ENY-001

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Field Corn Nematode Management [1]

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Nematodes That Attack Field Corn

Several nematode species are known to damage field corn in Florida. The most important is the sting nematode (*Belonolaimus longicaudatus*) whose distribution is limited to very sandy soils such as those typical of peninsular Florida. Stubby root (*Paratrichodorus* spp.), lesion (*Pratylenchus* spp.), lance (*Hoplolaimus* spp.), and root-knot (*Meloidogyne* spp.) nematodes may also affect field corn growth. Yield reductions by most kinds of nematodes parasitizing field corn are usually severest in the sandiest soils and in times of drought. Generally, well-irrigated field corn helps to overcomes nematode predation.

Diagnosis

The presence or potential for nematode problems in cotton could be suggested by one or more of the following: 1) Cropping history of the field, e.g. two or more years production of corn, grass crops or equally nematode-susceptible crops; 2) Above-ground symptoms including off-color and/or stunted corn in spots or large areas of a field; 3) Below-ground symptoms such as small knots on roots or stunted and swollen root tips.

Foliar Symptoms

Above-ground symptoms of nematode injury include stunting, thin stands, premature wilting under moderate heat or drought stress, and nutrient deficiency symptoms. Since nematode numbers can vary greatly within very short distances in the field, areas of stunted growth, yield reduction, and other above-ground symptoms of nematode damage vary greatly in shape, size, and distribution. Symptoms and yield loss are worse in soils that are sandy, dry, and infertile.

Root Symptoms

All nematodes affecting field corn reduce feeder roots and produce root stunting, but nematodes may differ in specific symptoms on roots. Roots should not be pulled but rather carefully dug with a shovel for examination of nematode damage symptoms. Roots injured by sting and stubby root nematodes are usually stunted, often with few fine secondary feeder roots. Root tips may be blunt and swollen. Sometimes tufts of many stunted lateral roots emerge near the main root tips. By damaging root tips as soon as they emerge, both sting and stubby root nematodes can be especially injurious to young seedlings. Even under

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moderate stress, nematode-damaged roots may cause young plants to die, resulting in a thin crop stand. Root-knot nematodes produce very small galls on field corn roots and can be overlooked. Damage from root-knot nematodes frequently occurs early in the season, and galling can sometimes be difficult to assess. In addition, all nematodes affecting field corn produce root symptoms similar to root pruning from some preplant herbicides. Both possibilities of damage from nematodes and herbicides must be assessed to correctly identify which problem exists.

Nematode Assays

Nematode problems of field corn can be determined only by nematode assay. Prior to taking samples, contact your county extension agent for information concerning available sampling tools, shipment bags and proper procedures for submitting samples. Samples should not be taken when the soil is dusty dry or soggy wet. Two sampling strategies may be employed. A general survey should be performed every two to three years and soil samples should be taken soon after field corn has been harvested. A soil core (1-inch wide by 8-10-inches deep) should be taken for every acre in a 10-acre block containing a uniform soil type and cropping history (Figure 1). The cores should be thoroughly mixed and a 1-pint sample extracted and placed in a sealed plastic bag and kept cool (not frozen) before immediate shipment to an advisory laboratory. As possible, live roots or root fragments should be included in the soil sample. Taking nematode samples at the time of sampling for soil fertility is most convenient for many growers. The samples may be split for nematode and fertility analyses, however, special care is needed not to let nematode soil samples dry-out. In a more definitive sampling strategy where a nematode problem is suspected, several soil cores from within and immediately around a poor growth site should be taken while the crop is still growing. Include portions of damaged roots with the soil sample. These samples should be as described above.

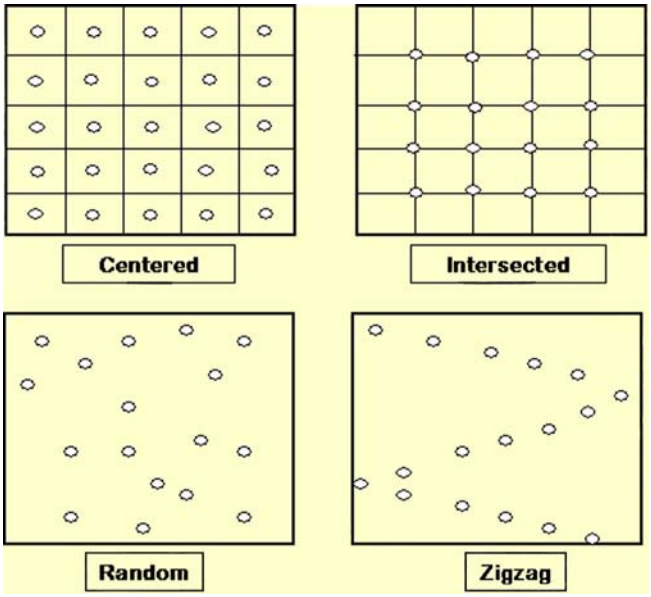

Figure 1. Ten acre sampling patterns. Take 15 to 20 cores.

Nematode Management

Crop Rotation

Crop rotation is an excellent practice for managing nematode soil population densities under seasonally planted crops. Rotations should include crops that are non-hosts or poor hosts of the problem nematode infesting the soil. Identification of the nematode species is critical since it will dictate the choice of rotation crop and length of rotational interval required. One year of a summer planting of a non-host crop is not usually sufficient to reduce populations of sting and root-knot nematodes to below damaging soil population densities. The worst nematode problems occur in fields where field or silage corn and/or close relatives such as sorghum have been grown every year. Hence, crops in the grass family, with the exception of bahiagrass, should be avoided since most are good hosts to sting and stubby root nematodes. Peanut and tobacco are non-hosts to sting and stubby root nematodes and are recommended in rotation sequences. Many varieties of soybean and some vegetable crops (tomatoes, southern peas) have been bred for resistance to root-knot nematodes and these varieties can be successfully used in rotation systems to manage root-knot nematodes in field corn. Unfortunately, none of these have resistance to sting or stubby root nematodes.

Crop Destruction and Weed Management

Roots of many crops survive a long time after harvest. In years when there is a delay in the onset of cool soil temperatures (<59°F), nematodes can feed and reproduce on these and on newly thriving weed roots. This increases nematode soil population densities surviving through to the next planting season. Therefore, destroying any living crop plants and weeds after harvesting crops is important to reduce nematode breeding sites. In particular, nematode weed hosts tend to grow profusely after a single crop of field corn and should be managed to deny reproductive sites for nematodes. Consequently, use of winter cover crops is helpful to provide competition against weeds and also the cover crop planting process helps destroy those weeds growing in the fall. The cover crop must be a poor or non-host of the problem nematode. Winter cereals are most suitable for managing root-knot nematodes in this regard but are not effective for soils infested with sting or stubby root nematodes.

Use of crop rotation systems that include bahiagrass are increasing, and this perennial grass is a non-host for nematodes affecting field corn. However, weeds must be managed in the bahiagrass or nematode populations will be maintained in such a system resulting in damage to the following corn crop. A two-year bahiagrass rotation will suffice to manage plant-parasitic nematodes in a future corn crop providing weeds (mainly grasses) are controlled early and regularly in the first year bahiagrass and this continued through the life of the rotation.

Nematicides

Several nematicides have been approved for management of nematodes of field corn (Table 1). A recommendation for their use is problematic due to the low monetary profit from this crop. If an irrigated field realistically can be expected to produce a profitable seed or silage yield, growers must consider that nematicides may only help recover some portion of the original potential yield that would be lost to nematodes.

Table 1. Nematicides that may be used for the management of nematodes on field corn.

Nematicide[1]	Product Rate/Acre	Application[2]
Counter CR	5.4 lbs./A	6 oz. / 1000 ft. row applied in a 7-inch band and incorporated before planting. Do not exceed 6.5 lb. / acre, regardless of row spacing.
Mocap 15 G	7.3 lbs./A	8 oz. / 1000 ft. row in a 6-7 inch band over a closed seed furrow and incorporated. Prevent direct contact with seed or phytotoxicity may occur.
Mocap EC	1.3 qts./A	2.9 fl. oz/ 1000 ft. row applied in a 12-15 inch band and incorporated. Prevent direct contact with seed or phytotoxicity may occur.
Telone II	3.0 gals./A	28 fl. oz. / 1000 ft. of row/outlet via single chisel to a soil depth of 12-14 inches.

[1]Please consult labels for pesticide handling and use restrictions.
[2]Application rates based on a 36-inch-wide row spacing.