

CHERRY (*Prunus avium* 'Bing')
Powdery Mildew; *Podosphaera cerasi*

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Evaluation of soil injected fungicide for management of cherry diseases, 2020-2021.

This trial was conducted at the Botany and Plant Pathology Field Laboratory in a cherry orchard planted on a Camas gravelly sandy loam soil type. Treatments were arranged in a randomized complete block design in a 'Bing' sweet cherry orchard on Mazzard F12-1 rootstock planted in 1995 on 20 x 20 ft spacing and grafted in 1998. Each treatment consisted of 5 single tree replicates. The diameter of trees 8 inches above ground was determined mid-Oct 2020. The fungicide RTSA 504 was injected into the soil around trees using an HTI 2000 Soil Injector connected to a Maruyama MS75 backpack power sprayer. The nozzle end of the injector was inserted 4 inches into the soil prior to horizontal injection of the fungicide solution. The amount of fungicide solution injected was based on the diameter of each tree where 250 ml of solution was injected per inch diameter. For example, 14 separate injection sites were evenly distributed within the drip zone of a tree 14 inches in diameter. Fall injections occurred on 22 Oct 2020 (30% leaf drop) and spring injections occurred 8 Apr 2021 (bud break) and 22 Apr 2021 (late bloom). Fungicide solution emerged from about half the injection sites (through cracks and earthworm middens) during application and puddled on the ground. The fungicide Banner Maxx II was foliar applied using a hydraulic handgun sprayer at 100 psi, such that 5 to 6 gal of a spray suspension was applied per 5 trees (136 to 163 gal water/A). Foliar sprays were applied on 9 Apr 2021 (bud break), 23 Apr (petal fall), 5 May (fruit set), 20 May (1st cover), 4 Jun, and 17 Jun (color change). Omni Supreme oil (1.5 gal/A) was applied to the entire block on 9 Feb for aphid management. Assail 70 WP (3 oz/A) was applied on 11 May to manage western cherry fruit fly and aphids. Insecticides were applied using a Rear's air blast speed sprayer. Makaze (64 fl oz/A) plus Goal 2XL (32 fl oz/A) was applied on 20 Jan and Rely 280 (52 oz/A) was applied on 29 Jun for weed control. Fertilizer was not applied this growing season. Trees were pruned hard from 28 to 29 Jan 2021. Incidence of powdery mildew was evaluated on 22 to 23 Jun by examining the last (distal) five (5) fully expanded leaves on each of 20 shoots from around the tree. To compensate for variations in tree vigor only shoots showing high vigor and strong growth were selected for disease evaluation. Powdery mildew on fruit was not assessed.

Rainfall for the dormant season (Oct 2020 to March 2021) was close to normal but spring rainfall was the second lowest ever recorded. Although a nearby TEROS 11 soil sensor connected to a Meter ZL6 Data Logger measured 23% soil water content during the fall injection and 26 to 27% during the spring injections, soil conditions were considered dry. An unusual climate change related heat dome (heat wave) occurred for 3 days in late June with temperatures reaching 107°F on 27 June. Conditions were not favorable for cherry leaf spot development which was not observed until 28 Jun on widely scattered leaves and never increased during the growing season. Powdery mildew, however, was first observed on 14 May and did increase during the growing season. The amount of powdery mildew found on non-treated trees was not significantly different from powdery mildew found on any of the trees treated with soil injection. Lowest amount of powdery mildew was found on trees treated with Banner Maxx II which was significantly lower than powdery mildew found on all other trees. Phytotoxicity was not observed on any treated trees. This includes any PGR effects or necrosis of the serrations on the leaf margins as has been seen with foliar applications of the same chemical (see Corum report from 2011).

Rainfall first occurred 8 days after the fall injection, 16 days after the first spring injection and 2 days after the second spring injection. There was 29.07 inches rain between the fall and first spring injection. Future trials may need to consider the soil water status *prior* to injection. Injections may need to be done shortly *after* significant rain or irrigation. Rain or irrigation shortly *after* injection may also be an important factor for chemical uptake.

Treatment & Rate/injection or /100 gal as indicated below	Time of Application*	Ave. Tree Diameter (inches)**	Powdery Mildew (% leaves)**
Non-treated.....	None.....	13.7	65.4 ab
RTSA 504 at 10 ml/injection.....	Fall.....	12.6	60.8 b
RTSA 504 at 5 ml/injection.....	Fall and Bud Break	13.7	71.4 ab
RTSA 504 at 5 ml/injection.....	Bud Break.....	13.4	75.2 a
RTSA 504 at 10 ml/injection.....	Bud Break.....	14.3	65.2 ab
RTSA 504 at 5 ml/injection.....	Bud Break and 2 weeks later.....	13.8	70.8 ab
Banner Maxx II at 4 fl oz/100 gal.....	All foliar apps...	13.4	27.0 c

* Fall injections occurred on 22 Oct 2020 (30% leaf drop) and spring injections occurred 8 Apr 2021 (bud break) and 22 Apr 2021 (late bloom). Banner Maxx II was foliar applied on 9 Apr 2021 (bud break), 23 Apr (petal fall), 5 May (fruit set), 20 May (1st cover), 4 Jun, and 17 Jun (color change).

** Means followed by the same letter do not differ significantly based on Fisher's protected LSD ($P=0.05$). Means without letters were not different.