

Seed Treatment Fungicides for Soybeans

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This NebGuide addresses how to protect soybean seedlings against fungi.

The most common soybean disease problem in Nebraska is seedling damping off and seed rot caused by several fungi. Early season damping off and root rots are often followed by premature death, which in many instances may be attributed to fungal infections earlier in the season. In some situations, large areas of a field or even entire fields need to be replanted due to early season fungal problems. This is especially true when cool, wet weather early in the growing season creates favorable conditions for infection by certain soil borne pathogens that attack developing soybean plants. Seedling diseases also are active at any time when saturated soil conditions occur. Several pathogens may cause damping off seedling diseases. The most common in Nebraska are species of *Fusarium*, *Phytophthora*, *Pythium* and *Rhizoctonia*. All four are capable of killing soybean seedlings or at least causing damage sufficient enough to affect the ability of the plant to achieve its full yield potential.

Seed treatment fungicides are available in a variety of formulations. Some products are labeled for commercial use in slurry- and mist-type seed treaters. Other products are labeled for on-farm application and commonly are referred to as hopper-box or planter-box treatments. Thorough seed coverage is required for maximum benefit in all cases. To attain good seed coverage with on-farm application, most seed treatment companies recommend adding half of the seed to the planter-box, then adding half of the seed treatment product and mixing thoroughly before adding the remaining seed and fungicide. Mix this thoroughly again. Good coverage also can be obtained by mixing the seed and treatment in a suitable container before adding seed to the planter-box. Always read and follow label directions before making any chemical applications.

Field history is a key component of the decision-making process for managing soybean seedling disease. In most cases,

problem fields will have a history of seedling emergence or post-emergence problems. The distribution of the problem area within a field, however, can be altered significantly in a wet year and may have substantial impact on stand throughout the field. It is critical that the correct fungicide treatment is used for effective disease control. Fungicides used as **protectants (contacts)** are effective only on the seed surface, while **systemic fungicides** are absorbed by the emerging seedling and inhibit or kill the fungus inside host plant tissues. Contact fungicides usually have shorter residual activity than systemic fungicides. Contact fungicides used for soybean seed treatment include: captan, fludioxonil, PCNB and thiram. Systemic fungicides used for soybean seed treatment include: azoxystrobin, carboxin, mefenoxam, metalaxyl, trifloxystrobin and thiabendazole. Another factor in choosing fungicides is their activity against various pathogens. For example, a fungicide that works well on *Pythium*, likely will not work well on *Rhizoctonia* or vice versa. Thus, a knowledge of the pathogens present in fields also will aid in choosing the most effective treatment. *Table 1* lists most of the seed treatment fungicides available for soybeans.

This publication has been peer reviewed.

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

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Table I. Active ingredient and specific activity of some soybean seed-applied fungicides^a.

| Active Ingredient | Trade Name | Manufacturer | Application Method | | Disease on Label ^b | | | | |
|---|--------------------------------------|------------------|--------------------|-------------|-------------------------------|---------------------------|----------------|------------|------------|
| | | | Commercial Treater | Planter Box | Pythium ^c | Phytophthora ^c | Rhizoctonia | Fusarium | Phomopsis |
| Azoxystrobin | Dynasty | Syngenta | + | - | Poor + | NA NS | Excellent + | Good NS | Good NS |
| Azoxystrobin + Metalaxyl | SoyGard | Bayer | + | - | Good + | Poor NS | Good + | Good NS | Good NS |
| | SoyGard L with Protégé | Bayer | + | - | Good + | Poor NS | Good + | Good NS | Good NS |
| Captan^d | Captan 400 | Bayer | + | - | Good NS | Poor NS | Good NS | Fair NS | Fair NS |
| | Hi Moly/Capta-D | Trace Chem LLC | - | + | Good NS | Poor NS | Good NS | Fair NS | Fair NS |
| Captan + Carboxin + Metalaxyl | Bean Guard Allegiance | Trace Chem LLC | + | - | Good + | Poor NS | Good + | Fair + | Fair NS |
| Carboxin + Thiram + Metalaxyl | Stiletto | Trace Chem LLC | + | + | Good + | Poor NS | Good + | Fair + | Fair NS |
| Carboxin + Permethrin^e | Kickstart VP | Helena | + | + | Good NS | Poor NS | Good NS | Fair NS | Fair NS |
| Fludioxonil | Maxim 4FS | Syngenta | + | - | Good NS | Poor NS | Good + | Fair + | Fair NS |
| Mefenoxam | Apron XL LS | Syngenta | + | - | Excellent + | Excellent + | NA NS | NA NS | NA NS |
| Mefenoxam + Fludioxonil | Apron Maxx RFC | Syngenta | + | + | Excellent + | Poor ^f + | Good + | Good + | Good + |
| | Apron Maxx RTA | Syngenta | + | + | Excellent + | Poor ^f + | Good + | Good + | Good + |
| | Apron Maxx RTA + Moly | Syngenta | + | + | Excellent + | Poor ^f + | Good + | Good + | Good + |
| | Warden RTA | Agrillance | + | + | Excellent + | Poor ^f + | Good + | Good + | Good NS |
| Mefenoxam + Fludioxonil + Thiamethoxam^e | CruiserMaxx Beans | Syngenta | + | + | Excellent + | Poor ^f + | Good + | Good + | Good + |
| | Warden CZ | Agrillance | + | + | Excellent + | Poor ^f + | Good + | Good + | Good NS |
| | Warden CZ + Moly | Agrillance | + | + | Excellent + | Poor ^f + | Good + | Good + | Good NS |
| Metalaxyl | Allegiance Dry | Trace Chem LLC | - | + | Excellent + | Excellent + | NA NS | NA NS | NA NS |
| | Allegiance FL | Bayer | + | - | Excellent + | Excellent + | NA NS | NA NS | NA NS |
| | Allegiance LS | Bayer | + | - | Excellent + | Excellent + | NA NS | NA NS | NA NS |
| Thiabendazole | Mertect 340 | Syngenta | + | - | Good NS | Poor NS | Good NS | Fair NS | Fair + |
| | LSP | Bayer | + | - | Good NS | Poor NS | Good NS | Fair NS | Fair + |
| Thiram | Protector-L | Trace Chem LLC | - | + | Fair NS | Poor NS | Good NS | Fair NS | Fair NS |
| | 42-S Thiram | Bayer | + | - | Fair NS | Poor NS | Good NS | Fair NS | Fair NS |
| Thiram + Metalaxyl | Protector-L-Allegiance | Trace Chem LLC | - | + | Excellent + | Poor NS | Good + | Fair NS | Fair NS |
| Trifloxystrobin + Metalaxyl | Trilex FS + Allegiance FL | Bayer | + | - | Excellent + | Poor NS | Excellent + | Good NS | Good NS |
| Bacillus subtilis | Kodiak Flowable Biological Fungicide | Bayer | + | - | Good NS | Poor NS | Good + | Fair + | Fair NS |
| | Subtilex | Becker Underwood | - | + | Good NS | Poor NS | Good + | Fair + | Fair NS |
| Bacillus subtilis + Metalaxyl + PCNB | System ³ | Helena | + | + | Good + | Poor NS | Good + | Fair NS | Fair NS |

^aThis list is presented for information only. No endorsement is intended for products listed nor criticism meant for products not listed. **Read the label carefully before making any application.**

^bSeed treatment fungicide rating for active ingredient. NA = no activity; NS = not specified on label; (+) = listed on label. Efficacy ratings are provided for those products which authors have sufficient experience to evaluate based on research from year 2000 to year 2007.

^cControl of *Pythium* and *Phytophthora* is rate dependent. Make sure the rate is adequate for the problem you are managing.

^dCaptan formulations have an adverse effect on *Rhizobium* inoculant. Therefore, they need to be avoided if seed is directly inoculated, or use an in-furrow application of the inoculant with Captan-treated seed.

^eProduct contains a seed treatment insecticide.

^fWarden RTA offers good early season control of *Phytophthora*. All others in this category have mefenoxam rates too low for *Phytophthora* management.