

CROP NEMATODE RESEARCH & CONTROL PROJECT



**A Service Offered by the
Department of Plant Pathology
at North Carolina State University
in conjunction with
the United States Agency
for International Development**

CROP NEMATODE RESEARCH and CONTROL PROJECT

Goals

To conduct collaborative research and serve as an information base and resource center for nematologists in developing countries.

Rationale

Average world crop losses due to nematodes may be as high as 10%, but in developing countries losses have often been as high as 25-50%. In these countries, nematode populations flourish due to the favorable climate and longer growing season. Although extensive research and sophisticated identification and management techniques have resulted in successful nematode management in developed countries, much less progress has been made in developing nations due to inadequate resources and training for dealing with such problems.

Research Emphasis

1. Screening Crop Germ Plasm for *Meloidogyne* Resistance

Rationale: Root-knot nematodes (*Meloidogyne* spp.) constitute a major group of plant pathogens affecting yield and quality of important food and fiber crops throughout the world. Due to their worldwide distribution, extensive host ranges, and involvement in disease complexes, these pests are among the top disease-causing agents of plants. Although there are many approaches to control, breeding for resistance offers by far the most promising and biggest economic pay off.

Objective: To develop and make available to large areas of the world cultivars of crops resistant to root-knot nematodes.

2. Cropping Systems Research

Rationale: Plant-parasitic nematodes cause severe crop losses in heavily farmed areas of tropical and subtropical regions. A large portion of these losses could be avoided by a better deployment of resistant cultivars, crop rotations, and other available management practices. A primary reason for the lack of effective deployment of existing management practices is that the relationships of crop losses to numbers of plant-parasitic nematodes are poorly understood.

Crop losses caused by nematodes are highly dependent on preplant nematode numbers, which means that these pests are amenable to the use of management practices aimed at the long-term reduction of population levels. This situation is ideal for the deployment of long-term optimized crop-rotation/management sequences, analyzed specifically for their impact on nematode populations.

The deployment of crop rotation sequences and other cultural practices does not require any high-cost, high-technology inputs, and should be well suited to use by developing country growers.

Objectives:

- a. To provide developing country growers with optimum crop rotation/management sequences for controlling crop losses due to plant-parasitic nematodes.
- b. To quantify the relationship of nematode numbers to crop yields for a variety of crops and plant-parasitic nematodes of worldwide importance.
- c. To demonstrate the feasibility of optimizing cropping systems for developing country growers through an international cooperative research effort.

3. Technology Transfer

Rationale: One of the greatest obstacles to effective nematode management in developing countries is the lack of trained personnel and adequate facilities. Refresher training and intensive specialty training is important since most of the technical information acquired during advanced education becomes obsolete within four to seven years after graduation. Developing country scientists are additionally at a disadvantage in that they often have inadequate access to current research findings. Improved information services and communication among scientists conducting similar research could help alleviate this situation.

Improvement of research capabilities, however, is only a first step toward increased yields resulting from nematode management. Unless appropriate management technology reaches and is adopted by farmers, the quality of nematode research will be irrelevant.

Objectives:

- a. To facilitate achievement of quality nematology research and services in developing countries.
- b. To increase communication among the international network of nematologists.
- c. To transfer nematode management information to farmers through extension-type publications.

Selected Examples of Services Available*

- Collaboration with International Agriculture Research Centers (IARCs) to screen plant cultivars for nematode resistance.
- Transfer of screening capability to IARCs and other research centers through training.
- Assistance in the design and implementation of nematology research programs in developing countries, with emphasis on appropriate management techniques.
- Provision of expertise in the establishment of nematode identification laboratories and/or nematode advisory services.
- Planning and organization of conferences and workshops.
- Provision of short-term specialty training.
- Provision of resource publications.
- Identification and assessment of crop nematode problems.

* The services listed here are available on a contract/for-hire basis with North Carolina State University. Local AID Mission Bureaus or other agencies can be approached for their help in financing cooperative efforts with the CNRCP.

Newsletter

Any nematologist or other person working on nematodes in a developing country is welcome to join CNRCP's International Nematology Network free of charge. Members will receive our quarterly newsletter and are invited to publish therein abstracts of their research findings, announcements of relevant conferences and workshops, and other pertinent information.

For further information on CNRCP services, contact:

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