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Hops: Trellis, Irrigation, and Establishment (and costs)

Rob Serrine
MSU Extension
Leelanau County, MI

MSU IPM Academy
February, 2014



MICHIGAN STATE
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Extension



Climbing bines

- Bine climbs with the aid of “Trichomes”
- In the wild-they climb up companion species
- Commercial production- Requires a trellis system for support
- Typical set-up
 - 18’ tall
 - Plants spaced 3’ x 14’
 - 1000-1200 plants/acre
- Vine wraps around string-clockwise-function of phototropism (light) and thigmotropism (touch)





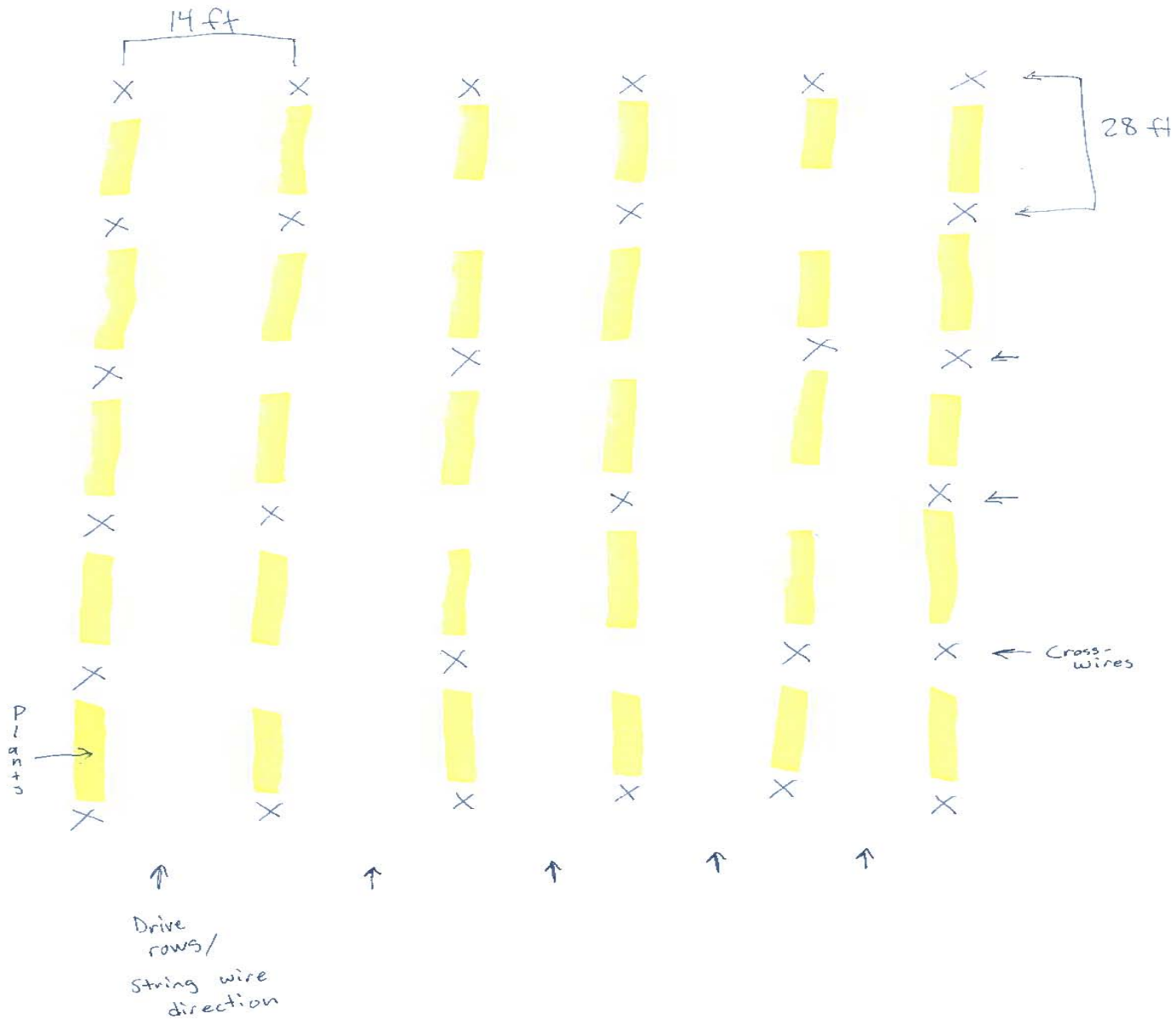
Conventional High Trellis

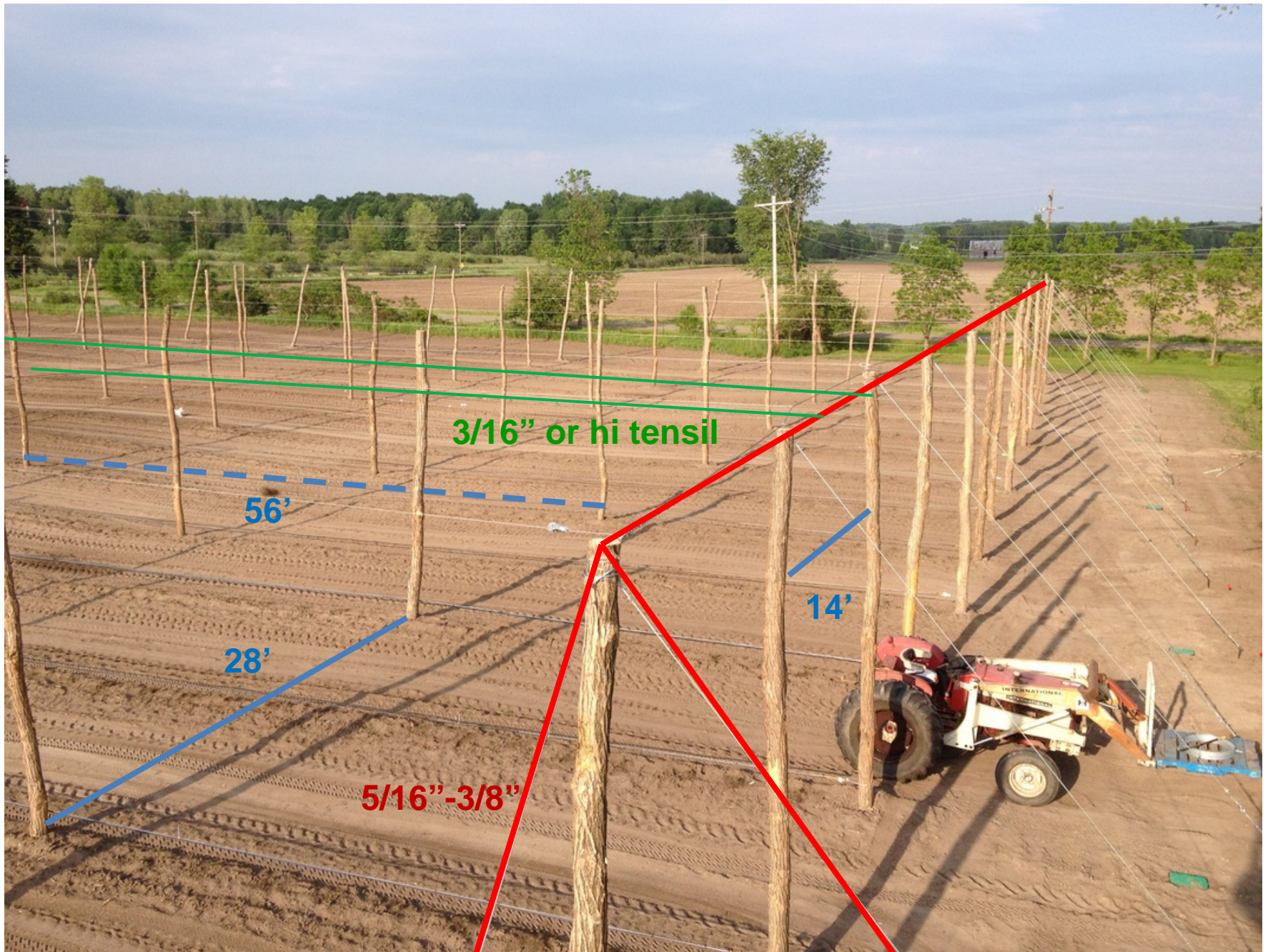






Standard Tall Trellis Hopyard Design





Carr creek hops



Important to build a Solid Trellis!!



Short Trellis

- 3' x 8', 9', or 12'
- Labor Reduction
- Lower Establishment Cost
- Lower yields
- Ill-adapted varieties





Alternative Spacing: NZ





Irrigation

- 75-80% of total annual hop water use occurs after mid-June
- Greatest daily amounts late July-early August
- Majority of roots are in top 4'
- Hops usually extract 50-60% from top 2', but can extract water from 8' or below
- Overall use around 30 inches/year, depends on season

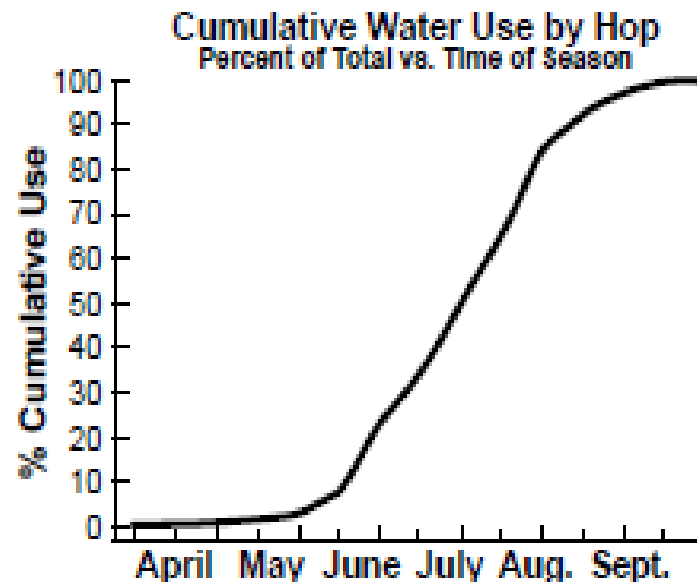


Fig. 1. Cumulative water use of hop during the growing season.



Irrigation Tips

- Baby plants more frequent light applications
- Carefully monitor soil water levels (tensiometer)
- With drip you should always think about clogged emitters:
 - Algae, silt or chemical deposits, etc.
 - Filtration, acid injection, chlorine injection.
- Applying fertilizers without enough water can lead to salt buildup
- Weed control-very important
- Good mite and aphid control-will reduce stress on plants
- Do not underwater
- Right size your well for your acreage
- Different zones for different cultivars



Irrigation: Examples

- Puterbaugh Farm-RAM pressure compensating- emitters every two feet.
- 2-4 hours cycles every other day in cooler temps, every day in hot temps
- Take the soil to saturation level but not beyond, because it would take fertilizer too deep.
- Flush lines once a month-flushes out sediment.





Irrigation: Examples

- Loftus Ranches
- Run two drip tubes per row
- 8 gallons per plant per day in hot season (4 on, 8 off, 4 on)
- ~8000 gallons/acre





Irrigation: Examples

NWMHRC

- Run one drip tube per row
- .42 gallon emitters every two feet
- RAM tubing
- 30 minute flush, 45 minute fertigate, 30 minute flush (every other day)
- NOT ENOUGH WATER





Fertigation





Table 1. 2013 Hopyard Preparation and Establishment Costs (Per Acre and Per 5 Acre yard)

Land Preparation	Per Acre	Notes	5 Acre Yard
Disc	\$ 26.00	\$26/acre	\$ 130.00
Establishment			
Post Holes- digging	\$ 312.50	2.5 hrs * \$125/hr (145 hp tractor)	\$ 1,562.50
Post Holes-placement	\$ 750.00	6 hrs * \$125/hr	\$ 3,750.00
Poles-field	\$ 1,590.00	50 @ \$30/pole	\$ 7,950.00
Poles-end~	\$ 1,840.00	46 @ \$40/pole	\$ 5,360.00
Earth Anchor	\$ 650.00	50 per acre @ \$13 each	\$ 3,250.00
Wire	\$ 1,000.00	Galvanized 7 strand (\$800) + #9 (\$200)	\$ 5,000.00
Misc Hardware/supplies	\$ 500.00	staples, etc.	\$ 2,500.00
Labor-poles	\$ 480.00	4 workers- \$10/hr x 12 hrs	\$ 2,400.00
Management	\$ 240.00	12 hrs @ \$20/hr	\$ 1,200.00
Hop Plants	\$ 3,000.00	(\$3/plant, 1000 plants per acre; 14' x 3.5')	\$ 15,000.00
Labor-planting	\$ 700.00	(70 hrs x \$10/hr)	\$ 3,500.00
Irrigation^	\$ 1,500.00	Includes installation	\$ 7,500.00
Well		Variable	
Total Initial Costs	\$ 12,588.50		\$ 59,102.50

~ For a 5 acre yard: 53 field poles/ac & 27 end poles/ac=265 field poles and 134 end poles or 80/acre

^ 50 gallon/min, 2 inch main (no filtration)-cost is variable depending upon needs, # zones, etc.



Table 2. 2013 Hopyard Annual Operating Costs and Returns (Per Acre)

	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Operating Costs					
Coir (1 string yr 1; 2 strings yr 2 +, \$.20/ string; clips \$80)	\$ 240.00	\$ 480.00	\$ 480.00	\$ 480.00	\$ 480.00
Labor-stringing (5 workers x 10 hours X \$10/hr)	\$ 350.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00
Labor-training	\$ 500.00	\$ 750.00	\$ 750.00	\$ 750.00	\$ 750.00
Pest/Disease Chemicals (insecticide/fungicide/herbicide)	\$ 400.00	\$ 600.00	\$ 600.00	\$ 600.00	\$ 600.00
Fertilizer	\$ 250.00	\$ 275.00	\$ 275.00	\$ 275.00	\$ 275.00
IPM Consultant	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00
Repairs/Parts/Maintenance		\$ 250.00	\$ 250.00	\$ 250.00	\$ 250.00
Machinery/Labor -Stringing	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
Machinery/Labor -Fertility	\$ 300.00	\$ 400.00	\$ 400.00	\$ 400.00	\$ 400.00
Machinery/Labor -Mowing/Till	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
Machinery/Labor- Spraying	\$ 300.00	\$ 350.00	\$ 350.00	\$ 350.00	\$ 350.00
<i>Subtotal</i>	\$ 2,565.00	\$ 3,830.00	\$ 3,830.00	\$ 3,830.00	\$ 3,830.00
Harvest					
Labor-harvesting (10 hrs, 4 workers-cut, load)		\$ 400.00	\$ 400.00	\$ 400.00	\$ 400.00
Management (\$20/hr* 10 hrs)		\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00
Machinery (\$125/hr)		\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00
<i>Subtotal</i>		\$ 1,850.00	\$ 1,850.00	\$ 1,850.00	\$ 1,850.00
Total Annual Operating Costs	\$ 2,565.00	\$ 5,680.00	\$ 5,680.00	\$ 5,680.00	\$ 5,680.00

- Analysis does not include land cost or overhead like interest on loans, taxes, etc.
- Does include per hour rate for machinery, labor, and management that would be charged if hired out (opportunity cost)
- Standard trellis design is 3.5 x 14 ft ~1000 plants/acre



TAKE HOME MESSAGES

- Quality is crucial
 - Do not skimp on establishment
 - You will not get rich growing hops
 - Hi initial and annual costs with questionable returns in the future
- | | | |
|--|-----------------|--|
| • Wolf (picker) | \$50,000+ | |
| • Hammermill & Pelletizer | \$10,000-15,000 | |
| • Vacuum Sealer | \$2000-2500 | |
| • Dryer | \$12,000 + | |
| • Energy (wet hop to pellet) | \$1.50 / lb | |
| • Cold Storage | \$????? | |
| • Annual labor for 14 acres
Crew of six (2 months working 10 hour + days) | \$600/day | |
- Don't underestimate the amount of labor required
 - Need for picking and processing equipment if you plant >1/2 acre
 - Line up supplies well in advance
 - How will you sell your hops?
 - Will most likely need a price premium to do organic



<http://www.hops.msu.edu>

Small scale hop production in the Great Lakes Region - Mozilla Firefox

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Small scale hop production in the Great Lakes Region

Home

- Getting Started
- Pest Management
- Weather and Climate
- Markets
- Resources
- Research
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Interested in growing hops?

Here you will find all you need to know about growing hops in the Great Lakes Region. Recent hop shortages, growing appeal with specialty beers, and the desire for organic and locally sourced agricultural products have resulted in increasing interest in local hop production by farmers, brewers, and backyard enthusiasts throughout Michigan. If you are new to hops production or just interested in learning about this novel crop, please visit the [Getting Started](#) page for information. Finally, the [2012 Hop Growers of America Statistical Report \(pdf\)](#) has been released. Enjoy!

Thanks for visiting, and we hope you will contact us with suggestions to improve this website!

Search for MSUE Hops News past articles [MSUE Field Crops](#).

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Registration for the 2013 Integrated Pest Management Academy CLOSES Thursday, Feb. 14!

Registration for this important event closes at midnight on Thursday, Feb. 14, so register NOW to ensure your spot at the 2013 IPM Academy!

Posted on February 13, 2013 3:13pm by Erin Lizotte

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Small scale hop produ... Downloads IPM Academy-Hops in...

1:12 PM Monday 2/18/2013