

Seed Treatments in Spring Wheat and Durum Production

A common question in spring is whether to treat seed or not. While seed treatment cannot improve seed quality, it can preserve quality. Preserving seed quality can help with plant establishment.

Seed treatments are not a silver bullet when it comes to diseases management, however they can be a useful tool when used in combination with other best management practices (BMPs). Disease BMPs such as diverse crop rotations, seed testing, residue management, foliar fungicide, and variety selection can decrease disease pressure to a point where seed treatments might be of benefit or possibly unnecessary.

Spring seeding conditions in Saskatchewan are wide ranging across the province. Often moisture conditions (too wet or too dry), and soil temperature can be less-than-ideal, leaving the germinating crop off to a slower start and often susceptible to disease. A list of common wheat seedling diseases along with common symptoms and management practices can be found in Table 1.

Table 1. Common wheat seedling diseases and general management options (Sourced from the Guide to Crop Protection)

Disease	Symptoms and Ideal Conditions	Recommended Management Options
<i>Alternaria alternata</i>	Leaf spotting disease; seed treatment will not provide protection against the development of disease in crop.	Clean seed, seed treatment for overall plant health.
<i>Aspergillus</i> spp.. <i>Penicillium</i> spp.	Storage molds that generally do not affect germination.	Seed treatment can be considered if levels are high
Bunts (<i>Tilletia triici</i> , <i>T. laevis</i>)	Cool soils at germination favor infection, symptoms occur at plant maturity.	Clean seed, resistant varieties, seed treatment (systemic and contact), seeding into warm soil, crop rotation.
Seed Rot, Damping Off (<i>Cochliobolus sativus</i>)	Poor emergence, damping off of seedlings. Symptoms occur scattered throughout field, not in patches.	Crop Rotation, seed treatment.
Common Root Rot (<i>Cochliobolus sativus</i>)	Drought, warm weather and nutrient deficiency favor infection. Patchy emergence, damping off of seedlings, stunting and reduced root growth.	Crop rotation, adequate N and P fertility for root growth, warm soil at seeding, seed treatment.
<i>Fusarium</i> spp. (seed-borne)	Thrives under wet and warm conditions. Can cause seed rot, damping off, root rot, and seedling blight. Identification of <i>Fusarium</i> species, through seed testing, can help with management decisions.	Crop rotation, variety selection, clean seed, seed testing, foliar fungicide, seed treatment.
<i>Pythium</i> spp.	Favours wet and cool soil conditions. Infects roots of germinating seeds and seedlings causing poor emergence, damping off, stunting, seedling mortality.	Crop rotation, seed treatment.
<i>Rhizoctonia</i> spp.	More prevalent in sandier, light soils. Causes bare patches and uneven emergence. The pathogen prunes the roots giving them fine, sharp points.	Crop rotation, control of host weeds, seed treatment.

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Disease	Symptoms and Ideal Conditions	Recommended Management Options
<i>Septora</i> spp. (seed-borne)	Leaf spotting disease; seed treatment will not provide protection against the development of disease in-crop.	Clean seed, seed treatment for overall plant health.
Smut (<i>Ustilago tritici</i>)	Cool soils favour infection, generally does not reduce germination, but can infect seedlings which results in yield loss.	Clean seed, resistant varieties.
Take-All (<i>Gaeumannomyces graminis</i>)	Favoured by warm, wet soils with poor drainage and low fertility. Early season symptoms present as chlorosis, stunted plants which eventually ripen prematurely.	Crop rotation, control of volunteers, seed treatment.

Research has shown that dual seed treatments (fungicide and insecticide) can possibly improve seedling survivability through improved tolerance to abiotic stress (Larsen & Falk, 2013). This means that the use of a dual seed treatment can increase seedling survivability in less-than-ideal conditions. The use of insecticidal seed treatments should be considered in fields where insect pests, such as wireworms, have previously caused yield loss. Table 2 shows insecticidal seed treatment options for spring wheat and durum. Seed

treatments provide protection from yield robbing factors, such as diseases and insects. Disease infected seed, soil and crop residues, and insects can all put seed and seedlings at risk, which can reduce yield. For a list of current wheat seed treatments sourced from the Guide to Crop Protection check out Table 3.

Table 2: Insecticidal seed treatment options for spring wheat (Sourced from the Guide to Crop Protection 2023)

Products	Insect		
	Armyworm	Cutworm	Wireworm
Alias 240 SC			X
Cruiser 5FS			X
Cruiser Vibrance Quattro			X
Lumivia CPL	X	X	X
NipsIt INSIDE 600 Insecticide			X ¹
NipsIt SUITE Cereals OF Seed Protectant			X
Raxil PRO Shield			X
Sombrero 600 FS			X
Stress Shield 600			X
Teraxxa F4			X

1. Suppression only

Seed Treatments in Spring Wheat and Durum Production

Table 3: Wheat seed treatments products sourced from the Guide to Crop Protection 2023.

Wheat Diseases											
Product	<i>Alternaria alternata</i> (seed borne)	<i>Aspergillus spp.</i> , <i>Penicillium spp.</i>	Bunts (<i>Tilletia tritici</i> , <i>T. laevis</i>)	Seed Rot, Damping Off (<i>Cochliobolus sativus</i>)	Common Root Rot (<i>Cochliobolus sativus</i>)	<i>Fusarium spp.</i> (seed-borne)	<i>Pythium spp.</i>	<i>Rhizoctonia spp.</i>	<i>Septora spp.</i> (seed-borne)	Smut (<i>Ustilago tritici</i>)	Take-all (<i>Gaeumannomyces graminis</i>)
Allegiance FL							X				
Belmont 2.7 FS							X				
Cover 2		X	X	X	X ¹	X	X	X		X	
Cruiser Vibrance Quattro		X	X		X ¹	X	X	X		X	X ¹
Dividend Extreme Fungicide			X	X	X ¹	X ¹				X	X ¹
Insure Cereal			X	X	X ¹	X	X	X		X	
Insure Cereal FX4			X	X	X ¹	X	X	X		X	
INTEGO Solo Fungicide					X ¹		X				
Interest Forte		X	X		X ¹	X ⁶	X		X	X	X ¹
Lixar PRO		X ³	X	X	X ¹	X	X	X ¹		X	
NipsIt SUITE Cereals OF Seed Protectant			X		X ¹	X	X	X			
Rancona Trio		X	X	X	X ¹	X	X	X		X	
Raxil PRO		X ³	X	X	X ¹	X	X	X ¹		X	
Raxil PRO Shield		X ³	X	X	X ¹	X	X	X ¹		X	
SHARDA METEB 11ST			X ⁷	X ¹	X ¹	X ⁶			X		
Telex Fungicide					X ¹						
Teraxxa F4				X	X ¹	X	X	X		X	
Vibrance Quattro	X	X	X	X ¹	X ¹	X	X	X		X	X ¹
VitaFlo Brands		X ⁴	X	X	X ¹	X	X		X	X	

1. Suppression only.
2. Winter wheat only.
3. Control of seed-borne *Aspergillus spp.* and suppression of seed borne *Penicillium spp.*
4. And *Alternaria spp.*
5. And suppression of net blotch (*Pyrenophora teres*).
6. Refer to label for expectations for control vs. suppression.
7. Refer to the label for details

Seed Treatments in Spring Wheat and Durum Production

Seed testing can be another useful tool to determine the value of a seed treatment. It is important to note that seed test results will provide insight into diseases present on the seed, and do not report on soil- or residue-borne pathogens present in the field. Fields with short rotations may harbour more soil-borne pathogens.

Different seed treatments are effective on different diseases and insects. It is important to choose a seed treatment that protects the seed from the pests that are specific to your farm. One of the most important diseases in spring wheat and durum production is *Fusarium* species (spp.). The use of a fungicidal seed treatment can help to reduce seedling blights and infections that can be caused by *Fusarium* spp. during germination and emergence. Seed test results will report two *Fusarium* values: total *Fusarium* spp., and *Fusarium graminearum* (Fg). Fg is reported on its own because it is the most aggressive species in terms of fusarium head blight (FHB) infection, and produces a mycotoxin called deoxynivalenol (DON). Seed treatments will not prevent FHB infection from occurring in-season. The guidelines for Fg infected seed are in place to prevent the spread of the pathogen into areas where it is not yet established.

Seed with more than 5% Fg infection is not recommended for use in areas where Fg is not yet established. To determine if Fg is established in your area, check your records, and discuss with neighbours to see if FHB has been an issue in the area over the last few years. Over the years, causal pathogens have spread across the province and are likely established in most areas, however it is still important to be vigilant.

Total *Fusarium* spp., is important when considering a seed treatment. Seed and soil-borne *Fusarium* spp. can cause poor emergence, seedling blights, reduced tillering, and yield loss. If the seed has >2% but <5% Fg, and total *Fusarium* spp. is >10% the use of a seed treatment is recommended. Total *Fusarium* per cent includes the Fg value. More information on *Fusarium* and other seed-borne diseases can be found here.

[The Provincial Seed Survey maps](#) show the average per cent infection of total *Fusarium* spp. in seed test results by crop district. Knowing the levels of seed-borne *Fusarium* spp. in your crop district can help with decisions around seed sourcing, seed treatment, and potentially identifying areas that may have higher disease risk in the upcoming crop year. These maps show the variability of the diseases across the province. Infection levels fluctuate from year to year, depending on environmental conditions. Research has shown

that Fg can remain in the soil for at least 2 years (Gilbert, Woods, Conner, & Fernandez, 2003). This means, it is important to look back over three to four years to get a better picture of the region's infection levels.

Another important consideration with seed treatment is the application process. Fungicide seed treatments protect seeds and seedlings from pathogens found in the soil, on the seed surface and within the embryo of the seed. Complete and adequate coverage over each seed with seed treatment is an important factor to ensure the full potential is reached. There are many different methods to apply seed treatment, whichever method is used it is important that volume can be measured and spread evenly across the seed. For best coverage, ensure the seed is not below freezing, this can cause uneven coating and poor adherence. It is also important to agitate the seed treatment prior to application, this will ensure the product has not settled out, and help with uniform coverage. Following label guidelines, and calibrating equipment will ensure the appropriate rate is used for the target pest.

Label guidelines and more information on seed treatments can be found in the Saskatchewan [Guide to Crop Protection](#).

References

- Gilbert, J., Woods, S. M., Conner, R. L., & Fernandez, M. R. (2003). Role of spring wheat seed infested with *Fusarium graminearum* in spread and development of fusarium head blight and effects on agronomic performance. *Canadian Journal of Plant Pathology*, 73-81.
- Larsen, J. R., & Falk, D. E. (2013). Effects of seed treatment with a neonicotinoid insecticide on germination and freezing tolerance of spring wheat seedlings. *Canadian Journal of Plant Science*, 535-540.