THE BIO ASSAY METHOD FOR IDENTIFYING ROOT-KNOT NEMATODE INFESTATIONS

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The standard methods employed to control root-knot nematodes in the field are costly at best. For this reason it is important that the grower know whether or not his fields are infested before he considers control measures.

A number of procedures have been developed for analyzing agricultural soils for the presence of plant parasitic nematodes. Selection of the best procedure depends on the type of nematode in question, the simplicity and accuracy of the method, and the training and experience of available personnel. The presence of root-knot nematodes can be determined with relative ease since infected host plants often produce diagnostic symptoms. Two relatively simple methods, "field inspection" and "bio assay," may be growers and technicians alike to determine the presence of root-knot nematodes. We should understand at the outset of this discussion that although different terms are used to describe the above methods, each is a method for assaying by biological means. Thus "field inspection" is used when host plants collected in the field are examined for presence of root-knot nematodes. The term "bio assay" is used when soil samples are removed from the field, planted to a known host in the greenhouse, and the developing roots are examined for the presence of root-knot nematodes.

Field inspection: This method has several distinct advantages. It can be employed by anyone who recognizes the distinct symptoms resulting from root-knot nematode infections. Typical galls are produced in a number of weed and cultivated hosts. In most cases this characteristic allows a thorough examination of suspect fields during the growing season. The roots of dandelion, china lettuce, pigweed, black medic clover, red clover, alfalfa, etc. can be examined for telltale galls. Potato tubers, sugar beets, and carrots are among the crop hosts which can be examined during or after harvest. Special attention should be given to plants taken from low or sandy areas in the field. Locations along the head ditches and bottoms of the field where the soil tends to receive the most irrigation water should also be given special attention.

Bio assay: The bio assay method can be used to advantage when fields are in a fallow condition or when growers are not sure of their own observations. This method is strictly dependent upon whether or not the soil samples collected are representative of the field condition.

Procedures for collecting soil samples to be assayed for root-knot nematodes, as outlined in Spud Topics, Vol. XIII - No. 19 by Bill Foeppel, Grant County Extension Agent, are as follows:

1. For fields up to 26 acres, take 1 sample for each two acres, for fields larger than 26 acres, take a sample for every three acres.

2. Divide the field lengthwise two or three acre strips, depending on size of field, putting stakes in both the top and bottom of the field.

3. Stakes should be left in place to provide identification of individual samples until the results come back.

4. Make a map of the field and number each location of the sample for future reference.

5. Samples should be taken with a soil probe, similar to those used in taking fertility samples. Samples should be taken from 8 to 12 inches deep. A sample should consist of 10 cores for each acre in the sample, hence a two-acre sample, 20 cores; a three-acre sample 30 cores.

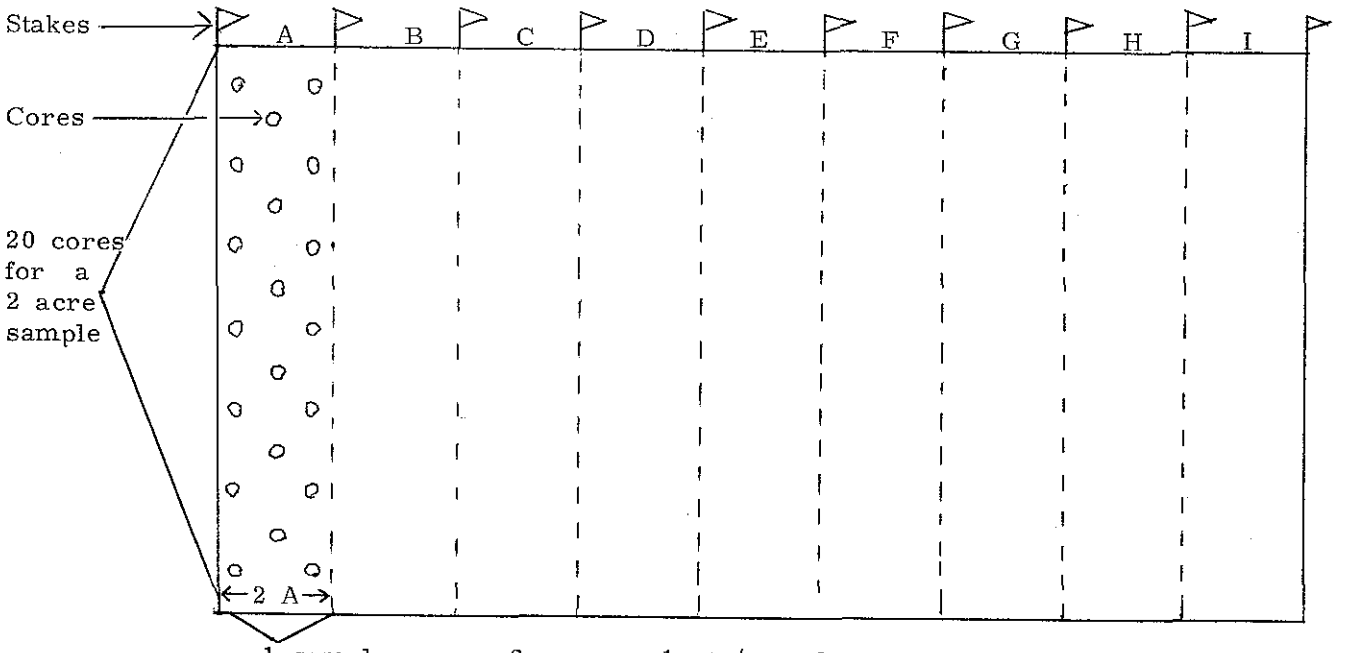
6. Cores from each sample area should be place in a bucket and thoroughly mixed. A sample of at least a quart should be then placed in a plastic bag or airtight container to retain the moisture. The sample should be kept cool and taken to the greenhouse that day, if possible, or the next day.

7. Each sample should be identified by the field number and sample number, and each set of samples be identified by Block number, Unit number, Field number and Name of grower.

8. If possible, clean the bucket and soil tube between samples. Sampling equipment should definitely be cleaned between fields by thoroughly rinsing with clean water.

Following collection, the soil samples are placed in plastic greenhouse pots, planted to susceptible tomato, and held in the greenhouse at 70-80° F for periods of not less than 60 days. Roots of these plants are then washed free of soil and examined for presence of nematode galls.

DIAGRAM FOR TAKING SOIL SAMPLES ON 18 ACRE FIELD



1 sample area - 2 acres - 1 qt./sample

Interpretation: Both of the methods reported here may be employed to determine the presence of root-knot nematodes. Each method is subject to both human and sampling error. Determinations on the intensity (population level) of root-knot nematode infestations can only be roughly determined by these means. When severe infestations are encountered measures should be taken to reduce the population. When light infestations are found measures to retard the development of severe infestations should be employed.

Consult with your county agent and field men for aid in the interpretation of bio assay results.