

Management of *Phytophthora cactorum* in Diamante Plantings with Aliette and Ridomil

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Severe *P. cactorum*-induced plant collapse in the Diamante cultivar has been observed in inoculation trials, and similar problems can be a concern due to infested nursery stock or inadequately fumigated soil in the fruiting field. Concerns about the susceptibility of this cultivar stimulated our interest in chemical methods of control, specifically metalaxyl (Ridomil) and a phosphorus acid product (Aliette). These compounds have been used in strawberry for years to mitigate *Phytophthora* problems, although dispute is common over their effectiveness. The most severe *P. cactorum* disease problems identified for Diamante during the past three seasons have been traced to nursery infestation. The following summarizes the results of two season's field trials which were aimed at control of disease symptoms due to *P. cactorum* of nursery origin with these systemic fungicide treatments.

Aliette treatments were applied to Diamante plants as a pre-plant dip in 1997 and 1998 as a 2.5#/gallon + 1# potassium carbonate buffer, 15 minutes soak. Metalaxyl was applied at the maximum label rate (1qt./A Ridomil 2E or 0.25 qt./A Ridomil Gold), with rates adjusted for application through the drip line on 52" beds (56% of actual surface area treated). Metalaxyl was applied Dec. 22, 1997 and Jan. 28 1998, or December 20 and January 26 for the 1998 and 1999 production seasons respectively. In 1998 plants were obtained from original (never meristemmed) Diamante stock, and propagated at a Macdoel nursery. Plants used for the 1999 trials were obtained from nursery plots located near Davis (Wolfskill). These plants were either meristemmed controls (not inoculated) or had been inoculated with *P. cactorum* in late August. Original stock plants from 1998 and inoculated plants from 1999 ultimately expressed minor infection and severe infection respectively in the absence of chemical treatments and were intended to represent a range of infection rates likely to be encountered in commercial nursery stock.

Our preliminary results demonstrated substantial effectiveness of Aliette in decreasing plant collapse and increasing the yield of surviving plants from infected nursery stock. With minimally infested high elevation stock, an Aliette dip alone virtually eliminated plant collapse (Table 1), with severe infection a pre-plant dip alone saved about half of the plants that were lost in the absence of any chemical treatment (Table 2). In both cases, the yield per surviving plant improved with Aliette treatment.

Metalaxyl proved effective in reducing plant collapse when infestation rate was low (1998 results) but slightly reduced the productivity of surviving plants (Table 1). When the infestation rate was high (inoculated plants, 1999 results) metalaxyl alone had no positive effect on survivability or the productivity of surviving plants (Table 2). The failure of metalaxyl treatment alone to control severe disease pressure may be a function of timing as well as material effectiveness, as the Aliette treatments were applied prior to planting and the Metalaxyl not until 5 and 10 weeks later.

With very severe infection, plant survival and productivity were improved most by a combination of Aliette dip and subsequent application of metalaxyl (Table 2). The survival rate and yield per surviving plant were similar for inoculated plants that had received this combined treatment and control plants that had not been infested with the disease in the nursery (Table 2), although chemical

treatments did not fully eliminate either plant mortality or yield loss due to disease. The highly successful control of disease symptoms, even for heavily infested plants, demonstrates considerable opportunity for chemical control of *P. cactorum* in the cultivar Diamante.

Table 1. Performance of Diamante with metalaxyl and Aliette treatments evaluated at the Watsonville Research Facility in 1998. Plants were of original stock, propagated at a Macdoel nursery, Dug October 16 and planted November 2.

Treatment	Survival (%)	Yield per Acre (C/A)	Yield per Surviving Plant (C/A)
Aliette	98.8	5,927	6,007
metalaxyl	98.8	5,020	5,089
metalaxyl + Aliette	96.3	4,846	5,039
Control	94.0	5,099	5,434

Table 2. Performance of Diamante and Aromas with metalaxyl and Aliette treatments evaluated at the Watsonville Research Facility in 1999. Plants were either infested or non-infested in the Wolfskill nursery 10 weeks prior to digging, and were treated with combinations of pre-plant Aliette dip and/or post -plant treatments with metalaxyl. All plants were harvested November 6 and planted November 18; yields accumulated to August 24.

Treatment	Diamante	
	Survival (August 16) %	Yield (surviving plants) C/A
Inoculated (<i>P. cactorum</i>)	42.5	3,293
Inoculated + Aliette	65.0	4,542
Inoculated + metalaxyl	32.5	3,637
Inoculated + Aliette + metalaxyl	85.0	4,678
Control (never inoculated)	92.5	4,979