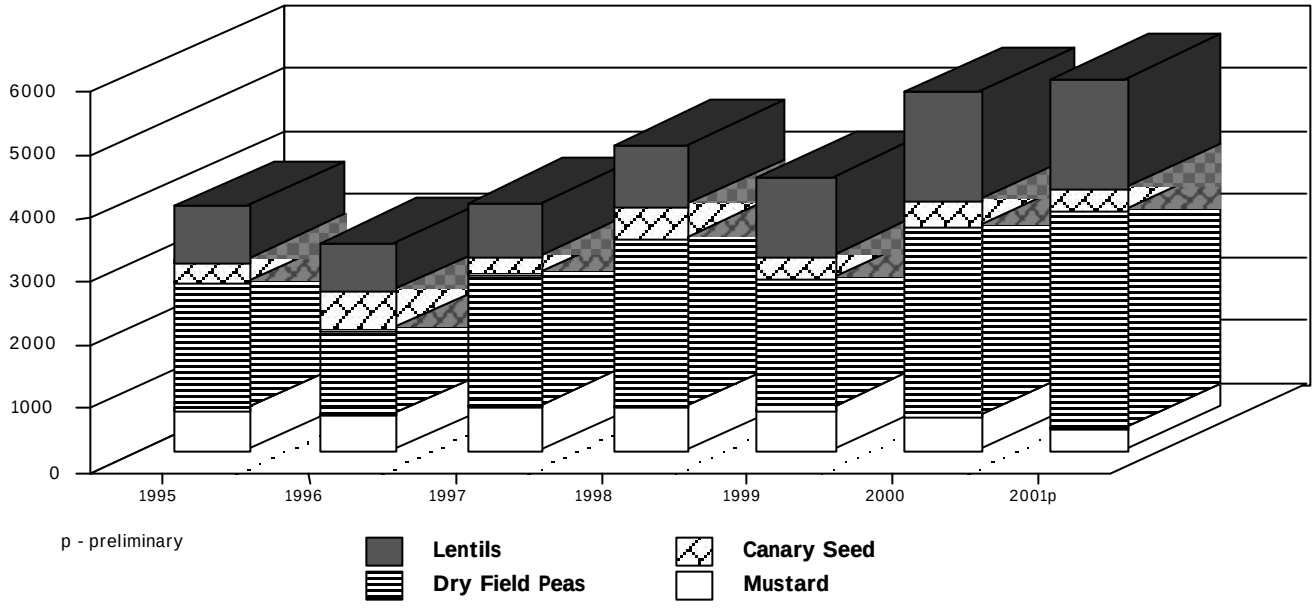
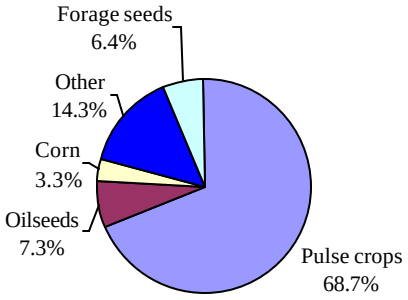


Table 1 Alberta 2001 Specialty Crops

		Seeded area (acres)	Harvested area (acres)	Yield (unit/acre)		Production (tonnes)
Pulse crops	Field peas, green	250,000	242,500	36.8	bu	242,870
	Field peas, yellow	385,000	353,000	30.0	bu	288,210
	Field peas, other	15,000	14,500	26.6	bu	10,497
	Total field peas	**650,000**	**610,000**	**32.6**	**bu**	**541,577**
	Chickpeas, desi	8,000	7,000	620	lbs	1,969
	Chickpeas, kabuli	88,000	76,000	525	lbs	18,098
	Total chickpeas	**96,000**	**83,000**	**533**	**lbs**	**20,067**
	Dry beans	55,000	54,000	22.3	cwt	54,500
	Fababeans	3,000	3,000	2,200	lbs	2,994
	Lentils	24,000	18,000	450	lbs	3,674
Oilseeds	Brown mustard	8,000	4,200	225	lbs	429
	Yellow mustard	55,000	50,000	380	lbs	8,618
	Oriental mustard	15,000	9,800	400	lbs	1,778
	Total mustard	**78,000**	**64,000**	**373**	**lbs**	**10,825**
	Sunflowers	7,000	6,000	1,250	lbs	3,402
	Safflowers	3,000	3,000	750	lbs	1,021
Corn	Grain corn	5,000	3,000	86.7	bu	6,607
	Silage corn	35,000	30,000	16.00	ton	435,453
Other	Potatoes (1)	55,000	54,000	316	cwt	774,000
	Triticale	82,000	48,000	32.0	bu	39,016
	Canary seed	5,000	4,300	680	lbs	1,326
	Sugar beets (2)	30,236	28,457	18.38	tonne	523,110
Forage seeds(3)	Alfalfa seed	15,381	15,381	385	lbs	2,686
	Alsike clover	2,110	2,110	---		---
	Brome grass	6,605	6,605	305	lbs	914
	Red fescue	14,439	14,439	505	lbs	3,307
	Red clover	170	170	---		---
	Timothy	15,748	15,748	300	lbs	2,143
	Other	23,225	---	---		---

Figure 3 Specialty Crop Seeded Acreage Alberta, 2001



Source: AAFRD, Statistics and Data Development Unit, Alberta 2001 Specialty Crop Survey

Except for:

(1) Statistics Canada, Canadian Potato Production by Province, November 2001

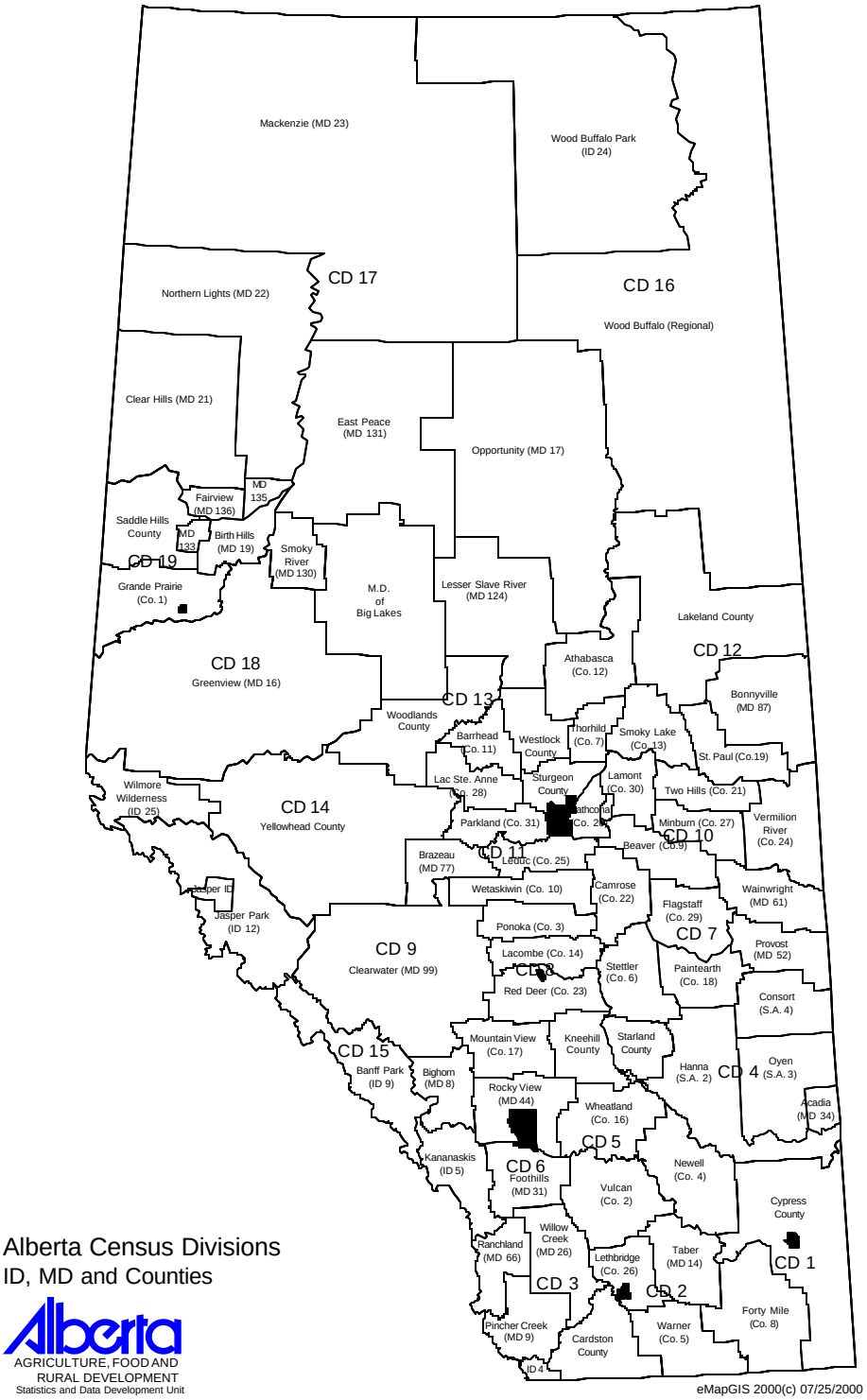
(2) Alberta Sugar Beet Growers' Marketing Board

(3) Canadian Seed Growers' Association - Inspected Pedigreed Acres of Grass and Legume Seed; Yield estimates are generated from the Alberta 2001 Specialty Crop Survey, including pedigreed and common seeds

cwt - hundred weight (hundred pounds)

ton = 2000 lbs tonne = 1.1023 tons = 2204.6 lbs

Figure 4



Alberta Census Divisions
ID, MD and Counties

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eMapGIS 2000(c) 07/25/2000

Table 2 2001 Specialty Crops by Census Division

C.D.	Dry Field Peas	Mustard	Lentils	Beans	Chickpeas
			Harvested Area (acres)		
1	17,774	5,598	3,657	25,651	17,678
2	37,151	15,615	8,114	25,644	37,153
3	16,391	2,939	-	-	3,204
4	18,045	26,422	5,408	1,021	13,675
5	96,815	13,426	820	498	9,952
6	29,917	-	-	107	875
7	89,671	-	-	-	462
8	19,451	-	-	-	-
9	-	-	-	-	-
10	145,974	-	-	1,078	-
11	21,890	-	-	-	-
12	15,896	-	-	-	-
13	24,763	-	-	-	-
17	35,536	-	-	-	-
18	1,278	-	-	-	-
19	39,447	-	-	-	-
Alberta	**610,000**	**64,000**	**18,000**	**54,000**	**83,000**
			Yield Per Acre		
	(bushels)	**(pounds)**	**(pounds)**	**(cwt)**	**(pounds)**
1	5.5	250.0	-	22.2	360.0
2	19.0	260.0	252.0	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**	**450.0**	**22.3**	**533.0**
			Production (tonnes)		
1	2,660	635	-	26,074	2,887
2	19,210	1,842	928	27,242	9,269
3	8,030	-	-	-	-
4	8,594	3,715	-	-	3,722
5	63,764	3,897	-	-	3,115
6	31,347	-	-	-	-
7	86,635	-	-	-	-
8	27,421	-	-	-	-
9	-	-	-	-	-
10	147,786	-	-	-	-
11	21,745	-	-	-	-
12	16,223	-	-	-	-
13	26,621	-	-	-	-
17	37,234	-	-	-	-
18	-	-	-	-	-
19	44,016	-	-	-	-
Alberta	**541,577**	**10,825**	**3,674**	**54,500**	**20,067**

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

Table 3 2000 Specialty Crops by Census Division

C.D.	Dry Field Peas	Mustard	Lentils	Beans	Chickpeas
			Harvested Area (acres)		
1	37,325	3,028	16,467	26,200	13,422
2	51,448	18,113	9,374	27,300	17,450
3	16,610	-	-	-	-
4	18,843	41,151	4,924	-	5,030
5	101,908	10,648	-	-	11,322
6	30,800	-	-	-	-
7	89,591	-	-	-	-
8	19,618	-	-	-	-
9	-	-	-	-	-
10	125,204	-	-	-	-
11	41,245	-	-	-	-
12	11,220	-	-	-	-
13	15,250	-	-	-	-
17	22,546	-	-	-	-
18	-	-	-	-	-
19	38,961	-	-	-	-
Alberta	**622,600**	**84,900**	**34,100**	**54,500**	**49,000**
			Yield Per Acre		
	(bushels)	**(pounds)**	**(pounds)**	**(cwt)**	**(pounds)**
1	13.8	600	648	23.8	690
2	15.5	575	690	21.3	570
3	14.7	-	-	-	-
4	17.5	850	750	-	1,230
5	32.5	610	-	-	660
6	48.4	-	-	-	-
7	39.6	-	-	-	-
8	43.1	-	-	-	-
9	-	-	-	-	-
10	44.4	-	-	-	-
11	43.7	-	-	-	-
12	50.4	-	-	-	-
13	50.4	-	-	-	-
17	39.8	-	-	-	-
18	-	-	-	-	-
19	36.0	-	-	-	-
Alberta	**35.6**	**699**	**684**	**22.5**	**738**
			Production (tonnes)		
1	14,018	824	4,840	28,237	4,201
2	21,703	4,724	2,934	26,376	4,512
3	6,645	-	-	-	-
4	8,974	15,866	1,675	-	2,806
5	90,137	2,946	-	-	3,389
6	40,570	-	-	-	-
7	96,554	-	-	-	-
8	23,012	-	-	-	-
9	-	-	-	-	-
10	151,291	-	-	-	-
11	49,053	-	-	-	-
12	15,390	-	-	-	-
13	20,917	-	-	-	-
17	24,421	-	-	-	-
18	-	-	-	-	-
19	38,172	-	-	-	-
Alberta	**603,045**	**26,920**	**10,580**	**55,622**	**16,403**

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

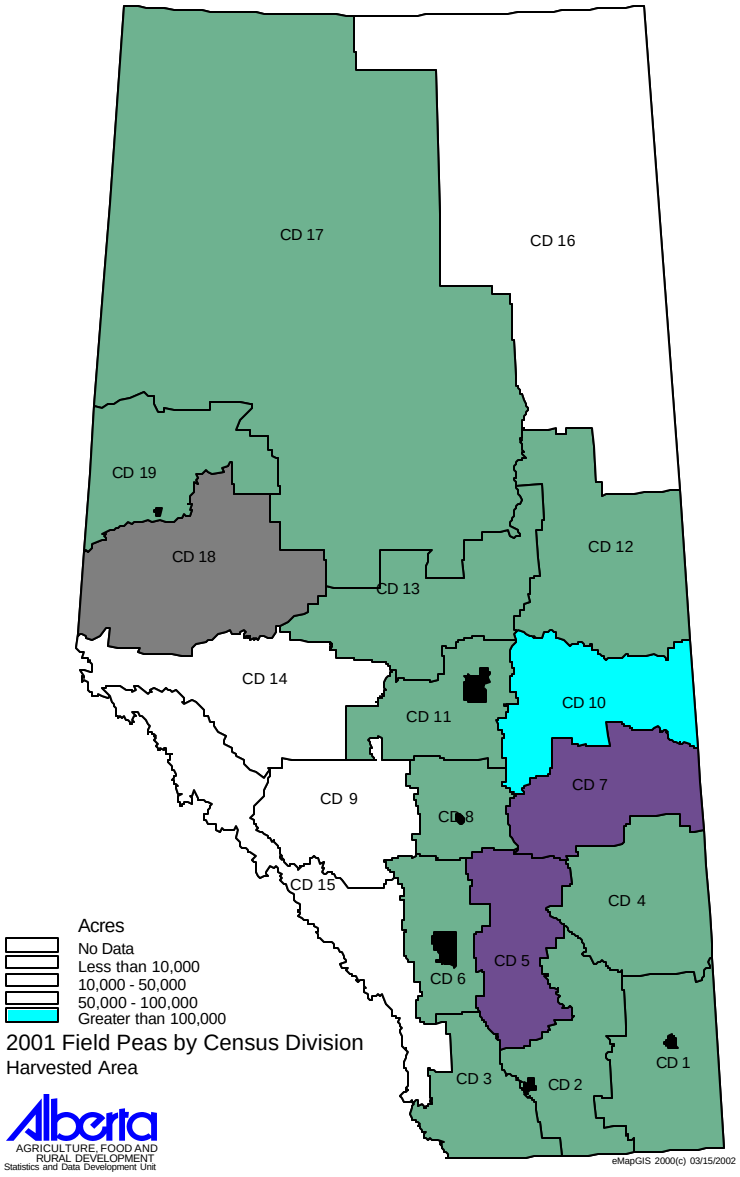
Dry Field Peas

In 2001, Alberta producers seeded 650,000 acres of dry peas, of which, 610,000 acres were harvested, with an average yield of 32.6 bushels per acre. Total dry pea production was estimated at 541,577 tonnes in 2001, down 10% from 2000, mainly due to a lower yield.

Dry peas are grown across Alberta, though a higher concentration is seen in Census Divisions 5, 7 and 10, which jointly accounted for 55% of total field pea area in Alberta in 2001.

Dry pea yields in 2001 ranged from very poor in the southeastern parts of Alberta to slightly above average in some other areas. The lowest average yield of 5.5 bushels per acre was reported in Census Division 1, while Census Division 8 had the highest average yield of 51.8 bushels per acre in 2001.

Dry peas are grown primarily on dry land in Alberta. Estimates of 2001 crop area under irrigation will be available from the annual irrigation report by the Irrigation Branch of Alberta Agriculture, Food and Rural Development in May of 2002.



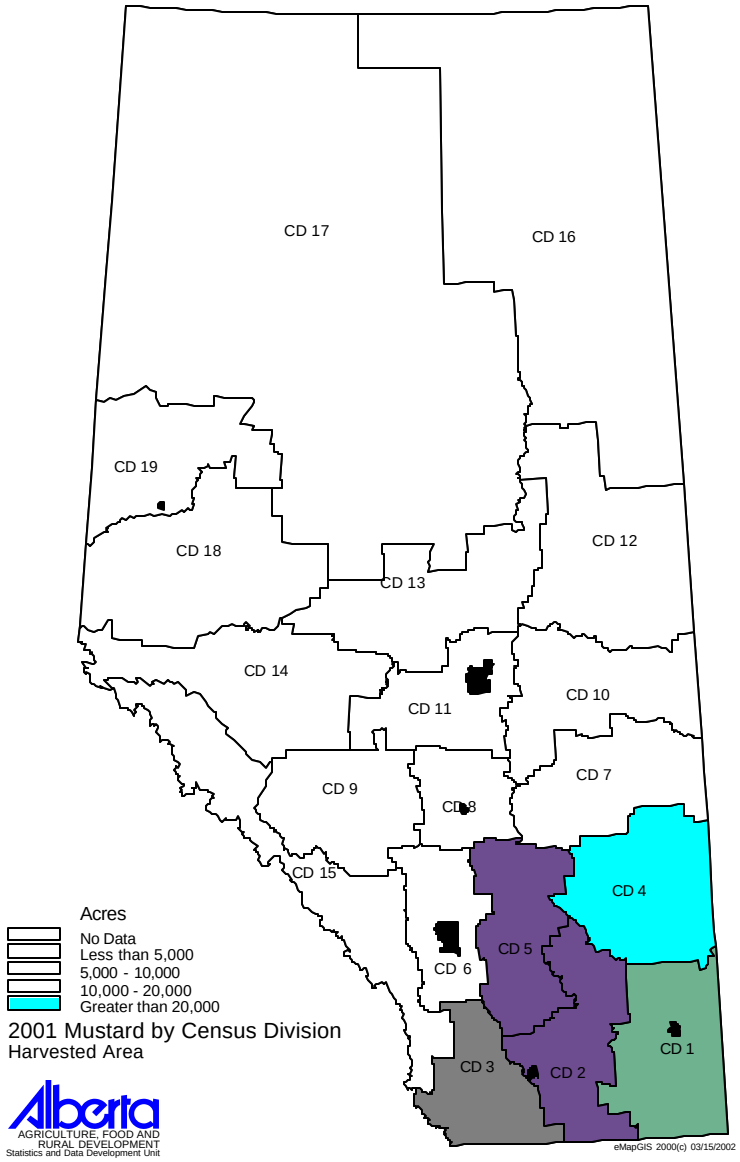
Please note that Census Division estimates were generated from a small sample; therefore, data usage with caution is advised.

Mustard

Mustard seed is grown on dry land in the southeastern parts of Alberta. In 2001, consistent dryness in the area through the 2001 crop season significantly reduced mustard seed yields. As a result, Alberta had a record low average yield of 373 pounds per acre in 2001, with Census Division 1 reporting an average yield of only 250 pounds per acre. A total of 10,825 tonnes of mustard seed were produced from 64,000 acres harvested in 2001.

However, the low mustard seed production in Alberta and Western Canada resulted in a tight supply and record or near record high prices. Canada is one of the largest mustard seed producers in the world and provides about three-quarters of total world mustard seed exports.

Yellow mustard continued to dominate, accounting for 78% of the provincial total harvested acreage in 2001, with brown mustard and oriental mustard representing 7% and 15%, respectively.

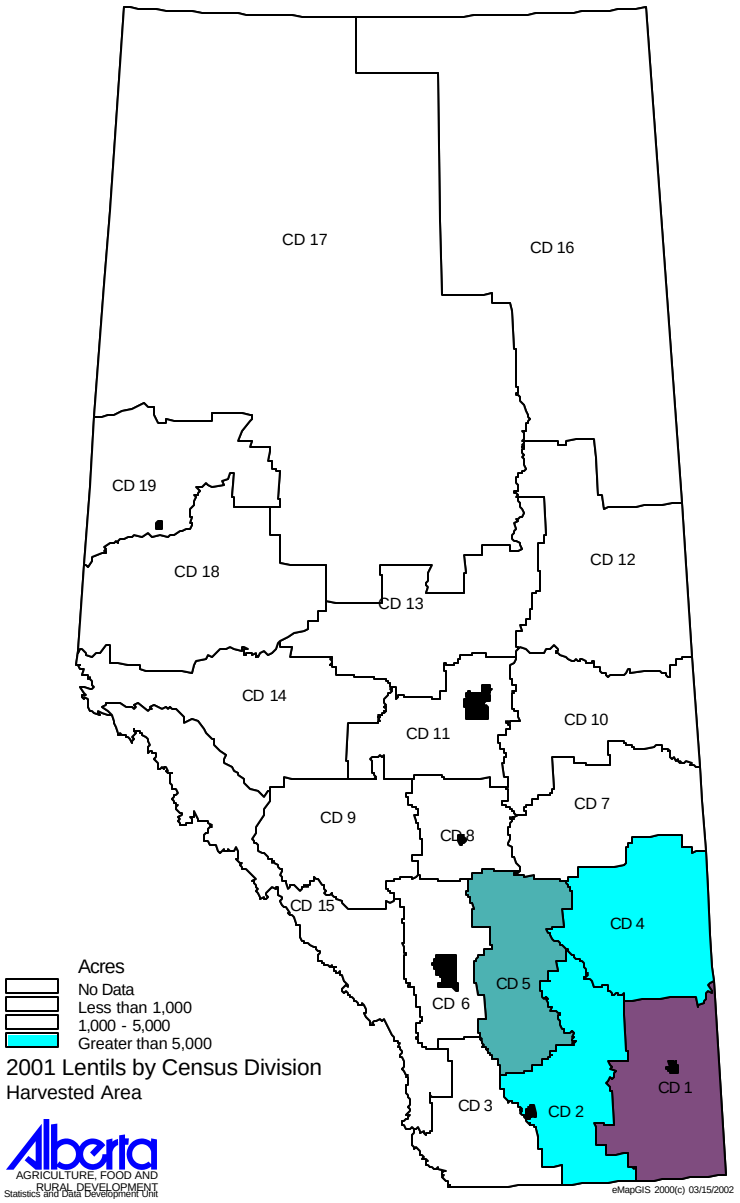


Lentils

In 2001, total area seeded to lentils was estimated at 24,000 acres, of which, 18,000 acres were harvested, with an average yield of 450 pounds per acre. Total lentil production in Alberta was estimated at only 3,674 tonnes in 2001, compared to 10,580 tonnes in 2000 and 12,400 tonnes in 1999.

The near record low lentil yield in 2001 was a result of severe drought conditions in the southeastern parts of the province, where lentils are grown in Alberta. The average yield was 684 pounds per acre in 2000 and 1,245 pounds per acre in 1999.

In addition, limited lentil acreage is irrigated in Alberta.

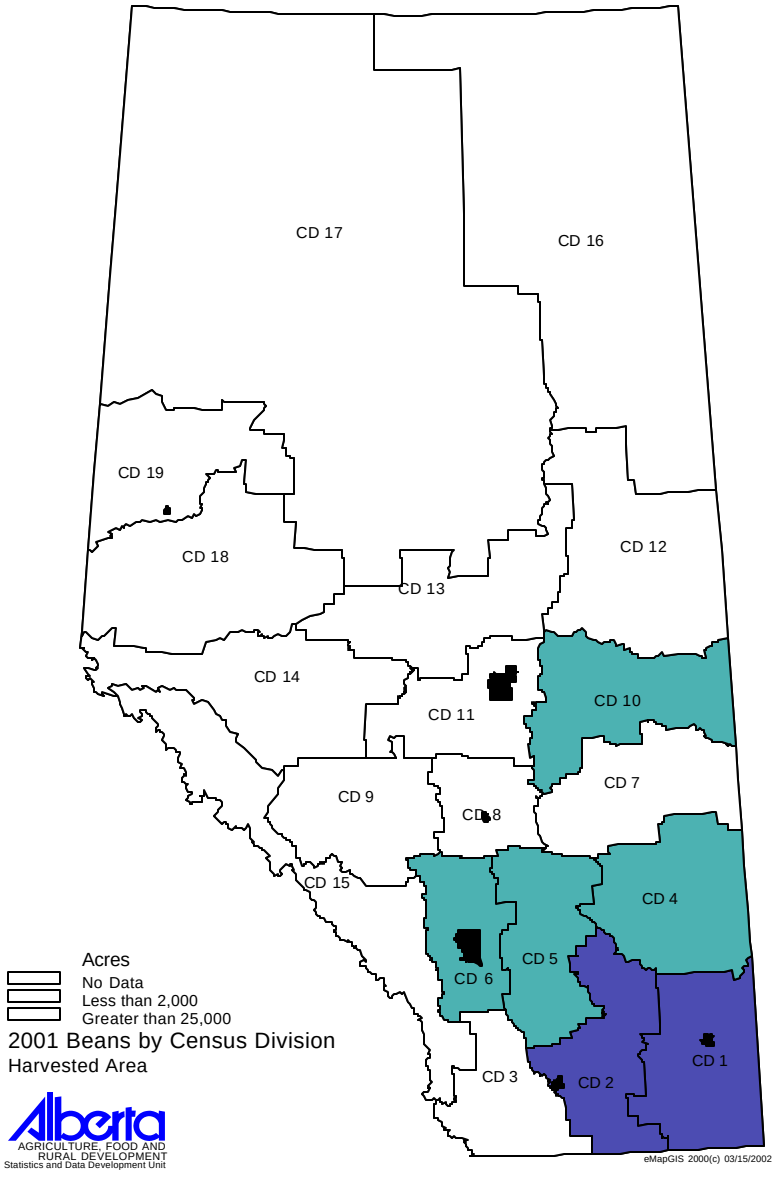


Dry Beans

In 2001, total area seeded to dry beans remained unchanged at 55,000 acres, of which, 54,000 acres were harvested, with an average yield of 2,230 pounds per acre. Total 2001 production was estimated at 54,500 tonnes, down slightly from 55,622 tonnes in 2000.

Dry beans are mostly grown under irrigation in southern Alberta. Census Divisions 1 and 2 jointly represented 95% of total dry bean area in 2001. Over 90% of dry bean acreage is irrigated.

In addition, dry beans are grown under contract in Alberta.



Chickpeas

Chickpeas are the latest Cinderella crop in the Prairies. In Alberta, total area seeded to chickpeas increased 92% to 96,000 acres in 2001 from 50,000 acres in 2000. However, with a much lower average yield significantly offsetting the increase in area, 2001 chickpea production (20,067 tonnes) was only 22% higher than in 2000.

Alberta producers harvested 83,000 acres of chickpeas with an average yield of 533 pounds per acre in 2001, compared to 49,000 acres harvested and an average yield of 738 pounds per acre in 2000.

Chickpeas are grown in the southeastern parts of Alberta, where severe drought conditions and insect problems prevailed during the 2001 crop season. Chickpea acreage in Census Divisions 1, 2, 4 and 5 accounted for 95% of the provincial total in 2001.

Chickpea data is not available for years prior to 2000.

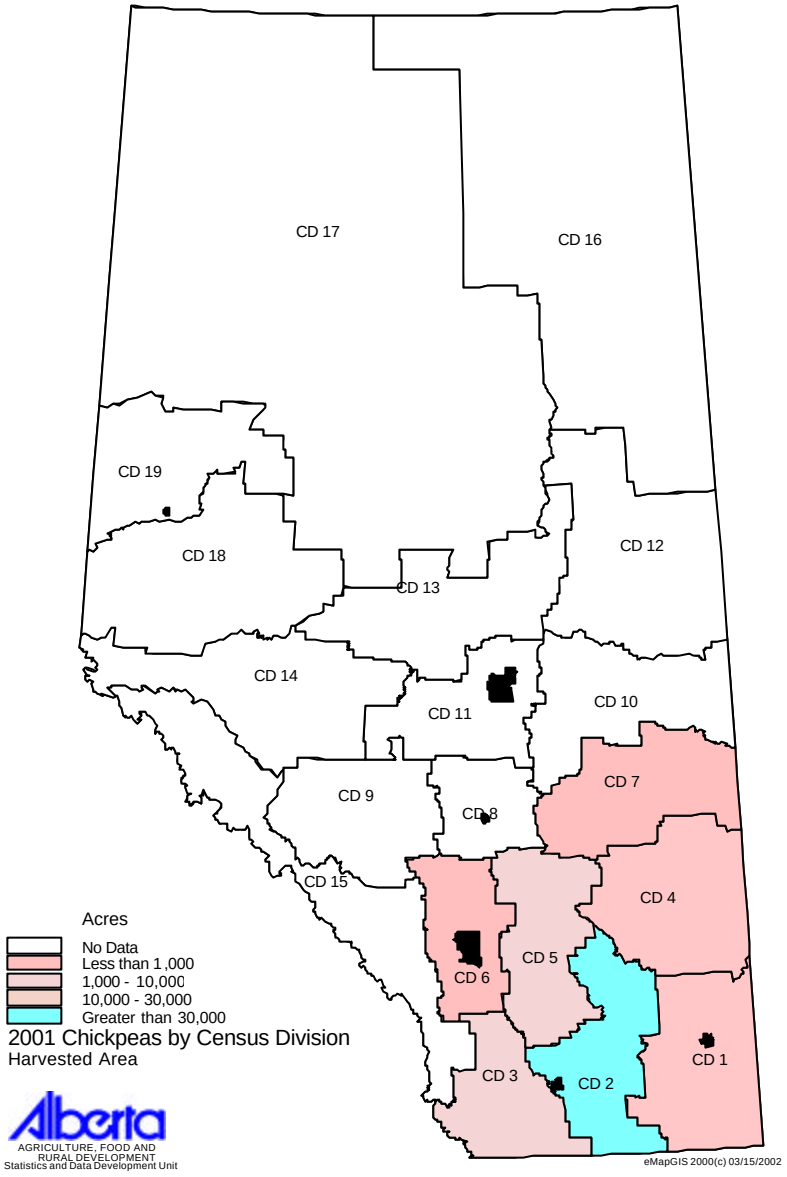


Table 4 Alberta Specialty Crops Historical Series

		1992	1993	1994	1995	1996	1997	1998	1999	2000 *	2001 *
Alfalfa Seed (1)											
Inspected area	(acres)	14,418	13,369	13,116	12,851	10,355	10,376	12,069	16,461	17,117	15,381
Yield	(lbs/acre)	85	83	340	265	265	300	425	200	525	385
Production	(tonnes)	556	503	2,023	1,545	1,245	1,412	2,327	1,493	4,076	2,686
Buckwheat											
Harvested area	(acres)	-	400	500	850	850	400	400	400	-	-
Yield	(bu/acre)	-	-	-	-	-	-	-	-	-	-
Production	(tonnes)	-	-	-	-	-	-	-	-	-	-
Canary Seed											
Harvested area	(acres)	1,500	6,200	20,000	10,000	25,000	10,000	20,000	10,000	7,900	4,300
Yield	(lbs/acre)	-	1,470	1,100	990	950	800	950	1,400	1,100	680
Production	(tonnes)		4,134	9,980	4,500	10,900	3,700	8,600	6,400	3,942	1,326
Corn for Grain											
Harvested area	(acres)	4,000	5,000	5,000	5,000	2,600	4,000	5,000	10,000	13,000	3,000
Yield	(bu/acre)	55.0	100.0	100.0	100.0	96.2	100.0	90.0	80.0	110.0	86.7
Production	(tonnes)	5,600	12,700	12,700	12,700	6,400	10,200	11,400	20,300	36,324	6,607
Corn Silage											
Harvested area	(acres)	20,000	10,000	10,000	10,000	10,000	15,000	15,000	15,000	28,600	30,000
Yield	(tons/acre)	9.00	13.00	20.00	15.99	19.50	12.00	20.00	13.30	17.10	16.00
Production	(tonnes)	163,300	117,900	181,400	145,100	176,900	163,300	272,200	181,400	443,672	435,453
Corn Sweet (2)											
Harvested area	(acres)	1,500	2,300	2,600	2,800	2,800	2,900	3,100	3,000	1,951	3,106
Yield	(tonnes/acre)	2.54	3.80	6.83	6.30	6.30	5.00	5.60	6.00	6.10	5.68
Production	(tonnes)	3,810	8,040	17,760	17,600	17,600	14,500	17,400	18,600	11,929	17,639
Fababeans											
Harvested area	(acres)	2,900	3,000	3,000	2,500	2,500	450	550	300	2,000	3,000
Yield	(lbs/acre)	1,560	2,010	1,950	1,824	1,824	1,617	1,260	3,000	2,520	2,200
Production	(tonnes)	2,052	2,735	2,650	2,070	2,070	330	310	400	2,286	2,994
Dry Beans											
Harvested area	(acres)	12,000	30,000	25,000	30,000	25,000	35,000	45,000	47,000	54,500	54,000
Yield	(cwt/acre)	10.4	15.0	32.0	20.0	18.0	22.9	22.2	20.0	22.5	22.3
Production	(tonnes)	5,700	20,400	36,300	27,200	20,400	36,300	45,400	42,700	55,622	54,500
Dry Field Peas											
Harvested area	(acres)	190,000	280,000	390,000	445,000	280,000	385,000	500,000	455,000	622,600	610,000
Yield	(bu/acre)	29.2	39.3	35.3	34.0	40.4	40.3	35.9	42.9	35.6	32.6
Production	(tonnes)	151,000	299,400	374,200	412,300	307,500	421,800	488,000	530,800	603,045	541,577
Lentils											
Harvested area	(acres)	45,000	30,000	40,000	38,000	20,000	25,000	15,000	22,000	34,100	18,000
Yield	(lbs/acre)	767	690	1,075	1,250	845	732	1,180	1,245	684	450
Production	(tonnes)	15,600	9,400	19,500	21,500	7,700	8,300	8,000	12,400	10,580	3,674
Mustard Seed											
Harvested area	(acres)	35,000	60,000	90,000	100,000	85,000	145,000	110,000	90,000	84,900	64,000
Yield	(lbs/acre)	1,266	1,180	889	1,125	753	769	795	1,100	699	373
Production	(tonnes)	20,100	32,100	36,300	51,100	29,000	50,600	39,700	44,800	26,920	10,825

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

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

(2) Alberta Vegetable Growers (processing only, excluding organic sweet corn)

Note: * Data shown in 2000 and 2001 are from AAFRD, Alberta Specialty Crop Survey, 2000 and 2001

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

		1992	1993	1994	1995	1996	1997	1998	1999	2000 *	2001 *
Safflower											
Harvested area	(acres)	3,500	2,500	2,300	1,850	1,850	2,400	4,000	5,000	3,000	3,000
Yield	(lbs/acre)	535	149	1,410	1,200	1,200	1,150	800	900	---	750
Production	(tonnes)	849	169	1,470	1,000	1,000	1,250	1,450	2,000	---	1,021
Sugar Beets (1)											
Harvested area	(acres)	31,127	32,432	34,836	33,656	33,463	33,124	41,132	44,522	42,017	28,457
Yield	(tonnes/acre)	15.29	16.72	21.17	20.46	20.22	19.64	23.32	18.86	21.90	18.38
Production	(tonnes)	475,823	542,253	737,774	688,498	676,611	650,423	959,310	839,773	920,252	523,110
Sunflowers											
Harvested area	(acres)	3,000	5,000	5,000	5,000	2,000	5,000	5,000	5,000	6,400	6,000
Yield	(lbs/acre)	833	1,000	2,000	1,900	1,675	1,400	1,900	1,600	2,050	1,250
Production	(tonnes)	1,100	2,300	4,500	4,300	1,500	3,200	4,300	3,600	5,951	3,402
Triticale											
Harvested area	(acres)	8,000	15,000	10,000	10,000	15,000	15,000	50,000	60,000	55,400	48,000
Yield	(bu/acre)	24.5	40.0	40.0	50.0	33.3	36.7	38.0	53.3	35.6	32.0
Production	(tonnes)	5,000	15,200	10,200	12,700	12,700	14,000	48,300	81,300	50,098	39,016
Potatoes											
Harvested area	(acres)	26,100	27,700	29,000	29,500	31,000	30,500	32,200	42,300	47,700	54,000
Yield	(cwt/acre)	230.0	269.0	277.8	297.7	268.0	290.0	295.0	290.0	310.0	316.0
Production	(tonnes)	272,300	338,000	365,500	398,400	376,900	401,200	430,900	556,400	670,700	774,000

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

(1) Alberta Sugar Beet Growers 2001, 77th Annual Report

Note: * Data shown in 2000 and 2001 are from AAFRD, Alberta Specialty Crop Survey, 2000 and 2001

Table 5 Western Canada Specialty Crops Area and Production

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000*	2001*
Mustard Seed					**Seeded Area '000 acres**						
Alberta	59.9	45.0	60.0	90.0	100.0	90.0	145.0	110.0	100.0	90.0	78.0
Saskatchewan	202.7	240.0	400.0	700.0	550.0	490.0	560.0	580.0	585.0	465.0	290.0
Manitoba	16.3	10.0	10.0	10.0	10.0	11.0	17.0	10.0	7.0	10.0	10.0
Western Canada	278.9	295.0	470.0	800.0	660.0	591.0	722.0	700.0	692.0	565.0	378.0
					Production '000 tonnes						
Alberta	30.5	20.1	32.1	36.3	51.1	29.0	50.6	39.7	44.8	26.9	10.8
Saskatchewan	81.7	109.7	180.0	278.9	190.6	196.9	186.5	195.5	259.7	185.1	80.1
Manitoba	8.9	3.5	3.8	4.1	2.6	4.9	6.3	3.4	1.9	3.3	3.4
Western Canada	121.1	133.3	215.9	319.3	244.3	230.8	243.4	238.6	306.4	215.3	94.3
Sunflowers					**Seeded Area '000 acres**						
Alberta	2.8	4.0	5.0	5.0	5.0	2.0	5.0	5.0	5.0	6.5	7.0
Saskatchewan	17.5	20.0	80.0	60.0	40.0	25.0	35.0	40.0	65.0	25.0	20.0
Manitoba	182.4	160.0	125.0	140.0	75.0	63.0	85.0	125.0	140.0	155.0	140.0
Western Canada	202.7	184.0	210.0	205.0	120.0	90.0	125.0	170.0	210.0	186.5	167.0
					Production '000 tonnes						
Alberta	2.1	1.1	2.3	4.5	4.3	1.5	3.2	4.3	3.6	6.0	3.4
Saskatchewan	8.2	8.4	29.0	25.9	18.4	15.7	14.3	21.3	35.4	12.4	8.1
Manitoba	124.3	55.3	47.2	86.6	43.5	37.7	47.6	86.2	82.9	101.8	86.2
Western Canada	134.6	64.8	78.5	117.0	66.2	54.9	65.1	111.8	121.9	120.2	97.7
Lentils					**Seeded Area '000 acres**						
Alberta	12.2	50.0	40.0	40.0	40.0	20.0	25.0	20.0	25.0	35.0	24.0
Saskatchewan	442.8	475.0	750.0	830.0	735.0	690.0	780.0	900.0	1,210.0	1,660.0	1,780.0
Manitoba	133.5	165.0	130.0	115.0	50.0	40.0	8.0	15.0	16.0	35.0	4.0
Western Canada	588.5	690.0	920.0	985.0	825.0	750.0	813.0	935.0	1,251.0	1,730.0	1,808.0
					Production '000 tonnes						
Alberta	6.6	15.6	9.4	19.5	21.5	7.7	8.3	8.0	12.4	10.6	3.7
Saskatchewan	272.2	254.0	315.2	381.0	381.9	373.8	365.2	465.9	702.6	888.1	576.6
Manitoba	64.0	79.4	24.1	49.9	28.5	21.0	5.3	5.9	8.8	16.1	2.3
Western Canada	342.8	349.0	348.7	450.4	431.9	402.5	378.8	479.8	723.8	914.8	582.6
Dry Field Peas					**Seeded Area '000 acres**						
Alberta	167.1	200.0	300.0	400.0	465.0	290.0	385.0	510.0	470.0	640.0	650.0
Saskatchewan	195.8	350.0	750.0	1,110.0	1,350.0	900.0	1,500.0	1,900.0	1,520.0	2,240.0	2,750.0
Manitoba	127.4	125.0	200.0	210.0	180.0	145.0	205.0	260.0	105.0	155.0	175.0
Western Canada	490.3	675.0	1,250.0	1,720.0	1,995.0	1,335.0	2,090.0	2,670.0	2,095.0	3,035.0	3,575.0
					Production '000 tonnes						
Alberta	164.7	151.0	299.4	374.2	412.3	307.5	421.8	488.0	530.8	603.0	541.6
Saskatchewan	160.6	244.9	585.1	898.1	868.2	729.4	1,158.0	1,613.9	1,623.4	2,072.4	1,475.1
Manitoba	84.4	108.9	85.7	168.7	147.0	132.0	178.3	225.9	92.0	160.5	170.7
Western Canada	409.7	504.8	970.2	1,441.0	1,427.5	1,168.9	1,758.2	2,327.7	2,246.2	2,835.9	2,187.4
Canary Seed					**Seeded Area '000 acres**						
Alberta	7.0	2.0	0.0	0.0	10.0	25.0	10.0	20.0	15.0	12.0	5.0
Saskatchewan	215.1	215.0	300.0	480.0	330.0	520.0	250.0	450.0	340.0	360.0	300.0
Manitoba	20.1	18.0	12.0	25.0	25.0	70.0	20.0	50.0	15.0	40.0	60.0
Western Canada	242.2	235.0	312.0	505.0	365.0	615.0	280.0	520.0	370.0	412.0	365.0
					Production '000 tonnes						
Alberta	3.0	1.0	0.0	0.0	4.5	10.9	3.7	8.6	6.4	3.9	1.3
Saskatchewan	93.0	116.8	124.7	226.8	137.9	240.0	102.1	201.8	152.0	148.6	78.9
Manitoba	7.3	7.3	3.1	13.6	12.2	33.7	9.2	24.9	7.6	17.2	11.3
Western Canada	103.3	125.1	127.8	240.4	154.6	284.6	115.0	235.3	166.0	169.7	91.5

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

* Data shown in 2000 and 2001 for Alberta is taken from AAFRD, Alberta Specialty Crop Survey, 2000 and 2001

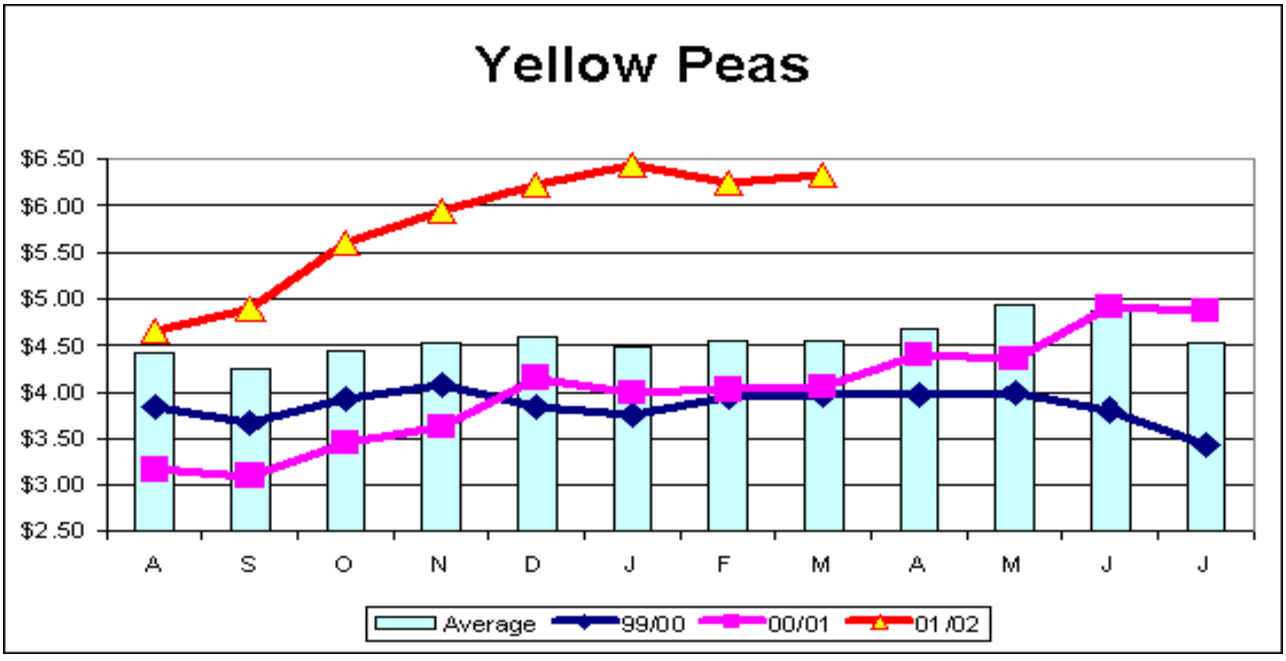
MARKET OUTLOOK FOR SELECTED SPECIALTY CROPS

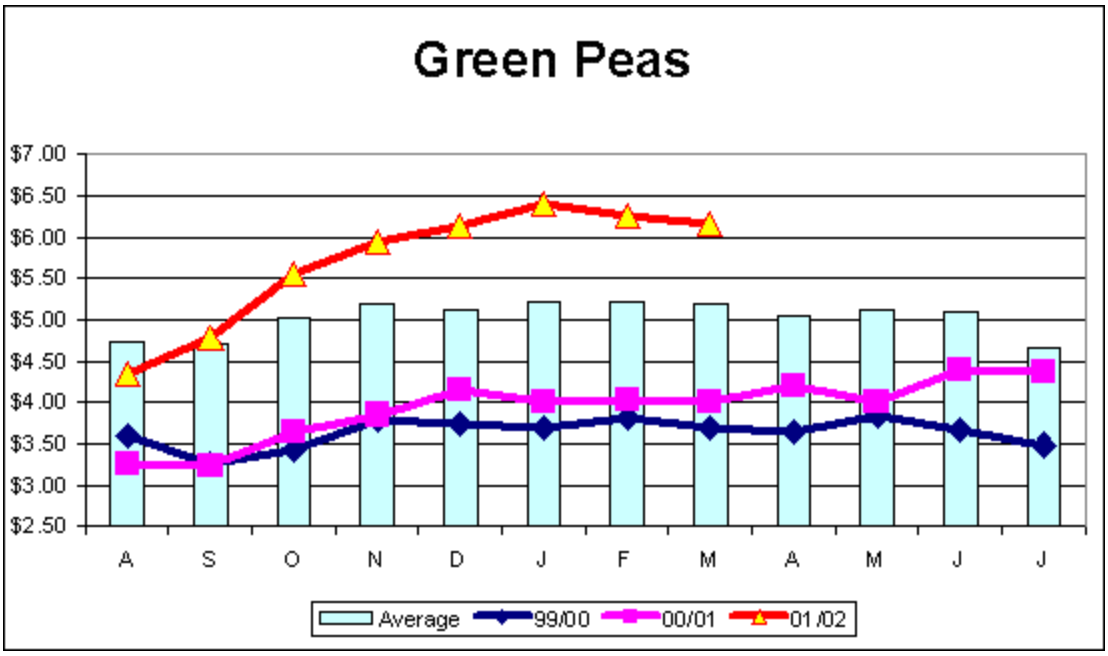
By Charlie Pearson

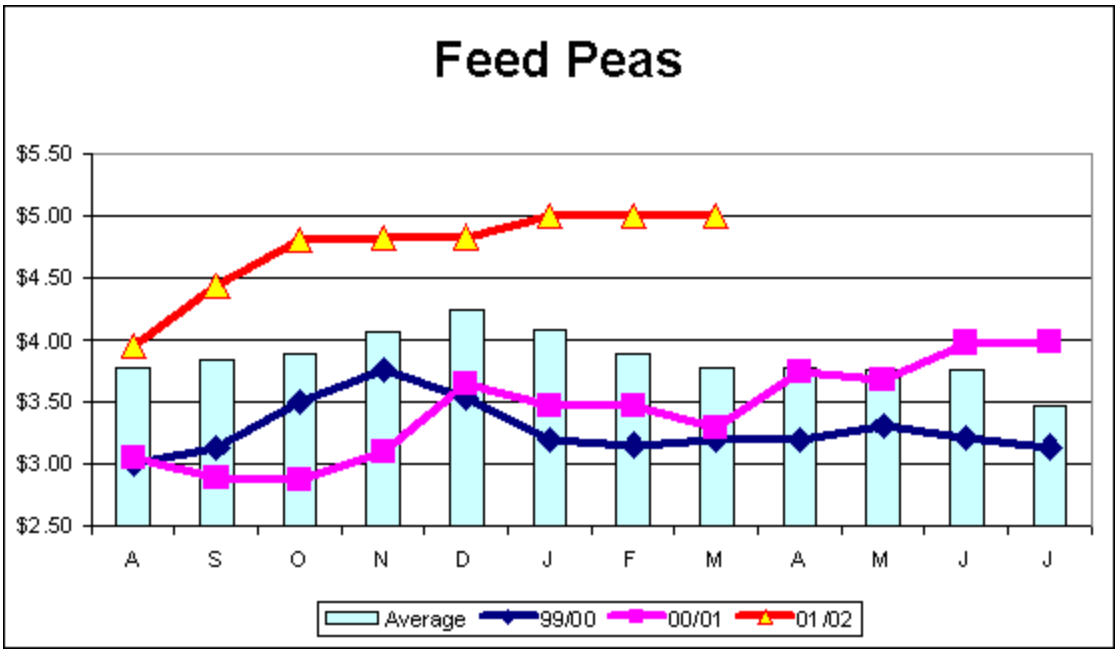
Dry Field Pea Markets

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 $6.50/bu range over the past winter. Prices are likely to hold this range during the winter but will likely start to slip lower into the spring as new crop outlook takes center stage.

Western Canadian farmers seeded a record 3.6 million acres this past spring, up 19% from 2000. This past summer's drought cut back on yields such that the average was 22.5 bu/acre, down from a five year average of 32 bu/acre and 35 bu/acre in 2000. Total Canadian pea production was 2.2 MMT, down from 2.9 MMT in 2000.







The coming year will be challenging given continued large western Canadian field pea acreage. High nitrogen fertilizer prices and farm managers who have found a good fit for peas within their crop rotations are the major factors in this increase. Western Canadian pea acres are expected to remain similar to last year's record 3.6 million acres.

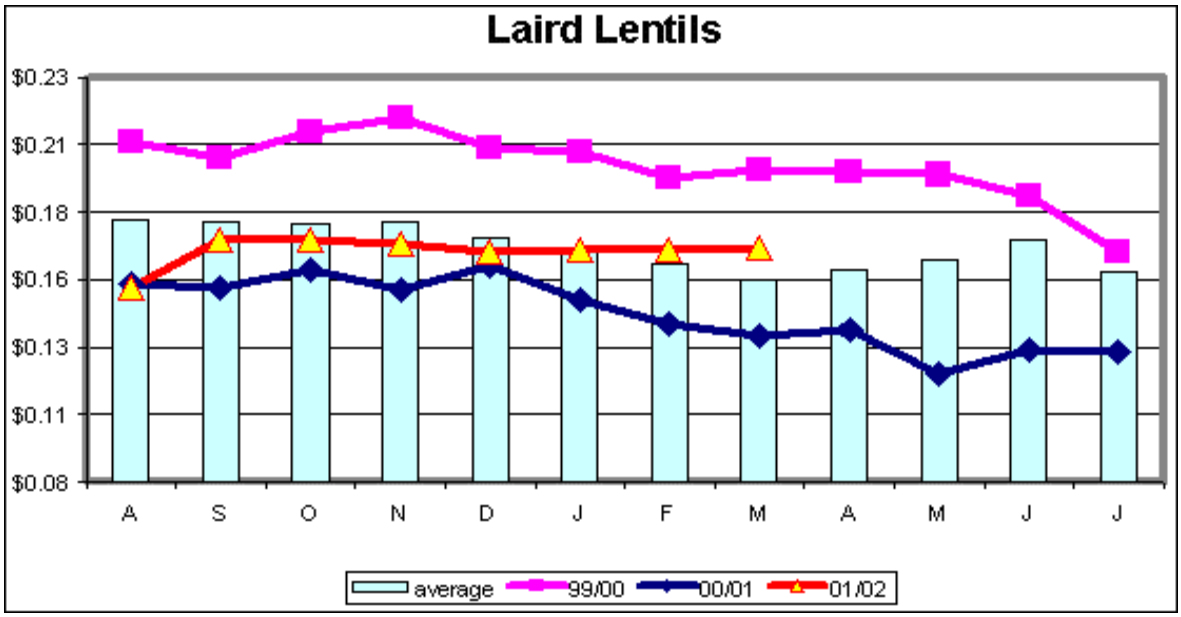
A larger European pea/lower priced soybean meal will keep feed pea prices under pressure. The continued ban on the use of meat and bone meal in European feed rations will allow a continued large export program for feed peas. A positive to come out of this is that the

feed peas will continue to be competitively priced into domestic feed rations as an energy source with the implication of continued increases in rations. Look for domestic feed pea prices to hold in the $3.75 to $4.25/bu range in the coming year, down from $4.25 to $5.00/bu in the current crop year.

Larger pulse crops in S.E. Asia (our major importer) and Australia (major competitor) will result in lower edible pea prices in the coming year. Our large crop/less feed pea demand will also mean increased supplies available for export from Canada. Canada will have good opportunities to move similar volumes to this past crop year but likely at prices closer to $4.50 to $5.00/bu versus $6.00 to $6.50/bu of this past six months.

Lentil Markets

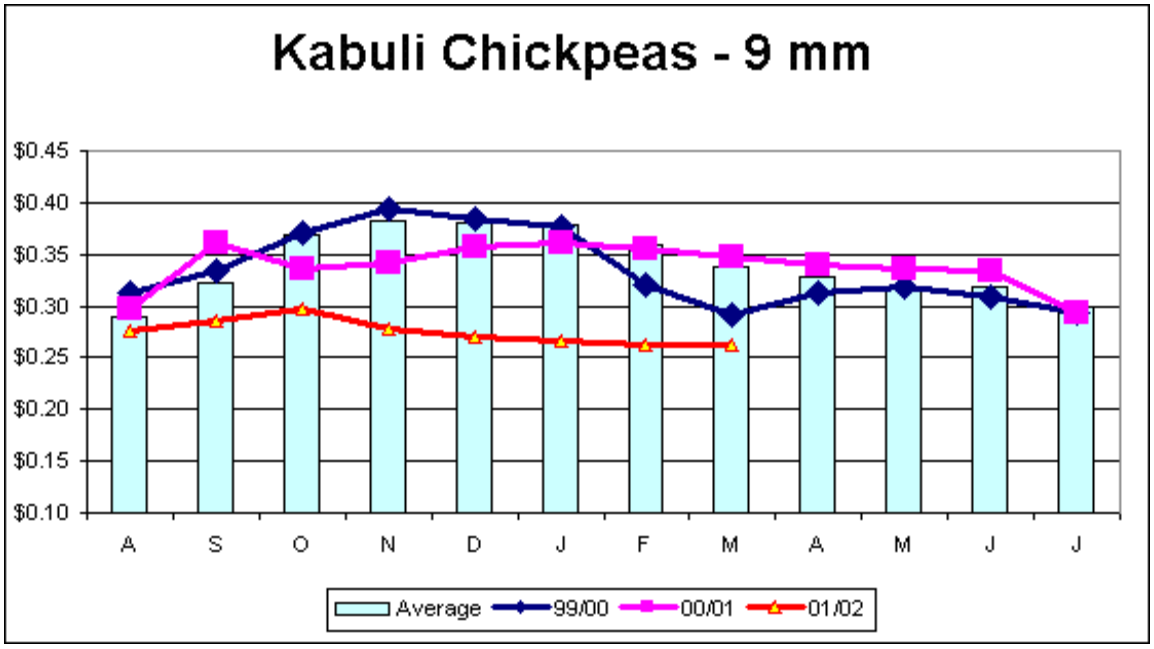
Larger Canadian and world lentil production has kept prices under pressure this crop year with a range of 13 to 17 cents/lb for green lentils and 14 to 15 cents/lb for red lentils. World lentil production has grown from about 2.8 MMT in 97/98 to about 3.2 MMT in the current crop year with increased production in all the major exporting countries (Canada, Australia, Turkey and the United States). The implication has been strong competition among the major lentil exporters. The export market is segregated, in which Turkey and Australia mainly export red lentils, whereas Canada mainly exports green lentils.

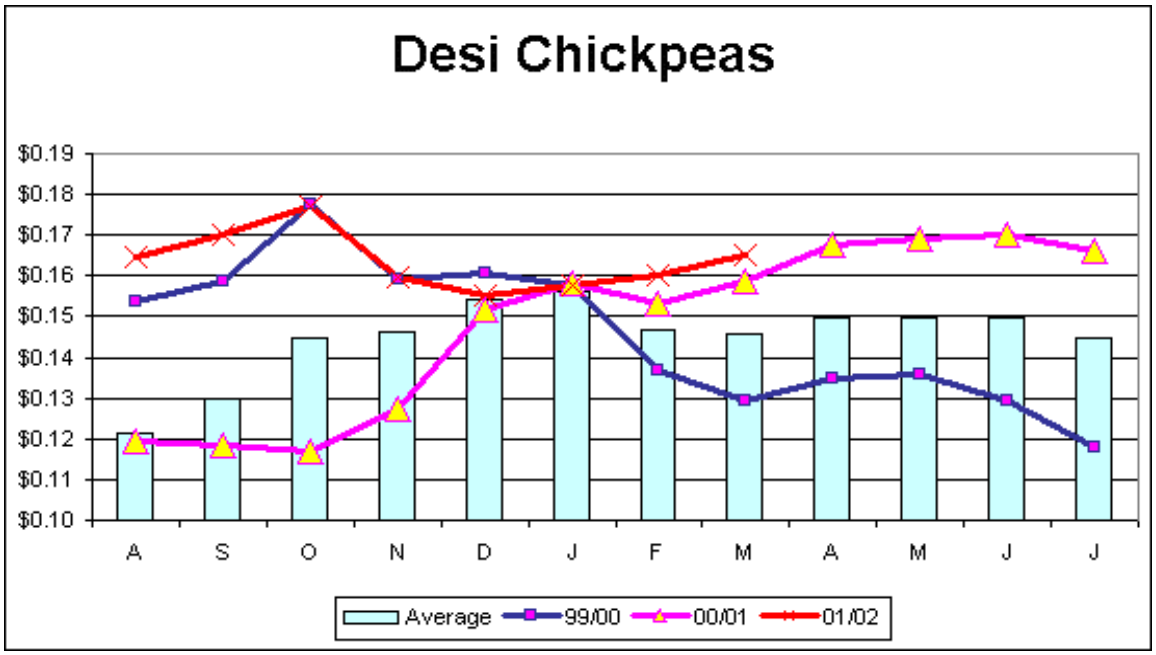


Western Canadian farm managers are expected to have seeded 1.6 million acres to lentils this spring, down 10% from 2001. Assuming average yields in the 1,100 to 1,200 lb/acre range and a normal quality distribution, prices for all classes of lentils should hold in the 13 to 17 cent/lb range.

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 2000 was a record 465,000 t. The additional supplies will allow chickpea exports to triple from previous years.





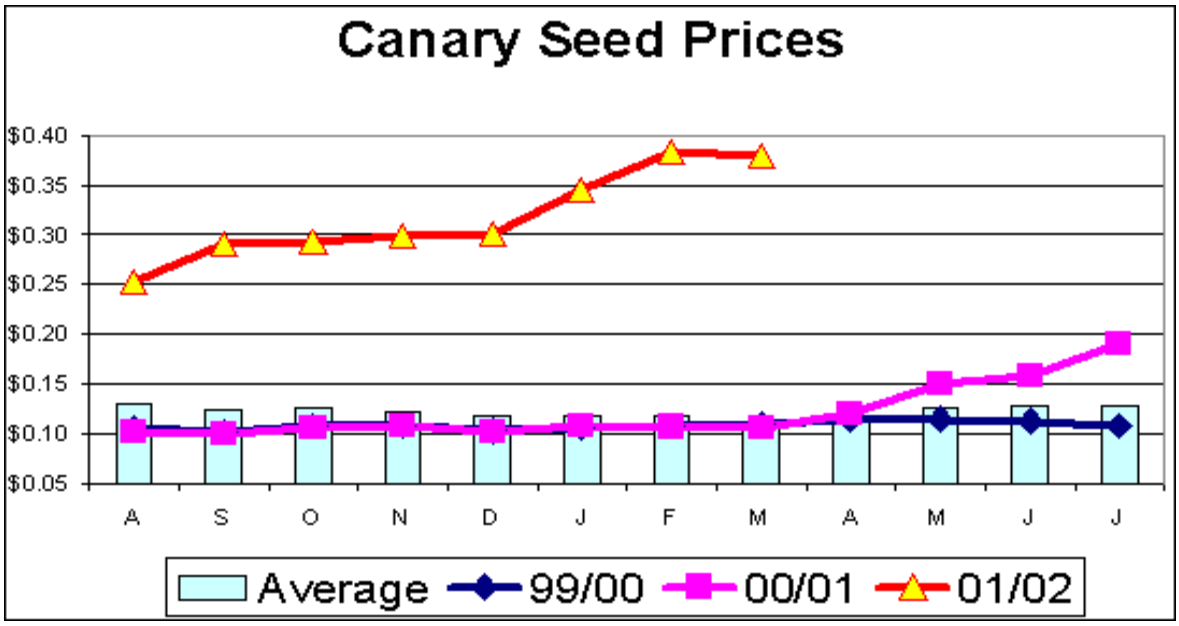
Chickpea prices for premium quality kabuli chickpeas have ranged from 26 to 28 cents/lb for 9 mm size, 20 to 23 cents/lb for 8 mm and 15 to 18 cents/lb for 7 mm. Desi chickpeas started out in the 14 to 16 cent/lb range last fall but have since increased to the 16 to 18 cent/lb area.

Western Canadian farm managers are likely to seed about 1 million acres of chickpeas this spring, down 15 to 20% from this past spring. The largest decrease will be in the smaller seeded (7 mm) kabuli type chickpeas. Based on average yields of about 1,000 lb/acre, this would result in production of 500,000 t. Larger chickpea crops are forecast in India, Australia and Turkey. This will likely result in lower prices in the coming year. New crop chickpea prices are 23 to 25 cents/lb for 9 mm kabuli, 15 to 17 cents/lb for 7 mm kabuli varieties such as B90 and Chico, and 15 to 17 cents/lb for desi.

CANARY SEED

Canary seed prices rallied over the past winter into the 35 to 40 cent/lb range, well above the 10 to 12 cent/lb range it has held for most of the past 5 years. Two factors contributed to this rally: the fact that western Canada (Saskatchewan in particular) is both the major canary seed producer (70 to 80% of world canary seed production) and exporter in the world; and a combination of reduced acres/poor yields which combined to result in a situation where we were not able to supply the birdseed markets needs. Prices have come under some pressure in the last half of the winter as substitution occurred with other ingredients in birdseed mixtures and western farm managers have become more willing sellers at current high levels. Prices are likely to hold around the 35 cent/lb range during the next 3 to 4 months.

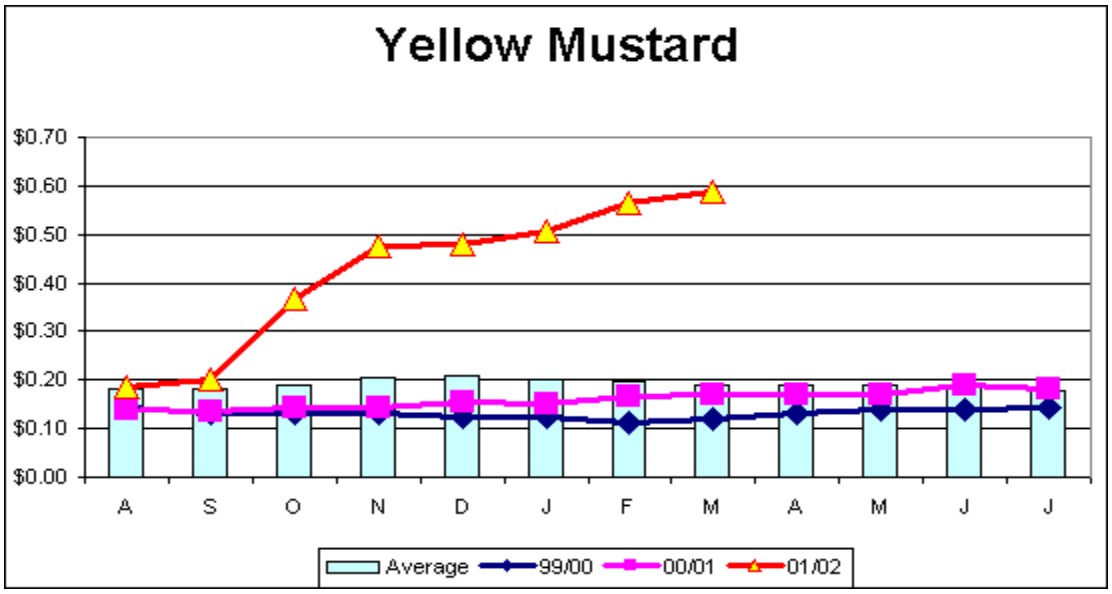
Forecasting western Canadian canary seed acreage this spring is a risky matter given the dry conditions and the fact it is a small seeded crop that needs good moisture to germinate. Assuming reasonable rainfall in the major canary seed producing regions of Saskatchewan, acreage should be up by at least 50 percent this spring. Based on average yields, this would result in a crop of around 200,000 t. Based on this assumption, canary seed prices should hold in the 15 to 20 cent/lb range. Current prices are likely to result in increased acreage in Argentina and Hungary and more competition in the export market.

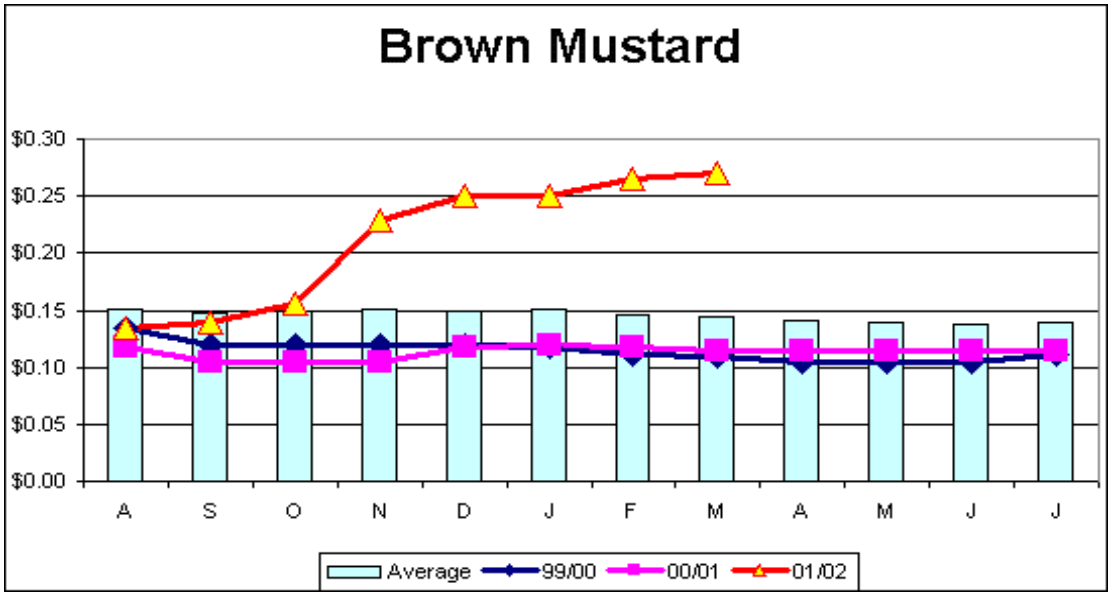


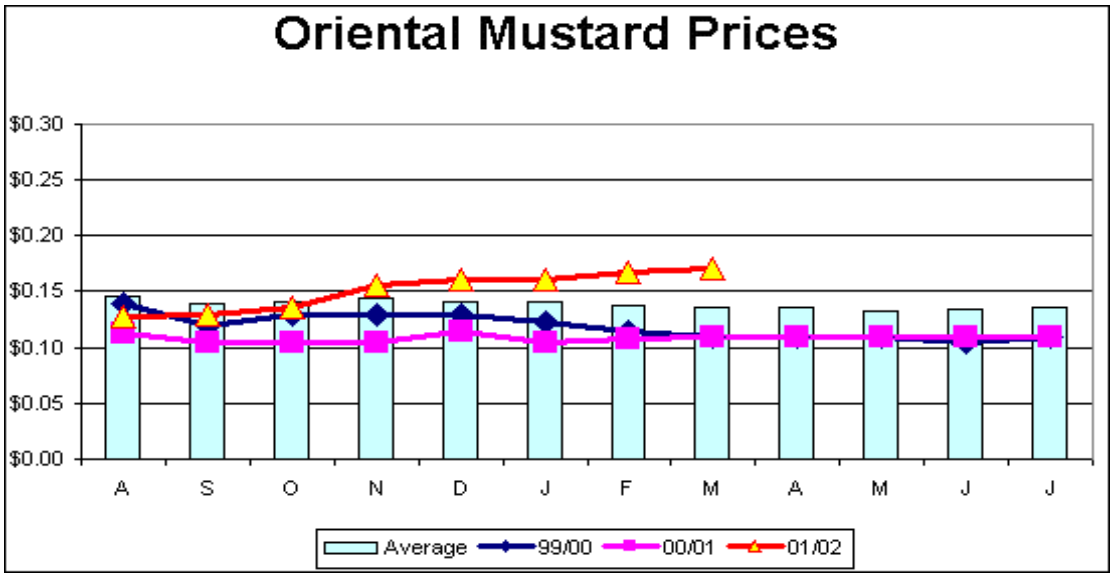
MUSTARD

A combination of reduced seeded acreage this spring and the drought this summer severely cut back on Canadian mustard seed production. Canadian mustard seed production in 2001 was around 90,000 t, less than half the average over the previous five years. 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. Yellow mustard prices have held over 60 cents/lb for most of the past winter, well above the five year average of about 20 cents/lb. Similarly, brown mustard prices have been above 25 cents/lb, about a dime above the five year average. Oriental mustard prices have remained relatively close to a five year average of 15 cents/lb.

Mustard seeded acreage is expected to nearly double this spring, reflecting this winter's higher prices. Assuming a return to more timely rains/better yields, the increased production will result in lower prices over the coming year. New crop deferred delivery contracts for yellow mustard have been around 23 to 25 cents/lb, while bids for brown and oriental mustard have been closer to 17 to 19 cents/lb.


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 99/00 00/01 01/02


Brown Mustard
$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 99/00 00/01 01/02


Oriental Mustard Prices
$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 99/00 00/01 01/02

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 and/or alternative crops for farm 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. 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 continue 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, 2001

	$ per Acre	$ per Bushel
Revenue per Acre		
Yield per Acre (bushels)	32.6	
Expected Market Price/bushel ($)	5.35	
(a) Gross Revenue per Acre	**174.41**	**5.35**
Expenses per Acre ($)		
Seed and Seed Cleaning	25.88	0.18
Fertilizer Rates: 2N 16P 1K 3S	5.93	0.90
Chemicals	29.35	0.23
Hail/Crop Insurance Premiums	7.43	0.04
Trucking and Marketing	1.39	0.25
Fuel	8.11	0.32
Repairs - Machinery & Buildings	10.58	0.35
Utilities & Miscellaneous Expenses	11.42	0.22
Custom Work & Labour	7.20	0.07
Operating Interest Paid	2.33	0.07
Unpaid Labour	3.28	0.61
(b) Variable Costs	**112.9**	**3.25**
Cash/Crop Share Rent	16.36	0.50
Taxes, Licence & Insurance	9.56	0.29
Equipment & Building - Depreciation	17.85	0.55
Paid Capital Interest	6.95	0.21
(c) Capital Costs	**50.72**	**1.56**
(d) Total Production Costs (b+c)	**163.62**	**5.02**
Gross Margin	**35.59**	**1.09**
Return to Investment (a-d+capital interest)	**17.74**	**0.54**
Return to Equity (a-d)	**10.79**	**0.33**

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, 2001

	$ per Acre	$ per pound
Revenue per Acre		
Yield per Acre (pounds)	2235	
Expected Market Price/pound ($)	0.26	
(a) Gross Revenue per Acre	**581.10**	**0.26**
Expenses per Acre ($)		
Seed and Seed Cleaning	47.35	0.02
Fertilizer Rates: 2N 16P 1K 3S	38.70	0.02
Chemicals	83.56	0.04
Hail/Crop Insurance Premiums	10.67	0.00
Trucking and Marketing	6.35	0.00
Fuel	30.93	0.01
Repairs - Machinery & Buildings	46.00	0.02
Utilities & Miscellaneous Expenses	10.89	0.00
Custom Work & Labour	10.60	0.00
Operating Interest Paid	7.20	0.00
Unpaid Labour	84.92	0.04
(b) Variable Costs	**377.17**	**0.17**
Cash/Crop Share Rent	88.65	0.04
Taxes, Licence & Insurance	26.85	0.01
Equipment & Building - Depreciation	62.42	0.03
Paid Capital Interest	12.30	0.01
(c) Capital Costs	**190.22**	**0.09**
(d) Total Production Costs (b+c)	**567.39**	**0.25**
Gross Margin	**227.20**	**0.10**
Return to Investment (a-d+capital interest)	**26.01**	**0.01**
Return to Equity (a-d)	**13.71**	**0.01**

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

Table 8 - Crop Budgets for Desi and Kabuli Chickpeas Production Costs and Returns

	Desi Chickpeas	Kabuli Chickpeas
Revenue Per Acre		
Estimated Yield per Acre (lbs)	750	850
Price per Pound ($)	0.16	0.33
(a) Gross Revenue per Acre ($)	**120.00**	**280.50**
Expenses per Acre ($)		
Variable Expenses per Acre		
Seed	20.85	48.75
Fertilizer	12.60	12.60
Chemicals	17.32	19.54
Machinery Expenses (Fuel & Repair)	14.50	14.50
Custom Work & Hired Labour	6.00	6.00
Utilities & Miscellaneous	3.45	3.45
Interest on Variable Expenses	2.24	3.20
(b) Total Variable Expenses	**76.96**	**108.04**
Other Expenses per Acre		
Building Repair	1.30	1.30
Property Expenses, Insurance & Licences	5.20	5.20
Machinery & Building Depreciation	16.85	16.85
Machinery & Building Investment	11.54	11.54
Land Investment	20.00	20.00
Labour & Management	15.60	16
(c) Total Other Expenses	**70.49**	**70.49**
(d)TOTAL PRODUCTION COSTS (b+c)	**147.45**	**178.53**
RETURNS PER ACRE ($)		
Return Over Variable Expenses (a-b)	**43.04**	**172.46**
Return Over Total Production Costs (a-d)	**-27.45**	**101.97**

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

Chickpea Production in Alberta

By Michael Clawson, Special Crops Specialist, Lethbridge

Introduction

Chickpeas are part of the Leguminosae family, and are also known in the salad bar business as garbonzo beans. This ancient crop was believed to be first grown in Turkey before 5000 B.C. Rhizobium bacteria living in association with the roots of the chickpea plant have the ability to take nitrogen out of the air and make it available for plant growth.

Chickpeas are an annual spring seeded legume which currently has the second highest pulse crop acreage worldwide. Last year, approximately 93,000 acres were grown in Alberta but with the drought about 6,000 acres were left unharvested.

There are two main commercial classes of chickpeas: kabuli and desi. The kabuli type normally have a unifoliolate leaf whereas the desi types normally have a fern type leaf. The fern type leaf is thought to be more disease resistant and breeding work is being done to have more kabuli types have this feature.

Chickpea seed varies in colour, shape and size. The kabuli type seed is usually beaked and wrinkled and is a light tan color. It is the light colour that makes it attractive to the salad bar trade. The desi seed is usually smaller, darker and dimpled.

Desi chickpea production accounts for 85-90% of the world's production. Most of this crop is produced in India, Pakistan, Burma, Bangladesh and Australia, and consumed in India where they mill or split the seeds to make food products.

Kabuli chickpeas make up 10 – 15% of the global production with Turkey, Syria, Iran, Mexico, Morocco and Ethiopa. In 1997, Alberta grew 1,200 acres and Saskatchewan grew 25,000 acres. In 2001 these acres increased dramatically to close of 1.3 million acres for the two provinces.

Adaptation

Chickpeas are adapted best to the brown and dark brown soil zones of Alberta. They thrive under good moisture conditions with daytime temperatures between 21 – 29º C and nighttime temperatures of 20º C. The long growing season of the current varieties limits them to the southern part of the province and going outside that area increases the cropping risk. The other limitation is the very aggressive disease Ascochyta rabiei. Also because chickpeas are indeterminate (they must be moisture stressed to mature) makes rainfall detrimental in the end of the growing season. Chickpeas have been grown

successfully under irrigation when the water is normally shut off during the first or second week in July. Desi chickpeas require 95 – 105 days to mature and kabulis require 100 – 110 days to mature.

Recommended Rotations

Chickpea production can be very successful with a good rotation that includes cereal crops. Where ascochyta blight occurs, the crop residues should be incorporated and chickpeas not be grown in that same field for four years.

As chickpeas are susceptible to many herbicides, a good spraying record is essential to prevent possible damage. Avoid seeding fields with the following history: Tordon, Glean › 5 years; Ally, Amber – 4 years; Accord – 2 years: Assert, Attain, Odyssey, Pursuit, Lontrel, Curtail, Prevail, Banvel (high summerfallow rate) – 1 year; Rustler, Banvel, 2, 4-D – spring applied. For more information, consult Alberta's Crop Protection Guide (Blue Book) or the Alberta Agriculture, Food and Rural Development website.

Varieties

See Table 9 for the main characteristics of Kabuli and Desi varieties.

Only ascochyta blight-resistant varieties should be grown in Alberta as a number of fields had the disease in 2001. Of the large kabuli types, Sanford, Dwelly, CDC Xena, CDC Diva and Evans all are rated as poor in resistance to ascochyta post flowering and Yuma is rated as fair. All the desi varieties such as Myles, CDC Desiray, CDC Anna and CDC Chico are rated fair post flowering. For up to date information, consult the Alberta Seed Guide or the Alberta Agriculture, Food and Rural Development website.

Inoculation

As a pulse crop, chickpeas will require far less nitrogen fertilizer if properly inoculated with the chickpea strain of Rhizobium bacteria. Inoculants are sensitive to granular fertilizer so banding fertilizer to the side or to the side and below the seed is recommended. For best results, inoculant should be applied immediately before seeding.

Seeding

Good quality seed is very important for successful chickpea production. Germination, disease levels and purity must be evaluated. Because of the high volume of seed that must

be forced through the drill system, we recommend reducing ground speed to 4 miles per hour. This is an effective way of reducing seed bounce, reducing seed injury and also should eliminate plugging of seed delivery lines.

Kabuli chickpeas have a very thin seed coat. The use of a seed treatment is recommended. APRON FL seed treatment fungicide is registered for control of seed rot and seedling blight. Crown received emergency registration in 2001 for ascochyta seedling blight and seed rot on chickpeas. For more information, check the Crop Protection Guide. Desi chickpeas have a thick seed coat and do not usually require a seed treatment.

Seeding depth of chickpeas should be between 1½ - 2½ inches. Seeding rates for desi chickpeas are 80 – 95 lbs per acre and for kabuli types the rates are 120 – 140 lbs per acre. The desired plant population is 44 seedlings/m^2 or 4/$feet^2$. A more accurate method is to use 1000 seed weight. Uniform crop density provides better weed competition and results in higher yields.

The minimum average soil temperature at seeding depth for desi and small kabulis should be 6º C and for large kabulis the soil temperature should be 8º C. The large kabulis are more susceptible to seedborne diseases because of their thin seed coat. Farmers have found that germination is enhanced in a direct seeding system by scraping away the trash in a narrow band just over the seed row. The warmer soil gives more rapid germination and emergence and reduces the plant's time of exposure to seedborne diseases.

Land Rolling

Land rolling is less beneficial for chickpeas than for lentils or peas because the seeds are usually higher off the ground at harvest. In a three year study that we conducted in Southern Alberta using a light roller, we found no difference in yield whether the crop was rolled from post-plant to the 10^{th} node. However, we recommend pre-emergent rolling to eliminate possible spreading of disease.

Fertilizer

Based on studies in Alberta, a well inoculated crop of chickpea should not require nitrogen fertilizer. However, when soil nitrogen levels are very low, a starter nitrogen fertilizer may be advisable. Through soil testing, most farmers have found that the standard ammonium phosphate works very well in supplying some nitrogen while not reducing nitrogen fixation or delaying crop maturity.

Chickpeas are very sensitive to nitrogen fertilizer; however up to 15 pounds of phosphorous can be banded with the seed under good moisture conditions.

Weed Control

Chickpeas are not good competitors with weeds. It is important to control perennial weeds such as Canada thistle and sow thistle in years prior to seeding chickpeas. Early seeding, along with uniform crop density, go a long way to increase crop competition. The use of a pre-seed burn down plus a post-seed burn down is used by many farmers using a non-selective herbicide such as Round-up.

Sencor is registered for control of some broadleaf weed seedlings in chickpeas. Application should take place at the 1 – 3 above ground node stage or about the height of a loonie on edge. Any application later than this will result in significant crop damage.

Select and Poast Ultra are registered grassy weed control. Consult labels for detailed information. A number of other chemicals are being tested at the present time for use in chickpeas but as yet have not been registered here.

Diseases

Kabuli chickpeas are susceptible to seed rots and root rots due to their thin and zero tannin seed coat. APRON FL seed treatment is registered for the control of seed rot and early seedling blight caused by Pythium. Chickpeas are also susceptible to Botrytis (grey mould) as a seedling and older.

The major disease for chickpeas is ascochyta blight caused by Ascochyta rabiei. This is a seed and stubble-borne fungus disease that was introduced into Canada by infected seed. This disease can completely devastate a crop in three weeks, and will wipe out a resistant line in six weeks. Only resistant lines of chickpeas should be grown and only seed that tests zero for ascochyta should be grown. Even at this level, some infected seeds will go undetected.

Bravo 500 is a registered fungicide and act to protect uninfected tissue from infection. It does not control ascochyta blight, serves to slow down the disease development. First application is at early flowering, and may require three applications. Quadris, a systemic fungicide, was registered in 2001 and is more effective but higher priced. Headline, another systemic fungicide, is expected to receive registration in 2002.

Insects

The leaves, stems and pods of chickpeas secrete malic and oxidic acid which acts as a natural insecticide. Grasshoppers appear to be the main insect problem for chickpeas although they prefer not to feed on pulse crops.

Harvesting

Chickpeas can be swathed at 30% moisture without loss of yield of seed size. Direct combining is the most economical and minimizes seed damage, especially when the crop is harvested at moistures above 16% and air dried to 15% or below. Reducing the cylinder speed (450-600 rpm), opening the concaves (18-25 mm) and running augers at lower speeds will help to minimize the seed damage.

Chickpeas are ready to harvest if the following conditions are met:

- seed moisture is 18% or below
- 90% of the pods rattle
- the pods break open easily when pressure is applied

Damaged seed lowers germination and market value. Timing of harvest is also critical in obtaining the desired seed color.

No desiccants are currently registered for chickpeas. Recommended rates of Regone and Round-up have proven effective; however, if using Round-up, the crop cannot be used for seed.

Storage

The moisture content for pulse crops is more critical than for cereals. The seed should be cleaned and tested shortly after harvest to eliminate seed staining and unnecessary augering which may damage seed and germination. In long-term storage, the moisture content should be less than 14.5%.

Marketing

The outlook for chickpea production in Southern Alberta continues to be promising in spite of three years of drought. Chickpea demands continue to increase; however, prices have dropped from the high prices enjoyed the past three years. Canada has the disadvantage of high shipping costs due to long distances from our growing locations to port and the even longer distances than our competition from Canada to India and other consuming countries.

Currently there is a small domestic market for chickpeas and chickpea products which have previously come from California, Mexico, Australia and Turkey. To remain competitive, new varieties of chickpeas now being tested here from CDC Saskatchewan must be more ascochyta resistant, require a shorter growing season and in the case of Kabulis produce size and color.

Presently there are many contractors, brokers and traders which include most of the major grain companies in the country who deal with the chickpea trade here in Alberta.

Additional Information Available through Alberta Agriculture, Food and Rural Development:

- Pulse Crops of Alberta
- Crop Protection Guide
- Cropping Alternatives

Table 9

Chickpea - Kabuli
Main Characteristics of Varieties

Variety	Years Tested	Yield as % Sanford Area 1	Yield as % Sanford Area 2	Ascochyta Blight	Height (cm)	Days to Flower	Maturity[1]	Seed Weight (g/1000)	Leaf Type*
Sanford	6	100	100	VP	49	56	I	425	U
Amit (B-90)	4	122	124	F	46	55	M	265	F
CDC Chico	6	132	141	P	45	51	E	265	F
CDC Diva	3	103	-	VP	43	52	M	490	U
CDC Xena	5	115	127	VP	44	52	M	470	U
CDC Yuma	6	114	114	P	45	53	L	410	F
Dwelley	3	86	88	VP	45	57	VL	490	U
Evans	3	92	-	VP	50	53	L	430	U

Chickpea - Desi
Main Characteristics of Varieties

Variety	Years Tested	Yield as % Myles Area 1	Yield as % Myles Area 2	Ascochyta Blight	Height (cm)	Days to Flower	Maturity[1]	Seed Weight (g/1000)	Leaf Type*	Seed shape**	Seed coat color***
Myles	6	100	100	F	41	50	E	200	F	A	T
CDC Anna	4	108	108	F	42	52	M	210	F	P	T
CDC Desiray	5	96	104	F	40	49	E	210	F	P	LT
CDC Nika	4	97	103	F	39	50	M	320	F	P	T

- * Leaf type: F=Fern, U=Unifoliate
- ** Seed shape: P=Plump, A=Angular
- ***Seed coat color: T=Tan, LT=Light tan
- [1]Maturity will be delayed in areas with a cool moist summer, especially on clay soils
- Area 1: Brown soil zone, Area 2: Dark Brown soil zone

Special Crops Program (Edmonton)

S.F. Blade, N. Clark and L. Maskewich

Alberta producers are interested in diversifying their production. This was true in 2001 as prices for several conventional crops continued to tumble. One successful strategy is to incorporate new crops into the farming system. The special crops program is dedicated to introducing new crops that will contribute to the long-term viability of agriculture in the province. Diversification can contribute to improving crop rotations through inclusion of pulse crops, reduce the impact of price volatility on producers dealing in traditional crops and expand opportunities for value-added processing in Alberta. Both large-scale conventional farmers and less-experienced entrepreneurs who wish to become involved in intensive production and processing opportunities presented for specific new crops are assisted.

2001 was a productive year for the special crops program at the Crop Diversification Centre North (CDCN). The breeding and agronomy commitment to pulses and other special crops was expanded.

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, spice, alternate, herb (medicinal, culinary and aromatic) and fibre crops.

Pulse Crops

Western field pea cooperative trial

In 2001, the special crops program entered three second year and four first year breeding lines into the Western Field Pea Cooperative Trial. The line SB2000-2 was the highest yielding line in the Coop Test (14 per cent higher than the average of four check lines) across Western Canada. In addition, it has superb powdery mildew and fusarium wilt resistance. This line is set for release in 2002 at the Prairie Recommending Registration Committee for Grains. The new cultivar will be available for commercial production in 2003 in accordance with the memorandum between Alberta Pulse Growers, AAFRD, the Crop Development Centre (University of Saskatchewan) and the Saskatchewan Pulse Crop Development Board.

Field pea breeding and germplasm evaluation CDC Advance — To jumpstart the field pea breeding program this program was able to collaborate with the Crop Development Centre in Saskatoon to obtain early-generation lines from crosses which were targeted to the cool, moist conditions of Alberta. Following original

unreplicated screening in 1996, a replicated preliminary yield trial was conducted in Edmonton and Grande Prairie in 1997. The elite material was put into an ongoing yield test in several locations in Saskatchewan and Alberta.

In 2000, a formal agreement was signed between the Alberta Pulse Growers Commission and the University of Saskatchewan pulse breeding programs to ensure that superior genetic material will be available to farmers in each province. These commissions have guaranteed long-term funding for the CDCN breeding program; and discussions are underway to include lentils and chickpeas into the agreement.

AAFRD/AAFC Breeding Agreement — In 1997 an agreement was signed between CDCN and the AAFC-Morden Field Pea Breeding Program. Approximately 200 lines were tested in 2000; the best lines will be determined and evaluated and by multilocation testing in 2001.

CDC North — 2000 pea lines crossed in the greenhouse were planted in the field for the 2001 growing season. This new material will be evaluated with several objectives in mind: plant maturity, height, harvestability, plant architecture, disease resistance, seed vigor, and yield.

CDCN also collaborated with the University of Saskatchewan's pulse breeding program to increase seed yield of pea, bean, lentil and chickpea lines numerous selections from the World Germplasm Bank were planted to examine pea lines that have economic potential as a sound agriculture crop for the region. The expectation is to use the Germplasm Bank to identify high-vigor genotypes that can be incorporated into the breeding program in the future.

Intensive pea management (IPM)

The IPM Trial was originally set up in 1998 to evaluate the impact of four major management issues in the production of field pea across Alberta. Preliminary results indicate 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 2000 season, allowing program staff to concentrate on issues that have a direct affect on the growers. In 2001, several locations were grown to increase the dependability of the data. Several presentations, including at the North American Pulse Improvement Association have been delivered.

Field pea inoculant trials

The second year of this experiment in collaboration with AAFC-Lacombe and AAFC-Beaverlodge was conducted in 2001. The basis of the experiment was to

determine the effects of inoculant formulations on nodulation (the symbiotic relationship between *Rhizobia* spp. and legumes).

New millennium silage trial

2001 was also the second year for the new millennium silage trial. This experiment was conducted at five locations across Alberta (Vermillion, Barrhead, Lamont, Grande Prairie, and Edmonton). The purpose of this trial was to look at protein content of grain and field pea intercropping at flat pod stage. The treatments incorporated varying levels of a cereal (barley or triticale) and Swing or Performance 4010 field pea.

Pulse crop screening (lentil, fababean, chickpea)

In collaboration with several seed companies and breeding programs lentil lines were tested in Vermilion (in cooperation with Terry Buss), chickpea lines and fababean (at CDCN). In collaboration with Randy Bjorklund the silage potential of 10 fababean lines was assessed by collecting data on biomass production and feed analysis. In collaboration with CDCS and AAFC-Lethbridge personnel four excellent fenugreek lines were identified that have good nutritional composition and maintain forage quality until late in the season.

Fibre Crops

Low-THC hemp research

Technology Transfer Service

In 2001 low-THC hemp research continued at three locations (Fairview, CDCN and Bow Island). Rate of seeding- and varietal- trials were conducted to support potential industry development using this crop.

Due to the high interest in special crops, staff was called upon to answer numerous enquiries regarding a range of new crop opportunities relating to pulse, spice, medicinal and fibre crops. Staff contributed articles on crop diversification and species-specific topics to producer newsletters, industry periodicals and provincial newspapers. The interest in crop diversification resulted in several media interviews that were the source for further enquiries from the general public.

The demand for increased knowledge regarding new crops resulted in courses, seminars and field tours. The Special Crops Field Day held at CDCN was a tremendous success; and the total number of tour participants throughout the

year totaled more than 1000 individuals. CDCN staff also assisted members of the Pulse and Special Crops Team with obtaining planting materials for demonstrations across the province, and distributing technical information to clients.

A new innovation was involvement in Ask The Expert and Agri-Ville electronic forums provided an opportunity for staff to interact directly with producers in a new and highly effective forum. Clients included producers, other AAFRD Units, universities, AAFC, other provincial agriculture departments, applied research associations and agri-industry. An interesting component of the work was that many of the trials were done as researcher-managed on-farm experiments, which allowed neighbors to view technological innovations in their own area. Program staff served as college and university guest lecturers, independent study course mentors (U of A) and resource people for a number of industry organizations.

The special crops program would like to acknowledge the contribution of Jackie Tieullie, Jo-Ann Berry, Leah Maskewich, J. Teulie, R. Bok-Vischer, M. Essensa for their assistance in 2001.

Special Crops Program (Barrhead)

K.J. Lopetinsky

Crop diversification by incorporating pulse crops in the rotation is greatly benefiting producers with greater stability of income and new marketing strategies. Development of value-added processing will enhance these benefits. As team leader of the Pulse Canada Research Agronomy Committee, much effort was spent on developing a National Pulse Strategy with full support from the producer organizations of four provinces. This strategy will form the basis of future developments in genetics, agronomy, quality and sustainability across Canada. The present pulse research program at Barrhead continues to grow and the team includes partnership of AAFRD (Pulse and Special Crop Specialists, Agronomy Unit, Crop Diversification Centre North, Crop Diversification Centre South), Agriculture and Agri-Food Canada (AAFC) - Lacombe, Alberta Research Council (ARC) – Vegreville, and the University of Alberta (U of A). As well, key participation from Alberta Pulse Growers (APG)—Central and Zones and various private pulse industry partners (AB, CA and International) has further enhanced the team. Research emphasis in 2001 continues to be on field pea and fababean agronomics with a future emphasis on quality effects and value-added projects.

Research Projects

The AAFRD team with APG and private industry participated in a total of 21 projects this year. Research priorities and projects were developed in consultation with industry and were coordinated by K.J. Lopetinsky with assistance from APG-Zone 3 staff: Glen Pullishy, Sheryl Strydhorst, Tanis Wagner and CDCN (contract) Maureen Essensa. Key additional partners included S.F. Hwang, ARC; J. King and L. Dosdall, U of A; N. Harker and G. Clayton, AAFC; and numerous industry specialists.

Fababean graduate research project

Partnership developed with APG-Zone 3 and J. King, Plant Science, U of A to sponsor Sheryl Strydhorst as a M.Sc. candidate with NSERC industry sponsorship from APG-Zone 3 and supervision by J. King, J.P Tewari and K.J. Lopetinsky. Field studies on Tannin Free Fababean Agronomics were conducted in 2001 in the APG-Zone 3 area at two locations.

Western Canada field pea cooperative trial

One of the 12 sites across Western Canada is maintained at Westlock, representing a total of 50 new cultivars from Canadian and European Breeding

institutions. Complete agronomic data, yield, and samples for food quality analysis were collected and submitted to Morden, MB. Results are published in the *Prairie Registration Recommending Committee for Grain-Special Crops Subcommittee Report* (annual). Data is used to support CFIA registration of new field pea cultivars. Advisory role as member of Special Crops—breeding and agronomy subcommittee.

Alberta regional pulse trials

Advisory role as member of Alberta Pulse Regional Testing Committee (ad hoc) which has developed a provincial testing program with monetary support from APG, AAFRD and sponsoring seed companies. The Barrhead program conducted field pea trials (green and yellow) at two locations as part of the Area 3 data for the provincial program. Results are published annually in Agdex 140/32-1 *Varieties of Special Crops of Alberta*. In addition, coordinated fababean trials with Collin Wildschut, CDCS at four locations. These trials included new fababean genetics from France and the Netherlands with Canadian sponsors Roy Legumex, MB and St. Denis Seed, AB.

Pre screening and evaluation of new pea genetics

In partnership with Cebeco Zaden (The Netherlands) a total of 20 lines of yellow, green and marrowfat field peas were evaluated at four locations with location support from R. Bjorklund, AAFRD and Robyn Russel, Agricore. In addition, Plant Breeders Rights (PBR) tests and descriptions were conducted at two locations for Advanta and Cebeco on eight field pea candidate cultivars and two fababean candidate cultivars against recognized reference cultivars. This is a two-year data collection and variety description funded by sponsoring industry.

Fababean agronomy and genetic improvement

Expansion of fababean research included the joint venture with U of A (M.Sc. candidate sponsorship), work with BASF on herbicide efficiency on fababean and evaluation of new genetic material from France and the Netherlands. Further expansion of value-added processing fababeans initiated with C. Phillips and M. Eliason for 2002.

Pea inoculant research program

Year two evaluation of biological signal molecule inoculants for field pea and lentil at CDCN in partnership with AAFC, Dr. George Clayton team leader and Bios Agriculture (QC). Evaluation of new field pea rhizobium strains and comparison of various formulations for optimum nitrogen fixations and yield continued in partnership with Microbiorhizogen (Saskatoon, SK) and PhilomBios (Edmonton, AB). Evaluation of phosphate fertilizer and blends on granular inoculant viability when mixed was supported by LiphaTech. Time intervals of the granular inoculant and fertilizer mixtures included 0, 1, 2, 3 days and yield comparisons evaluated both with an without the added fertilizer in the seed row. Two years of data are very positive for these mixtures.

New millennium silage trial

In partnership with Pulse and Special Crops Specialists, four locations were seeded (CDCN, Barrhead, Vermilion, Grande Prairie) to compare seeding rate of barley and spring triticale with Swing and Performance 4010 field pea as sole crop and intercrop mixtures. Biomass yield and crude protein determined for 16 treatments at each location. This program was developed at Barrhead where all seed ratios and seed sub plots determined and supplied to other locations. In addition, preliminary work in partnership with Quality Assured Seeds was initiated at Barrhead to compare new cereal genetics intercropped with Swing and Performance 4010 field pea.

Evaluation and special purpose field pea cultivars

Expansion of this project on evaluation of 20 cultivars of various niche field types to eight locations throughout Alberta. Agronomic data was collected with comparisons to a standard yellow and green pea cultivar. Various green and brown marrowfat, maple, orange cotyledon, white cotyledon and other types of peas represent a niche market and value-added processing opportunity. Presently, at least three companies have started developing actual value-added niche markets.

Ascochyta disease control in field pea

In partnership with Dr. S.F. Hwang, ARC-Vegreville, and industry support from BASF and Syngenta resulted in completion of a three-year study of Bravo® rates and timing evaluation on control of Ascochyta as well as work on a new

BASF fungicide (Headline) at two locations. This data was used by BASF in developing their new production bulletin on Headline.

Field pea research partnership with Alberta pulse growers—Zone 3

A research review of pulse priorities with Zone 3 and attention to the Pulse Canada Research-National Strategy has resulted in developing three new projects for 2002 based on the Agronomy Strategy of pulse quality improvement through production systems. The projects include work on field pea: quality effects of harvest management factors, quality effects of marrowfat peas through seed and desiccation management and quality effects of genetics of new pea varieties.

ACIDF pulse research development 2002

As part of a provincial pulse team, full ACIDF proposals have been developed on three programs: developing a fababean industry, pulse products development and suitability of new pulse crops. In addition partnership in ACIDF projects on value-added processing of chickpea with M. Eliason and C. Phillips and partner on pulse seed compositional data study with C. Phillips.

Technology Transfer Services

An expanded team approach has resulted in more technology transfer opportunities. Three posters and proceeding abstracts developed on millennium silage project, Ascochyta control in field pea and evaluation of special purpose pea cultivars were presented at three major conferences: Western Canada Agronomy Workshop, Lethbridge, Pulse Days 2002, Saskatoon and FarmTech 2002, Red Deer. In addition, team members presented results at APG Zone annual meetings. Development of year two pulse and new crops modules at Ellerslie Diagnostic School produced excellent results and a new method of technology transfer for many specialists. A total of seven summer tours were resourced with industry partners to see first hand differences in various project treatments of many projects in the area, and some key train the trainer opportunities developed at several tours. Written articles, resourcing of other seminars and radio talks highlighted the pulse industry's new results in 2001. Of special interest is the team approach to develop a computer based pulse and special crops slide and presentation database for future technology transfer opportunities. Completion of this project is within several months.

Special Crops Program (Brooks)

M. Bandara, C. Wildschut, C. Weisbach, L. Russell, J. Webber and T. Simo

The special crops program at CDCS is primarily responsible for the evaluation, introduction and development of alternative or new crops for southern Alberta through applied and adaptive research projects. Some study projects are conducted in collaboration with other research programs at CDCS, other divisions of AAFRD, University of Alberta, University of Saskatchewan, AAFC, Regional 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 several processing industry partners provide the financial support for the programs.

Agronomic and physiological studies and cultivar development programs are conducted on pulses, herbs and spices, medicinal plants and essential oil crops. A considerable amount of time is invested on new cultivar and species evaluation studies.

Research Projects

Detailed project results are presented in CDCS pamphlet 2001-20, *Special Crops Cultivar Trials.*

Regional/co-op trials

Newly developed breeding lines and promising cultivars of lentils, chickpeas, dry beans, field peas, fenugreek and fababean are received from various crop breeding programs. These are evaluated under dry land and irrigated conditions in Alberta, to select suitable cultivars for the region.

Dry bean cultivar evaluation and cultural practices

Seven yield tests, with various dry bean lines and varieties, were conducted at the Bow Island Sub Station under irrigated conditions. Information was collected for further evaluation, registration and recommendation purposes. The emphasis in the dry bean cultivar testing is on yield performance, early maturity and plant architecture which allows for narrow row configurations, direct combining and consequently an expansion of the present dry bean production area.

Breeding programs at the AAFC-Lethbridge, AAFC and the Saskatoon Crop Development Centre at the University of Saskatchewan are developing promising

lines of this type of dry bean. The Prairie Registration Recommending Committee (PRRCG) for Grains recommended four dry bean lines (one black, one pinto and two navy) for varietal registration.

Two irrigated locations in southern Alberta were established to test these newly registered cultivars in wide and narrow row configurations, under the Regional Pulse Varietal Testing Program.

Other pulse crops cultivar evaluation and cultural practices

Seven field pea cultivar trials were conducted at Brooks, Bow Island, Strathmore, Three Hills and Barons to evaluate lines/varieties for regional adaptation. Brooks and Bow Island were the only irrigated sites. The PRRCG in 2000 recommended five yellow and seven green type field pea lines for varietal registration. Most lines produced higher seed yields than the check varieties, generally were earlier maturing and had acceptable disease resistance and quality characteristics. In 2001, 27 sites were established in different geographic regions and soil zones of Alberta and the Peace region of British Columbia to test newly registered field pea varieties.

Different lines and registered varieties of lentils, chickpeas and soybeans, were evaluated for registration and regional adaptation. Six kabuli and six desi type chickpea regional tests were established under dry land conditions at Bow Island, Brooks, Strathmore and Barons. All sites were harvested, but due to severe drought conditions in the southern part of the province, only the Barons site produced good yields.

Other special crop cultivar evaluations and cultural practices

Several cultivars and lines of soybeans and silage and grain corn were evaluated for potential registration and regional adaptation.

Fall seeding studies

Fall seeding or dormant seeding refers to the planting of a crop species in the fall before freeze-up. 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, and at Bow Island Sub Station with two pulse crops, desi type chickpea cultivar Myles and red lentil cultivar Redwing. Different seeding rates (1x, 2x and 4x) and seed-coated with plastic polymers were used as treatments. Growth and yield performances of the fall-seeded crops were compared with spring-seeded crops. The test site at Bow Island was subject to severe wind erosion during the winter; consequently unacceptable plant populations of both pulse crops were produced and the study was abandoned.

At the Brooks test site, all the crop species except anise, established successfully. The crop emergence of both fall-seeded and spring-seeded anise was very low (< 5%), therefore the anise study was abandoned.

Increasing the seeding rate of the fall-seeded, uncoated treatment significantly increased the plant density, particularly at four times seeding rate. There was no impact on the final plant height, fruit yield or crop maturity of coriander. The polymer seed coating did not increase seedling density or extend the planting window in coriander either. On average, the seeding date during the late fall had no significant impact on plant density or fruit yield in coriander. This indicates the crop can be seeded with a wide window in the fall without having a significant impact on the crop stand.

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 produced a significant impact on fruit yield, in the crop seeded on October 26, no difference was noted with November seeding. This shows a higher seeding rate would provide fruit yield benefits, particularly when the crop seeds in early fall. The polymer seed coat treatment had no significant impact on either plant density or fruit yield of dill.

Overall, mustard plants of the uncoated fall-seeded treatment produced taller plants when grown at higher seeding rates compared to those grown at lower seeding rates. The spring-seeded crop was significantly taller than the fall-seeded crop. Increasing the seeding rate produced an increasing trend in the seed yield, but the effect was significant only in early November seeding. The seed coat treatment produced significantly higher seed yield (more than 52 per cent) than the corresponding uncoated treatment, particularly when seeded in October. On average, the fall-seeded crop produced over two-fold seed yield increase compared to the spring-seeded crop. The seed coat treatment would be

beneficial, if the crop was seeded in October. The fall-seeded crop can be harvested about one month earlier than the spring-seeded crop, thus early harvest of the crop would be the most beneficial impact of the practice.

In summary, results indicate that coriander, dill and mustard can successfully be produced from dormant seeding in southern Alberta. Seeding rates should be increased to two times recommended rate to maintain a satisfactory stand of the crop. Further studies are in progress using anise and other pulse crops such as fababean.

Lentil cultivar/line evaluation for overwintering ability

Fifteen lentil cultivars from the Crop Development Centre, Saskatoon, were seeded at CDCS, in the fall (October 26 and November 2) of 2000. One half of seed of each cultivar was coated with plastic polymer and the other half was uncoated (untreated control). Cultivar and coat treatment effects on winter survival, crop growth and seed yield of fall-seeded lentils were assessed and compared with that of spring-seeded lentils in the 2001 cropping season. Five cultivars/lines were found to be overwintered successfully under the field conditions at Brooks. The plastic polymer treatments enhanced the overwintering of these crops. All these cultivars/lines flowered and matured at least two weeks and three weeks earlier than the spring-seeded crop, respectively. On average, the stand establishment of the late fall-seeded crop was significantly than that of the early fall-seeded crop. Seed yields of the fall-seeded lentil lines were significantly lower than that of spring-seeded crops.

Effect of seed size on crop growth and seed yield pinto bean

The size of the seeds planted has been shown to have a significant impact on seedling establishment, seedling vigour and crop growth of several small-seeded field crops such as jute, mustard, coriander and carrot. This impact was not noted in large-seeded crops such as chickpeas. This study was conducted at CDCS to examine the effect of seed size on seedling growth, seed yield and seed size profile of the resulting crop of three pinto beans cultivars, Othello, Fargo and CDC Pintium, under field conditions in southern Alberta.

Results indicated that bean cultivar had a significant impact on the final plant height, date of first flowering, mean seed weight and seed size profile of the resulting crop, but had no effect on number of seeds per plant, seed yield per plant and plot seed yield.

At harvest, both Othello and Fargo produced significantly taller (10 cm) plants compared to CDC Pintium. Regardless of the size of seeds planted, on average, CDC Pintium flowered five days earlier than both Othello and Fargo, but there was no cultivar difference in terms of crop maturity (all cultivars matured about 98 days after seeding). On average, CDC Pintium produced the heaviest seed and Fargo produced the lightest seed among the three cultivars. The size of seed planted had no significant impact on the final plant height, number of seeds per plant, seed yield per plant, plot seed yield or seed size profile of the resulting bean crop. However, the seed size profile was significantly different among cultivars. On average, CDC Pintium, Othello and Fargo produced seed lots with 75.7, 59.9 and 45.9 per cent in the >7.9 mm in diameter category, respectively. Production of a higher portion of larger seeds by CDC Pintium appears to be partially associated with its longer flowering period.

Effect of flowering habit, stem cutting length and rooting hormone on plant growth and medicinal quality of St. John's Wort

A greenhouse study was conducted to examine the effect of flowering habit on the medicinal quality of St John's Wort, using the stem cuttings from field-grown three cultivars, Anthos, Elixir and Topas. Single plants from three groups with varying flowering habits (early, middle and late) within each cultivar, were selected for stem cuttings. Plant growth and rooting ability of single and double nodal stem cuttings were evaluated with or without rooting hormones (3-Indolebutyric acid). Results indicated that flowering habit had a cultivar-specific significant impact on medicinal quality. Double nodal stem cuttings were superior to single nodal cuttings in respect to plant growth and the hormone treatment had no impact on rooting of the cutting. Plant selection based on flowering and medicinal quality, is in progress.

Intercropping studies

A study was established to evaluate the interaction effects of several field crops, field peas, feed barley, fababeans and silage corn and spice crops, coriander and fenugreek on growth and development of these species, when grown as intercrops under field conditions at CDCS. Results indicated that fababean, fenugreek and field peas can be grown successfully as intercrops with feed barley and silage corn to improve feed quality, when seeded at 50 per cent seeding rate. Coriander was not suitable as an intercrop since it is a poor competitor with other crops, particularly feed barley.

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, both *Echinacea* and mint species were transplanted in CDCS plots. *Echinacea* species are being evaluated for aster yellows disease resistance and medicinal quality Mint species are being evaluated for over wintering ability and essential oil contents. Foliage of individual mint plants raised from the treated stolons was used to extract the essential oil. Crop selection, based on essential oil content, oil composition and overwintering ability is in progress.

The seed harvested from EMS-treated seed borage plants was planted in spring 2001 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.

Technology Transfer Services

Evaluation and selection of different lines/selections of essential oil, spice and health promoting crops are conducted for adaptability under the growing conditions in southern Alberta and to develop management practices for improved and sustainable production. Plant species included in this evaluation are coriander, dill, rosemary, lavender and mint.

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. The special crop variety performance factsheet was updated. Program staff participated in courses (Olds college), seminars, conferences and field tours. Demonstration plots of various special crops, including herbs, spices, essential oil, medicinal plants and other new crops at Brooks and Bow Island were visited by a large number of interested individuals, groups and college students.

The Alberta Regional Special Crops Variety Test was coordinated, prepared and distributed. The performance data of registered varieties of field peas, dry beans, lentils and fababeans was summarized and made available to cooperators, specialists, growers and agribusinesses.

Special Crops Program (Beaverlodge)

R. El Hafid, L. Ost and J. Thibodeau

Recognizing the lack of a special crops research initiative serving the Peace region, AAFRD proceeded with the recruitment of a research scientist in July 2000. The entire initiative is identified as the Crop Diversification Centre Peace (CDCP is located at the AAFC-Beaverlodge Research Farm) to complement and collaborate with the special crops research programs at CDCN and CDCS. This new initiative is indicative of the collaboration and partnership between AAFC and AAFRD to ensure that the Peace region has a strong research framework to develop new technologies for the entire zone.

The mandate of this program is to promote crop diversification and new crop development, mainly in northern Alberta, with the ultimate objective of fostering economic viability and sustainability of the special crops industry in the Peace River Region.

Research Projects

This was an exciting and productive year at CDCP as several research/extension projects were initiated in collaboration with scientists and specialists from AAFRD, AAFC, and academia. The program now has a permanent technician who has been of a tremendous help. Some equipment have been either purchased or transferred from CDCN and CDCS allowing the program staff of CDCP to be more flexible and independent in doing.

Fall seeding studies

In collaboration with Drs. S. Blade (CDCN) and M. Bandara (CDCS), field experiments were established in October 2000 at three different locations in the province (CDCN, CDCS, and CDCP) to examine the practicality of fall seeding anise, dill, coriander, chickpea and peas and yellow mustard). Preliminary results from the Beaverlodge site showed that fall seeding (mid-October) was (i) successful for coriander and dill, (ii) successful to a certain degree for chickpea and (iii) not successful for mustard, lentil and anise. Seed coating did not improve stand establishment or yield of most of the fall-seeded crops. For most species, increasing seeding rate to four times the recommended rate did not result in any significant increase in yield as compared to two times recommended seeding rate.

Adaptation and agronomics of new oilseed crops for non-food industrial use

The overall purpose of this research is to examine the viability of developing novel oilseed crops that produce specific fatty acids required by non-food industries. Two field experiments (Beaverlodge and Fairview) were established to (i) determine the adaptability of five crops (*Camelina sativa* L., *Crambe abyssinicia* Hochst, *Cuphea* sp., *Limnanthes alba* Benth and *Lunaria annua* L.) and (ii) develop agronomic practices for optimizing their seed yield and quality. In terms of adaptability, *camelina*, *crambe* and *lunaria* can be grown successfully in the Peace River region. *Cuphea* didn't emerge from the soil, probably due to a seed germination problem as evidenced by germination test performed in the laboratory. Although meadowfoam (*Limnathes alba*) could be grown in the Peace, the major handicap is that most of the seed produced is too close to the ground, making it almost impossible to harvest.

Optimum seeding rate should target an average stand of 100 plants/m^2 for crambe and 300 plants/m^2 for camelina.

Since there is no registered herbicide for use in these new crops, increasing the seeding rate has shown to be effective in reducing weed biomass. However, for most of the species, increasing seeding rate up to three times the recommended rate was not enough to obtain the seed yield obtained in plots seeded at recommended seeding rate and maintained under weed-free conditions.

Crambe and *camelina* are easy to grow in the Peace Region. *Lunaria* is a biannual and may not fit in the cropping systems of many farmers. *Cuphea* and meadowfoam are not recommended for cultivation in the Peace Region.

New millennium silage trial

The overall purpose of this multi-location study is to optimize silage yield and quality of cereal-pea mixtures through improved management practices such as seeding rate and cultivars. Six locations, including Beaverlodge, were seeded to compare various seeding rates of barley and triticale with Swing and Performance 4010 field pea as sole crops or as intercrop mixtures.

This research is conducted in cooperation with many scientists and crop specialists of AAFRD. The project leaders (Dr. Stan Blade and K. Lopetinsky) will report the results.

Non-traditional high quality forage crops with distinct advantages for livestock production

The overall purpose of this multi-location study is to develop, evaluate, and introduce the first forage cultivar of fenugreek adapted to Alberta growing conditions and associated cultural practices for optimizing forage and seed production. Eight fenugreek cultivars were compared in terms of forage and seed production to Performance pea 4010 and berseem clover. First-year preliminary results from the Beaverlodge site showed the fenugreek cultivars Amber, F80 and F86 are the most promising ones in terms of forage and seed production. Performance pea 4010 out yielded all fenugreek cultivars.

Field pea breeding lines evaluation

Two independent trials to evaluate germplasm developed by the pea breeding programs at CDCN and the University of Saskatchewan were carried out at several locations, including CDCP-Beaverlodge. Fifty-seven entries were evaluated. Please refer to the CDCN Special Crops Program section for more details.

Field pea regional variety trial

Technology Transfer Services

Sixteen yellow and 17 green field pea varieties were evaluated in several locations in the province, including CDCP-Beaverlodge. Please refer to the CDCS Special Crops Program section for more details.

The program leader, R. El Hafid received and answered numerous inquires about a wide range of new crops production issues. Producers were provided written materials on many aspects related to the agronomics of special crops. More than 300 people visited the research plots at Beaverlodge and Fairview through field days and tours. He attended many producer meetings (pulse growers, organic farmers, etc.) where he presented the CDCP research activities and answered crop inquiries. Presentations were given to farmers, scientists and extension specialists.

R. El Hafid wrote five sections for the hemp CD, an AAFRD initiative, to be released shortly. The five sections included hemp botany and biology, hemp history, hemp global status, hemp uses and medicinal cannabis.

R. El Hafid presented two posters on borage agronomy at the Agronomy Conference 2002 at Nisku and the FarmTech 2002 at Red Deer. He also prepared a presentation on borage agronomy for the international conference on new crops and new uses held in Atlanta, USA. Dr. Stan Blade gave the presentation on his behalf.