

Tobacco Nematode Survey in Tattnall and Candler Counties in Georgia

¹Aubrey Shirley, ²Initiaz Chowdhury, ³J. Michael Moore, ⁴Ganpati Jagdale, ¹Josh Dawson ¹Derrick Bowen, ¹Tony Barnes, ¹Ross Greene, ¹James Jacobs, ¹Holly Anderson, ¹Jennifer Miller, ¹Justin Shealey, ¹Kim Post

¹Extension Agents, University of Georgia Extension, UGA, ²UGA Cotton and Vegetable Crop Nematologist, Tifton, Georgia, UGA,

³Extension Agronomist – Tobacco, Tifton, Georgia, UGA, ⁴Associate Research Scientist and Director of the UGA Nematode Clinic, Athens, Georgia, UGA

Introduction and Objectives

Soil borne pests can be some of the most difficult pests to control. These pests include a wide array of fungal, bacterial, nematode and insect species. Plant-parasitic nematodes (PPN) are microscopic worms that feed and reproduce in plant root tissue and severely impact yield, causing economic losses. However, losses caused by PPN can depend on the type of nematode present and their population density. Tobacco growers fumigate land for nematode and disease prevention but sometimes this is not enough. Tobacco growers must rotate away from fields to prevent build-up and yield loss in future plantings. Choice of rotational crop for maximum nematode suppression can depend on the type of PPN present in the infested fields. For these reasons, a nematode survey was needed.

Nematode surveys of tobacco fields have not been completed in over 40 years and updating knowledge of PPN species diversity in Georgia tobacco fields is important. The invasive and aggressive guava root nematode, *Meloidogyne enterolobii*, has been recently detected in Tattnall and Echols Counties and understanding of the distribution of these pests is critical. A tobacco field survey was conducted in all tobacco producing counties in Georgia in collaboration with Dr. Intiaz Chowdhury, Dr. J Michael Moore, Dr. Ganpati Jagdale and numerous county Extension agents with the support of the Georgia Tobacco Commission to determine PPN species and their respective population densities.



Figure 1. Tobacco roots with extensive galling caused by root-knot nematodes. Photo credit: Ross Greene, UGA Extension Agent for Candler and Evans Counties.



Figure 2. Root-knot nematodes adult females indicated by the red circle. Photo credit: Ross Greene, UGA Extension Agent for Candler and Evans Counties

Experimental Design

In the fall of 2023, sampling was conducted between first and second tobacco harvest by Extension agents serving tobacco growing counties of Georgia. A total of 179 samples were collected across 15 tobacco growing counties of Georgia, ensuring at least 10 samples were collected from each county. Counties surveyed in this study include Lanier, Appling, Atkinson, Ben Hill, Berrien, Brooks, Candler, Coffee, Colquitt, Echols, Jeff Davis, Lowndes, Pierce, Tattnall, and Wayne counties

Sampling was conducted by randomly walking throughout each field collecting soil cores from 15 to 20 sampling points and a composite of three to four liters of soil were collected for each sample. Each sampling bag was labeled with field and producer names as well as GPS coordinates and cropping history. The samples were then thoroughly mixed, stored in coolers to keep soil from being exposed to direct sunlight, and hand-delivered to Dr. Chowdhury's Tifton Nematology team. The genus of each PPN in each sample and their population density was determined by the Athens Nematode Clinic. Soil characteristic and property data were determined by the UGA soil and water laboratories. Dr. Chowdhury's team then analyzed the data, and are currently evaluating species diversity of PPN in tobacco fields of Georgia. New samples were taken if results were too dry for analysis. In fact, 18 samples had to be re-sampled due to the lack of moisture in the soil (samples were taken during a dry period in July).

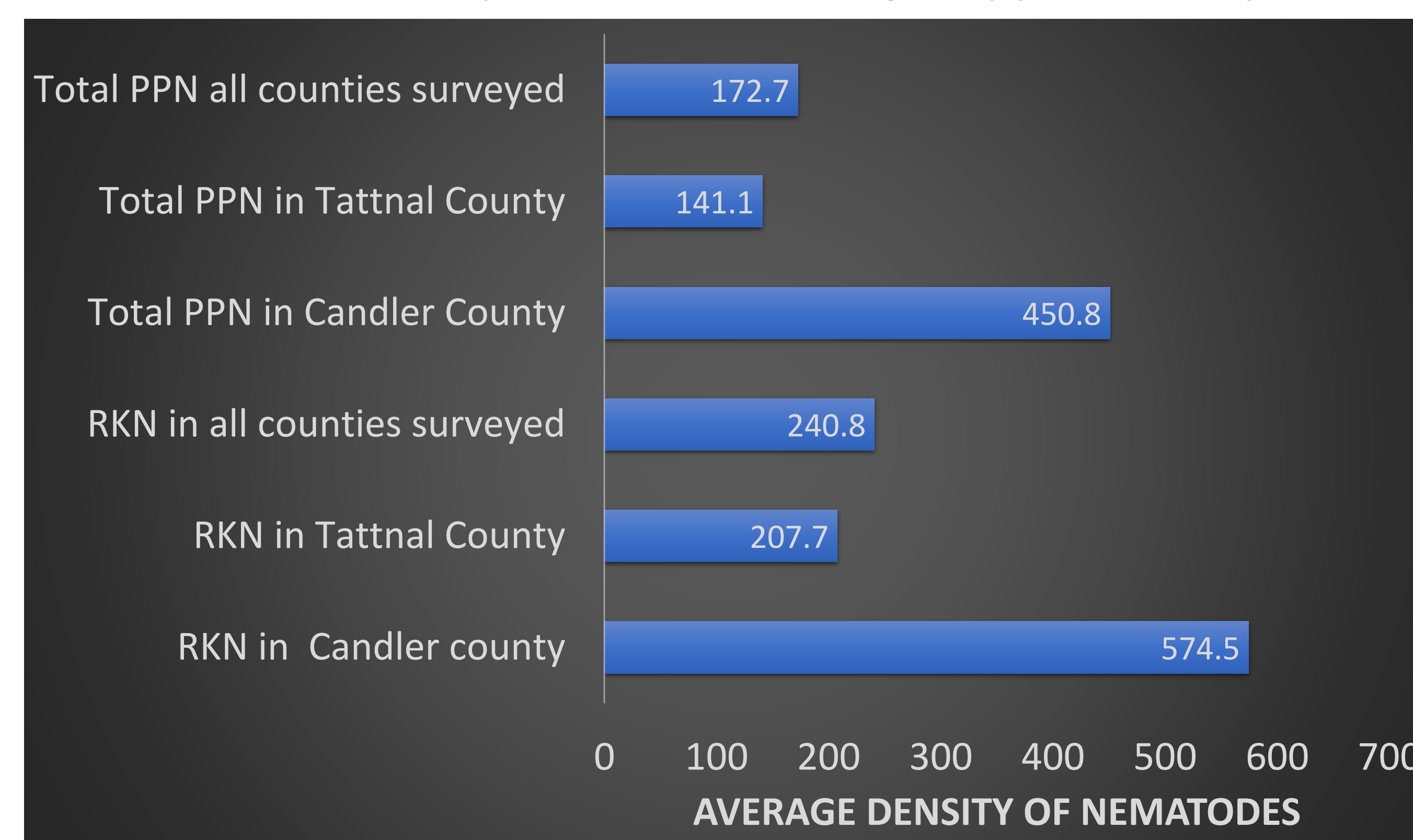


Figure 3. Plot showing average density of root-knot nematodes and total plant-parasitic nematodes per 100 cc of soil in Candler, Tattnall and combined results of all counties surveyed.

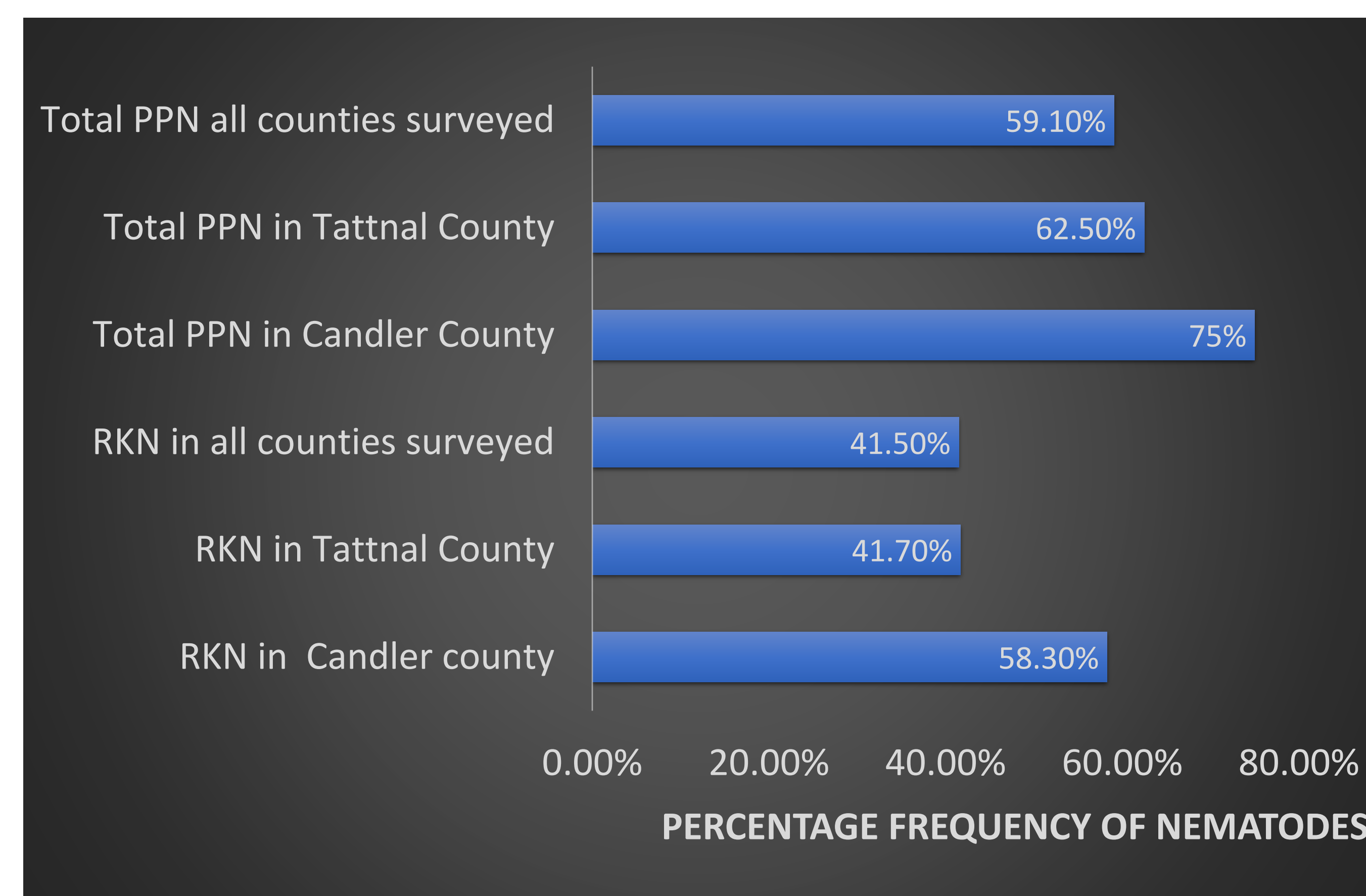


Figure 4. Plots showing percentage frequency of root-knot nematodes and total plant-parasitic nematodes per 100 cc of soil in Candler, Tattnall and combined results of all counties surveyed.

Results and Discussion

Root-knot nematodes were the most abundant and commonly found nematodes in Georgia's tobacco fields including the fields surveyed in Candler and Tattnall County. These nematodes are considered the most aggressive group of PPN in the world.

The highest density of RKN detected in the survey were 1,460 nematodes per 100 cc of soil. Whereas, the highest density of RKN in Candler and Tattnall counties were 1,314 and 765 nematodes, respectively.

Of the remaining species collected in the state, reniform nematodes had the second highest population density in a field. However, only one field in Colquitt County was found to be infested with this nematode in our survey. Although, lesion nematodes were found to be infesting tobacco fields of Georgia, their population density and frequency was low.

A similar trend appeared in the nematodes counts of Tattnall County. The second most common PPN in Tattnall was Ring (frequency: 21%, average density: 2.4), followed by Spiral (8%, 11.5), Stubby-Root (8%, 1) and Lesion (4.2%, 3). The presence of Stubby-Root is interesting because Tattnall County grows about 60% of the Vidalia Onion crop. These onions are host crops for Stubby-Root, and these nematodes were found in low populations in not only Tattnall and Candler but throughout the state.

Candler County had similar survey results to Tattnall. This is not surprising considering both counties are adjacent to one another and growers in both have similar practices and rotations. In Candler, nematodes other than RKN detected were Lesion (33.3%, 1.8), Ring (33.3%, 4.3) and Spiral (33.3%, 3.0).

Of the remaining non-RKN found, the most economically important is Lesion nematode, however, for the entire state this PPN only accounted for 8%. From the survey, it is evident that the most destructive and important PPN population in Georgia tobacco fields are RKN populations. According to previous literature, these appear to be the most economically important nematode affecting tobacco to date.



Figure 5. Tobacco with high counts of RKN. Photo credit: Ross Greene, UGA Extension Agent for Candler and Evans Counties



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