Corn and Sorghum

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Disease control in field crops is optimized through the development of a long-term management program. Prevention and risk reduction through the integration of various cultural practices including crop rotation, tillage, fertilizer management, and pesticides are the goals of an effective and economical disease management program. The starting point of any management program is the selection of locally adapted, disease resistant cultivars. Because of the importance of this selection, tables providing descriptions of reactions of commonly grown cultivars to prevalent diseases have been included in this section. Please note that the lists are not all-inclusive because new cultivar releases may be made after this printing or lack of adequate testing prevents inclusion in this printing. Updates are available through your local Extension office.

The remainder of this section is a compilation of recommended chemical disease control measures that were registered at the time of this printing. It is not intended to be an exhaustive index of all registered fungicides and nematicides. The information in this section is provided as a guide to available products but does not substitute for or supersede the information found on the pesticide label of a specific product. Trade names are included to aid in the identification of the specific active ingredient of a pesticide known to be effective. No discrimination against a similar product is intended or implied by omission. Mention of a commercial product does not constitute an endorsement by the authors or by their respective Extension Services. Consult the pesticide label for any changes in rate, timing, handling, or registration. Use pesticides only as directed.

Seed and Seedling Diseases

In the rare event that seed corn is purchased with a seed treatment that does not include a fungicide, or control of a specific problem is required, choose a product that contains one of the recommended pesticides or pesticide combinations listed below. For any seed treatment, the slurry or commercial misting type applications are recommended because these methods provide the best adhesion of the product and the most uniform coverage. Because a wide variety of formulation and mixtures exists, read the individual labels for rates and restrictions.

Table 3.1 - Fungicide Seed Treatments for Corn and Sorghum

Crop	Disease(s)	Fungicide Common name	Fungicide Trade name	Remarks
Corn	Seed decay, damping- off, and seedling blights	thiram captan captan captan fludioxonil	Gustafson 42-S Captan 30-DD Captan 300, 400 Captan 400-DD Maxim 4FS	General-use seed treatments. Use according to label instructions. Do not use treated seed for food, feed, or oil.
	Seed decay and seedling diseases including *Rhizoctonia solani*	carboxin carboxin + thiram PCNB	Vitavax-34 Vitaflo-280 RTU-PCNB	Use according to label instructions. Do not use treated seed for food, feed, or oil.
Sorghum	Seed decay and seedling blights, damping-off, and kernel smut	captan captan captan captan fludioxonil	Captan 30-DD Captan 300 Captan 400 Captan 400-DD Maxim 4FS	General-use seed treatments. Use according to label instructions. Do not use treated seed for food, feed, or oil.
	Seed decay and seedling blights, damping-off, covered kernel smut, and loose kernel smut	thiram thiram	Gustafson 42-S Thiram 50WP	Use according to label instruction. Do not use treated seed for food, feed, or oil.

Table 3.1 - Fungicide Seed Treatments for Corn and Sorghum (cont.)

Crop	Disease(s)	Fungicide Common name	Fungicide Trade name	Remarks
Sorghum (cont.)	Seed and soil-borne seedling diseases including those caused by *Rhizoctonia solani* and *Fusarium* spp.	PCNB	RTU-PCNB	Use according to label instruction. Do not use treated seed for food, feed, or oil.
	Pythium damping-off in all sorghum cultivars and systemic downy mildew	metalaxyl	Apron 50W	For Pythium damping-off use 0.5 - 1.0 oz/100 lbs of seed. For systemic downy mildew control apply 1.0 oz/100 lbs of seed on cultivars which possess resistance to downy mildew. On cultivars which are susceptible apply 2.0oz/100 lbs of seed.
		mefenoxam	Apron XL LS	For Pythium damping-off use 0.32 - 0.64 fl oz /100 lbs of seed. For systemic downy mildew contol apply 0.64 fl oz /100 lbs of seed on cultivars which possess resistance to downy mildew. On cultivars which are susceptible apply 1.28 fl oz /100 lbs of seed.

Foliar Diseases of Corn

Some chemical control measures are registered for foliar diseases of corn. However, their use is limited to the production of seed corn and is not recommended for general production. Use resistant hybrids when available, especially in continuous, no-tillage production systems. Many disease-causing organisms are harbored in infested corn debris and, thus, are more readily available to infect corn in systems where debris remains on the soil surface and is allowed to build up. Ask your seed supplier for information on hybrids with resistance to southern corn leaf blight and northern corn leaf blight. In Virginia and Maryland, gray leaf spot is a predominant foliar disease in the mountainous and piedmont production areas. Listed below are several hybrids that have exhibited a degree of resistance to this disease. This list is not all inclusive. Consult publications available from Virginia and Maryland Extension services for more information on hybrid performance in the presence of gray leaf spot.

Gray Leaf Spot of Corn

A foliar disease caused by the fungus *Cercospora zeae-maydis*, is of economic importance in many parts of the commonwealth and the mid-Atlantic region. It is recognized its characteristically long rectangular lesions (1/8 - 1/4 inch wide and 1/2 to 2 1/2 inches in length). These lesions typically show a grayish cast when the fungus is sporulating. As the disease progresses from the lower leaves upward and the disease becomes more severe, lesions may coalesce and cause the death of the entire leaf. (See Virginia Cooperative Extension Fact Sheet: Grayleaf Spot Disease of Corn, Pub. No. 450-612, at *http://www.ext.vt.edu/pubs/plantdiseases/450-612/450-612.html*.

Yield Loss

Gray leaf spot is most damaging when leaves are blighted at or just after silking stage. At this critical time it can cause severe yield reduction. Early blighting of the leaves above the ear leaf on susceptible hybrids has led to severe yield losses often exceeding 50% in experimental plots in Virginia. Blighting that does not occur until well into the grain-fill period results in very little grain loss. Premature stalk death and lodging is enhanced by severe leaf blighting and leads to difficulty in mechanically harvesting. Hybrids that are more resistant and slow to blight may prevent significant yield reduction.

Epidemiology

An understanding of the epidemiology of gray leaf spot is helpful in understanding why the disease has increased in intensity, severity, and distribution over the past 25 years. *C. zeae-maydis* overwinters in the debris of previously diseased corn plants remaining on the soil surface. In spring, conidia (spores) are produced and disseminated to corn plants by wind and perhaps splashing rain. These conidia require several days of high relative humidity to germinate and infect corn leaves. Several weeks may be required for the development of mature lesions on leaves. Conidia for secondary spread are produced from two to four weeks after initial leaf infection. Tillage systems that leave quantities of previously diseased crop residue on the soil surface provide the primary inoculum to produce severe levels of gray leaf spot in the next season.

Management of Gray Leaf Spot

It is recommended that growers continue to use conservation tillage methods wherever practical. Growers should, however, consider planting different crops in rotation with corn in their farming system. A one- or two-year rotation away from corn would help reduce inoculum levels of *C. zeae-maydis*. However, infested (diseased) corn debris on adjacent fields may be plentiful enough to initiate significant disease losses on moderately- to highly-susceptible hybrids. Growers who experience gray leaf spot are encouraged select one or more of the newer gray leaf spot resistant hybrids for use in fields where the potential for gray leaf spot is high. Selection should be based on yield potential and standability under gray leaf spot pressure.

Table 3.2 - Corn Hybrids that Have Exhibited a Degree of Resistance or Tolerance to Gray Leaf Spot in Evaluations Conducted in Virginia

Medium-full maturity
Dekalb DK585
Dekalb DK647
Dekalb DK683
FFR Cooperative SS729CL
FFR Cooperative SS791CL
FFR Cooperative SS842RR2
FFR Cooperative SS849CL
FFR Cooperative SS897
FFR Cooperative SS943
Pioneer Brand 33Y18
Pioneer Brand 31R88
Note: none of the commercial hybrids tested is immune.

Nematode Diseases of Corn

The need for a nematicide should be based on the results of a soil test for the presence and level of plant pathogenic nematodes and on the previous site history. The best time to collect samples for nematode testing is in the fall immediately after harvest. Consult your local Extension office for information on proper soil sampling procedures for nematode testing and for information on threshold levels before deciding to use a nematicide. In Virginia, the Nematode Advisory Program provides this service at a charge of $11.00 per sample. Virginia growers interested in this program should note that soil samples must be collected in the fall no later than November 20. Contact Virginia Extension offices for literature that details the guidelines for the program.

Table 3.3 - Nematicide Recommendations for Corn

Nematode	Nematicide Common name	Nematicide Trade name	Formulated Rate	Remarks
Root-knot Lesion Lance Sting Stunt Stubby root	terbufos	Counter 15G	8 oz/1,000 linear row ft. Do not exceed 8.7 lb/A.	Apply at planting in seed furrow or 7-inch bands and incorporate lightly in soil directly behind planter shoe but in front of press wheel. Consult label for details on restrictions and precautions. Note: Use of Accent or Beacon herbicide following applications of either Counter 15G or Counter 20CR may cause severe crop injury.
		Counter 20CR	6 oz/1,000 linear row ft. Do not exceed 6.5 lb/A.	
	ethoprop	Mocap 10G	12 oz/1,000 linear row ft; 10.0 lb (40-inch rows)/A.	Rate depends on row spacing. Apply at planting in 12 to 15-inch band over row and mix with top 3-4 inches of soil. Do not allow seed contact. Do not use in furrow.