

Fosphite Hop Trial - 2003

By 5/19, 14 days after the second application, results suggest a positive response from both rates of Fosphite when compared to the Untreated Check and the standard Aliette treatments with no yellowing of foliage. Two items of note were observed at this evaluation. First, spikes were found "on the string" i.e., on the vine, as well as in the hill in the Untreated Check and Aliette standard treatments, and not on any of the Fosphite treated vines. Secondly, the average spike count in the Aliette standard was greater than the average spike count in the Untreated Check. This may be attributed to potential resistance, as Aliette has been the standard downy mildew treatment in the trial site area in previous seasons.

Little difference between treatments was noted on 7/15 when plants were in the "burr"/bloom stage of growth. However, the Aliette standard treatment was ranked lowest of all for having less bloom and visually appearing to be less vigorous than vines in both Fosphite treatments and the Untreated Check.

Evaluation in mid August for the presence or absence of downy mildew in cones was inconclusive as very little downy mildew was found on cones in any of the treatments. However, 10 days later, on 8/22, no downy mildew was found in cones from the Aliette plots while some cones in two replicates of both Fosphite treatments the Untreated Check had downy mildew symptoms. The August 22 evaluation was made more than 4 weeks after the last application. Although the differences are minor, maybe these results suggest longer residual control of downy mildew in the cones with Aliette than with Fosphite. Although no downy mildew was found on cones from the Aliette plots, average 100-cone weight/plot from the Aliette treatment was slightly less than from the Fosphite and Untreated Check plot.

Conclusion: Results of this trial suggest better early season control of downy mildew in Nugget variety hops with Fosphite applied @ 3 qts/ac when compared to an industry standard of Aliette WDG applied @ 2.5 lbs/ac. Results of late season control are inconclusive because of lack of disease pressure.

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Objective: To evaluate and compare the efficacy of Fosphite for the control of downy mildew, *Pseudoperonospora humuli*, in hops with the industry standard treatment.

Procedure: A trial site was established in a commercial yard of Nugget variety hops near Hubbard, OR with a history of downy mildew. Plots consisted of 9 hop hills each and all treatments were replicated four times for a total of 36 hills per treatment. Treatments were applied on 5/2, 5/19, 6/3, 7/16, and 8/12/03. The first three treatments were applied using a CO2 pressurized sprayer with a single nozzle hand wand. These applications were made with 25 gallons/acre of total spray volume. The last two applications were made with a motorized backpack mist blower at 65 gallons/acre and 85 gallons/acre respectively. The treatments were as follows: 1) Untreated Check, 2) Fosphite @ 2 qts, 3) Fosphite @ 3 qts/ac, and 4) Aliette WDG @ 2.5 lbs/ac. The trial site observed on 5/7 and 6/2 to determine the number of "spikes", infected hop shoots, per plot. The plots were subjectively evaluated/rated on 7/15 for amount of bloom, number of sidearms, and general plant vigor. On 8/29, hop cones were quickly scanned for presence or absence of downy mildew. On 9/12, cones were more thoroughly observed and subjectively ranked for incidence and severity of downy mildew infection. Finally, on 9/13, cones were harvested from all treatments in the first 3 replicates. Cones from each replicate were composited into a single sample. A 100-cone sample was drawn from the composite of each of the three replicates per treatment and weighed.

Results: Spikes per plot on 5/7/03 (5 DAT)

Treatment	R1	R2	R3	R4	Total	Ave./plot
1) UTC	17	28	37	6	88	22
2) Fosphite @ 2 qts/ac	2	43	18	23	86	21.5
3) Fosphite @ 3 qts/ac	6	19	2	2	29	7.3
4) Aliette WDG @ 2.5 lbs/ac	29	26	8	0	63	15.8

* Observations: Significant yellowing of hop foliage was observed in all hills in Treatment #3 and slight yellowing in most hills in Treatment #2.

Results: Spikes per plot on 6/2/03 (14 DAT2)

Treatment	R1	R2	R3	R4	Total	Ave./plot
1) UTC	26	28	30	11	95	23.8
2) Fosphite @ 2 qts/ac	27	14	12	4	57	14.3
3) Fosphite @ 3 qts/ac	33	9	3	3	48	12
4) Aliette WDG @ 2.5 lbs/ac	58	45	24	28	155	38.8

* Observations: Spikes were found both in the hill and on vines in Tmt # 1 and Tmt #4. No yellowing of hop foliage was noted at this observation.

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Results: Evaluation on 7/15/03 @ burr stage of growth. Total amount of bloom, number of sidearms, and general vine vigor are subjectively ranked on scale from 1 to 10 where 5 = growth of vines in the UTC, 1 = minimal growth with no sidearms or bloom, and 10 = 2X growth seen in the UTC.

Treatment	R1	R2	R3	R4	Total	Ave./plot
1) UTC	5	5	5	5	20	5
2) Fosphite @ 2 qts/ac	4.8	4.0	5.1	5.0	18.9	4.7
3) Fosphite @ 3 qts/ac	5.1	4.8	5.2	5.3	20.4	5.1
4) Aliette WDG @ 2.5 lbs/ac	3.0	3.8	4.9	4.5	16.2	4.1

Results: Number of hop hills with one or more cones with downy mildew on 9/12/03.

Treatment	R1	R2	R3	R4	Total
1) UTC	0	0	1	1	2
2) Fosphite @ 2 qts/ac	1	1	0	0	2
3) Fosphite @ 3 qts/ac	2	0	1	0	3
4) Aliette WDG @ 2.5 lbs/ac	0	0	0	0	0

Results: 100-cone weights on 9/13/03.

Treatment	R1	R2	R3	Total	Ave./plot
1) UTC	101.6	88.9	56.1	246.6	82.2
2) Fosphite @ 2 qts/ac	93.5	78.2	72.2	243.9	81.3
3) Fosphite @ 3 qts/ac	95.6	82.3	69	246.9	82.3
4) Aliette WDG @ 2.5 lbs/ac	85.5	79.6	74.1	239.2	79.7

Discussion: The evaluation made on 5/7 seemed too early, only 5 days after treatment, to make a decision about the effectiveness of the treatments as spike counts per replicate varied widely. However, the data suggest a trend indicating better downy mildew control with the 3-qt/ac rate of Fosphite than with 2.5 lbs/ac rate of Aliette. It was interesting to note the yellowing of hop foliage in the Fosphite treatments at this observation.