AUBURN | extension
ALABAMA A&M & AUBURN UNIVERSITIES

Nematodes in Alabama Cotton

► Plant parasitic nematodes are a serious threat to Alabama cotton and are responsible for losses averaging 6.7 percent annually, valued at approximately $20.5 million. Nematodes spend their entire lives in the soil, feeding on the roots of cotton plants.

Although several species of nematodes parasitize cotton, only two cause significant economic damage in Alabama. The first is the southern root-knot nematode (*Meloidogyne incognita*), which is most often found in sandy soils in Alabama. The second is the reniform nematode (*Rotylenchulus reniformis*), which is most commonly found in the silty soils of Alabama.

Damage to cotton plants can range from mild to severe depending on the nematode species and its population level. In newly infested nematode fields, symptoms will first appear in localized, oval-shaped hot spots that run in the direction of the row or tillage patterns. These hot spots vary from a few feet to several hundred feet in diameter and will expand and coalesce (grow together) over time to form larger, irregular areas of symptomatic cotton. Aboveground symptoms of nematode-related injury include stunted plants, poor fruit set, and signs of potassium deficiency. These symptoms are easily confused with those caused by acidic soils, hardpans, nutritional deficiencies, and other diseases. Due to their small size, nematode injury to the roots can be difficult to recognize except for root-knot nematodes. Reniform-damaged roots are generally smaller and sparser but may otherwise look healthy. In contrast, root-knot nematodes can easily be identified by the presence of swellings or galls on cotton roots.

Spread

People are primarily responsible for the spread of nematodes. Spread from field to field usually occurs through nematode-infested soil clinging to farm equipment, vehicles, or the soles of field-workers' shoes. Reniform nematodes can survive for long periods in extremely dry soil, which ensures that

large numbers can successfully be transported in this manner. After nematodes are introduced to a field, they are spread within the field by water movement, cultivation, and equipment. Once nematodes are established in a cotton field, they remain there forever. Keeping nematodes out of clean, uninfested fields is extremely important for growers.

Kinds of Cotton Nematodes

Several species of nematodes are capable of parasitizing cotton roots, but reniform nematodes and the southern root-knot nematodes are responsible for 99 percent of the nematode damage in Alabama. Columbia Lance nematodes (*Hoplolaimus columbus*), serious cotton pests in North and South Carolina and Georgia, are found in a few cotton fields in Alabama, but cause less than 1 percent of production losses attributed to nematodes.

Reniform Nematodes

Reniform nematodes are one of the most damaging nematode pests on Alabama cotton, accounting for an estimated $10.7 million annual yield losses. First discovered in an east Alabama cotton field in 1959, reniform nematodes have since spread throughout the major cotton production areas of the state. This is due, in part, to their ability to thrive in many types of soil, survive under adverse conditions, produce extremely high populations, and reproduce on a variety of crops and weed hosts. Before 1994, most reniform infestations were found in south and central Alabama; however, more severe outbreaks have occurred in the Tennessee Valley area in north Alabama. Resulting damage from nematodes is directly related to the amount of moisture the crop receives. A wet season at planting stimulates nematode population levels. Currently, reniform nematodes are widely distributed across Alabama (figure 1).

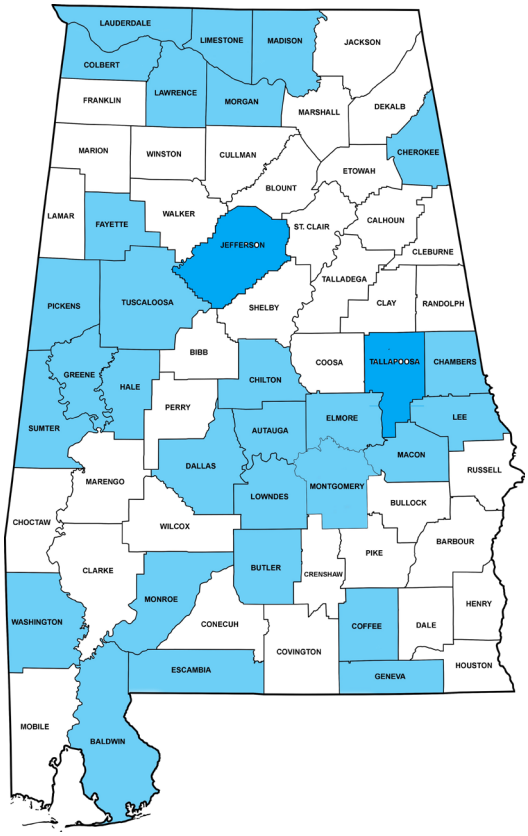

Figure 1. Evidence of reniform nematodes in Alabama.

Symptoms

In-field identification of reniform nematodes is difficult as infected plants exhibit various degrees of stunting, uneven plant growth, signs of potash deficiency (tiger striping), early maturity, and reduced cotton production. Due to variations in population densities, symptoms of reniform nematodes will typically first appear in localized areas or hot spots in newly infested fields (figure 2). Once they become established, stunting and uneven plant growth will become fairly uniform throughout the field. Under high reniform population densities, damaged cotton roots may appear normal but are generally smaller, more fragile, and have limited secondary root development compared to healthy roots. Soil particles adhere to nematode egg masses, giving the roots a gritty appearance. Necrosis may also be evident on impacted roots. Seedlings and young plants may have light green or chlorotic leaves, and leaf margins may

Figure 2. Symptoms of reniform nematodes on cotton.

take on a purple cast. Under high reniform nematode pressure, seedlings may die. Leaves of mature plants may be light green in color or exhibit the tiger striping yellow mottling between leaf veins (figure 3), which may become necrotic. However, infected plants can continue to grow slowly with a slightly off-color, uneven growth appearance (figure 4). Yield reductions of up to 50 percent of the previous yield in the cotton field before the reniform nematode infestation can be observed. Thus, a soil nematode analysis is the most reliable means for identifying reniform nematode infestations.

Life Cycle

Reniform nematodes begin feeding on the roots of cotton seedlings soon after the seed germinates. The adult female is the only stage that feeds. While in wormlike form, young adult females enter cotton roots and begin feeding. About one-third of the anterior

Figure 3. Tiger striping caused by reniform nematodes on cotton.

Figure 4. Symptoms of uneven growth caused by reniform nematodes on cotton at harvest.

(head) end of her body becomes embedded in the root, with her posterior remaining on the outside. In 2 to 3 days after entering the root, her posterior swells to form a reniform (kidney) shape, hence the name “reniform” nematode. The female lays from forty to seventy eggs in a gelatinous mass surrounding her posterior (figure 5). Adult males coil around the female and the egg mass. In 6 to 7 days, second stage juveniles emerge from the eggs and then undergo two molts (stages 3 and 4), lasting from 8 to 18 days before becoming adults. The reniform nematode completes its life cycle in 21 to 35 days at soil temperatures between 77 degrees F and 86 degrees F. Reniform nematodes can produce up to seven generations in the southern part of the state and as many as five generations in north Alabama.

Figure 5. Reniform nematode egg masses.

Host Range

Reniform nematodes parasitize a wide range of Alabama plants and crops. In addition to cotton, reniform nematodes attack many soybean varieties, sweet potatoes, vegetables, winter legumes, and several weed species including, cocklebur, jimsonweed, Florida beggarweed, Florida pusley, morning glory, pig weed, and sow thistle. Reniform nematodes do not feed or reproduce well on many winter cover crops including radish, mustards, canola, lupine, ryegrass, wheat, oats, and rye, making these crops a good choice for a winter cover crop. Corn, grain sorghum, and peanuts are not hosts for reniform nematode and make good rotation crops.

Interactions with Other Diseases

Reniform nematodes increase the incidence and severity of seedling diseases and fusarium wilt. However, reniform and root-knot nematodes are rarely found in the same field, as each species has its preferred soil type.

Southern Root-Knot Nematodes

Southern root-knot nematode (*Meloidogyne incognita*) is the most important nematode pest of cotton across the US Cotton Belt, but root-knot nematode ranks second in importance to reinform nematode in Alabama. The root-knot nematodes that attack cotton belong to two subgroups (races 3 and 4) of the southern root-knot nematode species *M. incognita*. Other root-knot nematode species include the peanut root-knot (*M. arenaria*), the northern root-knot (*M. hapla*), javanese root-knot (*M. javanica*), and the southern root-knot (*M. incognita* races 1 and 2), none of which feed or reproduce on cotton. The guava root-knot (*M. enterolobii)* does attack cotton but has only been found in ornamental fields in Alabama to date. The current distribution of various species of *Meloidogyne* in Alabama can be found in figure 6.

Although southern root-knot nematodes can be found in most soil types, they are most commonly found in coarse or sandy soils. They can be found in fields with Columbia lance nematodes but are not frequently found in the same fields as reniform nematodes unless corn has been a rotation crop. Yield losses to root-knot nematodes usually range from 10 to 25 percent but may exceed 50 percent in sandy soils on susceptible varieties exposed to drought conditions during bloom and boll set. However, damage or yield losses in fields are usually even. Heavily infested areas may have yield losses of up to 100 percent, while other areas exhibit no apparent damage. Statewide, southern root-knot nematodes account for an estimated $9.8 million in yield losses annually.

Symptoms

Symptoms of root-knot nematodes are found in clusters randomly distributed across a field and can be seen where the nematode pressure is high. Infected cotton plants will be stunted and often chlorotic. Affected areas are oval shaped and oblong in the direction of cultivation. Affected areas may be 10 to 30 feet wide and 20 to 50 feet long. Root-knot nematode infestations can often be identified by digging up the roots of suspected cotton plants to look for galls that resemble knots in a rope (figure 7). However, these galls may not be present early in the growing season. Galls are produced by the swelling of root tissue associated with the feeding of the nematode inside the root and are more common on secondary roots but can occur on the tap root. Galls on cotton roots are usually smaller and harder to recognize than those produced on soybeans. While the presence of galls on cotton roots is a diagnostic feature that can be used to identify southern root-knot nematodes, a nematode soil analysis is still useful. The analysis usually identifies root-knot nematodes morphologically to genera (*Meloidogyne spp*.). The laboratory will need to conduct polymerase chain reaction (PCR), a molecular technique used to identify nematodes, for species conformation. However, information on the field's cropping history may help indicate the species of root-knot nematode present.

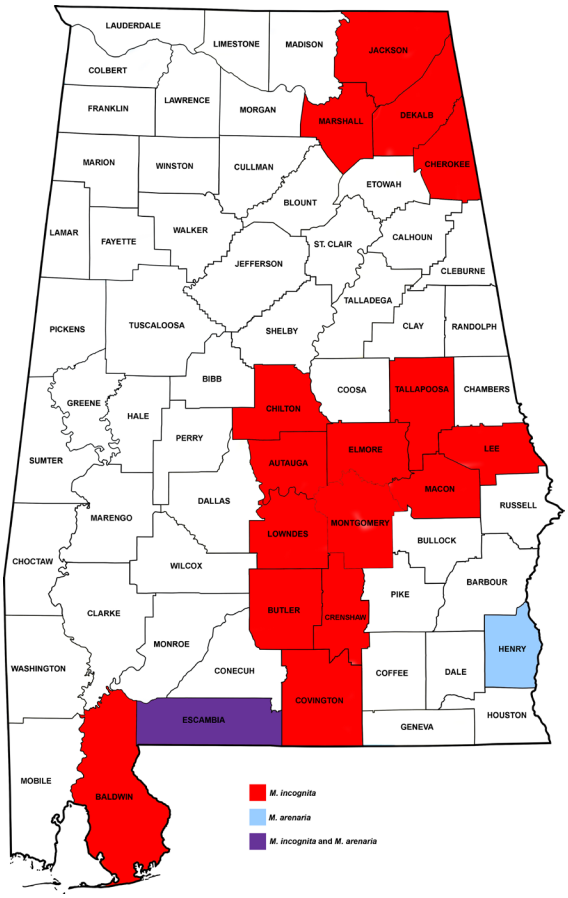

Figure 6. Distribution of southern root-knot nematodes in Alabama.

Figure 7. Cotton root with galls caused by root-knot nematodes.

Life Cycle

Root-knot nematodes complete their life cycle in approximately 30 days under ideal temperatures (80 degrees F). The second-stage juveniles hatch from the egg and then enter and start feeding on cotton seedling roots soon after the seeds germinate. Juveniles completely embed themselves in the root and become immobile. As they feed, plant cells near the feeding site divide and enlarge to form giant cells (galls). Juveniles remain sedentary and continue to enlarge, becoming sausage shaped as they reach the fourth stage. About 3 weeks after entering the root, juveniles develop into pear-shaped adult females. Females lay from 300 to 1,000 eggs in a gelatinous mass, and approximately 10 days later, second-stage juveniles hatch to begin the second generation.

Most damage to cotton results from the physiological changes in the root tissue as root-knot nematodes feed. Giant cells formed during the feeding process disrupt the development of the root's vascular system and impair the root's ability to absorb water and nutrients from the soil efficiently. Also, sugars and carbohydrates produced in the leaves are diverted to the nematodes' giant cell feeding sites rather than to the developing roots.

Host Range

Southern root-knot nematodes attack most crops, including cotton, soybeans, corn, and many vegetables. Southern root-knot nematodes also feed and reproduce on winter grass–type cover crops such as wheat, oats, rye, and barley, but root-knot population increases are significantly slowed by cool soil temperatures in the winter. Legume cover crops, including clover and most vetch varieties, are excellent hosts and can potentially increase root-knot populations. Weeds susceptible to root-knot attack include bermudagrass, johnsongrass, cocklebur, goosegrass, red root pigweed, purple nutgrass, yellow nutsedge, smartweed, teaweed, lambsquarter, ground cherry, and sicklepod.

Interactions with Other Diseases

Southern root-knot nematodes increase the incidence and severity of fusarium wilt and other cotton seedling diseases. The fusarium wilt and root-knot complex is well documented. Although fusarium wilt is capable of causing wilt in the absence of root-knot, the disease is almost always associated with these nematodes in Alabama.

Columbia Lance Nematodes

Several species of lance nematodes can be found in Alabama cotton fields, although the most economically damaging is the Columbia lance nematode (*Hoplolaimus columbus*), which seriously damages cotton. Fortunately, Columbia lance nematodes cause little damage to cotton in Alabama as they only occur sporadically but are most common in soils that have relatively high sand content.

Symptoms

Symptoms appear in localized, scattered areas across a field due to the clustered distribution of the Columbia lance nematode. Like root-knot nematodes, lance nematode–infested areas are oval and in the direction of cultivation. Infested plants are often stunted and chlorotic. The degree of stunting is typically related to population density, soil type, soil moisture, and other environmental conditions. Severe chlorosis is rare in cotton but can be pronounced in soybeans. Lance nematodes do not produce galls or other characteristic symptoms on root systems. However, the taproot is severely stunted with numerous secondary roots in the upper 4 inches of the soil as *H. columbus* prefers to feed on meristematic root tissue (figure 8).

Figure 8. Cotton root showing injury to the taproot. (Photo credit: Clemson University–USDA Cooperative Extension Slide Series, Bugwood.org)

Life Cycle

Columbia lance nematodes are migratory ecto-endo-parasites that migrate and feed throughout the outer root tissue. Unlike reniform and root-knot nematodes, lance nematodes retain their wormlike appearance in all developmental stages. All stages feed on cotton roots. The adult female lays twenty to fifty individual eggs. Although relatively few eggs are produced, a large percentage of offspring survive because they can tolerate severe desiccation and changes in soil conditions and can migrate vertically to avoid unfavorable conditions. The adult female has a life span from 6 months to a year. How many times the female lays eggs during her life span is unknown.

Host Range

Columbia lance nematodes have a wide host range, including cotton, corn, soybean, wheat, and bermudagrass. They do not feed or reproduce on peanuts, sweet potatoes, tomatoes, peppers, ryegrass, or bahiagrass. Poor hosts for Columbia lance nematode include watermelons, cucumbers, cantaloupes, and okra. Weeds that are good hosts for them are nutsedge, pigweed, sicklepod, henbit, crimson clover, and showy crotalaria.

Interactions with Other Diseases

The presence of Columbia lance nematodes has been associated with increasing the severity of seedling diseases caused by several fungal pathogens, including *Rhizoctonia solani*, *Pythium* spp., and *Fusarium* spp. However, they have not been shown to increase fusarium wilt in cotton.

Diagnosing Nematodes in Cotton

Fields where cotton has been grown repeatedly should be tested for nematodes every 2 to 3 years. This way, destructive nematode populations can be detected before yield losses, especially in fields with limited crop rotation. Generally, the best time to sample cotton fields for nematodes is after a rain event with moist soil between August and October, as populations will be at their highest level and most easily detected. Nematode populations will be at their lowest and may not be detected in the sample in late winter through early spring or when the soil is very dry.

For sampling, fields should be divided into 5-to-10-acre sections, and samples should be taken in a zigzag or irregularly shaped pattern. Twenty or more random samples per section should be taken, using a soil probe or shovel, from the top 8 to 10 inches of soil directly from the root zone if plants are still present. Mix all samples thoroughly and remove 1 pint for analysis.

Collect samples from problem areas of the fields, but take them from moderately affected plants as numbers are usually low beneath severely injured or dead plants. For comparison, also take samples from unaffected areas. Clearly separate and mark these samples as “good area” and “bad area” so they will not be confused. Samples should consist of roots and soil from several plants. DO NOT take samples from extremely dry or saturated soil, as nematode populations are usually low under these conditions. DO NOT allow samples to get hot or dry. Allowing samples to sit in direct sunlight or in a hot vehicle for even a short time can kill the nematodes. Nematodes must be alive for the extraction procedure from soil samples, and killing the nematodes will affect the ability to detect them. In short, treat nematode soil samples like a pint of milk, which should be stored in a cool ice chest out of direct sunlight. The Plant Diagnostic Lab of Auburn University provides soil nematode assay information and has sampling strategy recommendations available for producers. For additional information, see “Nematode Sample Submission Form” (ANR-F7) on the Extension website at www.aces.edu.

Interpreting Nematode Soil Assay Results

Producers can use nematode soil assay results to make informed management decisions. The University of Georgia Cooperative Extension Service provides information on interpreting nematode assay results for several crops including cotton (table 1). These recommendations are based on action thresholds and are meant to be taken as a general guide. An action threshold is the nematode population density at which control measures must be implemented to prevent economic losses.

Table 1. University of Georgia Extension Cotton Nematode Soil Assay Thresholds		
Nematode	**Assay Results***	**Recommendations**
Southern root-knot	1 to 99	Cotton crop will be affected. Use a resistant variety.
	100 or more	Use a resistant variety and a nematicide. Consider implementing a crop rotation sequence with a nonhost.
Reniform	1 to 249	This number of nematodes may begin to cause damage. Correct any pH, fertility, or hardpan conditions. Nematicides may be beneficial.
	250 or more	Use a resistant variety and a nematicide. Consider implementing a crop rotation sequence with a nonhost.
Lance	1 to 79	This number of nematodes may begin to cause damage. Correct any pH, fertility, or hardpan conditions. Nematicides may be beneficial.
	80 or more	Cotton crop will be affected. Use a nematicide. Implement a crop rotation sequence with a nonhost.
Sting**	1 or more	Cotton crop will be affected. Use a nematicide. Implement a crop rotation sequence with a nonhost.

*Collect samples in the fall (August to October) as populations will be at their highest. The worst time to sample for nematodes is late winter through early spring. Nematode numbers are per 100 cm3 of soil.

**Sting nematodes do occur on cotton but are rarely found in Alabama soils.

Management

Integrated pest management for nematodes in cotton focuses on crop rotation, planting resistant varieties, equipment sanitation, seed treatments, and applying nematicides. Management decisions should be based on nematode population levels determined by testing soils sampled in the fall (August to October) when populations are at their highest.

Crop Rotation

Crop rotation is an effective tool for controlling reniform and southern root-knot nematodes, especially where profitable nonhost crops can be rotated with cotton (table 2). Corn, sorghum, and peanuts are not hosts for reniform nematodes and will reduce populations. Winter grain crops such as wheat, rye, oats, and barley also are nonhosts for reniform; however, legume winter cover crops such as vetch and clover are hosts and should be terminated, usually in March, before the spring temperatures increase. Winter grain crops also do not generally enhance southern root-knot or lance nematode damage and have little impact on population densities as they are grown in the winter months when cotton nematodes are least active but should be terminated similarly to the legume cover crops. Due to the wide host range of lance nematodes, they can be difficult to manage by crop rotation alone. In Alabama, peanut is the only row crop not affected by reniform, the southern root-knot, or lance nematodes, so it is an excellent crop to rotate with cotton.

Table 2. Host Information for Nematodes in Alabama Row Crops

Nematode	Cotton	Soybean*	Corn	Peanut	Grain Sorghum
Southern root-knot	Host	Host	Host	Nonhost	Host
Reniform	Host	Host	Nonhost	Nonhost	Nonhost
Lance	Host	Host	Host	Nonhost	Host
Sting**	Host	Host	Host	Host	Host
Peanut root-knot	Nonhost	Host	Host	Host	Host
Lesion	Host	Host	Host	Host	Host
Soybean cyst	Nonhost	Host	Nonhost	Nonhost	Nonhost

*Soybean and cotton varieties are available that are root-knot and reniform nematode resistant.

**Sting nematodes rarely occur on cotton in Alabama but have been sporadically found on corn in very sandy soils.

Resistant Varieties

Variety selection is a key aspect of nematode management as it can reduce nematode populations and root damage. Consider planting a nematode-resistant variety as equivalent to planting a nonhost crop—both greatly reduce nematodes for future seasons. Several commercial varieties are resistant to either southern root-knot nematodes or both root-knot and reniform nematodes. Before planting a nematode-resistant variety, producers should determine the species of nematodes present in the field and use the Auburn University Variety Selection Platform on the Alabama Agricultural Experiment Station website to explore variety performance data in their area. The current list of resistant varieties as of 2025 is found in table 3. However, more information on each cotton variety can be found using each company's seed catalog.

Sanitization

Certain cultural practices can effectively reduce existing nematode populations and prevent the spread of nematodes to "clean" fields. **Exclusion or preventing the spread of nematodes is particularly important.** Once nematodes have been introduced into a cotton field, they can never be eradicated. To prevent the spread of nematodes, cotton growers should assay all their fields to know which ones are infested and which are not. Farm equipment should also be washed to remove all soil particles before moving to noninfested fields. Nematode-infested fields should be worked last, if possible, to reduce the need to wash equipment.

Table 3. Commercially Available Cotton Varieties with Nematode Resistance or Tolerance				
Company Name[1]	**Variety Name**	**Resistance/ Tolerance**	**Nematode[2]**	**Recommended Growing Region[3]**
BASF (FiberMax)	FM 765 AX	Resistant	RNK	High Plains of Texas
	FM 814AXTP	Resistant	RNK	Texas and Oklahoma
	FM 823 AXTP	Resistant	RNK	Texas and Oklahoma
	FM 868 AXTP	Resistant	RNK	Texas and Oklahoma
BASF (Stoneville)	ST 4833 AXTP	Resistant	RNK	Far West and East of Texas
	ST 5855 AXTP	Resistant	RNK	All US upland cotton regions
	ST 5931 AXTP	Resistant	RNK and Reniform	All US upland cotton regions
	ST 6000 AXTP	Resistant	RNK	SE and South United States
Bayer (Deltapine)	DP 2141NR B3XF	Resistant	RNK and Reniform	Far West, Midsouth, and SE
	DP 2143NR B3XF	Resistant	RNK and Reniform	Texas and Far West
	DP 2349NR B3XF	Resistant	RNK	Far West, East Texas, Midsouth, and SE
	DP 2436NR B3TXF	Resistant	RNK	West Texas
	DP 2522NR B3TXF	Resistant	Reniform	East Texas, Midsouth, and SE
Corteva (PhytoGen)	PHY 136 W3E1	Resistant	RNK and Reniform	n/a east of Texas
	PHY 137 W3E1	Resistant	RNK	n/a east of Texas
	PHY 205 W3FE	Resistant	RNK and Reniform	n/a east of Texas
	PHY 332 W3FE	Resistant	RNK and Reniform	All US upland cotton regions
	PHY 350 W3FE	Resistant	RNK	n/a east of Texas
	PHY 360 W3FE	Resistant	RNK	Eastern United States
	PHY 390 W3FE	Resistant	RNK	n/a east of Texas
	PHY 394 W3FE	Resistant	RNK	n/a east of Texas
	PHY 400 W3FE	Resistant	RNK	All US upland cotton regions
	PHY 411 W3FE	Resistant	RNK and Reniform	All US upland cotton regions
	PHY 415 W3FE	Resistant	RNK	All US upland cotton regions
	PHY 443 W3FE	Resistant	RNK and Reniform	All US upland cotton regions
	PHY 475 W3FE	Resistant	RNK and Reniform	Lower SE United States
	PHY 480 W3FE	Resistant	RNK	n/a east of Texas
	PHY 500 W3FE	Resistant	RNK	Lower SE United States
	PHY 545 W3FE	Resistant	RNK	Lower SE United States
DynaGro (Nutrien Ag Solutions)	DG P224 B3XF	Tolerant	RNK	Southern High and Rolling Plains of Texas
	DG 3215 B3XF	Tolerant	RNK	West Texas and Oklahoma
	DG 3387 B3XF	Tolerant	RNK	West Texas and Oklahoma
	DG 3421 B3XF	Tolerant	RNK and Reniform	Texas, Gulf Coastal, and SE United States
	DG 3422 B3XF	Tolerant	RNK and Reniform	Texas, Gulf Coastal, and SE United States
	DG 3519 B3XF	Tolerant	Reniform	Texas, Midsouth, and SE United States
	DG 3644 B3XF	Resistant	RNK and Reniform	Delta

[1] This list was compiled by the Cotton Nematology Working Group in 2025, and companies are listed in alphabetical order.

[2] RNK= Root-knot nematode.

[3] n/a= not-available; SE= southeast

Nematicides

Nematicides are important tools for nematode management, but they should only be applied when and where they are needed. If nematodes are not present in a field, then nematicide applications will not provide a return on investment. Depending on nematode pressure (i.e., population numbers from nematode soil assays), application technology and recommendations vary for different nematicides and control measures (table 4). Telone II, a preplant fumigant, is the only fumigant nematicide for use in fields with high nematode pressure; however, it is not widely used in Alabama. Several nonfumigant nematicides, such as AgLogic, Velum, and Vydate, are labeled for use in cotton and can be used in fields with low to moderate nematode populations. AgLogic is a granular formulation applied at planting and sometimes as a side dress near pin head square cotton growth stage. Velum can be applied as a liquid in-furrow spray at planting. Seed-applied nematicides are usually offered specifically paired with the cotton variety selected rather than applied by the grower. Seed treatments such as Aeris, Aveo ES, Avicta Duo, BioST, and Poncho/Votivo are nematicide seed treatment options for fields with low to moderate nematode pressure. Vydate C-LV and Velum can be applied postemergence as foliar sprays and may be considered as a rescue application if no nematicide was applied at planting. Bottom line: when selecting nematicides, don't guess, do a soil test. Overall, the number of nematicides is increasing, thus for specific nematicide recommendations and rates, see Extension publication "Cotton: Insect, Disease, Nematode, and Weed Recommendations" (IPM-0415) at www.aces.edu.

Table 4. Labeled Nematicides for Alabama Cotton

Nematode Level	Nematicide	Rate Per Acre	Application Method	Efficacy[1]
Low to moderate	Aeris	*See label	Seed applied	Poor to fair
Low to moderate	Aveo ES	*See label	Seed applied	Limited data
Low to moderate	Avicta Duo Cotton	*See label	Seed applied	Poor to good
Low to moderate	Bio ST	*See label	Seed applied	Fair to good
Low to moderate	Poncho/Votivo	*See label	Seed applied	Poor to fair
Moderate	AgLogic 15G	3.5 to 7.0 pounds	In-furrow at-plant	Good to excellent
Low to moderate	Averland FC	3.5 fluid ounces	In-furrow at-plant	Limited data
High	Telone II	3.0 to 6.0 gallons	Preplant fumigant	Fair to excellent
Moderate	Velum	5.0 to 6.84 fluid ounces	In-furrow at-plant	Good to excellent
Low to moderate	Vydate C-LV	8.5 to 17.0 fluid ounces	Postemergence	Poor to good

[1] Efficacy scale is none to excellent and is based on common application rates and methods in Alabama. Limited data = limited published data on effectiveness. Efficacy may vary by situation and should only be used as a guide. Ratings are based on published and unpublished data from cotton nematode research trials in Alabama as well as surrounding states. However, some products may not have been tested side-by-side in all trials.

Works Cited

Dyer, D.R., Groover, W. and Lawrence, K.S. 2020. Yield loss of cotton cultivars due to *Rotylenchulus reniformis* and the added benefit of a nematicide. Plant Health Progress. 21, 113–118.

Jagdale, G.B. 2016. Guide for interpreting nematode assay results. Cooperative Extension, University of Georgia, USA.

Jones, J.R., Lawrence, K.S. and Lawrence, G.W. 2006. Use of winter cover crops in cotton cropping for management of *Rotylenchulus reniformis. Nematropica* 36, 53–66.

Kirkpatrick, T.L., and Rothrock, C.S. (eds) 2001. Compendium of Cotton Disease, Second Edition. St. Paul, Mn. APS Press.

Koenning, S.R., Wrather, J.A., Kirkpatrick, T.L., Walker, N.R., Starr, J.L., and Mueller, J.D. 2004. Plant-parasitic nematodes attacking cotton in the United States: Old and emerging production challenges. Plant Disease. 88:100–113.

Lawrence, K.S., Price, A.J., Lawrence, G.W., Jones, J.R. and Akridge, J.R. 2008. Weed hosts for *Rotylenchulus reniformis* in cotton fields rotated with corn in the southeast of the United States. *N*ematropica. 38, 12–22.

Moore, S.R., Lawrence, K.S., Arriaga, F.J., Burmester, C.H. and van Santen, E. 2010. *Rotylenchulus reniformis* dispersal patterns upon introduction into a cotton field. Journal of Nematology. 42, 307–312.

Palmateer, A.J., Lawrence, K.S., van Santen, E. and Morgan-Jones, G. 2004. Interaction of *Rotylenchulus reniformis* with seedling disease pathogens of cotton. Journal of Nematology. 36, 160–166.

Robinson, A.F., Inserra, R.N., Caswell-Chen, E.P., Vovlas, N. and Troccoli, A. 1997. *Rotylenchulus reniformis*: Identification, distribution, host ranges, and crop plant resistance. Nematropica. 27, 127–180.

Schrimsher, D.W., Lawrence, K.S., Sikkens, R.B. and Weaver, D.B. 2014. Nematicides enhance growth and yield of *Rotylenchulus reniformis* resistant cotton genotypes. Journal of Nematology. 46, 367–375.

Amanda Strayer-Scherer, *Extension Plant Pathologist,* Assistant Professor, Entomology and Plant Pathology; **Kathy Lawrence,** Professor, Entomology and Plant Pathology; **Scott H. Graham**, *Extension Entomologist,* Assistant Professor, Entomology and Plant Pathology; **Eddie McGriff**, *Extension Agent*; and **Kassie Conner**, *Extension Specialist,* all with Auburn University

Revised June 2025, ANR-0967

www.aces.edu