

EFFECT OF FUNGICIDE DIP TREATMENTS ON FUNGAL DISEASES AND YIELD OF TRANSPLANTED SWEET ONIONS

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Introduction

Several fungal diseases of sweet onion cause significant losses to growers each year in Georgia. Botrytis neck rot, caused by the fungus *Botrytis allii*, can be soil borne or seed borne. Botrytis neck rot is predominantly a post harvest disease and is the most devastating disease of sweet onions in Georgia. Purple blotch, caused by the fungus *Alternaria porri*, and *Stemphyllium* leaf blight, caused by the fungus *Stemphyllium vesicarium*, are foliar pathogens of sweet onions and reduce yield and bulb size of infected onions. These two diseases are common in most years in Georgia and can cause severe losses. Pink root, caused by the fungus *Phoma terrestris*. This disease is soil borne and infects the roots of onions. Although pink root does not rot onion bulbs, the disease can cause significant losses. The purpose of this study is to evaluate fungicide dip treatments for the control of fungal diseases of sweet onion in Georgia.

Materials and methods

Trials were conducted in two consecutive growing seasons (2007-2008 and 2008-2009) at the Vidalia onion and Vegetable Research and Educational Center in Lyons, Georgia. Onions beds were on 6ft. centers with four rows in each bed with plant spacing 6 inches within each row and 12 inches between rows. Plots were 20 feet long with 5 foot unplanted borders. In 2007-2008 Sweet Vidalia, Savannah Sweet, and Ohoopee Sweet onions were transplanted on December 10, 2007, and in 2008-2009 Sweet Vidalia, Savannah Sweet, and Honey Bee onions were planted on November 18, 2008. Production guidelines for growing sweet onions published by the University of Georgia Extension Service were followed except for fungicide applications. The trial contained 21 treatments replicated four times in factorial design, factor one being variety and factor two being fungicide treatment.

Onion transplants were treated with fungicide dips at plant by dipping whole bundles of onions (100-150 plants/bundle) in buckets containing fungicide treatments. In 2007-2008 Endura (Boscalid) and Topsin (thiophanate methyl) were used as dip treatments and in 2008-2009 Endura and Switch (cyprodinil + fludioxonil) were used. Onions were submerged above the collar to the base of the outside leaves for one second. Foliar fungicide treatments were initiated in mid February and continued on a three week spray schedule for a total of three applications. Onion plots were rated for Purple blotch and Botrytis leaf blight severity, using a 0-100 scale (0 = no disease and 100 =100% of the leaf area affected). Pink root was rated twice, once in late February and once the day the onions were undercut. Pink root incidence was determined by examining the roots of 10 plants per plot. After onions were undercut, they were allowed to field cure for one week before clipping and bagging. All onions were placed in cold storage for at least two months after which they were rated for post harvest rots.

Results and Discussion

There were significant differences in yield between varieties in both trials where the variety Savannah Sweet out yielded Sweet Vidalia and Ochoopee Sweet in 2007-2008, and Savannah Sweet out yielded Sweet Vidalia and Honey Bee in 2008-2009 (Table 1.). Dip treatments had no effect on Purple blotch and Stemphyllium blight, Botrytis leaf blight, or Botrytis neck rot in both trials. In 2007-2008 Endura and Topsin dip treatments reduced pink root incidence in mid February when compared to the untreated check, and onions treated with Endura dips out yielded onions treated with Topsin dips and the untreated check (Table 2.). In 2008-2009, Endura and Switch dip treatments reduced pink root at harvest, and onions treated with Endura dips out yielded onions treated with Switch dips and the untreated check (Table 2.). Also, there was no difference in yield between plots treated with Endura dips and plots treated with three foliar sprays of Pristine (Boscalid + pyraclostrobin) in both years. Transplant dip treatments with Endura were superior to dips with Topsin or Switch, and dip treatments with Endura have the potential to increase onion yields and provide suppression of pink root.

Table1. Effect of variety on pink root disease and yield

Variety	2007-2008 Pink root ¹	2007-2008 Green weights ²	2008-2009 Pink root	2008-2009 Green weights
Sweet Vidalia	2.3	17714 b ³	6.9 a	16377 b
Savannah Sweet	1.3	22542 a	2.3 b	18624 a
Ochoopee Sweet	1.1	19819 c	NA	NA
Honey Bee	NA	NA	0.0 c	12024 c

¹ Pink root incidence, Honey bee onions rated 4/9/09, sweet Vidalia and Savannah sweet onion rated 5/5/09

² Field weights of onions in lbs/Acre

³ Means in columns with the same letter(s) are not significantly different according to mean separation by Fisher's protected LSD at P<0.05

Table 2. Effect of treatment on fungal diseases and yield

Treatments and Rates	2007-2008		2008-2009	
	Pink root ¹	Green weights ²	Pink root ³	Green weights
Endura (dip) 2.3oz/10gal	0 b ⁴	23740 d	47 b	15913 bc
Switch (dip) 2.6oz/10gal	NA ⁵	NA	50 b	14878 d
Topsin (dip) 20 floz/10gal	0 b	20618 c	NA	NA
Endura (dip) 2.3oz/10gal Pristine (foliar) 14.5oz/ac	NT ⁶	23703 d	34 c	17048 a
Switch (dip) 2.6oz/10gal Switch (foliar) 14 oz/a	NA	NA	42 bc	15197 cd
Topsin (dip) 20 floz/10gal Topsin (foliar) 30 floz/a	NT	18513 ab	NA	NA
Pristine (foliar) 14.5oz/ac	NT	17823 ab	40 bc	16487 ab
Switch (foliar) 14 oz/a	NA	NA	45 b	15935 bc
Topsin (foliar) 30 floz/a	NT	16915 a	NA	NA
Untreated	50.0 a	18929 b	62 a	14263 d

¹Pink root percent incidence taken 2/14/08

² Field weights of onion harvested from the middle two rows of each plot in lbs per acre

³ Pink root percent incidence, Honey bee onions rated 4/9/09, sweet Vidalia and Savannah sweet onion rated 5/5/09

⁴ Means in columns with the same letter(s) are not significantly different according to mean separation by Fisher's protected LSD at P<0.05

⁵ Treatment not applied

⁶ Data not taken because foliar sprays had not been applied