

# 2020 Hop Nitrogen Fertility Trial



Dr. Heather Darby, UVM Extension Agronomist  
John Bruce Scott Lewins and Ivy Krezinski  
UVM Extension Crop and Soil Technicians  
(802) 5246501

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**2020 HOP NITROGEN FERTILITY TRIAL**  
**Dr. Heather Darby, University of Vermont Extension**  
**heather.darby[at]uvm.edu**

Until now, commercial hop (*Humulus lupulus* L.) production has not occurred in the northeast (NE) region of the United States for 150 years. A combination of the spread of hop downy mildew, the expansion of

Hills were strung between 6-May and 8-May using a double coir string leading up to the top wire and trained 20-May. Beginning on 2-May, the entire hop yard was sprayed with Champ WG (Alsip, IL) at a rate of 1 lb ac<sup>-1</sup>, and diluted in 100 gallons of water and was sprayed on a weekly basis through 5-Jun. During this period plots were scouted weekly for downy mildew basal spikes and aerial spikes. Plants additionally scouted on a weekly basis starting 1-Jun for pest and beneficial insects through 5-Aug. Two plants and three random leaves per plant within each plot (variety) were visually inspected. The number of potato leaf hopper (PLH), hop aphid (HA), two-spotted spider mite (TSSM), and mite destroyer (MD) present on each leaf was recorded.

Hop harvest was targeted for when cones were 27% dry matter. At harvest, hop bines were cut in the field and brought to a secondary location to be run through our mobile harvester. Cascade perennial plants were harvested from 26-Aug through 28-Aug and Cascade plants were harvested from 14-Sep through 4-Sep. Plants were harvested using a Hopstep 5P harvester (HopHarvester LLC, Honeoye, NY). The number of individual plants harvested and total cone yield was recorded for each treatment. For bines from each plot were chipped, dried, and sent to Dairy One in Ithaca, NY to be analyzed for whole plant nutrient analysis. Cone samples were weighed and dried to determine dry matter content. Cones were also rated in browning severity on a 10 scale, where 1 indicates low browning and 10 indicates severe browning result of disease. All hop cones were dried to 8% moisture, baled, vacuum sealed, and then placed in a

months of May and June. Supplemental irrigation was applied to plants at a rate of 540 gal ac<sup>-1</sup>, however



### *Yields and cone quality*

At harvest 100 cone weight, diseased cone percentages, disease severity, harvest dry matter, and yields were recorded (Table 6 and 7). For both the Cascade and Centennial hops, there was no difference across treatments for 100 cone weight or 100 cone weights within variety. For the Cascade hops, significant differences were only observed in the percentage of diseased cones with the highest percentage observed (79.3%) in the 100/50lbs N ac<sup>1</sup> treatment. Overall, the percentage of diseased cones for the Cascade hops (59.5% average) was much higher than the Centennial average (29.9% average) on to greater disease severity by 1.67 points on the given 110 scale. More treatment differences were observed

### *Brew quality*

Higher rates of nitrogen appeared to have a negative impact on the brew quality of the Cascade cones for hop storage index (HSI) (Table 8). Values below 0.300 for HSI are considered to be of good quality with those reaching higher values above 0.400 becoming of questionable or poor quality. Highest observed values for HSI were seen at the 100/100s N ac<sup>1</sup> treatment at 0.639 (poor quality) compared and was statistically similar to all other treatments receiving summer nitrogen with the lowest value observed in the 100 ac<sup>1</sup> treatment at 0.212. Beta acids were lowest at the 100/150 N ac<sup>1</sup> treatment (250 lbs N total) at 1.87%. While differences in alpha acids were not significantly different, there were some observable differences between the highest nitrogen rates which were around 4% alpha acids and the lower nitrogen rates which were closer to 5%. This may also correspond to the higher HSI values observed in those treatments receiving higher nitrogen applications for Cascade. For the Centennial hops, HSI did not appear to be impacted by nitrogen fertility treatments with all values falling within acceptable or good quality ranges and relatively consistent observed values for alpha acids (Table 9). Beta acids in the Centennial hops again varied with the highest 100/150s N ac<sup>1</sup> treatments showing lowest overall beta acid percentage and all other treatments having similar

## **DISCUSSION**

As mentioned earlier, Cascade hops within this trial appeared to be impacted greatly by poor growth when compared to the Centennial hops. This may be a result of



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