



## IFAS EXTENSION

# Nematode Assay Laboratory<sup>1</sup>

William T. Crow and Frank E. Woods<sup>2</sup>

The Florida Nematode Assay Laboratory determines the types and numbers of plant-parasitic nematodes in soil and plant samples. Based on this information a diagnosis will be made. The diagnosis is an estimation of the risk to the plant or crop indicated from the nematodes present. This service is available to the public for a fee that is currently \$12.00, although it will be increasing as of July 1, 2006. Florida Cooperative Extension personnel are not charged for samples when "trouble-shooting" plant growth problems. Complementary samples must bear the signature of the responsible faculty member and be identified as an "IFAS Service Sample" on the assay form.

Assay results are returned to the client within ten working days of receiving the sample. Results will be sent to the appropriate County Extension Faculty simultaneously (only to the IFAS Faculty member for IFAS Service Samples). If a consultant is identified on the original assay form, they will also receive a copy of the results. Assay results may be returned by either mail, FAX, or e-mail. Check the appropriate box on the top left corner of the Assay Form indicating how you wish results returned. If the crop indicated is at risk for nematode damage a publication

describing management options will accompany the results.

## Procedure

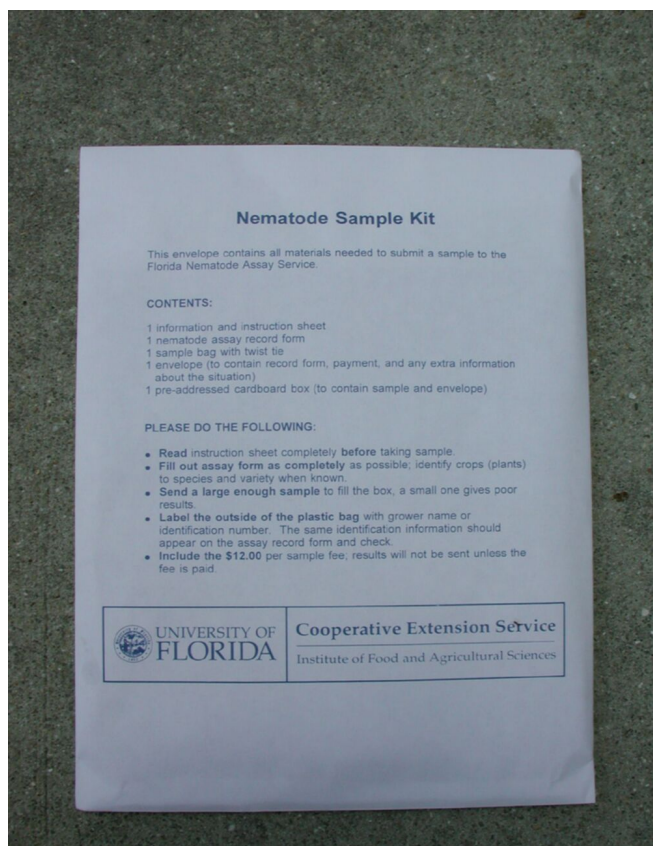
Nematode sample kits (Figure 1) are provided to County Extension Offices for distribution to clients who wish to submit nematode samples. Commercial operations using large numbers of kits may order them free by contacting the Nematode Assay Lab. The kit, contained in a 9" x 12" envelope, includes:

1. A Nematode Assay Form
2. A plastic bag to contain the sample (Figure 2)
3. A pre-addressed mailing carton (Figure 3)
4. A sheet of instructions for taking and submitting a nematode sample
5. An envelope to hold the assay form, the check or money order to pay for processing, and any further correspondence from the client.

Please fill in all of the requested information on the assay form. Without specific knowledge of the plant or crop, a diagnosis is impossible. Additional

1. This document is ENY-027 (SR011), one of a series of the Entomology & Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Published: September 2001. Revised: December 2005. For more publications related to horticulture/agriculture, please visit the EDIS Website at <http://edis.ifas.ufl.edu/>.

2. William T. Crow, assistant professor and Frank E. Woods, senior biologist, Department of Entomology and Nematology, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.



**Figure 1.** Nematode sample kits are available at your county Extension office, or can be ordered from the Assay Lab. Kits contain everything needed for a nematode sample and instructions.



**Figure 2.** Nematode samples must be kept in a sealed plastic bag to prevent drying.

information on visual symptoms and cropping practices will aid in the diagnosis.

The self-addressed cartons used to submit samples to the University of Florida Soil Testing Lab **should not** be used to submit nematode samples. The



**Figure 3.** Sample kits include a pre-addressed box for mailing.

addresses for the two labs are different and, more importantly, the soil testing paper bags are designed to dry soil out. Drying invalidates the results of a nematode assay.

While it is not mandatory that samples be submitted using our kits their use is recommended. For those not using the kits, or are using older kits with outdated instructions, the most recent sample kit instructions are reproduced on the following pages. These instructions must be followed carefully to insure an accurate diagnosis.

For further information about nematodes, nematode management, collecting samples, or help interpreting assay results contact:

Dr. William T. (Billy) Crow, Landscape Nematologist, Department of Entomology and Nematology, University of Florida, PO Box 110620 Gainesville, FL 32611-0620 Phone: 352/392-1901 ext. 138 FAX: 352/392-0190 E-mail: wtcr@ufl.edu.

For further information about submitting samples, operations of the Assay Lab, or to check on the status of a sample you submitted contact:

Frank Woods, Senior Biologist, Nematode Assay Laboratory, University of Florida, PO Box 110820 Gainesville, FL 32611-0820 Phone: 352/392-1994 FAX: 352/392-3438 E-mail: [nemalab@ifas.ufl.edu](mailto:nemalab@ifas.ufl.edu).

## Florida Nematode Sample Kit Instructions

Nematode problems cannot be diagnosed accurately in the field. Laboratory assay is necessary to confirm field observations. Carefully follow these instructions for collecting and submitting a sample to the University of Florida Nematode Assay Lab such that it reaches us in good condition to provide accurate information.

### Collecting The Sample

#### Commercial Vegetables and Field Crops

*Before planting:* Most nematode management practices must be performed before planting. Therefore, nematode samples need to be taken well before planting. Usually it is best to collect samples at the end of the previous crop, but they may be taken later if necessary. Collect soil from 10 to 20 field locations using a "T" type sampling tube (Figure 4), trowel, or shovel. Samples should be taken 8 to 10 inches deep. Sample in a regular pattern over the area. Take the samples from different rows in the field. All the soil collected from the 10 to 20 locations should be thoroughly mixed. From this a sample of at least one pint of soil should be placed into a single plastic bag. One sample should represent no more than 10 acres for low-value crops and no more than 5 acres for high value crops. Areas of fields which have had different crops (or varieties) in the recent past, or will have in the near future should be sampled separately. Also take separate samples for areas with different soil types or other physical characteristics. Fields which had different crops (or varieties) during the past season or which have obvious differences either in soil type or previous history of cropping problems should be sampled separately. Sample only when soil moisture is appropriate for working the field, avoiding extremely dry or wet soil conditions.



**Figure 4.** "T" type sampling tools are ideal for collecting most types soil samples for nematode analysis.

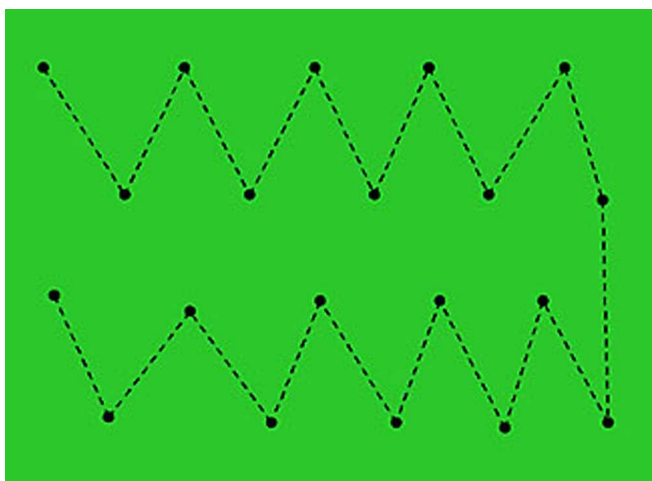
*After planting:* Sometimes it is necessary to determine what is causing plants to get sick after they are planted. For these samples both roots and soil are required. Roots and soil should be collected 8 to 10 inches deep from around 10 to 20 sick plants. Avoid dead or dying plants, since dead or decomposing roots will often harbor fewer nematodes. For seedlings or young transplants, whole plants with adhering soil may be submitted for analysis. A minimum of 1 pint of soil and 1 to 2 cups of roots are required. The roots and soil need to be placed into the same plastic bag for submission to the Nematode Assay Lab.

#### Turfgrasses

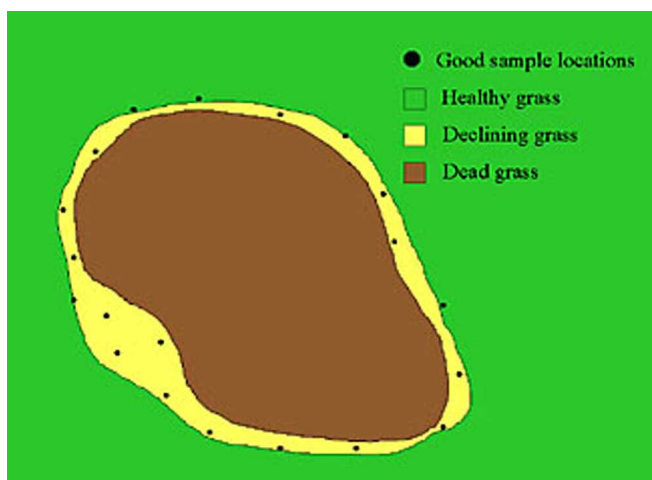
Collect soil from 20 locations in each area (lawn, green, fairway, block, etc.). Samples should be taken 3 to 4 inches deep. A "T" type sampling tube (Figure 4) is best for collecting nematode samples. A small trowel or other device may be used if necessary. If the sample is being taken before the turf is planted, or if the turf looks healthy, collect samples in a zig-zag pattern (Figure 5) across the area. If the turf is unhealthy, collect samples from around the borders of the affected area. Collect samples where the turf is sick, but not dead (Figure 6). If there are a number of affected areas take a few samples from the border of several of them until you have the required 20. Put all the soil from each area into a single plastic bag.

#### Landscape Plants and Trees

*Before planting:* Collect soil from 8 to 12 locations in a planting bed. Samples should be taken 8 to 10 inches deep. About a handful of soil from each



**Figure 5.** When sampling healthy appearing turf collect cores in a zig-zag pattern across the area.



**Figure 6.** Collect cores for a nematode sample from the edges of declining areas.

location is adequate. Combine all the soil into a single plastic bag. The total volume of soil from the samples should be between 1 pint and a half gallon. Samples may be taken with a shovel, trowel or other device. If using a shovel you can put part of the soil from 8 to 12 shovel fulls into a bucket. Thoroughly mix the soil in the bucket then take out a pint for analysis.

*After planting:* Often a nematode assay is needed to determine if nematodes are causing a plant to get sick. For this type of sample both **soil and roots** are required! Dig soil and roots from around the drip line of the plant. Sample depth depends on the size of the plant. For most bedding plants 6 inches deep is adequate. For most woody ornamentals sample 8 to 10 inches deep. Tree samples should be 12 inches deep. Do not include the top 1 inch of soil. If multiple plants are affected collect some soil and roots

from several plants. Place the soil and roots together in the same plastic bag. A minimum of 1 pint of soil and 1 to 2 cups of roots are required. For small bedding plants entire plants, with the soil around their roots, can be submitted.

## Vegetable Gardens

*Before planting:* It is best to take nematode samples well before planting. This allows you to implement management practices, or decide if your garden is in a good spot. Collect soil from 8 to 12 locations in the garden. Samples should be taken 8 to 10 inches deep. About a handful of soil from each location is adequate. Combine all the soil into a single plastic bag. The total volume of soil from the samples should be between 1 pint and a half gallon. Samples may be taken with a shovel, trowel or other device. If using a shovel you can put part of the soil from 8 to 12 shovel fulls into a bucket. Thoroughly mix the soil in the bucket then take out a pint for analysis.

*After planting:* Often a nematode assay is needed to determine if nematodes are causing a plant to get sick. For this type of sample both **soil and roots** are required! Dig soil and roots from around the plant. For most vegetables samples should be taken 8 to 10 inches deep. For very small plants the samples do not need to be that deep. Do not include the top 1 inch of soil. If multiple plants are affected collect some soil and roots from several plants. Place the soil and roots together in the same plastic bag. A minimum of 1 pint of soil and 1 to 2 cups of roots are required.

## Nurseries

*Root-feeding nematodes:* For smaller potted-plants (1 gallon size or less), submit several entire plants in their pots. The plants should be placed into plastic bags. For larger potted-plants take a cup of soil and a cup of roots from each of several plants. Put all of the soil and roots into a plastic bag.

*Foliar nematodes:* For smaller potted-plants (1 gallon size or less), submit several entire plants in their pots. The plants should be placed into plastic bags. For larger plants cut off twigs with affected leaves. A damp paper towel may be wrapped around the base of the twigs to help keep them from drying out. Place the twigs into a plastic bag and seal.

## Citrus

Take several samples from the drip-line of the tree. Samples should be 12 inches deep for most nematodes, but need to be deeper for detection of burrowing nematodes. Samples can be taken with a spade or shovel in most cases. Do not include the top 1 inch of soil. Both soil and feeder roots are required. Put soil and roots together in a plastic bag. A minimum of 1 pint of soil and 1 to 2 cups of roots are required. Sampling for detection of burrowing nematodes is more involved than for other nematodes of citrus. For specific instructions on collecting samples for detection of burrowing nematodes see publication "*Nematode Management in Fruit and Nut Crops*" available at your local Cooperative Extension Service office or online at <http://edis.ifas.ufl.edu/NG003>.

## Handling The Sample

1) If submitting more than one sample make sure that the outside of each bag is labeled with a permanent marker. You can also write on masking tape stuck to the bag. Do not put paper labels inside of bags, they will decompose and be illegible. If submitting several samples together wrap each in newspaper so that the labeling doesn't wear off.

2) Seal the plastic bags to keep sample moist. Dried out samples are no good for nematode diagnosis. Self-sealing bags often come open in the mail. If using a self-sealing bag tape the seal shut.

3) Keep samples out of direct sunlight or heat. Heat and ultraviolet light kill nematodes. Even a few minutes on the dashboard or in the back of a pickup can invalidate assay results. If you are storing the sample for more than a day it is best to keep it refrigerated, but not frozen.

4) Handle the sample gently and pack it well. Nematodes are between soil particles. So, the more the soil gets banged around the more the nematodes may get destroyed.

5) Fill out the information on the nematode assay form. In order to make a diagnosis we need to know as much as possible about the plant or plants in question. Make sure that the identification on the form matches the identification on the sample bag.

## Submitting The Sample

1) There is a \$12 fee for each nematode sample (this will be increasing in July, 2006). Place a check or money order payable to the "Florida Nematode Assay Service" into an envelope. Do not send cash.

2) Put the sample, assay form, and payment envelope into the self-addressed nematode assay box. Seal the box with the gummed tape enclosed in the sample kit.

3) Mail, ship, or deliver the samples to the Nematode Assay Lab as soon as possible. The mailing address is: Nematode Assay Lab, Building 78 Mowry Rd., Gainesville, FL 32611. If you are delivering the sample we are open Monday through Friday from 8:30 AM to 4:30 PM. For more information on submitting samples call the Nematode Assay Lab at (352) 392-1994, or email us at [nemalab@ifas.ufl.edu](mailto:nemalab@ifas.ufl.edu).