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CLEMSON UNIVERSITY

EDISTO RESEARCH & EDUCATION CENTER

COTTON

COTTON SEEDLING DISEASE CONTROL

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Seedling diseases occur on cotton in South Carolina every year. *Rhizoctonia solani* is the most commonly occuring pathogen with *Pythium* spp. occurring on early planted cotton or cotton planted on heavy or cool-wet soils. One or both of these seedling disease pathogens are present in almost every cotton field. Damage to plants may vary from barely detectable to death. The seedling disease complex is estimated to reduce yields 3 to 5% in South Carolina every year. The costs to growers are even higher when the cost of replanting and delayed maturity in the second crop are included. Disease incidence and severity in a given field are determined by environmental factors such as soil temperature and moisture conditions and by other factors such as seed quality and vigor. In addition stresses on the plant such as pesticide phytotoxicity, fertilizer burn, sand blasting, or damage from other pathogens such as nematodes will increase the incidence and severity of seedling diseases.

Cotton seedling diseases can occur as:

1) a **seed rot** which occurs prior to germination,
2) a **pre-emergence damping off** which occurrs between germination and emergence,
3) a **post- emergence damping off** and
4) **Sore shin** which occurs on plants greater than eight inches tall and is generally nonlethal.

Post-emergence damping off is the most commonly occuring "seedling" disease in South Carolina and over 80% of the time it is caused by *Rhizoctonia solani*.

Seedling disease management relies on the integration of cultural practices and the prudent use of fungicides. There are **no cultivars which offer any level of resistance** to seedling diseases. **Crop rotation is also ineffective** since both *Rhizoctonia solani* and *Pythium* spp. are capable of infecting most commonly grown rotation crops such as corn, peanut, and soybeans. Even when a susceptible host is not present both fungi are capable of surviving saprophytically on soil organic matter such as dead weeds or residue from winter cover crops. The most important **cultural practice limiting seedling disease severity is to delay planting** until soil temperatures at the 4 inch depth are above 68 F for three consecutive days. Planting on beds allows better drainage and creates higher soil temperatures. Other cultural practices include: 1) the use of high quality seed, 2). avoiding low pH's (less than 6.0) which favor disease development and suppress plant growth, and 3). avoid injury from preemergence and early season herbicides, insecticides, and fungicides

as well as fertilizer burn.

Fungicides used as seed treatments and in-furrow sprays or granular materials can be effective in reducing infections and stand problems due to either *Rhizoctonia solan* or *Pythium ultimum*. However, **most fungicides control only one of the two fungi**. **To control both fungi, combinations of fungicides must be used.**

Almost all commercial seed sold is treated with combinations of fungicides which can help control these fungi. The most commonly used seed treatment fungicide against *Rhizoctonia solani* is Vitavax (carboxin) and Apron (metalaxyl) is probably the most commonly used against *Pythium* spp. In-furrow granulars or liquid fungicides commonly use **PCNB** for *Rhizoctonia solani* and either **metalaxyl** or **etridiazole** (also known as ethazole) for *Pythium ultimum***.** Formulations of Terraclor Super X and Ridomil PC are very effective in preventing the seedling disease complex which occurs in South Carolina. Terraclor formulations are available for application when *Pythium* spp. are not believed to be present. Ridomil 2E is available for use where *Rhizoctonia solani* is not considered to be a problem. Using fungicides which control only one of the fungi can be risky.

As with in-furrow fungicide programs, hopper box treatments are available which are effective in reducing the seedling disease complex. Once again most products combine fungicides to control both *Rhizoctonia solani* and *Pythium* spp. Deltacoat AD combines Apron (metalaxyl for *Pythium* spp.) and Demosan (chloroneb for *Rhizoctonia solani*). Prevail combines Apron + Terraclor (for *Rhizoctonia solani*) + Vitavax (for *Rhizoctonia solani*). Kodiak is a biological control agent which contains the bacterium *Bacillus subtilis* which can be effective against *Rhizoctonia solani*.

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Table 1. Fungicides Available for Seedling Disease Control				
Disease	***Common Chemical Name***	***Pesticide***	***Product/Unit***	***Application Method***
Rhizoctonia spp.	Carboxin	VITAVAX 75W	8 oz/100 lb untreated seed	Planter box
			4 oz/100 lb previously treated seed	Planter box
	PCNB	TERRACLOR 2EC	3-6 pt/ac	In-furrow
		TERRACLOR 10G	8-15 lb/ac	In-furrow
		TERRACLOR 75W	1.3-2.5 lb/ac	In-furrow
Pythium spp.	Metalaxyl	APRON DRY	3-4 oz/100 lb untreated seed	Planter box
		RIDOMIL 2E	0.25-0.50 pt/13,000 ft of row	In-furrow
		RIDOMIL 5G	1.25-2.50 lb/13,000 ft of row	In-furrow
		RIDOMIL 50W	0.125-0.250 lb/13,000 ft of row	In-furrow
Rhizoctonia and Pythium	PCNB+Ethazole	TERRACLOR SUPER X 20-5	12-16 oz/100 lb seed	Planter box
		TERRACLOR SUPER X (G)	8-12 lb/ac	In-furrow
		TERRACLOR SUPER X 18.8G	6-9 lb/ac	In-furrow
	Metalaxyl+PCNB	RIDOMIL PC 11G	7-10 lb/ac	In-furrow
		RIDOMIL PC	Twin Pak container treats 5 ac	
		APRON-TERRACLOR Dust	8 oz/100 lb seed	Planter box
Broad Spectrum	Carboxin+Metalaxyl+PCNB	PREVAIL Dust	12-16 oz/100 lb seed	Planter box
	Chloroneb+Metalaxyl	DELTA COAT AD	5.75-11.75 fl oz/100 lb seed	Planter box

REMARKS: *Ethazole is not available as a single ingredient for cotton.*
13,000 ft. equals 1 acre of 42-inch rows.
Combination products with insecticides are available.
ALWAYS READ THE LABEL.
DO NOT USE TREATED SEED FOR FOOD.