

# Application of Systemic Fungicides Through Subsurface Drip Irrigation for Control of *Phymatotrichum* Root Rot

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## ABSTRACT

*Application of two systemic fungicides, propiconazole (Tilt) and triadimenol (Summit), through subsurface drip irrigation resulted in a significant reduction in the number of dead plants in a *Phymatotrichum*-infested cotton field. The percent reductions in Tilt treatments were 72% in 1985 and 66% in 1986 and in Summit treatments were reduced 90% in 1985 and 70% in 1986.*

## INTRODUCTION

The systemic fungicides, propiconazole (Tilt) and triadimenol (Summit) are very active against *Phymatotrichum omnivorum*, the fungus that causes cotton root rot. However, these fungicides are translocated downward in the plant at low levels, and are not mobile in the soil (1). Since disease begins on the lower tap root of cotton, they may not be practical for disease control using conventional application methods.

Subsurface drip irrigation may offer an alternative for fungicide application. Since the drip lines are buried approximately eight inches in the soil, the fungicides can be applied into the root zone where they are taken up by the plant. Trials were conducted in 1985 and 1986 in a field with a history of cotton root rot to find the effectiveness of these fungicides for control of the disease when applied through subsurface drip irrigation.

## MATERIALS AND METHODS

Trials were conducted at England Farms near Coolidge, Arizona in a field planted with DP 90. Tilt and Summit were applied into drip lines from five-gallon pressurized cans. Flow rates from the cans were calibrated so that the fungicides, mixed with water, flowed into the drip lines for one hour beginning at least one half hour after irrigation began. In 1985 both Tilt and Summit were applied into 4 rows at 0.5 lb/acre a.i. in split applications of 0.25 lb/acre a.i. on July 2 and August 1. In 1986 they were applied into 5 rows at 0.75 lb/acre a.i. in split applications of 0.25 lb/acre a.i. on June 20, July 17, and August 15. Rows averaged 200 ft in length. Adjacent non-treated rows were used as paired controls for each treated row. The number of dead plants in treated and control rows were counted in September of each year.

## RESULTS AND DISCUSSION

Application of both Tilt and Summit resulted in a significant reduction ( $P = .05$ ) in numbers of dead plants in both 1985 and 1986. Numbers of dead plants for each treatment are given in Table 1. The percent reductions in the number of dead plants in 1985 for Tilt and Summit were 72% and 90%, respectively, and in 1986 were 66% and 70%. These results indicate that placement of the fungicides into the root zone may greatly enhance their effectiveness against cotton root rot. The ability of these

fungicides to reduce the incidence of the disease in 1986, when the disease was very severe, indicates that they may be more efficient when applied through subsurface drip irrigation.

## REFERENCES

1. Whitson, R.S. and Hine, R.B. 1986. Activity of propiconazole and other sterol-inhibiting fungicides against Phymatotrichum omnivorum. Plant Disease 70:130-133.

**Table 1. The number of dead DP 90 cotton plants in rows treated with Tilt and Summit and in adjacent control rows in 1985 and 1986.<sup>1</sup>**

	1985	1986
Tilt	90	777
Control	230	1554
Summit	25	832
Control	227	1920

<sup>1</sup>Differences between treated and control rows were statistically different at  $P = .05$  using Student's *t*-test.