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CONTROLLING NEMATODES IN THE VEGETABLE GARDEN

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Nematodes or Eelworms (25 X actual size)

Nematodes or eelworms are inconspicuous agricultural pests that may seriously injure plants or at the very least reduce yields. Often the poor yields will be passed off as "another bad year for my garden". However, the damage may well have been caused by nematodes.

Nematodes are very small worm-like animals, generally ranging from 1/64 to 1/16 inches long. The plant parasitic nematodes are divided into two groups according to the method in which they feed on plants. The ectoparasites live outside the plant roots and pierce plant tissues with a stylet or spear which then sucks out plant juices. The endoparasites actually enter the plant roots to live and feed inside. Actual damage may go unnoticed if other growing conditions are optimum. During a good growing season you may simply experience a 15-30% reduction in yield. When growing conditions are marginal such as during dry weather or following an invasion by insect pests, the added stress of nematodes may seriously injure the plants.

SYMPTOMS PRODUCED BY NEMATODES

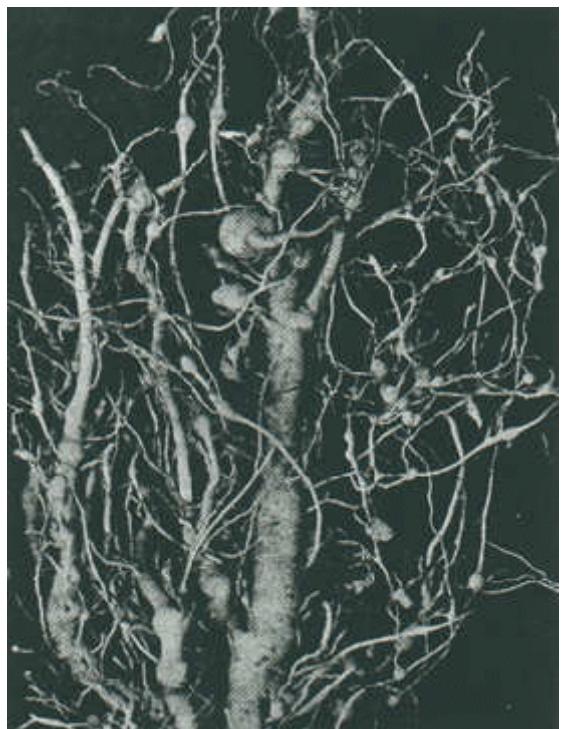
The symptoms that are likely to be found on underground parts of the plant include:

1. Root knots or galls. Galls are abnormal enlargements of the roots caused by feeding of nematodes.
2. Root lesions. These are sunken, rough, discolored areas of the roots caused by feeding of nematodes.
3. Excessive branching. Often roots may branch excessively producing a "hairy" appearance.
4. Injured root tips. Root tips may stop growing and die due to feeding by nematodes.

Feeding by nematodes will limit root growth and result in weak plants. Above-ground symptoms include slow growth, wilting, and a generally unhealthy appearance.

COMMON NEMATODES

The root-knot nematode is probably the most common, producing large conspicuous galls on tomatoes, cucumbers and



melons. Other vegetables that may be damaged include beans, carrots, okra, lettuce and sweet potatoes. The root-knot nematode lives and feeds inside the root, producing galls (endoparasite). It can seriously reduce root growth, resulting in stunted, weak plants.

Stubby root nematodes feed on the root tips without entering the root (ectoparasites). As new roots appear, these too are attacked, resulting in a small, compact root system composed of many stubby branch roots. The most susceptible crops include tomatoes, sweet corn, beans, cabbage and onions.

Many nematodes are found in the Virgin Islands that attack vegetable plants. It is often difficult to determine which nematode is doing the damage because the above-ground symptoms are similar. Since the control measures for all nematodes are the same, identification of the exact organism is not usually necessary.

CONTROL

Methods of preventing nematode damage include crop rotation, additions of organic matter, use of resistant varieties, soil fumigation and use of granular nematocides. While crop rotation is known to reduce nematode populations in vegetable fields, it is difficult to rotate in the home garden. Also, since the common root-knot nematode is known to attack over 2,000 species, rotation is difficult, if not impossible.

It has been demonstrated that additions of large quantities of organic matter to soils encourages several nematode parasitic fungi. These fungi attack many species of nematodes and may reduce the nematode population considerably. Additions of organic matter (compost, manure, peat moss, etc.) will also promote healthier plants which will be better prepared to sustain some nematode damage.

There are varieties of common vegetables that have some resistance to nematodes. When you choose varieties, look for the letter "N" with the variety name, indicating resistance to nematodes. Three tomato varieties that did well in trials conducted at the College of the Virgin Islands Agricultural Experiment Station were Better Boy VFN, N-5 and N-69. Better Boy VFN is available from several stateside seed companies. N-S and N-69 can be purchased from:

University of Hawaii
Department of Horticulture
Seed Specialist
Plant Science Building
3190 Maile Way
Honolulu, Hawaii 96822

Although crop rotation, addition of manure and the use of resistant varieties will reduce nematode damage, the only sure methods of nematode prevention are the use of soil fumigation and granular nematocides. Soil fumigation is an expensive, time consuming and somewhat dangerous procedure for the home gardener. However, it is by far the most effective means of eradicating nematodes for several years. Granular nematocides are easier to use, but must be applied annually to be most effective.

Soil fumigation requires the soil to be covered with a plastic tarpaulin and the fumigation gas to be released under the plastic. Specific directions depend on the type of fumigant employed. To be effective the soil should not be hard packed but loose and crumbly.

Soil fumigants are available from the following distributors:
Ochoa Fertilizer Company, Inc..

G.P.O. Box 3128
San Juan, Puerto Rico 00936

H. V. Grosch Co.
P.O. Box 45
402 Comercio Street
San Juan, Puerto Rico 00902

Agro Servicios, Inc.
G.P.O. Box 393
San Juan, Puerto Rico 00936

Complete instructions should be supplied by the distributor. Great care must be exercised when using fumigating gasses. **They are highly toxic and can be fatal if inhaled.** A gas mask is recommended for safety.

Granular nematocides can be broadcast over the garden and worked under the soil with a roto-tiller. These are safer to use than fumigants, however they are also toxic and must be handled with care. Actual rates and handling procedure information is available on the product label. Common nematocides for vegetables are Furadan, Mocap and Dasanit. These are available only to gardeners who have taken a pesticide training course and have received a Pesticide Applicators Certificate. Check with your Cooperative Extension Service for such training.

These nematocides must be used according to label directions. Do not use any product which is not registered for use on your specific vegetable.

Products and suppliers mentioned by name in this publication are used as examples and in no way imply endorsement or recommendation of these products or suppliers.

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