

Cereal Crop Nematode Survey Work Plan - Calendar Year 2010

Cooperator:	Kansas Department of Agriculture		
State:	Kansas		
Project:	Cereal Crop Nematode		
Project funding source:	Priority Survey <input checked="" type="checkbox"/> State Discretionary Survey <input type="checkbox"/> Other Line Item Pest <input type="checkbox"/>		
Project Coordinator:	Laurinda Ramonda		
Agreement Number	10-8453-1227-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 top 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.

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 acreages 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.

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.

This CAPS project is a commodity survey involving multiple pest targets. It targets the nematode pests Mediterranean Cereal Cyst Nematode (*Heterodera latipons*) – (#48 Priority Pest List FY10), Cereal Cyst Nematode (*Heterodera avenae*) – (pest of state concern), (*Heterodera filipjevi*) – (small grains commodity survey pest) and British Root Knot Nematode (*Meloidogyne artiellia*) - (#47 Priority Pest List FY10). 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 third and final year of this survey and the risk to Kansas is substantial if this survey is not completed. Cereal crop, 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.

This years' survey for Cereal Crop Nematodes will occur in the eastern half of the state. Funds provided to this project by USDA are necessary to make the completion of this survey possible.

II) RESULTS OR BENEFITS EXPECTED

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

1. Additional geographic assessment from data gathered.
2. Identification of Cereal Cyst Nematodes, Mediterranean Cereal Cyst Nematodes, and British Root Knot Nematodes, Soybean Cyst Nematodes, *Pratylenchus species*, if present.
3. Protection to the state of Kansas, the top producing state of winter wheat, from infestations due to machinery movement or soil peds in grain or seed.
4. Prevention of plant health restrictions from state, federal or importing countries.
5. Support domestic and foreign exports of grain from Kansas and other states.
6. Aid in determining best practices for movement of machinery across state lines.
7. Identification of pathways so action can be taken to stop further spread of pests.

III) APPROACH

What is the plan of action or approach to the work?

This is the third and final year of this project. On average, fourteen samples on a county basis are collected, 1 sample per 4,800 acres of wheat production. The eastern half of the state will be sampled which has approximately one-third of the production. Counties to be sampled will be: Allen, Anderson, Atchison, Bourbon, Brown, Butler, Chase, Chautauqua, Cherokee, Clay, Cloud, Coffey, Cowley, Crawford, Dickinson, Doniphan, Douglas, Elk, Franklin, Geary, Greenwood, Harvey, Jackson, Jefferson, Jewell, Johnson, Labette, Leavenworth, Linn, Lyon, Marion, Marshall, McPherson, Miami, Mitchell Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pottawatomie, Republic, Riley, Saline, Sedgwick, Shawnee, Sumner, Wabaunsee, Washington, Wilson, Woodson and Wyandotte.

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. Approximately, 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 improve 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.
- Utilize Cooperator and APHIS program funding, as outlined in the Financial Plan, within the authorized parameters to support survey, detection and CAPS objectives.

1. What is the quantitative projection of accomplishments to be achieved?

- **Anticipated accomplishments:**

1. Fact sheets, webpage, resources, and pest reporting will be continually updated as new information becomes available or new pests found.
2. Survey data on pests will be entered into the state survey database and NAPIS database when pest identification is confirmed and/or becomes available.
3. GPS coordinates will be included with surveys.
4. Additional geographic assessment from data gathered.
5. Identification of Cereal Cyst Nematodes, Mediterranean Cereal Cyst Nematodes, and British Root Knot Nematodes, Soybean Cyst Nematodes, *Pratylenchus* species, if present.

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

1. Pest detection survey activities completed.
2. All data collected from the pest detection survey is entered into the state survey database and NAPIS database.
3. State CAPS, KDA and SPHD, SPRO, PSS, SSC meetings to keep updated on issues.
4. Presence or absence of Cyst Nematodes, Mediterranean Cereal Cyst Nematodes, and British Root Knot Nematodes, Soybean Cyst Nematodes, and *Pratylenchus* species.
5. Increase collaboration potential with agencies involved-USDA/APHIS/PPQ, KDA, and KSU.
6. Better knowledge for the wheat industry.
7. Continued university research potential.

c. Methodology used to determine if identified needs are met and results and benefits are achieved:

1. Review of the state survey database and NAPIS database to ensure that data from the pest detection activities have been entered.
2. Review of the accomplishment reports, supporting outreach materials (if applicable), and maps.
3. State CAPS, KDA and SPHD, SPRO, PSS, SSC meetings to keep updated on issues.

2. Types of data to be collected and how it will be maintained:

- a. All survey data from cooperative agreements involving pest surveys will be entered by the State Survey Coordinator or KDA staff into the state survey database and NAPIS database to include but not limited to observation number, observation date, data source, state/county, site code, pest code, pest status, and survey method.
- b. Complete, accurate, and timely pest survey data will be entered into NAPIS using approved protocol. The data entry requirements are:

- Enter new national, state, and county records into NAPIS database within 48 hours of confirmation of a pest or pathogen identification by a recognized identifier.
- Non-time sensitive records, including negative data, must be entered into NAPIS within 2 weeks of confirmation.
- Negative data should be entered within 2 weeks of decommissioning a trap, obtaining the results from an identifier, or performing a laboratory assay.
- Survey data will be collected with GPS technology for internal pathway analyses. Survey maps will be developed from approved GIS mapping software.

B. The Cooperator will:

- Sample in the eastern half 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 rental vehicles or mileage for personal vehicles for travel of KDA staff and temporary staff for conducting field samples and collecting data.
- Equipment used in this survey will be maintained by cooperator upon completion of project.

1. By function, what work is to be accomplished?

- On average, fourteen samples per county, 1 sample per 4,800 acres of production samples on a county basis are collected. Approximately seven hundred samples are collected during the months of April, May, and June annually.
- Temporary staff will collect one sample from a field approximately 100 feet from a road 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.
- Location will be documented by GPS coordinates.
- Samples will be analyzed at the Kansas State University Nematology Laboratory in the Plant Pathology Department at Manhattan, Kansas.
- 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.

2. What resources are required to perform the work?

- Temporary employees for sampling.
- KDA staff when needed for collection or sorting.
- Rental or personal vehicles for temporary employees for travel involved in sampling.
- 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 state survey database and NAPIS database.

3. What numbers and types of personnel will be needed and what will they be doing?

- Four to six temporary employees to be hired through CAPS survey to conduct survey.
- KDA staff will help when needed for collection and/or sorting and training.

4. Equipment needed to perform work (\$5,000 or more):

- a. Equipment provided by cooperator:** N/A
- b. Equipment provided by APHIS:** N/A
- c. Equipment purchased in whole or part with APHIS funds:** N/A
- d. How equipment will be used:** N/A
- e. Method of disposition of the equipment upon termination of the agreement:** N/A

5. Information technology equipment:

- Provided by KDA, office space with associated services and utilities, computers and other office equipment for the use of Cooperator personnel. These include digital camera, GPS unit, PDA and computer with internet service. PDA's and GPS units are provided through Infrastructure.

6. Supplies needed to perform work:

- Shovels, soil probes, coolers, gallon bags, shipping boxes, office supplies and mailing costs.
- Most supplies will have been retained from previous survey work.

a. What supplies will be provided by the Cooperator?

- GPS units, PDA and office supplies.
- b. What supplies will be provided by APHIS? N/A**
- c. What supplies will be purchased in whole or in part with APHIS funds?**
- Ziploc bags
 - Shipping boxes
 - Office supplies
 - Sampling equipment (shovels, soil probes, coolers)
 - Mailing costs
- d. How will the supplies be used?**
- Collection of samples.
 - Shipping of specimens to identifiers or labs.
- e. What is the proposed method of disposition of the supplies with a cumulative value over \$5,000 upon termination of the agreement/project?**
- N/A
- 7. What procurements will be made in support of the funded project and what is the method of procurement (e.g., lease, purchase)?**
- The Fiscal Department at the Kansas Department of Agriculture will provide most contracts.
 - Temporary staff will be hired through KDA or Key Staffing.
 - Most of the procurements will be supplies and equipment and will be made by purchase.
- 8. What are the travel needs for the project?**
- a. Is there any local travel to daily work sites? Who is the approving official? What are the methods of payment? Indicate rates and total costs in the Financial Plan.**
- Travel will be required to survey sites by use of a KDA, personal or rental vehicle.
 - The KDA Plant Protection and Weed Control Plant Program Manager is the approving official. Costs are included in the financial plan.
- b. What extended or overnight travel will be performed (number of trips, their purpose, and approximate dates). Who is the approving official? What is the method of payment? Indicate rates and total cost in the Financial Plan.**
- Twenty-six nights lodging may be required for longer distance sampling between April and June.
 - The KDA Plant Protection and Weed Control Plant Program Manager is the approving official. Costs are included in the financial plan.

9. Reports:

- a. Submit all reports to the APHIS Authorized Department Officer's Designated Representative (ADODR). Reports include:
 - 1. Narrative accomplishment reports in the frequency and time frame specified in the Notice of Award, Article 4.
 - 2. Federal Financial Reports, SF-425 (replaces SF-269 October 1, 2009) in the frequency and time frame specified in the Notice of Award, Article 4.

10. Are there any other contributing parties who will be working on the project?

- a. **List Participating Agency/Institution:** KDA, Kansas State University Nematology Laboratory, USDA-APHIS-PPQ, University of Nebraska Nematology Laboratory.
- b. **List all who will work on the project:**
KDA full-time and temporary-sampling, data entry and mapping
Kansas State University Nematology Laboratory-presence or absence determination
USDA-APHIS-PPQ-advising, funding and possible identification
University of Nebraska Nematology Laboratory (if needed)-identification
- c. **Describe the nature of their effort:** Survey work and pest identification.
- d. **Contribution:** Survey work and pest identifications.

C. APHIS Will:

- 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.

1. What equipment will be needed to perform the work? Include major items of equipment with a value of \$5,000 or more.

- a. **Will Equipment be loaned or provided by APHIS?** Yes No (If Yes, please list:

- b. **How will the equipment be used?** N/A

IV) GEOGRAPHIC LOCATION OF PROJECT

A. Is the project statewide or in specific counties, townships, and/or national or state parks?

This survey is conducted in wheat fields in the eastern half with one-third of the production in the state. Counties to be sampled will be: Allen, Anderson, Atchison, Bourbon, Brown, Butler, Chase, Chautauqua, Cherokee, Clay, Cloud, Coffey, Cowley, Crawford, Dickinson, Doniphan, Douglas, Elk, Franklin, Geary, Greenwood, Harvey,

Jackson, Jefferson, Jewell, Johnson, Labette, Leavenworth, Linn, Lyon, Marion, Marshall, McPherson, Miami, Mitchell Montgomery, Morris, Nemaha, Neosho, Osage, Ottawa, Pottawatomie, Republic, Riley, Saline, Sedgwick, Shawnee, Sumner, Wabaunsee, Washington, Wilson, Woodson and Wyandotte.

- B. What type of terrain (e.g., cropland, rangeland, woodland) will be involved in the project?** Wheat fields
- C. Are there any unusual features which may have an impact on the project or activity such as rivers, lakes, wild life sanctuaries, commercial beekeepers etc? (list all that apply)** Weather conditions
- D. Identify the kind of data to be collected:**
The kinds of data to be collected will include, but not limited to, observation number, observation date, data source, state/county, site code, pest code, pest status and survey method.
- E. Establish criteria to evaluate the results and successes of the project:**
1. All data collected from the pest detection survey is entered into the state survey database and NAPIS database.
 2. State CAPS, KDA and SPHD, SPRO, PSS, SSC meetings to keep updated on issues.
 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.
- F. Methodology used to determine if the results and benefits are achieved:**
1. Review of the state survey database and NAPIS database to ensure that data from the pest detection activities have been entered.
 2. State CAPS, KDA and SPHD, SPRO, PSS, SSC meetings to keep updated on issues.

V) DATA COLLECTION AND MAINTENANCE

1. All survey data from cooperative agreements involving pest surveys will be entered by the State Survey Coordinator or KDA staff into the state survey database and NAPIS database to include but not limited to observation number, observation date, data source, state/county, site code, pest code, pest status, and survey method.
2. Complete, accurate, and timely pest survey data will be entered into NAPIS using approved protocol. The data entry requirements are:
 - Enter new national, state, and county records into NAPIS database within 48 hours of confirmation of a pest or pathogen identification by a recognized identifier.
 - Non-time sensitive records, including negative data, must be entered into NAPIS within 2 weeks of confirmation.
 - Negative data should be entered within 2 weeks of decommissioning a trap, obtaining the results from an identifier, or performing a laboratory assay.

- Survey data will be collected with GPS technology for internal pathway analyses. Survey maps will be developed from approved GIS mapping software.

VI) 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.

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 2010	~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>					
Cereal Cyst Nematode- <i>Heterodera filipjevi</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

VII) SIGNATURES

ROAR

Date

ADODR

Date

Detailed Financial Plan

PROJECT: Cereal Crop Nematode Survey
COOPERATOR NAME: Kansas Department of Agriculture
AGREEMENT NUMBER: 10-8453-1227-CA
TIME PERIOD: January 1, 2010-December 31, 2010

Financial Plan must match the SF-424A, Section B, Budget Categories

ITEM	APHIS FUNDS	COOPERATOR FUNDS (Show even if zero)	TOTAL
PERSONNEL:			
State Specialist 100 hours @ \$35/hr	0	\$3,500	\$3,500
Temporary State staff 704 hours @ \$18.15/hr	\$12,778	0	\$12,778
Subtotal	\$12,778	\$3,500	\$16,278
FRINGE BENEFITS:			
22% of salary for permanent employees	0	\$770	\$770
Subtotal	0	\$770	\$770
TRAVEL:			
26 nights lodging @ \$85/night	\$2,210	0	\$2,210
104 quarters of per diem for lodging @ \$9.50/quarter	\$988	0	\$988
Vehicle rental for 12 weeks @ \$300/week-pickup truck for use of temporary staff for sampling**	\$3,600	0	\$3,600
KDA staff 460 miles @ \$0.55/mile-personal vehicle usage	0	\$253	\$253
Temporary staff 3,000 miles @ \$0.55/mile-personal vehicle used for sampling, if not using rental vehicle**	\$1,650	0	\$1,650
Subtotal	\$8,448	\$253	\$8,701
EQUIPMENT:			
	0	0	0
Subtotal	0	0	0
SUPPLIES:			
3 pruners	\$100	0	\$100
2 spade shovels	\$200	0	\$200
800 half gallon bags	\$261	0	\$261
Shipping boxes, office supplies (tape, sharpies)	\$400	0	\$400
Fuel 10,290 miles/15mpg x \$4.00 per gallon-used for rental vehicles**	\$2,744	0	\$2,744
Subtotal	\$3,705	\$0	\$3,705
CONTRACTUAL:			
Kansas State University lab charges	\$17,500	0	\$17,500

700 samples @ \$25 per sample			
Other ID consulting University of Nebraska 10 samples @ \$75 per sample	\$750	0	\$750
Subtotal	\$18,250	0	\$18,250
OTHER:			
Postage and shipping	\$450	0	\$450
Subtotal	\$450	0	\$450
TOTAL DIRECT COSTS	\$43,631	\$4,523	\$48,154
INDIRECT COSTS (22.58% on Total Direct Cost of salary and fringe benefits)*	\$0	\$964	\$964
TOTAL	\$43,631	\$5,487	\$49,118
Cost Share Information	89%	11%	

* Kansas' Negotiated Cost Rate (Salary + Fringe Benefits x %=Indirect Cost)

** There is a shortage of state vehicles. We give the option of renting a vehicle or using personally owned vehicles. If renting we pay for the fuel and if a personal vehicle is used we pay mileage. Some temporary staff do not live near a state contracted rental car agency or will not be working long enough to make it useful.