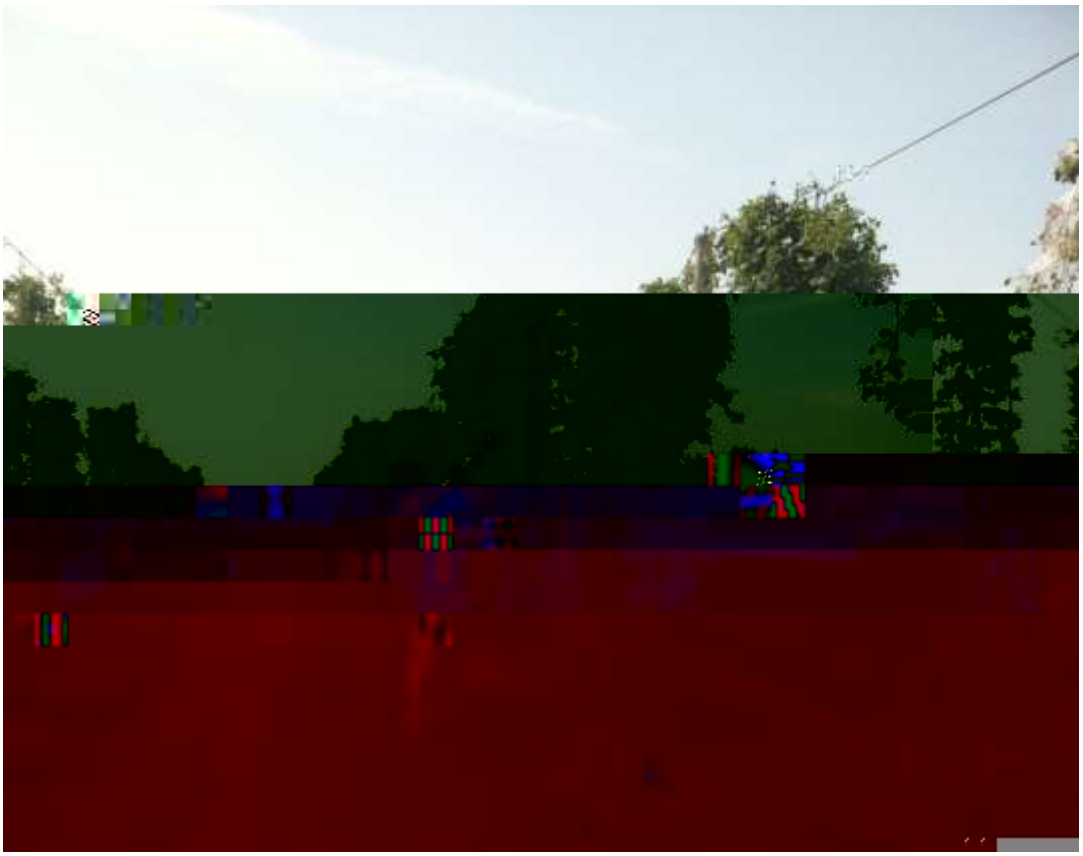
2015 Hop Compost Tea Trial



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2015 HOPS COMPOST TEA TRIAL

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As the acreage of hops continues to rapidly expand in the northeast, there is a great need for production knowledge specific to our region. Downy mildew has been identified as the primary pathogen plaguing our hop yards. This disease causes reduced yield, poor hop quality, and in extreme cases, plant death. Control measures are desperately needed that can effectively reduce disease incidence and have a minimal impact on the environment. Farmers have increasing interest in the potential impact of bio-based foliar products on yield, quality, and disease incidence of hops. Compost teas have been used to control disease and provide fertility in a wide range of crops. This study evaluates the impact of compost tea on disease incidence and yield of second year hops.

MATERIALS AND METHODS

The replicated research plots were located at Borderview Research Farm in Alburgh, VT on a Benson rocky silt loam soil. The experimental design was a randomized complete block with 5 replicates. The experiment included the following two treatments (8 plants per treatment):

1) Hops with standard granular fertilizer regime and downy mildew controlled with Champ WP (copper hydroxide).
2) Hops with standard granular fertilizer regime plus compost tea added as a foliar fertilizer and disease control.

The small hop yard was located east of the main hop yard and had a smaller design. Two parallel trellises, 517 feet in length, were constructed with 13 feet of space between them. Due to the short duration of this trial, this trellis was only 12 feet tall to accommodate the smaller first and second year plants. The construction of the small hop yard was similar to that of the main hop yard. Poles were set every 95 feet. Unlike the main hop yard, the posts were set at a 90° angle to the ground surface. A step-by-step guide for building a trellis can be found at www.uvm.edu/extension/cropsoil/wp-content/uploads/Rainville-Building-a-Hopyard.pdf.

The small hop yard was irrigated sporadically throughout July and August due to the ample moisture provided by precipitation during the growing season. When irrigation was applied, the rate was 3900 gal ac^{-1}. Detailed information for the drip irrigation sy2 f ior t 4(r)7(r)-3(i)6((t)6(he a1 0 0 1 11(h[.)]TJETBT1 0 0 1 93.14413

Table 1. Total nutrients applied via compost tea treatment over the growing season, Alburgh, VT, 2015.

	Total nitrogen (N)	Nitrate nitrogen (NO_3-N)	Ammonium nitrogen (NH_4-N)	Phosphorous (P)	Potassium (K)
Compost tea lb ac^{-1}	0.183	0.181	0.002	0.020	0.677

Downy Mildew Management

Harvest

Figure 1. Susceptible days for downy mildew infection, Alburgh, VT, 2015.

Impact of Treatment on In-Season Downy Mildew Indicators:

There was a significant difference between treatments for the number of aerial spikes present on the hops, but no difference between the number of basal spikes or infected leaves present on the plants (Table 4). Aerial and basal spike emergence represents systemic downy mildew infection. Infected leaves indicate downy mildew infection during the growing season.

Table 4. Downy mildew scouting data, Alburgh, VT, 2015.

Treatment	Basal spikes %	Aerial spikes #	Infected leaves %

DISCUSSION

Overall, the second year hop plants had very low yield and quality. Poor yields may be related to the low trellis system (10ft) utilized for this short term trial. This hop yard also had significant exposure to the elements (wind) and had traces of leaf scorch and wind damage at the very beginning of the season. The staggering level of leafhopper damage and amount of downy mildew present in hop yard throughout the growing season likely also correlated to the overall poor yields.

Overall, the conditions were very favorable for downy mildew infection during the 2015 growing season. There were no statistically significant differences between hops treated with Champ WG and those treated with compost tea in regard to basal spikes and infected leaves. It should be noted that aerial and basal spikes are a poor indicator of in-season downy mildew infection; however, they can be used to quantify systemic downy mildew infection. Leaf lesions provide the best indicator of in-season downy mildew infection. Based on these parameters, the in-season infection rate between the Champ WG and compost tea treatments was not statistically different from each other. This project indicates that compost tea provided in-season downy mildew control similar to Champ WG.

At harvest, cone disease incidence and severity was assessed for each treatment. The primary diseases identified on the cones were Alternaria and Phoma. These are secondary diseases that can colonize cones that have been previously damaged or injured. Downy mildew was not the primary pathogen identified on the cones. The severity of these diseases appeared to increase when