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UPDATE ON COST OF PRODUCTION & MARKETING OPPORTUNITIES OF HOPS IN THE SOUTHEAST

UTIA SYMPOSIUM ON HOPS
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UTEXTENSION
INSTITUTE OF AGRICULTURE
THE UNIVERSITY OF TENNESSEE

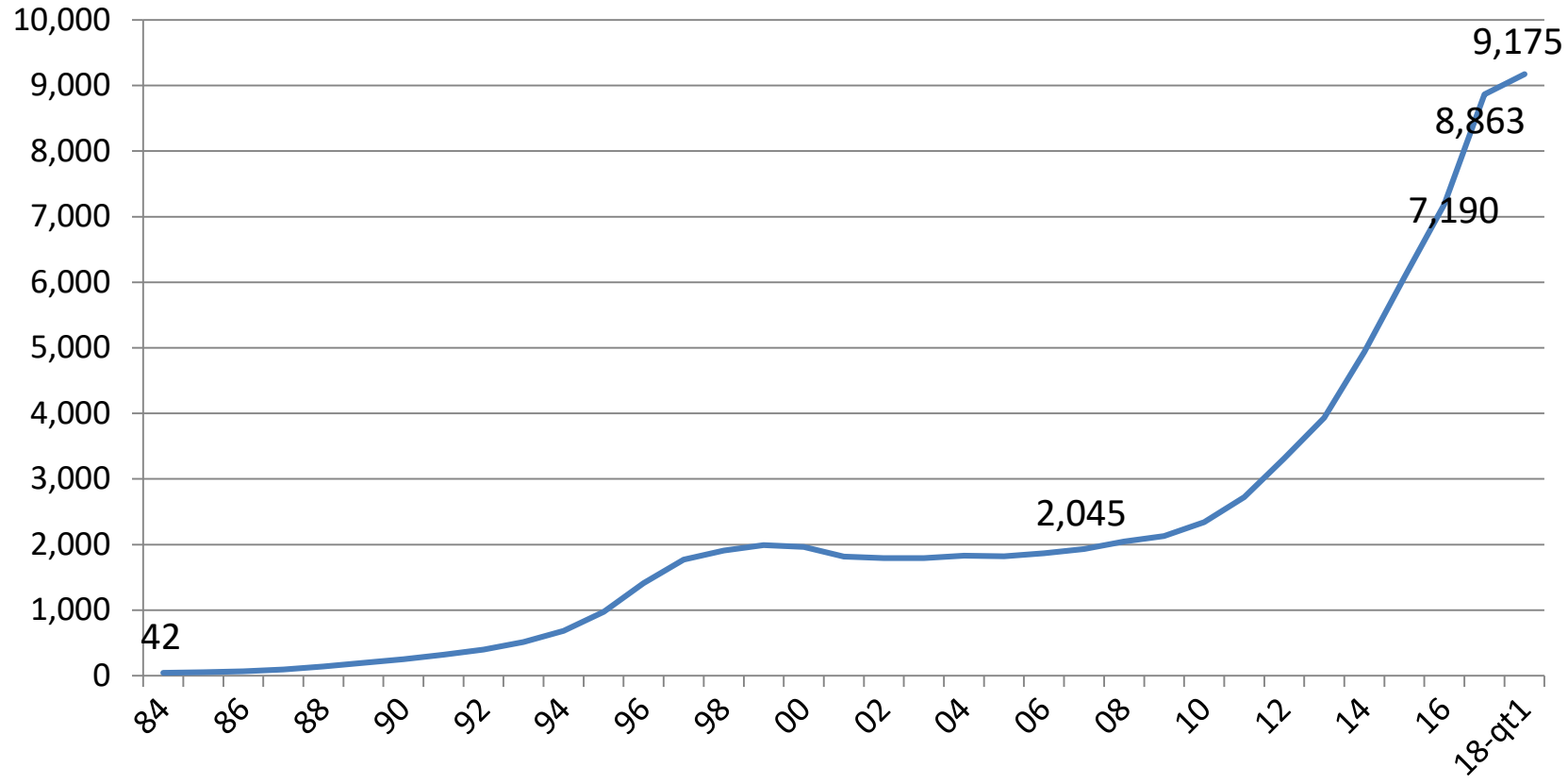
Outline

- Hops Industry Overview
- Challenges faced in Southeast with possible solutions
- Marketing

Hops

- Hops is a flower of Humulus lupulus
- Used in beer production as a preservative and flavor additive
- Grown as a bine (vine) on a trellis system (16-18 feet), hops are generally dried and usually pelletized before use
- Wet hops may be a source of demand held by brewers in the southeast (hops must be used or dried within in 24-36 hours due to oxidation of key ingredients)

Growth in Number of US Breweries



But Experts talking about slowdown

Hops Demand

(USA Hop Growers of America)

- Increased demand tied to tremendous growth in the US craft beer industry
  - 2016: 25.8 million barrels
  - 2011: 11.5 million barrels
  - 2003: 5.5 million barrels
- Hopping rate for craft beer
  - 1.24-1.65 pounds per barrel (31 gallons)
  - Has been increasing

Growing Industry

- US Production:
  - 2007: $180 m, 30,911 acres, 3 states
  - 2017: $617.8 m, 52,963 acres, 29 states
  - 1,959 pounds average yield per acre
  - Concentrated in arid parts of PNW
- >98% used to brew beer
- 26 other states 2,504 acres, 750 pounds/acre
- Cascade, Centennial, Chinook varieties
- But:
  - Estimated loss to pest and diseases is 15%
  - Talk of looming “over acreage”

Hops Yard

Hops Flower (Cone)

Hops Flower

Alpha Acids

- Alpha acids: found in the resin glands of the flowers of the hop plant and are the source of hop bitterness.
- Alpha acids: humulone, adhumulone, cohumulone, posthumulone, & prehumulone
- As a % of dried weight level vary by variety
- Cascade 4.5-8%
- Centennial 9-11.5%
- Chinook 12-14%

Other Components

- Essential oils:
  - Often add aroma, other attributes
- Flavonoids
- Beta acids

Three Major Categories

- Bittering hops have higher concentrations of alpha acids
- Aroma hops:
  - Lower concentration of alpha acids (~5%) and are the primary contributors of hop aroma and (nonbitter) flavor.
  - Often added later in the boiling process
  - May be used in dry hopping (added after cooling-while beer ferments).
- “Dual-use" hops: bittering & aromatic

Harvest, Drying, Pelletizing
(Gorst Valley Hops)

- Cut bines down
- Remove flowers (cones) from stems and bine
- Sort cones from leaves and stems
- Oxidation of lupilin start immediately
- Dry immediately unless wet hopping (24-36 hour window)
- Subject to food safety regulations

Drying

- Oasting or drying to appropriate moisture content (8-10%)
- Air flow driven by centrifugal fans is key
- Watch, adjust for humidity level
- Excess moisture can lead to:
  - Mold and mildew
  - Loss of lupilin
  - General spoilage

Pelletizing

- Brewers typically prefer to use pellets
- Hammer Mill
- Usually baled after drying
- Pelletizing:
  - Breaking bales into powder
  - Heat generated activates resins, bind the powder into pellets

Challenges for Southeast Industry

- High establishment cost
- Small size
- Low yields
- Humid environment
  - mildews and others diseases
  - pests
- Harvest (need labor quickly)
- Lack of industry infrastructure (custom machine harvest, drying, pelletizing)
- Marketing

Establishment Costs: Good Deal of Variation

- Ball Park: $8,000 -$20,000 per acre
- VA: $12,500 per acre
- Michigan Establishment Costs: $13,665 per acre
- Maryland (0.5 acre):
  - $18,400 (without harvester)
  - $46,400 (with)

Operating Costs: Ditto

- Maryland $4,175 per 0.5 acre (wo some labor cost)
- Michigan (acre, year 4):
  - Operating: $4,155
  - Harvest: $1,850
  - Post Harvest: $9,500
  - Total: $15,505
- NC State (0.25 acre)
  - Variable cost: $2,479
  - Fixed cost: $868
  - Total cost: $3,348

Prices

- Dried, 8-10% moisture
- 2017 US average $5.96 per pound
- $12-$14 per pound reported
  - Michigan budget
  - Virginia survey
  - Other sources
- Highest is for home brewers
  - Direct?
  - Or through craft beer stores?

Challenges & Possible Solutions: Yields

- VA producers 25% of large producers in PNW (i.e., around 500 pounds / acre) (Dick & Bresowar)
- Lack of vegetation prior to flowering a likely cause
- Yields generally highest between 35(?) and 55 latitude
- Possible solutions?
  - Light extension-interruption
  - Triming

Light Extension-Interruption

- Lack of summer sun an issue
- Several places (VA, FL, SA) looking at night time light interruption & daylight extension as ways to increase growth and yields
  - Preliminary results from FL appear promising
  - Apparently promising in South Africa but information is proprietary

Pruning as a Way to Increase Yields?
(source: hopnology)

- Optimal pruning (trimming) based on flowering date
- Flowering driven by growing degree days
- Some difference by variety and latitude
- Triming limits node “stretching” thereby generating more and longer sidearms
- More sidearms mean more hops
- 1.9 (trimmed) vs. 0.88 (not) pounds per plant

Ways Small Producers Market

(Virginia Hops Survey, 2017)

- Networking
- Email
- Facebook
- Cold calls to brewers
- Phone calls
- Product samples
- Website
- Home brewers target

Networking is Very Important (Kistler)

- Business cards, social media
- Establish relationship with a set of local brewers
- Visit their operation, drink their beer, learn their needs-capacities
  - Interest in wet hops
  - Hop back
  - Use of pellets
  - Varietal needs
- Have them visit you

More on Marketing

- Have draft contract with specifics
  - Wet or dried (is so what form?)
  - Pricing
  - Delivery dates
  - Delivery method
- Brewing schedule driven by equipment use and market needs
- Provide Alpha/Beta, oil content , moisture, storing index testing info

Marketing Even More

- Insufficient production to sustain a brewer(s)
- Focus on seasonal, industry needs
- Market to several local brewers

Summary, Future Work

- May be an opportunity but many challenges
- NC, VA 30 acres each (2016)
- Brewery survey
  - Demand for local hops
  - Demand for local malting barley
  - Demand for other local additives (fruit)

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Questions, Comments,
Thank You!

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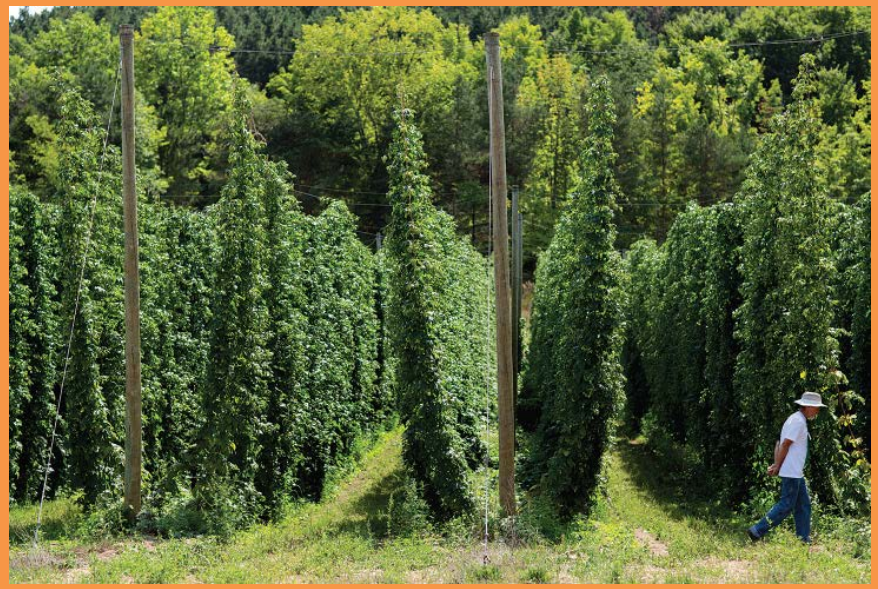

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