

Each year, the Saskatchewan pulse and cereal commissions partner with commercial seed testing laboratories to complete an annual survey of seed-borne pathogens measured on seed grown in Saskatchewan during the previous season. All labs that offer seed testing services to Saskatchewan growers are invited to participate in the annual survey with anonymous reporting of results amalgamated by crop district from all participating labs. Interim seed quality data, collected from the time of harvest to the end of December, are summarized and communicated to growers, agronomists, researchers, and industry during the winter months, ahead of the next crop season. These interim results provide insights into seed quality trends and identify potential hotspots for seed-borne pathogens across the province. A final summary of results, including data from seed samples analyzed after the interim results, is reported at the end of May. This final summary is submitted for publication in the [Canadian Phytopathological Society](#) Canadian Plant Disease Surveys. This publication of the provincial survey provides a record of seed-borne pathogen trends in pulse and cereal crops and allows for continued tracking of diseases over time.

Acknowledgments

The provincial seed survey would not be possible without the participation of 20/20 Seed Labs Inc., Discovery Seed Labs, Prairie Diagnostic Seed Labs, and Lendon Seeds. Thank you to all lab partners for their continued effort and support of this project. Brian Olson, independent contractor, is also gratefully acknowledged for his coordination of the seed quality survey and summarization of results. A special thanks is also extended to Dr. Randy Kutcher and Dr. Sabine Banniza from the University of Saskatchewan for their external review and pathology expertise. External review efforts of Alireza Akhavan, Provincial Plant Disease Specialist and Dale Risula, Provincial Special Crops Specialist, of the Saskatchewan Ministry of Agriculture (SMA) is also recognized with an extra note of appreciation to Alireza Akhavan and the SMA Geographic Information System (GIS) team for creating the seed-borne pathogen maps by crop district.

Thank you to our long-time lab partners for their continued volunteer participation in the annual seed survey!



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Germination Results

Percent germination levels were documented during the 2022 provincial seed survey with interim results showing a general improvement of germination levels across all crops from reported levels in the 2021. High numbers of seed lots harvested in 2021, particularly field pea, were reported to have below acceptable levels of germination; however, results to date indicate that mean germination across all crop types is at or above 89.9%.

Although germination levels look quite favourable across all provincial crop districts and all crop types, testing of individual seed lots is still recommended prior to seeding in the spring of 2023.

Table 1. Average percent germination of Saskatchewan pulse and cereal seed samples analyzed by commercial labs as of January 9, 2023.

Type	Crop	Number of Samples	Mean Germination (%)
Pulses			
	Lentils	298	96.6
	Peas	246	89.9
	Chickpeas	35	87
Cereals			
	Barley	178	96.1
	Durum	205	92.4
	Oats	76	96.1
	Wheat	534	95.3

Figure 1. 2022 Interim Seed Test Result for Seed Germination in Lentil. Source: Saskatchewan Ministry of Agriculture

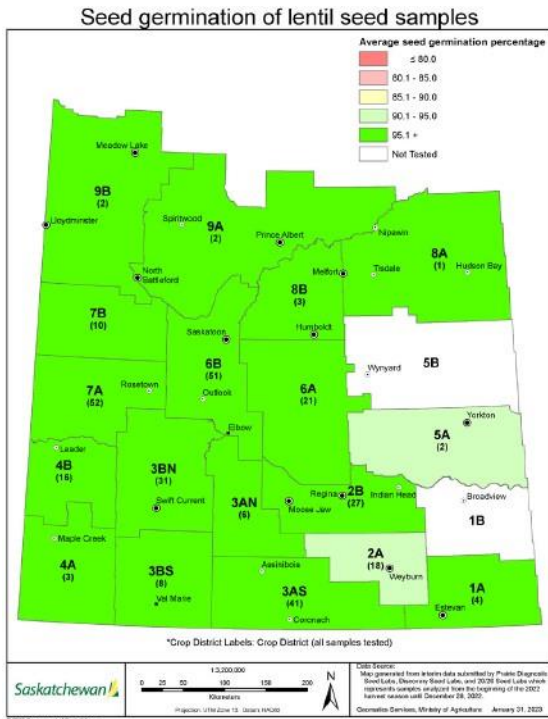


Figure 2. 2022 Interim Seed Test Result for Seed Germination in Pea. Source: Saskatchewan Ministry of Agriculture

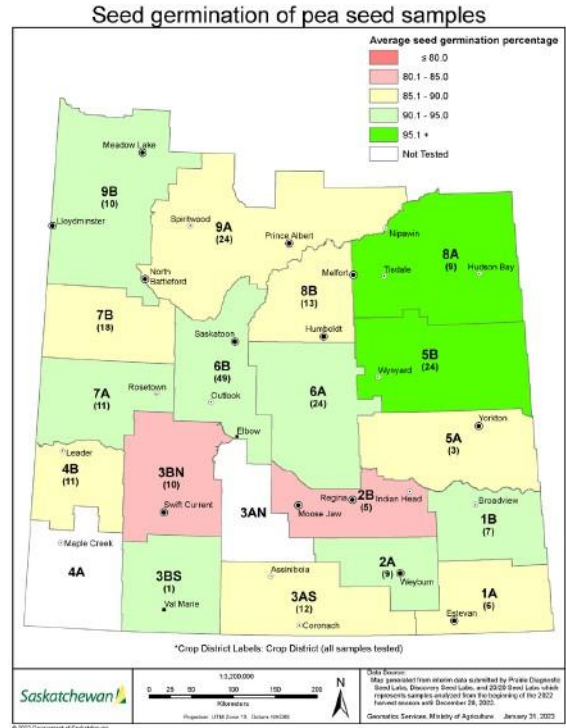


Figure 3. 2022 Interim Seed Test Result for Seed Germination in Chick-pea. Source: Saskatchewan Ministry of Agriculture

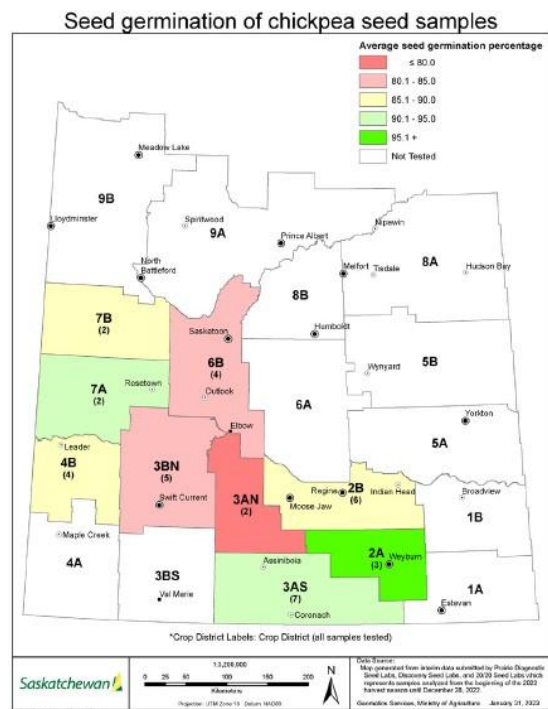


Figure 4. 2022 Interim Seed Test Result for Seed Germination in Barley. Source: Saskatchewan Ministry of Agriculture

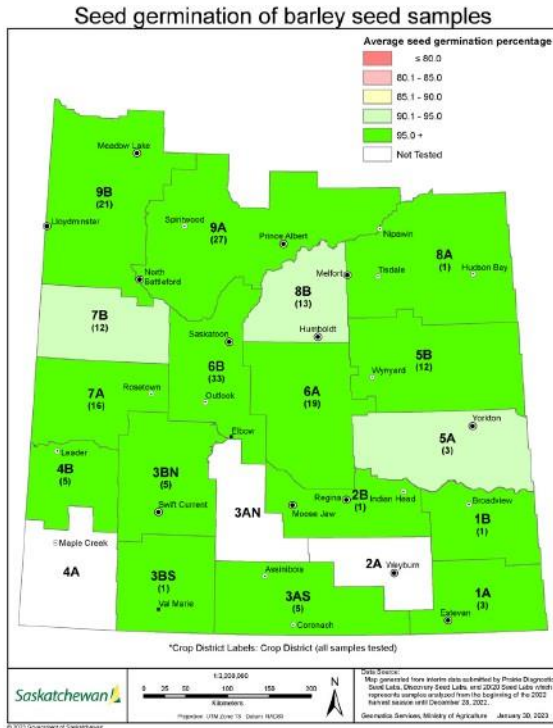


Figure 6. 2022 Interim Seed Test Result for Seed Germination in Oats. Source: Saskatchewan Ministry of Agriculture

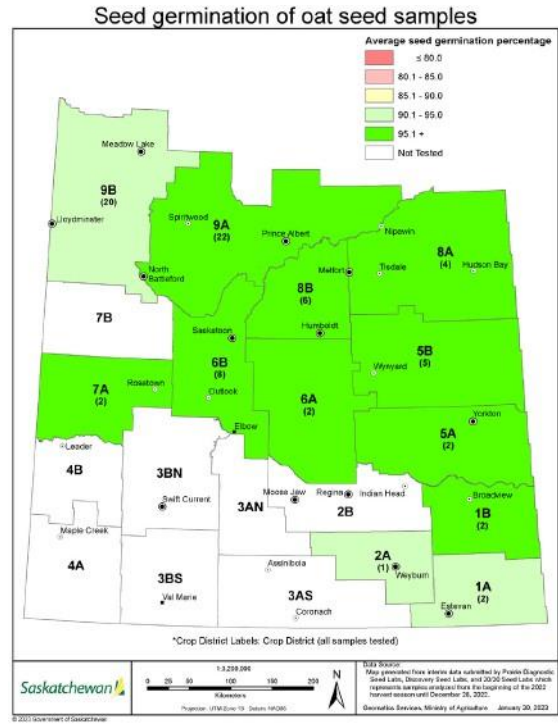


Figure 5. 2022 Interim Seed Test Result for Seed Germination in Durum. Source: Saskatchewan Ministry of Agriculture

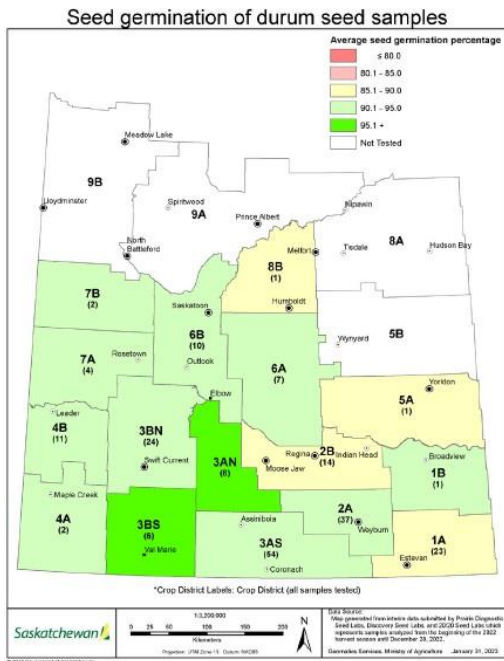
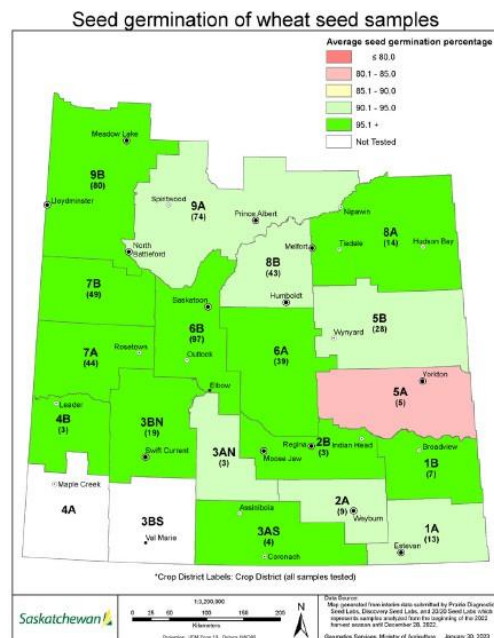


Figure 7. 2022 Interim Seed Test Result for Seed Germination in Wheat. Source: Saskatchewan Ministry of Agriculture



The interim results of commercial plate tests for seed-borne pathogens of lentil, field pea, and chickpea samples reveal a relatively high number of pathogen-free seed samples from across the province, although this number is slightly down from 2021. Results to-date suggest a slight overall in mean infection levels of seed produced during the 2022 growing season compared to results from 2021.

- Greater than 76% of lentil samples were free of seed-borne pathogens; samples that did have detectable levels of Ascochyta, Anthracnose, or Botrytis had a mean infection level that did not exceed 1.1%.
- Seed-borne Anthracnose is showing up on more seed lots relative to previous seasons (except 2016) and has a higher mean infection level than the past seven-year average (0.86).
- Seed-borne Botrytis was detected on less than 2% of lentil and field pea samples.
- Seed-borne Ascochyta was detected on 63.7% of field pea samples but mean infection levels (1.5%) were well below critical threshold levels.
- 45.9% of chickpea samples had detectable levels of seed-borne Ascochyta. On average, the level of infection was 2.1% and exceeded the critical threshold of 0.3%.
- Seed-borne Sclerotinia and Botrytis was not detected on any chickpea samples.

Distribution of submitted samples and crop districts reporting seed-borne pathogens varies across the province. Although the maps created by the Saskatchewan Ministry of Agriculture can help identify areas of lower risk of seed-borne disease, testing of individual seed lots is still recommended.

Table 2. Average percent of pathogen-free pulse seed samples and average infection levels measured in samples with disease analyzed as of January 9, 2023.

Crop	Pathogen	Number of Samples	Pathogen-free samples (%)	Mean Infection ¹
Lentils	Ascochyta	297	98.3	0.3
	Anthracnose	296	76.4	1.1
	Botrytis	296	99.7	0.3
	Sclerotinia	297	97.3	0.4
Field Peas	Ascochyta	245	36.3	1.5
	Botrytis	233	98.3	0.7
	Sclerotinia	234	98.7	0.7
Chickpeas	Ascochyta	35	51.4	2.1
	Botrytis	35	100	0
	Sclerotinia	35	100	0

¹ Mean infection level of samples with disease

Figure 8. 2022 Interim Seed Test Result for Seed-Borne Anthracnose in Lentil. Source: Saskatchewan Ministry of Agriculture

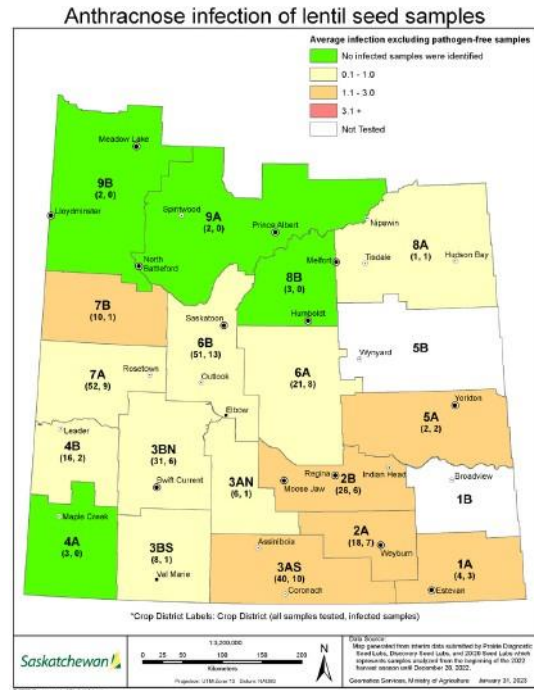


Figure 9. 2022 Interim Seed Test Result for Seed-Borne Ascochyta in Field Pea. Source: Saskatchewan Ministry of Agriculture

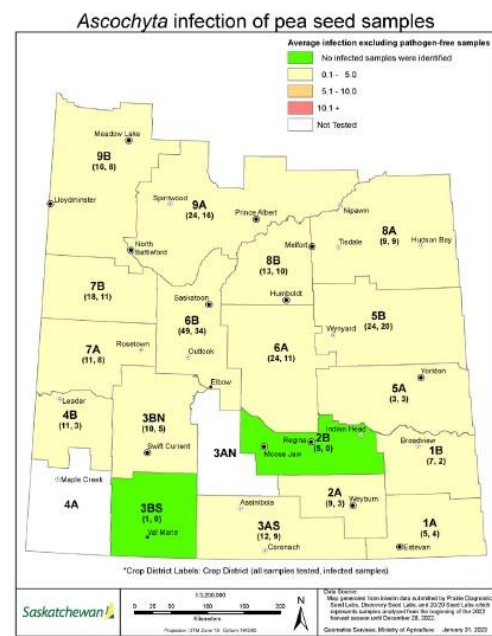


Figure 10. 2022 Interim Seed Test Result for Seed-Borne Ascochyta in Chickpea. Source: SK Ministry of Agriculture

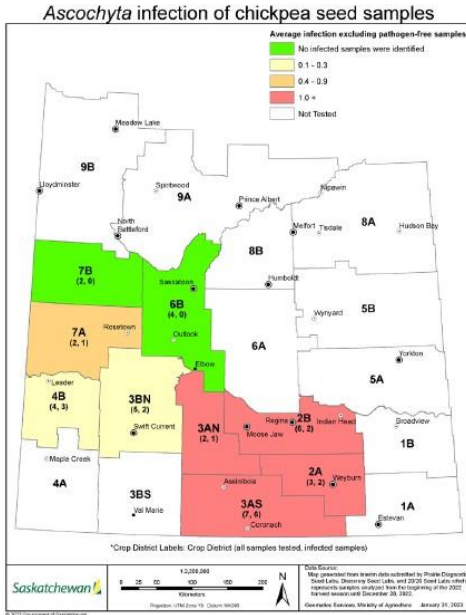


Table 3. Average percent of pathogen-free cereal seed samples and average infection levels measured in samples with disease analyzed as of December 28, 2021.

Crop	Total Fusarium			Fusarium graminearum		
	Number of Samples	Pathogen-free samples	Mean Infection ¹	Number of Samples	Pathogen-free samples	Mean Infection ¹
		(%)			(%)	
Barley	172	14	3.8	176	65.9	1.3
Durum	202	29.7	4.8	193	49.2	4.4
Oats	71	1.4	8.1	79	83.5	1.3
Wheat	502	20.5	3	535	72.1	1.1

¹ Mean infection level of samples with disease

Despite overall low levels of Fusarium-infected cereal seed lots being reported in interim results, seed quality does vary by crop districts as detailed by maps created by the Saskatchewan Ministry of Agriculture and it is recommended that seed lots should be tested on an individual basis.

Cereal Pathogen Results

The interim results of commercial plate tests for seed-borne fusarium pathogens reveal very low mean infection levels barley, durum, oat, and wheat samples tested as of January 9, 2022. The percentages of total Fusarium spp. and F.graminearum-free samples are trending lower with higher mean infection levels across all cereal samples relative to the prior season.

- F.graminearum was detected on less than 34.1% of barley, oat and wheat samples, but was identified on 50.8% of durum samples; mean infection levels were 4.4% or lower for all cereal samples
- The highest percentage of total Fusarium spp.-free samples were in durum (29.7%), followed closely by wheat (20.5%); wheat and barley had the lowest mean infection levels of total Fusarium spp., 3.0 % and 3.8%, respectively.
- Most oat samples (98.6%) had detectable levels of total Fusarium spp. with a mean infection level 1.1% higher than that measured in 2021 (8.1%).
- 86% of barley samples reported a detectable level of total Fusarium spp.; however, the mean infection level to date is only 0.4% higher than in 2021.

Figure 11. 2022 Interim Seed Test Result for Total Seed-Borne Fusarium in Barley. Source: Saskatchewan Ministry of Agriculture

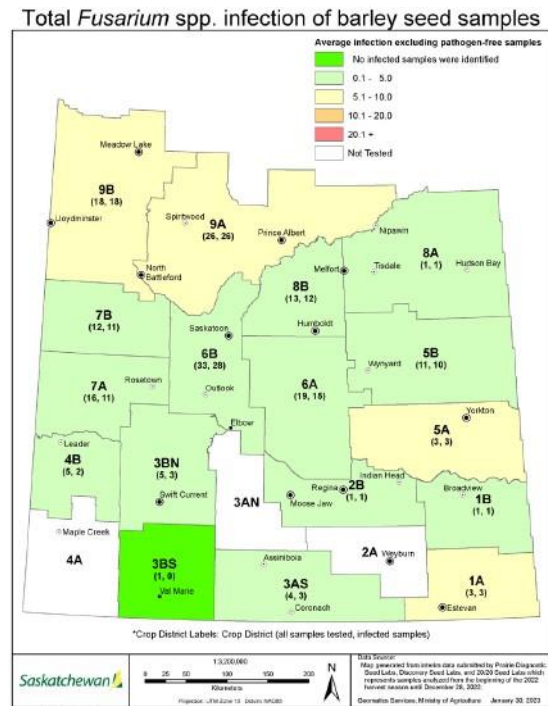


Figure 12. 2022 Interim Seed Test Result for Total Seed-Borne Fusarium in Durum. Source: Saskatchewan Ministry of Agriculture

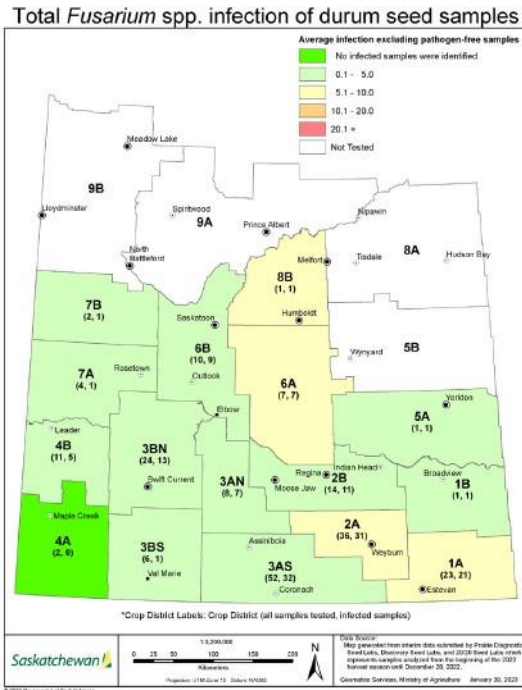


Figure 14. 2022 Interim Seed Test Result for Total Seed-Borne Fusarium in Wheat. Source: Saskatchewan Ministry of Agriculture

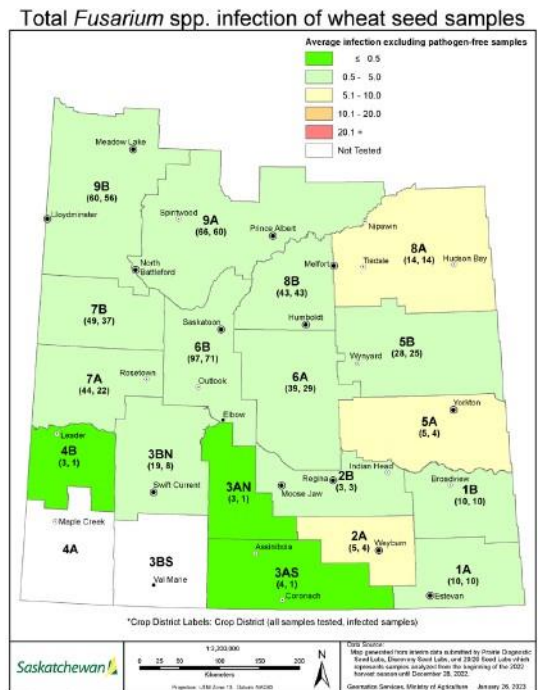


Figure 13. 2022 Interim Seed Test Result for Total Seed-Borne Fusarium in Oat. Source: Saskatchewan Ministry of Agriculture

