Crop Solutions that Work

May 1, 2015

SOYBEAN CYST NEMATODE PRE-SEASON CONSIDERATIONS

- ***SCN remains the most economically significant yield-robbing pathogen in soybeans.***
- ***SCN needs to be managed with good decisions BEFORE planting.***
- ***SCN population monitoring is the foundation of the management system.***
- ***Crop rotation and resistant varieties are two key cultural management tools.***
- ***Clariva and ILeVO are new crop protection tools for managing SCN.***

Soybean cyst nematode (SCN), officially *Heterodera glycines*, is the most economically significant pathogen of soybeans in the United States, accounting for an estimated 48 million bushels of yield loss annually. SCN is a microscopic roundworm that was first discovered in the US in 1954 and is now present throughout the major soybean growing regions of the US and the world.

The second stage juvenile infects the root, penetrates to the xylem, and establishes a feeding site, siphoning off plant nutrients for its own growth and reproduction. The females are about 1mm in length, lemon shaped, and noticeably smaller than *Bradyrhizobium* nodules (Figure 1). The female deposits 200-400 eggs in a sac, then dies, and her body forms a cyst, which can survive in the soil for many years and through harsh conditions. When environmental conditions are optimal for soybean growth, the eggs hatch and the life cycle is repeated.

SCN can reduce yield in an individual field by 40% or more, reducing nutrients available to the plant as well as restricting root growth and suppressing nodulation. SCN feeding injury also provides a point of entry for other plant pathogens to infect the root system, most notably Sudden Death Syndrome (SDS). While the two pathogens are not interdependent, SDS symptoms are often more severe when associated with SCN infestation. Above-ground plant symptoms with SCN are non-distinct from other many environmental causes and typically involve patchy areas of stunted plants with some mild yellowing of leaves (Figure 2). Later in the season, these areas of the field may become noticeably chlorotic and senesce early, which can be readily observed via aerial photography using a UAV.

SCN cannot be eradicated and must be managed using a systems approach, which is centered around keeping populations at manageable levels. The foundation of your SCN management program should be a routine sampling and scouting program to understand population dynamics. SCN can become established in a field and cause significant yield reductions before any above-ground symptoms appear in the plants and routine sampling is the only way to achieve early detection and trigger SCN population management strategies. Distribution of SCN is patchy within a field and populations vary by season, which makes sampling a challenge. Please see the provided references below for guidance on good sampling technique.

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SOYBEAN CYST NEMATODE PRE-SEASON CONSIDERATIONS

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Management of SCN must be done mostly BEFORE planting. Management systems employ a combination of good cultural practices, such as crop rotation, avoiding additive stressors, controlling winter annual weeds, and selecting resistant soybean varieties. Crop rotation to non-host species again works to keep populations at manageable levels by disrupting the reproductive cycle. Because cysts can survive for many years in soil, rotation alone is not an effective strategy. Any practice geared toward establishing and sustaining good plant health (e.g. maintaining fertility, avoiding compaction, controlling weeds and insects, possibly foliar fungicides) will help the plant fend off yield losses due to SCN. Most commercially available soybeans have been selected for naturally occurring genetic resistance to SCN, but the vast majority is from a single genetic source, PI88788. SCN is gradually evolving around this mechanism, so soybean breeders are increasingly turning to alternative genetic sources to keep ahead of the problem. When SCN is an issue, always make sure that you are planting a variety that is highly rated for SCN resistance. In growing environments with high SCN population pressure or resistant races, resistant varieties alone may not provide adequate control.

Fortunately, we now also have some new crop protection alternatives for SCN management. Clariva pn is a new biological seed treatment product introduced by Syngenta in 2014. The active ingredient is *Pasteuria nishizawae*, which is a bacterium that infects the nematode and provides a biological method of control. University and on-farm trials in 2014 across the Midwest showed a range of yield responses, but the most consistent and value-added response was in situations with high SCN pressure and high yield potential. Again, knowing your SCN populations in your fields will help you position the product where it most likely to provide return on investment. Another new alternative for 2015 is ILeVO from Bayer CropSciences, which uses the fungicide active ingredient *fluopyram* to very effectively target SDS. This chemistry also has the supplemental benefit of nematicidal activity for up to 30 days in the soil surrounding the root, possibly preventing the root feeding point of entry for SDS in the critical early development period of the soybean.

Both of these products are new to the market and would make excellent candidates for on-farm discovery work. Agronomy Services will be collaborating with the Seed Division in 2015 to provide a limited amount of complimentary product on a first-come, first-served basis in exchange for participation in standardized strip trials. Contact your Field Sales Agronomist TODAY if you are interested in participating.

1. American Phytopathological Society
   http://www.apsnet.org/edcenter/intropp/lessons/nematodes/pages/soycystnema.aspx
2. Iowa State University
   http://www.plantpath.iastate.edu/scn/
3. University of Nebraska-Lincoln
   http://nematode.unl.edu/scn/scnisu.htm

CONSIDERATIONS FOR DELAYED HERBICIDE BURNDOWNS

- ***Weather delays are resulting in larger, tougher weeds.***
- ***Observe label restrictions with growth regulator herbicides, or risk crop injury.***
- ***Watch out for glyphosate-resistant giant ragweed.***
- ***Scout fields to determine the weed spectrum and the best herbicides to use.***

While the old saying of "April showers bring May flowers" may hold true this season, our early April precipitation is certainly slowing down many essential field operations. While all these operations are vital to the successful production of our corn and soybeans, herbicide burndown is a task that may get moved towards the bottom of the list. The delay in herbicide burndown in our row crops can cause a few concerns, including larger weed size. As we all know, larger weeds are typically more difficult to manage. Increasing the herbicide rate to deal with these tall weeds is sometimes an option, but not always.

Due to the potential of a compressed spring, we need to be conscious of the label restrictions for growth regulator herbicide applications prior to soybean planting. Planting of soybeans must be delayed at least 7 days after an application of 2,4-D ester (3.8 lb. ae) at the one pint per acre rate to reduce the risk for seedling injury. If increasing the application rate of 2,4-D ester beyond 1 pint per acre to manage broadleaves, soybean planting must be delayed 15 days.

With dicamba (4 lb. ae/gal), the delay in planting must be increased from 14 to 28 days when increasing the use rate from 8 to 16 oz./acre. In addition, the dicamba label requires 1" of rainfall prior to planting. When these waiting periods are taken into consideration, growers may choose to not increase their usual use rate for the growth regulator herbicides. Therefore, additional herbicides may need to be added to the tank to achieve satisfactory weed control of taller weeds.

Weed spectrum should also be considered when faced with the possibility of a delayed burndown application. Many of our winter annual weeds have been in the field since September, but we might also have some newcomers out there. Some of our early germinating summer annuals, such as giant ragweed, may now be emerging and growing. Giant ragweed is especially a concern in burndown situations where only glyphosate is used.

Winter annual weed growth in spring

Glyphosate-resistant giant ragweed has been confirmed in 12 states, including Indiana, Iowa and Wisconsin. In areas where glyphosate-resistant giant ragweed is present, a herbicide featuring a different site of action should be added to the burndown herbicide tank mix to successfully manage this weed. While Illinois has not yet reported a case of glyphosate-resistant giant ragweed, caution should be taken when ragweed is present. Even in susceptible giant ragweed populations, the addition of another effective site of action will be beneficial in delaying the evolution of glyphosate resistance.

Giant Ragweed emerged in Springfield, IL. April 8, 2015

Regardless of whether or not the weather will delay burndown herbicide applications, it is still imperative that we first scout fields to determine the weed spectrum we will need to manage in these fields. We then need to be certain to follow herbicide label directions in order to successfully manage the weeds that are present in the fields, while ensuring limited crop phytotoxicity.

MAXIMIZING WINTER WHEAT YIELDS DEPENDS ON TIMELY SPRING MANAGEMENT OF DISEASE

Wet, cool weather and soft soil conditions have delayed normal spring management activities for winter wheat. As daytime highs move into the upper 60s and low 70s with continued wet weather,, the risk elevates for foliar diseases like powdery mildew, septoria, and rusts. Foliar diseases can cause yield losses of 10-30% under such conditions. Preventative applications during the early vegetative stages may help suppress inoculum load, which will help protect the flag leaf. And flag leaf protection is critical, as the two uppermost leaves are responsible for the photosynthetic activity that drives head fill. Fortunately, we have a very effective set of fungicide tools to control foliar diseases in wheat, if they are applied timely.

The principles of Integrated Pest Management always apply: disease development requires a susceptible host, a pathogen, and favorable environmental conditions. The decision to control must weigh the economics of the crop, the expected yield loss, and the cost of the controls to be used. Here are some factors to consider when evaluating fungicide applications for foliar disease in winter wheat:

Weather Forecast. If weather conditions from mid-April through mid-May are expected to remain wet, with rainfall on 2 or more days per week and daytime highs between 68-80 F, conditions will favor the development of foliar disease.

Cultural Practices. Nitrogen fertility programs geared toward high yields, fields with a history of foliar disease issues (inoculum present), rotations following corn or double-crop soybeans, and susceptible varieties all increase the risk for foliar disease issues.

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Disease Prevalence. Weekly scouting should begin at Feekes 4 (jointing stage) to check for the type of diseases present and whether those diseases are increasing in prevalence in the lower leaves. This is also a good opportunity to check for weed pressure and insects, most notably aphids.

Value of the Wheat Crop. High yield potential, wheat used for seed production, and higher market prices all drive economics toward a decision to apply fungicide.

Strobilurins and triazoles or combination products are very effective at controlling foliar diseases in wheat. Common product choices would include: Caramba, Tilt, Folicur, Headline, Stratego, Quilt, and Twinline. Fungicide efficacy ratings for disease control in wheat are provided in the reference below from Purdue, which may help tailor your recommendations. If herbicide application has been delayed and not yet applied, the herbicide pass may provide an opportunity to tank mix fungicide. If foliar disease pressure is low early, then target growth stage Feekes 8 (flag leaf emergence) for a fungicide application. If disease prevalence is high or increasing rapidly, an early season application may be warranted to keep inocolum load in check. Remember to manage fungicide resistance by rotating chemistries from year to year in the same field. Refer to specific product labels for use precautions and restrictions. Remember, strobilurins should NOT be applied after Feekes 10.5 (head emergence) or to control head scab (fusarium head blight, FHB) due to the increased risk for vomitoxin accumulation in the grain. Products containing solely triazoles, like Prosaro, are the products of choice for controlling FHB and are applied later at Feekes 10.5.1. FHB will be addressed in a separate article.

Reference: https://www.extension.purdue.edu/extmedia/BP/BP-162-W.pdf