DECIPHERING FUNGICIDE SEED TREATMENTS: TARGETS, OPTIONS, EFFICACY, AND ECONOMICS

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Abstract

Many soil borne fungi such as: multiple species of *Fusarium* and *Pythium*, *Rhizoctonia solani*, and *Thielaviopsis basicola*, cause seedling diseases of cotton under ideal environmental conditions. Cool and wet conditions encountered during planting and the early parts of the season immediately after seedling emergence often drive an increased incidence of seedling disease, which usually manifests as a complex of multiple pathogens. Seedling diseases may result in plant death, delay early season vegetative growth, delay maturity, and ultimately reduce yield. Since 1965 in the Mississippi River Valley, cotton seedling diseases have accounted for estimated average annual losses ranging from 3.2 to 7.4 percent. According to Crop Data Management Systems (CDMS) and Agrian websites, as of January 2018 there are over 80 seed treatment or in-furrow (liquid and granular) fungicide products labeled for cotton seedling disease management. Most seed treatment fungicides include those from Fungicide Resistance Action Committee (FRAC) Groups (based on mode-of-action [MOA]) 2, 3, 4, 7, 11, 12, and 14, which either target specific pathogen groups or are broad spectrum materials affecting multiple organisms. Seed companies usually offer base fungicide treatments containing 1 to 4 MOAs from Groups 3, 4, 7, 11 and/or 12, which in most cases are adequate for control. However, if adverse conditions are expected at planting, over-treatment of base seed treatments containing less than three MOAs may be suggested. Prior to ordering seed, or prior to over-treating, it is advisable to determine exactly which fungicides are included in base treatments since pricing, options, and availability may vary with company and growing region. There are also potential redundancies when over-treating; that is, treating seed with two different fungicides from the same FRAC group likely will not improve efficacy. Some seed companies offer flexibility with seed treatment options, which may provide an opportunity to reduce input costs. In cases where seedling disease pressure is high, even the best seed treatment products (regardless of active ingredients) may fail; therefore, utilizing integrated disease management techniques in conjunction with fungicide seed treatments is recommended. Finally, fungicide seed treatments and in-furrow fungicide products should be considered beneficial for seedling disease management only until the developing seedling emerges through the soil profile.