Hop Production to Enhance Economic Opportunities for Ohio Farmers and Brewers 2016

Brad Bergefurd, Extension Educator, Scioto County and Piketon Research & Extension Center, Ohio State University
Dr. Mary Margaret Gardiner, Associate Professor and Extension State Specialist, Department of Entomology, Ohio State University
Dr. Sally A. Miller, Professor and Extension State Specialist, Department of Plant Pathology, Ohio State University

Objective

To screen hop cultivars for suitability, production performance and quality attributes under Ohio growing conditions.

Background

This study was conducted at the Agricultural Incubator Foundation Bowling Green, Ohio (lat. 41.46° N, long. 83.66° W), elevation 660 feet. Research and Demonstration plot is a collaborated effort between The Ohio State University, Hirzel Farms, and Center for Innovation of Food and Technology. The experimental soil is designated as a HoA—Hoytville Clay loam, with 0–1% slopes. Soil was formed from wave planed- till. It is a very deep, nearly level and a very poorly drained soil. Permeability consists of moderately slow in the upper part of the solum, slow in the lower part of the solum, and slow or very slow in the substratum. The A horizon soil surface is predominantly clay loam or sandy clay loam; while the subsoil is clay, silty clay, clay loam, or silty clay loam.

Methods

This trial looked at 10 different hop varieties for with 4 replications of each treatment Rhizomes were hand planted into 10 inch tall raised beds covered with black landscape fabric for weed and soil erosion control. Plants are spaced 3 feet apart in row and beds are spaced 12 foot on center. Drip irrigation is installed on high tinsel wire above the landscape fabric. 159 pounds of P2O5, 140 pounds of K2O and 2477 pounds of CaCO3 per acre was applied according to soil test results and incorporated before forming beds and applying landscape fabric. A high trellis training system (17 ft. tall) was installed and assembled after formation of the raised beds.
Insect control: Collected leaf samples were inspected weekly for the presence of two-spotted spider mite, hop aphid and the potato leaf hopper. Chemical control was used when the thresholds had been reached for each insect type.
Disease control: Plant samples were analyzed by the Plant Pathology lab, OARDC to evaluate for disease as needed throughout the growing season.
Fungicide applications were made on a 10 day schedule.
Irrigation: Drip irrigation was applied as needed throughout the growing season.
Fertilization125 lb/acre of Nitrogen fertilizer applications were made via fertigation through the drip irrigation system, over a six week period 4/15/16-6/10/16. Nitrogen source used was 28%.

Yield data

Hop cones were hand harvested as they reached physiological maturity according to chemical analysis results and fresh weight data was collected. Hop cones were then dried to 8% moisture using a hop drying Oast (dryer), weighed, and air tight packaged with a vacuum sealer and immediately placed into a freezer at -20 degrees F.

Table 1: Hop Yields Bowling Green, Ohio 2016

Treatment	Wet lbs. per Plant	Dry lbs. per Plant	Wet lbs. per Acre	Dry lbs. per Acre
Columbus	1.5738 A	0.38326 A	1904.3 A	463.74 A
Chinook	1.3298 A	0.34163 A	1609.1 A	413.37 A
Galena	0.6613 B	0.16905 B	800.2 B	204.55 B
Cascade	0.4609 BC	0.11123 BC	557.7 BC	134.59 BC
Nugget	0.2428 BC	0.05705 C	293.8 BC	69.03 C
Centennial	0.1872 C	0.04901 C	226.5 C	59.3 C
Mt. Hood	0.1267 C	0.03359 C	153.2 C	40.64 C
Willamette	0.1162 C	0.02753 C	140.6 C	33.31 C
Sterling	0.0804 C	0.02037 C	97.3 C	24.65 C
Golding	0.0356 C	0.00925 C	43 C	11.19 C
LSD	0.4294	0.105	519.52	127.08

*Treatments with same letter are not significantly different.

* All results based on 1210 plants per acre

Table 2: Hop chemical analysis 2016

Variety	Moisture	Alpha Acids	Beta Acids	Alpha Acids at 8%	Beta Acids at 8%
Cascade	78.06	2.10	1.83	8.6	7.5
Centennial	68.5	3.83	1.20	10.9	3.4
Columbus	76.13	4.75	1.30	17.0	4.9
Nugget	73.46	3.03	1.71	10.2	5.7

Summary

Overall plant and hop cone quality was good. Wet pounds per acre ranged from a high of 1,904 (Cv. Columbus) to a low of 43 (Cv. Golding). Wet pounds per plant ranged from a high of 1.57 pounds (Cv. Columbus) to a low of .03 pound (Cv. Golding). Wet hop market prices average $25 per pound with gross return potential from Ohio hops in access of $70,000 per acre. Acreage estimates indicate 80 mature Ohio hop acres harvested in 2015. (http://www.usahops.org/userfiles/image/1452960660_2015%20Stat%20Pack.pdf)

THE OHIO STATE UNIVERSITY

For more information, contact:
Brad Bergefurd
OSU South Centers
1864 Shyville Road
Piketon, Ohio 45661
bergefurd.1@osu.edu