Hop Research Project: Installation of the Hop Yard

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Diana Cochran, assistant professor
Department of Horticulture
Brandon Carpenter, ag specialist

Introduction

Interest in locally grown food crops coupled with the increase in craft breweries around the United States has created a hop production craze. Hop cones are the product added to beer to enhance flavor and these are derived from *Humulus lupulus* (common hop). Midwest production of hops dates back to the early 20th century but due to downy mildew and mites, production moved to the drier climates of the Pacific Northwest (PNW) where it still dominates today. Washington, Oregon, and Idaho are the three largest states in hop production within the United States; however, with the excitement of craft breweries, production outside of the PNW has reemerged. Michigan is now the fourth largest state in hop production within the United States.

Common hop is a climbing perennial vine that produces bines (the vines of a hop plant) annually. They are dioecious plants, meaning there are male and female plants, but it is only the female cone-shaped fruit that is desirable. Within each fruit or cone are lupulin glands containing alpha and beta acids, and oils responsible for the bittering and flavoring of beer. One plant can weigh as much as 30 lb and one acre of hop plants can produce over 800 lb of dry cones; thus plants must be grown on a support structure (trellis). Selecting the correct materials and site is key to having a successful hop yard and a reliable trellis.

Materials and Methods

Hop yard installation began in November 2014 with the installation of 99 black locust poles. Digging and setting poles took roughly 90 man-hours to complete. Each black locust pole was 24 ft long and ranged from 8 to 12 in. (10 in. avg) in diameter. Holes were dug using an 18 in. auger attached to a skid steer. Poles were placed using an Excavator with a 360° grapple arm and spaced 42 ft apart within row and 10-ft spacing between rows, for a total of 9–420 ft rows. End poles of each row were set at 45° angles for anchoring strength. Prior to pole placement, holes were filled with an estimated 0.8 ft^3 of half-inch road base gravel. Once poles were set, holes were backfilled with an additional 6.1 ft^3 of gravel (each pole was buried 5 ft in the ground leaving 19 ft above the ground).

Spring 2015. Poles were leveled off to 18 ft above the ground (measured from ground to top of pole) using a chainsaw. Next, half-inch diameter holes were drilled in the top of the pole using an auger-style drill bit. Five-sixteenth inch galvanized aircraft cable (GAC) was fed through the holes, running north to south (across the row), and looped around the top of the poles in rows 1 and 9. Cables then were strung east to west down the rows using the north-south crosswire as a support. This effectively made a grid to support the rows of hops plants during periods of high wind. A wire tensioner was used to tighten the GAC within and across the rows. Along the perimeter, GAC was attached from the top of the pole (using cable clamps) to a 48 in. earth anchor with a 6-in. spiral baseplate buried in the ground. Turnbuckles were used to tighten the GAC at each terminal or end pole. Each anchor wire had two cable clamps at the top and bottom for a total of four clamps/anchor wire. High tensile 12-gauge wire was attached to each pole 1 ft above the ground running the length of each row. The high tensile wire serves as an attachment point for the hop bines

and to attach drip tubing (3/4" UV lined white polyethylene tubing).

Summer 2015. Hop yard was amended with urea (80 lb/acre), monoammonium phosphate (100 lb/acre), potassium (100 lb/acre), and elemental sulfur (150 lb/acre) for establishment. Next, the hop yard was laid out for planting Cascade and Chinook hop plants. Cascade liners were planted within row at 3.5 ft spacing and Chinook liners were planted within row at 4 ft spacing and watered in immediately after planting. Approximately four weeks after planting, hop bines were trained by wrapping 2 to 3 bines around natural twine. Twine was hand-tied to the top wire (GAC) and attached to the bottom high tensile wire to provide support for the hop bines. Plants were maintained with irrigation and weeds were managed through mechanical cultivation and hand removal.

Results and Discussion

In 2015, Cascade and Chinook hop plants produced cones; however, cones were not harvested the first year. Therefore, bines remained on the twine until the first hard frost.

Acknowledgements

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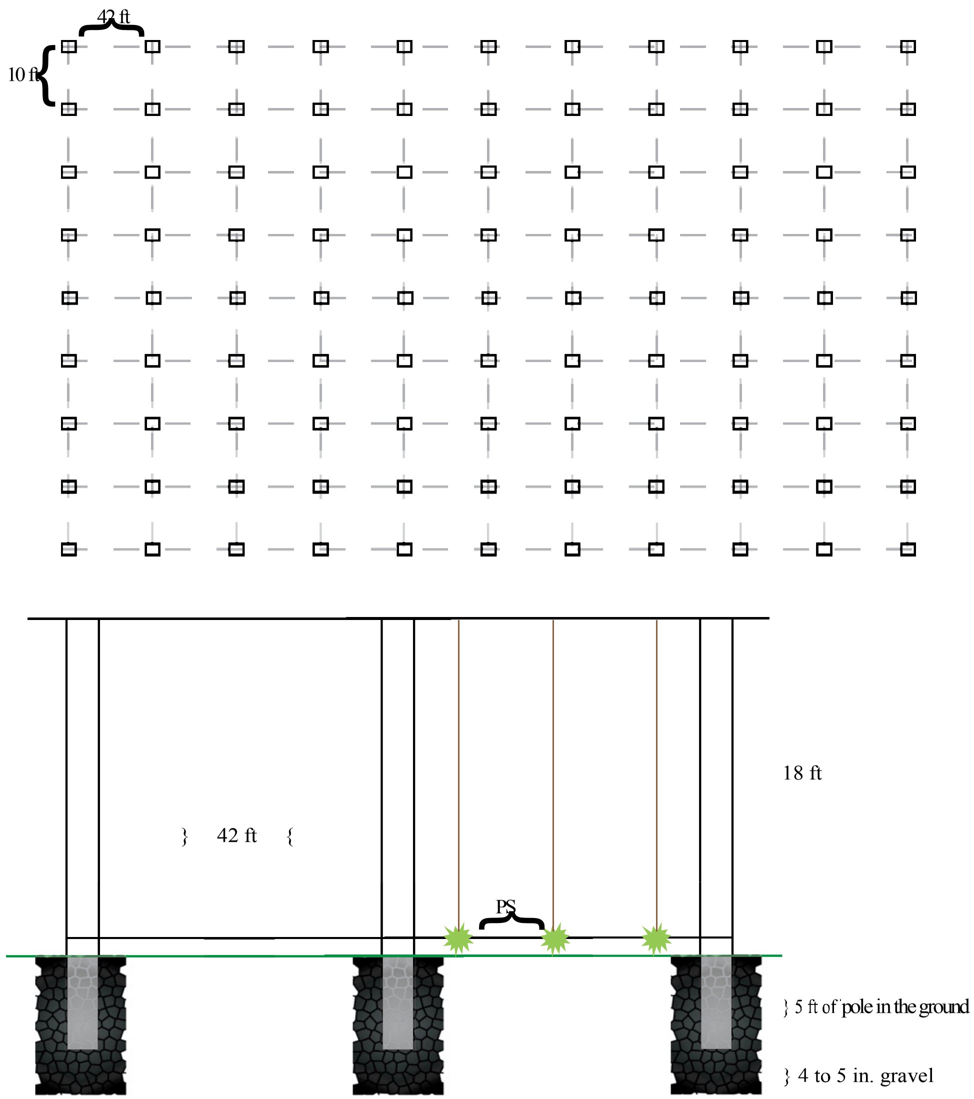

Plot size:	420 ft × 90 ft
Pole spacing:	42 ft spacing within row × 10 ft between rows
Pole placement:	18 in. diameter holes backfilled with gravel
Rows:	Laid out north to south
Top wire:	Runs length of rows (north and south) and across rows (east and west)
Low wire:	8 in above ground, runs length of rows
PS:	plant spacing = ‘Cascade’ 3.5 ft × 10 ft; ‘Chinook’ 4 ft × 10 ft
Twine:	Hand-tied to top wire and low wire

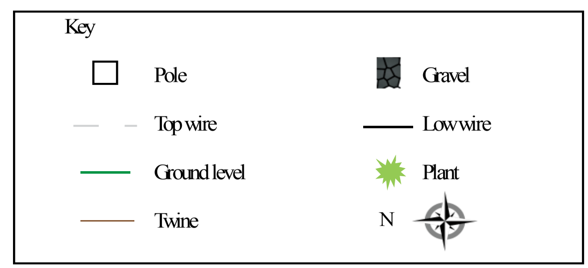

Figure 1. ISU Hop Research Plot