

Evaluation of Special Purpose Field Pea Cultivars



Project #99-NW-01 Year 3 Final Report 2001

Farming for the Future
On Farm Demonstration Project

Alberta Pulse Growers
Zone 3

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**Alberta Agricultural Research Institute
On-Farm Demonstration Project**

Project Number: 99-NW-01
Project Name: Evaluation of Special Purpose Field Pea Cultivars
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Abstract

Alberta Agriculture, Food and Rural Development (AAFRD) is focused on crop diversification as an integral component for further development of agriculture in the province. This project was conducted to assess various special purpose pea cultivars and to generate information on their performance compared to standard yellow and green pea cultivars. Niche market opportunities are being explored for special types of field pea.

A total of twenty special purpose pea cultivars were compared to Espace and Integra field pea – standard green and yellow pea cultivars, respectively. The project was conducted at eight locations throughout the province: Westlock, Namao, Andrew, Grande Prairie, Wainwright, Brooks, Carstairs and Lacombe. Each trial was conducted as a randomized complete block design with four replicates. In addition, a single replicate trial was established at CDC North - Oliver for the annual tour day and at Manning for the Provincial Agriculture Service Board Tour. The data in this report focuses on Westlock and Namao. Agronomic data ; days to flowering, plant height, days to maturity and standability was collected for each variety. Yield and seed size was determined for each harvested subplot.

There are several special purpose pea cultivars that have potential when compared to the check varieties. Statistical analysis showed that the orange pea cultivars, U30 Orange, QAS Orange 1478, CEB 1487 Orange and SDS Orange, yielded equal to or greater than the check varieties and matured within a day or two of the check varieties. All other special purpose varieties tended to yield lower and mature later than the check varieties. The orange pea cultivars and White Pea were the only varieties that yielded equal to or greater than the check varieties. Varieties that consistently matured within a few days of the check varieties were Black Eye Yellow, Black Eye Green, U33 Green, White Pea and all the orange pea varieties. The seed size ranged from 121 g/1,000 seeds to 393 g/1,000 seeds. The smaller seeded varieties tended to be the maple type (*Pisum sativum 'arvense'*) pea, a class of pea that is commonly distinguished by their purple coloured flowers. The largest seeded varieties were the green and brown marrowfat cultivars.

Comments on market potential for each entry are provided. There is good potential for contract production for some types. Further research is required to better assess agronomic and market potential.

Key Results and Conclusions

The majority of the special purpose varieties in this study yielded less than the check varieties. In most instances the special purpose varieties yielded between 10-20 percent less than the highest yielding check. These varieties would have to have a premium price paid for them in order to be profitable. There were some varieties that showed great potential for being grown in the Zone 3 area, particularly the Orange Pea cultivars and the White Pea cultivar. These varieties yielded the same as or higher than the check varieties indicating they are well adapted to this climatic zone and could be profitable at the same prices paid for standard yellow and green pea varieties.

Background

Most pea production in Alberta is marketed as livestock feed with only 20-25% sold for human consumption. High quality dry pea receives a premium price in the human consumption market, with green pea selling at a higher price compared to the yellow pea (Agriculture and Agri-food Canada, 2001). There are few other marketing options for field pea because feed pea prices have dictated the pea market over the past fifteen years (Park and Lopetinsky, 1999) making development of niche markets necessary for further development of field pea production.

Alberta Pulse Growers Zone 3 wants to introduce new pea types to expand pulse crop diversification. This thrust is in conjunction with Alberta Agriculture, Food and Rural Development (AAFRD). AAFRD is focusing on crop diversification as an integral component for further development of agriculture within the province. The Zone 3 area is well suited to growing field pea but currently most production is of the yellow and green types. Traditional yellow and green pea varieties grown primarily for livestock feed are high yielding, early maturing, short in vine length and less prone to lodging (Saskatchewan Pulse Growers, 2000). High seed yields and small seed size are important in the livestock feed markets, however, certain characteristics such as high tannin seed and large seeds of other types are well suited to many niche markets (Saskatchewan Pulse Growers, 2000). Marrowfat pea types are marketed as a human consumption pea. This pea tends to be very large, angular shaped and ranging in cotyledon color from green, to yellow, or brown. Green marrowfat pea is produced primarily for confectionery use in Asia (Agriculture and Agri-food Canada, 2001). Extremely small, high tannin pea, seed size between 130-160g/1000, is marketed as bird feed (Park and Lopetinsky, 1999). Maple pea types, *Pisum sativum* spp. *arvense*, also have shown potential as cover crops in various climatic zones (Power and Koerner, 1994). The maple pea types have also been intensely studied for their use as a green manure crop (Mahler and Hemamda, 1993; Mahler and Avid, 1989).

Objectives

The purpose of this project was to assess various special purpose pea cultivars and to generate information on relative performance compared to two standards, Espace and Integra.

The project wishes to identify suitable special purpose pea types to further expand markets and diversify the pea industry in the Zone 3 area.

The following objectives were established for this project:

- Establish a special purpose field pea trial at two locations in co-operation with right holder companies
- Evaluate yield performance and agronomic characteristics compared to well adapted high yielding yellow and green checks
- Assess market potential for these niche type pea cultivars
- Evaluate end use and value added opportunities for these special purpose pea types

Project Plan

Varieties:

- | | |
|----------------------|----------------------|
| 1. QAS Orange 1478 | 12. Brown Marrowfat |
| 2. CEB 1487 Orange | 13. Integra (check) |
| 3. SDS Orange | 14. Espace (check) |
| 4. CDC Maple | 15. Performance 4010 |
| 5. CDC Sonata | 16. Canseed – 1 |
| 6. Courier | 17. Radke GMF |
| 7. QAS GMF 1223 | 18. U18 GMF |
| 8. Racer | 19. U28 GMF |
| 9. Black Eye Green | 20. U30 Orange |
| 10. Black Eye Yellow | 21. U36 GMF |
| 11. White Pea | 22. U33 Green |

Experimental Design:

A 4 replicate completely randomized block design was established. There were 22 varieties in total, 20 special purpose pea cultivars and 2 check varieties (Espace and Integra).

Four row plots were seeded using 8 inch row spacing. Plots were trimmed to 14.76 feet.

Plot Plan 2001

401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422
22	7	20	18	14	1	10	2	9	8	12	19	16	17	15	21	13	4	5	6	3	11
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322
8	7	6	10	17	18	20	22	2	13	5	3	11	1	14	15	19	12	21	9	16	4
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222
6	20	9	4	7	10	15	1	8	3	13	22	11	14	2	18	12	5	16	21	17	19
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Site Description:

The test plots were seeded at two sites in 2001: Westlock and Namao. The sites are located in the same eco-region but soil types are slightly different.

Namao

Legal Land Description: NE 9-55-24 W4

Descriptive Location: 3 miles north of Namao on Highway 28, ¼ mile west on Carbondale road, and plot is on the south side of the road

The soil at this site is an Eluviated Black Chernozem developed on lacustrine material. The soil texture is a silty clay loam. Water storage is regarded as high (more than five inches of water per foot of soil). The topsoil has medium permeability (between 0.2-2.0 inches of water per hour) and the subsoil has low permeability (less than 0.2 inches of water per hour). The average depth of the topsoil ranges between 14 and 18 inches. The amount of organic matter in the topsoil is medium to high (>3.5% OM). The soil drainage is classified as well drained (i.e. the water is removed from the soil readily). Salinity of subsoil is low to medium (between 0-0.8% soluble salt). Productive ability ranges from very good to excellent.

Westlock

Legal Land Description: SE 2-60-27 W4

Descriptive Location: 2 miles west of Westlock on Highway 18, plot is on the North side of the road

The soil at this site is primarily Orthic Dark Grey Chernozem with some Gleyed Dark Grey Chernozem. The Orthic Dark Grey Chernozemic soil has a loam texture and was developed on till parent material. This soil is well drained and has an 11 inch Ahe horizon with medium acidity. The Gleyed Dark Grey Chernozem also has a loam texture and developed on till parent material. The major difference between this soil and the previous soil is imperfect drainage that lead to the development of an 10 inch Ahegi horizon which is slightly acidic to neutral. These soils are rated as having fairly good (Gleyed Dark Grey) to very good (Orthic Dark Grey) productivity ratings.

Climate Information:

Both sites, experienced early season drought, heat stress and then later a shift towards better conditions. The Namao site experienced the best growing conditions. The site received 329 mm of rain from May 3 to August 27, 2001. The Westlock site received 189 mm of rain between May 2 and August 24, 2001.

Table 1 Summary of monthly rain averages from May to August 2001

Month	Westlock 2001	Namao 2001
May rainfall	40 mm	45 mm
June rainfall	7 mm	62 mm
July rainfall	120 mm	192 mm
August rainfall	22 mm	30 mm
Total Rainfall	189 mm	329 mm

Seeding Specifications and Plot Maintenance:

The pea cultivars were seeded at a rate of 7 plants/ft² or 75 plants/m². Seeding rates were determined by calculating the 1000 kernel weight (g/1000) of each variety. Both sites received phosphate fertilizer (12-52-0) at a rate of 120 lb/ac. The fertilizer was broadcast and worked in prior to seeding. MBR pea granular inoculant was applied at 8 lb/ac with the seed. The Westlock site was sprayed with a half rate Pursuit plus full rate Poast mixture, followed fourteen days later with a second application of full rate Poast. The Namao site was sprayed with a full rate of Poast for grassy weed control. This site had fall applied Edge for broadleaf weed control. Reglone PRO was applied one week prior to combining to enhance dry down and assist harvest.

Seeding and Harvest Dates:

The Namao site was seeded May 3, 2001 and the Westlock site was seeded May 2, 2001. The Westlock plots were harvested August 24, 2001 and Namao on August 27, 2001.

Data Collected and Analysis

Days to 10% Flowering

Days to flowering data were collected by observing the plots several times each week immediately following the appearance of the first flowers. A visual assessment of the percent of the plants in bloom was made and the date recorded when 10% of the plants had started to flower. The number of days was calculated by subtracting the seeding date from the date of 10% flower.

Total Plant Height or Vine Length

Plants were measured after they had completed flowering and prior to desiccation to determine the total plant height or vine length. The heights were measured in centimeters.

Number of Days to Maturity

A visual assessment was completed prior to desiccating to determine the number of days the plants had remaining from the date of assessment to full maturity. The number of days to maturity was calculated by subtracting the date of seeding from the date of the maturity assessment and adding the number of days left until maturity.

Standability

Standability measured how well the plants remained upright. A visual assessment was completed using a scale of 1 to 9, where 1 indicated the plants remained completely upright and 9 indicated the plants were completely flat on the ground.

Thousand Kernel Weight

A thousand kernel weight was done for each variety to provide the seed size. A sample of 100 seeds was weighed and then multiplied by 10.

Yield

The harvested sample from each plot was dried and then weighed to determine yield. Yield was recorded in grams per plot and converted to kilograms per hectare.

Analysis

Statistical analysis of the yield data was completed by using the GLM statistical program of SAS, 2001. Least Significant Difference (L.S.D.) $P \leq 0.05$, was calculated to determine significant differences between varieties and Coefficient of Variance (C.V.%) was calculated to reveal the relative measure of variation that exists within the data.

Discussion of Results

Following is a brief discussion of the pea cultivars tested in 2001:

Black Eye Green

A small sized (150 g/1,000 seeds) semi-leafless white flowered type with green cotyledon and black hylum. Potential as an addition with other pea types for parfait soup mixes and as a replacement for black eyed bean in various parfait mixes. From Cebeco, contact company is St. Denis Seeds.

Black Eye Yellow

A medium small (215 g/1,000 seeds) semi-leafless white flowered type pea with a yellow cotyledon and black hylum. Has potential similar to black eye green. From Cebeco, contact company is St. Denis Seeds.

Brown Marrowfat

A very large sized (340 g/1,000 seeds) semi-leafless brown marrowfat which has potential as a substitute for peanuts in peanut butter. Also has potential in the starch market. From Cebeco, contact company is St. Denis Seeds.

Canseed – 1

A very small sized (110 g/1,000 seeds) normal leaf high tannin pea. Useful for biomass production for silage or plow down. Has potential in mixtures with cereals such as triticale. Contact is Bill Leshner, Clive.

Courier

A medium small seed size (200 g/1, 000 seeds) maple type with potential for the pigeon feed market. Contact company is Canterra Seeds Ltd.

Espace (Check)

A medium small green pea (215 g/1,000 seeds) with excellent standability and good yield potential. Present check cultivar for green pea Regional Test Program. Contact company is St. Denis Seeds.

Integra (Check)

A large yellow pea (280 g/1,000 seeds) with excellent standability and good yield potential. Contact company is St. Denis Seeds.

Racer

Medium small (180 g/1,000 seeds) maple type with potential in the pigeon feed market. Contact company is St. Denis Seeds.

Radke GMF

A large sized (286 g/1,000 seeds) semi-leafless green marrowfat with medium maturity. Large sized green marrowfats are primarily reconstituted in a canning process and used as mushy pea in England. They are also roasted and puffed for snack food. Contact company is Radke Seed Farms.

U18 GMF

A very large sized (342 g/1,000 seeds) normal leaf type green marrowfat with medium maturity. Large sized green marrowfats are primarily reconstituted in the canning process and used as mushy pea in England. They are also roasted and puffed for snack food. Contact company is Klempnauer Seeds / Columbia Seeds Co. Ltd.

U28 GMF

A very large sized (356 g/1,000 seeds) semi-leafless green marrowfat with medium-late maturity. Large sized green marrowfats are primarily reconstituted in a canning process and used as mushy pea in England. They are also roasted and puffed for snack food. Contact company is Klempnauer Seeds / Columbia Seeds Co. Ltd.

U30 Orange

A large sized (260 g/1,000 seeds) semi-leafless white flowered pea cultivar with an orange cotyledon. Potential as a substitute in or to extend markets using split red lentil. Contact company is Klempnauer Seeds / Columbia Seeds Co. Ltd.

U36 GMF

A large sized (272 g/1,000 seeds) semi-leafless green marrowfat with medium maturity. Large sized green marrowfats are primarily reconstituted in a canning process and used as mushy pea in England. They are also roasted and puffed for snack food. Contact company is Klempnauer Seeds / Columbia Seeds Co. Ltd.

White Pea

Large sized (280 g/1,000 seeds) semi-leafless white flowered type with high potential as a chickpea substitute in India and other countries. Mainly a whole pea market type that can be decorticated. Contact company is St. Denis Seeds.

QAS GMF 1223 (Samson)

This large seeded (350 g/1,000 seeds) marrowfat is high yielding and displays good lodging resistance. Samson is a variety with medium maturity, which yields 8% higher than Guido, and the semi-leafless nature of the plant ensures a quick and uniform dry down. This variety is in

demand and can command an attractive selling price in the Asian roasted snack pea market. Contact company is Quality Assured Seeds, Kent Hall.

U33 Green

A small seeded (145g/1,000 seeds) processing pea cultivar. Seeds are wrinkled and blocky, with green cotyledon. Contact company is Klempnauer Seeds / Columbia Seeds Co. Ltd.

SDS Orange

Semi-leafless, large sized (270 g/1,000 seeds) cultivar with an orange red cotyledon. Potential as a substitute in or to extend markets using split red lentil. Contact company is St. Denis Seeds.

CEB 1487 Orange

Yields 9% higher than Carneval, 2% higher than CDC Mozart and 2% lower than Carrera. This semi-leafless orange cotyledon pea has a 243 g/1,000 seed weight and a similar maturity to Carrera. It is two days earlier than Carneval and three days earlier than CDC Mozart. Seeds are round and smooth. This variety tends to yield higher in wetter areas. The contact company is Walker Seeds.

QAS Orange 1478

A medium sized (269g/1,000 seeds) cultivar with an orange cotyledon. Seeds are smooth and round, the variety has potential as a substitute in or to extend markets using split red lentil. Contact company is Quality Assured Seeds, Kent Hall.

CDC Maple

Small seeded (143g/1,000 seeds) maple pea cultivar. This variety is powdery mildew resistant. This variety has recently been renamed CDC Acer. Contact company is Crop Development Center, Saskatoon.

Perf 4010

Small seeded (145g/1,000 seeds) silage type pea cultivar. This maple type is late maturing and has poorer standability compared to the common grain types. Contact company is Quality Assured Seeds, Kent Hall.

CDC Sonata

A medium sized (220g/1,000 seeds) forage type pea cultivar. This variety has a medium to late maturity and it is also powdery mildew resistant. Contact company is Crop Development Center, Saskatoon.

The market use descriptions for the special purpose pea cultivars are based on discussions with exporters. The varieties should be grown under total production contracts to ensure the high quality and purity that are required for a small niche market.

Agronomic Characteristics

Tables 2 and 3 provide a summary of the agronomic data for the Westlock and Namao sites. The data shown are days to 10% flower, vine length (plant height), days to maturity, standability, thousand kernel weight and yield.

Table 4 provides a statistical analysis of the combined Westlock and Namao data, representing the average performance of these varieties in Zone 3. Days to 10% flower was similar for all the cultivars. Racer and Brown Marrowfat reached 10% flower in 55 days after seeding and Perf

4010, CDC Maple and Courier were the last varieties to flower, reaching 10% flower between 64 and 66 days after seeding. Most cultivars reached 10% flowering 59 or 60 days after seeding. There were considerable differences in vine length (plant height) with the plants generally taller at the Namao site. The tallest cultivars were CDC Sonata, Canseed-1 and Perf 4010. Perf 4010 was the tallest variety at both sites. The standability ratings were generally higher (1 – 9 scale) for the special purpose varieties than for the check varieties, Espace and Integra. The orange pea cultivars produced the best standability while the maple pea varieties had the poorest standability. The seed size ranged from 119 g/1,000 seeds for Canseed-1 to 390 g/1,000 seeds for Radke GMF. The maple type cultivars were generally the smallest seeded and the marrowfat (green and brown) cultivars were generally the largest seeded.

Yield Data

Yield data for Westlock and Namao are also presented in Tables 2 and 3, with the average values presented in Table 4.

Yields were higher overall at the Namao site in comparison to the Westlock site. The orange pea varieties; QAS Orange 1478 and U30 Orange, Ceb 1487 Orange and the White Pea were the highest yielding varieties at both sites and had yields similar to Espace. QAS Orange 1478, U30 Orange, White Pea, CEB 1487 Orange, SDS Orange, Integra, Radke GMF, Perf 4010 and U36 all had yields similar to Espace at the Westlock site. QAS Orange 1478, U30 Orange, White Pea, CEB 1487 Orange, Black Eye Green, SDS Orange, Integra and Radke GMF yielded similarly to Espace at the Namao site. A trend showed that the orange pea varieties, White Pea and Radke GMF were the best yielding varieties at both sites.

The lowest yielding varieties were only slightly different for the two sites. The lowest yielding varieties at Namao were QAS GMF 1223, CDC Sonata, U33 Green and Canseed-1 while the lowest yielding varieties at Westlock were CDC Sonata, U28 GMF, QAS GMF 1223 and U33 Green. Most of the green marrowfat types were among the lowest yielding varieties.

A compilation of yield data from 1999-2001 is presented in Table 5. Yields were highest in 1999, and tended to be lower in 2000 and 2001.

Table 6 summarizes the yield of the special purpose pea varieties as a percent of the check variety Espace. This table includes Westlock and Namao data and additional data from six sites outside the Zone 3 area, Andrew, Brook, Carstairs, Grande Prairie, Lacombe and Wainwright. The orange pea cultivars performed well at Andrew and Carstairs. At Lacombe, the check variety Integra yielded higher than Espace. The orange pea varieties were among the best yielding cultivars. At Wainwright, the orange varieties, white pea, black eye yellow and black eye green cultivars had equal to or better yields than the checks. The Grande Prairie site showed different results in that the maple types yielded highest followed by the green marrowfat types and then the orange types. Table 7 provides a summary of yields for all the sites.

Special Purpose Pea Trial, 2001
Summary of Agronomic Data
Westlock
Co-operator: Wes Latimer

Table 2

Variety	Days to Flower (# Days)	Plant Height (cm)	Days to Maturity (# Days)	Standability (1-9)*	1000 KWT (g/1000 seeds)	Yield (kg/ha)
	Average of 4 Replications					
Espace	58	55	108	2	273	4277 ab
Integra	58	61	110	4	333	3837 bcde
Canseed – 1	55	77	110	9	119	3390 defghi
QAS GMF-1223	61	62	111	8	393	2799 ij
Radke GMF	59	53	110	8	399	3782 bcdef
U18 GMF	58	63	110	8	337	3194 fgghi
U28 GMF	60	64	110	7	348	2842 ij
U36 GMF	60	54	108	7	385	3658 bcdefg
Black Eye Green	57	52	108	8	291	3555 cdefgh
U33 Green	58	62	108	8	144	2370 j
Brown Marrowfat	54	59	109	8	417	3283 efghi
Ceb 1487 Orange	57	56	108	8	266	4052 abc
QAS Orange – 1478	57	55	108	3	281	4661 a
SDS Orange	57	46	108	4	328	3931 bcd
U30 Orange	60	59	109	7	270	4579 a
Black Eye Yellow	57	59	108	8	218	3402 defghi
CDC Maple	66	59	109	8	147	3518 cdefgh
Courier	66	53	111	8	239	3533 cdefgh
Racer	55	50	107	9	173	3034 ghi
Perf 4010	64	79	111	7	146	3676 bcdef
CDC Sonata	60	70	109	8	190	3002 hi
White Pea	56	50	108	6	301	4239 ab
Site Average	59	59	109	7	272	3573
LSD (P ≤ 0.05)						626.1
C.V.%						12.4

NOTE: 1. a,b...yields followed by the same letter are not statistically different
2. *Standability scale: 1=perfectly upright, 9=flat (measured 106 days after seeding)

Special Purpose Pea Trial, 2001
Summary of Agronomic Data
Namao
Co-operator: Doug Craig

Table 3

Variety	Days to Flower (# Days)	Plant Height (cm)	Days to Maturity (# Days)	Standability (1-9)*	1000 KWT (g/1000 seeds)	Yield (kg/ha)
	Average of 4 Replications					
Espace	59	58	109	4	263	4999 a
Integra	60	70	109	3	301	4557 abcd
Canseed – 1	60	108	115	7	119	2295 i
QAS GMF-1223	62	75	114	7	372	3174 gh
Radke GMF	61	74	113	7	381	4419 abcde
U18 GMF	60	65	113	8	325	3617 fg
U28 GMF	61	67	113	6	342	4027 def
U36 GMF	62	74	112	7	369	4040 cdef
Black Eye Green	57	60	109	7	264	4835 ab
U33 Green	58	62	109	8	146	2756 hi
Brown Marrowfat	55	66	112	7	343	4252 bcdef
Ceb 1487 Orange	58	64	110	6	257	4864 ab
QAS Orange – 1478	61	69	109	5	258	5012 a
SDS Orange	57	50	109	4	299	4761 abc
U30 Orange	61	72	110	6	263	5010 a
Black Eye Yellow	57	64	109	8	220	3909 def
CDC Maple	66	86	113	7	140	3749 efg
Courier	67	76	115	7	200	4242 bcdef
Racer	55	62	111	7	181	4213 bcdef
Perf 4010	64	111	115	7	144	3639 fg
CDC Sonata	62	104	115	8	184	3098 gh
White Pea	58	53	111	7	289	4945 ab
Site Average	60	72	111	6	257	4110
LSD (P ≤ 0.05)						732.9
C.V.%						12.6

NOTE: 1. a,b...yields followed by the same letter are not statistically different
2. *Standability scale: 1=perfectly upright, 9=flat (measured 107 days after seeding)

**Special Purpose Pea Trial, 2001
Overall Summary of Agronomic Data**

Westlock and Namao Sites Combined

Table 4

Variety	Days to Flower (# Days)	Plant Height (cm)	Days to Maturity (# Days)	Standability (1-9)*	1000 KWT (g/1000 seeds)	Yield (kg/ha)
	Average of Westlock and Namao Sites					
Espace	59	56	108	3	268	4638 abc
Integra	59	65	109	3	317	4197 bcdef
Canseed – 1	57	92	112	8	119	2842 ij
QAS GMF-1223	62	69	112	8	382	2986 ij
Radke GMF	60	64	111	7	390	4101 cdef
U18 GMF	59	64	111	8	331	3405 ghi
U28 GMF	60	65	111	7	345	3434 ghi
U36 GMF	61	64	110	7	377	3849 efg
Black Eye Green	57	56	108	7	277	4195 cdef
U33 Green	58	62	108	8	145	2563 j
Brown Marrowfat	55	62	110	7	380	3768 efg
Ceb 1487 Orange	58	60	109	7	261	4458 abcd
QAS Orange – 1478	59	62	108	4	269	4837 a
SDS Orange	57	48	109	4	313	4346 abcde
U30 Orange	61	65	109	6	266	4794 ab
Black Eye Yellow	57	61	108	8	219	3655 fg
CDC Maple	66	73	111	8	143	3633 fgh
Courier	66	65	113	8	219	3888 defg
Racer	55	56	109	8	177	3623 fgh
Perf 4010	64	95	113	7	145	3657 fg
CDC Sonata	61	87	112	8	187	3050 hij
White Pea	57	51	109	6	295	4592 abc
Overall Average	59	66	110	7	265	3841
LSD (P ≤ 0.05)						597.7
C.V.%						15.7

- NOTE:**
1. a,b...yields followed by the same letter are not statistically different
 2. *Standability scale: 1=perfectly upright, 9=flat

**Special Purpose Pea Trial
1999, 2000, 2001 Yield Summary
Namao and Westlock**

Table 5

Variety	Namao Yield			Westlock Yield			Average (kg/ha)
	1999	2000	2001	1999	2000	2001	
Espace	6712	6248	4999 a	5139	3887	4277 ab	5210
Integra	5351	6119	4557 abcd	4503	3891	3837 bcde	4710
Canseed – 1	4154	1944	2295 i	3415	2089	3390 defghi	2881
QAS GMF-1223	n/a	n/a	3174 gh	n/a	n/a	2799 ij	2987
Radke GMF	n/a	4129	4419 abcde	n/a	2838	3782 bcdef	3792
U18 GMF	n/a	3074	3617 fg	n/a	2553	3194 fghi	3110
U28 GMF	n/a	4146	4027 def	n/a	3080	2842 ij	3524
U36 GMF	n/a	4613	4040 cdef	n/a	3300	3658 bcdefg	3903
Black Eye Green	6218	5383	4835 ab	5269	4169	3555 cdefgh	4628
U33 Green	n/a	n/a	2756 hi	n/a	n/a	2370 j	2563
Brown Marrowfat	n/a	5003	4252 bcdef	n/a	6747	3283 efghi	4821
Ceb 1487 Orange	n/a	n/a	4864 ab	n/a	n/a	4052 abc	4458
QAS Orange – 1478	n/a	n/a	5012 a	n/a	n/a	4661 a	4837
SDS Orange	n/a	n/a	4761 abc	n/a	n/a	3931 bcd	4346
U30 Orange	n/a	6062	5010 a	n/a	4126	4579 a	4944
Black Eye Yellow	5588	4721	3909 def	5409	3782	3402 defghi	4469
CDC Maple	n/a	4323	3749 efg	n/a	3266	3518 cdefgh	3714
Courier	5317	3968	4242 bcdef	3336	2996	3533 cdefgh	3899
Racer	5668	4237	4213 bcdef	4349	3810	3034 ghi	4219
Perf 4010	n/a	n/a	3639 fg	n/a	n/a	3676 bcdef	3658
CDC Sonata	n/a	n/a	3098 gh	n/a	n/a	3002 hi	3050
White Pea	6083	5732	4945 ab	5268	4479	4239 ab	5124
Sask – Maple	n/a	3305	n/a	n/a	2744	n/a	3025
Sask – Forage	n/a	2568	n/a	n/a	2413	n/a	2491
CEB 1224 GMF	5645	4734	n/a	4257	3198	n/a	4459
Orange Pea	5052	5104	n/a	5078	3939	n/a	4793
Per 1221 GMF	n/a	1512	n/a	n/a	1729	n/a	1621
Per 1220 GMF	n/a	3668	n/a	n/a	2547	n/a	3108
LSD (P ≤ 0.05)			732.9			626.1	
C.V.%			12.6			12.4	

NOTE: 1. a,b...yields followed by the same letter are not statistically different
2. not all varieties were included in all three years of this project.

Special Purpose Pea Trial, 2001
Special Purpose Pea Yield Summary
(As a Percentage of Espace)
8 Alberta Locations

Table 6

Trt Name	Site								Average %
	Andrew %	Brooks %	Carstairs %	Grande Prairie %	Lacombe %	Namao %	Wainwright %	Westlock %	
Espace	100	100	100	100	100	100	100	100	100
Integra	91	88	73	81	120	91	93	90	91
Canseed – 1	82	97	85	76	58	46	83	79	76
QAS GMF-1223	28	43	39	55	52	63	25	65	46
Radke GMF	63	75	72	89	81	88	88	88	81
U18 GMF	55	76	57	68	57	72	79	75	67
U28 GMF	67	62	90	91	77	81	77	66	76
U36 GMF	67	74	93	89	88	81	80	86	82
Black Eye Green	87	72	70	66	82	97	102	83	82
U33 Green	40	45	42	n/a	32	55	76	55	49
Brown Marrowfat	84	98	56	74	85	85	98	77	82
Ceb 1487 Orange	92	92	70	93	89	97	106	95	92
QAS Orange – 1478	104	130	100	76	86	100	99	109	101
SDS Orange	73	89	75	82	76	95	103	92	86
U30 Orange	101	108	111	85	101	100	92	107	101
Black Eye Yellow	88	112	75	61	84	78	101	80	85
CDC Maple	94	94	111	98	57	75	96	82	88
Courier	88	72	99	96	65	85	96	83	86
Racer	71	91	45	64	49	84	78	71	69
Perf 4010	68	78	80	81	77	73	79	86	78
CDC Sonata	68	91	126	126	44	62	92	70	85
White Pea	76	99	89	87	66	99	104	99	90

Special Purpose Pea Trial, 2001
Special Purpose Pea Yield Summary
8 Alberta Locations

Table 7

Special Purpose Pea Variety	Site								Average (kg/ha)
	Andrew (kg/ha)	Brooks (kg/ha)	Carstairs (kg/ha)	Grande Prairie (kg/ha)	Lacombe (kg/ha)	Namao (kg/ha)	Wainwright (kg/ha)	Westlock (kg/ha)	
Espace	2489 ab	3334 cd	2569 bc	3381 b	4068 abc	4999 a	4570 abc	4277 ab	3711
Integra	2257 bcd	2886 fg	1881 de	2754 bcdefgh	4901 a	4557 abcd	4250 abcde	3837 bcde	3415
Black Eye Green	2168 cd	2346 h	1795 def	2244 fghi	3336 bcdef	4835 ab	4641 ab	3555 cdefgh	3115
Black Eye Yellow	2195 cd	3692 b	1919 cde	2076 hi	3402 bcdef	3909 def	4638 ab	3402 defghi	3154
Brown Marrowfat	2094 cde	3248 cde	1439 efg	2486 defghi	3466 bcdef	4252 bcdef	4466 abc	3283 efghi	3092
Canseed – 1	2049 def	3057 def	2194 bcd	2577 cdefghi	2372 ghi	2295 I	3772 defgh	3390 defghi	2713
CDC Maple	2332 abc	2976 efg	2841 ab	3298 bc	2299 hi	3749 efg	4377 abcd	3518 cdefgh	3174
CDC Sonata	1692 gh	2938 efg	3238 a	4264 a	1802 ij	3098 gh	4188 bcdefg	3002 hi	3028
Ceb 1487 Orange	2297 bcd	3037 def	1788 def	3146 bcd	3632 bcd	4864 ab	4856 a	4052 abc	3459
Courier	2188 cd	2446 h	2545 bc	3234 bcd	2627 fghi	4242 bcdef	4410 abc	3533 cdefgh	3153
Perf 4010	1701 gh	2529 h	2063 cde	2738 bcdefgh	3119 defgh	3639 fg	3594 fgh	3676 bcdef	2882
QAS GMF-1223	704 k	1385 j	997 g	1851 i	2128 ij	3174 gh	1146 i	2799 ij	1773
QAS Orange-1478	2584 a	4426 a	2560 bc	2564 cdefghi	3478 bcdef	5012 a	4534 abc	4661 a	3727
Racer	1765 gh	3037 def	1159 fg	2175 ghi	1996 ij	4213 bcdef	3587 gh	3034 ghi	2621
Radke GMF	1564 hi	2451 h	1852 de	3017 bcde	3309 bcdefg	4419 abcde	4004 cdefgh	3782 bcdef	3050
SDS Orange	1816 fgh	2920 efg	1934 cde	2764 bcdefgh	3111 defgh	4761 abc	4696 ab	3931 bcd	3242
U18 GMF	1357 I	2665 gh	1465 efg	2295 efghi	2335 hi	3617 fg	3620 fgh	3194 fghi	2569
U28 GMF	1656 gh	1988 I	2309 bcd	3082 bcd	3135 cdefgh	4027 def	3497 h	2842 ij	2817
U30 Orange	2510 ab	3566 bc	2849 ab	2879 bcdefg	4092 ab	5010 a	4202 bcdef	4579 a	3711
U33 Green	985 j	1530 j	1085 g	n/a	1317 j	2756 hi	3479 h	2370 j	1932
U36 GMF	1673 gh	2364 h	2389 bcd	3016 bcde	3589 bcde	4040 cdef	3657 efgh	3658 bcdefg	3048
White Pea	1884 efg	3212 def	2294 bcd	2946 bcdef	2671 efghi	4945 ab	4737 ab	4239 ab	3366
LSD (P≤0.05)	263.7	353.0	662.0	754.0	946.6	732.9	184.9	626.1	
C.V.%	9.8	8.9	22.8	19.0	22.3	12.6	10.8	12.4	

Note: 1. a, b...means followed by the same letter are not statistically difference

Economic Impact

Development and expansion of niche markets is necessary for the economic and productive growth of field pea in Alberta. Knowledge of the agronomic characteristics of these special purpose varieties may improve marketability and provide alternatives to traditional green and yellow pea varieties. These pea types have been grown around the world and in other parts of Western Canada, but may not be profitable in this region due to lower yields and quality.

The 2001 test shows that the majority of the special purpose pea cultivars yield less than the best check variety, therefore a premium price would be needed in a niche market to equal or better the returns of standard field pea. Table 8 shows a price matrix using various prices and percent yield of green and yellow varieties to determine the price required for the special purpose pea. This table assumes that other costs would be similar.

For example, from Table 5, brown marrowfat pea yield approximately 20% less than the check variety Espace, based on the overall average. Therefore, if green or yellow field pea is priced at \$4.50 per bushel, then the brown marrowfat pea would have to be sold at \$5.63 per bushel in order for a producer to be willing to grow it. If the price of green or yellow field pea was \$6.50 per bushel, then the price of brown marrowfats would have to be \$8.13 per bushel.

Table 8 Market Prices Required for Profitable Production of Special Purpose Pea

		Green & Yellow Pea Prices						
		\$6.50 /bu	\$6.00 /bu	\$5.50 /bu	\$5.00 /bu	\$4.50 /bu	\$4.00 /bu	\$3.50 /bu
Percent Yield of Check Varieties	50	13.00	12.00	11.00	10.00	9.00	8.00	7.00
	55	11.82	10.91	10.00	9.09	8.18	7.27	6.36
	60	10.83	10.00	9.17	8.33	7.50	6.67	5.83
	65	10.00	9.23	8.46	7.69	6.92	6.15	5.38
	70	9.29	8.57	7.86	7.14	6.43	5.71	5.00
	75	8.67	8.00	7.33	6.67	6.00	5.33	4.67
	80	8.13	7.50	6.88	6.25	5.63	5.00	4.38
	85	7.65	7.06	6.47	5.88	5.29	4.71	4.12
	90	7.22	6.67	6.11	5.56	5.00	4.44	3.89
	95	6.84	6.32	5.79	5.26	4.74	4.21	3.68

Producer Tips and Insights to the Special Purpose Pea Market

- These special pea varieties may be the future for value adding and further processing.
- All varieties should have complete production contracts from a specific company. Production potential of a niche pea may be limited to smaller acreages.
- Many of these varieties will have PBR registration.
- These special purpose varieties normally yield 10-15% less than the main yellow and green field pea varieties. Niche pea must have a premium price so that the returns will be equal to or better than the returns of standard field pea.
- Seed “quality” will be the main criteria for production contracts. Poor quality will not sell.

- Agronomic packages for some varieties may take a few years to develop. Some varieties are already being produced under contract.

Conclusions

There is great potential for some of the special purpose varieties, which were tested in 2001. Several of the varieties yielded the same as or slightly higher than the check varieties, indicating they could be a feasible option if similar prices were paid as for standard yellow and green pea varieties. The orange pea cultivars and white pea cultivar have the most potential in this area as they all yielded similar to the check varieties indicating they are well suited to the growing conditions in this area. The remaining pea types; the marrowfat cultivars, the maple cultivars and black eyed cultivars, generally yielded less than the check varieties. Many of these cultivars yielded 80% of the check varieties indicating that they could be grown in this area, if premium prices were available.

The production potential for special purpose pea is very high in this area. The price for the lower yielding special purpose varieties would have to increase in order for the return per acre to be sufficient for production to occur. Market development and information will be the key to how quickly these niche type pea cultivars become commercialized.

Extension Activities

Producers and professionals involved in the pulse industry toured both the Westlock and the Namao Special Purpose Pea sites over the three years of the study. There was a demo plot at the Crop Diversification Center North for their 50th anniversary, where the varieties received exposure to many people outside of the pulse industry. Results from this study are widely distributed throughout Alberta and Saskatchewan. Research data from this 3 year study will be presented to: Saskatchewan Pulse Days in January 2002, Western Canadian Agronomy Workshop in Lethbridge, Farm Tech 2002 in Red Deer and Leading Edge Seminar in Westlock March 2002. The information will also be distributed to over 200 producers. Final results are available to all pulse producers at the AAFRD office in Barrhead.

Recommendations

Production of niche pea types is an opportunity for diversification of the pulse industry. Further study is a must! New varieties that entered the test in the third year require more site years of data for reliable predictions of their performance in our area. Production systems must be developed to ensure maximum quality for niche market pea types. Quality analysis will be required in order to develop new markets for these specialty pea crops. Fat, protein, soluble and insoluble dietary fiber, carbohydrate, amylose/amylopectin ratios are all needed to sell these products. Information about phytoestrogen content, color and bitter flavor profiles are also necessary to complete the marketing package for these special purpose pea varieties. More research is required, in order to successfully develop this prospective industry.

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