**SCSB Final Report**

**General Information**

**Principal Investigator(s) Name(s):** J. D. Mueller & J. Croft
**Organization:** Clemson University Cooperative Extension Service

**Date:** January 2, 2020

**Quarter:** Final report

**Proposal Information**

**Title:** Evaluation of Available Resistance to Soybean to Southern Root-knot Nematode

**Amount Expended to Date:** $3,069

**Project Summary**: See attached page

**Key Performance Indicators**

*KPI-1*: Plots were established at both locations, maintained and managed to normal agronomic standards at both locations. Yields were taken in a timely manner.

*KPI-2*: Data documenting the presence of root-knot nematodes in the 2 fields were collected at approximately 6 weeks after planting.

*KPI for measuring project success:* All crops were grown to normal maturity except those killed by high levels of nematodes. Nematode damage to plants was sufficient to cause yield losses differentially among the varieties planted based on their levels of resistance to root-knot nematode.

*KPI(s) exceeded:* Excellent nematode pressure was present in both fields. In field 1 we found the reason for excessive damage was the presence of extremely high levels of Southern root-knot nematode; levels high enough to overcome the host plant resistance and the seed treatments present on the seed planted in these fields.

**Next Steps**

The next steps of this project will be to alert growers of the potential presence of Southern root-knot nematode in extremely high population densities and that current levels of resistance will not control Southern root-knot nematode at these levels. We will also inform growers that current seed treatments are not effective against such high levels of Southern root-knot nematode.

**Additional Information**

*See project summary below*

**Project Summary**:

Plots were established on the Edisto REC (EREC) in Barnwell County and in a grower’s field on Planter’s Trace Road (PTR) in Orangeburg County. Tests consisted of 2 replications of large plots of 10 varieties on PTR and 7 replications of small plots at the EREC location.

**PTR:** At this location at plant counts of Southern Root-knot nematodes (SRK) averaged 213 per 100 cm3 soil, or almost double the damage threshold. Galling indices (0 = no galling to 5 = roots 100% galled: indices of less than 2.5 indicate resistance) ranged from a mean of 0.44 to 4.20 for some varieties. Five of the 10 varieties appeared resistant with indices less than 2.5. Resistance and/or nematicidal seed treatments were ineffective in preventing reproduction by SRK. Reproductive ratios of 3.7 to 11.2 indicate all varieties exhibited some susceptibility to this population of root-knot nematode. Yields of 6.5 to 23.1 bushels per acre were observed. Low yields were tightly linked to high levels of root-knot nematode.

At EREC 2 additional varieties were included to equal 12 varieties. Levels of SRK were barely detectable in this field, but Columbia lance, soybean cyst and stubby root nematode were present in damaging levels. Low levels of galling (less than 0.50) were detected at 5 weeks after planting. Recovery of SRK from roots was even more dramatic with recovery levels from 25 to 583 per gram dry weight of root. Yields were much greater ranging from 35 to 56 bushels per acre.

High yielding varieties in the EREC field provide a good platform from which to choose varieties to plant in root-knot infested fields. Yields are listed below for both fields.

|  |  |  |
| --- | --- | --- |
| **Variety** | **EREC****Bushels/acre**  | **PTR****Bushels/acre** |
| DY S572XT80 | 55.7 | 7.1 |
| DY S74XT59 | 48.1 | 19.4 |
| AG 74X8 (Avicta) | 47.4 | 20.8 |
| Pioneer P72A21x | 47.0 | 19.6 |
| AG74X8 (Check) | 46.5 | 20.8 |
| DY S67XT29 | 45.0 | Not grown |
| DY S75XT26 | 43.6 | 10.4 |
| Pioneer P63A47x | 42.7 | Not grown |
| Croplan RX 7516 | 41.6 | 12.0 |
| AG 74X8 (Nemastrike) | 41.9 | 23.1 |
| DY SX19867XS | 37.7 | 9.1 |
| Croplan RX6987 | 34.7 | 6.5 |