

Disease Control

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Seed and Seedling Diseases

Rapid emergence and strong early-season growth are recognized as being most important to success in cotton production. Seedling diseases occur more frequently under cool, wet conditions immediately after planting. Soil temperatures at the 4-inch depth should average above 60°F and the forecast should favor continuation of these conditions over the next three days. Daily soil temperatures and cotton degree-days are available on the World Wide Web at <http://www.ipm.vt.edu/infonet/>. It is also important to check the ten-day forecast at <http://www.weather.com>. Other factors, such as planting too deep, heavy soil crusting, sting and reniform nematodes, and misuse of herbicides may increase disease problems. Seedling diseases do not usually kill an entire seedling population, but rather cause uneven, slow-growing stands with skips in the row.

The first line of defense against seedling disease is to plant high-quality seed that is coated with seed protectant fungicides and insecticides. Try to obtain seed with cool germination levels of 80 percent or higher. Avoid seed with cool germination levels below 70 percent. All commercial seed is routinely sold with protectant fungicide coatings, which include Captan, Thiram, or Baytan plus PCNB and metalaxyl. New seed treatments include Dynasty CST (azoxystrobin, fludioxonil, mefenoxydemethylpropyl) and Trilex Advanced (Trilex, Baytan, Allegiance) for seedling diseases, and Avicta Complete Pak (Dynasty CST, Cruiser, Avicta), and Aeris (thiodicarb, imidacloprid) for control of thrips and nematodes.

If additional protection is desired, an in-furrow fungicide treatment, or hopper-box treatment can be used. Benefits would most likely be seen in fields with a history of seedling disease problems when planting early or when cold, wet weather is expected shortly after planting. Field trials at multiple locations in Virginia since 1990 have not shown an economic benefit from use of in-furrow or hopper-box fungicide treatments on seed.

Table 6. In-furrow and hopper-box fungicides for cotton.

Disease	Fungicide Common Name	Fungicide Trade Name	Formulated Rate	Remarks
Seedling disease; Damping-off; Seed rot	PCNB + etridiazole	Terraclor Super X 12.5G Terraclor Super X 18.8G (Note: also available in liquid formulation)	8-12 lb/A 6-9 lb/A	Apply to seed furrow at planting. Read and follow all label restrictions.
	metalaxyl + PCNB	Ridomil PC	7.0-10.0 lb/A	Same as above.
	azoxystrobin	Quadris	5.8-8.7 fl oz/A	Same as above.
	carboxin + PCNB + metalaxyl	Prevail	8.0-16.0 oz/cwt	Apply to seed in hopper at planting.

Nematodes

Nematodes cause significant damage to cotton in some fields in southeastern Virginia. The sting nematode is recognized as highly destructive to cotton because of the crop's high sensitivity to this nematode. Root knot nematodes are generally not a problem when peanut and cotton are rotated in the same field. However, southern root knot and reniform nematodes have become an increasing problem where cotton is grown continuously for five or more years. Stubby root nematodes are parasitic on cotton and may represent the most common cause of crop damage in Virginia.

Diagnostic assays for nematodes in soil planted to cotton are provided free of charge by the Plant Disease Clinic at Virginia Tech. Nematode population thresholds for damage to cotton are available on the Web at <http://ipm-www.ento.vt.edu/states/va/html>. The Virginia Predictive Nematode Assay Program offers growers an opportunity to locate problem fields prior to planting. The best time to collect soil samples for assay is in the fall. Assay forms, sample bags, and instructions should be obtained from a local Extension office before collecting samples. A service charge of \$11.00 for vermiform or \$19.00 for cyst nematodes is levied on each sample. Counts of vermiform species are all that is needed if cotton is the only crop to be grown. However, if soybean or possibly tobacco might be considered as alternative crops, then counts of cyst nematodes would be more important or even critical. Nematode control is best accomplished by preventing the buildup of harmful numbers of nematodes in soil through crop rotation and good weed control. If nematodes pose a threat to cotton production, chemical control can be used to minimize the risk of crop damage.

The most common and important nematodes that parasitize cotton in Virginia are southern root-knot and stubby root nematodes. Cotton is also damaged by sting and reniform nematodes, but these species are more widely scattered in the soils planted to cotton.

Table 7. Nematicides for use in cotton.

Disease	Nematicide Common Name	Nematicide Trade Name	Formulated Rate	Remarks*
Sting, reniform, lesion, lance, root knot, stubby root	aldicarb	Temik 15G	5.0 lb/A	Apply in seed furrow. Higher rates can reduce seedling emergence.
			7.0-10.0 lb/A	Apply in a 4- to 6-inch band over row and incorporate.
	1,3-D	Telone II	3.0 gal/A	Apply 8-12 inches deep in row and bed soil. Wait 7-14 days before planting.
	abamectin	Avicta Complete Pak (also contains Dynasty CST and Cruiser)	Mixture of abamectin, azoxystrobin, fludioxinil, mefenozam thiamethoxam	Suppresses early-season root damage by nematodes. Must be applied by seed vendors with commercial application equipment.
	thiodicarb	Aeris seed-applied system	Mixture of thiodicarb + Gaucho	Same as above, except lacks fungicide unless requested with Trilex Advanced.

* Read product label carefully. Note application hazards, re-entry statements, restrictions on feeding livestock, rotation restrictions, and protective clothing required before treatment. Read and observe all requirements as defined on labels.

Boll Rot

Foliar applications of fungicides have not been shown to reduce boll rot in Virginia. Boll rot is often a result of excessive insect damage coupled with excessive moisture. Management of boll rot is best achieved indirectly through control of boll damage by insects and use of growth regulator to manage vegetative growth.

Hardlock

Hardlock is a problem that causes seed cotton to remain compact in the shape of locules. Although the bolls open, the cotton fibers do not “fluff out” of the open boll. As a result, hardlocks often fall to the ground during harvest with spindle-type pickers. Studies are currently ongoing to determine the cause and the potential benefit of fungicide sprays for control of hardlock in Virginia and other states.