**MISSISSIPPI SOYBEAN PROMOTION BOARD**

**PROJECT NO. 48-2017 (YEAR 1)**

**FINAL REPORT**

**Title: Sample Collection and Transportation Method Effects on Accuracy of Nematode Analysis in Mississippi Soybean Fields.**

PI: Bill Burdine bill.burdine@msstate.edu

**BACKGROUND**

Soybean Cyst (SCN) and other nematode species are perennial pests often overlooked by producers in NE Mississippi. In 2014, 2015, and 2016, I received numerous calls by soybean producers with yellow, necrotic areas in fields. Producers were convinced the culprit was pathological or fertility; however, laboratory analysis confirmed nematodes in over 70% of samples I submitted.

Data from 2009 suggest SCN nematodes reduce soybean yield by 3.6% and preventing this loss would increase Miss. soybean production by 3.81 million bushels. Many producers do not perform nematode analysis and some fields that are analyzed show below-threshold levels due to factors such as poor sampling technique, poor handling technique, and/or improper timing of sampling. Proper sampling and handling technique is considered critical for accurate treatment recommendations. This case study was designed to demonstrate a lack of training among producers in how they should sample and to demonstrate how excessive heat during transportation reduces the accuracy of nematode analyses.

**OBJECTIVES**

**Objective 1:** Compare and contrast nematode sampling techniques of “untrained” producer vs. “trained” Extension Specialist.

**Objective 2:** Compare sample analysess via USPS Ground transportation vs. direct delivery by Extension Specialist.

**PROGRESS/ACTIVITY**

**Objective 1: *Compare and contrast nematode sampling techniques of producer versus Extension Specialist*.**

All 5 test locations were sampled in late August/early September and samples were analyzed for nematode populations at the Nematology Laboratory at MSU. All samples were stored in an ice chest and delivered immediately to the nematode laboratory.

Reniform, lesion, spiral, lance, stunt, and sheath nematode populations were below threshold in all samples and will not be discussed. Root-knot, SCN juvenile, and SCN Cyst stage had above-threshold counts and are the focus of results.

**Root-knot**: The Extension Specialist (ES)-collected samples saw significantly higher populations in 3 of 5 fields. The Grower (G)-collected samples showed higher populations in the remaining 2 fields but counts were low in these fields.



***Figure 3–8 Legend:***

***ES = Extension Specialist, G = Grower***

***F(1-5) indicates field location (F3 = Field 3)***

***0, 30, or 78 indicate number of hours sample was held in hot vehicle***

**SCN juvenile**: ES collected-sample was highest in only 1 field while G-collected sample was higher in 2 fields. The remaining 2 fields has zero counts for both grower- and specialist-collected samples.



**SCN Cyst stage**: ES-collected sample was highest in 2 fields while G-collected sample was higher in 2 fields. The remaining field had identical counts.



**Objective 2: *Compare sample analysis via USPS Ground transportation versus direct delivery by Extension Specialist*.**

All 5 test locations were sampled in late August/early September and analyzed for nematode populations at the Nematology Laboratory at MSU. Each sample was divided into 3 subsamples: 0 hours in hot vehicle, 30 hours in hot vehicle, and 78 hours in hot vehicle.

Reniform, lesion, spiral, lance, stunt and sheath populations were below threshold in all samples and will not be discussed. Root-knot, SCN juvenile, and SCN Cyst stage had above-threshold counts and are the focus of results.

**Root-knot**: Longer exposure in a hot vehicle led to 1 field increasing counts, 1 field decreasing counts, and 3 fields remaining fairly constant regardless of time in hot vehicle.



**SCN juvenile**: Longer exposure in a hot vehicle led to 1 field increasing counts, 3 fields decreasing counts, and 1 field remaining fairly constant regardless of time in hot vehicle.



**SCN Cyst stage**: Longer exposure in a hot vehicle had little effect on cyst counts.



**IMPACTS**

Sample collection by a “trained” Extension Specialist and an “untrained” grower resulted in both individuals finding higher populations 6 times out of 15 opportunities. **This suggests that advanced training helps one recognize nematode symptomology but it does not translate into finding higher populations within that field. These data suggest that storing samples in an ice chest may be moot in some instances and collecting a representative sample from areas of a field showing symptomology is more critical than storage method or the number of cores collected.**

**Increased exposure in a hot vehicle did not reduce overall nematode population counts as expected; however, it does seem to reduce SCN juvenile counts.** Literature indicates nematode populations fluctuate widely due to temperature, moisture, time that the host plant is available, and population dynamics of adults dying and successive generations hatching. Generation hatching may explain population fluctuation between samples analyzed over time (hours in hot vehicle). Numerous samples had low populations when delivered immediately to the laboratory but increased populations with more time and exposure to hot conditions.

**It appears that laboratory analysis can result in a true-positive or a false-negative. If test results are negative but field symptomology such as stunting or yellowing suggests a possible nematode infestation, it may be justified to submit a second sample to overcome the generational effect.**

**END PRODUCTS**

Completed

Nematodes in Mississippi Soybean: A Case Study Evaluating Sampling and Transportation Methods. June 2018. Bill Burdine. Mississippi State University Extension Publication 3244.

Grower Production Meeting. *Sampling and Transportation Method effects on Nematode Analysis*. Attendees represented from 4 counties. Pontotoc, MS. March 01, 2018.

 Grower Production Meeting. *Sampling and Transportation Method effects on Nematode Analysis*. Attendees represented from 3 counties. Pittsboro, MS. March 01, 2018.

Forthcoming

Social Media. Results will be disseminated via Twitter.