SNOBELEN FARMS

QUALITY WITHOUT COMPROMISE

2022

WINTER WHEAT GUIDE

Contents

Growing Forward. Since 1971.
Snobelen Farms

Lucknow

- Head office
- Food grade soybean facility
- Receiving facility
- Cleaning, processing, and packaging pedigree seed
- Seed treating

Palmerston

- IP and Seed receiving facility
- Cleaning, processing, and packaging pedigree seed
- Seed treating

Inset: Troy Snobelen, Tanya Leppington, and Sam Snobelen

The Snobelen Farms Difference

Snobelen Farms Ltd. is an independent, family-owned company that was founded in 1971, specializing in the production, processing and sales of food grade soybeans, commercial grains and pedigreed seed for markets across Canada and internationally. We take pride in combining years of experience with attentive customer service to complement the premium quality of our agricultural products. With eight locations we are able to serve the needs of growers across Ontario.

Family

Snobelen Farms has been a family business from the beginning. We treat all our customers, employees and communities as part of the family as well.

Customer Service

Unsurpassed service to customers before, during, and after your visit to Snobelen Farms.

Quality & Development

Continuously improving the Snobelen Farms experience.

CIPRS SCRS CGC HACCP HACCP CCG

We are CIPRS+HACCP, FEMAS Certified

We specialize in:

- Multiplying, processing, and selling the best genetics for our area.
- Testing and growing the varieties that work for the farmer and the end users.
- Selling certified seed to farmers and retailers across Ontario.

With our state-of-the-art seed treating facilities we are able to offer the best seed treatment offerings on the market, providing solid agronomic choices and returns to the farmer.

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Winter Wheat

Variety Descriptions

Soft Red Wheat

91

B654SRW

- Highest yielding wheat variety in Area II over the last 5 years
- Responds well to intensive management
- Leaf architecture fills in rows quickly (absorbs more sunlight)
- Consistently high yielding
- Awnless

Branson

- A consistent top performer for years
- Short plant height allows variety to be pushed (intensively managed)
- Early maturing, superior harvestability
- Excellent flour quality
- Awnless

Marker

- Consistently a top performer in both Area I and Area II
- Responds very well to intensive management
- Sound agronomics (winter survival, disease reaction, lodging, etc.)
- Performs well on tougher soil types and challenging environments
- Awnless

91 Breeders Rights, for further details see **PBRfacts.ca**

Certified Seed – You're Planting Success

Winter Wheat

Characteristics

VARIETIES	Branson	Marker	B654SRW
Fusarium Data	MS	MS	S
Combined Fusarium Rating	S	MS	S
Test Weight	BA	BA	A
Approximate number of seeds/lb	12,400	14,000	10,900
Winter Survival	G	G	VG
Lodging	F	VG	F
Height	Short	Average	Tall
Heading Date	157	159	159
Maturity Date	195	199	195
Powdery Mildew	F	VG	F
Leaf Rust	VG	G	VG
Stripe Rust	VG	VG	VG

*Always verify seed size by checking the seed tag
*Seed size varies by year and seed lot
*Chart derived from OCCC trials, Snobelen Farms plots, and field observations

Fusarium Data: MR=Moderately Resistant, MS= Moderately Susceptible, S=Susceptible, HS=Highly Susceptible
Combined Fusarium Ratings are based on both Fusarium head blight ratings and deoxynivalenol (DON) levels from inoculated provincial trials (OCCC 2018 trials table 5a, 5b, 5c)
Lodging, Powdery Mildew, Leaf Rust, & Stripe Rust, Winter Survival: VG=very good G=good F=fair
Test Weight: AA=above average A=average BA=below average
Heading Date: # of days from January 1 when 75% of heads are at Zodok 59
Maturity Date: # of days from January 1 when 75% of peduncles have changed colour

TABLE 1a – ONTARIO WINTER WHEAT PERFORMANCE TRIAL

Cumulative Yield Indices[1] Intensive Trials Area I & II Combined[2], OCCC, August 2021

		5-Year Index Fungicides		4-Year Index Fungicides		3-Year Index Fungicides		2-Year Index Fungicides		2021 Index Fungicides	
CLASS[3]	VARIETY	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
sww	Ava	95[2]	102	96	101	94	101	95	101	92	99
	25W38 (awned)					104	110	104	111	106	114
srw	**Branson**	**100**	**106**	**98**	**104**	**95**	**103**	**94**	**103**	**93**	**105**
	CM614	98	106	98	105	96	104	96	104	96	105
	Secord (awned)	98	107	99	105	98	104	99	105	97	104
	25R40 (awned)	103	109	101	105	99	106	100	106	101	109
	Marker	**98**	**105**	**98**	**103**	**95**	**103**	**96**	**102**	**93**	**101**
	UGRC Ring (awned)	96	105	96	101	95	101	95	99	91	99
	Cruze (awned)	94	105	95	103	94	104	94	103	91	102
	DS572SRW	102	111	106	108	106	108	106	108	102	106
	B654SRW	**101**	**108**	**99**	**106**	**97**	**105**	**96**	**104**	**94**	**105**
	25R61 (awned)	94	106	97	105	93	104	94	103	92	104
	25R74 (awned)	101	107	99	104	97	105	98	105	98	106
	Blaze (awned)			101	108	102	110	103	111	99	110
	Hilliard (awned)					104	108	104	108	107	113
	OAC Constellation (awned)					100	105	100	105	100	107
hrw	AC Morley	89	93	87	89	83	84	82	83	87	87
	PRO 81 (awned)			100	102	101	103	102	104	99	102
	Adrianus (awned)					105	108	106	109	105	109
efw	Frontenac					99	100	95	100	93	99
Means (t/ha)		6.03	6.61	6.27	6.66	6.48	7.00	6.50	6.97	6.65	7.29
Means (bu/ac)		90	98	93	99	96	104	97	104	99	108
Locations (years)		19		13		9		8		5	

1 Values differing by less than 3 within a column may not represent true differences in yield. Yield indices are Heritability Adjusted Relative Vales (HARV), which favour results from trial locations with high repeatability. For more information, see: Yan, W. Use of HARV in Variety Trial Summaries.

2 Area I & II = see area map on **GoCereals.ca** website or page 10 of this seed guide.

3 sww = soft white winter, srw = soft red winter, hrw = hard red winter, efw = eastern feed winter.

4 Cultivar yield rankings may vary from year to year. Decisions are therefore best using data with the greatest number of years.

For the latest Provincial Trial Results visit our website.

TABLE 2a – ONTARIO WINTER WHEAT PERFORMANCE TRIAL

Cumulative Yield Indices[1] Intensive Trials Summary for Area I[2], OCCC, August 2021

		4-Year Index Fungicides		3-Year Index Fungicides		2-Year Index Fungicides		2020 Index Fungicides	
CLASS[3]	VARIETY	NO	YES	NO	YES	NO	YES	NO	YES
sww	Ava	95[4]	98	95	97	94	97	90	93
	25W38 (awned)					105	110	107	115
								103	112
srw	**Branson**	**99**	**103**	**98**	**102**	**95**	**101**	**93**	**102**
	CM614	97	102	95	101	90	99	91	101
	Secord (awned)	101	105	101	104	101	104	98	101
	25R40 (awned)	104	107	103	105	102	107	103	110
	Marker	**99**	**102**	**98**	**100**	**95**	**99**	**94**	**98**
	UGRC Ring (awned)	99	102	98	99	96	99	93	99
	Cruze (awned)	98	103	96	102	95	103	91	100
	DS572SRW	104	107	105	106	103	105	99	102
	B654SRW	**99**	**102**	**99**	**102**	**96**	**101**	**94**	**101**
	25R61 (awned)	97	105	99	103	96	102	96	104
	25R74 (awned)	102	105	103	105	102	107	102	107
	Blaze (awned)			103	106	104	109	99	106
	Hilliard (awned)					104	108	108	113
	OAC Constellation (awned)					101	106	103	109
	UGRC 9-21							96	101
	CM18-004							93	99
	25R28							95	102
	25R76							100	111
	OAC Moon (awned)							103	109
	OAC19-SRW-03							81	86
hrw	AC Morley	88	90	87	88	81	81	85	82
	PRO 81 (awned)			100	102	101	103	98	101
	Adrianus (awned)					108	111	107	112
Means (t/ha)		6.08	6.39	6.01	6.21	6.44	6.76	6.77	7.24
Means (bu/ac)		90.5	95.1	89.4	92.4	95.7	100.5	100.6	107.7
Locations (years)		11		8		5		3	

1 Values differing by less than 3 within a column may not represent true differences in yield. Yield indices are Heritability Adjusted Relative Vales (HARV), which favour results from trial locations with high repeatability. For more information, see: Yan, W. Use of HARV in Variety Trial Summaries.

2 Area I = see area map on **GoCereals.ca** website or page 10 of this seed guide.

3 sww = soft white winter, srw = soft red winter, hrw = hard red winter, efw = eastern feed winter.

4 Cultivar yield rankings may vary from year to year. Decisions are therefore best using data with the greatest number of years.

For the latest Provincial Trial Results visit our website.

TABLE 3a – ONTARIO WINTER WHEAT PERFORMANCE TRIAL

Cumulative Yield Indices[1] Intensive Trials Summary for Area II[2], OCCC, August 2021

		5-Year Index Fungicides		4-Year Index Fungicides		3-Year Index Fungicides		2-Year Index Fungicides		2020 Index Fungicides	
CLASS[3]	VARIETY	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
sww	Ava	98[4]	108	96	110	97	108	93	107	98	107
	25W38 (awned)							101	107	102	110
	25W37									92	111
srw	**Branson**	**102**	**111**	**99**	**106**	**98**	**107**	**96**	**106**	**92**	**110**
	CM614	100	110	104	109	103	109	104	109	102	110
	Secord (awned)	92	107	95	103	94	102	94	102	97	107
	25R40 (awned)	101	110	97	104	97	104	98	102	98	108
	Emperor	88	104	96	103	94	102	94	101	89	101
	Marker	**98**	**110**	**99**	**108**	**98**	**107**	**100**	**107**	**93**	**105**
	UGRC Ring (awned)	96	108	96	104	96	104	96	102	89	99
	UGRC C2-5									96	104
	25R46 (awned)	90	106	93	104	93	104	93	103	91	104
	Cruze (awned)	99	115	108	111	109	112	109	111	108	113
	DS572SRW									99	104
	UGRC GL164	104	115	102	112	100	111	99	110	93	111
	B654SRW	**91**	**109**	**96**	**107**	**94**	**106**	**95**	**106**	**87**	**103**
	25R61 (awned)	100	108	97	103	95	103	95	102	91	105
	25R74 (awned)			101	109	101	110	102	111	98	115
	Blaze (awned)					103	105	103	105	107	113
	Hilliard (awned)					98	102	97	101	96	104
	OAC Constellation (awned)							100	104	99	100
	UGRC 9-21									95	102
	CM18-004									98	105
	25R28									96	112
	25R76									88	108
	OAC Moon (awned)									94	108
	OAC19-SRW-03									89	99
hrw	AC Morley	87	93	84	86	83	83	80	80	90	95
	Champlain (awned)									85	91
	Lexington (awned)			92	98	92	99	91	98	94	106
	PRO 81 (awned)			102	103	103	104	104	106	100	104
	Adrianus (awned)					101	103	103	104	101	104
	Montcalm									88	93
efw	Frontenac			98	102	97	102	96	101	89	97
Means (t/ha)		5.81	6.62	6.29	6.82	6.13	6.68	6.07	6.55	6.52	7.35
Means (bu/ac)		86.3	98.5	93.5	101.5	91.2	99.4	90.3	97.4	96.9	109.3
Locations (years)		9		6		5		4		2	

1 Values differing by less than 3 within a column may not represent true differences in yield. Yield indices are Heritability Adjusted Relative Vales (HARV), which favour results from trial locations with high repeatability. For more information, see: Yan, W. Use of HARV in Variety Trial Summaries.
2 Area II = see area map on **GoCereals.ca** website or page 10 of this seed guide.
3 sww = soft white winter, srw = soft red winter, hrw = hard red winter, efw = eastern feed winter.
4 Cultivar yield rankings may vary from year to year. Decisions are therefore best using data with the greatest number of years.
For the latest Provincial Trial Results visit our website.

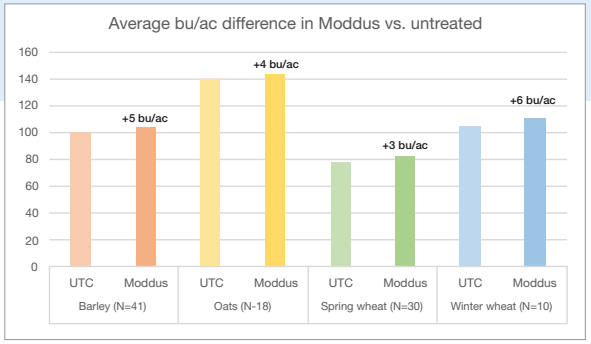
Moddus® | syngenta®

Grow your best cereal crop with Moddus

A lodged cereal crop can result in lost yield, reduced quality, and decreased harvest efficiencies which ultimately reduce profits for growers. With Moddus® plant growth regulator (PGR) working to mitigate lodging, growers have the freedom to plant the varieties they want, choose higher fertility input programs, or better capture upsides from seasons with plentiful rainfall for maximum ROI – all while helping maximize harvest efficiencies to save time, money and effort. Moddus lets growers manage their cereals the way they want. It inhibits cell elongation, resulting in sturdier plants that can resist lodging so the crop stays standing until the combine is ready to roll. That strong, standing crop has more potential to fill for maximum yield and improved quality.

Moddus gives you a stronger crop to reach for higher yields

Moddus helps maintain yield



Yield differences vary depending on variety, degree of lodging, fertility, etc.
Source: Syngenta research authorization trials conducted across Canada from 2018 to 2020.

Seeding Rates

Earlier Than Optimum Planting Date by 10 days	**Optimum Planting Date**	7 Days Past Optimum Planting Date	14 Days Past Optimum Planting Date	21 Days Past Optimum Planting Date
1.0 – 1.2	**1.4 – 1.5**	**1.6 – 1.8**	**1.8 – 2.0**	**2.0 – 2.2**

*seeding rates are expressed in millions of seeds per acre

*seeding rates derived from Crop Advances 2013, OMAFRA Publication 811 and University of Guelph

The above seeding rate chart is a general recommendation based on years of Ontario based research. However, seeding rates need to be adjusted for soil type, fertility levels, soil structure, and planting dates. Heavy clay soils may require as much as 20% more seed than other soil types. Ideally, 60 heads per square foot is the target. Winter wheat planted early allows for prolific tillering and strong tillers to develop and therefore fewer seeds per acre are required. If the plant density is too high for early planting dates, lodging can be an issue. Wheat planted well after the optimum planting date typically does not tiller much and therefore requires a heavier seeding rate to achieve 60 heads per square foot.

Calculating Seeding Rate by Amount of Seed to Achieve Target Plant Density
Use the number of seeds per lb (often found on the seed tag) to determine the required seeding rate in (lb/acre)

Amount of Seed	Desired Plant Population (x 1,000)							
	809/ acre	1,012/ acre	1,213/ acre	1,416/ acre	1,619/ acre	1,861/ acre	2,024/ acre	2,226/ acre
8,000/lb	101	127	152	178	202	233	253	278
9,000/lb	90	112	135	158	157	207	225	247
10,000/lb	81	101	121	142	162	186	202	223
11,000/lb	73	91	109	127	145	164	185	204
12,000/lb	67	83	100	117	133	150	170	187
13,000/lb	62	77	92	108	123	138	157	172
14,000/lb	55	71	86	100	114	128	146	160
15,000/lb	53	67	80	93	107	120	136	149
16,000/lb	50	63	75	88	100	113	127	140

Seeds Per Foot Row

Seeds per foot row (7.5" rows) conversion to millions of seed per acre							
Seeds per foot row	16	17	18	19	20	21	22
Seed per acre (million)	1.115	1.195	1.254	1.324	1.394	1.463	1.533

Seeds per foot row	23	24	25	26	27	28	29
Seed per acre (million)	1.603	1.673	1.742	1.812	1.882	1.951	2.021

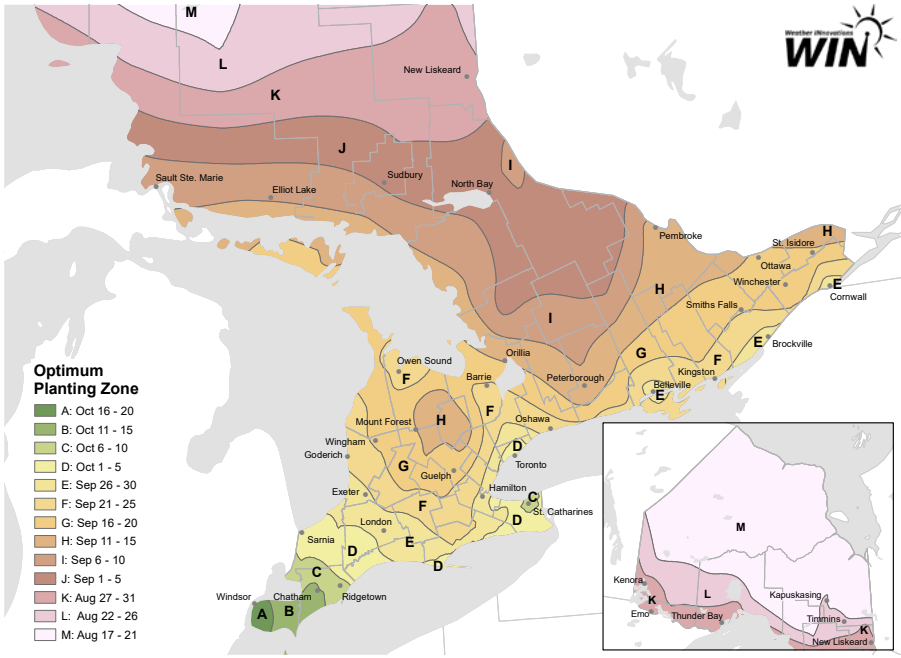
Seeding Depth

Wheat should be planted no less than 1.0" deep (2.5cm). The preferred range of seeding depth is 1.0 – 1.25". Any shallower and the crop becomes more vulnerable during the winter months. It takes approximately 80 growing degree days for winter wheat to germinate and an additional 50 GDD for every inch of seeding depth to achieve emergence.

Agronomic TIP

It is important to use multi-year data when selecting a variety. This is especially critical when the number of testing locations are limited in any one year.

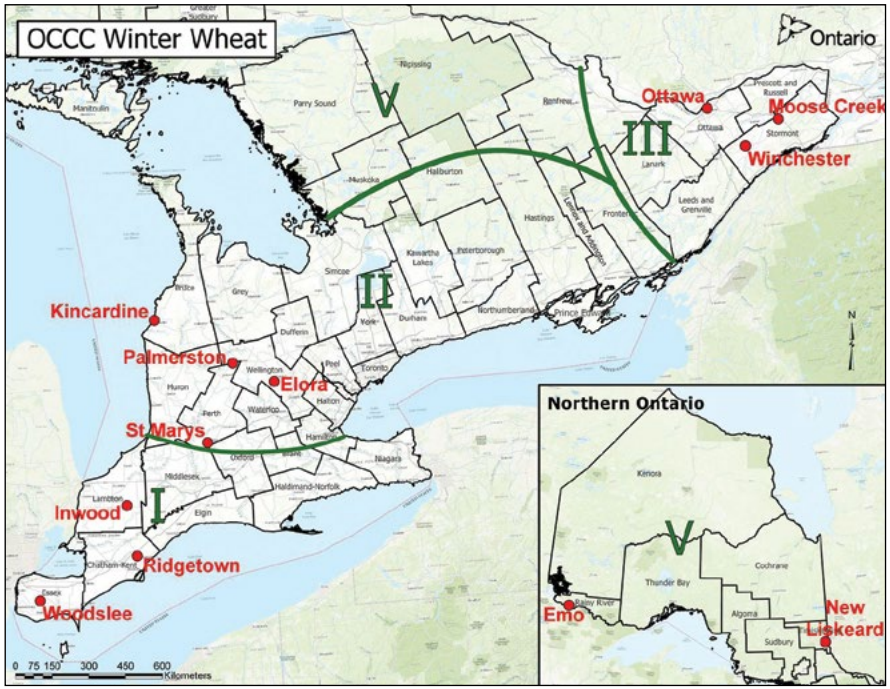
Optimum Planting Date



Source: Ontario Cereal Crop Committee, 2018

Ontario Cereal Crop Committee

Winter Wheat Testing Areas



Source: Ontario Cereals Crop Committee, 2018

Additional Information and Resources

- Cereal Staging Guide: Bayer Crop Science
- PUB 811: Agronomy Guide for Field Crops (OMAFRA)
- PUB 812: Field Crop Protection Guide (OMAFRA)
- PUB 611: Soil Fertility Handbook (OMAFRA)
- PUB 75: Guide to Weed Control-Field Crops (OMAFRA)
- Head Disorders of Wheat: University of Nebraska
- NCERA 184: Identify Wheat Diseases (affecting Heads & Grain)
- NCERA 184: Wheat Fungicide Efficiency for Control of Wheat Diseases
- OSCIA Crop Advances: Field Crop Reports
- Guide to Early Season Field Crop Pests
- Field Crop News
- OMAFRA: Weed ID Guide
- USDA: Guide to Wheat Diseases & Pests

Wheat Stand Assessment

Number of Plants		% Yield Potential	Planting Date	
per metre of row	per foot of row		October 5	October 15
			Yield t/ha (bu/ac)	
66	20	100	5.34 (80)	4.84 (72)
33	10	95	5.11 (76)	4.57 (68)
23	7	90	4.84 (72)	4.37 (65)
20	6	85	4.57 (68)	4.10 (61)
16	5	80	4.30 (64)	3.90 (58)

Source: A Smid, Ridgetown College, University of Guelph, 1986-90.

Agronomic TIP

2022 OCCC Performance Trial information is typically compiled and released near the end of August

Diseases*

Powdery Mildew

Symptoms: On all hosts, the first visible symptoms of this disease are white to pale grey, fuzzy or powdery colonies of mycelia, and conidia on the upper surfaces of leaves and leaf sheaths (especially on lower leaves), and sometimes on the spikes. Older fungal tissue is yellowish gray. This superficial fungal material can be rubbed off easily with the fingers. Host tissue beneath the fungal material becomes chlorotic or necrotic and, with severe infections, the leaves may die. Eventually, black spherical fruiting structures (cleistothecia) may develop in the mycelia, and can be seen without magnification.

Development: The development of powdery mildew is favoured by cool (15-22°C), cloudy, and humid (75-100% relative humidity) conditions.

Threshold: 5-10% lower leaves affected early in the season, 1% of the flag leaf affected and 3-5% of the second leaf later in the season.

Barley Yellow Dwarf Virus

Symptoms: The symptoms of barley yellow dwarf virus (BYD) vary with the affected crop cultivar, the age of the plant at the time of infection, the strain of the virus, and environmental conditions. Symptoms often are masked by or confused with other problems. Affected plants show a yellowing or reddening (on oats and some wheats) of leaves, stunting, an upright posture of thickened stiff leaves, reduced root growth, delayed (or no) heading, and a reduction in yield. The heads of affected plants tend to remain erect and become black and discolored during ripening due to colonization by saprophytic fungi.

Development: Temperatures of approximately 20°C are favorable for disease development and symptoms appear approximately 14 days after infection.

Threshold: 5-10% of lower leaves affected early in the season, 1% of the flag leaf affected and 3-5% of the second leaf later in the season.

Disease descriptions derived from USDA: Guide to Wheat Diseases and Pests.

Take-All

Symptoms: This fungus causes rotting of the roots and lower stems. Basal stem and leaf sheath tissues, as well as roots, may turn a shiny black color. When examined with a hand lens (10x), dark fungal hyphae may often be found on the subcrown internode beneath the old leaf sheaths. Coarse, black runner hyphae are conspicuous on roots. Severe disease development is indicated by stunted plants with whitened stems and spikes. When infection occurs early in the crop cycle, the number of tillers is often reduced and spikes are often sterile.

Development: The fungus persists on crop debris in the soil. Initial infections come from contact with hyphae or ascospores in the soil. Infection can occur throughout the crop cycle, but is favored by cool (12-18°C) soil temperatures and alkaline or nutrient deficient soils. Nitrate also appears to enhance disease development. Infections of the roots occurring in the fall and early spring generally progress to the crown and lower stem tissues; infections occurring later in the crop cycle cause less damage since they usually are confined to the roots.

Leaf Rust

Symptoms: The postules are circular or slightly elliptical, smaller than those of stem rust, usually do not coalesce, and contain masses of orange to orange-brown urediospores. Infection sites primarily are found on the upper surfaces of leaves and leaf sheaths, and occasionally on the neck and awns.

Development: Primary infections usually are light and develop from wind-borne urediospores that may have travelled long distances. The disease can develop rapidly when free moisture is available and temperatures are near 20°C. Successive generations of urediospores can be produced every 10-14 days if conditions are favorable. As plants mature or when environmental conditions are not favorable, masses of black teliospores may become evident.

Threshold: Use foliar fungicide treatments when the flag leaf has 5-10 pustules or 1% of the flag leaf area is affected (during head emergence to the end of flowering) and when the weather forecast predicts rainy, wet weather.

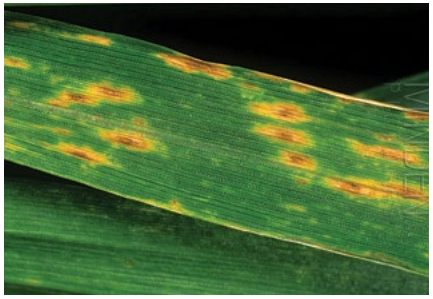
Diseases

Stem Rust

Symptoms: Pustules are dark reddish brown, and may occur on both sides of the leaves, on the stems, and on the spikes. With light infections the pustules are usually separate and scattered, but with heavy infections they may coalesce. Prior to pustule formation, “flecks” may appear. Before the spore masses break through the epidermis, the infection sites feel rough to the touch; as the spore masses break through, the surface tissues take on a ragged and torn appearance.

Development: Primary infections are usually light and develop from wind-borne urediospores that may have travelled long distances. The disease can develop rapidly when free moisture (rain or dew) and moderate temperatures prevail. If temperatures average about 20°C or more, the first generation of urediospores will be produced in 10-15 days. As plants mature, masses of black teliospores may be produced.

Threshold: See Leaf Rust threshold on page 13.

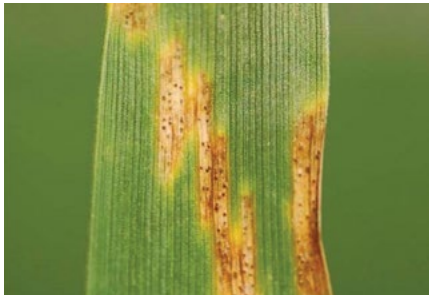


Tan Spot

Symptoms: At first, lesions appear as tan to brown flecks, which expand into large, irregular, oval- or lens-shaped tan blotches with a yellow or chlorotic margin. As these spots coalesce, large blotches are formed. The development of a dark brown to black spot in the center of the lesion is characteristic of the disease. As the disease progresses, entire leaves, spikes, and even whole plants may be killed.

Development: Initial infections come from diseased crop debris in the soil or from diseased grass hosts. Usually the lower leaves are infected first, and the disease progresses to the upper leaves and leaf sheaths if conditions are favorable. This disease develops over a wide range of temperatures and is favored by long periods (18 hours or more) of dew or rain.

Threshold: Generally, 25% of leaves with one or more lesions.



Septoria Leaf Spot

Symptoms: Initial infection sites tend to be irregular in shape, oval to elongated chlorotic spots or lesions. As these sites expand, the centers of the lesions become pale, straw colored, and slightly necrotic, often with numerous small black dots (pycnidia). The lesions of septoria tritici blotch tend to be linear and restricted laterally, while those of septoria nodorum blotch and septoria avenae blotch are more lens-shaped. All above ground plant parts can be affected. Light infection produces only scattered lesions, but heavy infection can kill leaves, spikes, or even the entire plant. Identification of species in the field can be difficult, and microscopic examination is often necessary.

Development: Initial infections tend to be on the lower leaves, progressing to the upper leaves and spikes if environmental conditions remain favourable. Cool temperatures (10-15°C) and prolonged wet, cloudy weather favours the development of these diseases.

Threshold: 1-2 lesions on the leaf below the flag leaf up to booting, or 1-2 lesions on the flag leaf at head emergence.

Stripe Rust

Symptoms: The pustules of stripe rust, which contain yellow to orange-yellow urediospores, usually form narrow stripes on the leaves. Pustules also can be found on leaf sheaths, necks, and glumes.

Development: Primary infections are caused by wind-borne urediospores that may have travelled long distances. The disease may develop rapidly when free moisture (rain or dew) occurs and temperatures range between 10-20°C. At temperatures above 25°C, the production of urediospores is reduced or ceases and black teliospores are often produced.

Threshold: See Leaf Rust threshold on page 13.

Agronomic TIP

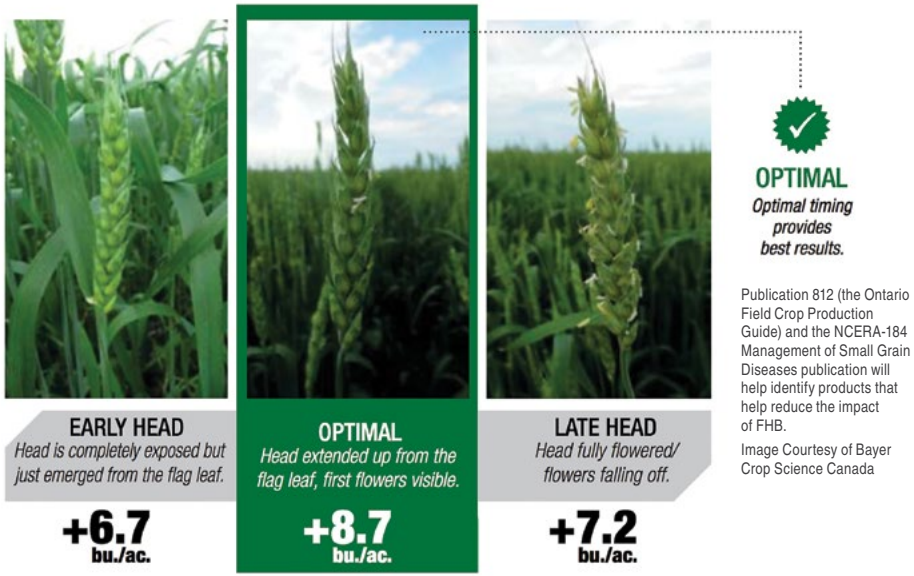
For the optimum seeding date, the target plant population is 22 seeds/foot row on 7.5” rows

Diseases

Fusarium Head Blight

Fusarium head blight (FHB), sometimes called Scab, is one of the most serious diseases of winter wheat, spring wheat and other small grains such as barley and oats. FHB can cause significant loss of quality (incurring grade discounts) and grain yield (due to lightweight, shrunken kernels). Infected kernels can produce harmful toxins such as DON (deoxynivalenol) to which there is very low tolerance by millers and animal feed manufacturers. The fungus overwinters, primarily on infected kernels and stubble or straw/stalk residue left on the soil surface. The proliferation of the disease is favoured by extended periods of warm (22-27°C), wet, and humid weather. Infection occurs at flowering time as the anthers emerge from the spikelet.

The most practical way to control FHB is by growing resistant varieties and by correctly applying fungicides at heading time. It is critical to scout fields as heads emerge from the boot and to use high water volume and multi-directional nozzles. The chart below helps stage the wheat for proper timing.



Publication 812 (the Ontario Field Crop Production Guide) and the NCERA-184 Management of Small Grain Diseases publication will help identify products that help reduce the impact of FHB.

Image Courtesy of Bayer Crop Science Canada

Insects*

Armyworm

Symptoms: The primary symptom is defoliation of the plant. Larvae feed on leaves, chewing from the edges to the midrib, or on the heads of cereal plants. Heavy infestations can be very destructive; larvae may climb the plant and sever the neck just below the head. Some species may be found feeding at the soil surface, others underground feeding on roots, and still others feeding inside the stem.

Life Cycle: Adult cutworms and army worms are moths, and the females lay eggs on leaves and leaf sheaths near the ground. These eggs hatch within a few days and initially the larvae feed close to where they hatch. The larvae are found in cracks in the soil or under rocks during the day, feeding at night or early in the morning. In damp weather, they may feed all day.

Cereal Aphids

Symptoms: Aphids are nearly transparent, soft-bodied sucking insects. When present in sufficient numbers, aphids can cause yellowing and premature death of leaves. They exude drops of sugary liquid known as “honeydew”, which may cause tiny scorch marks on the foliage and tends to encourage the development of sooty molds. The feeding is especially damaging, resulting in the development of necrotic areas sometimes accompanied by purpling and rolling of the infested leaves. The feeding of Russian Wheat Aphid produces long white stripes on the leaves, leaf rolling, prostrate growth habit, and sterile heads.

Life Cycle: The life cycle of aphids involves winged, wingless, sexual, and asexual forms. When feeding on cereals, the females of most aphid species reproduce asexually (without being fertilized), giving rise to nymphs rather than eggs.

**Insect descriptions derived from USDA: Guide to Wheat Diseases and Pests.*

Insects

Cereal Leaf Beetle

Symptoms: Adult beetles are 4-5 mm long, have a black head, light brown thorax, and a shiny blue-green wing cover with parallel lines of small dots. Larvae are a dull to bright yellow color, but soon take on the appearance of a slimy, globular, black mass due to the mound of fecal material they produce and accumulate on their backs. The most prominent symptom of cereal leaf beetle infestations is the distinct, longitudinal stripes on leaves; these stripes are produced by the feeding of adult beetles and of larvae.

Life Cycle: The insect produces one generation per year. Adults begin their feeding activity in the spring. They lay yellow eggs, either singly or in small chains, covering them with a sticky film. Young larvae feed on the leaf surface and when mature, drop to the soil surface. Adults overwinter underneath plant debris on the soil surface, in leaf sheaths and ears of standing maize, or under the bark of trees.

Slugs

Symptoms: Slugs and snails can feed on the endosperm of germinating seed, bite seedlings off at ground level, and graze older plants, chewing longitudinal stripes on the leaves. This gives the adult plant a frayed appearance.

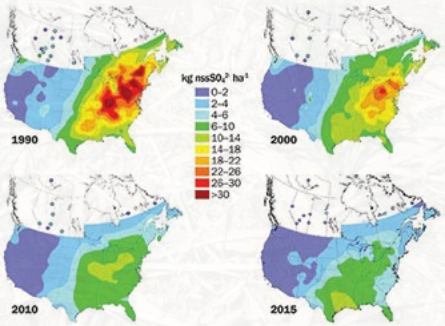
Agronomic TIP

Long term research conducted by Dr. Bill Deen at the University of Guelph determined that on average, the addition of winter wheat to a corn/soybean rotation yielded 10 more bu/ac corn and 4-5 more bu/ac soybeans. Winter wheat contributes to overall soil health and structure.

Fertility

economical rate of nitrogen is 120-150 lbs/ac with the use of fungicides and 90 lbs/ac without fungicides. Keep in mind that nitrogen rates are farm specific and depend on field history, fertility levels, history of manure, soil structure, rotation, compaction, etc.

- A 90 bu/ac crop of grain (only) removes approximately 53 lbs/ac actual phosphorus and 32 lbs/ac potassium
- A 90 bu/ac crop of grain and straw removes approximately 64 lbs/ac actual phosphorus and 148 lbs/ac potassium
- Wheat is highly responsive to phosphorus fertilizer
  - Seed placed phosphorus starter yields 7.5 more bu/ac than without (on average)
  - Increases fall tillers
  - Promotes root development
  - Increases winter survival
- Nitrogen is extremely important in driving yield. Higher nitrogen rates require the use of fungicides and wheat treated with a fungicide will respond to higher nitrogen rates. They work together. Ontario research suggests that the most
- Wheat is also responsive to sulphur. The deposition of sulphur in the great lakes area has dramatically been reduced (see deposition map below), to the point where grass crops such as winter wheat show an economical response.



Source: Environment and Climate Change Canada, 2018.

Seed Treatments

Fungicides

Vibrance® Quattro

Chemistry group:
Group 3, 4, 7 and 12 fungicides

Mode of action:
Vibrance Quattro is a combination of the fungicides difenoconazole, metalaxyl-M and S-isomer, sedaxane and fludioxonil, which control or suppress certain seed- and/or soil-borne diseases of cereal crops.

Resistance management:
Where possible, rotate the use of Vibrance Quattro or other Group 3, 4, 7 and 12 fungicides with different groups that control the same pathogens/insect pests.

Disease controlled:
- Seed Rots
- Seeding Blight/ Damping Off
- Seed-borne Alternaria
- Loose Smut
- Common Bunt
- Dwarf Bunt
- Common Root Rot (suppressed)
- Fusarium Crown & Foot Rot
- Take All (suppressed)

Courtesy of: Syngenta Canada

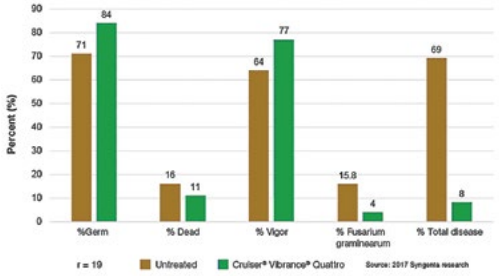
Cruiser® Vibrance® Quattro

Group 4 insecticide; Group 3, Group 4, Group 7 and Group 12 fungicides.

Mode of action:
Cruiser Vibrance Quattro contains the active ingredients thiamethoxam, difenoconazole, sedaxane, metalaxyl-M (and S-isomer) and fludioxonil.

How it works:
- Difenoconazole is a Group 3 triazole that inhibits sterol biosynthesis
- Metalaxyl-M is a Group 4 phenylamide that targets RNA polymerase I
- Sedaxane is a Group 7 succinate dehydrogenase inhibitor that affects respiration
- Fludioxonil is a Group 12 phenylpyrrole that affects signal transduction
- Thiamethoxam is a Group 4A neonicotinoid that affects nerve action
- In addition to the diseases controlled

2017 Seed Testing Program – Wheat



and supressed, Cruiser Vibrance Quattro controls wireworms and European Chafers

Mode of Action	Active Ingredient	Product Name	Company	Product Application Rate	ground H2O rate	rainfast (Hour)	PHI (Days)	REI (Hours)	Application staging	Powdery mildew	Stagonospora leaf/glume blotch	Septoria leaf/ blotch	Tan spot	Stripe rust	Leaf rust	Stem rust	Fusarium Head Blight
3	Propiconazole	Quilt (multiple generics)	Syngenta	305 to 405 ml/ac	15 gal/ ac	2	45	12	T1/ T2	VG	VG	VG	VG	E	E	VG	NL
11	azoxystrobin																
3	Propiconazole	Cerefit	Corteva	1 case treats 40 acres	10 - to 20 gal/ ac	1			T1/ T2	VG	VG	VG	VG	E	E	VG	NL
11	Picoxystrobin																
3	Prothioconazole	Stratego Pro	Bayer	177 to 230 ml/ac	10 gal/ ac mini-mum	1	do not apply after boot stage	12	T1/ T2	G	VG	VG	VG	VG	VG	VG	NL
11	Trifloxystrobin																
7	Pydiflumetofen	Miravis Ace	Syngenta	400 ml/ac	20 gal/ ac	1	7	12	T1/ T2/ T3	VG	VG	VG	VG	VG	VG	VG	G
3	Propiconazole																
3	Mefentrifluco-nazole	Veltyma	BASF	152 to 202 ml/ac	10 gal/ ac mini-mum	1	21	12	T1/ T2	G	VG	VG	VG	VG	VG	VG	NL
11	Pyraclostrobin																
7	Fluopyram	Prosaro Pro	Bayer	303 ml/ac	10 gal/ ac mini-mum	1	36	12	T1/ T2/ T3	G	VG	VG	VG	E	E	E	G
3	Tebuconazole																
3	Prothioconazole																
3	Prothioconazole	Delaro Complete	Bayer	177 ml/ac	10 gal/ ac mini-mum	1	45	12	T1/ T2	G	VG	VG	VG	VG	VG	VG	NL
11	Trifloxystrobin																
7	Fluopyram																
7	Pydiflumetofen	Mirivas Neo	Syngenta	300 ml/ac	15 gal/ ac	1	45	12	T1/ T2	VG	VG	VG	E	E	E	VG	NL
11	Azoxystrobin																
3	Propiconazole																
3	Metconazole	Sphaerex	BASF	253 ml/ac	10 gal/ ac mini-mum	1	30	24	T1/ T2/ T3	VG	VG	VG	VG	E	E	E	G
3	Prothioconazole																

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