

Nematodes

Several species, primarily sting [*Belonolaimus species*], stubby-root [*Trichodorus species*], and lance [*Hoplolaimus species*]



SYMPTOMS

Nematodes are microscopic, worm-like organisms that feed on the roots of all plants, including turfgrasses. They are usually grouped with turfgrass diseases because of their microscopic size

and because their symptoms often resemble those caused by fungal diseases. Nematode feeding causes a variety of symptoms on turfgrass roots, including stunting, clubbing, lack of branching, dieback, and rot. The above-ground symptoms of nematode feeding are slow growth, thinning of the turf, poor response to adequate fertilization and irrigation, rapid wilting during dry weather, and weed invasion. These symptoms typically appear in irregular patterns across the turf stand, not in circular patches or other distinct patterns. By the time the above-ground symptoms of nematode injury appear, significant damage to the root system has already occurred. A preliminary diagnosis can be made by comparing the root system in core samples from healthy and affected areas. For a definitive diagnosis, submit a soil sample for analysis of nematode populations, since nutritional or other cultural problems may cause similar symptoms. There are about 12 nematode species that are known to damage turfgrasses in North Carolina. Some species are more damaging than others, so each species has a unique threshold, or number of nematodes per volume of soil at which control practices are needed.

Characteristic	Description
Host Grass Species	all turfgrasses; especially those grown in sandy soils
Month(s) with symptoms	spring and fall for cool season grasses, mid-summer for warm season grasses
Stand Symptoms	irregular distribution across turf stand, slow growth, thinning of the turf, rapid wilting during dry weather
Foliar Symptoms - Location/Shape	dieback from leaf tip
Root/Crown Symptoms	stunting, clubbing, lack of branching, dieback, and rot

FACTORS AFFECTING DISEASE DEVELOPMENT

Nematodes grow and reproduce best in light, sandy soils. Turfgrasses growing in sand are also less tolerant of root damage, because these soils are low in nutrient and water holding capacity. Soils with significant amounts of silt and clay are not devoid of nematode problems, however, as certain species are able to thrive in these soils. Above-ground symptoms of nematode injury are most prevalent during times of stress or on turf that is under-irrigated or under-fertilized. Nematodes are able to grow over a wide range of soil temperatures, from 50 to 80°F. Because plant roots are the only source of food for nematodes, their growth closely matches the growth of the turf roots. Nematode populations in warm-season grasses peak in mid-summer, and populations in cool-season grasses peak in the spring and fall. Nematodes are fairly immobile in soil and their spread is mostly through movement of soil and plants by man or the elements.

CULTURAL CONTROL

Make sure that the problem is due to nematode injury by taking a representative soil sample from the affected area and submitting it to a laboratory for analysis. North Carolina residents can submit samples to the [North Carolina Department of Agriculture](#) for analysis of nematode populations. Samples, consisting of 12 to 15 soil cores approximately 4 inches deep, should be taken from the edge of the affected area. The sample must not be allowed to dry or be exposed to extreme heat, otherwise nematodes will be killed and an accurate count cannot be obtained. A separate set of soil samples should also be submitted for chemical analysis to determine if any nutritional deficiencies or imbalances exist.

Selection of a well-adapted turfgrass species is an important first step in nematode management. For example, centipedegrass is more susceptible to the sting nematode than bermudagrass or bahiagrass. Therefore, bermudagrass would be the best choice for use in residential lawns where high quality turf is desired if irrigation is available. Zoysiagrass has been observed to be very sensitive to damage from sting nematodes and would not be a good replacement for centipedegrass in sting nematode infested soil. Bahiagrass may be the best choice for low maintenance lawns and in large commercial landscapes in eastern North Carolina. Very little damage from nematodes has been observed on this turfgrass species.

Proper turfgrass management practices will help to overcome a certain amount of nematode injury. When symptoms from nematode injury appear, apply low rates of fertilizer and irrigation on a frequent basis to compensate for the shallow root system, but do not increase the total amount of fertilizer or water applied to the turf. Incorporation of organic matter, such as peat or compost, into the soil may help to reduce nematode populations and increase the turf's tolerance to nematode feeding.. In landscape and utility turf situations, these are the only practical means of nematode management, as nematicides are not registered for use in these areas.

CHEMICAL CONTROL

Nematicides may be used on golf courses and sod farms when nematode populations exceed threshold values. Nematicides are very toxic to humans and the environment, so label directions should be followed closely if and when they are used.

Links in This Publication:

North Carolina Department of Agriculture: <http://www.agr.state.nc.us/agronomi/nemhome.htm>

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