Soybean Cyst Nematode (SCN) Management Recommendations for Delaware

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SCN Resistant Varieties. Using resistant varieties is an essential tool and the most economical means of managing SCN. Although some of the early resistant varieties in the 1980's did not perform as well as elite susceptible varieties, newer resistant varieties that can be grown here do not suffer the same yield penalty. In non-infested fields it is common for modern SCN resistant varieties to do as well or better than susceptible varieties in university variety tests. Most if not all of the Roundup Ready soybean varieties that are available from all the seed companies have PI88788 in their background. It is the major source of resistance to SCN for the last 25 years. It was very effective against the common races of SCN in the past and its resistance was easily incorporated in new varieties. In fact, there are few modern soybean varieties without SCN resistance.

There has always been a range of effective SCN resistance in soybean varieties due to differences in breeding programs which have used a handful of resistance genes from PI88788 as the basis for their breeding programs. This has resulted in different levels of resistance although all are listed as resistant to race 3, or race 3 and 14. If continuous resistant soybeans are selected as the major control measure, it is important to remember that resistant varieties are still attacked by the nematode. They are resistant because they prevent or limit nematode reproduction, but the nematodes can enter the roots and cause damage. Some reproduction can occur. They will still yield better than a susceptible variety. Periodic monitoring of egg numbers is important to detect any shift in SCN races. A recent survey demonstrates that SCN populations have adapted to soybean varieties with resistance from PI88788 here in Delaware and similar studies have shown the same shifts in other parts of the U.S. as well. Despite the high reproductive potential of these current SCN populations and the yield limiting effect they could have under optimum conditions for yield reductions (high initial SCN egg numbers and dry weather early in the growing season) we can expect to see differences in impact among the currently available soybean varieties. Selecting the best resistant variety is not easy because of a general lack of industry standards for developing and marketing SCN-resistant varieties. For help with selecting SCN resistant varieties go the University of Illinois 'VIPS' website (http://www.vipsoybeans.org) that can help determine the level of resistance for many soybean varieties sold in Delaware. Excellent information is also available from many of the large seed companies as well.

Ideally the approach to retain the usefulness of SCN resistant varieties would be to rotate varieties with different sources of resistance eg. PI88788, PI437654, and Peking. This would slow the adaptation of SCN populations to the current sources of resistance; however the availability of other sources other than PI88788 is extremely small to non-existent. Until varieties are developed with resistance from other sources growers are going to have to implement the next best thing which would be growing different SCN resistant varieties each year. Basically the recommendation is to **not** plant the same SCN resistant variety two or more times in a row. This approach has shown to be useful by research conducted in Illinois and Missouri. Regardless of the situation, however most resistant varieties will out yield an SCN susceptible variety if SCN populations exceed the damage threshold.

Susceptible varieties: Never plant susceptible varieties without first taking a nematode soil test. Never presume that your control program has reduced the numbers to a safe level. If SCN is not detected or is at very low levels, susceptible varieties can be grown for one season. Planting susceptible varieties in rotation with non-hosts or resistant varieties can prevent race shifts according to some nematologists. In the sandy soils of Sussex and Kent counties, planting susceptible varieties in an SCN-infested field may be possible once every three or four years if SCN egg counts are low prior to planting.

Rotation: Crop rotation is beneficial for profitable soybean production and can significantly reduce SCN populations. Alternating non-host crops with

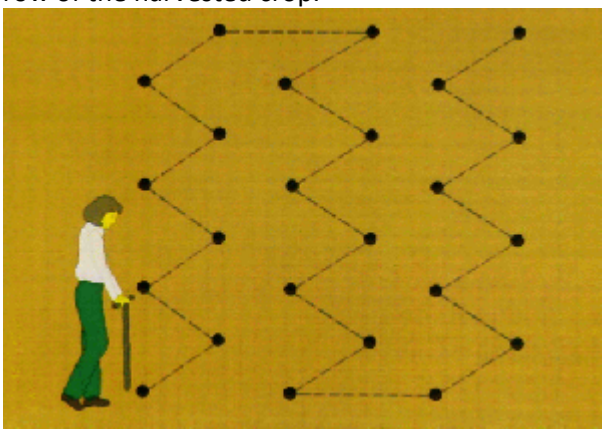
different SCN-resistant varieties is the basis of an effective, long-term SCN management program. Planting a non-host crop such as sorghum, corn, sunflower, forage grasses, or vegetables (except snapbeans) will reduce SCN populations. Small grains, although non-hosts, are not considered to be rotation crops since they are not growing when SCN is active. However, small grains can help reduce SCN populations, because the soybeans planted behind small grains usually are exposed to fewer SCN at planting and allow less time for SCN reproduction. SCN numbers in a field decline faster when the grower uses non-host crops instead of planting resistant varieties. Two or more years of using non-host crops and/or resistant varieties may be needed to reduce SCN populations to manageable levels depending on the starting populations and the growing conditions during the season.

Cultural practices. Providing a crop with the best possible growing conditions will reduce stress and limit yield loss due to SCN. Maintain optimum soil fertility to optimize plant growth and development. Control weeds and other pests to reduce overall plant stress. There is some evidence that wheat residue can somewhat limit SCN reproduction when soybeans are double-cropped behind wheat. Because this effect is not evident until the end of the season, damage to soybean plants will still occur if SCN levels (at planting) exceed the damage threshold. However, the so-called "residue effect" may help in the long term management of SCN by keeping populations in a field lower than they otherwise would be (in the absence of wheat residue).

Chemical control. Nematicides are not economically feasible nor as effective as rotation and planting resistant soybeans. For these reasons, nematicides are generally not recommended. It could be a "last resort" effort under special circumstances but would be very costly and results can be inconsistent.

Soil Sampling

The best way to confirm an SCN infestation is to sample soil when symptoms are first seen. Or, if the white or yellow females are not observed, at the end of the season once the crop is harvested. The Nematode Assay Program provided by Delaware Cooperative Extension can provide this information. Sample submission forms are available online at http://ag.udel.edu/plantclinic . At the site go to the sidebar on the left and select the form. Soil sample bags for nematode assays are available for $10.00 in-state and out-of-state from county Extension offices. Checks should be made out to the *University of Delaware*. Fall is the best time for nematode sampling. Sample after fall harvest but before fall tillage. Take 20 to 30 soil cores between plants in the row of the harvested crop.



Soil sampling pattern for survey sample after fall harvest.

In areas of the county known to have SCN infestations, do not plant susceptible varieties without first taking a nematode soil test. Fortunately, SCN can be found at any time of the year as long as the soil is not frozen, too wet, or too dry.

For fields known to be infested, monitor nematode numbers by taking nematode samples in the fall following harvest. Routine monitoring of SCN egg numbers can indicate the effectiveness of your management plan. This is very important when resistant varieties are used almost exclusively. Increases in egg numbers following a resistant variety could indicate that SCN populations are shifting.

If you have egg counts and are planting susceptible varieties you can expect potential yield losses from 5% to more than 60% when egg levels per ½ pint of soil increase from 500 to more than 5,000 eggs. It is very difficult to predict potential yield losses when planting resistant varieties, but numbers exceeding 5,000 would likely cause some yield loss.

SCN can be managed, but not <u>eradicated.</u>

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