The Sting Nematode

Douglas J. Jardine
Extension Specialist, Plant Pathology
Timothy C. Todd
Nematologist, Plant Pathology

Cooperative Extension Service, Kansas State University, Manhattan, Kansas

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Sting nematodes *(Belonolaimus* spp.) are native to sandy soils in much of the southeastern and Midwestern United States. In Kansas, these nematodes are associated with the deep, sandy soils of the flood plain of the Arkansas River and its tributaries in the southwestern and south central regions of the state. Most agronomic, fruit, and vegetable crops are hosts for the nematode, but in Kansas, damage is more commonly observed on irrigated corn, sorghum, and soybeans. Yield losses can be severe, approaching 100 percent in localized areas of infested

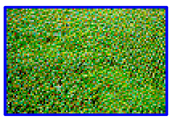
Figure 1. Typical stunting of corn caused by the sting nematode.

The Nematode

The sting nematode is a microscopic roundworm averaging about 1/12 inch in length. It is found almost exclusively in soils with a sand content of 80 percent or higher and thrives best in irrigated cropland where there is a constant supply of moisture. Sting nematodes do not enter plant roots'. All life stages remain in the soil, feeding at or near root tips. Even small populations can cause serious damage because of a powerful toxic chemical injected into the roots during feeding *Figure 2).*

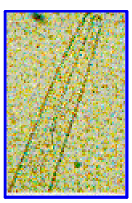
Figure 2. Greatly enlarged adult female sting nematode showing slender, elongated stylet (center) used for reaching deep inside root tissue.

Symptoms

Primary damage from the sting nematode is to the roots of the plant. The degree of injury to the roots varies with the age of the plant when attacked. Symptoms are most severe when the feeding occurs during the first few weeks after planting.

In general, symptoms consist of greatly reduced root systems with short, stubby roots having dark, shrunken lesions, particularly at the tips. If the root tip is destroyed, new roots may be produced above the damaged area, resulting in a highly-branched appearance *(Figure 3).* Plants which are not severely damaged by the initial feeding may recover and produce near-normal yields under optimum growing conditions.

Table 1. Host plants for the sting nematode.

Crops	**Forages**	**Weeds**	**Others**
corn	pearl millet	morning glory	bentgrass
sorghum	fescue	crabgrass	tomato
soybean	white clover	johnsongrass	potato
wheat	crimson clover	sorrel	peppers
oats	ladino clover	wild carrot	peach
barley	Kobe Iespedeza	ragweed	elm
rye		cocklebur	pecan
peanuts			Bermuda grass
			strawberry

Field symptoms usually consist of severe stunting, wilting, yellowing, and sometimes death. Infested areas consist of spots that vary in size and shape, but the boundary between diseased and healthy plants usually is fairly well defined *(Figure 1)*.

Other field problems can mimic sting nematode symptoms. These include damage from two other nematodes, the stubby-root nem*atode (Trichodorus and Paratrichodorus* spp.) and the stunt nema*tode (Tylenchorhynchus spp.)*. While both of these nematodes will cause root pruning, neither produces the root lesions characteristic of the sting nematode. Dinitroaniline herbicides such as trifluralin can also produce a root pruning similar to sting nematode damage *(Figure 4)*, but, again, root lesions will not be present.

Sampling Sting Nematode/Populations

Populations of sting nematodes may be distributed unevenly in the soil profile, due partly to downward movement of the pest as plant roots penetrate deeper in the soil. In Kansas, numbers of sting nematodes at standard sampling depths (the top 6 to 8 inches of soil) typically peak 30 to 45 days after planting. During the remainder of the growing season, nematode populations decline steadily and may not be easily detected by harvest. Therefore, the optimum time to sample for this nematode is when damage is first noticed on seedling crops.

Due to the severity of the damage caused by the sting nematode (especially to corn), detection of the nematode's presence in a field is more critical than the determination of actual numbers. Any number is a potential threat to crop production.

Complete guidelines for collecting soil samples for nematode assay are available at local Cooperative Extension Service offices.

Control

Crop rotation has some potential for reducing sting nematode problems. Rotation schemes must be selected carefully, however, because the nematode's wide host range includes many weed and grass species *(Table 1)*. Research has indicated that soybeans, while susceptible to sting nematodes, are better at compensating for such damage than corn (at low to moderate nematode levels), resulting in relatively less yield loss. In addition, soybeans and alfalfa appear to support lower populations of sting nematodes than either corn or sorghum *(Table 2)*. Conclusive information on yield or stand reductions due to sting nematodes is currently unavailable for alfalfa.

While wheat is an excellent host for the sting nematode, the crop can sometimes be grown successfully in infested fields by taking advantage of the natural population cycle of the nematode. In the fall when wheat is planted, nematode numbers in the upper soil profile are generally at their lowest point. This should always be confirmed by a nematode assay of the field.

By the time nematode populations increase in the spring, the wheat has made enough growth to withstand most of the damage. Because the nematode reproduces extremely well on wheat, planting a susceptible crop following wheat, especially if it is double-cropped, could lead to significant yield losses.

The most effective control currently available for the sting nematode is an at-planting application of a labelled nematicide. Impressive yield increases have been obtained with nematicide applications to sting nematode-infested corn fields in Kansas *(Table 3)*.

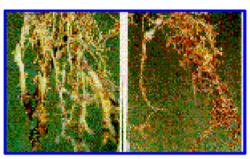

Figure 3. Roots of corn (left) and soybean (right) with severely pruned roots caused by the sting nematode.

Table 2. Comparison of sting nematode populations on four crops and in followed soil at Hutchinson, Kansas, 1989.

	Number of nematodes /100 cm3 soil		
Cropping system	**May**	**June**	**Oct**
	12	**8**	**17**
Alfalfa	20	12*	0*
Corn	25	27	6
Sorghum	25	38	15
Soybean	31	27	1*
Fallow	23	13*	0*

Table 3. Effect of selected nematicides on sting nematode populations and corn yields-Garden City, Kansas, 1984-1985.

Nematicide*	Rate lb/A	%Reduction in nematode Population	Yield Increase	Chemical Cost/A Bu/A
Counter 15G	6.67	79	20	$ 11.00
Counter 15G	13.33	85	24	$ 21.00
Furadan 15G	6.67	34	2	$ 9.00
Furadan 15G	13.33	48	9	$ 18.00

It is important to note, however, that reduction in nematode populations due to nematicides are temporary, and populations often return to pre-treatment levels by the end of the season. Remember also that a crop grown in an infested field treated with a nematicide will probably still not yield as well as the same crop would if grown in the complete absence of the nematode. Proper soil fertility and water management are also necessary to realize the maximum benefit (yield increase) from a nematicide treatment.

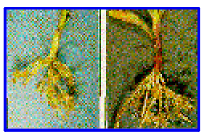

Figure 4. Comparison of root damage to corn from the sting nematode (left) and trifluralin (right).

Contact your local county Cooperative Extension Agent for current nematicides and rates recommended in Kansas.

Cooperative Extension Service, Manhattan, Kansas

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