HARVEST NEW YORK

GROWING
NEW YORK'S
AGRICULTURE &
FOOD ECONOMY

Hard Cider Supply Chain Analysis

March 2018

Cornell Cooperative Extension
Harvest New York

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Photo: A high-density cider apple orchard near Lake Ontario, NY.

Background

Hard cider is one of the fastest growing adult beverages in the country with 18 million consumers in 2016 and estimated retail sales exceeding $1.3 billion in 2017. New York's nearly 100 cider producers represent 11% of the total number of producers in the country, and are making approximately five million gallons of hard cider per year. Although hard cider can be made from any variety of apple, many New York cider producers are seeking specialized cider apple varieties to satisfy consumer demand for a distinct sweet, medium-dry, and dry cider style.

In the United Kingdom, the largest cider producing country in the world, hard cider is largely made from apples that have high levels of acid and/or tannin[1]; whereas hard cider in New York is predominantly made with dessert apples, which typically offer a sweeter flavor profile. Figure 1 highlights the Long Ashton Research Station apple categorization system for cider apples along with flavor traits, and a few varieties that can be found in New York. The growth of the hard cider industry, coupled with a desire from cideries to produce hard cider with varying taste profiles, has created a new interest in hard cider apple varieties from New York's commercial apple growers.

Photo: GoldRush, a disease resistant apple variety that is gaining popularity among New York's cider producers.

Governor Andrew M. Cuomo:

"The Farm Cideries Law has cut red tape and created new opportunities for apple growers and entrepreneurs across New York, helping this burgeoning part of the craft beverage sector grow by leaps and bounds. There is a great synergy to farm cideries, which use New York apples to make a great New York product, a win-win that helps create jobs and economic activity across the board. I look forward to this exciting industry's continued growth in virtually every corner of this state."

Figure 1

Categories	Flavor Traits	Common Varieties
Sweet	low acidity and low tannins	Fuji, Gala, Red Delicious
Sharp	high acidity and low tannins	Baldwin, Cortland, GoldRush, Granny Smith, McIntosh, and Macoun
Bittersweet	low acidity and high tannins	Dabinett, Geneva Tremlett's Bitter, and Yarlington Mill
Bittersharp	high acidity and high tannins	Kingston Black and Porter's Perfection

[1] Tannin: naturally produced compounds that lend astringency and bitterness to cider

Executive Summary

Photo: Preharvest fruit drop in a Harry Master's Jersey orchard in the Finger Lakes region.

Hard cider is a fast-growing craft beverage industry in New York, in part due to the passage of the Farm Cider Law in 2013, which affords licensees certain benefits, but requires the use of New York grown agricultural products. With increasing market demand for hard cider variety apples, there may be challenges with sourcing specialty cider apples, such as bittersharps, bittersweets and heirloom dual purpose (dessert/cider).

Although there is interest in planting these varieties, New York apple growers have concerns with regard to fire blight susceptibility, return on investment, future market demand, biennial/irregular bearing habit, and which varieties to plant. Given establishment costs that are often more than $15,000 per acre, the uncertainty of the market demand may slow planting.

Methodology

In the Spring of 2017, Harvest NY surveyed members of the hard cider industry, to include apple growers, hard cider producers, and nurseries, to analyze the current state of the value chain and assess projected growth. The information contained within this report is an analysis of the survey data received. The surveys were developed through a collaborative effort among: Cornell University, Cornell Cooperative Extension Area Teams, and the New York Cider Association. The distribution of the electronic survey was made possible through the support of Cornell University, Cornell Cooperative Extension, the New York Cider Association, and the New York Apple Association.

Survey Response Rate:

21% hard cider producers (17 out of 82)

6% of apple growers (43 out of 694) or 13% of total apple acreage (5,116 out of 41,000).

Study Limitations

The surveys suffered a low response rate from all types of respondents and survey fatigue was observed. Additionally, questions with multiple parts were either left blank or reported in another format than that which was requested. Given these limitations, the number of respondents for each question is cited in the caption. As the sample size was so small, nursery survey responses were omitted from this report.

Summary of Findings

The following findings are based on the survey responses received, and potentially do not represent the entire industry.

- Hard cider producers are making a medium-dry to dry carbonated hard cider, predominately from sweet and sharp dessert apple varieties.
- Hard cider producers are having difficulty sourcing specialty bittersharp, bittersweet, and heirloom dual purpose apple varieties, despite interest.
- Hard cider producers identified the availability and price of hard cider apples as significant challenges and concerns.
- Hard cider producers are sourcing the majority of their apples from NYS, which has a positive economic impact on the State's apple growers.
- The primary point of sales for hard cider producers is their own tasting room.
- Hard cider producers have positively contributed to the workforce sector, with 82% hiring additional labor since first opening their operation.
- NY apple growers primarily grow sweet and sharp dessert apples varieties, but are considering planting specialty cider bittersharp, bittersweet, and heirloom dual purpose apple varieties, but only on a small scale.
- The primary concerns growers have with growing hard cider varieties are fire blight susceptibility, return on investment, and future market demand for hard cider varieties.

Photo: Cornell is working with the NY Cider Association and other non-profits to educate growers and consumers about hard cider.

Hard Cider Production Responses

This section summarizes the following information relative to the cider industry:

- New York State Hard Cidery Licensing
- Production Volume
- Hard Cider Styles
- Hard Cider Categories and Varieties
- Sourcing Apples, Juice, and Juice Concentrate
- Sales, Markets and Distribution
- Labor

LICENSING

Licensing*	Description
Farm Cidery	Authorizes licensee to manufacture and wholesale up to 250,000 gallons of NYS labeled cider, made exclusively from NYS grown agricultural products, annually.
Farm Brewers	Authorizes licensee to operate a brewery for the manufacture of up to 75,000 barrels of NYS labeled beer and/or cider annually.
Farm Winery/Special Farm Winery	Authorizes licensee to manufacture and wholesale up to 250,000 gallons of wine and/or cider, made exclusively from NYS grown agricultural products, annually. Must be located on a farm.
MicroFarm Winery	Authorizes licensee to manufacture and wholesale up to 1,500 gallons of wine and/or cider, made exclusively from NYS grown agricultural products, annually. Must be located on a farm.
Cider Producer	Authorizes licensee to manufacture and wholesale cider.

*(Chart information provided by the NYS Liquor Authority)

There are five types of licenses that hard cider can be produced under, which are detailed in the above chart. Please note that the Farm Brewery license was not included in this survey, but hard cider can be produced under this license.

The New York State Liquor Authority reported that as of December 2017, there were 41 Farm Cidery and 23 Cider Producer licenses in the state. Cider may also be produced by the 12 Micro Farm Winery, 344 Farm Winery, and 190 Farm Brewery license holders.

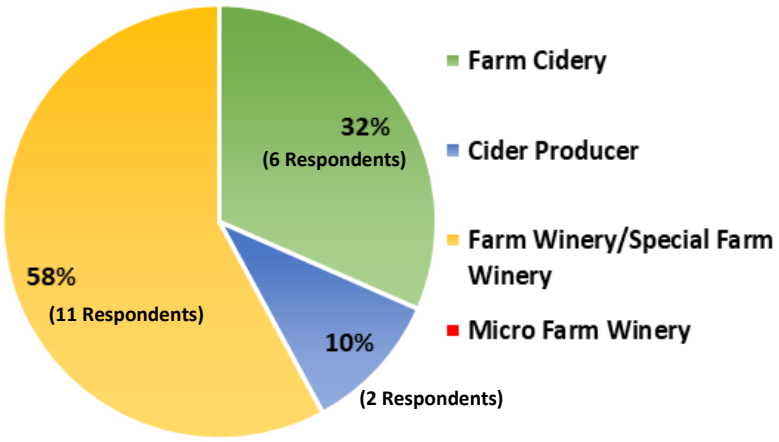


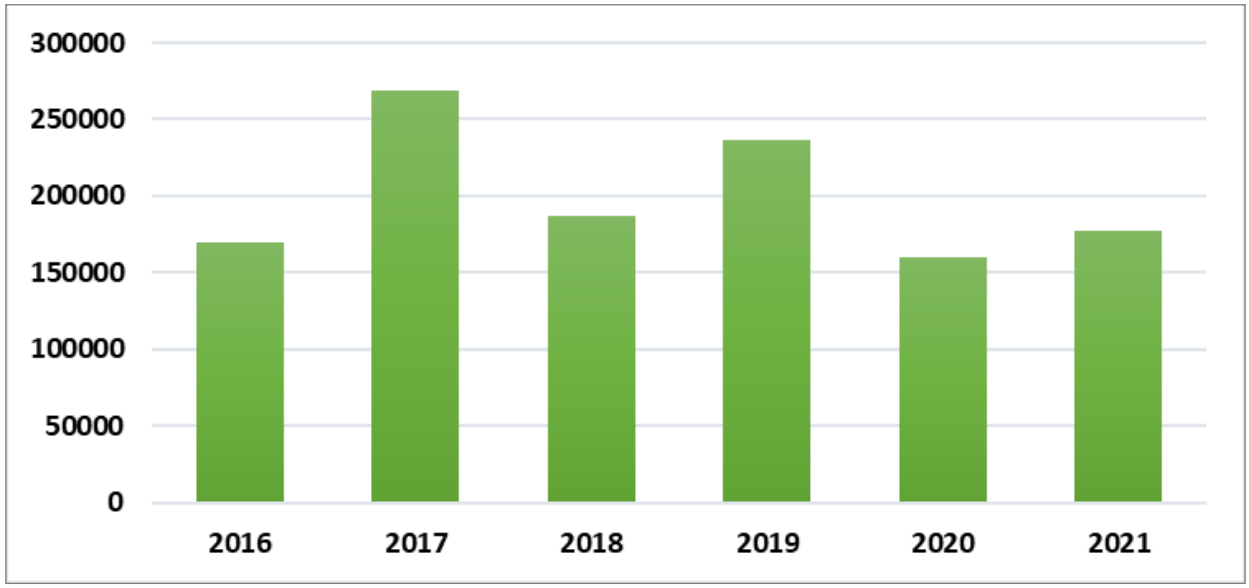
Figure 2: Hard Cider Licensing NY State (N=17)

Figure 2 shows that of hard cider producers that responded to the survey, the majority have a Farm Winery/Special Farm Winery license, followed by Farm Cidery license.

PRODUCTION VOLUME

Figure 3 depicts hard cider producers' past, current, and future production projections from 2016 to 2021. These values ranged from 16,030 to 26,880 gallons per year.

Figure 3: Estimated Cider Production: Past, Current and Future Projections (N=16)



HARD CIDER STYLES

Hard cider producers were asked what type of hard cider they are currently making; the most common of which are either a medium-dry (44%), dry cider (44%), or carbonated (sparkling) style.

HARD CIDER INGREDIENTS

Figure 4 breaks down the type and source of various raw ingredients used to make hard cider. " Other ingredients included hops, pumpkin puree, spices, fruit concentrate (blueberry, cranberry, pineapple, peach), maple syrup, and flavor syrups.

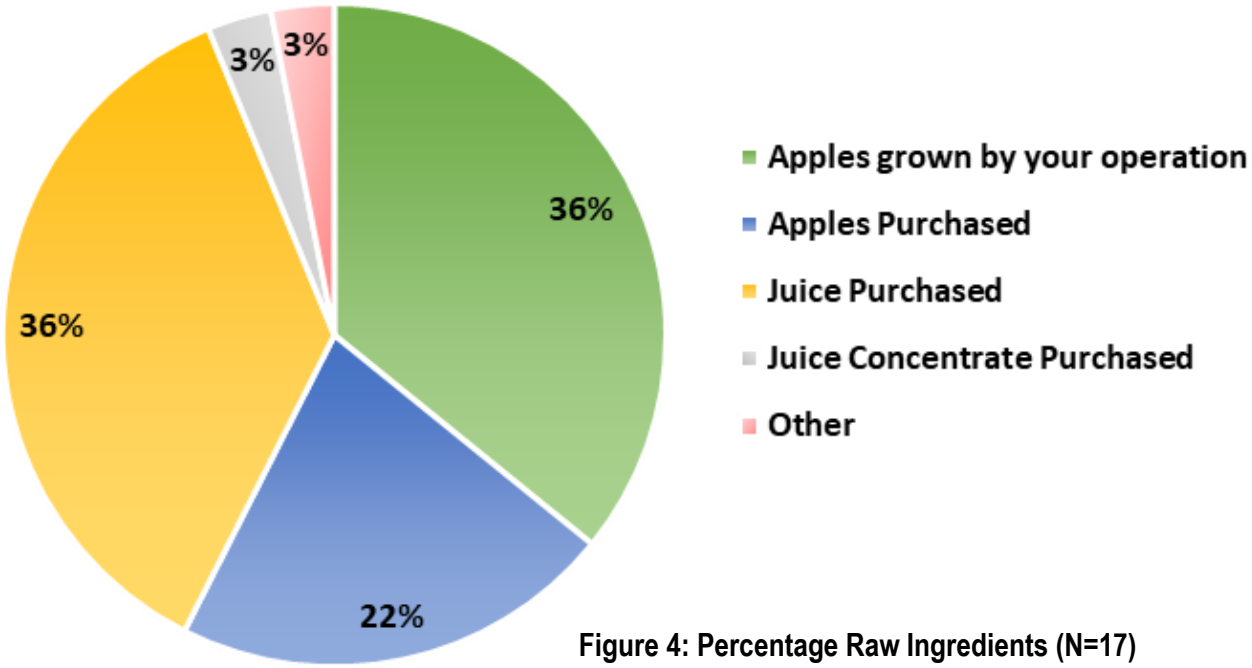


Figure 4: Percentage Raw Ingredients (N=17)

HARD CIDER CATEGORIES AND VARIETIES OF APPLE/JUICE CONCENTRATE

Figure 5 depicts the percentage of apples and/or juice being used in the production of hard cider; the majority of which are sweet and sharp varieties.

Figure 5: Percentage Apples/Juice Concentrate (N=17)

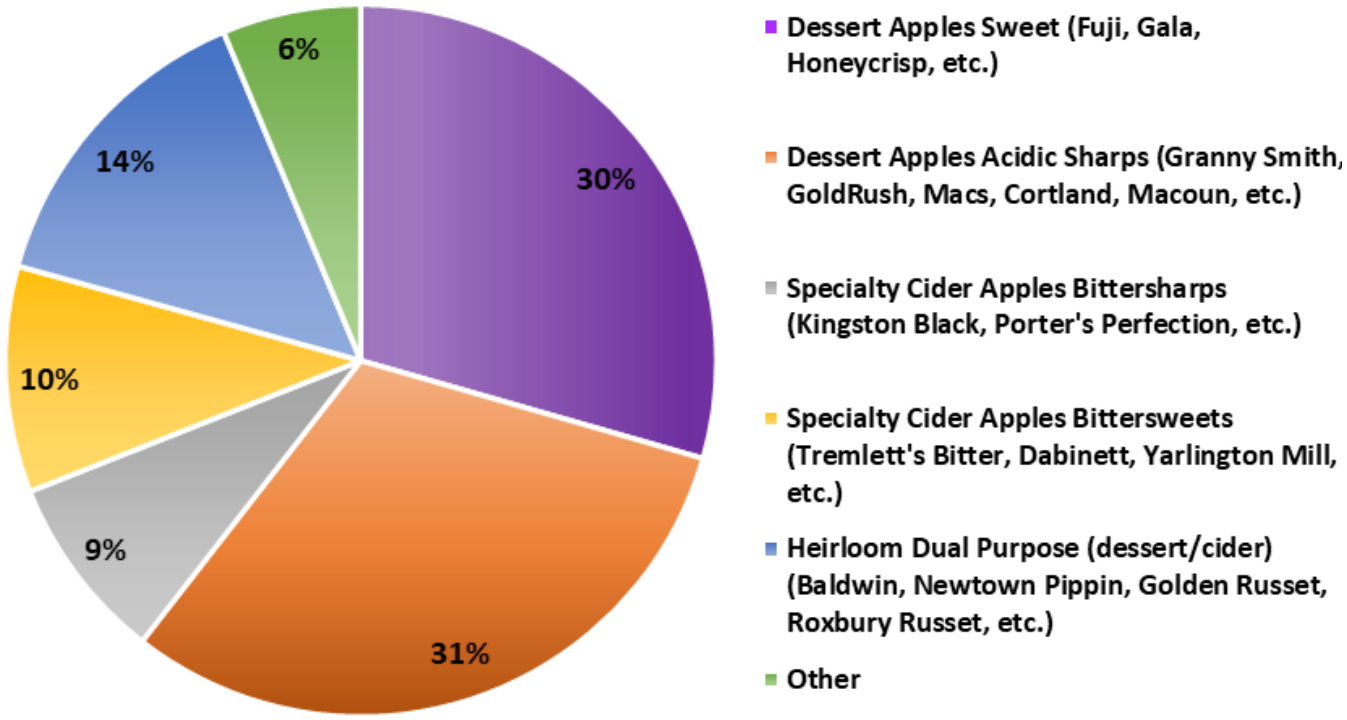


Figure 6 lists the top 10 apple varieties hard cider producers use, as well as the estimated amount of cider they produce with each variety. Based on survey respondents, GoldRush is the top apple variety used and Idared is the least.

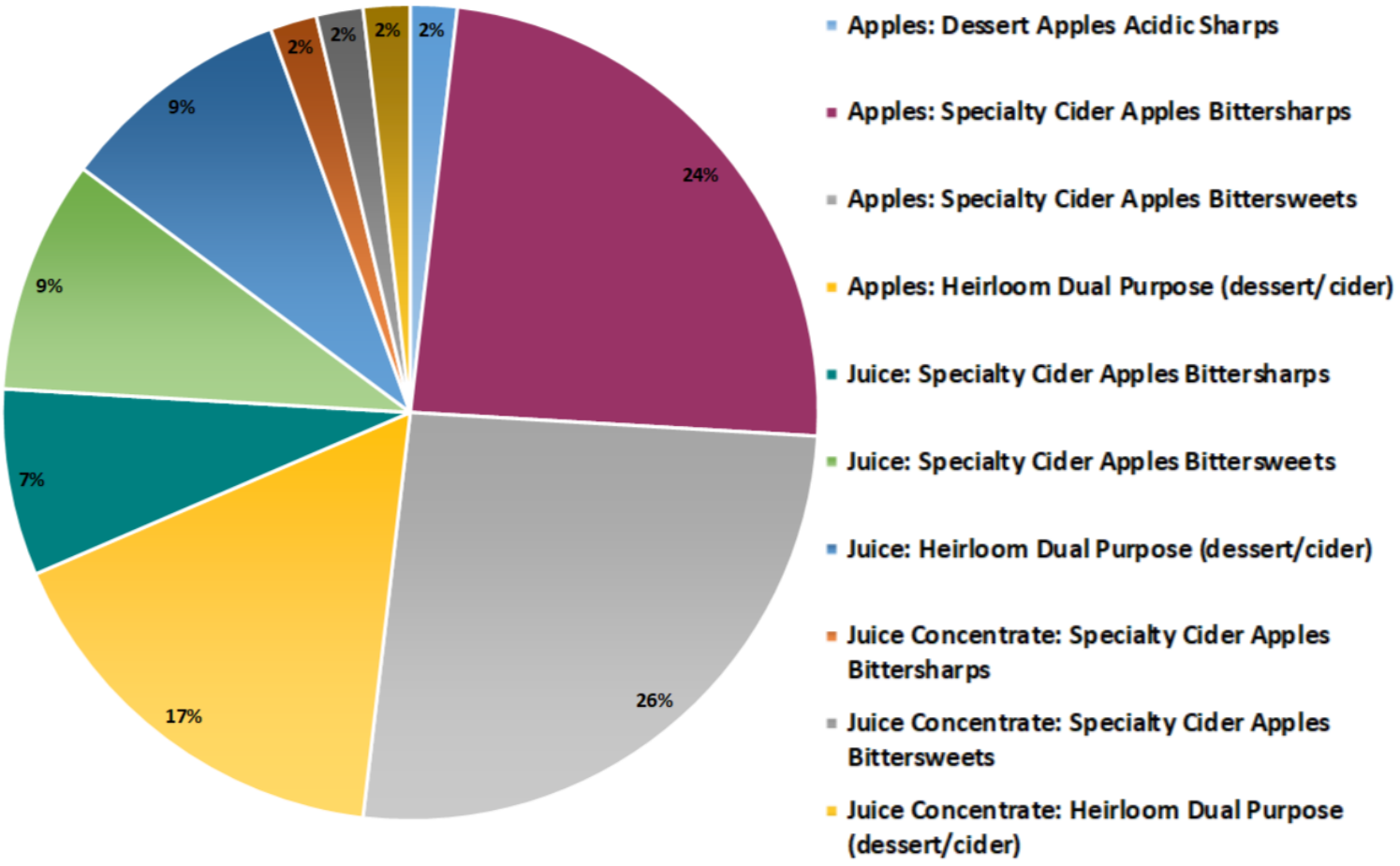
Figure 6: Top Apple Varieties and Estimated Gallons (N=17)

Apple Variety	Gallons
GoldRush	3,128
Golden Russet	2,411
Golden Delicious	2,239
Ashmead's Kernel	2,011
McIntosh	1,861
Northern Spy	1,540
Honeycrisp	930
Cortland	850
Jonagold	675
Idared	350

SOURCING APPLES, JUICE, AND JUICE CONCENTRATE

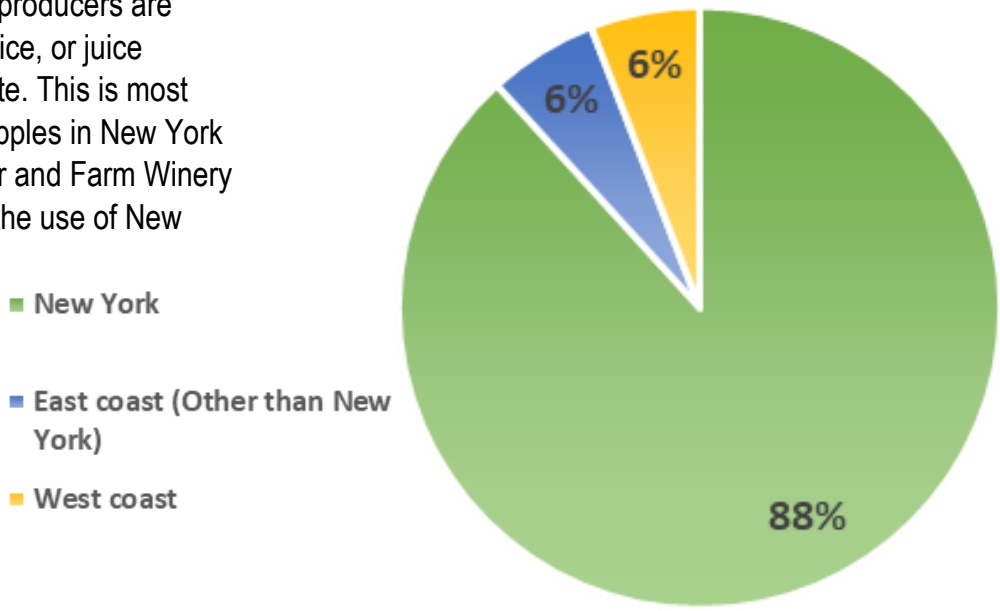
Figure 7 demonstrates that hard cider producers are having difficulty sourcing varieties specific to hard cider production, to include: specialty cider apples bittersharps, specialty cider apples bittersweets and heirloom dual purpose.

Figure 7: Difficulty Sourcing Specific Apples, Juice, and Juice Concentrate (N=17)



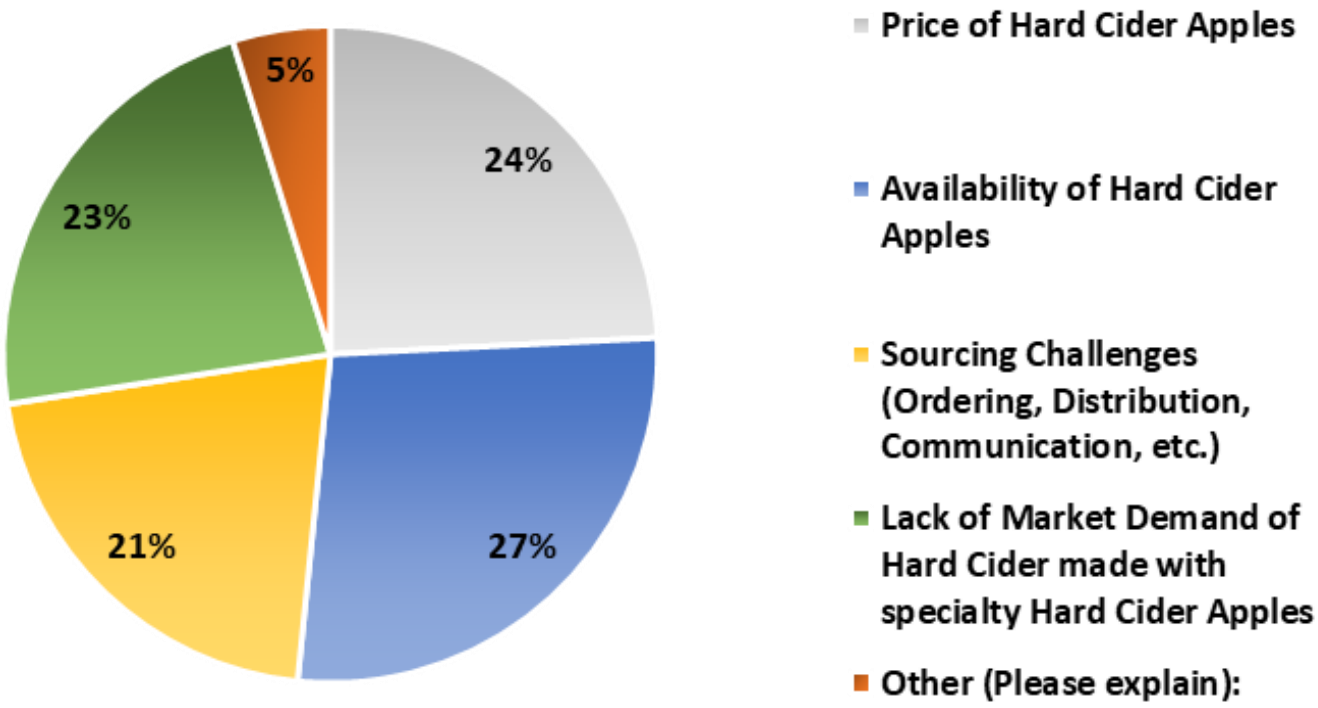
As seen in Figure 8, hard cider producers are sourcing 88% of their apples, juice, or juice concentrate from New York State. This is most likely due to the availability of apples in New York State, as well as the Farm Cider and Farm Winery licenses, both of which require the use of New York State ingredients.

Figure 8: Sourcing of Apples, Juice, and Juice Concentrate (N=16)



As indicated in Figure 9, hard cider producers have four main concerns with regard to sourcing specialty hard cider varieties: price, availability, lack of market demand, and sourcing challenges.

Figure 9: Challenges/Concerns Purchasing Hard Cider Variety Apples (N=16)



SALES, MARKETS, AND DISTRIBUTION

Figure 10 demonstrates the percentage of hard cider sales through various market channels. As depicted, 29% of sales were realized in hard ciderys' own tasting room and 23% of sales were realized through a wholesale distributor

Figure 10: Current Sales By Market Channels (N=17)

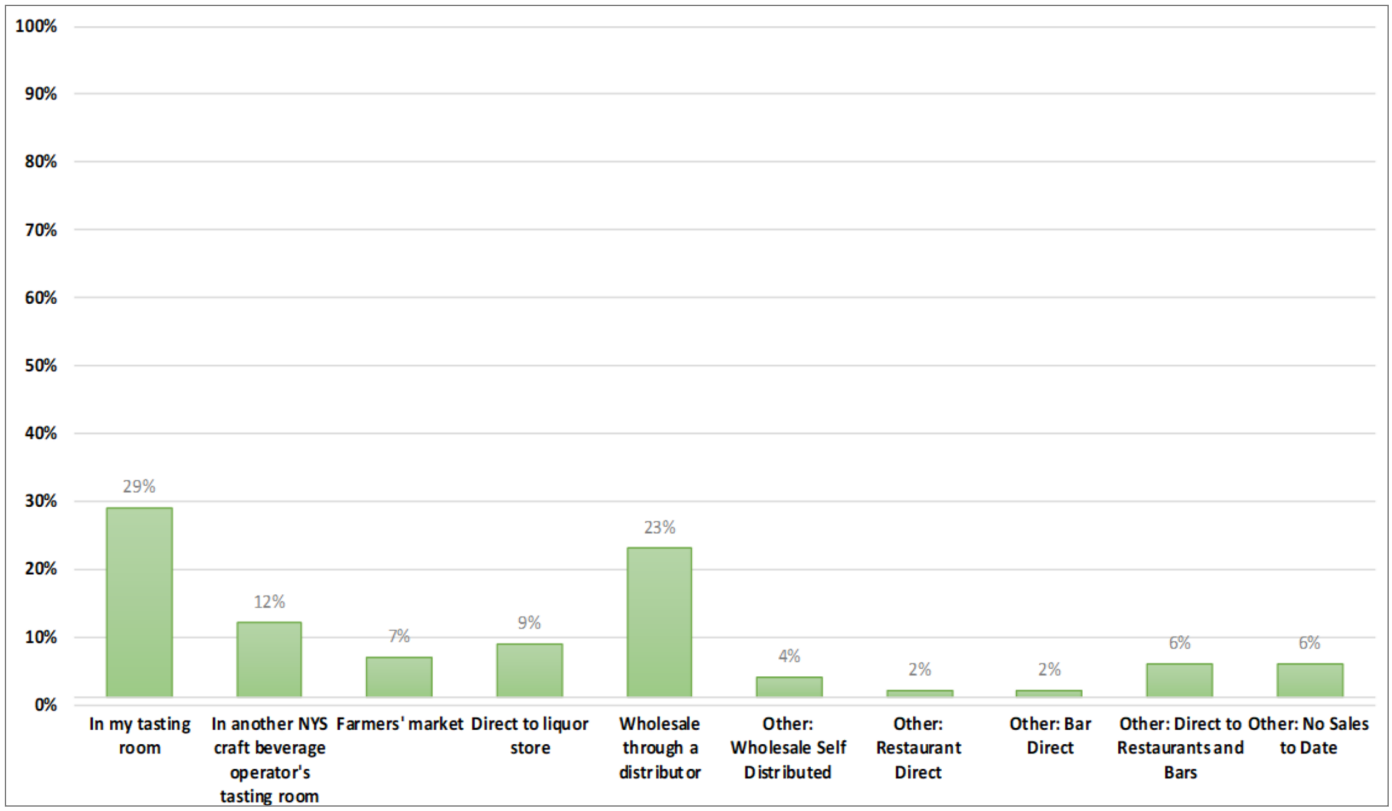
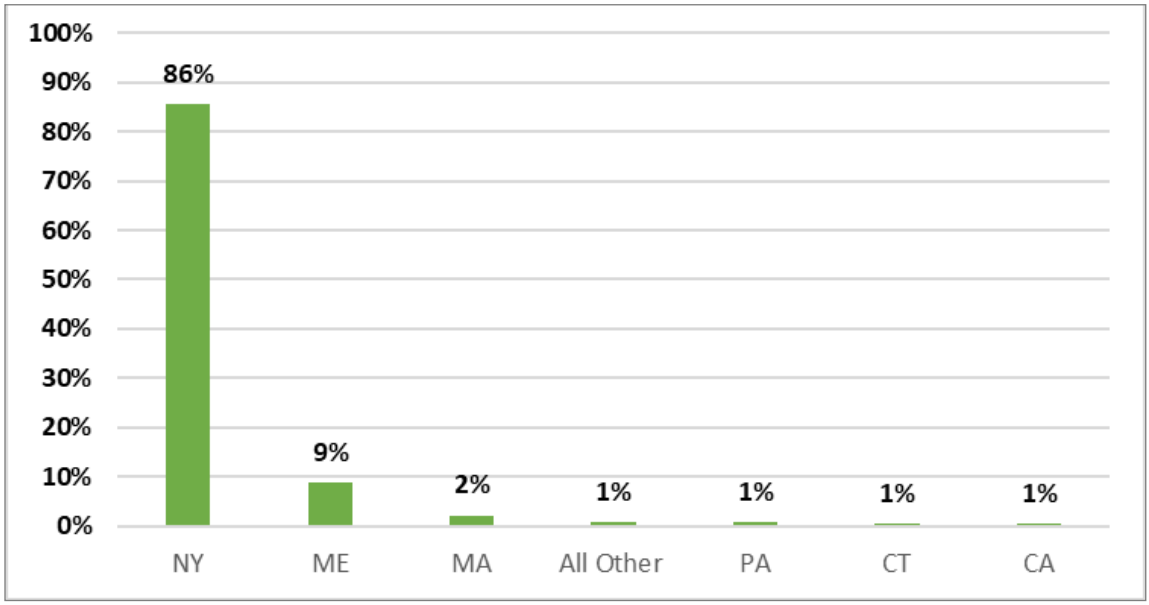


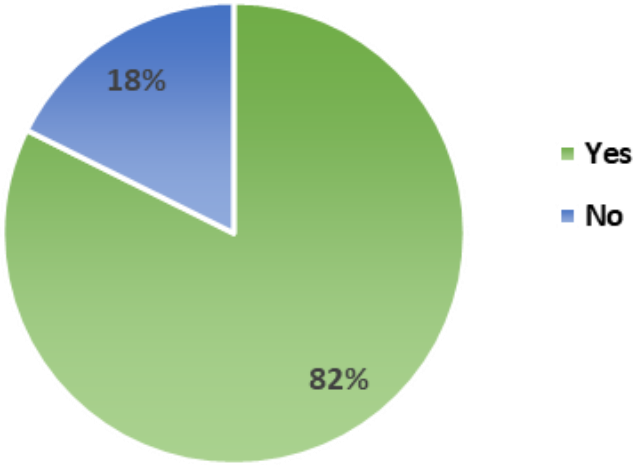
Figure 11 shows that in 2016, the vast majority of New York State produced hard cider was distributed in New York State.

Figure 11: New York Produced Hard Cider Distribution by State (N=11)



Although the majority of the hard cider produced is remaining in the state, Figure 12 shows that 82% of hard cider producers would be interested in receiving assistance to distribute their hard cider out of the State.

Figure 12: Out of State Hard Cider Distribution Assistance (N=17)



LABOR

When hard cider producers were asked how many people they employed, to include themselves, responses ranged from 1 to 14, with an average of 5 employees. 82% of cider producers have hired additional labor since opening, with an average of 3.5 positions. Additionally, pay rates to their employees ranged from $11 to $18, with the average hourly pay being $14.23.

"Craft cider must continue to differentiate itself from mass produced ciders in the market. Using high quality raw products can only help bolster the bourgeoning NY cider industry." (NYS Cider Maker)

Growers

This section summarizes the following information from New York State apple growers who responded to the survey:

- Market Channels
- Apple Acreage
- Current and Future Industry Projections
- Concerns/Challenges with Growing Hard Cider Apples

MARKET CHANNELS

As indicated by Figure 13, 58% of apple growers have sold apples to the hard cider industry within the past three years.

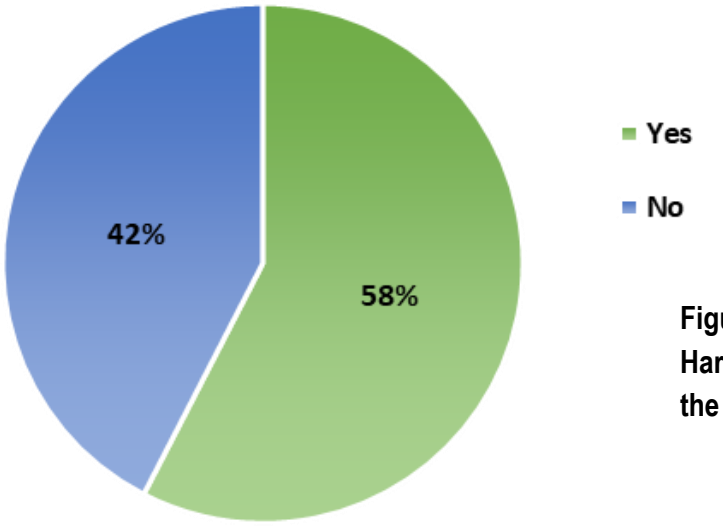


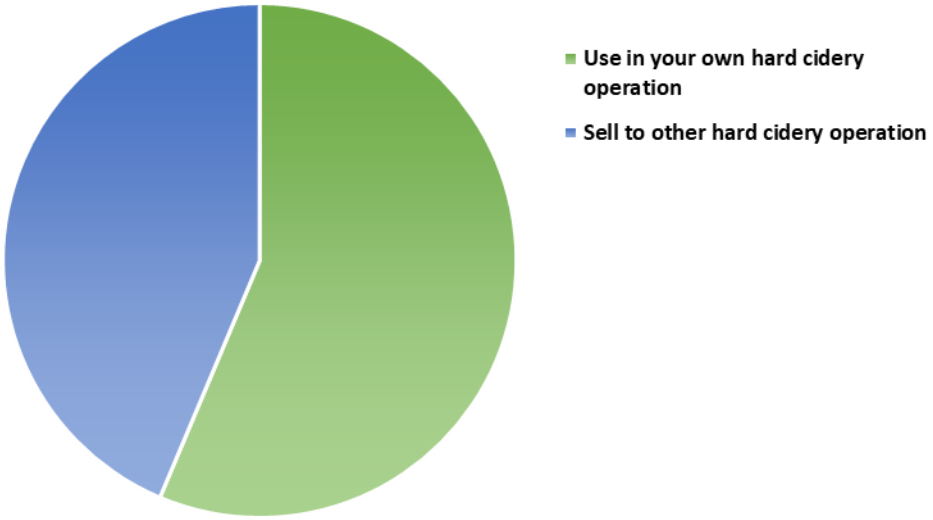
Figure 13: Sold Apples to Hard Cider Producers over the Past Three Years (N=42)

Figure 14 shows the various market channels with the minimum, maximum, and average price per pound received by apples growers in New York State. The market channels that returned the highest price per pound were not surprisingly, fresh direct and fresh wholesale. However, it's important to note that both sales to ones own hard cidery or someone else's returned a higher price per pound than processing.

Figure 14: Market Channels (N=31)

Market Channels	Average Price per Lbs.	Min Price per Lbs.	Max Price per Lbs.
Fresh Direct	$0.69	$0.06	$2.62
Fresh Wholesale	$0.40	$0.06	$1.19
Own Cidery	$0.13	$0.04	$0.19
Someone Else's Cidery	$0.28	$0.11	$0.95
Processing	$0.10	$0.05	$0.12

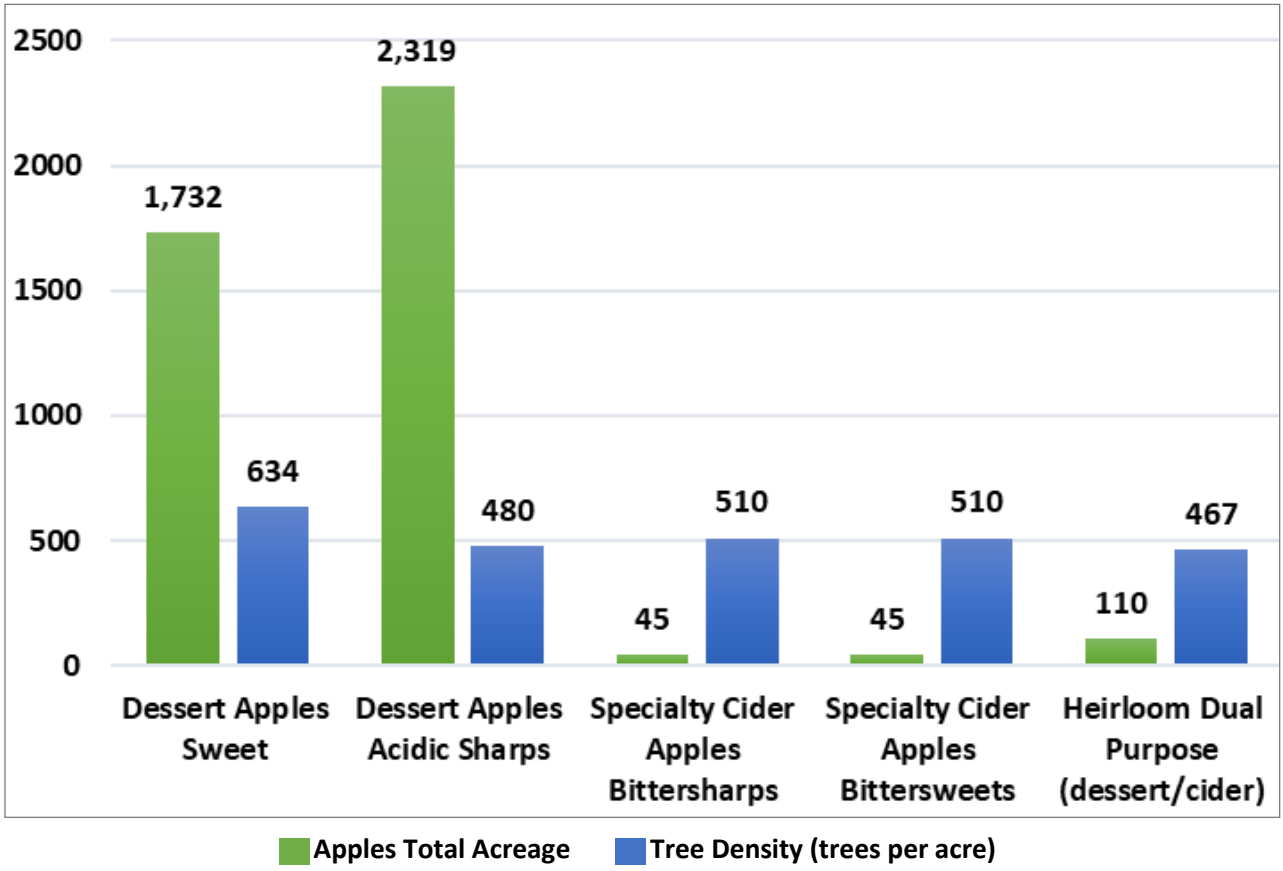
Figure 15 shows that among apples grown for the hard cider industry, 56% are produced for growers' own hard cidery operation, while 44% are sold to other hard cideries.



Percentage of Apples Grown for Hard Cider (N=46)

APPLE ACREAGE

Figure 16: NYS Acreage and Tree Density by Cider Apple Classification (N=38)



The 43 growers who responded to this survey report a total of 5,116 acres in apple production; however only 4,241 acres are represented in Figure 16.

Figure 16 also shows the acreage of apple variety categories based solely on survey respondents, with dessert sharp and sweet varieties making up the majority of the planted acreage. The acreage of bittersharp, bittersweet, and heirloom dual purpose apple varieties were very small when compared to the overall apple industry.

CURRENT AND FUTURE INDUSTRY

Figure 17 shows the top 15 specialty hard cider varieties that comprise the most acreage on the farm.

Figure 17: Top 15 Specialty Hard Cider Varieties N=34

Top 15 Specialty Hard Cider Varieties
Dabinett
Kingston Black
Porter's Perfection
Golden Russet
GoldRush
Harry Master's Jersey
Newtown Pippin
Geneva Tremlett's Bitter
Brown Snout
Wickson Crab
Ellis Bitter
Chisel Jersey
Michelin
Brown's Apple
Harrison
Yarlington Mill
Baldwin
Somerset Redstreak

Photo: Michelin apple flowers about to bloom

Photo: Harry Masters Jersey apples harvested from Cornell's cider research orchard in Lansing, NY.

Figure 17 depicts survey respondents projections for their future apple variety plantings over the next 3 years. As stated in Figure 16, plantings of bittersweet and heirloom dual purpose apples are on the rise.

Figure 17 : Future Apple Plantings, by Category (N=35)

Apple Categories	Acreage		
	2018	2019	2020
Sweet	2	2	1
Sharp	5	3	1
Bittersharp	3	7	1
Bittersweet	12	10	3
Heirloom Dual Purpose (dessert/cider)	8	5	4

CONCERNS/CHALLENGES WITH GROWING HARD CIDER APPLES

Apple growers were asked to rate what their concerns were in regard to growing hard cider apples on a scale of 0 (lowest concern/challenge) to 10 (highest concern/challenge). Figure 19 shows that the top three concerns were respectively: fire blight susceptibility, return on investment for growing specialty cider apples, and future market demand for specialty cider apples.

Figure 18 Concerns/Challenges Growing Hard Cider Apples (N=36)

Concerns/Challenges Growing Hard Cider Apples	Average Value
Fire blight susceptibility	7.7
Return on investment for growing specialty cider apples	6.9
Future market demand for specialty cider apples	6.5
Biennial/irregular bearing habit	6.4
Which varieties to plant	6.0
Crop load management	5.3
Availability of specific rootstock-variety combination from nurseries	5.0
Lack of information/resources from Extension and Universities	5.0
Which orchard system/tree density is best for specialty cider apples	4.5
Mechanical harvesting	4.5
Diseases other than fire blight, rots, and viruses	4.4
Post-harvest storage	4.4
Viruses	4.3
Insect pest control	4.1
Fruit size	4.0
Fruit rots	4.0

Conclusion

New York State is the second largest apple producing state in the USA, with a growing craft beverage sector. However, the continued growth of the hard cider beverage market may be hampered by the lack of supply for specialized cider apples.

Our data shows that traditional hard cider apple varieties are in demand from the hard cider producers, but growers have reservations about planting these varieties. Hard cider producers and apple growers would likely benefit from working together to identify which varieties will best match each other's needs. For cideries this would mean bittersweet, bittersharp, and dual-purpose apples and for apple growers, this would mean varieties that are less susceptible to fire blight and other diseases, and bear fruit annually.

Cornell Cooperative Extension
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In collaboration with:

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Gregory Peck, Ph.D., Cornell University, School of Integrative Plant Science-Horticulture Section

Jenn Smith, New York Cider Association

Cheryl Thayer, CCE Harvest NY

Craig Kahlke, CCE Lake Ontario Fruit Team

New York Apple Association

Prepared by

Lindsey Pashow
Ag Business Development & Marketing Specialist
Harvest New York
Cornell Cooperative Extension
335 W. Main Street, Ste. 150
Malone, NY 12953

Margaret Mahr
Promotions & Marketing Coordinator
Cornell Cooperative Extension-Yates County
417 Liberty Street, Ste. 1027
Penn Yan, NY 14527

http://harvestny.cce.cornell.edu

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