

EVALUATION OF MASTERCOP® FOR DISEASE MANAGEMENT—2019

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Objective

Evaluate Mastercop® fungicide/bactericide for disease management in onion. Mastercop is a fungicide/bactericide with copper sulfate pentahydrate as the active ingredient. Badge® SC is a fungicide/bactericide with copper oxychloride and copper hydroxide as the active ingredients.

Materials and Methods

Cultural Practices

Onion seed (cv ‘Vaquero’) was planted at 143,000 seeds/acre on April 1, 2019. The field was drip irrigated with drip tape laid at 4-inch depth between two onion beds during planting. The drip tape had emitters spaced 12 inches apart and an emitter flow rate of 0.22 gal/min/100 ft (Toro Aqua-Traxx, Toro Co., El Cajon, CA). The distance between the tape and the center of each double row of onions was 11 inches.

Onions were irrigated automatically to maintain the soil water tension (SWT) in the onion root zone below 20 cb. Soil water tension was measured with six granular matrix sensors (GMS, Watermark soil moisture sensor model 200SS, Irrometer Co., Riverside, CA) installed at 8-inch depth in the center of the double row. Sensors had been calibrated to SWT. Irrigations were run by a controller programmed to irrigate twice a day, applying 0.48 inch of water per irrigation. A Watermark Electronic Module (WEM, Irrometer Co.) was adjusted to override controller irrigations if the SWT was below 20 cb. Four Watermark sensors were connected to the WEM.

Treatment Applications

Three fungicide/bactericide treatments were applied weekly, on July 24, July 30, August 06, August 13, and August 20, 2019. The three treatments were Mastercop at 1.5 pt/acre, Mastercop at 2.5 pt/acre, and Badge SC at 2.0 pt/acre.

Products were applied with a CO₂ backpack sprayer using a 4-nozzle boom with 11004 nozzles at 30 psi and 35 gal/acre. Each treatment plot was four double rows wide by 23 ft long.

Data Collection

Plots were inspected weekly for symptoms of disease.

Onions from the middle two double rows in each plot were lifted on September 10. They were topped by hand, bagged on September 18, and placed in storage on September 24. The onions from each plot were graded on January 9 and 10, 2020. During grading, bulbs were separated according to quality: bulbs without blemishes (No. 1s), split bulbs (No. 2s), neck rot (bulbs infected with the fungus *Botrytis allii* in the neck or side), plate rot (bulbs infected with the

fungus *Fusarium oxysporum*), and black mold (bulbs infected with the fungus *Aspergillus niger*). The No. 1 bulbs were graded according to diameter: small, medium, jumbo, colossal, and super colossal. Bulb counts per 50 lb of super colossal onions were determined for each plot of every variety by weighing and counting all super colossal bulbs during grading. Marketable yield consisted of No.1 bulbs in the medium or larger size classes (larger than 2¼ inches).

After grading, a subset of approximately 50 bulbs per plot were cut open to evaluate for internal rots that may not have been evident in grading.

Results

The trial field received 3.70 inches of rain in April and May and 0.39 inches in September in the days leading up to harvest. However, none of this precipitation came in the form of a severe thunderstorm that likely would have caused plant injury.

The only fungal disease detected in the field was a minor amount of plate rot caused by *Fusarium oxysporum* f. sp. *cepae*. No other fungal diseases or bacterial diseases were evident. No phytotoxicity was observed from the treatments.

After storage, neck rot caused by *Botrytis allii* was found in all treatment plots. However, there were no differences among treatments in the amount of neck rot or other unmarketable bulbs (Table 1). Incidence of neck rot ranged from 7 to 13% but varied among plots.

There were no significant differences among the treatments in marketable yield or yields of the different size classes (Table 1).

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Table 1. Yield of ‘Vaquero’ onions treated with fungicide/bactericide products, Malheur Experiment Station, Oregon State University, Ontario, OR, 2019.

Treatments	Neck rot	Plate rot	Culls	Small	Medium	Jumbo	Colossal	Super colossal	Marketable	Total yield	Supers/50#	Neck rot ^a
	----- cwt/acre -----											%
Control	104.16	8.68	1.99	3.96	6.72	508.39	371.01	52.07	942.13	1075.96	28.53	13.4
Mastercop 1.5 pt/acre	75.03	9.04	1.22	3.28	6.74	538.09	410.29	108.89	1067.29	1167.07	30.53	13.5
Mastercop 2.5 pt/acre	61.60	3.82	4.96	1.32	13.97	488.21	391.98	98.56	994.04	1075.67	30.84	9.7
Badge 2 pt/acre	65.09	2.30	3.98	1.53	8.96	547.93	405.82	85.44	1049.67	1135.53	28.58	6.7

^aNeck rot percentages are based on assessment of cut onions and are higher than percentages based on weight at grading.