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Fall is Root Knot Nematode Sampling Time

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Why is Fall the best time to sample for Root-Knot Nematodes?

All nematodes pass through an embryonic stage, four juvenile stages (J1–J4) and an adult stage. Juvenile *Meloidogyne* parasites hatch from eggs as second-stage juveniles (J2), the first molt having occurred within the egg. Newly hatched juveniles have a short free-living stage in the soil, in the rhizosphere of the host plants. They may reinvade the host plants of their parent or migrate through the soil to find a new host root. J2 larvae do not feed during the free-living stage, but use lipids stored in the gut.

The J2s undergo morphological changes and form pouches. Without further feeding, they molt three times and eventually become adults. In females, which are close to spherical, feeding resumes and the reproductive system develops. The life span of an adult female may extend to three months, and many hundreds of eggs can be produced. Females can continue egg laying after harvest of the plant and the survival stage between crops is generally within the egg.

The length of the life cycle is temperature-dependent. The relationship between the rate of development and temperature is linear over much of the root-knot nematode life cycle, though it is possible the component stages of the life cycle, e.g. egg development, host root invasion or growth vary slightly different within species. Most growth and development of Root-Knot species occurs between 55 and 93 °F, with optimal development at about 84 °F. This is why the summer months are prime months for nematode growth and development and early fall are the prime time months to sample for this pest. The reason being is that the populations will be at their peak before the season changes and after the weather cools the populations decrease. We must know what level of population that we have to determine the severity of the pest to gauge control measures. For this reason fall months September till early October are prime months to sample and monitor Root-Knot Nematodes.

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Two Different kinds of Root Knot Nematodes to be concerned with:

There are four different pathogens of Root Knot Nematode but only race 3 and 4 are our major concerns as damaging nematodes.

*Meloidogynes incognita* – is the Cotton Root-Knot Nematode

*Meloidogynes arenaria* – is the Peanut Root-Knot Nematode

When analyzing in the laboratory, the scientist cannot distinguish between these two different races of Root-Knot Nematode. Therefore, the production history of the field can give us great insight to the species that may be prevalent within a field. If the production history has been several years of peanut production, then the Peanut Root-Knot Nematode would be the nematode that is present. One interesting fact is that the Peanut Root-Knot Nematode cannot survive on the cotton plant and vice versa, therefore rotation is a key component to cultural control of these species of nematodes.

Symptoms of Peanut Root-Knot Nematode

![Circular areas of dying peanut due to nematodes](image)
How should you sample your Fields?

1. **General Sampling** - It is recommended that random sampling should occur so that a general overview of the nematode population could be analyzed. For South Alabama it is noted that the sandier the soil texture the more likely that Root Knot Nematode could be a problem. Also nematodes are likely to have higher populations in the irrigated fields due to higher survival rate with more soil moisture. Therefore, it is recommended that you sample the most risk prone fields or in fields that have a history of nematodes.

2. **“Hot Spot” sampling** – Typically in late August and early September if there are any “hot spots” the plants will exhibit the stress caused by the root feeding of the nematode. The stress is caused by the nematode feeding root tissue with the disruption of the phloem and xylem tissue.
will cause apparent nutrient deficiencies on the upper part of the plant. Sometimes the nematode issue can be mistaken for poor soil or lack of nutrition when it is really a nematode issue. Sample these “hot spots” separately from a general sampling of a field.

3. **Moisture needed** – Nematodes are living organisms and they require moisture to survive and reproduce. Therefore, it is recommended that sampling be done when there is good moisture in the soil.

4. **Maintain the integrity of the sample** - Keep the sample moist and cool. Remember nematodes are living organisms. For this reason, it is recommended that nematode samples be put in plastic bags to prevent them from drying out. Also put the samples in a cooler or refrigerator until the samples can be transported to the laboratory.