SDSU Extension

iGrow Soybean

BEST MANAGEMENT PRACTICES

Chapter 8:
Fungicidal Seed Treatments for Soybeans

Kay Ruden

Planting high quality seed at an appropriate time is critical for optimizing soybean yields. However, planting seed too early can result in yield reductions if emergence is delayed or if soil diseases are a concern. Seed treatment can provide protection against diseases and insect pests. The purpose of this chapter is to discuss fungicide seed treatment options, classification, management, and impact on other inoculants. Key items for insuring good seed germination are provided in Table 8.1.

Table 8.1. Key items for insuring good seed germination.

1. Select high quality seed.
2. Select an appropriate variety and trait package.
3. Use crop rotations to reduce disease prevalence.
4. Know your disease problems by scouting the field.
5. Treat the seed with an appropriate fungicide.

Seed treatments

Treating seed with fungicide treatments is a useful tool that improves stand establishment and seedling vigor. An important advancement in plant disease management is the development of effective seed treatments. In general, fungicidal seed treatments are used to control seed rots, damping-off, and/or seedling blights. **Most seed treatments do not control all types of fungal pathogens, so before using, do some background checking to know what specific fungal disease needs to be controlled.** This information can be obtained by reviewing your scouting records and visiting with an Extension Field Specialist (Chapter 2).

Classification of fungicidal and seed treatments

Based on movement of the fungicide in relationship to the seed, fungicidal seed treatments can be classified as contact (protectants) and systemic fungicides. Contact treatments are effective only on the seed surface and provide protection against seed surface-borne pathogens and targeted control of soil-borne pathogens, with the exception of the root rotting organisms. These products generally have a relatively short residual. Examples of contact seed treatment fungicides are captan, thiram or fludioxonil.

Systemic fungicides are absorbed into the germinating seed and inhibit or kill the fungus on the emerging plant. Systemic fungicide seed treatment examples include azoxystrobin, carboxin, mefenoxam, metalaxyl, thiabendazole, trifloxystrobin and various triazole fungicides such as ipconazole. Mefenoxam and metalaxyl are primarily used to target the water mold fungi *Pythium* and *Phytophthora*. Biological control agents are also available and may provide some level of protection. It is important to note that not all fungicides are available as seed treatments, and not all fungicides have activity against the same range of organisms.

Disease management using seed treatment

Situations that favor disease development include: poor seed quality and adverse growing conditions (wet soil, compaction, and cool temperatures, <60°F). Seed treatments are important, but they are only one component of a multi-faceted integrated pest management (IPM) program. In many situations, problems can be avoided by:

1. Using high quality, disease-free seed to prevent the spread of seed-borne diseases and promote healthy stand establishment.

2. Selecting a well-adapted variety, for the growing region, with appropriate traits for disease resistance and maturity.

3. Using a crop rotation that includes non-host crops to reduce pathogen load. Soybean diseases, such as root rot, build up in soil when soybeans are in close rotations. The pathogen population can be decreased by lengthening rotations that include non-susceptible crops to three or four years between soybeans. When developing the rotation, care must be used in selecting the crop. Dry beans and soybeans may be infected by similar pathogens.

4. Using appropriate residue and tillage management systems. Tillage assists in reducing disease incidence by destroying infested residue, separating the pathogen from the soybean plant, and changing the soil moisture and temperature. High residue loads left on the soil surface may increase disease incidence. http://www.ipm.iastate.edu/ipm/icm/2002/10-21-2002/timetill.html

5. Checking the combine (during harvest) to minimize combine yield losses (Chapter 38 and 40). Volunteer soybean plants in the following year reduce the impact of rotations.

6. Using fertilizers, herbicides, insecticides, and fungicides judiciously while following appropriate application guidelines. This can reduce losses, promote healthy plants, and prevent decreases in seed quality.

7. Matching problems with solution. Field history is a key component for managing soybean diseases with seed treatments (Chapter 2). Field areas that are routinely wet will have different requirements than areas that are well drained. Soils information can be obtained from the USDA-NRCS (Chapter 19).

Cropping sequence and disease or insect pest histories are important factors that should be considered when selecting a treatment. Proper identification of disease agents is also important. The South Dakota State University Plant Disease Clinic or Plant Pathology Extension Field Specialists at the regional centers can provide assistance. Contact information is below.

SDSU Plant Disease Diagnostic Clinic
605-688-5545
sdsu.pdc@sdstate.edu
SPSB 117, Box 2108
South Dakota State University
Brookings, SD 57007-1090

Plant Pathology Field Specialist
SDSU Extension Regional Center
605-782-3290
4101 W. 38th St., Ste. 103
Sioux Falls, SD 57106

Plant Pathology Field Specialist
SDSU Extension Regional Center
605-842-1267
325 S Monroe Street, Ste. 125
Winner, SD 57580

Effective control varies with seed treatment product, rate, environmental conditions, and pests present. Seed treatments are most effective against seedling blights, and seed- or soil-borne diseases and provide some level of control for early season diseases.

Application information

Fungicide seed treatment products vary in formulation type, packaging, and use requirements. Products may be dry or liquid and in concentrate or ready-to-use formulations. While many seed treatments may be applied on farm, several products are limited to use only by commercial applicators using closed application systems.

Seed treatment and rhizobia (N_2 fixation) inoculants

Seed treatments containing fungicides or fungicide/insecticide combinations may adversely affect N_2 fixing inoculants applied to soybean seed. Captan and PCNB severely reduces *Rhizobium* survival on treated seed. If these seed treatments are selected, consider using an in-furrow *Rhizobium* inoculation approach (Chapter 23). In contrast, some seed treatments have moderate impact (carboxin) or little to no impact (thiram, fludioxonil, mefenoxam, and metalaxyl) on *Rhizobium* survival.

Producers should carefully read and follow label instructions and limitations for both the pesticide seed treatment and the inoculants. Liquid fungicides or fungicide/insecticide combinations should not be directly mixed with liquid inoculants prior to application, and care should be followed to limit the time that inoculants and pesticide seed treatments are in direct contact. The different products that are available for use in South Dakota are provided in Table 8.2.

Table 8.2. The 2012 seed treatment fungicides or fungicide/insecticide combinations currently labeled for use in South Dakota. The list is dynamic and prone to frequent modifications. Always check the product label. (Source: K. Ruden, SDSU)

Diseases Listed on Label				Seed Treatment Products	Application Rate	Special Notes
Seed & Seedling Rots	Fusarium Root Diseases	Pythium Root Diseases	Rhizoctonia Root Diseases			
NA	NA	NA	NA	**abamectin** Avicta 500 FS	See product label	For control of soybean nematodes.
NA	NA	NA	NA	**abamectin + one of the following: mefenoxam, fludioxonil, and thiamethoxam.** Avicta Complete Beans	See product label	For control of soybean nematodes.
X	NA	X	X	**azoxystrobin** Dynasty Protege-FL	 0.153-0.459 fl oz/cwt plus suppression of white mold. 0.20-0.27 fl oz/cwt	NA
X	NA	X	X	**azoxystrobin + metalaxyl** SoyGard SoyGard L with Protege	NA See product label See product label	NA
NA	NA	NA	NA	**Bacillus firmus I-1582 + clothianidin** Poncho/VoTiVO	See product label	For control of soybean nematodes. Do not graze or feed forage and hay to livestock.
NA	X	NA	X	**Bacillus pumilus GB34** Yield Shield	0.1 oz/cwt	NA
X	NA	NA	NA	**captan** Captan 400 Captan 400-C	 1.5-2.5 fl oz/cwt 1.5-2.5 fl oz/cwt	NA
X	X (Enhance)	X (Enhance)	X (Enhance)	**captan + carboxin** Enhance Vitavax M DC	 5 oz/cwt 2 oz/bu	Do not graze or feed forage or hay from treated areas of livestock (Enhance).
X	X	X	X	**captan + carboxin + imidacloprid** Enhance AW	5 oz/cwt	Do not graze or feed livestock on soybean forage or hay.
X	X	X	X	**captan + carboxin + metalaxyl** Bean Guard Allegiance	2 oz/60 lb	NA
X	NA	NA	NA	**captan + molybdenum** Hi Moly/Captan D	3.3 fl oz/cwt	NA
X	NA	NA	X	**carboxin** Vitavax-34	3-4 fl oz/cwt	Do not graze or feed livestock on forage or hay grown from treated seed.
X	NA	NA	NA	**carboxin + metalaxyl + imidacloprid** Latitude	4 oz/cwt	Do not graze or feed livestock on forage and hay on treated areas from 6 weeks after planting.

Diseases Listed on Label				Seed Treatment Products	Application Rate	Special Notes
Seed & Seedling Rots	Fusarium Root Diseases	Pythium Root Diseases	Rhizoctonia Root Diseases			
X	NA	NA	X	**carboxin + permethrin** Kernel Guard Supreme	1.5 oz/50 lb	Do not graze or feed livestock on treated areas for 6 weeks after planting.
X	X	X	X	**carboxin + thiram** RTU-Vitavax-Thiram Vitaflo 280	6.8 fl oz/cwt 4 fl oz/cwt	Do not graze or feed livestock on forage and hay grown on treated areas.
X	X	NA	X	**fludioxonil** Maxim 4FS	0.08-0.16 fl oz/cwt	Green forage may not be grazed until 30 days after planting.
X	X	X	X	**fludioxonil + mefenoxam** ApronMaxx RFC ApronMaxx RTA Maxim XL Warden RTA	NA 1.5 fl oz/cwt plus control of early season Phytophthora and suppression of seed-brome Sclerotinia. 5 fl oz/cwt plus control of early season Phytophthora and suppression of seed-brome Sclerotinia. 0.167-0.334 fl oz/cwt plus early season Phytophthora control. 5 fl oz/cwt plus control of early-season Phytophthora and suppression of seed-brome Sclerotinia.	Additional Apron XL can be added (ApronMaxx RFC, ApronMaxx RTA and Maximu XL) (See label for instructions.)
X	X	X	X	**fludioxonil + mefenoxam + thiamethoxam** CruiseMaxx CruiseMaxx Advanced CruiseMaxx Plus	NA 3 fl oz/cwt 3.2 fl oz/cwt 3.2 fl oz/cwt	Additional Apron XL can be added (see label for instructions).
X	X	NA	X	**ipconazole** Rancona 3.8 FS	0.085 fl oz/cwt	NA
X	X	X	X	**ipconazole + metalaxyl** Rancona Summit Rancona Xxtra	NA 4 fl oz/cwt 3.5 fl oz/cwt	Do not graze or feed livestock on soybean forage or hya (Rancona Xxtra)
X	X	X	X	**ipoconazole + metalaxyl + clothianidin** Inovate	4.74 fl oz/cwt	Do not graze or feed livestock on soybean forage or hay.

Diseases Listed on Label				Seed Treatment Products	Application Rate	Special Notes
Seed & Seedling Rots	Fusarium Root Diseases	Pythium Root Diseases	Rhizoctonia Root Diseases			
NA	NA	X	NA	**mefenoxam** Apron XL Apron XL LS	0.16-0.64 fl oz/ cwt (Use the higher rate for best early season Phytophthora protection.)	NA
X	X	X	X	**mefenoxam + fludioxonil + molybdenum** Apron Maxx RTA + Moly	5 fl oz/cwt	Additional Apron XL can be added (see label for instructions).
NA	NA	NA	NA	**Metalaxyl**		NA
NA	NA	NA	NA	Acceleron DX-309	0.10-0.375 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Aquire	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Allegience Dry	1.5-2.0 oz/ cwt plus early-season control Phytophthora.	NA
NA	NA	NA	NA	Allegiance FL	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Belmont 2.7 FS	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Dyna-Shield Metalaxyl	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	MetaStar ST	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Sebring 2.65 ST	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Sebring 318 FS	0.75-1.5 fl oz/ cwt plus early-season control of Phytophthora.	NA
NA	NA	NA	NA	Sebring 480 FS	0.50-1.00 fl oz/ cwt plus early-season control of Phytophthora.	NA
X	NA	NA	X	**pyraclostrobin** Acceleron DX-109	0.4-1.5 fl oz/cwt	NA
X	NA	NA	NA	**thiabendazole** Mertect 340-F	0.08-0.16 fl oz/cwt for control of pod and stem blight	NA

Diseases Listed on Label				Seed Treatment Products	Application Rate	Special Notes
Seed & Seedling Rots	Fusarium Root Diseases	Pythium Root Diseases	Rhizoctonia Root Diseases			
X	NA	NA	NA	**thiram** 42-S Thiram Signet 480 FS	NA 2 fl oz/cwt 2 fl oz/cwt	NA
NA	NA	X	X	**thiram + metalaxyl + molybdenum** Protector-L-Allegiance	6.7 fl oz/cwt	NA
X	NA	NA	NA	**thiram + molybdenum** Protector-D	3.3 oz/cwt	NA
X	X	NA	X	**trifloxystrobin** Trilex Flowable	0.32 fl oz/cwt	Do not plant any other crops without trifloxystrobin tolerances until 30 days after planting.
X	X	X	X	**trifloxystrobin + metalaxyl** Trilex 2000	1 fl oz/cwt	Do not plant any other crop without trifloxystrobin tolerance until 30 days after planting.

References and additional information

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