Hops Production Economics and Marketing

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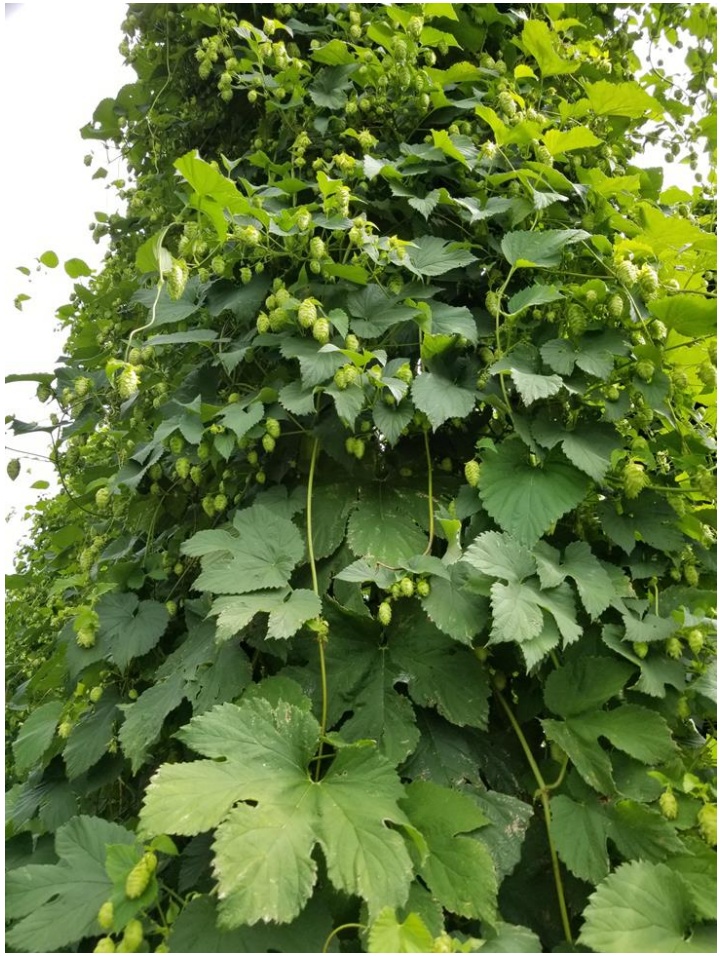
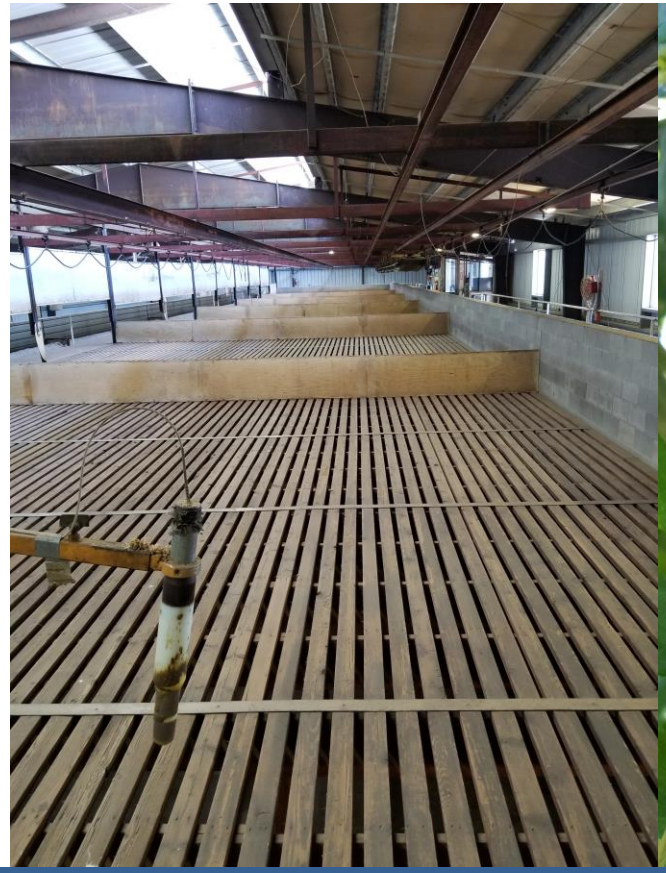
Producer Considerations

- Do you have a market?
- What varieties can/should be grown?
- How many acres or plants?
- Do you have a suitable site?
- Do you have sufficient labor and capital?
- Do you have a harvest, pelletizing, processing, storage, and marketing plan?
- What are cost of production, price, yield, and revenue expectations?





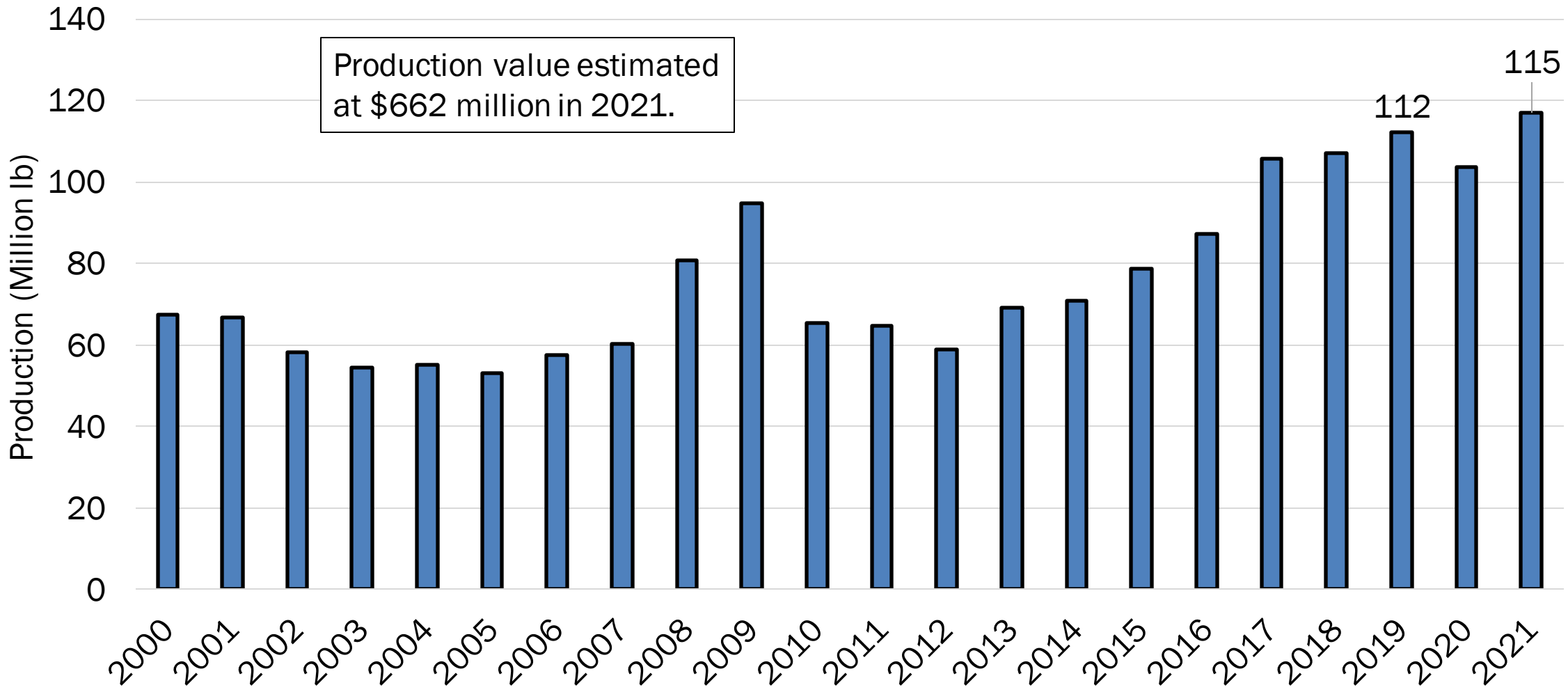
Production, Acres, and Yield

US HOPS SUPPLY AND DEMAND

Hops Supply

- NASS estimates 60,872 acres of hops harvested in the US 2021 (acres up 9 consecutive years).
  - Pacific Northwest (Washington, Oregon, and Idaho) accounts for >95%.
  - Michigan 700 acres; New York 400 acres; North Carolina 25 acres; Virginia 20 acres; and Kentucky 18 acres.
- PNW yields = 1,700-2,200 lb/acre.
- South / Mid-South yields are highly variable.
  - Variety selection will partially dictate yield.

U.S. Hops - Production



Source: USDA NASS - https://quickstats.nass.usda.gov/

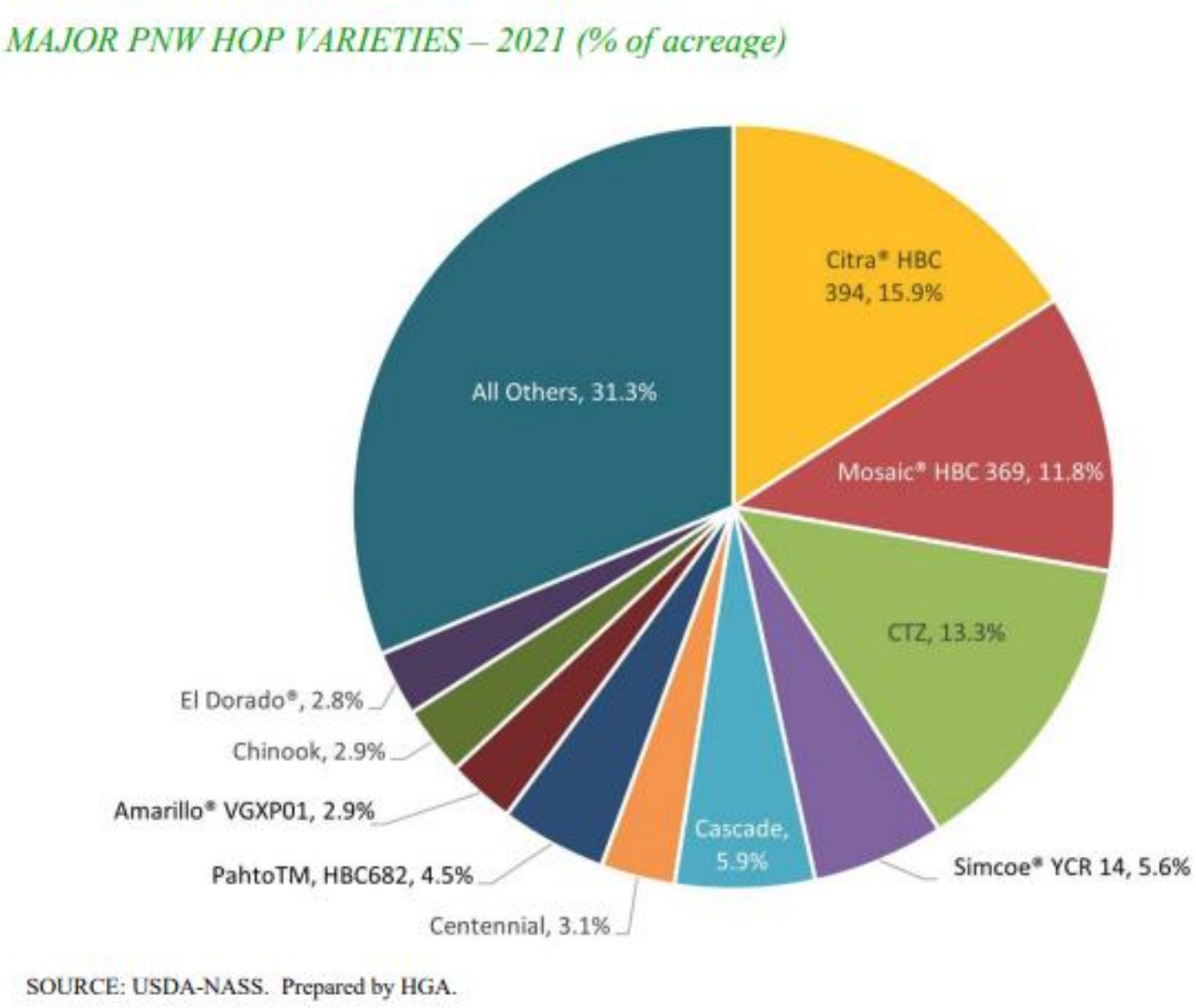
Hop Variety Selection

Top 10 PNW Hop Varieties by Acreage:

Rank	2016	2017	2018	2019	2020	2021
1	Cascade	Cascade	Citra®, HBC 394	Citra®, HBC 394	Citra®, HBC 394	Citra®, HBC 394
2	Centennial	Centennial	CTZ	CTZ	CTZ	Mosaic®, HBC 369
3	CTZ	Citra®, HBC 394	Cascade	Cascade	Mosaic®, HBC 369	CTZ
4	Citra®, HBC 394	CTZ	Centennial	Simcoe®, YCR 14	Simcoe®, YCR 14	Cascade
5	Simcoe®, YCR 14	Simcoe®, YCR 14	Simcoe®, YCR 14	Mosaic®, HBC 369	Cascade	Simcoe®, YCR 14
6	Mosaic®, HBC 369	Mosaic®, HBC 369	Chinook	Centennial	Centennial	Centennial
7	Chinook	Chinook	Mosaic®, HBC 369	Amarillo®, VGXP01	Pahto®, HBC 682	Pahto®, HBC 682
8	Summit	Willamette	Amarillo®, VGXP01	Chinook	Amarillo®, VGXP01	Amarillo®, VGXP01
9	Willamette	Summit	Pahto®, HBC 682	Pahto®, HBC 682	Chinook	Chinook
10	Apollo™	Apollo™	Summit	Summit	El Dorado®	El Dorado®

- Most varieties are developed for Pacific NW production

Source: USA Hops - https://www.usahops.org/img/blog_pdf/405.pdf



- Increase in the number of varieties
  - Over 80 varieties of hops in the US

Source: USA Hops - https://www.usahops.org/img/blog_pdf/405.pdf

Hops Demand

- Increased demand tied to tremendous growth in the US craft beer industry
  - Craft beer higher price vs. non-craft beer
  - Craft breweries are often interested in new / unique hop varieties
  - Local demand varies, but most breweries indicate a willingness to pay a premium for local hops (quality needs to be achieved by the producer)
  - Limited other uses for hops

- Hopping rate for craft beer is typically higher than non-craft
  - 1-3 pounds (or more) per barrel (31 gallons)
  - Hop use in craft beer has been increasing over time

Amount of hops per beer style

A typical keg holds 1,984 oz of beer. These amounts are based on pound per keg.

Source: USA Hops - https://www.usahops.org/enthusiasts/brewing.html

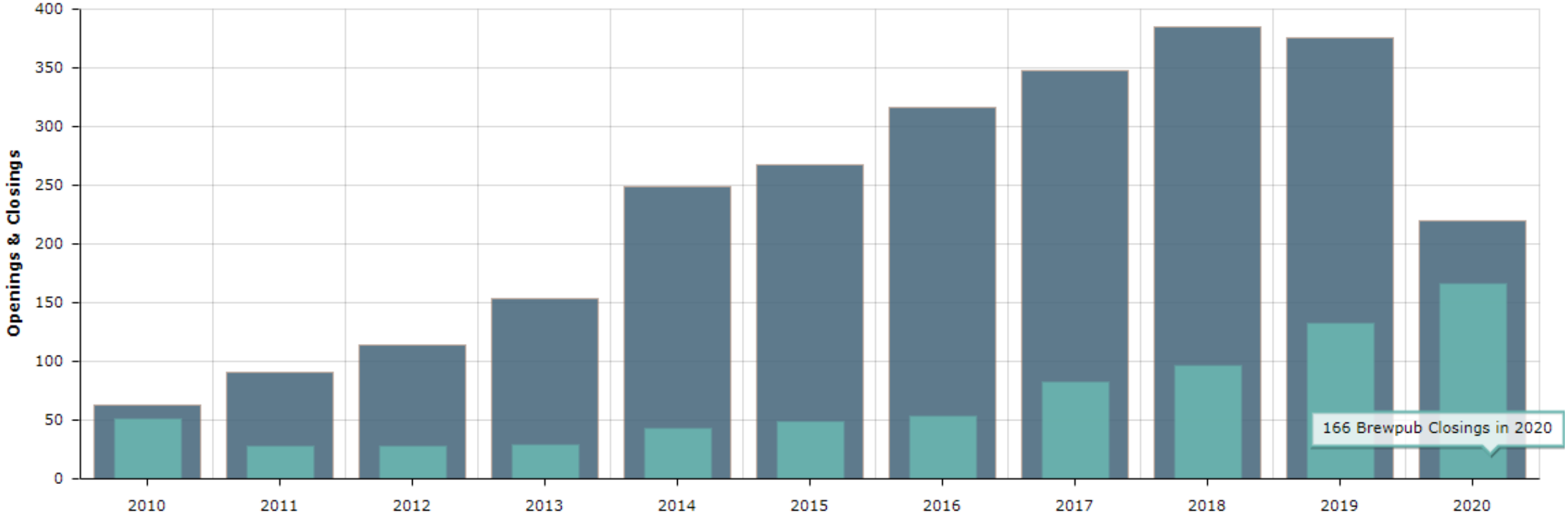
Craft Breweries

- Over 8,800 breweries in the US (1,500 in 2007)
  - Gained over 380 in 2020
- Tennessee 122 (ranked 23rd) in 2020
  - 24 in 2011 (400% growth in 10 years)
  - Concentrated in metro areas
- Craft breweries use hops from all over the world

Source: https://www.brewersassociation.org/statistics-and-data/national-beer-stats/

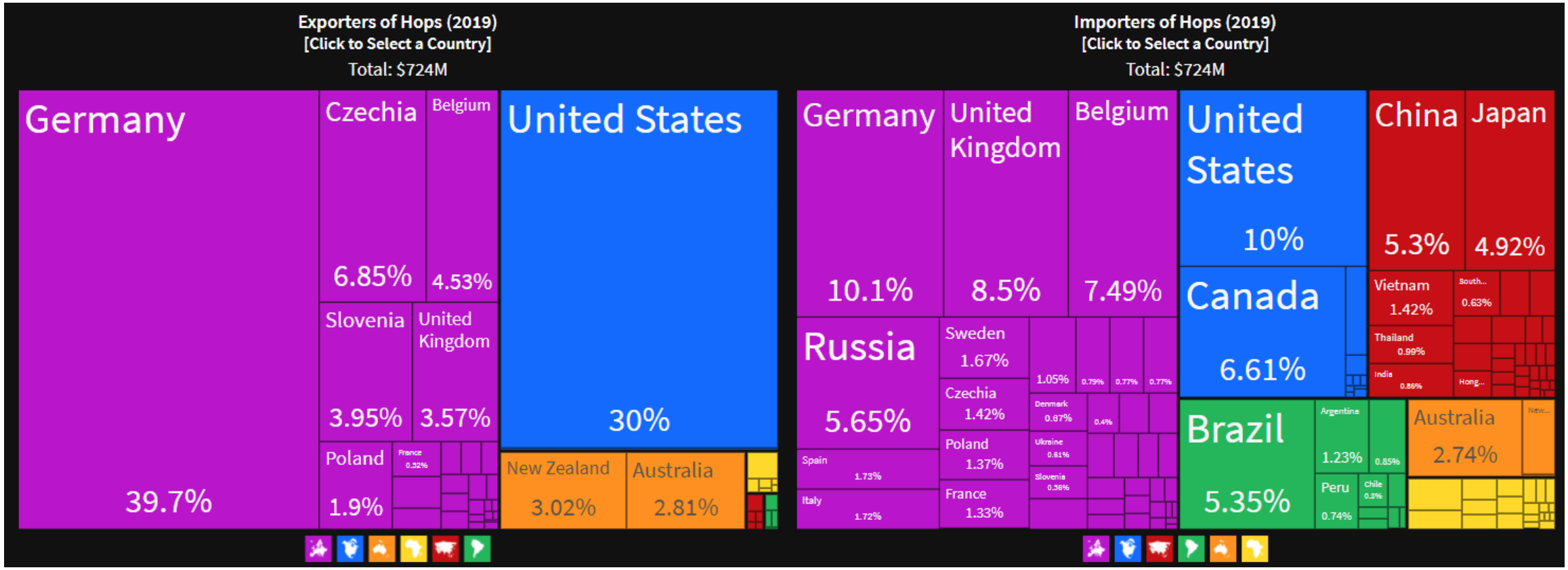
Craft Breweries

Brewpub Openings and Closings



Source: https://www.brewersassociation.org/statistics-and-data/national-beer-stats/

Hop Importers and Exporters

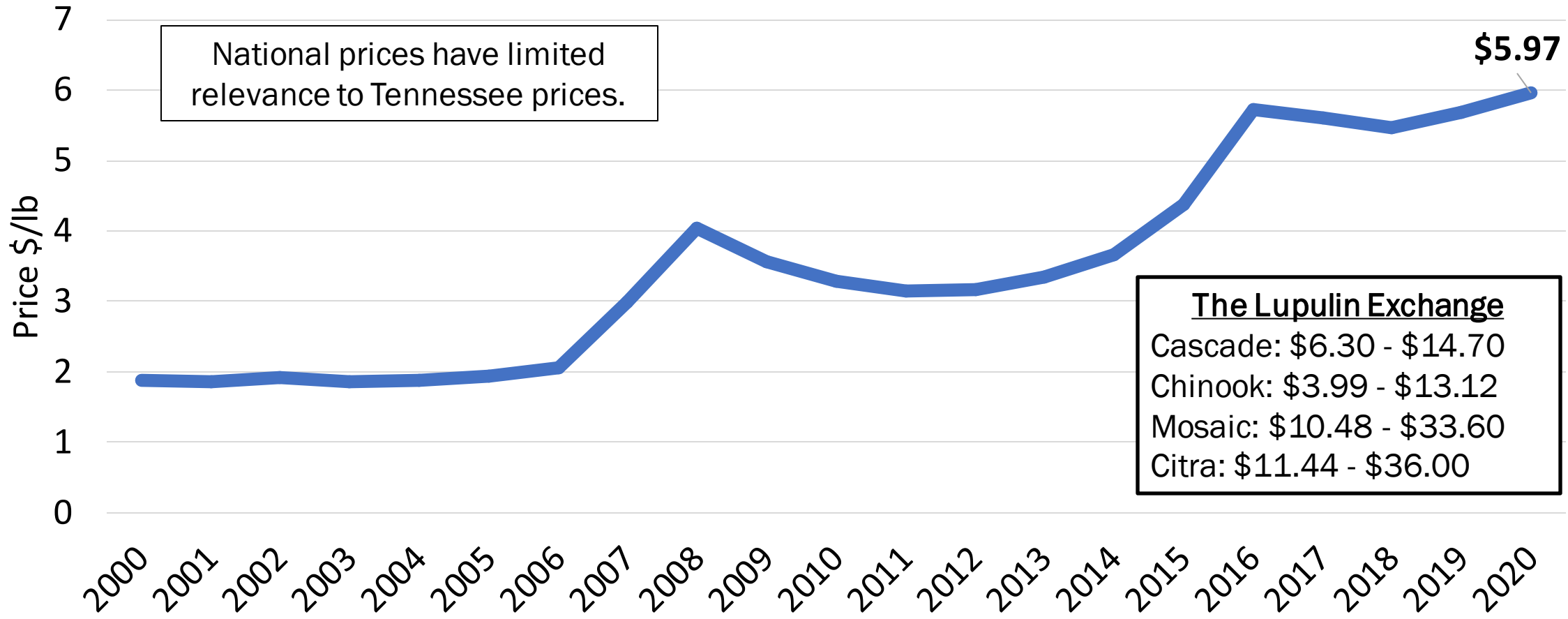


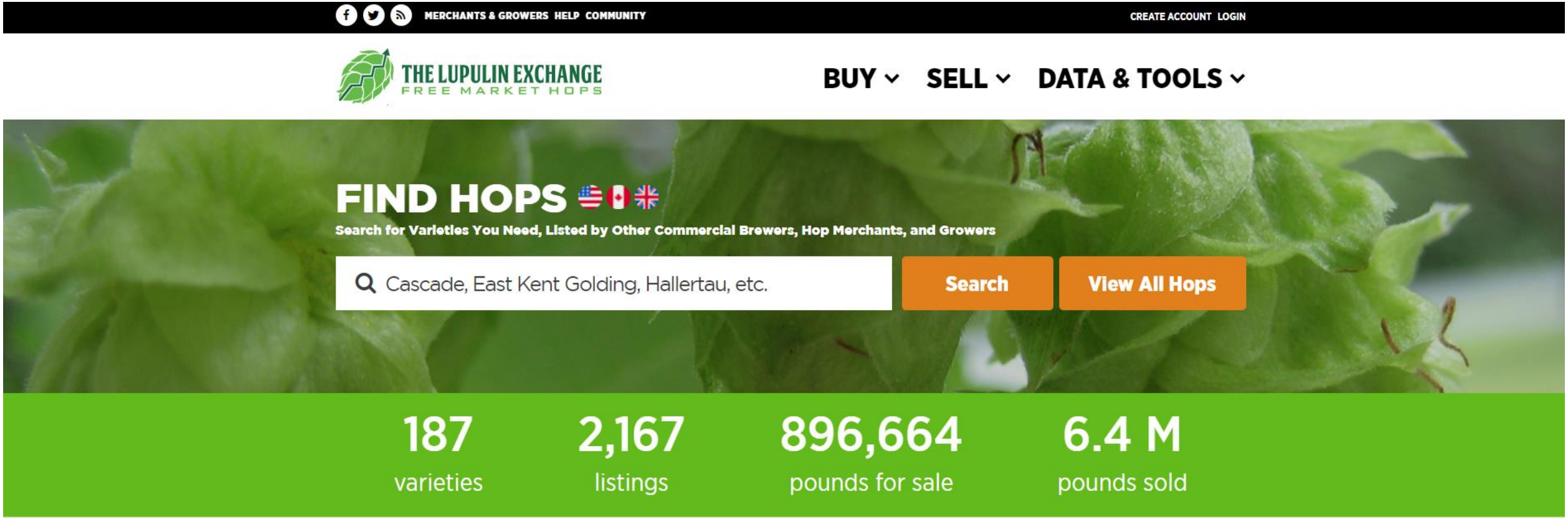
PRICES AND MARKETING

Hops Prices in Tennessee

- Prices vary tremendously in Tennessee
- Heterogeneous product
  - Variety
  - Quality
  - Local production
- Work with a brewer(s) to determine hop characteristic preferences
- Spend time on marketing your product and establishing relationships

Hops – National Average Price Received





https://lupulinexchange.com/

Marketing Considerations

- Type (pellet, loose leaf/cone, extract, fresh)
- Production practice (organic?)
- Packaging and size
- Shipping and storage

Other Market Opportunities

- Partnerships with craft breweries
- Home brewing
- Agri-tourism
- Co-operatives or machinery costs shares
- Custom work (harvesting / pelletizing / packaging)

Tremendous variation in costs and revenue for Tennessee producers

Establishment costs, annual costs, and revenue expectations: highly variable

COST OF PRODUCTION AND REVENUE EXPECTATIONS

ESTABLISHMENT COSTS

Land Preparation (Example ¼ acre)

Land Preparation	Quantity	Unit	Cost	Total Cost	Useful Life	Annual Cost
Disc	1	acre	$ 15.00	$ 15.00	20	$ 0.75
Drill Post Holes	1	day	$ 175.00	$ 175.00	20	$ 8.75
Fertilizer	1	50 lb bag	$ 23.00	$ 23.00	20	$ 1.15
Lime	4	40 lb bag	$ 5.49	$ 5.49	20	$ 0.27
Total Land Preparation Costs				**$ 218.49**		**$ 10.92**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Trellis Construction (Example ¼ acre)

	Quantity	Unit	Cost	Total Cost	Useful Life	Annual Cost
Trellis Materials						
Posts (6"x6"x16')	30	post	$ 38.50	$ 1,155.00	20	$ 57.75
3/8" 7x19 strand wire	1	1330' roll 2000'	$ 380.00	$ 380.00	20	$ 19.00
12.5 GA high tensile wire	1	role	$ 59.95	$ 59.95	20	$ 3.00
Ground anchors (4ft)	20	anchor	$ 10.49	$ 209.80	20	$ 10.49
Cable Clamps (3/8")	40	clamp	$ 0.99	$ 39.60	20	$ 1.98
Wire crimps	1	jar	$ 12.95	$ 12.95	20	$ 0.65
Eye bolts (3/8" x 6" Ga)	60	bolt	$ 1.96	$ 117.60	20	$ 5.88
Fence Tightners	30	tightner	$ 3.99	$ 119.70	20	$ 5.99
Washers	1	lb	$ 1.59	$ 1.59	20	$ 0.08
Nuts	1	lb	$ 1.89	$ 0.95	20	$ 0.05
Total Trellis Materials Costs				**$ 2,097.14**		**$ 104.86**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Planting (Example ¼ acre)

	Quantity	Unit	Cost	Total Cost	Useful Life	Annual Cost
Rhizomes	200	rhizones	$ 2.00	$ 400.00	15	$ 26.67
Mulch	5	cubic yard	$ 18.00	$ 90.00	1	$ 90.00
				$ 490.00		**$ 116.67**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Irrigation System (Example ¼ acre)

Irrigation Setup

	Quantity	Unit	Cost	Total Cost	Useful Life	Annual Cost
Mainline (10' 3/4" PVC)	10	section	$ 2.10	$ 21.00	20	$ 1.05
Laterials (1/2" poly tubing)	1	1000' roll	$ 120.00	$ 120.00	10	$ 12.00
PVC Fittings (risers)	40	fitting	$ 0.49	$ 19.60	10	$ 1.96
Poly Tube Fittings	10	fitting	$ 0.54	$ 5.40	10	$ 0.54
Irrigation Pump (1 HP)	1	pump	$ 280.00	$ 280.00	5	$ 56.00
Pump Fittings	4	fittings	$ 8.00	$ 32.00	10	$ 3.20
Pressure regulator	1	fitting	$ 12.50	$ 12.50	5	$ 2.50
Mesh Filter	1	filter	$ 18.00	$ 18.00	1	$ 18.00
Cistern (2500 gallon)	1	cistern	$1,324.95	$ 1,324.95	20	$ 66.25
Drip emitters (500 total)	2	bag	$ 62.50	$ 125.00	5	$ 25.00
Zip ties (1000 ties)	1	bag	$ 24.50	$ 24.50	5	$ 4.90
Total Irrigation Material Costs				**$ 1,982.95**		**$ 191.40**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Labor (Example ¼ acre)

Labor

	Quantity	Unit	Cost	Total Cost	Useful Life	Annual Cost
Disking Field	2	hour	$ 9.70	$ 19.40	20	$ 0.97
Liming Field	1	hour	$ 9.70	$ 9.70	20	$ 0.49
Bob Cat and Auger Work	6	hour	$ 9.70	$ 58.20	20	$ 2.91
Setting poles	18	hour	$ 9.70	$ 174.60	20	$ 8.73
Ground anchor install	8	hour	$ 9.70	$ 77.60	20	$ 3.88
Anchoring posts	14	hour	$ 9.70	$ 135.80	20	$ 6.79
Top wire install	22	hour	$ 9.70	$ 213.40	20	$ 10.67
Bottom wire install	12	hour	$ 9.70	$ 116.40	20	$ 5.82
Planting	24	hour	$ 9.70	$ 232.80	20	$ 11.64
Mulching	6	hour	$ 9.70	$ 58.20	20	$ 2.91
Dig mainline trench	3	hour	$ 9.70	$ 29.10	20	$ 1.46
Install mainline and laterials	15	hour	$ 9.70	$ 145.50	20	$ 7.28
Zip tie laterials	4	hour	$ 9.70	$ 38.80	20	$ 1.94
Install Drip emitters	7	hour	$ 9.70	$ 67.90	20	$ 3.40
Cistern and Pump setup	3	hour	$ 9.70	$ 29.10	20	$ 1.46
Total Labor Costs				**$ 1,406.50**		**$ 70.33**

Source: NCState Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Establishment Costs Summary (1/4 acre)

Category	Total	Annual
Land Preparation	$218	$11
Trellis Construction	$2,097	$105
Planting	$490	$117
Irrigation System	$1,983	$191
Labor	$1,407	$71
Interest	$310	$15
Total Establishment Costs	**$6,505**	**$510**

Operating Costs (Example ¼ acre)

	Quantity	Unit	Cost	Useful Life	Annual Cost	Total
Operating Costs						
Cultural						
Twine	1	2500' roll	37.95	1	$37.95	$ 37.95
Fertilizer	2	50lb bag	$23.00	1	$23.00	$ 46.00
Herbicide	1		$28.00	1	$28.00	$ 28.00
Pesticide	1		$37.00	1	$37.00	$ 37.00
Fungicide	1		$42.00	1	$42.00	$ 42.00
Tissue Analysis	5	samples	$7.00	1	$7.00	$ 35.00
Mulch	5	cubic yard	$18.00	1	$18.00	$ 90.00
Fuel	7	gallon	$3.75	1	$3.75	$ 26.25
Lime	1	40lb bag	$5.49	3	$1.83	$ 5.49
Lab Testing	2	samples	$35.00	1	$35.00	$ 70.00
Total Cultural Costs						**$ 342.20**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Production Labor (Example ¼ acre)

Production Labor	Quantity	Unit	Cost	Useful Life	Annual Cost	Total
Pre-emergent	1	hour	$9.70	1	$9.70	$ 9.70
Stringing	12	hour	$9.70	1	$116.40	$ 116.40
Training/Initial Pruning	18	hour	$9.70	1	$174.60	$ 174.60
Stripping Leaves	30	hour	$9.70	1	$291.00	$ 291.00
Fertilizing	1	hour	$9.70	1	$9.70	$ 9.70
Mulching	6	hour	$9.70	1	$58.20	$ 58.20
Mowing	16	hour	$9.70	1	$155.20	$ 155.20
Weeding	24	hour	$9.70	1	$232.80	$ 232.80
Spraying	12	hour	$9.70	1	$116.40	$ 116.40
Pruning	36	hour	$9.70	1	$349.20	$ 349.20
Soil Testing	2	hour	$9.70	1	$19.40	$ 19.40
Total Production Labor Costs						**$ 1,503.50**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Trellis and Irrigation Maintenance (Example ¼ acre)

Trellis and Irrigation Maintenance	**Quantity**	**Unit**	**Cost**	**Useful Life**	**Annual Cost**	**Total**
Flush lines	1	hour	$9.75	1	$9.75	$ 9.75
Repairs	2	hour	$9.75	1	$19.50	$ 19.50
Replace emitters	2	hour	$9.75	1	$19.50	$ 19.50
Misc. trellis repairs	1	hour	$9.75	1	$9.75	$ 9.75
Total Maintenance Costs						**$ 48.75**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Harvest Labor (Example ¼ acre)

Harvest Labor	Quantity	Unit	Cost	Useful Life	Annual Cost	Total
Picking	60	hour	$9.75	1	$585.00	$ 585
Total Harvesting Costs						**$ 585**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Fixed Costs (Example ¼ acre)

Fixed Costs	Quantity	Unit	Cost	Useful Life	Annual Cost	Total
Annualized Establishment Cost						$ 510.17
Taxes & Insurance						$ 100.00
Land Charge						$ 75.00
Overhead	$2,479.45		8%			$ 198.97
Total Fixed Costs						**$ 884.14**

Source: NC State Hop Budget - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/enterprise-budget/

Other Cost Considerations

- Drying and Pelletizing
- Labeling, Packaging, and Storage
- Marketing / Contracting
- Shipping

Cost of Production Summary

- Establishment Costs = $6,505 for ¼ acre

- Total Annualized Costs = $3,363 for ¼ acre
- Revenue: 300 lb (1,200 lb/acre) x $10/lb = $3,000

- Large variations in establishment and annual costs.
- Labor versus capital cost for harvest and other functions.
- Need a premium price to offset lower yields than PNW.

Net Return Sensitivity

1/4 Acre Annualized Cost of Production of $3,400

		Yield lb/Quarter Acre				
		100	200	300	400	500
Price ($/lb)	$ 5.00	(2,900)	(2,400)	(1,900)	(1,400)	(900)
	$ 6.00	(2,800)	(2,200)	(1,600)	(1,000)	(400)
	$ 7.00	(2,700)	(2,000)	(1,300)	(600)	100
	$ 8.00	(2,600)	(1,800)	(1,000)	(200)	600
	$ 9.00	(2,500)	(1,600)	(700)	200	1,100
	$ 10.00	(2,400)	(1,400)	(400)	600	1,600
	$ 11.00	(2,300)	(1,200)	(100)	1,000	2,100
	$ 12.00	(2,200)	(1,000)	200	1,400	2,600
	$ 13.00	(2,100)	(800)	500	1,800	3,100
	$ 14.00	(2,000)	(600)	800	2,200	3,600
	$ 15.00	(1,900)	(400)	1,100	2,600	4,100

Resources

- The Lupulin Exchange - https://lupulinexchange.com/
- Great Lakes Hops - https://www.greatlakeshops.com/
- USA Hops - https://www.usahops.org/
- NC State - https://newcropsorganics.ces.ncsu.edu/specialty-crops/nc-hops/
- Virginia Tech - https://ext.vt.edu/agriculture/commercial-horticulture/hops.html

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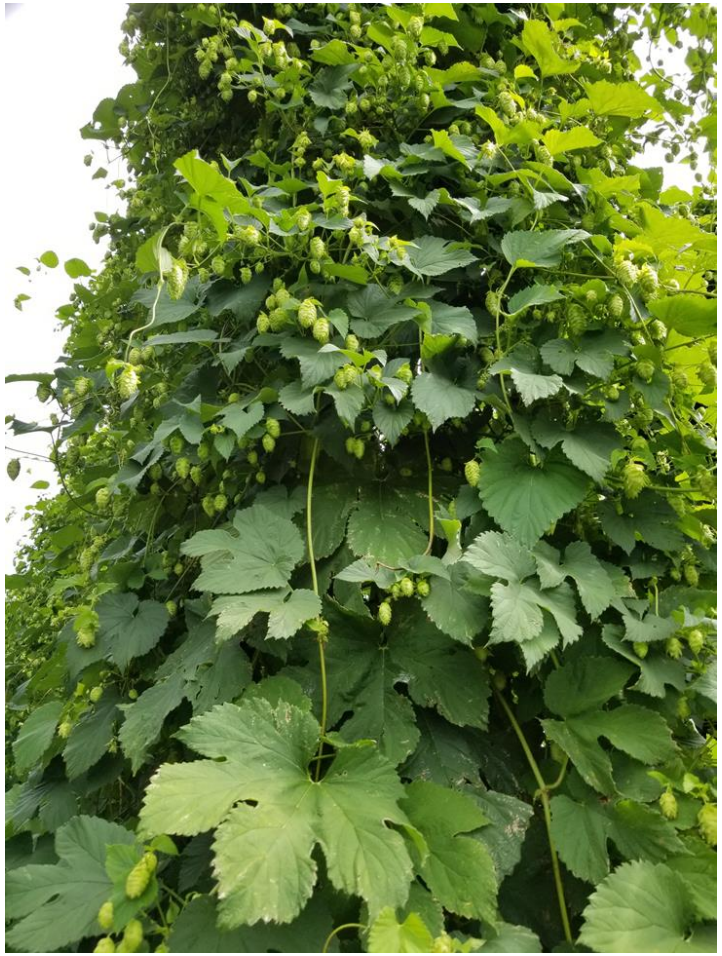

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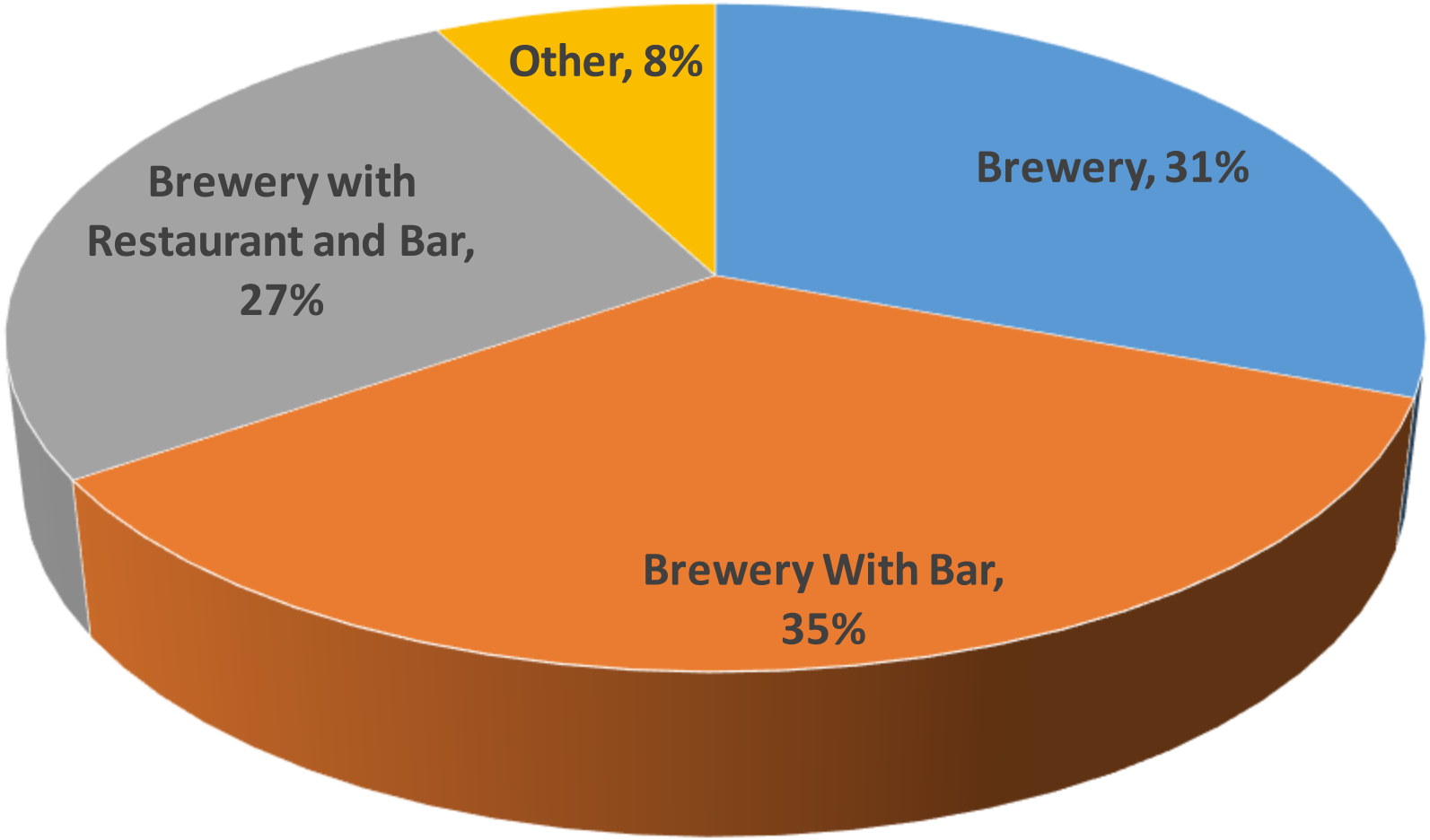
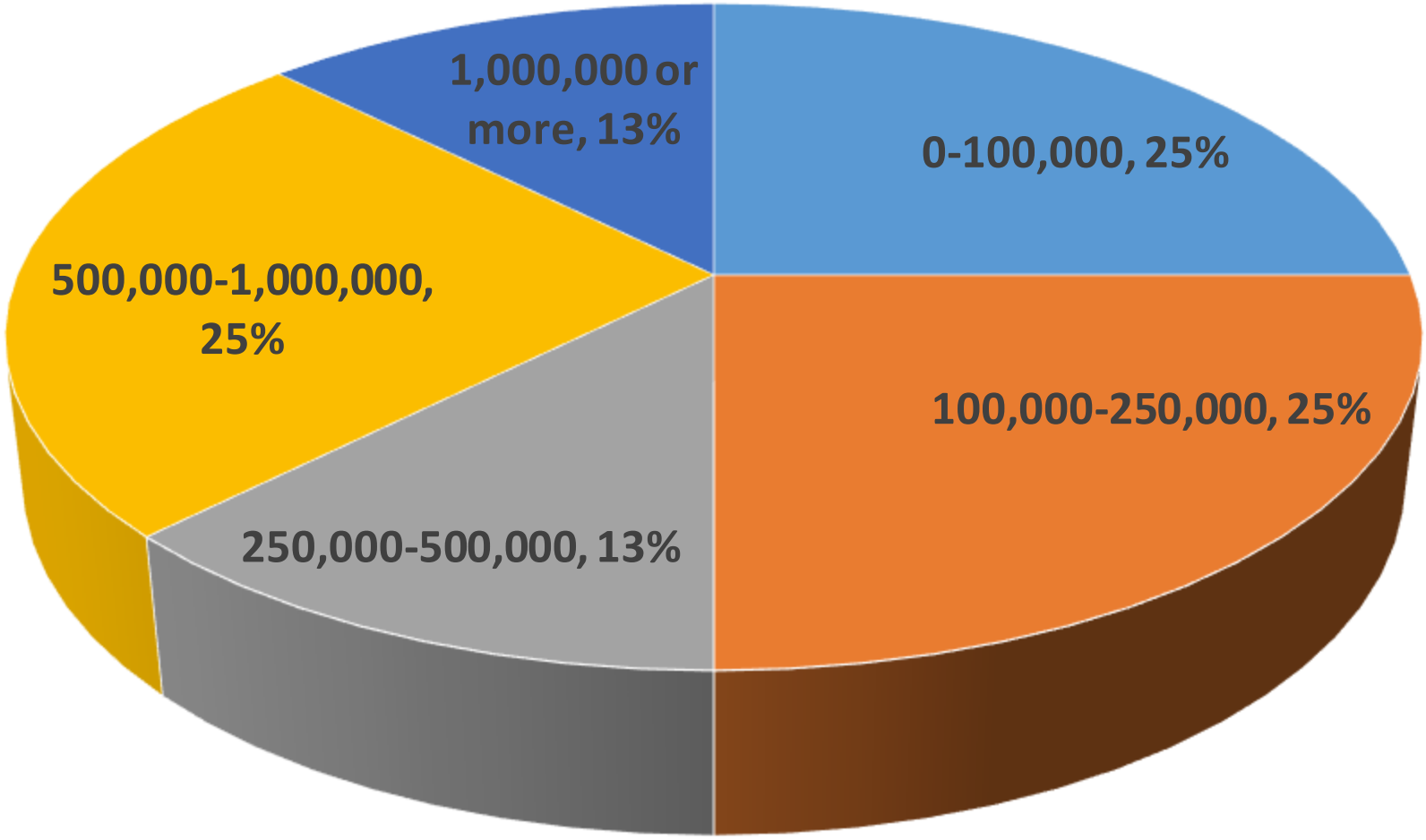
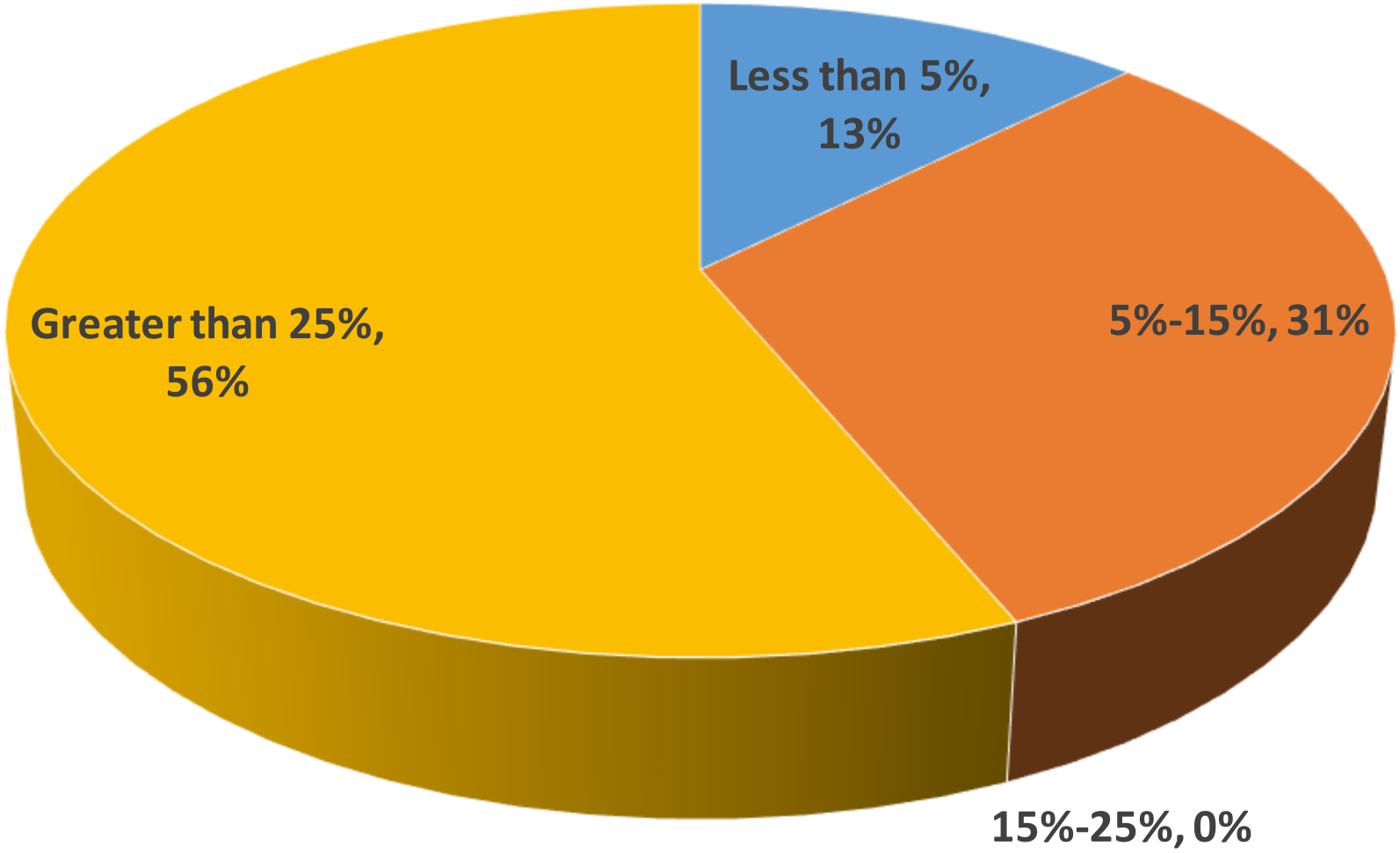
THANK YOU

Craft Breweries Can be Identified in Sub Categories



Craft Breweries Tennessee Beverage Sales in the Last Fiscal Year (2019)



How much do you expect your sales to increase over the next five years?