ADF

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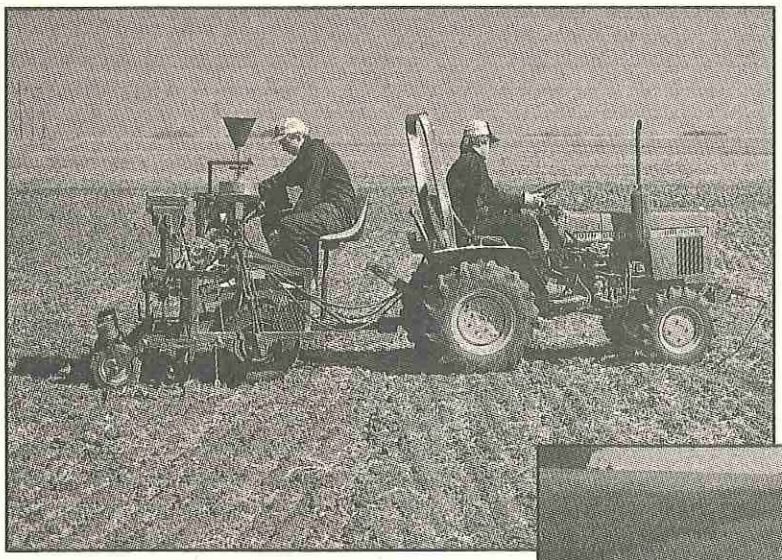
Agriculture
Development Fund

Varieties of Grain Crops for Saskatchewan 1990



SASKATCHEWAN AGRICULTURAL SERVICES COORDINATING COMMITTEE

Saskatchewan Agriculture Development Fund (ADF)

Initiated in 1985, the Agriculture Development Fund (ADF) is a commitment by the provincial government to enhance the competitive position of Saskatchewan producers. The ADF coordinates and funds agricultural research, development and demonstration projects in the province.

The ADF will support efforts in areas such as crops and forages, soils, livestock, land improvement, engineering, economics, extension, marketing, new product development and agri-food processing.

In 1989 the ADF contributed $214,000 to the Spring Grain Variety Trials conducted throughout the province by the University of Saskatchewan. In addition, ADF funds the printing and distribution of the **Varieties of Grain Crops for Saskatchewan 1990**.

Saskatchewan Agricultural Services Coordinating Committee

The Saskatchewan Agricultural Services Coordinating Committee (SASCC) is the agency which coordinates agricultural research and extension activities in Saskatchewan. SASCC has a system of advisory councils representing the major subject areas: extension, economics, forage crops, grain crops, soils and agronomy, crop protection, horticulture, engineering, food production and marketing, animal health, animal production, and meteorology. The advisory councils are further divided to cover specific subject matter areas. For example, the agricultural and food engineering council works through sub-councils on power and machinery, structures and environment, soils and water, and food and process engineering.

The Saskatchewan Advisory Council on Grain Crops is responsible for the recommendations in the **Varieties of Grain Crops for Saskatchewan** publication as well as other recommendations for grain crop production. The council, like all others, makes recommendations on research and extension to SASCC. The membership on the council is made up of representatives from Agriculture Canada, Saskatchewan Agriculture and Food, University of Saskatchewan, Crop Development Centre, Saskatchewan Wheat Pool, Saskatchewan Water Corporation, Canadian Seed Trade Association, Saskatchewan Seed Growers' Association, SeCan and farmers.

The Advisory Council on Grain Crops gratefully acknowledges Agriculture Canada, University of Saskatchewan, the Crop Development Centre and all other researchers involved for the research and analysis which comprise the recommendations in this publication.

Contributing Agencies

Agriculture Canada

Saskatchewan Agriculture and Food

Soils and Crops Branch

University of Saskatchewan

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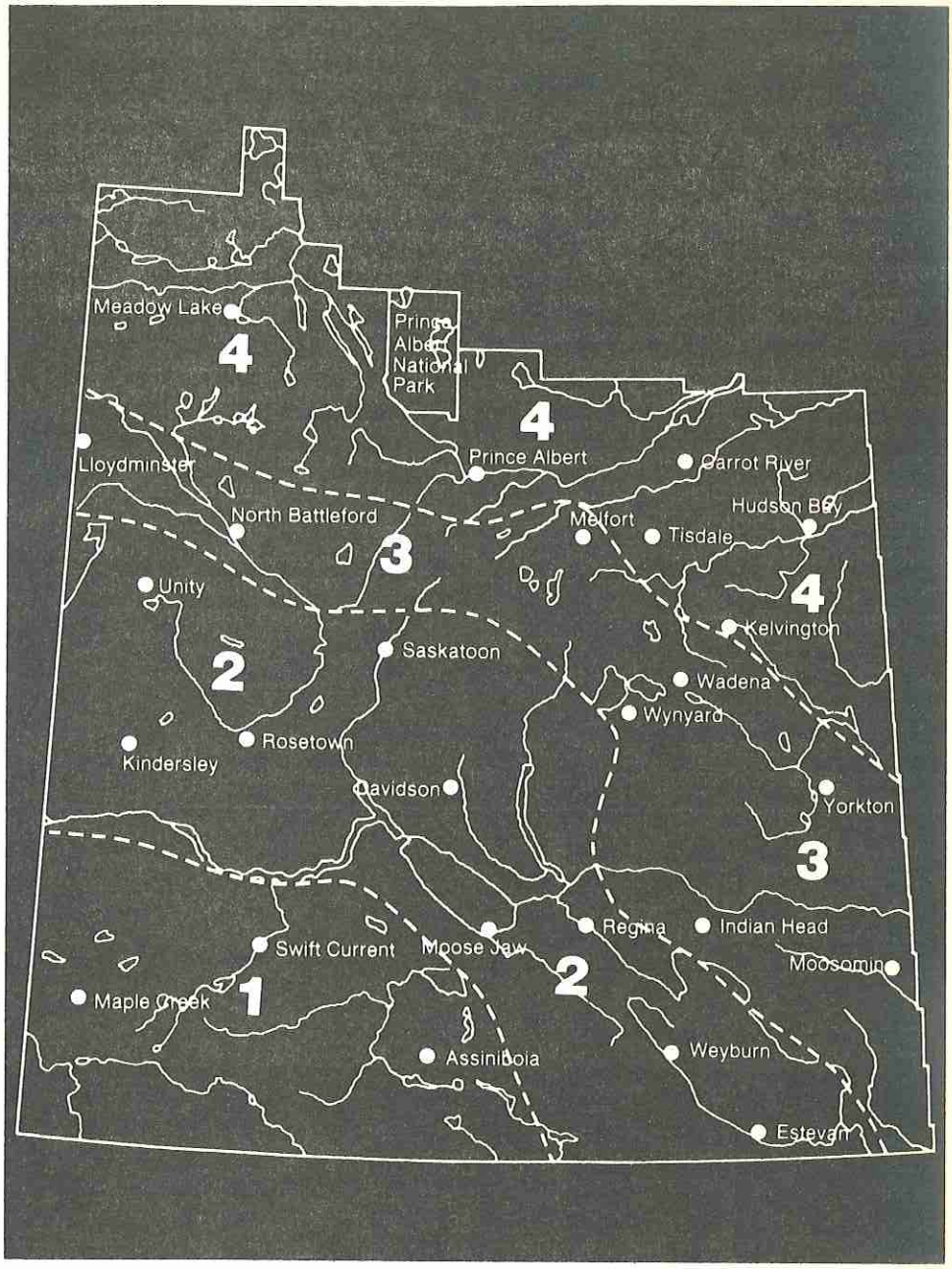

Grain Crop Production Areas

The cropland of Saskatchewan has been divided into four areas based roughly on climate, vegetation and soil type. The relative yields of crop varieties tend to vary from area to area. In choosing a variety a farmer will want to consider the yields in his area and special requirements such as early maturity, disease resistance or sawfly resistance.

Area 1: Drought is a definite hazard and high winds are common. Sawfly outbreaks often occur in this area. Cereal rust may be a problem in the southeastern section.

Area 2: Drought and sawflies may be problems in the western and central sections of the area. Cereal rust may be a problem in the southeastern section.

Area 3: Drought is not as likely to be a problem in this area, particularly in the east. Cereal rust may occur in the eastern portion. The frost-free period can be fairly short in the northwestern and northeastern sections.

Area 4: Rainfall is usually adequate for crop production. However, early fall frosts and wet harvest weather are frequent problems.

The dividing lines do not represent distinct changes over a short distance. The change from one area to another is gradual.

Cereal Crops

Wheat

Main Characteristics of Varieties

Variety	Irr	Area 1	Area 2	Area 3	Area 4	Average Maturity in Days	Resistance to** Lodging	Shattering	Stem Rust	Leaf Rust	Loose Smut	Bunt	Root Rot
		Yield as % of Katepwa											
Bread Wheat													
Katepwa ..	-	100	100	100	100	98	G	G	VG	F	G	G	F
Benito	-	94	95	95	97	97	G	G	G	G	G	F	F
Columbus*	-	98	101	101	97	102	G	F	G	G	F	VG	F
Conway	-	103	98	97	97	98	G	G	G	P	G	F	F
Kenyon	-	98	97	97	95	98	G	G	VG	VG	G	F	F
Laura	-	103	105	104	100	100	G	G	G	G	F	P	G
Leader	-	95	96	-	-	100	F	F	G	F	F	G	P
Lancer	-	94	95	-	-	100	F	G	G	G	G	G	F
Neepawa ..	-	99	100	99	98	98	G	VG	G	P	G	F	F
Roblin	-	94	90	92	92	97	G	G	G	VG	G	P	G
Canada Prairie Spring Wheat													
Biggar* ..		124	116	119	121	119	102	G	G	G	G	VP	VP	F
HY355 ..		135	120	126	126	122	102	F	VG	G	F	F	VP	F
Oslo		87	96	102	101	95	98	G	G	G	G	P	F	F
Canada Western Utility													
Bluesky	-	95	93	94	96	99	G	G	G	F	VG	F	G
Glenlea	-	95	105	108	110	101	G	G	G	VG	VG	F	G
Wildcat.....	-	90	87	89	90	98	G	G	G	P	VG	VP	
		Yield as % of Kyle											
Durum Wheat													
Kyle*		100	100	100	100	103	F	VG	VG	VG	F	VG	F
Arcola ..		103	92	93	97	99	G	VG	VG	VG	F	VG	F
Medora ..		99	97	96	97	100	G	VG	VG	VG	F	VG	F
Sceptre		103	97	97	98	100	G	VG	VG	VG	F	VG	G
Wakooma		87	95	95	96	102	F	VG	VG	VG	F	VG	G
Wascana ..	-		96	96	95	101	F	VG	VG	VG	F	VG	F

*These varieties are variable in maturity and may mature later under cool conditions.
Resistance ratings: **VG — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.
- No data available.

Comments

Threshing characteristics of wheat varieties can be estimated from their response to shattering. For example, **Neepawa** has very good resistance to shattering and is difficult to thresh. **Columbus** and **Leader** have fair resistance to shattering and are among the easier varieties to thresh.

During wet harvest weather grades drop more rapidly due to sprouting in swathed than in standing crops.

Canada Western Red Spring Wheat

Conway has performed well in the Brown soil zone. **Conway** has poor leaf rust resistance and is not suited for the eastern Prairies.

Columbus has good leaf rust resistance and has better sprouting and weathering resistance than the other varieties except **Leader** and **Lancer**. **Columbus** is late maturing and must be sown early, particularly in Area 4.

Katepwa is similar to **Neepawa** but has better stem and leaf rust resistance and is easier to thresh.

Kenyon is similar to **Neepawa** and has very good leaf and stem rust resistance.

Laura is higher yielding than other varieties and matures about two days later than **Katepwa**. **Laura** has an awned head and good shattering resistance.

Roblin has very good leaf and good stem rust resistance. Under drought

stress grain yield of **Roblin** can be reduced more than other varieties. **Roblin** is early maturing, making it best suited to northern areas.

Leader and **Lancer** are resistant to wheat stem sawfly. **Lancer** has better resistance to wheat stem sawfly, seed shattering and root rot than **Leader**.

Canada Prairie Spring Wheat

Biggar has harder kernels than **HY320** but otherwise is similar to **HY320**. **Biggar** is late maturing and must be sown early, particularly in Area 4.

HY320 will be deregistered August 1, 1990 and after that time will be eligible only for Canada Feed grade.

Oslo is similar in maturity to **Katepwa** and lower yielding than **Biggar**.

HY355 is white-seeded and sprouts similarly to durum wheat under wet harvest conditions. **HY355** is the highest yielding Canada Prairie Spring Wheat but it is slightly taller than **Katepwa** and later maturing, making it best suited to Areas 1 and 2.

Canada Western Utility

Bluesky and **Wildcat** are earlier maturing than Glenlea and lower yielding.

Canada Western Amber Durum

All durum varieties are susceptible to two new races of loose smut. Seed can be treated to provide control. See the **Seed Facts** section for details.

Arcola, Medora and **Sceptre** are early maturing and have short, strong straw.

Kyle is higher yielding than other durum varieties but is a little taller and later maturing, making it best suited to the Brown and Dark Brown soil zones.

Sceptre is the shortest, strongest-strawed durum variety, and has performed well under both dryland and irrigated conditions.

Soft White Spring Wheat

Fielder and **Owens** are semidwarf varieties and are the only varieties eligible for grades of this class. **Fielder** shatters more than **Owens,** but has stronger straw. They are both susceptible to loose smut, bunt, and sprouting of the grain before harvest. **Owens** has resistance to stripe rust which occurs in some locations of southern Alberta.

Winter Wheat

Winter survival is the chief factor limiting winter wheat production in Saskatchewan. However, with proper management successful production is possible. This means that, in most years, some form of snow trapping is necessary in most of Saskatchewan to ensure overwintering.

Norstar is the most winter-hardy variety of winter wheat available. In addition, it is high-yielding and has acceptable baking quality.

Norwin is a semi-dwarf variety. It has very short, strong straw. Its winter hardiness and yield are inferior to **Norstar**. **Norwin** should be grown only under low winter stress, high moisture conditions where lodging and excessive straw production are problems.

Rye

Main Characteristics of Varieties

Type and Variety	Yield as % of Puma				Resistance to*				
	Area 1	Area 2	Area 3	Area 4	Winter Killing	Shattering	Lodging	Stem Smut	Straw Length
Winter									
Puma	100	100	100	100	G	G	F	P	Tall
Musketeer	106	102	104	105	G	G	G	G	Tall
Prima	108	111	108	107	G	G	F	G	Tall

*Resistance ratings: **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.

Comments

Stem smut has been observed in a number of fields in Area 1 in recent years. The use of either **Prima** or **Musketeer** could alleviate the problem.

Gazelle is the only registered variety of spring rye.

Barley

Main Characteristics of Varieties

Type & Variety	2 or 6 row	Rough or Smooth Awns	Irr Yield as % of Duke	Yield as % of Harrington: Area 1	Area 2	Area 3	Area 4	Average Maturity in Days	Resistance to*: Lodging	Shattering	Net Blotch	Stem Rust	Scald	Loose Smut	Other Smuts	Root Rot
Malting																
Harrington	2	R	-	100	100	100	100	92	G	VG	P	P	P	P	VP	G
Argyle	6	S	-	92	91	95	94	91	VG	VP	G	G	P	P	VP	G
Bonanza	6	S	-	93	91	93	93	89	G	VP	G	G	P	P	P	G
Ellice	2	R	-	91	95	96	96	92	G	VG	F	G	P	P	P	F
Klages	2	R	-	98	92	95	93	94	F	VG	P	P	P	P	G	G
Feed																
Abee	2	R	-	107	104	104	100	94	P	VG	P	P	P	P	F	G
Brier	6	S	-	124	105	109	104	92	G	F	G	G	VG	P	G	VP
Deuce	2	R	-	97	98	98	97	92	G	VG	F	G	P	P	G	G
Heartland	6	S	102	97	99	100	100	92	VG	F	VG	G	P	P	P	G
Johnston	6	S	-	107	106	107	107	94	VP	P	F	G	G	P	VP	P
Leduc	6	R	99	107	107	103	99	91	P	P	F	G	VG	F	G	F
Noble	6	S	-	98	99	101	96	92	G	G	F	G	P	P	F	P
Virden	6	S	-	107	102	105	107	95	VG	G	G	G	P	P	F	VG
Hulless																
Condor	2	R	-	81	84	80	80	92	G	G	P	F	P	P	P	G
Scout	2	R	-	91	85	84	80	91	P	VG	VP	P	P	P	VP	F
Tupper	6	R	-	74	77	83	77	90	G	P	F	G	P	F	VP	G
Intensive Management+																
Duke	6	R	100	-	-	-	-	93	VG	F	F	G	VG	P	F	VG
Samson	6	R	95	-	-	-	-	92	VG	F	F	G	P	P	F	G
Winchester	6	R	94	-	-	-	-	90	VG	F	G	P	VG	P	G	G

+These varieties are suited only to high input conditions, see comments section.
*Resistance ratings; **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.

Comments

None of the current two-rowed varieties have good field resistance to all races of net blotch. Therefore, growers who must plant barley on barley stubble should select six-rowed varieties which are more tolerant. None of the available varieties are resistant to all three types of smut. Therefore, seed should be treated on a regular basis. See the **Seed Facts** section for details.

Growers are reminded that commercial evaluation of new malting varieties requires a minimum of three years. Until this is done, only very limited quantities will be purchased for malting.

In hulless varieties the hull is left in the field, therefore comparable yields are 10-15% lower. Hulless seed is more susceptible to damage than hulled seed, so handling should be minimized. Markets for hulless barley have not been clearly defined but it should be valuable for hog feed, pet food and human consumption.

Samson, Duke and **Winchester** are new semidwarf feed varieties. They should be grown only under high moisture, high fertility conditions which would cause severe lodging of conventional varieties. High productivity tests in Saskatchewan have shown **Duke** to outyield **Samson** by 5%, **Winchester** is intermediate. **Duke** is 1-2 days later than **Samson** and **Winchester** is 1-2 days earlier.

Noble is a new six-rowed feed variety. It has yielded well in drier locations. It has good lodging and shattering resistance and is similar to **Leduc** in maturity.

Virden is a new six-rowed feed variety. It has very high yield potential but is very late. It has very good straw strength.

Brier is a new six-rowed feed variety. It has very good yield potential and good disease resistance.

Irrigation

Under irrigation, disease resistance, straw strength and maturity are more critical. Growers should select early, strong-strawed, disease resistant varieties.

Lines under Interim Registration for Evaluation of Malting and Brewing Quality

Small scale tests are a good measure of malting potential but are not sufficient to determine the commercial acceptability of malting varieties. Final acceptance is given only after two years of successful plant scale evaluation. Several carload lots of barley are malted and subsequently brewed. The beer is then given the ultimate test -- a taste panel. This process will normally take a minimum of three years. Crop grown in 1989 will be malted in January-February, 1990. It will be brewed in May-June 1990, aged and tested in October-November, 1990. Crop grown in 1990 will be tested in October-November, 1991. To facilitate this testing "Interim Registration" has been established as a special category. This registration is granted for one year at a time renewable for a total of three years. It allows seed increase and marketing in a normal manner but automatically expires if performance of the line is not satisfactory. If performance is satisfactory then a full registration is granted. Production of the carload lots for evaluation is done by contract through the Canadian Wheat Board. **The following lines are currently under test:**

Lines under Interim Registration

Main Characteristics of Lines

Type and Line	Yield as a % of Harrington				Average Maturity in Days	Resistance to*						
	Area 1	Area 2	Area 3	Area 4		Lodging	Shattering	Net Blotch	Loose Smut	Other Smuts	Root Rot	Stem Rust
Two Row												
TR490	96	104	102	106	94	G	G	G	P	P	G	G
TR930	99	101	106	100	93	G	G	P	P	P	G	P
Six Row												
BT917	91	99	98	95	92	G	VP	G	P	P	G	G
BT477-B	92	100	99	96	92	G	VP	G	P	P	G	G
B1602	83	86	90	83	92	VG	VP	G	P	F	G	G
BT447-W	80	88	85	83	91	G	VP	G	P	P	G	G

*Resistance ratings; **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.

Comments

TR490 has higher yield potential, and better disease resistance than **Harrington. TR490** also has resistance to the spotted form of net blotch. **TR930** is similar in performance and disease reaction to **Harrington.**

BT917 and **BT477-B** are both blue aleurone six rows with superior yield to **Bonanza** and **Argyle**. **BT447-W** is of interest because it has a white aleurone. It may be suitable to meet the US market for white aleurone six row.

B1602 is a white aleurone six row, similar in performance to **Bonanza** and **Argyle**. Some contract production has been grown in Alberta.

Triticale

Main Characteristics of Varieties

Variety	Yield as % of Carman				Average Maturity in Days	Resistance to*				
	Area 1	Area 2	Area 3	Area 4		Lodging	Stem Rust	Leaf Rust	Bunt	Root Rot
Carman	100	100	100	100	107	G	VG	VG	VG	F
Frank	115	119	111	127	105	G	VG	VG	VG	F
Wapiti	109	120	112	106	107	G	VG	VG	VG	G

*Resistance ratings: **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.

Comments

Triticale matures 3-5 days later than **Biggar** wheat therefore should be seeded as early as possible. Triticale matures very late in Area 4.

Main Characteristics of Varieties

Variety	Yield as % of Calibre				Test wt. (kg/hl)	% Hull	Average Maturity in days	Resistance to*			
	Area 1	Area 2	Area 3	Area 4				Lodging	Stem Rust	Leaf Rust	Smut
Calibre	100	100	100	100	50.0	22.9	93	G	VP	VP	P
Cascade	105	98	99	98	47.4	26.0	92	G	VP	VP	P
Derby	100	100	99	106	50.1	22.2	93	G	VP	VP	F
Dumont	96	99	96	94	48.8	23.5	94	F	VG	VG	G
Harmon	93	91	89	85	48.2	24.1	91	G	VP	VP	P
Jasper	93	91	92	91	50.0	22.5	89	F	VP	VP	P
Riel	93	97	92	94	50.0	21.0	93	G	VG	VG	G
Robert	94	95	92	95	48.5	22.5	93	VG	VG	VG	G
Waldern**	89	93	100	107	45.7	25.0	94	G	VP	VP	F

*Resistance ratings: **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.
**Less than 3 years data available in Area 4.

Comments

Calibre has high yield potential and superior kernel quality, having very high test weight and low percent hull. **Cascade** has high yield potential but poorer kernel quality being lighter in test weight with higher hull content. **Cascade** is one to two days earlier maturing than **Calibre**.

Derby is a new variety, similar to **Calibre**, having high yield potential and test weight, but plumper grain and even lower hull content. It is slightly earlier than **Calibre** but not as early as **Cascade**. Like **Calibre** and **Cascade**, **Derby** is susceptible to the oat-rusts and may be at risk if grown in the oat-rust area of southeast Saskatchewan. Certified seed of **Derby** will not be generally available until 1991.

Dumont has excellent disease resistance and good kernel quality, however it has weaker straw and lower yield potential than **Calibre**. **Dumont** is one to two days later maturing than **Calibre**. This variety should be considered for use in the oat rust-area of southeastern Saskatchewan.

Jasper is an earlier maturing variety with kernel quality equal to **Calibre**, however its yield potential is considerably lower.

Riel and **Robert** have tan colored grain. They have very good kernel quality and disease resistance, however, yield potential is generally lower than other varieties available. They appear to be best adapted to Manitoba.

Waldern is a new variety with large grain size. However, it has very low test weight and high hull content. Therefore, it will not be desirable for milling and specialty markets. **Waldern** is rust susceptible so should not be considered for the oat-rust area of southeastern Saskatchewan. Certified seed of **Waldern** will not be generally available until 1992.

Oat Production for Specialty Markets

Producers aiming for oat sales into the specialty milling and race horse markets should be aware that marketplace specifications often exceed those for the #1 CW oat grade. In particular producers must minimize amounts of green kernels along with maximum test weight, plumpness, uniformity and freedom from weathering damage. Contamination with barley and wild oats is unacceptable for both milling and performance oat markets. While some shattering losses may occur, specialty oat crops should be left standing as long as possible prior to harvest to maintain the best opportunity of obtaining a top quality product. For further information please see the farm facts pamphlet - "Milling and Pony Oat Production" available from Saskatchewan Agriculture and Food and Saskatchewan Rural Development.

Oilseed Crops

Canola

Main Characteristics of Varieties

Type & Variety	Area 2	Area 3	Area 4	% Oil	Average Maturity in days	Resistance to* Lodging	White Rust	Blackleg**	Sclerotinia Stem Rot
	Yield as % of Westar								
Argentine									
Westar	100	100	100	43.2	96	F	VG	VP	P
Alto	99	98	100	43.2	97	F	VG	VP	P
Celebra	108	103	-	43.4	102	G	VG	F	P
Delta***	113	112	111	41.8	100	-	VG	F	P
Hyola 40	106	106	105	41.5	98	G	VG	F	P
Legend	107	101	102	42.4	99	G	VG	F	P
Profit	102	91	94	44.2	99	G	VG	F	P
Tribute(TT)	68	68	71	39.9	98	VP	VG	P	P
Vanguard	111	96	107	43.1	98	G	VG	F	P
	Yield as % of Tobin (See Comments Section)								
Polish									
Tobin	100	100	100	41.7	86	G	G	P	P
Colt	106	100	100	42.5	88	G	VP	P	P
Horizon	109	99	104	42.5	88	G	VP	P	P
Parkland	107	102	107	43.2	88	G	VG	P	P

TT = Triazine tolerant
- = insufficient data
*Resistance ratings; **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.
**A minimum of 3 years is recommended between canola crops to reduce the incidence of blackleg.
***Less than 3 years of data.

Comments

Argentine varieties yield, on average, 20% more seed than **Polish** varieties, and mature in approximately 100 days. These varieties are best suited to the longer season growing areas of central Saskatchewan. Polish varieties mature in 88 days approximately two weeks earlier than Argentine varieties, and are therefore well adapted to the short season growing areas of northern Saskatchewan. Under conditions of drought or early fall frost, which shorten the growing period, the yield of Polish varieties are also less likely to produce green seed.

All Argentine varieties are black seeded. **Westar** has a proven record as a well adapted, early maturing, high oil content variety. However, **Westar** is very susceptible to blackleg and should therefore not be grown in blackleg zone areas. **Alto** is similar to **Westar** in susceptibility to blackleg, yield and maturity. All other new Argentine varieties are less susceptible to blackleg than **Westar** and **Alto**.

Legend is high yielding, but has lower oil content than **Westar** and **Alto**. **Profit** has the highest oil content of all Argentine varieties. **Celebra** and **Vanguard** are high yielding and have oil contents similar to **Westar**. **Celebra** is late maturing. **Delta** is high yielding but tends to mature later, and its oil content is very low. **Hyola 40** is a hybrid variety that has an interim registration with high yield, and medium maturity; but has lower oil content.

Tribute is a triazine tolerant (TT) variety. Its seed yield, under weed free conditions is substantially lower than that of other Argentine varieties. **Tribute** also has a lower oil content, and is susceptible to lodging and blackleg. **Tribute** has poor seedling vigour and requires careful seedbed preparation, and should be planted only under severe infestation of stinkweed and/or wild mustard weeds which cannot be controlled in canola with herbicides. For registered herbicides consult "Chemical Weed Control in Cereal, Oilseed, Pulse and Forage Crops 1990".

Global, a very late maturing variety, is not adapted to Saskatchewan canola growing areas.

All Polish varieties are yellow-brown seeded. **Tobin** is a well adapted, early maturing variety with good resistance to white rust. Its oil content is low. **Horizon** and **Colt** are higher yielding than **Tobin**, have medium oil content; but both varieties are highly susceptible to the prevalent race of white rust. **Parkland** is high yielding, has a high oil content, and has an even greater resistance to white rust than **Tobin**. A new race of white rust, found in 1988, can attack all Polish type varieties.

Irrigation may delay maturity by 4 to 5 days.

For special industrial oil markets, a high erucic acid oil is needed. Varieties producing such oils are available, and information on the contract production of these varieties should be obtained from the industry.

Flax

Main Characteristics of Varieties

Variety	Yield as % of NorLin					Average Maturity in Days	Seed Size	Resistance to*		
	Irr	Area 1	Area 2	Area 3	Area 4			Rust	Wilt	Lodging
NorLin	100	100	100	100	100	101	Medium	VG	G	G
Andro	87	103	92	95	93	100	Medium	VG	G	G
Dufferin	90	95	98	99	95	102	Medium	VG	G	F-G
Flanders**	-	115	107	111	101	102	Small	VG	G	VG
McGregor	102	97	98	100	94	103	Small	VG	G	VG
Noralta	94	99	93	95	93	99	Small	VP	G	F-G
NorMan	98	103	100	100	99	101	Medium	VG	G	G
Somme**	-	110	107	105	113	101	Medium	VG	G	F-G
Vimy	92	115	106	101	97	101	Large	VG	G	F

*Resistance ratings: **VG** — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.
**Limited Data

Comments

Andro is a new early-maturing, rust-resistant variety that should replace the old rust-susceptible variety **Noralta**.

McGregor is a high yielding but later maturing variety. It has better straw strength than other varieties and should be considered for irrigation in areas where maturity is not a problem.

NorLin is high yielding and slightly earlier maturing than both **Dufferin** and **McGregor**. **NorLin** has good straw strength making it a good choice for irrigation.

NorMan is a medium-late variety with similar characteristics to **NorLin**.

Vimy is a new medium-late variety that is very well adapted to zones 1 and 2.

Flanders is expected to be a high yielding replacement for **McGregor**. Seed will not be generally available until 1992.

Somme is a medium-early maturing variety that will not be generally available until 1992.

Frozen flax should be analyzed by the Saskatchewan Feed Testing laboratory to determine that it is free of prussic acid before using it as a livestock feed.

Condiment Mustard

Main Characteristics of Varieties

Type & Variety	Yield as % of Cutlass	Average Maturity in days
Oriental		
Cutlass	100	94
Domo	100	95
Forge	96	96
Lethbridge 22A	88	96
Brown		
Commercial	89	96
	Yield as % of Ochre	
White		
Ochre	100	95
Gisilba	95	95
Kirby	99	95
Tilney	96	95

Comments

Mustard is grown in the drier regions of the province because of the better seed quality obtained under these conditions. Oriental and Brown mustards are usually swathed, but straight combining is also possible. White mustard should be straight combined because of possible losses due to wind damage to the fluffy swath. Any mixtures of rapeseed in mustard, due to volunteer plants in the field or to improper handling on the farm, cause substantial losses through grade reductions.

Oriental mustard varieties are yellow seeded. **Cutlass** and **Domo** are high yielding and early maturing varieties. **Lethbridge 22A** is low yielding and susceptible to lodging. **Forge**, a new variety, has good yield and superior seed quality. **Cutlass, Domo** and **Lethbridge 22A** are resistant to white rust, while **Forge** is highly susceptible.

Brown mustard **Commercial Brown** is brown seeded. It yields 10% less than **Cutlass** and is highly susceptible to white rust.

White mustard varieties are large seeded and seed is light yellow in colour. They yield, on average, 30% less than the Oriental mustard variety **Cutlass**. **Ochre** and **Kirby** are high yielding while **Gisilba** and **Tilney** yield less.

All mustard varieties listed are resistant to blackleg.

Mustard is usually grown under contract. Differences in yield between the types is normally compensated for by contract price.

Sunflower (oilseed)

Main Characteristics of Varieties

Variety	Yield as % of USDA 894	Average Maturity in days	Oil %
USDA 894	100	125	44.9
DO-707	112	124	45.5
DO-855	108	122	46.3
IS 7000	102	121	47.6
IS 7111	103	121	47.9
S 1296	107	121	46.1

Comments

Sunflower requires 110-135 days to mature, depending on the cultivar and the growing season.

Oilseed sunflower is adapted to the Dark Brown and Black soil zones in southeastern Saskatchewan. Because of the relatively short growing season in this province, early maturing cultivars are required. Later maturing hybrids have also been grown. These later hybrids should be planted early and should be considered only in the extreme southeast of Saskatchewan and at Outlook. Contractors and crushers may pay a premium for high oil content. The Saskatchewan sunflower Committee conducted tests at Saskatoon, Watrous, Carievale, Outlook and Moose Jaw.

Pulse Crops

Field Pea

Main Characteristics of Varieties

Variety	Color***	Yield as % of Century: Area 2 and Southern 3	Yield as % of Century: Area 4 and Northern 3	Average Maturity in Days	Resistance to**: Ascochyta Blight	Resistance to**: Powdery Mildew	Resistance to**: Seed Coat Breakage	Seed Weight (g/1000)
Century	Y	100	100	101	VP	F	F	250
Bellevue	Y	113	103	105	P	P	G	190
Express	Y	117	126	96	P	VP	P	260
Fortune	Y	122	117	104	F	VP	F	210
Miranda*	Y	-	98	93	F	-	P	330
Princess*	G	78	90	93	VP	P	-	190
Radley*	G	-	108	98	-	-	-	200
Tara	Y	125	118	103	F	VG	F	230
Tipu	Y	96	106	99	P	P	P	240
Titan	Y	113	110	102	P	F	G	270
Trapper	Y	104	109	100	P	F	F	150
Victoria	Y	104	117	95	P	P	F	190

*Limited data only.
Resistance ratings: **VG — very good; **G** — good; **F** — fair; **P** — poor; **VP** — very poor.
*** Cotyledon color: G — green, Y — yellow.

Comments

Field pea is best adapted to the more northerly black and gray soil zones. Early seeding will usually result in late August maturity and increase the likelihood of harvesting high quality seed. Seed splitting may be reduced by harvesting pea tough and drying in an aeration bin. Seed of **Bellevue**, **Express** and **Fortune** will not be generally available in 1989. The recommended seeding rate for **Trapper** is 135 kg/ha (120 lb/ac). Other varieties should be sown at higher rates in proportion to seed size. Under dry conditions, **Tipu**, **Radley**, **Miranda**, **Express**, and **Princess** provide particularly poor weed competition. As well, the short vines of **Miranda**, **Express** and **Princess** makes harvesting difficult.

Tipu and **Radley** are semi-leafless. The main advantage of this plant type is easier harvesting as it does not lay as flat on the ground.

Princess and **Radley** are green seeded varieties for which there is considerable risk of low grades due to bleaching. **Radley** is semi-leafless, and has higher yield and longer vines than **Princess**. However, the acceptance of **Radley** by the food industry has not yet been established.

Damaged and uncleaned seed of all varieties may be utilized for feed purposes, but some varieties are of lower quality and are only suitable for the feed market. When growing field pea for feed, one should select a high-yielding variety, such as **Tara**. **Sirius**, **Stegholt** and **Whero** are newly-registered feed varieties for which there is only limited yield data. Small seed size is desirable for reducing the cost of seeding feed varieties, but **Stegholt** has very large seed.

Provided that adequate moisture is available, the field pea, like other legumes, offers considerable benefit when grown in rotation with other crops. Proper seed inoculation results in symbiotic nitrogen fixation which reduces input costs by supplying most of the nitrogen required by a productive pea crop. In addition, succeeding crops require less nitrogen fertilizer to attain high yields. See seed inoculation section.

Lentil

Main Characteristics of Varieties

Variety	Yield as % of Laird	Height (cm)	Days to First Flower	Seed Size	Seeding Rates kg/ha(lb/A)
Laird	100	41	51	Large	90-100 (80-90)
Eston	107	30	48	Small	45-50 (40-45)

Comments

Lentil is best adapted to the Brown, Dark Brown and southernmost areas of the Black soil zones. It has about the same growing season requirement as durum wheat. However, lentil has an indeterminate growth habit and some stress is required during flowering to stimulate heavy pod set. A nitrogen stress can be induced by seeding early on cereal stubble. A drought stress occurs naturally during most years in the Brown and Dark Brown soil zones or can be induced by early seeding on light soils in the Black soil zone.

Young lentil plants can tolerate a light frost; a heavier frost will kill the tops, but they will regrow from axillary buds at or below the soil surface. Thus lentil can and should be seeded early, even earlier than wheat and as soon as the soil temperature at seeding depth exceeds 5°C. Early seeding is also important from the standpoint of reducing the hazard from early fall frosts which severely damage immature seeds. Lentil will not tolerate flooding or salt-affected soils.

Lentil plants are short (30-45 cm) and must be swathed close to the ground using a pick-up reel. Thus, they should be seeded on a smooth, rock-free seedbed to facilitate swathing.

Two lentil varieties have been developed for Western Canada. **Laird** is a tall, late-maturing variety with extra-large seeds and has become the industry standard for quality. **Laird** has some resistance to ascochyta leaf, stem and pod blight. **Eston** is a short, erect, early-maturing variety with small seeds and is susceptible to ascochyta blight.

Lentil producers should plant lentil seed that has been tested for seed-born ascochyta and use only seed testing "none-detected" or as low as is readily available.

Lentil marketing is a highly specialized business and it is advisable to grow lentil under contract.

For cropping practices, weed control and inoculation information, see the reference section.

Faba Bean

Main Characteristics of Varieties

Variety	Yield as % of Outlook	Average Maturity in Days	Seed Size
Outlook	100	109	small
Aladin	106	112	large
Encore	103	110	small
Orion	68	102	small
Pegasus	100	111	small

Faba bean should be seeded early (late April to early May). It is best adapted to irrigated areas in the Dark Brown Soil Zone and to that portion of the Black Soil Zone with the longest growing season.

Encore and **Pegasus** are the highest yielding varieties under irrigation production. **Orion** is the earliest maturing variety and is a good performer in areas with a short growing season.

Faba bean is a legume and thus is able to use nitrogen from the air provided the seed is inoculated with the proper bacteria prior to planting. Faba bean requires a special strain of inoculum which is different from other pulse crops.

Other Crops

Canary Seed

The seed of annual canarygrass, more commonly called canary seed, is used as food for caged and wild birds. It is generally grown under contract with the contracting companies providing the seed. Two registered varieties are available. **Elias** and **Keet** are similar in yield, but **Keet** is earlier maturing and more resistant to lodging. The maturity requirements are equal to wheat. Average moisture is required for canary seed and growing the crop on sandy soils is not recommended. Summerfallow is generally used, but canary seed may be grown successfully on well-prepared stubble, providing adequate moisture is available.

Seed early in May at 34 kg/ha (30 lb/A) (germination greater than 85 percent). Plant the seed 3.5 to 5 cm deep into a firm seedbed. A grain drill is recommended.

Fertilizer recommendations are similar to those for cereal crops. No serious insect or disease problems have been identified. Canary seed is very sensitive to diclofop methyl and trifluralin. It should not be seeded on land that was treated with triflualin the previous year.

Canary seed is resistant to shattering. It may be straight-combined or swathed when fully matured.

Safflower

Safflower is an annual oilseed or birdseed crop which can be grown successfully in the brown soil zone. Safflower must be sown early. **Saffire** matures in about 119 days. Seed shallow but into a firm moist seedbed at about 27 lbs/A. **Saffire** has moderate resistance to Sclerotinia head rot and Alternaria leaf spot. Contract production is advisable.

Seed Facts

Pedigreed Seed

Use certified seed regularly, and especially when changing to a different variety. This assures that the seed has high genetic purity, high germination and is relatively free from weeds and other crop seeds. Pedigreed seed may be paid for by an over-quota delivery of commercial grain. Ask your elevator agent or seed dealer for details.

Seed Cleaning

Seed should be carefully cleaned to remove weed seeds, trash, small or broken kernels, ergot and sclerotia. **Country grain elevators are not equipped to clean grain to seed standards, and the risk of mixing varieties and types of grain is very high.**

Seed Treatment

Smuts that attack wheat, barley, oat and rye can be controlled by chemical seed treatments. If bunt or smut was observed in a crop which is being used for seed it should be treated. However, it may be a wise precaution to treat seed of susceptible varieties periodically, depending on the susceptibility of the variety. Varieties rated **Very Poor** should be treated every year and varieties rated **Poor** every second year.

The virulent form of blackleg is now widespread on canola in Saskatchewan. Treatment of seed with a recommended fungicide can be beneficial to reduce the disease and the risk of introducing the disease into unaffected areas. Growers with carryover stocks of treated seed should have these tested for germination.

Coating of canola with the appropriate seed dressing is a convenient alternative to on farm seed treatment.

Various fungicides have been registered for the control of seedling diseases. Flax, rye and winter wheat seed should be treated to promote good seedling growth.

Wireworms, which attack all grain crops and flea beetles, which attack canola and mustard, can be controlled by seed treatment with insecticides. Read the label carefully and follow all directions.

Treated seed **must not** be allowed to contaminate grain delivered to an elevator or used for feed.

Ergot

Ergot attacks all varieties of rye, triticale, wheat and barley, as well as most common species of grass. Oat is rarely attacked and all broadleaved species are immune. Grain containing 0.1% ergot is considered poisonous and should not be used as food. For details on the disease obtain a copy of 'Ergot of Grains and Grasses'. Publ. 1438.

Seed Inoculation

Legume crops are only able to fix atmospheric nitrogen if their roots are well nodulated with nitrogen-fixing bacteria. Whenever a legume is planted in a field it is important that the seed be inoculated with the **proper** strain of nitrogen-fixing bacteria immediately before seeding. The use of a sticker such as a syrup solution or a powdered milk solution will help assure proper inoculation.

Ascochyta on Lentil

Lentil producers should plant lentil seed that has been tested for seedborne ascochyta and use only seed testing "none-detected" or as low as is readily available.

Damp and Frozen Seed

Seed which is stored damp or tough may be low in germination. Grain which is being saved for seed should be dried if necessary, soon after harvest. Drying temperature should be kept below 37°C for batchdriers, or 43°C for recirculating and continuous driers. Frozen grain should never be sown without a laboratory germination test. There is frequently a high percentage of abnormal seedlings which may be unnoticed by an inexperienced observer.

Production Notes

All classes of wheat including durum and triticale are susceptible to wheat midge. Farmers in the infested area should be prepared to spray these fields with recommended insecticides if necessary. Refer to **Orange Wheat Blossom Midge** Publication.

Residue of infected crops may harbour disease agents. Seeding into stubble of the same crop kind may increase disease risk, particularly in the higher rainfall areas.

Inspect fields weekly for the presence of Russian wheat aphid. Infested plants will show white or purple longitudinal stripes. Biology and control of this aphid are described in the leaflet "Russian Wheat Aphid".

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Testing Varieties in Saskatchewan

Information in the pamphlet "Varieties of Grain Crops for Saskatchewan" is based on the performance of varieties at about 40 locations across the province. Data from these trials are summarized and interpreted by the Grain Crops Sub-council to the Saskatchewan Advisory Council on Grain Crops.

These trials are conducted by researchers from Agriculture Canada and the University of Saskatchewan. The most recently registered varieties and promising experimental lines that might become registered are compared to standard varieties. Wheat, oat, barley and flax varieties are grown at all locations, whereas canola, mustard, field pea, lentil and minor crops are tested in those regions in which they are considered to be adapted. Information on sunflower production is received from trials conducted under the auspices of the Saskatchewan Sunflower Committee. The reaction of varieties to diseases and seed treatment recommendations are updated and forwarded to the Grain Crops Sub-council by pathologists who meet as members of the Plant Disease Sub-council of the Council on Crop Protection.

Variety Trials are grown both on Research Stations and farmers' fields. Multiple small plots (30 ft.^{2} to 45 ft.^{2}) of the various varieties are sown and harvested with miniature press-drills and combines.

Grain yield results from the interplay of genetic factors and non-genetic factors. Variety trials are designed to measure the differences between varieties that are due to genetic causes. It is important to minimize variability due to non-genetic factors such as soil type, nutrients, moisture, weeds, diseases, and other pests. Experimental designs using replication (repeated plantings of the varieties) and randomization (the position of the varieties within the test are assigned by chance) are then used to estimate the precision with which the genetic factors can be measured. Yield potential of a variety is estimated by measuring the weight of grain produced per unit area. Comparisons among varieties for yield potential involves an evaluation of both their absolute amounts of grain and their relative yield. Relative yield is the yield of one variety expressed as a percentage of a second variety.

Yields obtained in these trials are not likely to be identical to those obtained under commercial production conditions. However, the average yield for these varieties, obtained over a number of years at several locations, would remain in relatively the same ratio regardless of whether the grain yields were measured in small plots or large-scale fields. **Relative yields** presented in this pamphlet are the best estimates of expected yield advantage in the areas indicated. They are considerably more reliable than estimates based on data from a single test or from a single location. Farmers should be aware, however, that actual yields within an area, or in a particular year, may vary substantially from the average figures reported because of natural variability. For example, Laura wheat is expected to outyield Katepwa by 5% in Area 2. A farmer in this area may find that Laura will yield anywhere in the range of about 7 percent less than Katepwa to about 17 percent more than Katepwa.

One out of three times, Laura may even yield outside this range. Similar variation in relative yields can be expected for most crops.

Relative maturity ratings are average number of days from seeding to swathing ripeness. The actual number of days to reach maturity depends on local climate and to some extent management practices. For example, Neepawa will often mature in less than 98 days in Area 1 and may require 120 days in Area 4. The maturity ratings should be considered as a guide to the relative maturity of the varieties, that is, whenever and wherever, Neepawa and Columbus are both seeded at the same time, Neepawa will reach maturity sooner than Columbus.

Breeding Institutions and Seed Distributors of Varieties Listed in This Publication

Crop Kind, Class & Variety	Breeding Institution	Distributor
[W]heat		
[H]ead Wheat		
Benito	Ag Canada (Winnipeg	SeCan Members
Columbus	Ag Canada (Winnipeg)	SeCan Members
Conway	Univ. of Sask. — Crop Development Centre	Sask Wheat Pool
Katepwa	Ag Canada (Winnipeg)	SeCan Members
Kenyon	Univ. of Sask. — Crop Development Centre	SeCan Members
Laura	Ag Canada (Swift Current)	SeCan Members
Leader	Ag Canada (Swift Current)	SeCan Members
Lancer	Ag Canada (Swift Current)	SeCan Members
Neepawa	Ag Canada (Winnipeg)	public
Roblin	Ag Canada (Winnipeg)	SeCan Members
Canada Prairie Spring Wheat		
Biggar	Ag Canada (Swift Current)	SeCan Members
HY355	Ag Canada (Swift Current)	SeCan Members
Oslo	NAPB; Sask Wheat Pool	Sask Wheat Pool
Canada Western Utility		
Bluesky	Ag Canada (Beaverlodge)	SeCan Members
Glenlea	Univ. of Manitoba	public
Wildcat	Ag Canada (Beaverlodge)	SeCan Members
Durum		
Arcola	Univ. of Sask. — Crop Development Centre	SeCan Members
Kyle	Ag Canada (Swift Current)	SeCan Members
Medora	Ag Canada (Winnipeg)	SeCan Members
Sceptre	Univ. of Sask. — Crop Development Centre	SeCan Members
Wakooma	Ag Canada (Swift Current)	public
Wascana	Ag Canada (Swift Current	public
[S]oft White Spring Wheat		
Fielder	Idaho State Univ. & USDA; Ag Canada (Lethbridge)	public
Owens	Idaho State Univ. & USDA; Ag Canada (Lethbridge)	public
Winter Wheat		
Norstar	Ag Canada (Lethbridge)	public
Norwin	Montana Ag Exp. Station & USDA (Aberdeen); Univ. of Sask. — Crop Development Centre	public
Winter Rye		
Musketeer	Ag Canada (Swift Current)	SeCan Members
Prima	Ag Canada (Swift Current)	SeCan Members
Puma	Univ. of Manitoba	public
Spring Rye		
Gazelle	Univ. Of Sask. — Crop Development Centre	public
Triticale		
Carman	Univ. of Manitoba	SeCan Members
Frank	Ag Canada (Swift Current)	SeCan Members
Wapiti	CIMMYT; Alta Ag	SeCan Members
Barley		
Malting		
Argyle	Univ. of Manitoba	SeCan Members
Bonanza	Ag Canada (Brandon)	public
Ellice	Ag Canada (Winnipeg)	SeCan Members
Harrington	Univ. of Sask. — Crop Development Centre	SeCan Members
[M]es	USDA (Idaho); Univ. of Sask. — Crop Development Centre	public
Feed		
Abee	Alta Ag (Lacombe)	SeCan Members
Brier	Univ. of Sask. — Crop Development Centre	SeCan Members
Deuce	Univ. of Sask. — Crop Development Centre	SeCan Members
Heartland	Ag Canada (Brandon)	SeCan Members
Johnston	Ag Canada (Brandon)	SeCan Members
Leduc	Ag Canada (Brandon)	SeCan Members
Noble	Alta Ag (Lacombe)	SeCan Members
Virden	Ag Canada (Brandon)	SeCan Members
Hulless		
Condor	Alta Ag (Lacombe)	SeCan Members
Scout	Univ. of Sask — Crop Development Centre	SeCan Members
Tupper	University of Sask — Crop Development Centre	SeCan Members
Intensive Management		
Duke	Univ. of Sask. — Crop Development Centre	SeCan Members
Samson	Alta Ag (Lacombe)	SeCan Members
Winchester	Western Plant Breeders; Prairie Pools	Sask Wheat Pool
Oat		
Calibre	Univ. of Sask — Crop Development Centre	SeCan Members
Cascade	Ag Canada (Lacombe)	SeCan Members
Derby	Univ. of Sask. — Crop Development Centre	United Grain Growers
Dumont	Ag Canada (Winnipeg)	SeCan Members
Harmon	Ag Canada	public
Jasper	Ag Canada (Lacombe)	SeCan Members
Riel	Ag Canada (Winnipeg)	SeCan Members
Robert	Ag Canada (Winnipeg)	SeCan Members
Waldern	Ag Canada (Lacombe)	SeCan Members
Canola		
Argentine		
Alto	Univ. of Alta.	Cen Alta Grain, Canbra Foods Ltd., Northern Sales, United Oilseeds
Celebra	Svalof; Bonis	Newfield Seeds, Canadian Seed Coaters
Delta	Allelix Inc.	United Grain Growers
Hyola 40	Garst Seed Company Canada	Garst Seed Agents
Global	Svalof; Bonis	Sask Wheat Pool, Canbra Foods Ltd.
Legend	Svalof; Bonis	Sask Wheat Pool
Profit	Ag Canada (Saskatoon)	SeCan Members
Tribute (TT)	Ag Canada (Saskatoon; University of Guelph	SeCan Members
Vanguard	Svalof; Bonis	Newfield Seeds, Canadian Seed Coaters
Westar	Ag Canada (Saskatoon)	SeCan Members
Polish		
Colt	Svalof; Bonis	Sask Wheat Pool
Horizon	Svalof; Bonis	Sask Wheat Pool
Parkland	Ag Canada (Saskatoon)	SeCan Members
Tobin	Ag Canada (Saskatoon)	SeCan Members

Breeding Institutions and Seed Distributors of Varieties Listed in This Publication

Crop Kind, Class & Variety	Breeding Institution	Distributor
Flax		
Andro	Univ. of Sask — Crop Development Centre	SeCan Members
Dufferin	Ag Canada (Morden)	SeCan Members
Flanders	Univ. of Sask. — Crop Development Centre	SeCan Members
McGregor	Ag Canada (Morden)	SeCan Members
Noralta	Ag Canada (Fort Vermilion and Ottawa)	public
NorLin	Ag Canada (Morden)	SeCan Members
NorMan	Ag Canada (Morden)	SeCan Members
Somme	Univ. of Sask. — Crop Development Centre	SeCan Members
Vimy	Univ. of Sask. — Crop Development Centre	SeCan Members
Mustard (Condiment)		
Brown		
Commercial		Trade
Oriental		
Cutlass	Ag Canada (Saskatoon)	Trade
Domo	Ag Canada (Saskatoon)	Trade
Forge	Garst Seed Company Canada	Garst Seed Agents, Trade
Lethbridge 22A	Ag Canada (Saskatoon)	Trade
White		
Gisilba	Kurt Behm GMBH; Ag Canada (Saskatoon)	Northern Sales
Kirby	Colmna's of Norwich; Ag Canada (Saskatoon)	United Grain Growers
Ochre	Ag Canada (Saskatoon)	Trade
Tilney	Colman's of Norwich; Ag Canada (Saskatoon)	United Grain Growers
Sunflower		
USDA 894	USDA	no seed
DO-707	Dahlgren and Company	farmer dealers
DO-855	Dahlgren and Company	farmer dealers
IS 7000	Interstate Seeds	Sask. Wheat Pool
IS 7111	Interstate Seeds	Sask. Wheat Pool
S 1296	Northrup King	farmer dealers
Field Pea		
Bellevue	Univ. of Sask. — Crop Development Centre	SeCan Members
Century	Ag Canada (Morden)	public
Express	Svalof; Bonis	Newfield Seeds
Fortune	Svalof; Bonis	Newfield Seeds
Miranda	Cebeco; Manitoba Pool	Manitoba Pool
Princess	Wilbur Ellis Co; CanMar Grain	CanMar Grain
Radley	Booker Seeds Ltd; Columbia Seeds	Columbia Seeds (Alta)
Tara	Ag Canada (Morden)	SeCan Members
Tipu	Ag Canada (Morden)	SeCan Members
Titan	Ag Canada (Morden)	SeCan Members
Trapper	Ag Canada (Morden)	public
Victoria	Svalof; Bonis	Newfield Seeds
Lentil		
Eston	Univ. of Sask. — Crop Development Centre	SeCan Members
Laird	Univ. of Sask. — Crop Development Centre	SeCan Members
Faba Bean		
Aladin	Univ. of Manitoba	public
Encore	Univ. of Sask.— Crop Development Centre	Manitoba Pool
Orion	Ag Canada (Lacombe)	Roger Lee (Alta) Lyster Farms Ltd (Alta)
Outlook	Univ. of Sask. — Crop Development Centre	SeCan Members
Pegasus	University of Manitoba	Roy Legumex (Man)
Canary Seed		
Elias	University of Minnesota; U of S Crop Development Centre	public
Keet	Univ. of Minnesota; U of S Crop Development Centre	public
Safflower		
Saffire	Ag Canada (Lethbridge)	SeCan Member

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