

ECONOMICS OF COTTON SEEDLING DISEASE

K.S. McLean and J. Palmateer

Department of Entomology and Plant Pathology

Auburn University

G.W. Lawrence

Department of Entomology and Plant Pathology

Mississippi State University

Abstract

The seedling disease complex is composed of several fungi which cause serious problems in cotton production wherever cotton is grown. Cotton seedling disease fungicide tests were conducted under high and low disease pressure in north and central Alabama to determine efficacy and economic feasibility. Treatments consisted of all recommended in-furrow spray and granule fungicides and one seed treatment. Significant differences in cotton stand were observed at high and low disease incidence tests at all locations. Seed cotton yields were increased over the control in 55 and 11% of the fungicide treatments under high and low disease pressure, respectively. An economic analysis indicates that the majority of the fungicide treatments had positive net returns above the direct cost of the materials under high disease pressure.

Introduction

Seedling disease of cotton is a major problem across the cotton belt. Losses attributed to seedling disease, across the cotton belt usually average at approximately 4.0%. The soil born pathogens most commonly involved in the seedling disease complex in Alabama include *Pythium* spp., *Fusarium* spp., *Rhizoctonia solani* and *Thielaviopsis basicola*. These soil fungi may produce symptoms alone or in combination. The seedling disease complex includes the pregermination decay of the seed, preemergence damping off, postemergence damping off and seedling root rot. The effects of seedling root rot are often subtle and lead to weakness of the plant and thereby reduce yields. Most of the pathogens involved in the seedlings disease complex are ubiquitous fungi that are associated with many other hosts as well as with cotton. The fungi that cause these diseases are carried in the soil and can attack either seed or seedling. The organisms that cause seedling disease are found in all cotton producing areas of the United States, but populations and virulence differ from area to area thus demonstrating the necessity of testing the various recommended control practices across a wide geographic area. The objective of this research was to examine the influence of in-furrow and seed applied fungicides for control of the seedling disease complex of cotton and subsequent effects cotton yield and economical effectiveness.

Materials and Methods

In Alabama, cotton seedling disease fungicide tests were conducted under high and low disease incidence at the Tennessee Valley Substation located in north Alabama, the Prattville Experiment Field and the E. V. Smith Substation in central Alabama. Treatments in the standard row tests consisted of in-furrow applications of Terraclor Super X 18.8 applied at 5.5 lb/A, Terraclor Super X EC applied at 48 fl oz/A, Terraclor 2E applied at 48 fl oz/A, Terraclor 15 G applied at 5 lb/A, Rovral 4E applied at 6.0 oz/A, Ridomil Gold PC 11G applied at 7.0 lb/A, Ridomil Gold EC applied at 1 fl oz/A, Quadris 2 SC 6.0 fl oz/A, Delta Coat AD applied at 11.75 fl oz/cwt, Messenger applied at 2.25 oz/A and an untreated control. Treatments of the ultra narrow row tests consisted of broad cast applications of Terraclor Super X 18.8 applied at 5.5 lb/A, Terraclor Super X EC applied at 48 fl oz/A and 96 fl oz/A, Rovral 4E applied at 6.0 oz/A, Ridomil Gold PC 11G applied at 7.0 lb/A, Ridomil Gold EC applied at 3 fl oz/A, Quadris applied at 6.0 fl oz/A, oz/cwt, Delta Coat AD applied at 11.75 fl oz/cwt, and an untreated control. Treatments of each test were arranged in a randomized complete block design with four or five replications. Plots were rated at 14 and 28 days after planting to determine the percent seedling loss and stand uniformity. All plots were harvested using one row cotton pickers to determine the effects of the treatments on cotton yields.

Results and Discussion

Significant differences in cotton stand were observed at high and low disease incidence tests at all locations (Figure 1). In north Alabama under high disease pressure, seedling stand ranged from 0.32 to 2.96 plants per foot of row in the Messenger and Ridomil Gold PC treatments, respectively. Under low disease pressure, seedling stand ranged from 2.84 to 3.52 plants per foot of row in the Terraclor Super X EC and Messenger and Ridomil Gold PC treatments, respectively. In central Alabama under high disease pressure, seedling stand ranged from 0.68 to 2.00 plants per foot of row in the Terraclor 2E and Delta Coat AD

treatments, respectively. Under low disease pressure, seedling stand ranged from 1.68 to 2.92 plants per foot of row in the Terraclor 15G and Terraclor Super X EC treatments, respectively.

Seed cotton yields were increased over the untreated control by most fungicide treatments. In north Alabama under high disease pressure, yields ranged from 1299 to 3031 lb/A of seed cotton for the Messenger and Quadris treatments, respectively (Figure 2). Seed cotton yields were increased an average of 523 lb/A in six of the nine treatments over the control. In north Alabama under low disease pressure, yields ranged from 3303 to 3815 lb/A of seed cotton for the Terraclor Super X EC and Messenger treatments, respectively. Seed cotton yields were increased an average of 223 lb/A in two of the nine treatments over the control. In central Alabama under high disease pressure, yields ranged from 1706 to 2121 lb/A of seed cotton for the Terraclor 2E and Terraclor Super X EC treatments, respectively. Seed cotton yields were increased an average of 110 lb/A in four of the nine treatments over the control. In central Alabama under low disease pressure, yields ranged from 2726 to 3214 lb/A of seed cotton for the Terraclor 15G and Quadris treatments, respectively.

Economic Analysis

An economic analysis indicates that the majority of the fungicide treatments had positive net returns above the direct cost of the materials using the assumption of current input prices and the product price of \$0.55/lb of cotton. Yield data in north Alabama under high disease pressure indicates an average lint yield across treatments of 992.2 pounds representing a 187.7 increase over the control. The value of this additional yield using a market price of \$0.55/lb is \$102.85/acre. Yield data in north Alabama under low disease pressure indicates an average lint yield across treatments of 1466 pounds representing a 68.2 decrease compared to the control.

Disclaimer

The interpretation of data presented may change with additional experimentation. Information is not to be construed either as a recommendation for use or as an endorsement of a specific product by Auburn.

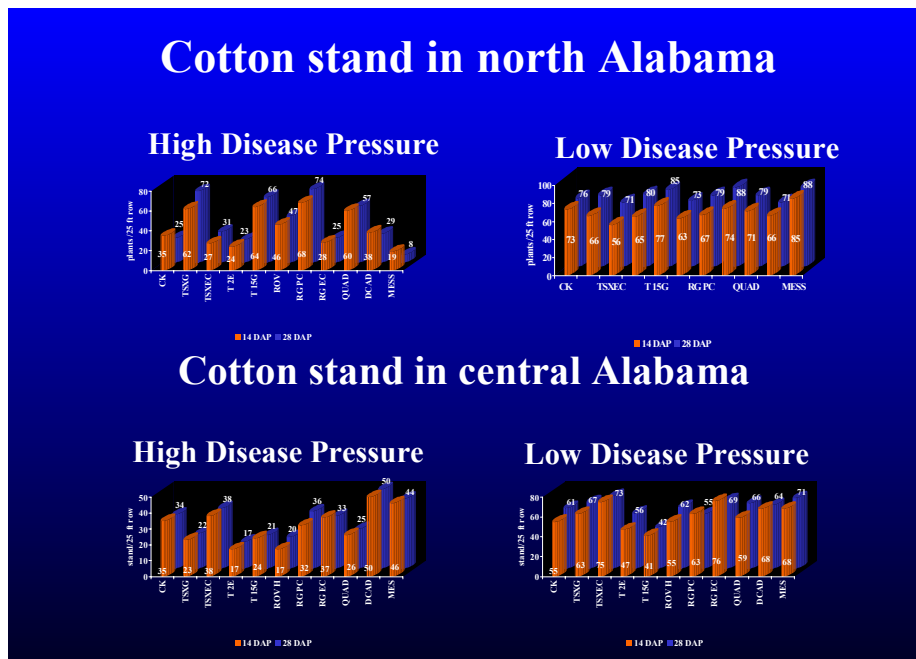
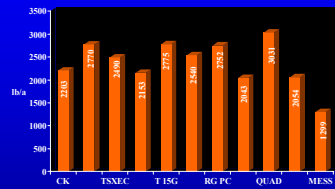


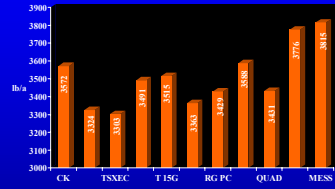
Figure 1.

Seed cotton yield in north Alabama

High Disease Pressure

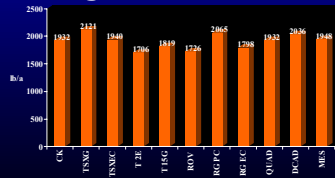


Low Disease Pressure



Seed cotton yield in central Alabama

High Disease Pressure



Low Disease Pressure

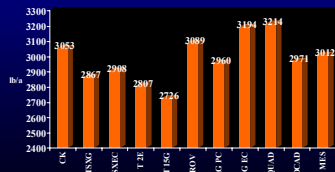


Figure 2.