



Crop Management Factors to Consider Before Using a Soybean Seed Treatment

There are many seed treatments available to manage soybean pests, but most of these products are only effective in the first few weeks after planting. In addition, there are many products and product combinations, which can make it difficult to understand what treatments will consistently provide positive returns on your investment.

This publication describes the factors you should consider to help you make the right soybean seed treatment decisions for your operation. Let's begin by looking at the three major types of seed treatments: fungicides, insecticides, and nematicides.

Fungicide Seed Treatments

Fungicide seed treatments can manage two different types of pathogens: seedborne fungal pathogens — such as the *Phomopsis* seed decay fungus — and soilborne pathogens that infect seedlings and roots — such as *Pythium* spp. and the sudden death syndrome (SDS) fungus.

If you are considering a fungicide seed treatment, then it's important to know that they are more likely to benefit you when you:

- Have a field that has a history of soybean seedling diseases and/or SDS
- Are planting into wet, cool soils below 60°F (16°C)
- Are planting into compacted soils
- Are seeding at rates less than 140,000 seeds per acre
- Practice no-till or reduced tillage
- Have high surface residue
- Have a field with a history of flooded soils
- Have high levels of seedborne fungal infection
- Did not rotate crops — second year (or more) of soybean
- Plant varieties that are susceptible to soilborne diseases such as *Phytophthora* root and stem rot and SDS



Figure 1. Fields with high levels of surface residue may benefit from a fungicide seed treatment.

Insecticide Seed Treatments

You can use insecticide seed treatments to manage early-season insect pests, especially insects that injure soybean before growth stage V2. However, most soybean insect pests occur after this time.

Except in special circumstances in the North Central Region and Ontario, economic analyses that incorporate yield benefits and management costs show that farmers have a higher return on investment when they follow an integrated pest management (IPM) approach (based on scouting and treating at insect pest thresholds). In other regions of the country you should base your decision to use insecticide seed treatments on pest history, cropping patterns, and economic analyses for local conditions.

If you are considering an insecticide seed treatment, they are more likely necessary when you:

- Plant soybean into fields after pasture, grassland, or a Conservation Reserve Program (CRP)
- Plant soybean into fields with a high level of decomposing organic matter (such as recently incorporated green cover crops or animal manure)
- Plant second-crop soybeans in a double-crop system (for example, following wheat)
- Use soybean varieties at risk of acquiring bean pod mottle virus from bean leaf beetle

Nematicide Seed Treatments

Nematicide seed treatments can be classified as either chemical or biological agents with varying modes of action. While nematicide seed treatments provide some early-season seedling protection, they are not meant to be a silver bullet for seasonlong nematode control. Consider a seed treatment as just one additional nematode management tool.

The two best tools for managing nematodes continue to be rotating crops and planting nematode-resistant varieties. However, repeatedly using varieties with the same source of resistance can result in the selection of a nematode population that is able to damage varieties with that source of resistance.

If you are considering an nematicide seed treatment, they are more likely beneficial when you:

- Have fields with a history of plant-parasitic nematodes
- Combine the seed treatment with nematode-resistant varieties
- Have limited crop rotation options
- Have a manageable population of plant-parasitic nematodes. Nematicide seed treatments provide very little to no protection when nematode populations are severe. Before using a seed treatment, submit soil samples to a nematode testing laboratory and consult with your extension specialist to determine if nematode populations are in a range where seed treatment may be beneficial.

Inoculants

Although not a seed treatment, inoculants may be applied to soybean at planting.

Soybean has the unique ability to form a symbiotic relationship with a soil bacterium, *Bradyrhizobium japonicum*. *B. japonicum* forms nodules on the roots that can biologically fix nitrogen. During this process, atmospheric nitrogen (N) is converted to plant-available N.

Because of this symbiotic relationship, soybean farmers typically do not apply N fertilizer to soybean, but may consider applying soil inoculants that contain *B. japonicum* on or near the seed to ensure that biological nitrogen fixation occurs.



If you are considering an inoculant they are more likely necessary when you:

- Are planting into a field with no history of soybean production
- Have a field that has gone several years without soybean

Also, be aware that:

- Your tillage method does not influence the need for inoculant
- Any seed-applied fungicides you use will be compatible with any inoculants you use
- There are no known harmful effects from applying inoculants

Agronomic Practices

In addition to the considerations we've examined so far, it's important to remember that several agronomic practices can influence seed treatment performance.

Always consider the following agronomic factors when deciding whether to use seed treatments:

- **Planting time.** Seed treatments are most likely to be beneficial when you plant soybean early for your region in wet soil conditions. Early planting can increase the risk of encountering wet, cool soil conditions that favor seedborne and soilborne pathogens (infection).
- **Seeding rate.** The benefit of a seed treatment is most evident when you plant at a reduced soybean seeding rate (140,000 seeds per acre or less). In many regions, the minimum plant stand for highly productive soils is 100,000 plants per acre. Because farmers want to minimize input costs while maximizing yield, they may reduce their seeding rates and use seed treatments to help protect the stand.
- **Yield basement.** Seed treatments can raise the yield basement (less downside risk) compared to untreated seed across lower populations/stand counts



Figure 2. Seeding rate will influence the decision of whether to use a soybean seed treatment.

Additional Risks to Consider

Repeatedly using products that have the same pesticide mode of action can lead to less sensitive or resistant insects and pathogens over time. Using integrated management strategies can help reduce the need for seed treatments, which reduces selection pressure on insects and pathogens.

Additionally, there is an economic risk to using seed treatments, because they are an added expense and may not provide an economic benefit in all fields. Carefully weigh the costs and benefits of seed treatments and consider fields and conditions before deciding on any seed treatment.

Bottom Line

Taking good field history notes and getting an accurate diagnosis of pest problems can help you make decisions about whether or not you need seed treatments in a given field and which seed treatments are most likely to provide a benefit. You should explore the seed treatment options available to you.

Every year, the North Central Regional Committee on Soybean Diseases (NCERA-137) updates a publication that rates fungicide seed treatment efficacy. It is available from Take Action, iwilltakeaction.com. The Take Action for Fungicide Resistance also produces



Table 1. Risk factors that influence the need for soybean seed treatments.

Parameter	Risk	Factors to Consider
Conservation tillage	<ul style="list-style-type: none"> Reduced tillage increases disease risk 	<ul style="list-style-type: none"> Planting in warmer soils with conservation tillage reduces disease risk
Residue and decomposing organic matter	<ul style="list-style-type: none"> Increased residue levels increase disease risk High levels of decomposing organic matter increase insect risk 	<ul style="list-style-type: none"> Planting in warmer soils reduces disease risk Planting in warmer soils increases insect risk
Planting density	<ul style="list-style-type: none"> Lower plant population densities increase stand establishment risk 	<ul style="list-style-type: none"> Nematodes have a greater impact on yield during dry years
Field history	<ul style="list-style-type: none"> Fields with a previous history of disease have a higher disease risk Fields taken out of pasture or CRP have a higher insect risk, particularly wireworms and other seed and seedling feeders 	<ul style="list-style-type: none"> Obtaining an accurate pest diagnosis will help determine optimum management practices
Soybean market class	<ul style="list-style-type: none"> Insect-transmitted diseases have a greater effect in soybean grown for seed/food 	<ul style="list-style-type: none"> Planting early increases risk of insects and some insect-transmitted diseases
Planting date	<ul style="list-style-type: none"> Early planting has a higher disease risk The second-crop of double cropping system has a higher insect risk (i.e. soybean aphid) 	<ul style="list-style-type: none"> Soil temperature influences insect and disease risk
Cover crops	<ul style="list-style-type: none"> Late cover crop termination increases disease and nematode risk Some cover crop species may be pathogen hosts 	<ul style="list-style-type: none"> Soil temperature and cover crop species will influence insect, disease, and nematode risk Terminated cover crops can result in mulching soil that results in higher moisture availability and keeps soil cooler longer

ratings in *Determining Fungicide Efficacy*, available at iwilltakeaction.com/resources/fungicide-efficacy-fact-sheet.

You can review a list of insecticide seed treatment products from University of Wisconsin Extension at: ipcm.wisc.edu/download/pubsPM/2017_Whats_on_your_seed_web.pdf.

Although choice may be limited, you can select seed treatments with active ingredients that control pests in a given field and have a high probability of return on investment. Although it is easy to consider seed treatments as “insurance” for stand establishment, such a practice may not be economically viable each year, and will increase the risk that pest populations will develop pesticide resistance.

Find Out More

Other publications in the *Crop Management* series are available on the Crop Protection Network website (cropprotectionnetwork.org).

In particular, see:

- *Soybean Disease Management: Soybean Seedling Diseases* (CPN-1008)
- *Soybean Seed Treatments: Questions that Emerge When Plants Don't* (CPN-1016)
- *Scouting for Common Seed Diseases* (CPN-1001)



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