Evaluation of new fungicides as soil and foliar treatments for control of *Phytophthora capsici* on watermelon

P. Ji and A. S. Csinos, Department of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, P. O. Box 748, Tifton, GA 31794

Introduction

Phytophthora capsici, the causal agent of Phytophthora root, crown and fruit rot, is responsible for serious yield and quality losses in the production of watermelon and a number of other important vegetable crops in the U.S. The pathogen causes crown and root rot, leaf blight, plant wilt, fruit rot and other damages. Fruit rot on watermelon is often the most damaging which begins as a dark, water-soaked, depressed lesion that expands quickly along with powdery, wet mold occurring over the infected area and fruit become completely rotted. Current strategies for control of *P. capsici* on watermelon are limited. Commercial watermelon cultivars resistant to fruit infection are not known to be available. Crop rotation is a recommended strategy; however, the efficacy of crop rotation is hampered by the wide host range of the pathogen and the ability of long-term survival of the pathogen in the soil. Application of effective fungicides continues to be a significant component in developing efficient programs for managing this disease. However, *P. capsici* has a remarkable ability to develop resistance to chemical fungicides and isolates resistant to mefenoxam have been identified in several states in the U.S. This study was conducted to determine the efficacy of some newer fungicides to be used for soil and foliar treatments for control of *P. capsici* on watermelon.

Materials and methods

Efficacy of mandipropamid, initium, and fluopicolide used for soil and foliar treatments was evaluated in comparison to mefenoxam. The field experiment was conducted at University of Georgia Coastal Plain Experiment Station in Tifton, GA, in the fall of 2010. The experiment was conducted in an experimental field infested with *P. capsici*. Plant beds (6-in-high by 30-in-wide centered 6 ft apart) was formed using a commercial tractor-drawn bed-former. Silver reflective mulch was used and a single drip tape was installed 1-2 inch below the surface in the center of the beds as the plastic mulch was applied. Watermelon cultivar Majestic (Stargazer as pollenizer) was used in the study. The seedlings were planted 3 ft apart in a single row. Each treatment plot was 36 ft long and a randomized complete block design with three replicates was employed. For soil treatments, Presidio (a.i. fluopicolide), Revus (a.i. mandipropamid), Initium, and Ridomil Gold (a.i. mefenoxam) were applied through drip tape at transplanting. Two weeks after transplanting additional applications of the products were made through drip tape. Foliar applications of the fungicides started either one week or three weeks after transplanting. Fruit was hand-harvested when mature, and marketable, non-marketable, and *P. capsici* infected fruit was evaluated. Disease and yield data were analyzed statistically using the ANOVA or GLM procedures of SAS.

The experiment included the following treatments:

1) Revus (8 fl oz/acre), soil treatment
2) Revus (8 fl oz/acre), soil treatment + foliar sprays (3, 4, 5, 6 weeks)
3) Revus (8 fl oz/acre), foliar sprays (1, 2, 3, 4, 5, 6 weeks)
4) Presidio (4 fl oz/acre), soil treatment
5) Presidio (4 fl oz/acre), soil treatment + foliar sprays (3, 4, 5, 6 weeks)
6) Presidio (4 fl oz/acre), foliar sprays (1, 2, 3, 4, 5, 6 weeks)
7) Initium (14 fl oz/acre), soil treatment
8) Initium (14 fl oz/acre), soil treatment + foliar sprays (3, 4, 5, 6 weeks)
9) Initium (14 fl oz/acre), foliar sprays (1, 2, 3, 4, 5, 6 weeks)
10) Ridomil Gold (1 pt/acre), soil treatment + foliar sprays (3, 4, 5, 6 weeks)
11) Ridomil Gold (1 pt/acre), foliar sprays (1, 2, 3, 4, 5, 6 weeks)
12) Non-treated control

Results

Initium, Presidio, and Revus reduced Phytophthora fruit rot incidence significantly, compared with the non-treated control, when used as soil treatment and foliar applications (Fig. 1). These treatments also increased marketable yield of watermelon compared to the non-treated control (data not shown). It appeared that soil treatments were numerically more effective than foliar applications in disease reduction, though soil treatments alone did not significantly reduce disease in this experiment. Due to the ability of *P. capsici* to develop resistance to fungicides, it is desirable to develop integrated programs with alternated application of these new fungicides to potentially enhance disease suppression and reduce selection pressure for *P. capsici* to develop resistance.

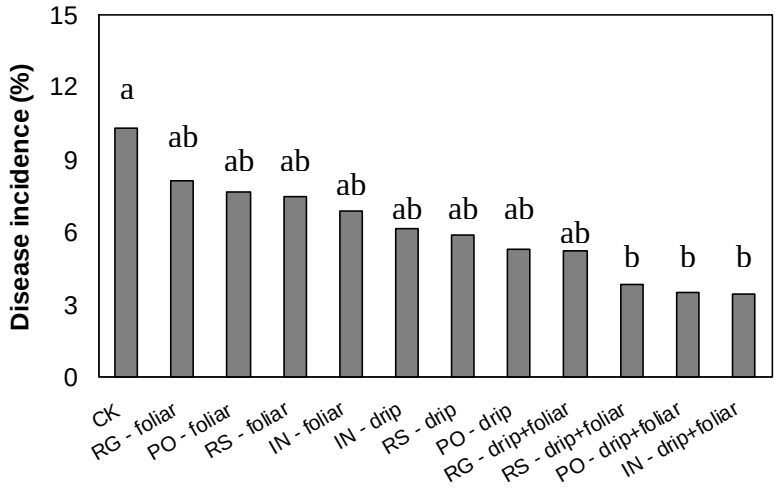

Fig. 1. Incidence of fruit rot caused by *P. capsici* on watermelon. RG = Ridomil Gold; PO = Presidio; RS = Revus; IN = Initium. Different letters above the bars indicate significant difference ($P = 0.05$) according to the least significant difference test.