

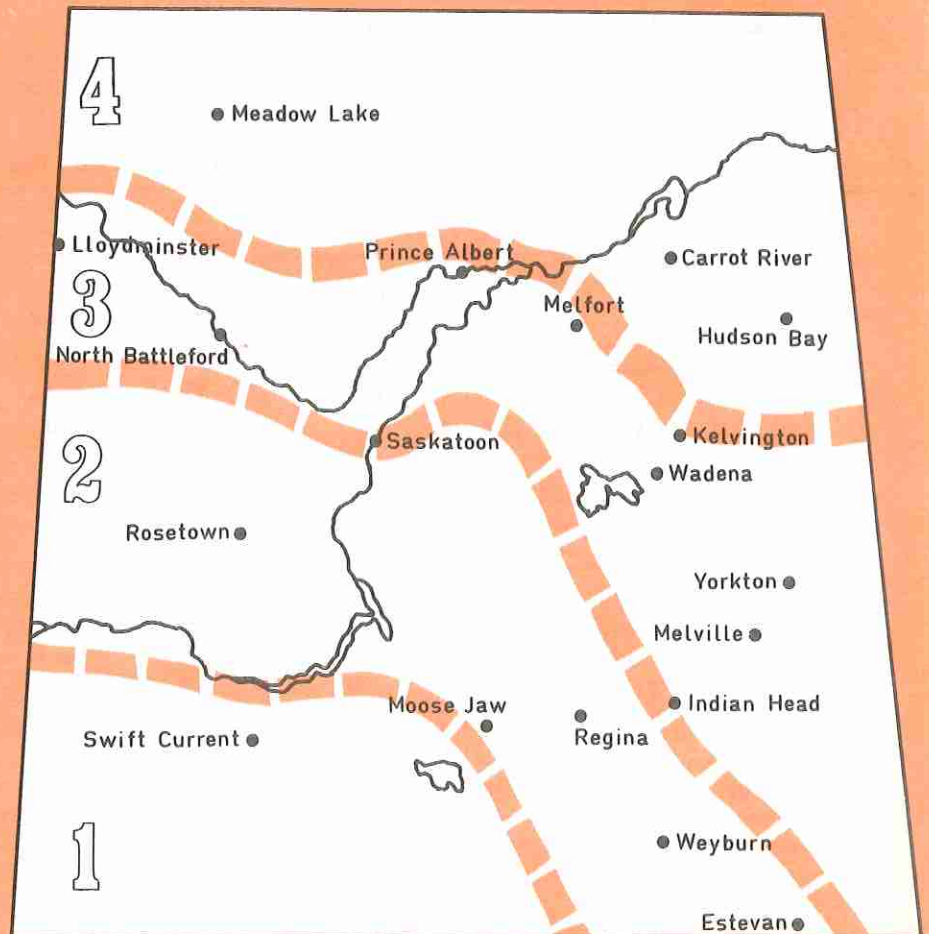


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# Varieties of Grain Crops for Saskatchewan 1980



Descriptions as prepared by:  
The Grain Crops Committee of  
**THE SASKATCHEWAN ADVISORY COMMITTEE  
ON GRAIN CROPS**

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## GRAIN CROP PRODUCTION AREAS

(See map on front page)

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 occur in the extreme southeastern section.
- Area 2: Drought and sawflies can 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.

The following tables contain the main characteristics of new and commonly grown varieties of cereals, oilseed crops and minor crops. Varieties that are not listed are considered to be inferior for production in Saskatchewan, except under certain localized conditions. The comments in the tables are based on averages for several stations in each area for at least three years.

### BARLEY

#### Main Characteristics of Varieties

Type and Variety	Six or Two Rowed	Yield as % of Bonanza				Average Maturity in Days	Resistance to				
		Area 1	Area 2	Area 3	Area 4		Lodging	Stem Rust	Loose Smut	False Loose and Covered Smut	Shattering
<b>Eligible for C.W. Grades</b>											
Bonanza.....	Six .....	100.....	100.....	100.....	100.....	89	Good .....	Good .....	Fair .....	Fair .....	Fair
Conquest.....	Six .....	92.....	92.....	91.....	93.....	88	Good .....	Good .....	Fair .....	Fair .....	Fair
Betzes* .....	Two .....	110.....	99.....	98.....	91.....	90	Poor.....	Poor.....	Poor.....	Poor.....	Good
Elrose** .....	Two .....	102.....	108.....	107.....	98.....	90	Fair .....	Poor.....	Poor.....	Fair .....	Good
Klages .....	Two .....	106.....	105.....	103.....	99.....	94	Fair .....	Poor.....	Poor.....	Good.....	Good
<b>Feed</b>											
Fairfield* .....	Two .....	116.....	110.....	104.....	100.....	91	Fair .....	Poor.....	Poor.....	Fair .....	Good
Fergus .....	Two .....	107.....	102.....	98.....	91.....	93	Fair .....	Poor.....	Fair .....	Fair .....	Good
Hector* .....	Two .....	114.....	106.....	101.....	90.....	92	Fair .....	Fair .....	Fair .....	Fair .....	Good
Summit .....	Two .....	100.....	106.....	107.....	100.....	93	Good.....	Poor.....	Poor.....	Fair .....	Good
Bedford** .....	Six .....	103.....	108.....	105.....	99.....	92	Good.....	Good.....	Fair .....	Fair .....	Fair
Klondike .....	Six .....	108.....	112.....	109.....	105.....	91	Good.....	Good.....	Fair .....	Fair .....	Fair
Melvin.....	Six .....	111.....	114.....	111.....	104.....	92	Good.....	Good.....	Poor.....	Fair .....	Fair

\* See comments

\*\*Less than three years' data for yield figures

#### COMMENTS:

Loss appraisal studies in Saskatchewan indicate an estimated average yield reduction of 12% due to common root rot. BONANZA, BETZES, CONQUEST, KLAGES, ELROSE, SUMMIT and HECTOR have fair tolerance to the disease.

KLAGES is a two-rowed malting variety with superior quality to BETZES and thus is preferred by the malting industry. KLAGES germinates very readily therefore care should be taken to avoid sprouting during harvest.

ELROSE is a new two-rowed malting variety with similar quality to KLAGES. The acceptance of this variety by the malting and brewing industry will be determined by plant scale tests in 1979-80. ELROSE is similar in disease resistance to KLAGES. In the traditional two-row area these two varieties are similar in performance but ELROSE is 4-5 days earlier maturing. Limited supplies of seed will be available through SeCan members.

HECTOR and FAIRFIELD are high yielding two-rowed varieties which are technically eligible for C.W. Grades. The malting industry prefers other varieties thus little of these varieties are being purchased for malting.

SUMMIT is a two-rowed feed variety. It is strong strawed and high yielding especially in area 3. SUMMIT is similar in maturity to FERGUS and provides a good alternative due to its superior yield.

BEDFORD is a new six-rowed feed variety which is

adapted to eastern Manitoba. It does not appear to have any advantages for Saskatchewan production.

KLONDIKE is a six-rowed feed barley. It is 2-3 days later than BONANZA, 7-13 cm shorter and is higher yielding in all areas.

MELVIN is a six-rowed feed barley. It is 3-4 days later than BONANZA and similar to KLONDIKE in height. It has some field tolerance to scald. MELVIN is adapted to the west-central portion of the province and outyields other six-rowed varieties in this area.

### WHEAT Main Characteristics of Varieties

Variety	Area 1	Area 2	Area 3	Area 4	Average Maturity in Days	Resistance to					
						Lodging	Shattering	Stem Rust	Leaf Rust	Loose Smut	Root Rot
Yield as % of Neepawa											
<b>Bread Wheat</b>											
Neepawa	100	100	100	100	98	Good	Good	Good	Poor	Good	Fair
Canuck	101	97	—	—	101	Fair	Good	Fair	Poor	Good	Fair
Chester	103	98	—	—	100	Fair	Good	Fair	Poor	Fair	Fair
Manitou	95	98	97	98	98	Good	Good	Good	Poor	Good	Fair
Napayo	95	95	95	100	99	Good	Good	Good	Poor	Good	Fair
Sinton	91	97	97	105	99	Good	Fair	Good	Good	Poor	Fair
Yield as % of Wascana											
<b>Durum Wheat</b>											
Wascana	100	100	100	100	101	Good	Good	Good	Good	Good	Poor
Coulter	92	94	98	104	99	Good	Good	Good	Good	Good	Fair
Hercules	85	88	90	99	98	Good	Good	Good	Good	Good	Poor
Macoun	94	90	95	101	100	Good	Good	Good	Good	Good	Poor
Wakouma	99	98	99	101	102	Good	Good	Good	Good	Good	Fair
Yield as % of Sundance						Resistance to					
	Area 3	Area 4		Plant Height		Winter Killing				Lodging	
<b>Winter Wheat**</b>											
Sundance	100	100		Tall		Fair				Poor	
Norstar	104	102		Medium		Good				Fair	

\* These varieties are variable in maturity and may mature later under cool conditions.  
 \*\* Failure to show yield data for Areas 1 and 2 is due to absence of test sites.

### COMMENTS

The incidence of wheat stem sawfly has continued to increase in southwest Saskatchewan. CANUCK and CHESTER are sawfly-resistant varieties of which CANUCK has superior sawfly resistance. CHESTER is slightly earlier maturing and has slightly shorter, stronger straw than CANUCK.

SINTON is the only bread wheat variety that is

resistant to leaf rust but it is free-threshing and shattering can occur, particularly if swathing is delayed. SINTON seems adapted to all areas except the drier Area 1.

COULTER and MACOUN are early maturing, short-strawed varieties of durum wheat which should be grown where these characteristics are important.

Soft white wheat should be grown only on irrigated land and under contract with a milling company. SPRINGFIELD has acceptable quality and has higher yield and better leaf rust resistance than LEMHI 62. FIELDER, licensed in 1976, is superior to SPRINGFIELD in yielding ability, test weight and resistance to powdery mildew.

Winter survival is the chief factor limiting winter wheat production in Saskatchewan. However, with proper management successful production is possible in areas 3 and 4 and the southern portion of area 1. If a

reasonable stand survives the winter, winter wheat should yield about 25% higher than NEEPAWA spring wheat. It also has the additional advantages of early maturity, redistribution of labor requirements and increased competition with weeds.

NORSTAR, licensed in 1977, is the most winter hardy variety of winter wheat available. In addition it is higher yielding and better baking quality than SUNDANCE.

### OATS Main Characteristics of Varieties

Variety	Yield as % of Harmon				Average Maturity in Days	Resistance to				Test Wt. Kg/hl.
	Area 1	Area 2	Area 3	Area 4		Lodging	Stem Rust	Leaf Rust	Smut	
Harmon	100	100	100	100	91	Fair	Poor	Fair	Fair	48
Athabasca	102	99	100	102	90	Fair	Poor	Poor	Poor	46
Cascade	115	104	114	—	92	Fair	Poor	Poor	Poor	47
Cavell	103	102	102	100	86	Poor	Poor	Poor	Poor	48
Foothill*	107	97	98	—	95	Poor	Poor	Poor	Poor	46
Hudson	107	107	110	108	91	Good	Good	Good	Fair	46
Kelsey	98	106	106	104	89	Fair	Poor	Fair	Fair	47
Random	109	106	110	107	89	Good	Poor	Fair	Poor	46
Sioux	105	104	104	102	88	Good	Poor	Poor	Poor	49

\*1 year's data only  
Data not available for Cascade and Foothill in Area 4

#### COMMENTS:

HARMON is a plump-seeded variety with moderately strong straw.

ATHABASCA is similar in yield to HARMON, but has smaller kernels, lower test weight and less disease resistance.

CAVELL, KELSEY and SIOUX mature earlier than HARMON but CAVELL and SIOUX have poorer disease resistance and CAVELL has weaker straw. CAVELL and SIOUX perform better than KELSEY in area 1.

HUDSON and RANDOM are high yielding varieties

which have short, strong straw but have lower test weight than HARMON. RANDOM is better adapted to area 1 than HUDSON. HUDSON is the only listed variety with resistance to stem rust race C10 and is therefore useful for the rust area.

CASCADE is a new, high yielding variety similar in maturity and straw strength and slightly lower in test weight than HARMON.

FOOTHILL is a late, tall, weak strawed, low test weight forage oat not particularly well adapted to Saskatchewan.

### OTHER INFORMATION RELATING TO GRAIN CROP PRODUCTION

Bulletins on fertilizers and weed control, generally revised annually, are available from sources given. Information on crops, plant diseases, insect pests and other aspects of production can be found in the Guide

to Farm Practice in Saskatchewan and other pamphlets. These publications may be obtained from Agricultural Representatives, Research Stations and the University of Saskatchewan.

## FLAX

### Main Characteristics of Varieties

Variety	Yield as % of Dufferin				Average Maturity in Days	Resistance to		Seed Size	Flower Color
	Area 1	Area 2	Area 3	Area 4		Rust	Wilt		
Dufferin.....	100.....	100.....	100.....	100.....	101	Good.....	Good.....	Medium.....	Blue.....
Culbert.....	83.....	91.....	88.....	83.....	93	Good.....	Good.....	Medium.....	Blue.....
Linott.....	85.....	96.....	93.....	86.....	100	Good.....	Good.....	Medium.....	Blue.....
Noralta.....	85.....	102.....	103.....	88.....	99	Poor.....	Good.....	Small.....	Blue.....
Norland.....	103.....	98.....	96.....	86.....	105	Poor.....	Fair.....	Large.....	White.....
Raja.....	71.....	80.....	77.....	70.....	95	Good.....	Good.....	Large.....	Blue.....
Redwood 65.....	102.....	104.....	102.....	95.....	105	Poor.....	Good.....	Medium.....	Blue.....

#### COMMENTS:

DUFFERIN, LINOTT, CULBERT and RAJA are the rust resistant varieties presently available. DUFFERIN should be considered a replacement for REDWOOD 65. Although late seeding of flax is not advised, LINOTT usually yields better than other varieties when seeded late. CULBERT is a United States bred variety adapted to late seeding in the Red River Valley area of Manitoba.

NORALTA, NORLAND and REDWOOD 65 are

susceptible to several races of rust currently found in Saskatchewan. Rust and other flax diseases overwinter in Saskatchewan. To minimize these diseases, avoid planting flax on or near flax stubble. Use clean seed as the refuse or debris in the seed may be infected with the disease.

Frozen flax should be analysed by the Saskatchewan Feed Testing Laboratory to determine that it is free from Prussic acid before using it for livestock feed.

## RYE

### Main Characteristics of Varieties

Type and Variety	Yield as % of Puma				Winter Killing	Resistance to		Kernel		Straw Length
	Area 1	Area 2	Area 3	Area 4		Shattering	Lodging	Color	Size	
<b>Winter Rye</b>										
Puma.....	100.....	100.....	100.....	100.....	Good.....	Good.....	Fair.....	Green.....	Medium.....	Tall.....
Cougar.....	94.....	97.....	93.....	97.....	Fair.....	Good.....	Good.....	Green.....	Medium.....	Medium.....
Frontier.....	86.....	90.....	94.....	97.....	Good.....	Fair.....	Poor.....	Green.....	Medium.....	Tall.....
Kodiak.....	77.....	93.....	92.....	100.....	Fair.....	Fair.....	Fair.....	Tan.....	Large.....	Tall.....

#### COMMENTS:

COUGAR, FRONTIER and PUMA are the most commonly grown varieties. Although COUGAR is not as winter hardy as FRONTIER and PUMA, it is popular because of its short straw.

PUMA is similar in height and winterhardiness to FRONTIER, but more resistant to lodging and shattering. PUMA on the average is higher yielding than COUGAR or FRONTIER.

KODIAK is less winter-hardy, taller and more prone to lodging than COUGAR. Kernel size is about 10% larger than COUGAR, FRONTIER and PUMA.

GAZELLE is the highest yielding variety of spring rye licensed for production in Saskatchewan. Winter rye is approximately 35% higher yielding than spring rye.

**RAPESEED**  
Main Characteristics of Varieties

Variety	Yield as % Of Torch		Average Maturity in days		% Oil	Gluco- sinolate Content	Seed Color	Resistance to White Rust
	Areas 2&3	Area 4	Areas 2&3	Area 4				
<b>B. campestris (Turnip rape)</b>								
Torch	100	100	82	87	40.8	High	Brown	Poor
Candle	86	87	84	88	42.7	Low	Yellow-brown	Poor
R-500*	89	89	92	95	45.4	High	Yellow	Poor
<b>B. napus (Argentine type)</b>								
Alex	116	118	96	103	43.6	Low	Black	Good
Midas	127	128	99	106	43.8	High	Black	Good
Regent	116	122	99	106	43.7	Low	Black	Good
Tower	112	109	98	106	43.2	Low	Black	Good

\* High erucic acid variety.

**COMMENTS:**

CANDLE, TOWER, REGENT and ALTEX produce low glucosinolate meal and therefore are more readily marketable than the high glucosinolate varieties TORCH and MIDAS.

R-500, which has large yellow seed, produces oil with

a very high erucic acid level and should only be grown under contract for specialized industrial oil markets.

Under irrigation *B. napus* varieties will produce higher returns than *B. campestris* varieties because of their higher yield potential. Maturity may, however, be delayed by 4 or 5 days with irrigation.

**FIELD PEAS**  
Main Characteristics of Varieties

Variety	Yield as % of Century	Average Maturity in Days	Seed Size	Cotyledon Color	Vine Length	Seeding Rate
						kg/ha.
Century	100	100	Large	Yellow	Tall	190
Tara	128	100	Medium	Yellow	Medium	175
Trapper	109	98	Small	Yellow	Medium	125

**COMMENTS:**

Field peas are best adapted to the parkland area of the province. Growers should investigate potential markets such as home-grown protein, industrial use or pea soup before seeding. Protein content varies considerably among fields of the same variety and, thus, it is advisable to obtain a protein analysis on seed for forage

used in livestock rations. Field pea seed should be inoculated before planting. See SEED INOCULATION section.

TARA is a recently licensed variety with greater powdery mildew resistance than CENTURY or TRAPPER. However, seed may be in short supply in 1980.

**FABABEAN**  
Main Characteristics of Varieties

Variety	Yield as % of Ackerperle	Average Maturity in Days	Seed Size	Plant Height	Seeding Rate
					kg/ha
Ackerperle	100	114	Small	Tall	150
Diana	95	108	Medium	M. Tall	175
Herz Freya	100	108	Medium	Tall	180

**COMMENTS:**

Fababeans are a promising source of protein for livestock feeding. They should be seeded early and are best adapted to that portion of the Black soil zone with the longest growing season. Fababeans also perform well under irrigation. Only the earliest varieties should be considered for the northern areas. Seed 7 cm deep in

rows 15 to 17 cm apart. Fababean seeds are very large and a seeder with a deep-fluted cup must be used to prevent seed cracking. In order to reduce shattering losses, swathing can be done as soon as the lower most pod turns dark on 25% of the plants. Fababean seed should be inoculated before planting. See SEED INOCULATION section.

## LENTILS

Lentils are grown only for human food. They are best adapted to the brown, dark brown and southern areas of the black soil zones. Disease problems may reduce seed quality in parts of area 3 if rainfall is abundant in late July and August. Lentils do best when seeded on stubble land. They have about the same season requirement as wheat, but should be sown early. Young lentil plants are frost hardy whereas immature pods of late sown plants are easily damaged by fall frosts. Lentils should be sown at a rate of 56 to 66 kg/ha.

Seed of a new variety LAIRD, a large-seed Chilean type, will be available in limited quantities in 1980.

The main problems in lentil production are weed control and harvesting. Lentils do not compete well with weeds so should be sown on relatively clean land. Some herbicides are now available for use on lentils. Growers should consult the Crop Development Center in Saskatoon or the Plant Industry Branch, Saskatchewan Department of Agriculture in Regina regarding weed control.

Lentils should be sown on relatively level, stone-free land. Since the plants are short, swathing must be carried out at ground level to avoid harvest losses.

Lentil seed should be inoculated before planting. See SEED INOCULATION section.

## TAME BUCKWHEAT

Buckwheat is a short season cash or honey crop. When grown for grain it is usually by contract to ensure a market.

Three varieties, MANCAN, TEMPEST and TOKYO are recommended for growing in Saskatchewan. Each have a requirement of 80 frost-free days and are susceptible to high temperatures and dry weather. MANCAN flowers about 3 days later but has a larger seed for which a premium may be paid. Buckwheat yields have been quite variable. It is recommended that buckwheat be grown on summerfallow or on the stubble of a crop such that separating of similar sized seeds will not be a problem.

Buckwheat is very susceptible to frost; therefore, early June seeding is recommended.

Buckwheat has an indeterminate growth habit and should be swathed when the majority of the seeds are ripe or promptly after the first killing frost. Adjust equipment to minimize shattering losses.

## SUNFLOWERS

Sunflowers are a long season crop requiring 120 to 130 days to mature, depending on the cultivar and growing season. Both the oilseed and confectionery seed-types are grown in Saskatchewan as contract cash crops.

Oilseed sunflowers are adapted to the Dark Brown and Black soil zones in south-eastern Saskatchewan. Because of the need for early maturity, early oilseed cultivars such as SATURN and CORONA are best adapted. However, since 1976, there has been a trend for sunflower contractors to offer unlicensed hybrids which require 7-10 days longer growing season than the

## CORN

Corn is recommended for silage purposes only since grain corn does not usually mature in most areas in Saskatchewan. For information on varietal performance see Forage Crops Recommendations Bulletin.

## TAME MUSTARDS Main Characteristics of Varieties

Variety	Type	Yield as % of Lethbridge 22A
Lethbridge 22A	Oriental	100
Stoke*	Oriental	105
Domo	Oriental	116
Blaze	Brown	102
Ekla	Brown	95
Commercial	Brown	92
Gisilba	Yellow	80
Sabre**	Yellow	69
Kirby	Yellow	71
Commercial	Yellow	79

\* relatively late

\*\* very short, and early

**COMMENTS:** SABRE yellow mustard is suitable both as a condiment and as an industrial oil source. EKLA brown mustard is particularly high in allyl isothiocyanate, the hot substance in brown and oriental mustards.

The mustards are less drought resistant than wheat, but are grown more extensively in drier regions of the province than is rapeseed, because of the better seed quality obtained under these conditions.

The three types of mustard grown commercially are Yellow, Brown and Oriental. All are intermediate in maturity between Argentine and Turnip rape. Yellow mustard is slightly lower yielding than turnip rape and is similar in plant height. It is quite resistant to shattering, and because of the risk of loss due to wind damage to the fluffy swath, should preferably be straight combined. Brown and Oriental mustards usually yield 10-15% more than Argentine rapeseed and 20-30% more than yellow mustard. They are more susceptible to shattering than yellow mustard, and are usually swathed although straight combining is feasible.

Mixtures of mustard and rapeseed due to volunteer plants or to handling on the farm cause substantial losses through a grade reduction.

The mustards are almost exclusively contract crops, yield differences between the types being compensated for by contract price differences.

licensed early cultivars. Several of these hybrids have exhibited vigorous growth, high yields and uniformity in maturity. Growers electing to experiment with the late maturing hybrids, should plant early, preferably before wheat. The late maturing hybrids should be considered only in the extreme southeast of Saskatchewan and at Outlook.

COMMANDER and SUNDAK are confectionery cultivars which perform equally well at Outlook under irrigation. SUNDAK is a rust resistant variety which matures 1-2 days later than COMMANDER.

## SAFFLOWER

Safflower is a higher risk crop than sunflowers, requiring 120 to 140 days to mature. It can tolerate some frost in the early seedling stage but is easily damaged by fall frosts. Clean land is required because safflower is a poor weed competitor in its early stages of growth. Dry atmospheric conditions are required during flowering for maximum seed set, otherwise many empty hulls are produced which lower both yield and oil content. Seed yields are extremely variable. Safflower can be planted and harvested with conventional grain equipment. Its most suitable area of production is the southern part of the province.

## CANARY SEED

This is an annual grass with the same maturity requirement as wheat. The seed is about the size of flax and should not be sown deeply. Hot dry weather at heading time can reduce yields to very low levels.

## PEDIGREED SEED

A good practice is to 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 and sclerotia. Sclerotia (hard, black fungal bodies) of *Sclerotinia* are frequently present in seed of broad-leaved crops. These bodies should be removed. In rapeseed, screening and spiral cleaning are effective.

## SEED TREATMENT

Chemical seed treatments can be used to control certain diseases and insects. The smuts that attack wheat, barley, oats and rye can be controlled in this manner. Pedigreed seed, seed of resistant varieties (see variety descriptions), and seed of susceptible varieties that is free of smut should not require treatment. If smut was observed in a crop which is being used for seed it should be treated. When growing cereal varieties which are susceptible to smuts and the presence of smut is uncertain, it may be a wise precaution to treat home-grown seed every two or three years depending on the susceptibility of the variety.

Black leg of rape, a seed-borne fungus disease, has recently appeared in a more virulent form in localized areas. While weather conditions have not been favourable for a major outbreak of the disease, it is becoming more widespread. A precautionary treatment with an appropriate fungicide is advisable in order to reduce the risk of introducing the disease to new fields. Growers with carry-over stocks of treated seed are advised to have such stocks tested for germination, particularly those treated with the flowable formulation.

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

Wireworms, which attack all grain crops, and flea beetles, which attack rape and mustard, can be controlled by seed treatment with insecticides. A seed treatment may contain a fungicide alone, an insecticide

Average yields in Saskatchewan during the past three years have been 800 kg/ha. Herbicides can be used for the control of broadleaved weeds.

Seed and detailed information are available from contract buyers of the crop.

## TRITICALE

WELSH is a recently licensed variety of triticale with a yield potential similar to Glenlea wheat and 15% greater than the previously licensed ROSNER. Exaggerated claims of yield and protein content have been made for some non-licensed varieties which have generally been too tall and late maturing for Saskatchewan. As some difficulty has been experienced in marketing triticale, producers are advised to grow licensed varieties only under contract.

# SEED FACTS

alone or a dual-purpose mixture. 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. This means cleaning out bins, truck boxes and augers used for handling treated seed.

Unless left-over treated seed is being stored for future use it should be buried. Care should be taken to prevent exposure of treated grain to wildlife.

## ERGOT

Ergot attacks all varieties of rye, triticale, wheat (both common and durum) and barley, as well as most common species of grass. Oats are rarely attacked, and all broadleaved species are immune. Cool, moist weather at flowering time increases risk of ergot infection. To minimize ergot infection use clean seed, cut nearby grasses before flowering, and avoid seeding rye, wheat or barley on land which produced an ergoty crop in the previous year. Grain containing 0.1% ergot is considered poisonous and should not be used as feed.

## SEED INOCULATION

The legume crops mentioned above (peas, lentils and fababeans) add nitrogen to the soil only if their roots are well nodulated with nitrogen-fixing bacteria. When growing a particular legume on a field for the first time, inoculate the seed immediately before planting. Packaged inoculant for specific crops is available from seed dealers. Peas and lentils are nodulated by the same bacterial strains. Fababeans require a different strain. Inoculants packaged for use on alfalfa and clovers are not effective on peas, fababeans and lentils. Be sure the inoculant is not outdated, and follow instructions on the package.

## 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 batch driers, 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.