Root-knot Nematode

Meloidogyne spp.

Description:

Females are pear-shaped and about 0.4-1.3 mm long and 0.27-0.75 mm wide. Whereas males are vermiform (worm-shaped) and about 1-1.5 mm long and 30-36 μ m in diameter. Immature, second-stage juveniles (J2s) are thread-like and colorless roundworms (0.5 – 0.75 mm long), and are the only infective stage.

Biology:

Life Cycle: Nematode populations overwinter primarily as eggs, from about December through March when most Georgia soils are too cold to support active root growth of warm-season crops. Eggs generally hatch into second-stage juveniles when soils are warm. Hatched juveniles enter into a nearby host's roots, then migrate to the vascular system to begin forming and feeding on cystic-like "giant cells". Once giant cells are formed, second- stage juveniles become sedentary, molt three times and become adults. Females are always sedentary but males become mobile and move into the soil after third molt. Mature females lay 150-1500 eggs on the root surface in a protective gelatinous matrix. These eggs hatch into new second-stage juveniles and begin new life cycle. Egg to egg life cycle of root-knot nematode is completed within 3-5 weeks at 25-30°C.

Distribution: Four major species of root-knot nematodes including *M. incognita*, *M. javanica*, *M. hapla* and *M. arenaria* are distributed worldwide but the most predominantly widespread species in GA are *M. incognita* and *M. arenaria*. In GA, pecan root-knot nematode (*M. partityla*) is also becoming a serious problem to pecan growers. Recently, the occurrence and distribution of *M. floridensis* and *M. marylandi* have also been reported in GA.

Damage:

Root-knot nematodes are one of the most economically important plant-parasitic nematodes distributed worldwide, known to cause severe damage to many vegetables, field crops, fruits, ornamentals and turfgrasses. They attack and infect roots of host plants and cause above- and below- ground symptoms. Above-ground symptoms from heavy infestation are chlorosis, yellowing, wilting, stunted growth and yield loss. Below-ground symptoms are more common, with entire root systems being completely covered with galls (knots) formed from feeding sites. Secondary infections may occur by soilborne bacterial and fungal pathogens that cause disease complexes in host plants. In Georgia, pecan root-knot nematode, *M. partityla*, is considered the most damaging nematode associated with mouse-ear foliar symptoms, nickel deficiencies, stunted growth and dead branches in the upper canopy of pecans.



Infective juvenile



Severely galled tomato roots



Above-ground symptoms in soybean

Management:

The ideal timing of collecting predictive nematode samples is important because nematode populations fluctuate throughout the year. Nematodes may be undetectable during the winter and early spring but increase to very high levels just before harvest; following harvest, population levels may decline precipitously.

Generally, resistant varieties will be preferable to chemical control if such varieties are available, but they must be used as part of a rotation and not grown every year or they may lose their efficacy as a management tool. New varieties with varying levels of resistance are released each year.

Crop rotations with non-host plants may provide benefits in addition to nematode control and should be considered if economically acceptable. Consider multi-year rather than year-to-year profits when determining if crop rotations are economically acceptable.

Combining the use of a nematicide with resistant varieties or non-host crops may decrease nematode population densities, which may increase the effectiveness of chemical control and allow the use of lower nematicide rates. For current resistant variety and cropping sequence recommendations, contact your county Extension office. Current nematicide recommendations can be found in the Georgia Pest Management Handbook.

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