

Flax on the Farm

Disease Survey Results, Harvest and Seed Testing

A. DISEASE SURVEY RESULTS AND HARVEST

- 2019 was characterized by dry, cool conditions early in the season and limited moisture in many areas for the remainder of the season, a situation which typically does not promote high levels of disease in flax, and this was reflected in the flax disease survey⁸ results:
 - Close to half (49%) of the surveyed crops in Saskatchewan had pasmo, which was a slight decrease from 2018 (54%). Similar to the situation in 2018, pasmo severity was at low to moderate levels in most of the flax crops surveyed. There were a few more fields rated as having severe pasmo in 2019 compared to 2018, and this was likely reflective of those areas that received abundant mid-season moisture.
 - Alternaria blight was the second most prevalent disease in the 2019 flax crop and was observed in approximately 31% of the flax fields surveyed in Saskatchewan, which was significantly less than the 73% of fields with Alternaria last year.
 - Fusarium wilt was present in 6% of crops surveyed compared to 1% in 2018.
 - The prevalence of aster yellows was very low (2%) and was slightly increased over last year (6%).
 - Powdery mildew or Sclerotinia were not observed.
- Harvest conditions were a challenge for the flax crop. A considerable amount of the crop has yet to be harvested and will likely remain unharvested until spring.
 - Poor harvest conditions and prolonged exposure to fall and winter weather mean that a good proportion of the crop was binned at tough (10.1-13.5%) or damp (>13.5%) moisture contents and the levels of blighted seed (i.e. discoloured (dull grey to black), shrivelled, frosted or scabbed in appearance) are likely to be higher than normal.
 - The use of supplemental heat and grain dryers on flax seed has been common with late fall harvested flax crops.
 - Prolonged cool conditions beginning in August meant that plants were well acclimated to the cold before killing frosts arrived and therefore the incidence of frost-damaged seed may be less than expected.
 - Storage moulds may be common this year due to challenging harvest conditions and prolonged weathering of seed.
 - Seed storage challenges could mean that the supply of high-quality seed in the spring may be limited.

- Harvest Sample Program
 - The Canadian Grain Commission’s annual Harvest Sample Program generates harvest and export quality data on the Canadian grain crop.
 - Growers who submit samples of flax seed will receive an unofficial grade in addition to the oil and protein content and the iodine value (IV) for the flax seed lot.
 - This process serves to provide quality data that is used to promote the high quality of Canadian grain and to aid in the marketing of Canadian grain.
 - Due to the amount of the flax crop still in the field, the Canadian Grain Commission will be conducting a **Spring Harvest Sample Program for flax**.

§The flax disease survey was conducted by staff of the Crop Development Centre, the Saskatchewan Flax Development Commission and the Saskatchewan Ministry of Agriculture. The results were summarized by Trisha Islam, Research Assistant with the Cereal and Flax Pathology Research Group at the Crop Development Centre.

B. SEED TESTING

Seed health directly impacts crop establishment and yield, and therefore seed testing can play an important role in measuring the quality of farm-saved seed and making decisions on the use of seed lots. Crop management decisions are ultimately based on the seed that was planted, so knowing more about its condition upon planting can be cost-saving information.

General

- Numerous tests are available for flax seed (Table 1).
- Most seed testing facilities recommend testing for germination, vigour and disease prior to seeding.
- A minimum of a week’s time is typically required to conduct a germination, vigour or disease test.
- Earlier testing of seed quality affords more time to formulate a plan if the quality is poorer than expected (e.g. purchase a seed treatment, locate an alternative seed source, etc.)
- Re-testing of seed in the spring is recommended if the fall results indicated that:
 - Germination was lower than desired.
 - The variability between the germination and vigour tests was higher than desired.
 - Storage moulds were detected.
- Seed testing results are only as good as the sampling procedure used for the seed lot. A good rule of thumb is that a cup of seed should be set aside from every load that goes into a bin to create a sample for that bin.

Table 1. Tests available for flax seed

Test	Description	Comments
Germination	The number of seeds that germinate under ideal conditions (i.e. temperature, moisture, growing media) expressed as a percentage.	Useful information for calculating seeding rate. Will quantify the % normal, % abnormal and % dead seeds.
Vigour	The number of seeds that germinate under less than ideal conditions expressed as a percentage.	Each lab has a slightly different procedure. Often conducted under cool temperatures and called a cold stress test. Will quantify the % vigorous, % non-vigorous and % no growth seeds. Can be used to calculate seeding rate (e.g 80% vigour = 80% emergence or 20% mortality rate).
Thousand seed weight (TSW)	The weight of 1000 seeds in grams. Also referred to as thousand kernel weight (TKW).	Useful information for calculating seeding rate and for calibrating the seed drill.
Moisture	The moisture content of the seed expressed as a percentage.	Commercial flax seed typically has a moisture content of 10% or less.
Test/bushel weight	The weight of a standard volume of seed. Also called bushel weight.	Expressed as kg/hL or g/0.5L. A measure of grain density. Useful information for calculating seeding rate.
Purity	A measure of the physical purity of a seed lot.	An indication of what else besides flax seed is in the sample (i.e. weed seeds and other crop kinds).
Grade	A measure of seed quality based on purity and germination.	Different than the grading done on grain at the elevator. Seed grades defined by the CFIA.
Dockage	The quantity of foreign material in a seed lot.	An indication of what else besides flax seed is in the sample (e.g. chaff, weed seeds, soil, etc.).
Disease	The percentage of seeds with a specific disease-causing organism on them.	Useful information that can influence seed treatment decisions. Seed-borne diseases in flax include: Alternaria blight, anthracnose (<i>Colletotrichum</i> spp.), Fusarium wilt (<i>Fusarium oxysporum</i> f. sp. <i>lini</i>), grey mould (<i>Botrytis cinerea</i>), pasmo (<i>Septoria linicola</i>), stem break and browning (<i>Polyspora lini</i>).
Triffid	A test for the presence of CDC Triffid flax (event FP967) in a seed lot.	Check with your buyer before having seed tested as some buyers will only accept test results from certain laboratories.
Herbicide residue	A measure of the concentration (e.g. ppm) of a pesticide in a sample of seed.	Typically tested for by exporters but may be used by producers in years where application timing of desiccants and pre-harvest herbicides was difficult to judge. Quantities of seed required range between 250g to 1kg.

Germination and Vigour

- Percent germination of a seed lot can decrease over time in storage, so if tested in the fall and the results are less than optimal, re-testing again in the spring may be valuable.
- Increasing the seeding rate to compensate for poor germination will not always solve the problem because the reduction in germination could be due to disease instead.
- A vigour test will provide additional information related to the ability of the seed to germinate under challenging conditions and may be especially informative if planning to seed early. Vigour results can be directly applied to seeding rate calculations by using as the emergence rate.
- Heated seeds can often be identified in a germination test as well as those seeds damaged by frost, chemicals and equipment as well as those infected with Alternaria.

Disease

- Disease testing of seed can indicate the presence of seed-borne diseases, while fungal scans of seed can also detect storage moulds.
- The presence of pathogens on the seed often leads to decreased germination and vigour. Disease testing can be done after receiving the results of germination tests or can often be purchased as a package with germination and vigour tests.
- Some labs recommend that if there is more than a 10% difference between the germination and vigour test results, it is a good idea to test for disease.
- Disease testing gives an indication of the disease levels that were present in the field during the growing season. If planted, diseased seed acts as a source of inoculum for this year's crop, so applying a seed treatment can help prevent the spread of disease.
- There are no official recommendations regarding the disease levels on flax seed that require seed treatment, but in general less than 10% diseased seed is preferred for seeding.
- If you have your flax seed tested for disease, talk through the results with your lab because each may have different recommendations for seed treating or abandoning a seed lot based on pathogen levels.

Testing Facilities

- A large number of labs across Western Canada offer seed testing services for flax (Table 2).
- These facilities can be accredited by the CFIA for germination, purity, grading and dockage tests as well as disease identification, and as such, use standardized protocols for these tests.



Don't forget to check on your stored flax seed this month! More frequent monitoring is critical if flax seed was binned when tough (10.1-13.5% moisture) or damp (>13.5% moisture), as it will be more susceptible to heating and deterioration due to storage mould growth. Remember that the size and shape of flax seed makes it very dense in storage so maintaining good airflow is important. Refer to the [September edition of Flax on the Farm](#) for more advice on flax seed storage.

For more information about disease survey results, harvesting or storing flax contact the following:

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Saskatchewan Flax Development Commission
(306) 664-1901
michelle@saskflax.com

Agriculture Knowledge Centre
Saskatchewan Ministry of Agriculture
(306) 694-3727
1-866-457-2377

Dane Froese
Industry Development Specialist – Oilseeds
Manitoba Agriculture
(204) 750-2840
dane.froese@gov.mb.ca

AgInfo Centre
Alberta Agriculture and Forestry
(403) 310-3276
aginfocentre@gov.ab.ca

Useful links:

1. Seed Quality:

- [Photos of seed quality issues \(Flax Council of Canada\)](#)
- [Canadian Food Grade Flax \(Flax Council of Canada\)](#)
- [Effect of Frost on Seed Quality \(Saskatchewan Ministry of Agriculture\)](#)
- [Marketing, Grading and Seed Quality of Flax \(Saskatchewan Flax Development Commission\)](#)
- [Seed Smart Alberta](#)

2. Seed Storage:

- [The Process of Grain Aeration \(Ron Palmer\)](#)
- [Crop Storage \(PAMI\)](#)

3. Grain Grading

- [Official Grain Grading Guide-Flaxseed Chapter \(Canadian Grain Commission\)](#)
- [Variety Designation List for Canada Western flaxseed \(Canadian Grain Commission\)](#)
- [Harvest Sample Program information \(Canadian Grain Commission\)](#)

Table 2. Flax seed testing facilities in western Canada by province

Prov.	Company	Contact information			Tests performed										
		Address	Phone	Email	Germ	Vigor	TSW	Moisture	Test weight	Purity	Grade	Dockage	Disease	Triffid*	Herbicide Residue
AB	20/20 Seed Labs Inc. [^] https://2020seedlabs.ca/	507-11th Ave. Nisku, AB T9E 7N5	1-877-420-2099 780-955-3435	info@2020seedlabs.ca support@2020seedlabs.ca carey@2020seedlabs.ca	✓	✓	✓			✓	✓		specific diseases upon request	✓	
	Precision Seed Testing	Box 210 Beaverlodge, AB T0H 0C0	780-354-2259	precisionseed@xplornet.com	✓		✓			✓	✓				
	Seed Check Technologies Inc. https://www.seedcheck.net/	101, 5906-50 Street Leduc, AB T9E 0R6	780-980-8324 1-866-980-8324	info@seedcheck.net office@seedcheck.net morgan@seedcheck.net	✓	✓	✓	✓	✓	✓	✓		Alternaria, Fusarium, Botrytis anthracnose		
	SGS BioVision Seed Research Ltd. [^] https://biovision.ca/	Unit 310, 280 Portage Close Sherwood Park, AB T8H 2R6	780-436-8822 1-800-952-5407	biovision.sherwoodpark@sgs.com holly.gelech@sgs.com	✓	✓	✓	✓	✓	✓	✓	✓	Alternaria, Fusarium; fungal scan available	✓	✓
	SGS BioVision Seed Research Ltd. https://biovision.ca/	Unit 106, 10136 128 Ave. Grande Prairie, AB T8V 4H3	780-532-8890 1-877-532-8889	biovision.grandeprairie@sgs.com	✓	✓	✓	✓	✓	✓	✓	✓	Alternaria, Fusarium; fungal scan available	✓	✓
SK	Ag-Seed Laboratory	Box 998 Carrot River, SK S0E 0L0	306-768-3335	agseedlab@nutrien.com	✓	✓				✓					
	BDS Laboratories http://www.bdslabs.com/	Northern Bank Building #13 Qu'Appelle Street P.O. Box 363 Qu'Appelle, SK S0G 4A0	306-699-2679 1-888-237-5227	bds.laboratories@sasktel.net									Alternaria, Fusarium, Botrytis anthracnose		
	Canadian Grain Commission https://www.grainscanada.gc.ca	103-108 Research Dr. Saskatoon, Saskatchewan S7N 3R3	306-975-5714												✓
	Discovery Seed Labs Ltd. ⁹ https://www.seedtesting.com/	450 Melville Street Saskatoon, SK S7J 4M2	306-249-4484	info@seedtesting.com	✓	✓	✓			✓			Alternaria, anthracnose pasma	✓	
	Lendon Seed Lab www.lendonseeds.com	147 Hodsman Rd. Regina, SK S4N 5W5	306-585-7333	test@lendonseeds.com lendon.seeds@gmail.com	✓	✓	✓			✓	✓	✓	Alternaria		
	Quantum Genetix/Biosciences https://quantumgenetix.com/	HWY 16 E & Floral Rd Site 501 Comp 11 RR 5 Station Main Saskatoon, SK S7K 3J8	306-956-2071	dna@quantumgenetix.com s.james@quantumgenetix.com											✓
	Parkland Laboratories ⁹ http://parklandlabs.com/	143 – 11th Avenue West Melville, SK S0A 2P0	306-508-0151	desireeprice76@gmail.com	✓	✓	✓	✓	✓	✓	✓		Alternaria, Fusarium		
	Prairie Diagnostic Seed Lab Inc. [^] http://www.pdsl.net/index.html	1105 Railway Avenue Weyburn, SK S4H 3H5	306-842-7375	pds@psasktel.net	✓	✓	✓			✓	✓	✓			
	Prairie Diagnostic Services Inc. http://pdsinc.ca/Home.aspx	52 Campus Drive Saskatoon, SK S7N 5B4	306-966-7952	pds.info@usask.ca karen.moline@pds.usask.ca											✓
	Seed Solutions Seed Labs Inc. [^] http://www.seedssolutionsseedlabs.com/	Box 1420 Swift Current, SK S9H 3G6	306-741-9309 1-866-990-7333	seedssolutions@xplornet.com	✓	✓	✓	✓	✓	✓	✓	✓	Alternaria, Fusarium		
SGS Saskatoon	Unit 2, 3327 Lambert Crescent Saskatoon, SK S7K 1K4	306-934-3559	jonathan.brooks@sgs.com tajinder.grewel@sgs.com				✓	✓	✓	✓	✓	Alternaria, Fusarium; fungal scan available	✓	✓	

Table 2. Continued

Prov.	Company	Contact information			Tests performed										
		Address	Phone	Email	Germ	Vigor	TSW	Moisture	Test weight	Purity	Grade	Dockage	Disease	Triffid*	Herbicide Residue
MB	20/20 Seed Labs Inc. ^λ https://2020seedlabs.ca/	3489 Pembina Hwy Winnipeg, MB R3V 1A4	204-261-3755	shari@2020seedlabs.ca	✓	✓	✓			✓	✓		specific diseases upon request	✓	
	Accu-Test Seed Lab ^λ http://redsper.ca/accu-test/	102 2nd Ave. East Box 579 Rivers, MB R0K 1X0	204-328-5313	dgerrard@redsper.ca	✓	✓	✓	✓	✓	✓	✓	✓			
	Canadian Grain Commission https://www.grainscanada.gc.ca	1404-303 Main Street Winnipeg, MB R3C 3G8	204-984-4582	tigst.demeke@grainscanada.gc.ca										✓	
	Integrity Seed Lab Ltd. http://integrityseedlab.com/	8040 Park Royale Way Box 17, Grp 210, RR2 Winnipeg, MB R3C 2E6	204-774-1882	g.green@integrityseedlab.com	✓	✓	✓			✓	✓				
	SGS BioVision Seed Research Ltd. [¶] https://biovision.ca/	930, 167 Lombard Ave. Winnipeg, MB R3B 0V3	204-942-8557	biovision.winnipeg@sgs.com	✓	✓	✓	✓	✓	✓	✓	✓	Alternaria, Fusarium; fungal scan available	✓	✓

^λCan apply a seed treatment to determine the effect on germination and vigour

[¶]Can apply a nutrient enhancement product to determine effect on germination and vigour

[§]Offer a soil germination test