Hops Workshop at Hughesville SMECO

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UME HOPS TEAM

University of Maryland Extension Hops Project

Objectives:

- To gauge the response to the local interest in hops production
- Trial varieties on the Eastern Shore and Western Maryland
- Trial growing systems
- Develop extension programs for hops management

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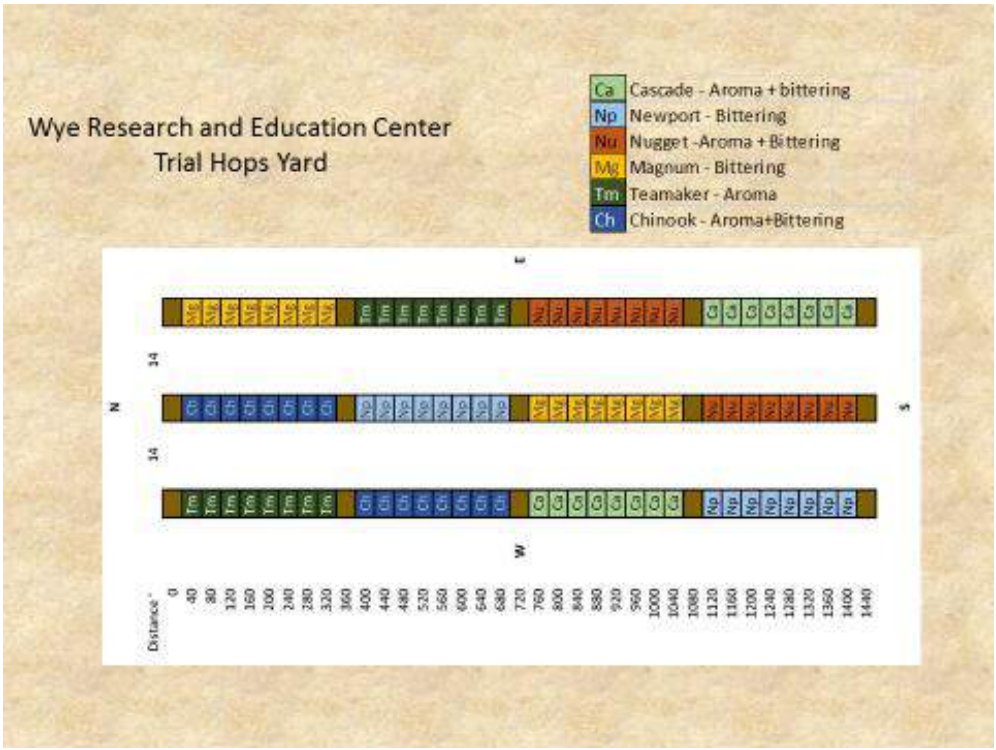
Wye Hops		
Planting Date	**Variety**	**Profile**
Jun-16	Nugget	Aroma/Bittering
Jun-16	Cascade	Aroma/Bittering
Jun-16	Newport	Bittering
Jun-16	Willamette (removed)*	Bittering
17-Oct	Magnum	Bittering
17-Oct	Chinook	Aroma/Bittering
17-Oct	Teamaker	Aroma/Bittering

Summary for Wye 2016 Hops: Nugget and Cascade have performed well. Willamette was a failed crop and was removed from the hops yard after year 1.

Profile content:
Bittering - High alpha acids/low oil
Aroma - Low alpha acids/high oil
Nobel - High oil/moderate alpha acid



Wye Hops Chemical Analysis

Cascade 2017 (1st Harvest)	
Alpha Acids (%)	4.98
Cohumulone (%)	1.30
Humulone (%)	3.68
Beta Acids (%)	7.32
Colupulone (%)	2.96
Lupulone(%)	4.36

Cascade 2017 (2nd Harvest)	
Alpha Acids (%)	4.58
Cohumulone (%)	1.29
Humulone (%)	3.29
Beta Acids (%)	5.77
Colupulone (%)	2.48
Lupulone(%)	3.28

Newport 2017	
Alpha Acids (%)	8.16
Cohumulone (%)	3.12
Humulone (%)	5.03
Beta Acids (%)	5.63
Colupulone (%)	3.47
Lupulone(%)	2.16

Nugget 2017	
Alpha Acids (%)	11.41
Cohumulone (%)	2.61
Humulone (%)	8.80
Beta Acids (%)	3.47
Colupulone (%)	1.62
Lupulone(%)	1.85

Cascade 2017 Yield (combined 1st & 2nd Harvest)

The Cascade Harvest was 5.6 lbs dry hops for 12 plants. That's just under a half pound per plant or 470 dry lbs per acre given the below density info from Michigan of 1000 plants per acre.

"Hop yields are cultivar-dependent, with full production for 'Cascade', for example, to be at least 1,500 pounds of dried hops per acre. Conservative annual yield estimates for year 1 are negligible; for year 2, 50% production; for year 3, 75%; and for years 4 and 5, 100%. It is assumed that wet hops contain 75% moisture and dried hops 10% moisture." (MSU E3236)

The Hops yard designed at the Wye has dimensions that have a max density of 800 plants per acre. The rows are wider than average (14ft) for increased airflow to accommodate Maryland's humid climate. Based on our Hops yard dimensions and current yield history, we are expected to produce 800 lbs per acre when we reach year 4 (100% production). This falls behind the 1500 lbs for commercial production of Cascade based on Pacific Northwest averages..

Useful Resources:

- Maryland Rural Enterprise Development Center –Hops Production
https://extension.umd.edu/mredc/specialty-modules/hop-production

- Carrol County Extension – Hops in Maryland
http://extension.umd.edu/carroll-county/agriculture/hops-maryland

- Field Guide for Integrated Pest Management in Hops
Oregon State University
University of Idaho
Washington State University
USDA Agricultural Research Service

- Michigan State University Extension Bulletin E3236
http://msue.anr.msu.edu/uploads/234/71501/MI_Hops_cost_of_production_Bulletin-E3236.pdf
Search Term: Michigan State Bulletin E3236

- The American Organic Hop Grower Association
http://www.usorganichops.com/AOHGA/index.php

- Book:

Hops Harvest Moisture Determination

$$\text{Hops \% Wet Matter} = \frac{\text{Dry Cone Weight}}{\text{Green Cone Weight}} - 1$$

The hops % wet matter calculation is used to determine the percent moisture of the hops at time of harvest. The goal for harvesting hops is to have them picked at approximately 23% percent moisture. To get a percent moisture calculation you must weigh the "wet" hops and then place them in an oven at approximately 175 degrees F. The time it takes to get down to 0% moisture is indeterminate so periodic weighing is needed to see when the weight levels off. When the weight levels off, the percent moisture should be at 0% moisture in that environment. When 0% moisture is achieved, the calculation [MC = (D / W) - 1] can be used to determine percent moisture of the wet hops.

MC = Moisture Content, W = wet hops, and D = dry weight

$$\text{Hop percent dry matter} = 100 \times \frac{\text{Dry cone weight} - \text{Empty container}}{\text{Green cone weight} - \text{Empty container}}$$

When we determine percent moisture of the wet hops, we can then calculate to get our target percent moisture for storing hops. Our "target" percent moisture to effectively store hops is between 8 and 12% moisture.

$$\text{Target weight} = \frac{\text{Harvest \% dry matter}}{\text{Target \% dry matter}} \times (\text{Green sample weight without the weight of the mesh bag})$$

Custom Hops Dryer designed by Ryan Rhodes (Photo Credit: Nate P.Richards)

Drying Hops

This Hops dryer (or Hops Kiln) has 5 levels and each level is divided making 10 sections. This design is especially important for variety trials as well as capturing "per-bine-weight" during the drying process.

The red bag is weighed at the beginning of the drying process at 100 grams and is re-weighed throughout the drying process until it reaches the "target weight" which falls between 8 and 12% moisture.

There are two square fans placed at the bottom (not pictured) that blow upwards towards the hops and a cover with holes is placed on the top (left pic) and creates and environment where the air "bounces around in the box but can also escape".

Important tip: Hops must be dried in an insulated room (usually air conditioned) so the humidity is kept low and will not interfere with the drying process. This is critically important in the Mid-Atlantic region where it is especially humid.

Custom Hops Dryer designed by Ryan Rhodes (Photo Credit: Nate P. Richards)