

## Questions and Answers about Nematode Parasites of Turfgrasses

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**Q: What are nematodes?**

A: Nematodes are minute round-worms, not closely associated with other forms of animal life found in turf.

**Q: How big are nematodes?**

A: Plant parasitic nematodes are very small and generally range from about 1/64 to 1/8 inch in length, but are usually very thin and cannot generally be seen without magnification.

**Q: How many different kinds of nematodes are there in turf?**

A: There are many kinds of nematodes that feed on bacteria, and others that feed on fungi. Some nematodes in turf are predatory, attacking small soil-borne animals including other nematodes. In addition, there are many common species of plant-parasitic nematodes present in the turf. The common names of a few of these are stunt, lance, spiral, ring, lesion, stubby root, and pin nematodes. Within the stunt nematode category are at least three species that attack turf grasses.

**Q: How do plant parasitic nematodes feed on turf?**

A: Plant parasitic nematodes feed by means of a hollow stylet (spear). Through this hypodermic-like spear, they suck the pre-digested cell contents from the roots of plants. Root tips, root hairs, epidermis, or inner tissues serve as sites of feeding for various types of nematodes. Some nematodes attack stems and seed heads.

**Q: How did my soil become infested?**

A: The nematodes were in the soil prior to even planting the turf in most cases. Populations built up due to either an environmental change; a change in the susceptibility of the grass species; or possibly the nematodes, through natural selection, became more pathogenic.

**Q: How do nematodes cause damage?**

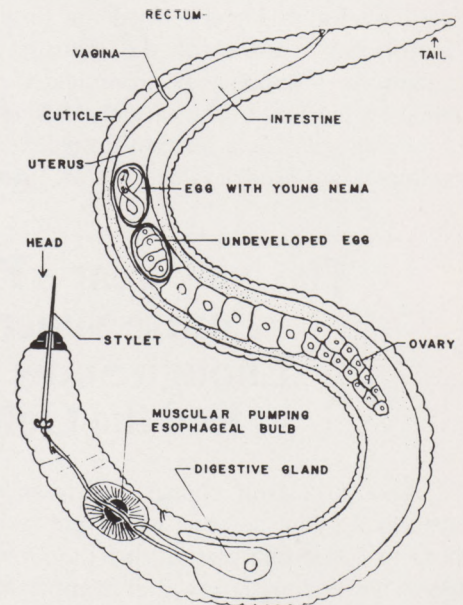
A: Nematodes cause damage in several ways. They directly destroy cells and when enough cells are destroyed, the ability of the plant to remove water and nutrients from the soil is lowered. Further root growth may be prevented. Next, nematodes may produce infection courts in plant roots either by mass cell destruction or by forcing their bodies through and between cells, thus creating tunnels through which other organisms can penetrate the plant's natural defenses. Finally, some nematodes transmit viruses and carry fungi and bacteria into wounded roots.

**Q: What kind of symptoms are observed on turf that has a nematode problem?**

A: The symptoms are those related to deficiencies in minerals and water. Symptoms such as lighter color, drought susceptibility, scanty growth, lack of vigor, and all the other common complaints have been attributed to nematodes.

**Q: What do the turf roots look like?**

A: Root growth is shallow and sparse. There is a lack of feeder roots and there may be necrotic lesions on the roots. Similarly, root tips may be stunted, malformed, or even swollen. Often roots have rot associated with them and the outer layers may slough off.



PLANT DESTRUCTIVE NEMA

### Female Plant-Parasite Nematode

Diagrammatic sketch of a typical female plant-parasite nematode showing the hypodermic-like stylet and the pumping bulb used to feed upon the roots of turfgrasses.



### Effect of Nematodes on Bentgrass Culture

Stunt nematodes reduced growth and vigor of the bentgrass culture on the left as compared with the bentgrass culture on the right which was free of nematodes.

**Q: How can I tell if nematodes are damaging my turf?**

A: You know your turf best and  
*(Continued on page 2)*



# Comments and Opinions

## Will the Real Ralph Engel Stand?

"Federal Regulations and Their Effect on the Chemical Specialties Industry" were studied in a survey of CSMA member firms conducted by the Center for the Study of American Business. Fourteen percent of the firms responding feel that EPA rules, present or future, could cause them to shut down and nine percent feel the rules might cause them to sell their businesses. CSMA President Ralph Engel termed the findings "astounding" and said they have "major implications for the industry and the country as a whole. When regulations — supposedly promulgated for the good of the nation — seriously damage a segment of the nation's business, then it's time to take a second look." Is someone playing a joke on Ralphie? Maybe I am moonlighting — maybe this explains a late issue of *Green World*. I fear some of the ad libs this will draw.

The other R.E.

## The New Year's Prayer of the Golf Course Superintendent — Enough Snow and Winter to End the Golfing Season

Tsk! Tsk! Golf course superintendents! Use of turf is the fabric of our business. In your defense, winter play is often very destructive. It probably adds more to costs than play during the growing season. So why not have a higher greens fee or charge for winter membership? Of course, it is much easier for me to say this than it is for you.

R.E.E.

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## Nematodes

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should be able to immediately drop soil compaction, poor fertilization, lack of water, chemical injury, and other problems of this nature as the cause of the damage. Second, consider the symptoms of the common turf diseases associated with fungi, bacteria, and insects and eliminate them. Finally, if the problem is persistent or recurring, root and top growth is poor, and it defies other explanations, then send soil samples to the Nematode Detection Service. Soil will be examined for plant parasitic nematodes, and the number of each kind will be counted. An answer will then be sent to you as to whether a nematode problem exists. In addition, the recommended treatment will usually be provided.

**Q: Does the presence of plant parasitic nematodes always indicate the need for control?**

A: No. Plant parasitic nematodes, when present in low numbers, usually do not cause sufficient damage to justify the cost of the control measure.

**Q: Are there optimum times for collecting samples for sending to the Nematode Detection lab?**

A: Yes. Generally during the active growing season, nematodes can be collected from soil or turf. Under drought conditions nematodes are more difficult to find and soil temperature should be a minimum of 40° F.

**Q: Can nematodes be eradicated from soil by chemical treatment?**

A. In most cases, no. It is difficult to get a 100 percent kill in soil because some nematodes can be found down deep in the soil or protected within roots where not all chemicals penetrate. Those not killed rapidly reproduce and, in approximately a year, may build up to a potential threat.

**Q: Should soil always be treated for plant parasitic nematodes?**

A. Turf should not be treated for plant parasitic nematodes unless populations are actually high enough and are damaging the grass. The cost of chemical control is high and there is no sense wasting money if no

nematode problem exists.

**Q: What are the chemicals that can be used for treating nematodes on turf?**

A: Presently only Nematicur and Dasanit are licensed for application on commercial turf. Neither one can be used on lawns or near residences. Nematicur is perhaps slightly more nematicidal than Dasanit but Dasanit costs less. Control is seldom effective for periods of over one-year duration with both compounds.

**Q: How are these chemicals best applied?**

A. Personally, I prefer to spread granules with a drop-spreader rather than use a spray concentrate. The reason is because drift is less of a hazard and since these compounds have a high mammalian toxicity, extreme care must be taken in their application.

**Q: What should the soil conditions be when applying these materials?**

A: Soil water should be at field conditions. That is the upper layers of soil where the roots predominate should be drained by gravity. A wait of several days may be necessary after a



# Steiniger Receives N.J. Turfgrass Hall of Fame Award



N.J.T.A. President Fred Eden (left) and Dr. John Gerwig (right), director of the New Jersey Agricultural Extension Service, congratulate Eberhard Steiniger of Pine Valley Golf Club upon his acceptance of the New Jersey Turfgrass Hall of Fame Award.

Eberhard Steiniger is the recipient of the 1979 New Jersey Turfgrass Hall of Fame Award. Eberhard is widely known for his many years as golf course superintendent in making Pine Valley Golf Club of Clementon, N. J., a most enjoyable landscape and mecca of golf. Eb started work on the course as a young man when the golf course was young and sand was everywhere. He attended the first turf course at Rutgers and many turf conferences of New Jersey, Pennsylvania, and the national golf course superintendents. Eb has always been a turf research enthusiast. He helped Dr. Evaul plant some of the earlier turf plots at Rutgers University, and he served on the New Jersey Turfgrass Advisory Committee that preceded the New Jersey Turfgrass Association.

Eb made some of the earliest zoysia and bermudagrass plantings in New Jersey and he can still show original plots of these grasses. He has made many trial plantings on his practice fairway and he is always generous in allowing research workers of the public or private sectors to use this site.

Eb was the official representative of the Golf Course Superintendents of America at the third International Turfgrass Conference in his native Germany in 1977.

Eberhard Steiniger is one of the men who have made turf growing a pleasure and a highly respected profession. Eb, the New Jersey Turfgrass Association, officers, and executive board members are most appreciative of what you have done. And all the fun you have given us has made the hard work of growing turf easier. Congratulations!

## Nematodes

(continued from page 2)

rain. If there is excess water in the soil when the compounds are watered in with one-half inch or more irrigation, the active ingredient will not deeply penetrate the soil. What will happen is that the nematodes will not be killed in high numbers. One indication of a bad application is when earthworms are killed on the surface of the ground. This can create other problems with additional nontarget organisms. For instance, birds may devour these earthworms and die. If birds are killed, state and federal regulations have been violated, the nematicide treatment was

a failure, and complaints may be received from persons who are using your facilities.

### Q: What compounds can be used by the homeowner?

A: There are no registered nematicides for use on home lawns by nonregistered applicators. Sarolex, a diazinon-containing nematicide, can be used on home lawns by a registered applicator. Unfortunately, the supply of Sarolex in New Jersey is either limited or nonexistent at this time. Ciba-Geigy has sub-registered Sarolex to firms in Florida and Texas, but it is not supplied to New Jersey.

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# ABSTRACT

## Effects and Treatments of Petroleum Spills on Bermudagrass Turf

D. Johns and J. B. Beard  
Agron J. 71:945-947.

A field study was conducted in Texas on "Tifgreen" bermudagrass (*Cynodon L. spp.*) to determine the injury symptoms and subsequent recovery rates from petroleum spill damage. Five petroleum products commonly used in turfgrass maintenance equipment were applied as spill treatments to the turf growing on Lufkin fine sandy loam. Injury symptoms of the turf were documented

following the three replicate spray applications of gasoline, motor oil, hydraulic fluid, and brake fluid, and following direct spreading of grease over 1 m<sup>2</sup> plots. Calcined clay fines, activated charcoal, and detergent were evaluated as potential corrective treatments. Each corrective treatment was applied within 20 minutes of each spill in three replications.

The injury symptoms varied among the petroleum spill treatments. Detergent proved effective in enhancing bermudagrass recovery (three to four weeks) from motor oil, hydraulic fluid, and brake fluid damage. None of the corrective treatments were effective on either the gasoline or grease-damaged turf. The bermudagrass recovered rapidly (three to four weeks) from gasoline spills without corrective procedures. More than ten weeks were required for recovery from grease spills.

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