California Melon Research Board
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Evaluation of a Late-Season Application of the Fungicides Quadris and Cannonball for Management of Vine Decline of Cantaloupe Caused by *Monosporascus cannonballus*

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Introduction:

Vine decline of melons, a disease characterized by a sudden and field-wide collapse of mature fruit-bearing plants 1-2 weeks before harvest, is attributed to *Monosporascus cannonballus*, a soilborne, root-infecting fungus. Our previous results showed that although root infection occurs within 1-3 weeks after planting, root lesion formation (the onset of disease) occurs late in the growing season. Thus, our hypothesis was that a late season application of a fungicide would be more efficacious in disease management than an early season chemical application. Evidence in support of this hypothesis was supported by our field trials in 2010. Specifically, the 46 DAP (days after planting) fungicide application of Quadris and Cannonball resulted in a 40% reduction of root lesions at harvest. Additionally, results from similar studies in Israel supported the hypothesis on late season chemical application for disease management.

Our objectives for 2011 were to verify the efficacy of late season chemical application (via both drip and furrow irrigation) regimes of Quadris (Azoxystrobin) and Cannonball (Fludioxonil) for disease management of vine decline.

Materials and Methods:

The cantaloupe crop (Sol Real) was planted on April 14, 2011 and harvested on July 6, 2011. There were seven treatments (Control, Quadris 55 DAP {Days After Planting}, Quadris 70 DAP, Quadris 55 + 70 DAP, Cannonball 55 DAP, Cannonball 70 DAP, Cannonball 55 + 70 DAP). Each treatment consisted of one 80-inch bed, 75 feet long. Treated beds were replicated five times, with each bed being only a single treatment applied through the drip line, totaling 35 beds. Additionally, in separate treatments Quadris was applied (55, 70, and 55+70 DAP) as a side dress on furrow irrigated rows. There were three replications of each treatment (randomized block design).

Chemical treatments in the drip irrigated plot were applied, over a 60 minute time period at label rates (0.5 lb. product per acre), three hours after the start of a 6 hr. long irrigation regime. In the furrow irrigated plot, the chemicals were applied immediately prior to the onset of the irrigation regime.

Disease incidence and severity was assessed as follows: the root system of 5 plants per treatment replication from the drip irrigated plot were excavated from soil 21, 55 and 70 days after planting and at crop termination (July 6) and were evaluated for lesion presence and severity. A root rot rating system at harvest was as follows: 1 = 1-20, 2 = 21-40, 3 = 41-60, 4= 61-80, and 5 = 81-100% of the root system of each plant with lesions. Randomly selected roots from each treatment were cultured or examined to document the cause of the root rot.

Additionally, the number of fruit per treatment replication was enumerated at harvest. Appropriate statistical tests were used to analyze the data.

Results:

At 21 days after planting, 44% of the plants assayed had one or more roots colonized by *Monosporascus cannonballus*. Characteristically, the roots of colonized plants appeared white and healthy (no lesions or discoloration). At 55 days after planting (the date of the first application of the chemical treatments), small lesions were observed on ca. 30% of the roots of all sampled plants. At 70 days after planting (the date of the second application of the chemical treatments), lesions (of various sizes) were observed on ca. 80% of the roots of all sampled plants from the non-treated control. At harvest on July 6, 2011, lesions (of various sizes) were observed on all roots of all plants from all treatments. Data on root rot disease rating, as well as yield, are presented in Table 1.

Table 1. Effect of fungicide treatment on *M. cannonballus* infection of melon roots and yield.

	Number of fruit/30' of row		Root rot severity rating (1-5)	
Treatments @ DAP	Drip	Furrow	Drip	Furrow
Check	46a	37a	2.0a	3.1a
Cannonball @55	48a	NT	2.1a	NT
Cannonball @70	44a	NT	2.1a	NT
Cannonball @55 & 70	49a	NT	2.1a	NT
Quadris @ 55	48a	31a	1.8 a	3.5a
Quadris @ 70	46a	35a	2.2 a	4.0a
Quadris @ 55 & 70	45a	31a	2.4a	3.5a

Means within a column followed by the same letter are not significantly different.
DAP = days after planting. Disease rating: 1 = 1-20, 2 = 21-40, 3 = 41-60, 4= 61-80, and 5 = 81-100% of the root system of each plant with lesions (20 plants per treatment).

Conclusion:

Results of the 2011 field trail indicate that none of the chemical treatments, relative to the nontreated control, provided control of root rot caused by *Monosporascus cannonballus* and that disease severity was more pronounced in the furrow irrigated treatment compared to the drip irrigated treatment. These results are in contrast to our 2010 data with indicated that late season applications of either Quadris or Cannonball (applied via drip irrigation) resulted in a 40% reduction in root disease severity compared to the nontreated control. We do not know the reason(s) why the chemicals were not effective. Lack of disease control may be due to lack of absorption of the chemicals by roots or lack of translocation following absorption. The growing season was cooler than normal and may have reduced root absorption and translocation of the chemicals, particularly Quadris, which is systemic. Or, our hypothesis was incorrect.