

NEW FUNGICIDE SEED TREATMENTS FOR COTTON FROM BAYER CROPSCIENCE

Jennifer L. Riggs
Bayer CropScience
RTP, NC

Abstract

Bayer CropScience has two new fungicide seed treatments, Trilex™ FL and Vortex™ FL for cotton. Each of the fungicides is excellent for controlling seedling disease caused by *Rhizoctonia solani*. In addition to the activity against *Rhizoctonia solani*, Trilex FL has very good activity against many of the “junk” fungi known as seedborne problems on cottonseed. Vortex FL is systemic in movement and has a broad spectrum of activity against a wide range of fungi belonging to the classes of Zygomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes. Vortex FL is extremely efficacious against the seedling stage of disease caused by *Fusarium solani*. The addition of Trilex FL and Vortex FL to the seed supplies improved disease protection at low use rates with excellent seed safety characteristics.

Introduction

Gustafson/Bayer CropsScience has two new fungicide seed treatments for use on cottonseed. The use of either or both new products in combination with existing seed treatment products increases the efficacious characteristics of the commercial seed treatment packages. Vortex FL has recently received registration with Environmental Protection Agency (EPA) and is available for use immediately. Trilex FL has anticipated registration with EPA by summer of 2006 according to their adopted timeline with the pay for use schedule. In addition to the increased efficacy the substitutions of these new active ingredients for older chemistries result in a seed treatment package that has significantly lower application rates.

Vortex FL is made with ipconazole as a sole active ingredient in an aqueous based flowable formulation that contains 3.74 lbs of active ingredient per gallon of product. The compound is systemic in nature and has one of the broadest ranges of efficacy of any new or pre-existing seed treatment. The seed treatment application of Vortex has activity against most major cotton seed- and soil-borne plant pathogens except for those belonging to the Oomycete class. Vortex FL is currently registered for cottonseed at the application rate of 2.5 gm ai/100 kg (0.089 fl oz/cwt) of seed. A seed treatment application of Vortex aids in the control of species of seedborne fungal pathogens in the genera of *Fusarium*, *Alternaria*, *Cladosporium*, *Aspergillus*, *Penicillium*, *Phoma*, *Bipolaris*, *Helminthosporium* and *Rhizopus*. Vortex FL has excellent efficacy against *Rhizoctonia solani* and the many species of *Fusarium* that cause infections of cotton seedlings. Cottonseed treated with Vortex show excellent germination results using standard industry seed testing methods at the time of treating and over time.

Trilex FL is made with trifloxystrobin as the sole active ingredient in a flowable product that contains 2 lbs of active ingredient per gallon. Trilex FL has excellent activity against the soilborne pathogen *Rhizoctonia solani* and adds good protection against the seedborne pathogens that occur on cottonseed. The recommended application rate for Trilex FL is 10 gm ai/100 kg (0.64 fl oz/cwt) of cottonseed. In addition to the activity on *Rhizoctonia*, Trilex has good efficacy against species of *Fusarium*, *Alternaria*, *Cladosporium*, *Aspergillus* and *Penicillium*. There is some limited activity against certain species of *Pythium* with Trilex usage. The seed treatment application of Trilex is extremely safe to the cottonseed with respect to germination when used at the label rate.

When combining Vortex and Trilex with the commercial seed treatments of Baytan 30 FL (triadimenol) and Allegiance FL (metalaxyl), a cottonseed treatment is developed that results in excellent disease protection against all of the major cotton seedling diseases (Table 1). Baytan has efficacy against *Rhizoctonia*, *Fusarium* and *Thielaviopsis*, while Allegiance FL is efficacious against Oomycete fungi including all species of *Pythium*.

Table 1. Seed Treatment Performance for Bayer CropScience Cottonseed fungicides.

<u>Seed Treatment</u>	<u>Rhizoctonia</u>	<u>Pythium</u>	<u>Thielaviopsis</u>	<u>Fusarium</u>
Allegiance	none	Excellent	none	none
Baytan	Excellent	None	Excellent	Fair
Vortex	Good	None	none	Excellent
Trilex	Excellent	Limited activity	none	Fair

The combination of all four active ingredients is applied to the cotton seed at a rate of 37.5 gm of active ingredient per 1,212,522 seeds based on a seed size of 5500 seed per pound. This can be converted to 0.031 mg of active ingredient per seed. The combination of Baytan, Vortex, Trilex and Allegiance results in a seed treatment that reduces the level of chemicals placed in the environment when compared to current chemicals, yet the disease control is equal or better than the standard commercial standards. In addition to the efficacy against the soilborne diseases, the four-way combination controls all seedborne “junk” fungi that often cause decrease in germination values.

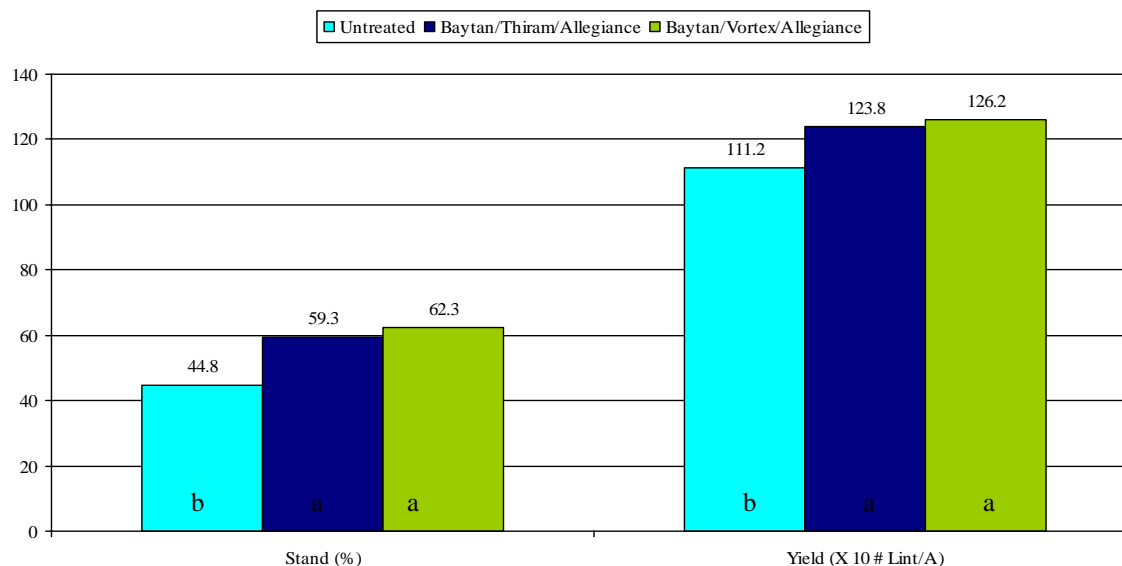
Results and Discussion

Laboratory testing at the Gustafson/Bayer CropScience Seed Technology Center shows under extreme disease pressure the advantages in root health when all four compounds are combined on the seed. Roots from inoculated soil testing show a benefit in root health with the four-way combination of Baytan, Vortex, Trilex and Allegiance (B-V-T-A) when compared to commercial seed treatment standards. This particular test used soil inoculated with *Rhizoctonia solani*, *Fusarium solani* and *Pythium ultimum*. Following the planting of the seed the test was incubated at 20 C and emergence and stand counts taken to assess disease control. At day 35, roots were washed and pictures taken (Figure 1).



Figure 1. Root pictures of cotton seedlings from *Rhizoctonia solani*, *Fusarium solani* and *Pythium ultimum* inoculated soil disease screen done at the Gustafson/Bayer CropScience Seed Technology center.

From 1999 to 2005 test results show the excellence of the combination of Vortex and Trilex with Baytan and Allegiance under field conditions. Both Vortex and Trilex were tested singularly with Baytan and Allegiance and then in a four-way combination. The three way treatment of Baytan, Vortex and Allegiance in a 1999 experimental seed treatment trial with Dr. Earl Minton showed the strength of Vortex under field conditions. An increase in yield correlated to the increase in stand counts when comparing the Baytan-Vortex-Allegiance treatment to the commercial seed treatment or the untreated control (Graph 1).



Graph 1. Stand and Yield Results: Earl Minton, Benoit, MS, 1999 Experimental Fungicide Seed Treatment Trial

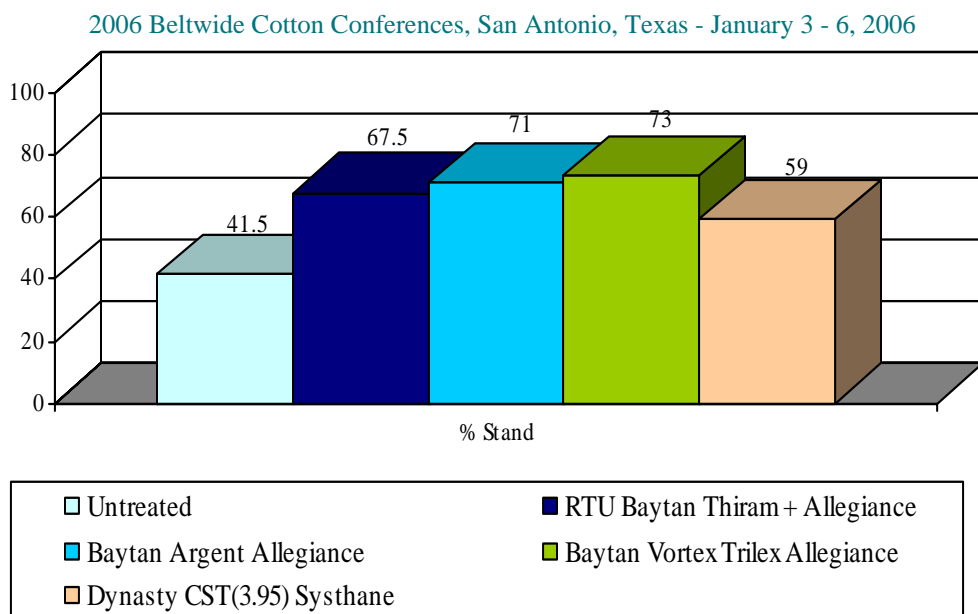
In a 2004 field test the treatment of Baytan, Trilex and Allegiance was compared to Baytan, Thiram and Allegiance and Dynasty CST. Baytan, Trilex and Allegiance had the best final stand in the test. Baytan, Trilex and Allegiance increased stand counts from four to thirteen percent over the commercial treatments (Table 2). The increased protection provided by Trilex against *Rhizoctonia* can account for the advantage observed in the field test.

Table 2. Stand Results: Earl Minton, Benoit, MS, 2004 Advanced Fungicide Seed Treatment Trial

	Untreated Control	Baytan, Thiram. Allegiance	Baytan, Trilex, Allegiance	Dynasty CST
Stand Counts (%)	23	57	61	48

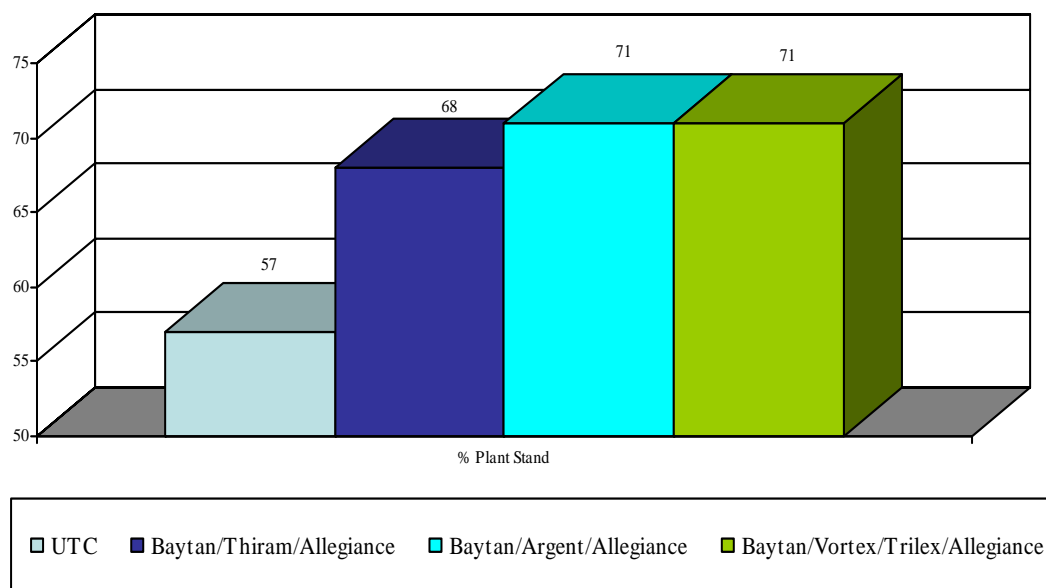
In 2004, Dr. Terry Wheeler tested the 4-way combination B-V-T-A under field conditions at two distinct locations. The treatment B-V-T-A led the tests in stand counts when compared to commercial fungicide seed treatments from Gustafson/Bayer CropScience. The stand counts for the four-way combination was 79 percent compared to 78 and 70 percent for Baytan-Argent-Allegiance and Baytan-Thiram-Allegiance, respectively.

The treatment of B-V-T-A increases stand counts when compared to standard fungicide seed treatments. A Delta and Pine Land fungicide field trial at Winterville, MS revealed the best stand with the B-V-T-A treatment (Graph 2). In this trial B-V-T-A increased plant stand over Baytan, Argent and Allegiance by two percent and over Dynasty CST with Systhane by fourteen percent.



Graph 2. Delta and Pine Land Fungicide Cotton Trial in Winterville, MS.

The Beltwide Cottonseed treatment trial in 2005 included the four way combination, B-V-T-A. At the time of writing this article, the data from fourteen locations showed the average stand counts for B-V-T-A were equal to the stand for Baytan-Argent-Allegiance, which has led the Beltwide Seed Treatment Trials in four of the last five years. A comparison of B-V-T-A to Baytan-Thiram-Allegiance shows a three percent increase in stand (Graph 3).



Graph 3. Average stand counts from fourteen locations in the 2005 Beltwide Cotton Seed Treatment trials.

Summary

The cottonseed fungicide seed treatment of Baytan-Vortex-Trilex-Allegiance is a combination of chemistries that result in an excellent level of efficacy against all major fungal cotton seed and seedling plant pathogens. Vortex is systemic in nature and has efficacy in all classes of plant pathogenic fungi other than those belonging to the Oomycetes. Trilex has excellent efficacious activity against *Rhizoctonia solani* and many of the seedborne “junk” fungi. Each compound by itself or in combination with each other offers a cottonseed treatment that is safe to the seed and is used at very low application rates.