

Work Plan Kansas Fiscal Year 2009

Cooperator:	Kansas Department of Agriculture		
State:	Kansas		
Project:	Cereal Crop Nematode Survey		
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Agreement Number	08-8453-0014-CA		
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This Work Plan reflects a cooperative relationship between the Kansas Department of Agriculture (KDA) and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ). It outlines the mission-related goals, objectives, and anticipated accomplishments as well as the approach for conducting a Cereal Crop nematode survey and control program and the related roles and responsibilities of the Kansas Department of Agriculture and USDA-APHIS-PPQ as negotiated.

I) OBJECTIVES AND NEED FOR ASSISTANCE

Kansas is the number one producing state of winter wheat in the United States and averages about 10 million acres of planted crop annually. Nematodes are on the list of pests of national concern and the significance of their establishment is of great concern to us.

This CAPS project is a commodity survey involving multiple pest targets. It is about nematode pests such as the Mediterranean Cereal Cyst Nematode (*Heterodera latipons*), Cereal Cyst Nematode (*Heterodera avenae*) and British Root Knot Nematode (*Meloidogyne artiellia*) –(#19 Surveys of State Regulatory Concern). These Cereal Cyst Nematode pests are well documented as potential threats to cereal production. The Cereal Cyst Nematode (*Heterodera avenae*) is as close to Kansas as Colorado. *Pratylenchus* species are believed to cause measurable loss to wheat but have never been studied (Tim Todd, nematologist, Kansas State University). In addition soybeans which are considered a major crop, estimated at 2.9 million acres planted annually are susceptible to the Soybean Cyst Nematode (*Heterodera glycines*).

This is the second year of this survey and the risk to Kansas is substantial if this survey is not completed. Cereal, particularly wheat, production is found in every county and is the foundation of the Kansas agriculture economy. If exotic wheat parasitic nematodes would become established in the state of Kansas, it is realistic to believe it would be able to propagate and spread. It may take many years for the spread of particular nematodes but once the pest is established their control is often difficult, especially in areas of the state where wheat is grown

continuously. A one percent yield loss from an additional pest or pests would result in about a 10 million dollar loss directly to growers.

In addition, much of Kansas production is planted to soybeans in crop rotation schemes and the Soybean Cyst Nematode may also be present. Information regarding this serious pest of a major crop in Kansas would be beneficial to regulatory and state university personnel in managing the nematode and of importance to export restrictions of soybean and nursery crops.

The purpose of the Cereal Crop Nematode survey is to provide information on the presence of exotic and endemic cereal grain soil nematode pests. This survey will provide early detection of infestations of exotic nematodes and general population information of endemic plant parasitic nematodes. The information will allow federal, state, university and extension personnel to make decisions regarding measures to prevent future crop losses by limiting the spread and population build up of cereal nematodes. Custom harvesters harvest considerable acreage of wheat crop annually. Their equipment may carry soil nematodes and if exotic nematodes were present, regulation could prevent the spread to new areas or additional states.

This will be the second year of a three year survey for Cereal Crop Nematodes. Funds provided to this project by USDA are necessary to make the continuation of this survey possible.

II) RESULTS OR BENEFITS EXPECTED

The Cooperator seeks to conduct a program which is expected to result in:

- Additional geographic assessment from data gathered.
- Identification of Cereal Cyst Nematodes, Mediterranean Cereal Cyst Nematode, and British Root Knot Nematode, if present.
- Protection of the state of Kansas, the number one winter wheat producing state, from infestations due to machinery movement or soil peds in grain or seed.
- Prevention of plant health restrictions from state, federal or importing countries.
- Support domestic and foreign exports of grain from Kansas and other states.
- Aid in determining best practices for movement of machinery across state lines.
- Identification of pathways so action can be taken to stop further spread of pest.

III) APPROACH

This is the second year of this project. On average, twenty samples on a county basis are collected. Kansas has 105 counties and the total samples overall for the three year project will be 2,100. These samples are prorated on a systematic acreage basis within the nine crop reporting districts of the state. Seven hundred samples are collected during the months of April, May, and June annually. Cyst and Root Knot Nematode populations will be at their highest during these months.

Temporary staff will collect one sample from a field approximately 100 feet from a road access point. Since local farm or custom equipment may move the nematode within an area, introduction into a field will likely occur near the access point. A sample of about one liter of

soil will consist of 15-20 cores from probes in a two to three acre area. The probes will be taken within rows and will include feeder roots. Location will be documented by GPS coordinates. Samples will be stored in coolers and analyzed at the Kansas State University Nematology Laboratory in the Plant Pathology Department at Manhattan, Kansas.

Soil samples will be thoroughly mixed and a sub-sample of 100 cc of soil will be processed with standard sieve selection methods for genus identification. If Root Knot Larvae Nematodes are found in the sample, then the sample will be further analyzed by taking the remaining soil sample and growing a wheat cultivar in it for 30-45 days to increase the population for adult nematode identification. Morphological and/or serological methods will be conducted by Tim Todd (nematologist, Kansas State University,) and Craig Webb, PhD., (USDA/APHIS/PPQ), identifier, Kansas State University Plant Pathology Department. The University of Nebraska Nematology Laboratory may also be utilized for specific nematode identification.

A. The Cooperator and APHIS Mutually Agree to/that:

- Maintain a State Cooperative Agricultural Pest Survey (CAPS) Committee that will meet at least once a year for input on surveys and how to better the CAPS program.
- Work together in carrying out field surveys, trapping, identification and data collection on pests, diseases or weeds that may pose an immediate risk to the agriculture of Kansas or the United States.
- Have representation at National and/or Regional annual planning meetings.
- Utilize Cooperator and APHIS program funding, as outlined in the Financial Plan, within the authorized parameters to support survey, detection and CAPS objectives.

B. The Cooperator will:

- Sample in three crop reporting districts of Kansas during the months of April, May and June when nematode populations are highest.
- Hire temporary staff to collect soil cores.
- Document locations by GPS coordinate.
- Store samples in coolers until sent to the Kansas State University Nematology Laboratory in the Plant Pathology Department at Manhattan, Kansas to be analyzed.
- Supply tools for sampling of soil cores (soil probes, coolers, gallon bags, sharpies, and GPS equipment).
- Utilize the University of Nebraska Nematology Laboratory for nematode identification, if necessary.
- Provide KDA staff when needed.
- Provide vehicle and fuel for travel for KDA staff for conducting field samples and collecting data.
- Equipment used in this survey will be maintained by cooperator upon completion of project.

Resources

- Hire temporary employees for sampling.
- Provide KDA staff when needed for collection or sorting.

- Set up a rental or state vehicles for travel for sampling.
- Provide office space with associated services and utilities, computers and other office equipment for the use of Cooperator personnel. These include digital camera, GPS unit and computer with internet service. Computers will be used for entering survey data into the KAPPRIS and NAPIS database.

Supplies

- Shovels, soil probes, coolers, sharpies and gallon bags.
- Most supplies will have been retained from first years' survey. Disposable supplies will be procured through CAPS program.

Travel

- Travel will be required to survey sites by use of a rental vehicle. The KDA Plant Protection and Weed Control Plant Program Manager is the approving official. Costs are included in the financial plan.
- Lodging maybe required for longer distance sampling. The KDA Plant Protection and Weed Control Plant Program Manager is the approving official.

Reports:

1. Submit all reports to the APHIS Authorized Department Officer's Designated Representative (ADODR). Reports include:
 - a. Narrative accomplishment reports in the frequency and time frame specified in the Notice of Award, Article 4.
 - b. Financial Status Reports, SF-269, in the frequency and time frame specified in the Notice of Award, Article 4.

Other contributing parties

- a. List Participating Agency/Institution: Kansas State University Nematology Laboratory, USDA-APHIS-PPQ, University of Nebraska Nematology Laboratory.
- b. List all who will work on the project: KDA, Kansas State University Nematology Laboratory, USDA-APHIS-PPQ, University of Nebraska Nematology Laboratory.
- c. Describe the nature of their effort: Pest identification
- d. Contribution: Confirmation of pest identifications

C. APHIS Will:

- Provide funds for temporary staff, lodging (if needed), fuel and rental vehicle needed for survey work.
- Provide any new information that becomes available on Cereal Crop Nematodes and review data.
- Provide funds to the Cooperator to cover costs outlined in the Financial Plan.

- Make arrangements for Taxonomic support in identification if necessary.

IV) GEOGRAPHIC LOCATION OF PROJECT

- This survey is conducted in one third, three crop reporting districts in the central part of the state. This is the second year and the survey.
- This survey will be conducted on cropland.

V) QUANTITATIVE PROJECTION OF ACCOMPLISHMENTS TO BE ACHIEVED:

- Sampling will be done during April, May and complete in June.
- Location will be documented by GPS coordinates.
- Samples will be stored in coolers and analyzed at the Kansas State University Nematology Laboratory in the Plant Pathology Department at Manhattan, Kansas.
- Survey data will be entered into state KAPPRIS and NAPIS database.

VI) DATA COLLECTION AND MAINTENANCE

A. Data Management:

All survey data from cooperative agreements involving pest surveys will be entered into the NAPIS database by KDA staff.

- a. First record for the State and/or County will be entered within **48 hours** of confirmation of identification by a qualified identifier.
- b. All other required records, both positive and negative survey data, must be entered **within two weeks** of confirmation.
- c. All records are to be entered into the NAPIS database by **December 1** of the year of survey, so these data are included in the yearly Plant Board Report.

B. Data collection and maintained in:

All survey data including GPS survey coordinates will be entered into state KAPPRIS and NAPIS database. Survey data includes but not limited to date trap was set, when it was checked and picked up, county and any problems. Pests will be checked and verified by state entomologist before being entered.

C. Criteria to evaluate the results and successes of the project:

1. Pest detection survey, outreach and other Core project activities completed.
2. All data collected from the pest detection surveys is entered into KAPPRIS and NAPIS databases.
3. Maps of the pest detection survey activities are produced to aid in planning of future pest detection surveys, pathway risk analysis, and outreach activities.

D. Methodology used to determine if the results and benefits are achieved:

1. Review of the KAPPRIS and NAPIS database to ensure that data from the pest detection activities has been entered.
2. Review the accomplishment reports, supporting outreach materials (if applicable), and maps.

VII) TAXONOMIC SUPPORT

Tim Todd, Kansas State University nematologist and Craig Webb, USDA/APHIS/PPQ, pest identifier will be responsible for specimen identifications. Specimens will be sorted to species. All screening will be done in Kansas. The University of Nebraska Nematology Laboratory may also be utilized for specific nematode identification.

Screened to what taxonomic group (e.g., family or genus name)?

Target Species	Survey Dates (Starting-Ending)	Number of Sites	Number of Traps/Visual surveys	Number of visits	Potential Number of Collections
British Root Knot Nematode- <i>Meloidogyne artiellia</i>	April through June 2009	700 annually; 2,100 Project total	20 sample cores	1	14,000 annually; 42,000 Project total
Mediterranean Cereal Cyst Nematode- <i>Heterodera latipons</i>					
Cereal Cyst Nematode- <i>Heterodera avenae</i>					
Other Nematode pests- <i>Pratylenchus species</i>					
Soybean Cyst Nematode- <i>Heterodera glycines</i>					
* Samples for these pests are screened simultaneously					

Source(s):

Tim Todd, nematologist, Kansas State University; Kansas Farm Facts from the National Agriculture Statistics Service

