

ARONIA BERRY FEASIBILITY STUDY

**An Evaluation to Determine the Feasibility of Growing
Aronia Berries at the Kohler Company
January, 2016**

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Whitewater, Fiscal & Economic
Research Center

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Executive Summary

- The aronia fruit has more antioxidants than popular "superfoods" like blueberries, acai berries and goji berries. It is appearing in mainstream grocery stores, showing up in everything from juices to powdered supplements to baby food.
- Aronia berries have risen from being a novelty item at farmers markets into a multimillion-dollar U.S. industry.
- The native North American berry was introduced to Russia and Eastern Europe in the early 20th century and has been cultivated there for juices and wines. Aronia has been grown as a commercial berry crop in most Eastern European countries since the 1950s.
- Aronia was reintroduced to the U.S. in 1997, where it can be grown in a sustainable manner in Wisconsin and Iowa and adapts well to organic production practices.
- The USDA table of ORAC (Oxygen Radical Absorbance Capacity) values lists the value for raw aronia at 15,280 umol TE/100 g, nearly three times the value in blueberries and blackberries and one and one-half times the value in black currants and cranberries. ORAC values are the most important indicator of juice quality because aronia is used for its high antioxidant activity components.
- Kohler Company has 700 acres of farmland, of which 113 acres are suitable to grow aronia berries.
- The Midwest Aronia Association has confirmed that current market prices of aronia berries ranges from a low of \$0.50/lb. to a high as \$7.50 /lb. \$2 per pound of aronia berries and an average of 20 lbs. of aronia berries per bush, was used as the average calculations within this study. This was determined by industry analysis and the current market price of aronia berries.
- The start-up farm costs to plant aronia berries is \$4,469 per acre, based on estimates provided by Iowa State University Extension.
- The specialty harvester equipment would cost \$45,000.
- The cleaning equipment would cost \$4,500.
- The walk-in refrigeration equipment used for storage costs is estimated at \$399,670.
- **Breakeven would be reached after 3.6 years based on 100% production immediately of the 113 acres of suitable Kohler farmland.** Using a recommended 'phased approach' as seen in the Pro Forma Income Statement, breakeven would be reached after 4.62 years. This is based on 25% production of the suitable land in year 4, 50% in year five, 75% production in year six and 100% in year seven. Capital investment would also be phased accordingly.
- The demand in the U.S. for aronia berries exists and has been growing over the past 18 months. Purchaser responses point to much needed marketing and education by a credible source to the consumer to drive market demand and awareness of aronia berries and their superior health benefits.
- Potential aronia growers should secure a contract to sell their fruit before planting begins. The marketing and education of aronia berries to consumers can be compared to cranberry adoption in the U.S.
- The FERC recommends Kohler Company enter the aronia berry market with caution through 'phased' production and establish relationships with the Buyers that will purchase future aronia berries Kohler Company will produce. Align with aronia berry associations to market the product and mitigate risks.

Overview

The objective of this research is to assess the feasibility of the Kohler Company of providing additional supply to the aronia berry market. This research will identify target markets for Kohler Company to potentially capture.

Products and Uses of Aronia

Aronia's high anthocyanin and polyphenol content yield deep reddish-purple hues and color with a strong astringent taste. For juice and food processors using aronia for color, aronia can contain up to 2,000 mg/l of anthocyanins. These compounds are also useful in wine making, particularly in dry red wines both for color and astringency. Beverage manufacturers including SoBe®, SunOpta® and Hipp Organics® have included aronia juice in their products. The berries are also used to make food coloring.

Aronia berries can be canned whole or the juice extracted for jelly making, as well as healthful fruit drinks. The juice contains high levels of anthocyanins and flavonoids. Aronia berries can be eaten fresh off the bush or used in bread, muffins, pies, cookies and other baked goods. They can be used to make tea, aronia wine or blended with grapes or other fruits. Aronia fruit or fruit juice can be used to make jams, jellies, syrup, candy, salsa and barbeque sauce, and to flavor and color yogurt, sorbet, ice cream, milk and other products.

Health Benefits

Aronia is the newest 'superfood,' according to the Wall Street Journal. Antioxidant-containing foods are being recommended by doctors and nutritionists as important additions to a healthy diet. Scientists now agree that one of the best ways to protect against aging is to consume a diet rich in fruits and vegetables. Even those who manage to consume the recommended five daily servings of fruits and vegetables may not be obtaining enough antioxidant protection to ward off cancer, cognitive decline and cardiovascular disease. (Cherlet 2008).

Medical research has documented many health benefits of aronia berries. Most of the effects of aronia berries are due to their high antioxidant activity.

Aronia berries top the list of more than 100 foods that have been scientifically tested for antioxidant capacity, according to Dr. Xianli Wu, researcher at the Arkansas Children's Nutrition Center in Little Rock. Other researchers have looked at how aronia affects cardiovascular disease, colon and breast cancers, liver failure and obesity (Sagarrio 2008).

Nutrient Composition

The USDA table of ORAC (Oxygen Radical Absorbance Capacity) values lists the value for raw chokeberry (aronia) at 15,280 umol TE/100 g, nearly three times the value in blueberries and blackberries and one and one-half times the value in black currants and cranberries. ORAC values are cited by nutraceutical processors as the most important indicator of juice quality because they use aronia for its high antioxidant activity components. ORAC is considered an acceptable laboratory method for estimating antioxidant activity of foods.

Aronia berries and products made from them are gaining in popularity due largely to the rising interest in eating healthier foods. The berries are high in vitamins, minerals and folic acids. They are also one of the richest plant sources of phenolic substances, mainly proanthocyanins and anthocyanins. Laboratory tests have shown that proanthocyanins represent 66 percent and anthocyanins represent about 25 percent of total polyphenols. These chemical compounds are water-soluble pigments that give aronia berries their dark purple or nearly black color.

Conclusions

Based on the primary market research results, FERC recommends that the Kohler Company should work to secure a contract to sell their fruit before planting begins. Target sales to companies making health food snacks, drinks and energy bars. These products would specifically be aimed at consumers who are health-conscious and seeking healthy food solutions for the prevention and treatment of disease. Aronia berries fit well into this market, which includes other “superfood” products, such as acai and gogi berries. A secondary market for aronia berries would be producers of products such as wine, juices, jellies, jams, and other consumer products that may be as interested in the unique health benefits of the berry.

FERC research found to supply quality aronia berries to the health food market, Kohler Company must grow, harvest, clean and store the berries. The estimated revenue based on a selling price of \$2 per pound and 1,356,000 pounds of berries harvested is \$2,712,000. Variable costs associated with operating capital equipment totaled \$231,930. This leads to and EBTIDA of \$2,480,070 as shown on the chart below. ^{[6][10][11]}

EBTIDA Calculation	
Total Revenue	\$2,712,000
Total Variable Costs	\$231,930
EBTIDA	\$2,480,070

It was determined that the specialty berry harvester equipment would cost \$45,000, cleaning equipment would cost \$4,500 and storage of the berries, via walk-in refrigeration costs \$339,628. This leads to total capital costs, including contingency costs, of \$1,488,725, which then leads to a **breakeven point after 3.6 years.** ^{[6][10][11]}

Recommendation

The FERC recommends Kohler Company to enter the aronia berry market with a ‘phased approach’ gradually increasing production and capital investment over time. We suggest that Kohler Company align with the Midwest Aronia Association and other aronia berry associations to gain education on marketing aronia berries and mitigating risks. When entering into aronia berry production, we recommend ‘staged’ production, not full production of the 113 suitable acres. Stage 1 would include planting and evaluating test harvests, picking the berries by hand, and Marketing them to potential Buyers to create a partnership for the future. Invest in capital equipment the year before the expected increase in production is expected. This will mitigate risks in capital spending and overproducing leading to an overstock of berries.

Findings - Breakeven Analysis

Capital Costs

Total capital investment Kohler Company will need to farm, harvest, clean and store aronia berries is outlined in the Section on page 7.

The harvester equipment for aronia berries will cost \$45,000 and can be easily operated similar to traditional harvesters. Once the berries are picked they must be cleaned. An industrial berry cleaner costs \$4,500 and can process the entire Kohler harvest annually in 281 hours.

Storage Costs

Once the aronia berries have been harvested, the berries must be cleaned and stored. The number of pounds of berries per cubic foot stored is 38.52 lbs. This can be used to determine the size of the walk-in refrigeration needed. Using the 1,356,000 lbs. harvested berries divided by the number of pounds in a cubic foot gives us the cubic feet needed. The cost per cubic foot of walk-in refrigeration is \$11.04, which is used to calculate the total cost of the walk-in refrigeration is \$339,670.

Storage Costs	
Pounds of Berries per cubic foot stored	38.52
Number of cubic feet needed	35,202
Cubic feet needed for shelving & aisles	1,000
Refrigerator Storage per cubic feet	\$11.04
Total Cost of Walk-In Refrigerator Storage	\$399,670

Reference: [6][10][11]

Farm Start-up Costs

For the first three years, aronia berries do not produce berries to harvest. During these years, transplants need to be planted, plants watered and the land needs to be maintained. The first three years of farming costs are calculated as follows:

Farm Start-Up Costs	
Farm Start Up Costs per Acre	\$4,569
Total Farm Start Up Costs	\$516,306

Reference [13][3]

Fencing Costs

Aronia berries are susceptible to foraging from small animals and deer. To prevent these animals from eating the berries, Dr. Smith from the University of Wisconsin – River Falls recommends fencing off aronia production areas. Cost breakdown of the fencing below.

Fencing Costs	
Cost of Fencing per foot	\$3.00
Number of feet of Fencing	16,988
Total Cost of Fencing	\$50,965

Reference [13][3]

Facility Costs

The cost to construct a new facility is based on a 5,125 square foot building. This will house the cleaning equipment, walk-in refrigeration and harvester. Below are the estimated facility costs.

New Facility Costs	
Electrical Costs	\$50,000
New Facility Price per square foot	\$56
New Facility square feet needed	5,125
Cost of New Facility	\$336,987

Total Capital Costs	
Harvester	\$45,000
Berry Cleaning Equipment	\$4,500
Total Cost of Fencing Farm Land	\$50,965
Total Farm Start-Up Costs	\$516,306
Total Cost of Walk-In Refrigerator Storage	\$399,628
Cost of New Facility	\$336,987
Total Capital Costs	\$1,353,386
Contingency Costs (10%)	\$135,339
Final Total Capital Costs	\$1,488,725

Note: Contingency Cost is the cost of permits, licenses and other startup costs.

Aronia berries require a unique production cycle, in which there are no harvestable berries until after year three. This means berries are harvestable in year four, and that would be when Kohler Company can collect revenue. Professor Brian R. Smith, with the University of Wisconsin – River Falls and State Extension Commercial Fruit Specialist, recommends growing a green manure cover crop in year one and plowing it under to add organic matter to the soil. The FERC recommends ‘phased’ or gradual production and capital investments, due to the long production cycle, along with large capital costs shown above. This is done to mitigate capital investment and an overstock of berries. A Pro Forma Income Statement of the recommendation is indicated below:

Pro Forma Income Statement					
Operating Capacity	0%	25%	50%	75%	100%
Revenue	Year 1-3	Year 4	Year 5	Year 6	Year 7 (On Going)
Selling Price of berries per lbs	2	2	2	2	2
Bushes per acre	600	600	600	600	600
Pounds Per bush	-	15	20	20	20
Pounds per acre	-	4,500	9,000	12,000	12,000
Amount of Farming area (acres)	-	28	57	85	113
Operating Capacity	0%	25%	50%	75%	100%
Pounds of Berries produced (lbs)	-	127,125	508,500	1,017,000	1,356,000
Total Revenue	-	254,250	1,017,000	2,034,000	2,712,000
Capital Costs					
Pound of Berries per cubic foot	39	39	39	39	-
Number of cubic feet needed	3,300	9,899	13,199	8,800	-
Refrigerator Storage per cubic feet	11	11	11	11	-
Total Storage	36,430	109,290	145,721	97,147	Capacity Reached
New Facility Electrical Cost	50,000	-	-	-	-
New Facility Price per square foot	56	-	-	-	-
New Facility square feet needed	5,125	-	-	-	-
Cost of New Facility	336,987.38	-	-	-	-
Cost of fencing per foot	3	3	3	3	-
Number of feet in Expiation Area	4,247	4,247	4,247	4,247	-
Total Cost of Fencing	12,741	12,741	12,741	12,741	-
Farm Start Up Cost per acre	4,569	-	-	-	-
Total Farm Start Up Costs	516,306	-	-	-	-
Harvester	45,000	-	-	-	-
Berry Cleaning Equipment	4,500	-	-	-	-
Total Capital Costs	435,666	122,032	158,462	109,900	-
Contingency Cost (10%)	43,567	12,203	15,846	10,990	-
Final Total Capital Costs	479,233	134,235	174,308	120,890	-
Variable Costs					
Time to complete Berry Cleaning	-	26	105	211	281
Maintenance Costs (2%)	1,719	3,176	3,904	2,933	8,762
Equipment Power Costs per hour	0.35	0.35	0.35	0.35	0
Total Machine Power Costs	-	9	37	74	99
Refrigerator Power Costs per hour per square foot	0	0	0	0	0
Refrigerator Power Costs per hour	1	4	9	12	12

Operating Capacity	0%	25%	50%	75%	100%
Total Refrigerator Power Cost (for Year)	9,502	38,007	76,014	101,351	104,231
Number of Times of Transportation	-	13	51	102	136
Number of Mile to transport	-	-	2	12	12
Cost per Mile of Transportation	1.18	1.18	1.18	1.18	1.18
Total Cost of Transportation	-	-	120	1,440	1,920
Operating Capacity	0%	25%	50%	75%	100%
Cost of Maintaining Berries per acre	-	985	985	985	985
Total Cost of Maintaining Berries	-	27,826	55,653	83,479	111,305
Labor Costs per hour	20	20	20	20	20
Total Labor Costs	-	526	2,105	4,210	5,614
Total Variable Costs	11,220	69,544	137,833	193,487	231,930
EBITDA	(11,220)	184,706	879,167	1,840,509	2,480,070
EBITDA less Total Capital Cost (On going Investment)	(490,453)	50,471	704,859	1,719,619	2,480,070
Breakeven Point	-	6.32	3.9	3.45	3.6

Year 1-3 are the years in which the aronia berry plants are not producing harvestable berries. The costs laid out are not on a yearly basis, and can be divided up for a decreased investment each year. In these years, things that must occur are investing in a facility to hold all equipment and storage once 100% capacity is reached. Investment must also occur in the berry harvester, cleaning equipment, start-up farming costs, and the next year's storage and fencing. Once these investments are made, Kohler Company will work on the production of the aronia berries. In the above table, the storage capacity is broken into only what is needed for the next year's production. The FERC recommends investing in the storage refrigeration needed, based on the production capacity. This will allow Kohler Company to mitigate capital investments and risks. Once all storage investments are made, Kohler Company will have four separate storage walk-in refrigerators.

In year 4, only 25% of the available 113 acres of land will be used. This is again done to mitigate capital investment and an overstock of berries. During this year, capital costs will be spent on the next year's expected production and variable costs, which will increase. The variable costs mapped out above are necessary to keep equipment running and berries stored properly. These variable costs will continue to increase until year 7, when capacity reaches 100%. Here the total capital investment will have been \$1,685,681 over 7 years and the ongoing variable costs will be \$268,885.

Breakeven Point

Using the Pro Forma Income Statement, we can estimate the breakeven point. We use the EBITDA less Total Capital Costs for each year to determine how long it will take to recoup the initial investment. **Breakeven will be reached after 4.62 years, based upon the recommended phased approach.**

Breakeven is reached	
Year 1-3	\$(490,453)
Add Year 4	\$50,471
Year 1-4	\$(439,982)
Add Year 5	\$704,859
Year 1-5	\$264,877

Value Chain

The native North American aronia berry was introduced to Russia and Eastern Europe in the early 20th century and has been cultivated there for juices and wines. Aronia has been grown as a commercial berry crop in most Eastern European countries since the 1950s. The average yield is around 23 pounds per aronia bush in Eastern Europe. The current U.S. average production is 20 lbs. per aronia bush, which was used in the calculation in the study.

Aronia was reintroduced to the U.S. in 1997 and launched in Iowa, where the first aronia was planted for commercial cultivation. Aronia berries offer great health benefits whenever consumed and the cost makes them appealing to food manufacturers.

Aronia berries can only be grown in specific pH level soil. This level is between 6.1 - 6.7, which is slightly acidic. Based on soil samples, the FERC was able to determine the best area to grow aronia berries on Kohler Company farmland.

Once the berry transplants are planted it takes roughly three to four years for the plant to develop harvestable berries. The harvester is driven over the aronia berry bush and the mechanics within the harvester cut the berries off the bush to be collected in a container. After collection the berries must be cleaned using berry cleaning equipment. Once cleaned the berries are stored prior to shipping.

Production Costs

According to a study done by the University of Wisconsin – River Falls and Iowa State University

	Year	Quantity	Unit	\$/Unit	Total
Average Annual Receipts					
First Production Year	2019	4500	lbs		
Second Production Year	2020	9000	lbs		
Third Production year	2021	12000	lbs		
Production Year 4-13	2022- 2034	12000	lbs		
Planting Year Costs					
	2016				
Seed - between rows		125	lbs	\$2.00	\$250.00
Fertility testing		2	tests	\$10.00	\$20.00
Fertilization		70	lbs	\$1.50	\$105.00
Viking liners – aronia transplants		600	plants	\$1.40	\$840.00
Plastic mulch		3630	feet	\$0.05	\$164.08
Drip irrigation equipment		1	ft	\$1,500.00	\$1,500.00

	Year	Quantity	Unit	\$/Unit	Total
Poly tubing		4000	ft	\$0.11	\$452.00
Water		6000	gal	\$0.02	\$120.00
Labor Costs					
Planting grass		3	hrs	\$10.00	\$30.00
Preparing soil		8	hrs	\$10.00	\$80.00
Spreading fertilizer		2	hrs	\$10.00	\$20.00
Installing irrigation		4	hrs	\$10.00	\$40.00
Planting liners		16	hrs	\$10.00	\$160.00
Hand weeding		4	hrs	\$10.00	\$40.00
Installing mulch		4	hrs	\$10.00	\$40.00
Mowing between rows		3	hrs	\$10.00	\$30.00
Total Planting Year Costs					\$3,891.08
Pre-Production Year Costs	2017	Quantity	Unit	\$/Unit	Total
Water		12000	gal	\$0.02	\$240.00
Fertility testing		2	tests	\$20.00	\$40.00
Fertilization		6	lbs	\$1.50	\$9.00
Labor Costs					
Fertilizer spreading		3	hrs	\$10.00	\$30.00
Hand hoeing		2	hrs	\$10.00	\$20.00
Total Pre-Production Year Costs					\$339.00
Pre-Production Year Costs	2018	Quantity	Unit	\$/Unit	Total
Water		12000	gal	\$0.02	\$240.00
Fertility testing		2	tests	\$20.00	\$40.00
Fertilization		6	lbs	\$1.50	\$9.00
Labor Costs					
Fertilizer spreading		3	hrs	\$10.00	\$30.00
Hand hoeing		2	hrs	\$10.00	\$20.00
Total Pre-Production Year Costs					\$339.00
Total Pre-Production Costs					\$4,569.08
Production Year Costs	2019	Quantity	Unit	\$/Unit	Total
Preharvest					
Water		1000	gal	\$0.02	\$20.00
Fertilization		50	lbs	\$1.50	\$75.00
Labor Costs					
Mowing between rows		3	hrs	\$10.00	\$30.00
Fertilizer spreading		2	hrs	\$10.00	\$20.00
Total Preharvest Costs					\$145.00
Harvest (Average Production / year - lbs)					
Labor Costs					
Harvesting Labor		48	hrs	\$7.50	\$360.00
Packaging		48	hrs	\$10.00	\$480.00
Total Harvest Costs					\$840.00
Total Preharvest and Harvest Costs					\$985.00

Note: The following is a breakdown of the costs associated with aronia berry farming. ^{[3][13]}

Capital Investment

Cleaning

After aronia berries are harvested they must be cleaned before they are stored. The cost of such equipment was found to be \$4,500. It can process 4,831 pounds of berries in an hour. Because Kohler Company will be producing 1,356,000 lbs. of berries this leads to a run time of 281 hours. This equipment also needs 2.7 kwh of power.^[10]

Storage

After being cleaned the aronia berries are stored in bins in walk-in refrigeration. The cost of the refrigeration depends on its size. Because Kohler Company would be producing 1,356,000 pounds of berries, the refrigeration costs will be substantial. Walk-in refrigeration units cost \$11.04 per cubic foot. Kohler Co needs 36,202 cubic feet to store the entire amount of berries from the harvest. This equates to 38.52 pounds of berries per cubic foot multiplied by the 1,356,000 pounds harvested. Combined, the total cost of refrigeration would equate to \$399,670. Forecasting of the berry harvest quantities each year will allow Kohler Company to plan their capital needed to store the berries.

Equipment - Harvester

Because aronia berries are not a grain or typical crop, a traditional harvester cannot be used. Berries can be picked by hand, but would be cost and time prohibitive. A berry harvester is recommended at a cost of \$45,000. This harvester is pulled by a tractor or truck over the berry bushes. It then cuts the berries off the bush which are collected in the harvester.

Transportation

Transportation costs will not show until year 5 because the berries grown on the land not located near the cleaning and storage facility will not be grown until this time. Before this time the harvester can be driven to the facility. After this time, the harvester must be emptied to the gravity box Kohler Co is currently using to harvest corn. This will then be transported via tractor to the facility. These costs are shown in the Pro Forma Income Statement seen above.

Labor

Once the aronia berries are harvested they must be cleaned. Using the equipment explained above, one individual must operate the machine. Another must then take the cleaned berries and place them in the walk-in refrigerator. Because it takes 281 hours to clean the berries, FERC recommends using two labors to complete the job of cleaning and storing the berries. Each laborer will cost \$10/hour making a total labor costs estimated of \$5,620.^[3]

Facility

Kohler Company will need a facility to house the cleaning and storage equipment explained above. The size of the building is determined by the size of the equipment and the berry harvester. The facility would be located on existing Kohler land and the space required is 5,125 square feet. Estimating the cost per sq. foot of \$56 and with electrical installation, the total price of the new facility would be \$336,987.^[12]

Price

The Midwest Aronia Association President, Melissa Ehrman Johnson, confirmed that the association, which has members in 12 states and Ontario, Canada, has producers receiving \$.50/lb. on the low end of

the wholesale price scale to \$7.50/lb. on the high end of the range depending on the quality and product end use.

In addition, the FERC determined the price of aronia berries by contacting industry experts. Joe Hannan, Iowa State University Extension and Outreach Director, estimated the price of aronia berries to be between \$1 and \$2 per pound. Using these combined price estimates, the FERC used an estimated price of \$2 per pound in its calculations.^{[3][1][8]}

Target Market

Kohler Company is interested in the market feasibility of producing and selling aronia berries in Wisconsin and the Midwest.

FERC worked to identify the target market, potential customers, estimated market size, and growth/expansion options including, but not limited to:

- Juice
- Wine
- Whole berries
- Concentrates

FERC also compiled a list of aronia producers in the United States, contacted aronia producers and conducted interviews with five of them to learn about market trends. FERC also compiled a list of potential customers for aronia berry products and conducted interviews with 15 representatives to learn about the market need and preferences.

Project Tasks:

- I. Identify the key competition, and where possible, their revenue and geographic market served. Provide a list of key competitors (aronia producers) with contact and company information where possible.
- II. Interview up to five aronia producer representatives for market insights.
- III. Identify potential customers (producers of juices, concentrates, wines and other aronia berry products) and compile lists with company information.
- IV. Conduct interviews with the potential customers to gain insights into customer preferences and market trends.
- V. Assess the competitive nature of the market and make best effort to gauge overall market size and need for aronia.
- VI. Compile summary report and provide along with supporting research material.

Survey Interviews – Aronia Producers

FERC contacted aronia producers across the country and conducted interviews with five representatives to learn about market trends. Participants were asked the following questions:

1. How are aronia berries used? (What products?)
2. In the past three years what market trends have you noticed for aronia berries?
 - In particular, is demand increasing, remaining the same or decreasing?
3. What do you think is driving the demand for aronia berries at this time?
4. In your opinion, what is the most popular aronia product?
5. What are some emerging markets for aronia?
 - Specifically, do you see it replacing cranberries in some products?
6. Is there room in the market to increase aronia production?
7. Do you grow other crops in addition to aronia berries?
8. If yes, about percentage of your sales would you say is aronia?
9. What volume does your farm produce on average each year?

Survey Interviews – Potential Customers for Aronia Products

FERC targeted potential customers for aronia products to learn about the market need and preferences. Potential customers included wholesalers, food co-ops, and concentrate, powder, or wine converters.

Potential Customer Survey Questions

1. Do you purchase aronia berries? (If not disqualify and move on)
2. What quantity do you purchase in a given year?
3. Do you purchase them fresh or frozen or in other form? (If other, please specify)
4. Do you purchase aronia berries from a U.S. source? (If yes, what state?)
5. Do you import aronia berries from outside the United States? (If yes, what percentage?)
6. Who are the leading suppliers of aronia berries in the US?
7. How satisfied are you with your current aronia berry supplier? (scale of 1 to 5)
8. What do you like best about your current aronia berry supplier?
9. If you could quickly and easily acquire U.S. grown aronia berries, would that influence your decision to change suppliers?
10. When would you choose aronia berries over other berries?
11. Typically, how important is proximity of the supplier to your company when purchasing aronia berries?
12. How important is price to your company when purchasing when purchasing aronia berries? (How price sensitive is the market.)
13. How important is quality to your company when purchasing when purchasing aronia berries?
14. Within the next 18 months, do you think that your company will be increasing, decreasing or maintaining the amount of aronia berries you purchase?
15. What criteria does your company use to select suppliers of aronia berries?
16. What trends or issues that are going to affect the way you do business in the next 18 months?
17. Would you be open to considering a new source for aronia berries?

Market Assessment Executive Summary

Target Market

Based on the primary market research results, FERC recommends that aronia producers target sales to companies making health food snacks, beverages and other products. These products would specifically be aimed at consumers who are health-conscious and seeking healthy food solutions to prevention and treatment of disease. Aronia berries fit well into this market, which includes other “superfood” products. A secondary market for aronia berries are producers of products such as wines, juices, jellies, jams, and other consumer products due to the health benefits of the berry.

Estimated Market Size

FERC located the aronia producers through the Midwest Aronia Association membership and through our interviews with purchasers of aronia berries who shared who their suppliers are.

Growth opportunities

Aronia berries, still being a new and relatively unknown fruit, offer some general growth opportunities that FERC gathered through representative interviews. The secondary market research indicates that the market is predicted to grow with increased awareness of the benefits of the fruit. Likewise, primary interview respondents said that the market has grown over the past three years and they anticipate the market will remain the same or increase in the coming 18 months.

General growth opportunities include areas where the berry is transformed into a different form such as through juice, concentrate, whole or fresh, and also in wine. Many small online retailers and growers with physical and online retail presence, have developed their own line of products made from aronia. However, some of the largest retailers of juice products, such as Dole, Snapple, and especially Ocean Spray have not yet utilized aronia to any great extent if at all. This will take Marketing and education of the health benefits of the aronia.

This same situation is also prevalent with the other main markets for aronia such as wine, jams and jellies, and concentrates. Cranberries currently have a tight hold on these markets with the big companies. Provided there is enough consumer education over time, demand for aronia is predicted to increase. Other specific growth opportunities are in other markets that include candies, salsas, dehydrated powder form, trail/snack mixes, liqueur, and even animal pet food.

Marketing Aronia Berries

Potential aronia growers should secure a contract to sell their fruit before planting begins. Marketing of aronia will have to learn from the ‘Best practices’ of marketing cranberries, since there are synergies between the two products.

Aronia producers in 12 states work with the Midwest Aronia Association for Marketing assistance and education of the consumers and Buyers of aronia. Other producers operate independently and sell their fruit to other processors and handlers. Most of the Wisconsin aronia crop is sold for processing. Only about 5% of the state crop is sold as fresh fruit. Growing aronia for the fresh fruit market requires additional management skill and great attention to detail.

Aronia berries are available in an array of food products available at Whole Foods and other grocery stores, as well as at Amazon and other online sources. You'll find them frozen, freeze-dried or dried and as syrups, juices (and juice concentrates), extracts, powders, teas and even in wines. You may find jams, jellies and purées at farmers markets in the Midwest where aronia is produced.

Aronia berries are also used in juice blends, sometimes with apple juice to get the goodness of aronia berries and using the apple juice sweetness to offset the tartness in many of these offerings.

Market Research Recommendations

Since the aronia product presents a relatively unknown market, FERC suggests that it would be in the best interest of the client to join an organization that would be able to provide support to them. Networks such as the **Midwest Aronia Association and Aronia Berry Services of Northeast Iowa** provide valuable resources to growers and marketers of aronia products. A list of resources for cultivation and marketing of aronia berries is provided in the Market Analysis section of this report. For example, Tony Heisterkamp of Akron Apple and Aronia, heads a network of growers across the Midwest where he acts as a wholesale distributor for the farms. Tony is also a part of the National Aronia Growers, which is a marketing arm for the aronia industry.

Another suggestion, as noted in the growth opportunities section, identify large consumer product companies like Ocean Spray, Dole, and Snapple that have not yet produced any aronia related products. Meetings with these Buyers would be highly recommended to identify how to get aronia added to their product lines/extensions.

Many representatives that were interviewed, had common responses that more awareness and education of the berry's health benefits and different uses is needed to gain market acceptance and trials. Focus on gaining relationships with Buyers in the specialty food, health food, beverage and snack food categories is highly encouraged to introduce aronia to broader retail markets.

Forecasting and managing the production and supply chain with a relatively new product offers some challenges in matching potential supply with the level of demand generated. This seems to be a challenge in the aronia industry currently. The Kohler Company could excel with their supply chain management and has staying power. The market may see a contraction in supply due to some producers walking away from the market due to the long production cycles and cost of capital investment.

Summary of Business Interviews

Purchasers

FERC conducted 15 interviews with representatives of companies that purchase aronia berries. Those interviewed include representatives from wholesalers, food co-ops, and other firms that either purchased whole berries for processing or purchased processed aronia product in the form of a concentrate or powder.

Quantity and Form of Aronia Berries Purchased

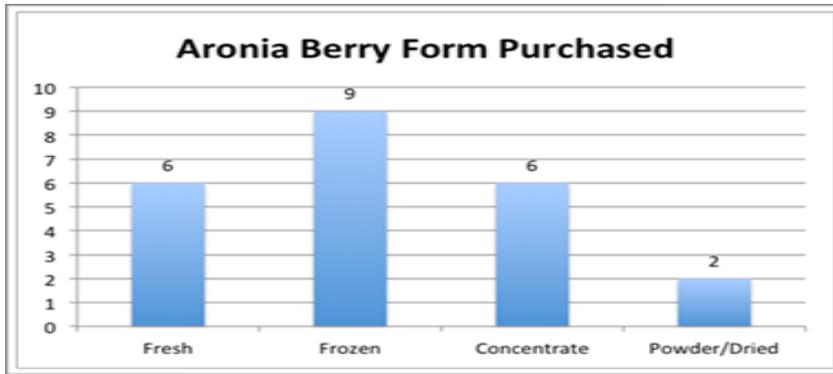
FERC asked questions aimed at determining the quantity and form of the berry purchased by each respondent. Responses to the question of volume purchased varied from as few as 10-20 pounds of berries annually to as much as 80-100 metric tons of concentrate. Specific responses are provided in the table below.

Interviewed Purchaser Company Name	Form and Volume Purchased Annually
Hummingbird wholesale	910 pounds of frozen berries
Country View Dairy	30 gallons of concentrate
Irv and Shellys	200 pounds dried and 100 pounds frozen
Organically Grown	20 to 100 cases fresh berries
Northwest Wild Foods	20,000 pounds frozen berries
Milne Company	Couple of truckloads fresh berries (varies)
Akron Apple and Aronia	2,000 pounds fresh and frozen in first year
EncoreFruit	No volume given. Buys puree concentrate, juice
Anonymous	5,400 gallons concentrate
FruitSmart	250 to 300 thousand fruit pounds concentrate
SVC USA Washing INC.	80 to 100 metric tons concentrate
Willy Street Co-op	1,000 pounds fresh and frozen
Rosebud Botanicals	30 pounds of powder. Also purchases fresh and frozen but did not indicate volume for those.
Williamson Street Co-op West	520 to 620 pounds frozen berries
Oneota Food Co-op	10 to 20 pounds of fresh berries

The respondent from Williamson Street Co-op West said that, in addition to the amount of frozen berries listed, other buyers at the store purchase fresh and frozen berries when it is in season in Wisconsin. Oneota Food Co-op indicated that they freeze them to sell when they are not in season. Akron Apple & Aronia indicated that they only buy from suppliers that are part of the organization—a marketing group—and only when their inventory is depleted.

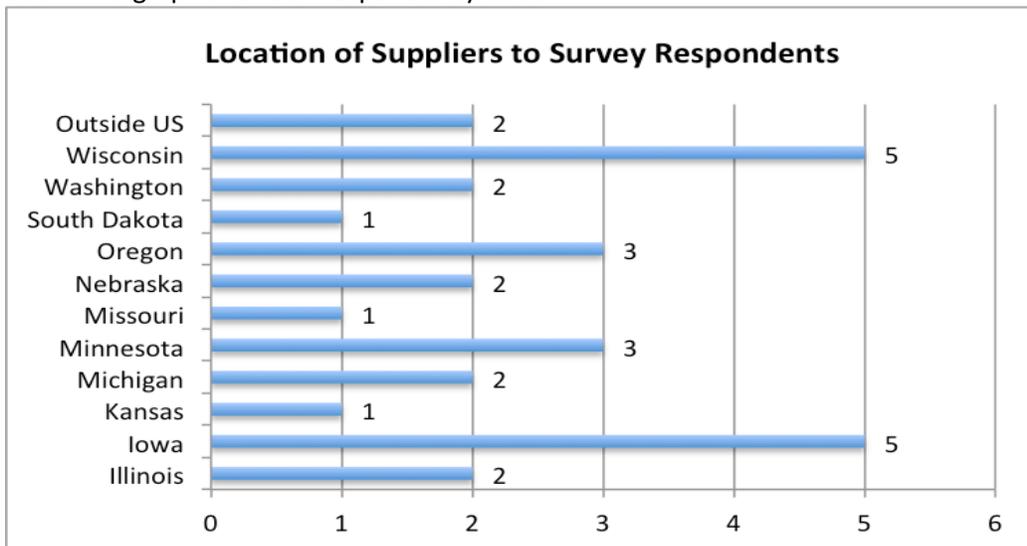
Products Purchased

Frozen whole berries and powdered berries were the most common form for aronia berries to be purchased by the survey respondents. Concentrate (which is often purchased frozen) and fresh whole berries were second most common. Two of the fifteen respondents indicated that they purchase dried or powdered aronia.



U.S. Sourced Berries by State

Two of the fifteen respondents indicated that they do not source aronia berries from the United States. The remaining thirteen respondents selected one or more states as sources. The most common states cited were Iowa and Wisconsin with five each. Minnesota and Oregon followed with three responses each. The graph shows all responses by state.



Import Sources

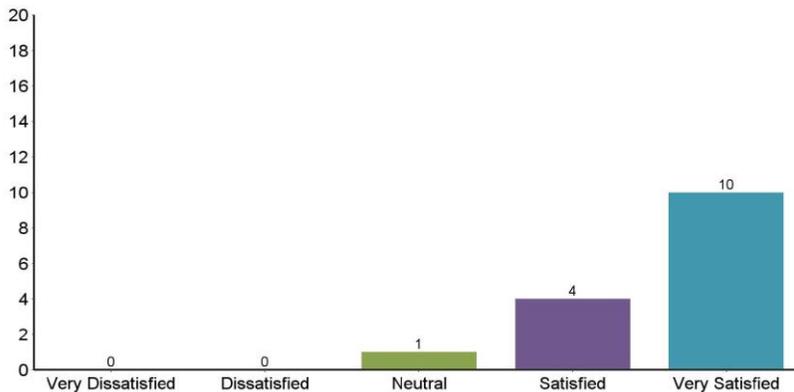
EncoreFruit sources berries from Poland, in addition to Oregon and Washington, but they did not provide a percentage sourced by location. Northwest Wild Foods sources from Illinois, Iowa, Michigan, Minnesota, and Wisconsin in addition to Europe. They did not specify which country in Europe, but commented that Europe is 'cheaper' as a source for aronia than U.S. suppliers. Two respondents, namely FruitSmart and SVC USA Washing Inc., only purchase from Poland. In total, four of the fifteen respondents source from outside the United States.

Leading U.S. Suppliers

Responses regarding leading suppliers of aronia berries varied widely with no clear market leader emerging. Many suppliers appear to be local to the purchasers. See responses below.

Interviewed Company Name	Leading Suppliers Listed
Hummingbird wholesale	Buy locally, so Sunset Valley Organics
Country View Dairy	Midwestern farms mainly
Irv and Shellys	Local aronia berry farms (Illinois)
Organically Grown	No idea, relatively unknown fruit.
Northwest Wild Foods	Europe is cheaper.
Milne Company	Do not know.
Akron Apple and Aronia	Independent growers.
FruitSmart	Poland
SVC USA Washing INC.	Milne
Rosebud Botanicals	Carlisle Farm (Iowa)
Williamson Street Co-op West	Bellbrook Berry Farms
Oneota Food Co-op	UNFI

Level of Satisfaction with Suppliers



What Purchasers Like Best About Suppliers

Things purchasers liked about their current suppliers included the following:

- Contacted me to incorporate aronia berries in my products, partnership
- Never had any problems, cheap price and very fast delivery. The farming techniques are excellent, especially the soil quality.
- Local, easy to work with and easy to promote product
- They produce it over there (Poland) and the aronia over there is very widely established and cheap to grow. They grow a lot of it over there.
- Local and they come tell you how much they can supply you in a quick amount of time.
- They are consistent about knowing how much product they will produce to meet our demands.
- Price and quality
- Accommodating, great customer services, reliable delivery, very knowledgeable about aronia

berries. Our supplier has a strong passion about the health benefits of the aronia berries.

- A product that customers value.
- Lot of independent growers. National aronia growers will be the best supplier to the food industry. Brings farms on board to their company. Have to meet guidelines for quality control or else cannot become a part of the group. Local farmers, sustainable agriculture, good quality farmers and people. They are concerned about the food chain in the country.
- They are close, easy to contact, responsive and good at communicating while producing a reliable product ethically and conscientiously.
- Competitive market prices: \$15 to \$30 a gallon driven by the cranberry market.
- They supply us with berries as close to ripe as possible.
- Organic and a good price.

Common themes are that purchasers prefer to work with growers who provide value through their agriculture practices, health benefits, consistency to supply, proximity, customer service, and pricing.

Influence of Availability of U.S. Source

FERC asked purchasers: If you could quickly and easily acquire U.S.-grown aronia berries, would that influence your decision to change suppliers? EncoreFruit and FruitSmart were the only two purchasers interviewed who indicated that they would definitely be open to a new supplier, if they could quickly and easily acquire aronia berries from a U.S. supplier. Seven other respondents indicated that they may be open to new suppliers in these conditions. Factors influencing willingness to change include whether the new supplier would be local, what level of service they were able to offer, cost, quality, packaging and how it would affect sales to the purchaser's customers. One concern shared was that the market is unknown, that no one asked about aronia this past year when the purchaser did not have any in stock. Overall, though, they expressed that it has marketability and that the Midwest is more educated on the benefits of eating aronia in part because of the immigrant population. Those that were interviewed said they like to promote the success and develop relationships with local farmers.

Interviewed Purchaser Company Name	Influence of New US Source on Supplier Selection
Hummingbird wholesale	No
Country View Dairy	Maybe
Irv and Shellys	Maybe - (prefer local relationships)
Organically Grown	Maybe
Northwest Wild Foods	Maybe
Milne Company	No
Akron Apple and Aronia	No – farms contact them to be a part of organization
EncoreFruit	Yes
Anonymous	No response.
FruitSmart	Yes
SVC USA Washing INC.	Maybe - if there were shortages in Poland
Willy Street Co-op -East	Maybe (if local)
Rosebud Botanicals	No - have great relationship with current
Willy Street Co-op-West	Maybe (if local)
Oneota Food Co-op	No - do not sell a lot of them

Why Select Aronia Rather than Other Berries

Overall, the common trend with the responses to the question is that they would never choose aronia over other berries simply based on taste. The astringent nature of the berry is what makes it less desirable to eat whole, but that is where producers and manufacturers transform it into juice, concentrate, wine, and other forms. Some responses indicate that the astringency can be tolerable. The big reason why the potential customers would choose aronia over other berries is because of the health benefits. Aronia has the highest concentration of antioxidants of any fruit that is consumable by humans, Tony Heisterkamp from Akron Apple and Aronia quotes. Many food co-ops that generally have a customer base of health-conscious people who prefer it solely for the health benefits. Other companies are selling the berry mainly because of customer needs.

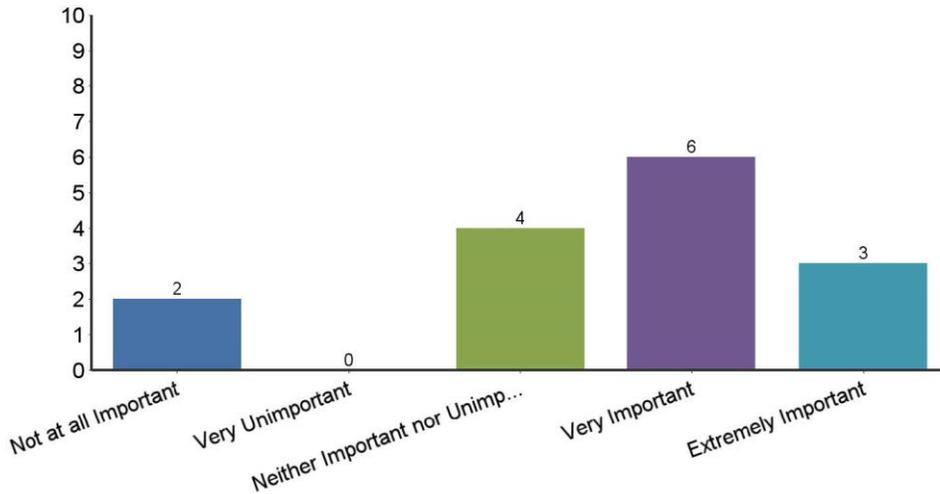
Specific responses are provided below:

- I would not choose other berries over aronia berries because my skin care products rely on high antioxidant levels of the aronia berries
- Based on flavor perspective it is extremely bitter, but paired with a fruit such as dried cranberries, it makes an excellent pair. Overall, I would choose aronia berries based on a transitional trail mix.
- Health benefits.
- All customer dependent.
- If they didn't have any customers saying they wanted the berries, they would not sell them. Only on the shelf for health benefits.
- The antioxidant blend for health benefits.
- Customer needs.
- For culinary use – smoothies. Nutritional value/profile of nutrients.
- Never
- Highest antioxidant of any other fruit that is consumable by humans. Many uses to manipulate the berry into powder. Digestible in intestine and stomach – good for colon. Don't have to worry about damage to organs and have anti-inflammatory properties. More micromoles per gram than acai berries.
- For shakes and baking. I enjoy snacking on them if they are in season and fresh but I am tolerant of their astringency. Most folks are not. The concentrate is nice squirted into water.
- Never for the taste. We use it as a juice colorant or as an astringent for other juices. One key market segment for aronia berries is nutraceuticals – which is less price sensitive.
- They are the last new berry on the market at the moment.
- Health benefits solely, leaves mouth chalky.

Importance of Supplier Proximity

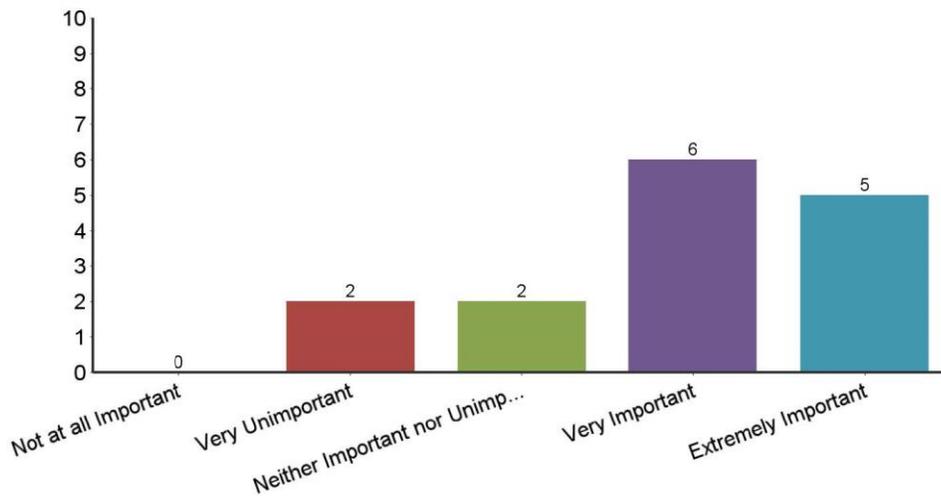
Overall, most purchasers value proximity of the supplier. This is because many of the firms believe local crops demonstrate high value and also appeals to customers well. The two that do not value proximity source their products from outside the US.

Importance of Proximity to Supplier



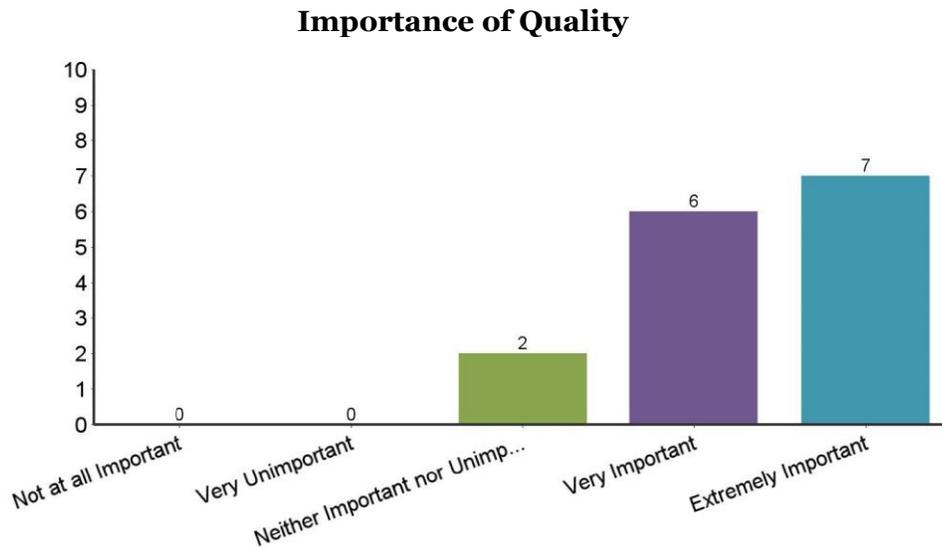
Importance of Price

As seen in the graph below, most purchasers consider price important in their buying decisions. Some, including food co-ops, believe that quality is significantly more important than the price.



Importance of Quality

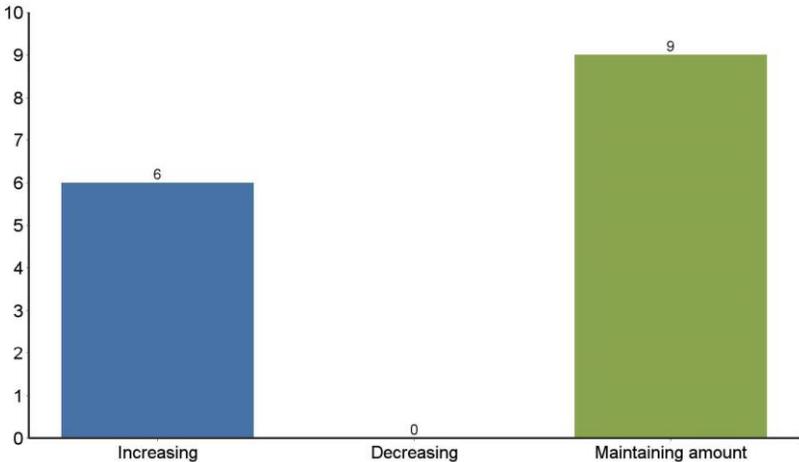
Overall, quality is the most valued aspect that purchasers look for. Since their market is generally health conscious people, how the berry is grown, organic components, and farming techniques are very important to consumers of aronia.



Projected Change in Purchase Patterns

FERC asked, "Within the next 18 months, do you think that your company will be increasing, decreasing or maintaining the amount of aronia berries you purchase?" Overall, most of the firms are either maintaining or increasing the amount of aronia purchased. Many expressed that there needs to be a driving market demand for the product in order to change their supply significantly.

Projected Market for Aronia Products



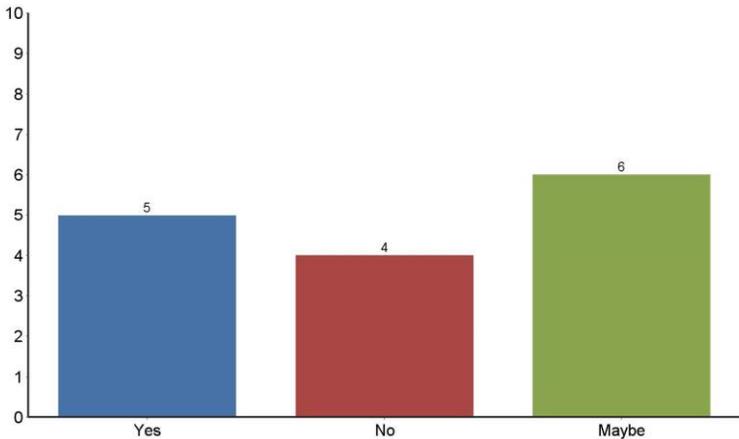
Supplier Selection Criteria

Many purchasers indicated that quality, proximity (local), and price were the three main criteria to select suppliers. Others also expressed organic growing practices and the delivery schedule of the product as well as an available supply.

Trends & Issues Over Next 18 Months

Many of the purchaser’s responses point out a need for a driving market demand or awareness of aronia berries, the variety of uses and superior health benefits. Many responses included that there needs to be a “Dr. Oz special” or significant research/report by a reliable source that will educate the consumers. They think that the health benefits and antioxidant properties would drive many people into the aronia berry market. Some said provide consumers with recipes for how to use the berry in different forms would help prevent consumer drop-off due to the astringent tastes of the whole berry. Some purchasers also expressed that Europe, more specifically Poland, is cheaper to buy from.

Open to Considering New Source



Responses Table

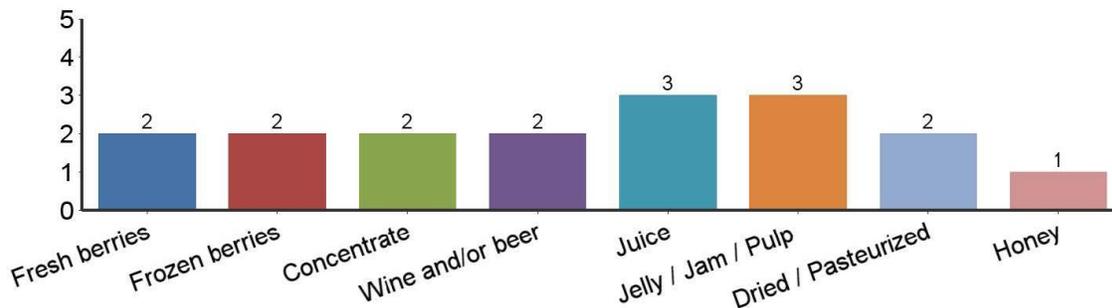
Interviewed Purchaser Company Name	Open to New Source
Hummingbird wholesale	No
Country View Dairy	No
Irv and Shellys	Maybe - (prefer local relationships)
Organically Grown	Maybe
Northwest Wild Foods	Maybe
Milne Company	Maybe
Akron Apple and Aronia	Yes
EncoreFruit	Yes
Anonymous	No
FruitSmart	Yes
SVC USA Washing INC.	Yes
Willy Street Co-op	Yes
Rosebud Botanicals	No - have great relationship with current
Williamson Street Co-op West	Maybe (if local)
Oneota Food Co-op	Maybe

Producers Survey Summary

FERC interviewed five aronia producers located in the United States.

Top Uses of Aronia by Number of Times Mentioned

FERC asked respondents, 'How are aronia berries used?' (What products?) The five producers interviewed provided responses that indicate the uses of aronia may be fairly evenly distributed among products like juice, jelly, fresh and frozen whole berries, concentrate, and alcoholic beverages. One respondent said, 'A lot of berries will end up in concentrate and not whole berries. The whole berries are seasonal so it is more difficult to obtain them fresh. Concentrate can go straight into a product unlike fresh berries.'



Recent Market Trends

FERC asked, 'In the past three years what market trends have you noticed for aronia berries? In particular, is demand increasing, remaining the same or decreasing?' All five respondents said that the

market has grown in the past three years. Comments provided by survey respondents indicate that they see definite potential with aronia berries but, like some of the purchasers, they thought that there needs to be more education and press about the berries to attract more acceptance and trial by the consumers. One grower said that health professionals and nutritionists are starting to recognize the health benefits of aronia. Consumers who are extremely health conscious are prime target customers because they are specifically looking for more products that can improve their health and wellness.

The size and production capacity of the aronia farms are recognized as important success factors in this market. One respondent from Star Valley Flowers expressed the opinion that there is not enough acreage dedicated to aronia at this time. He said that there is a supplier in Michigan that is looking for large quantities of aronia, but when FERC contacted the representative from Graceland Fruit, they did not confirm interest in aronia. In contrast, one respondent said that if better sales results are not seen, producers will start leaving the market. Some growers are still waiting on a big player to get in the game like OceanSpray or Dole.

What Is Driving Demand

FERC asked growers, 'What do you think is driving the demand for aronia berries at this time?' The main answer across the board from growers was the health benefits and antioxidant levels. Growers also said that people need to know how to prepare it in order for it to be successful since the berry eaten alone is not very appealing. One respondent said that Poland grows aronia because of its high yield per acre.

Most Popular Product & Emerging Markets

FERC asked growers, 'In your opinion, what is the most popular aronia product? and What are some emerging markets for aronia?' Most growers indicated that the most popular product is either fresh, as concentrate, juice, wine, as well as combining it with other berries. Growers also had differing opinions on some emerging markets for aronia. Concentrate is popular because it is easy to use and is fairly reasonable. Juice is also very popular. One respondent mentioned cider because aronia is more like an apple than a berry. Another good use is as powdery substance and in dehydrated form. In terms of emerging markets, comments indicated that a liqueur would be interesting. They also could see aronia in chocolate, jams, cakes, candies, bars, beer, and even salsa.

Aronia as a Replacement for Cranberries

FERC asked growers, 'Do you see aronia replacing cranberries in some products?' All of the growers interviewed indicated that they could not specifically see aronia berries replacing cranberries in some products. Cranberries are the number one produced crop in the state of Wisconsin. Although the growers are skeptical about aronia replacing cranberries, they all provided suggestions on growing market share. Below are some different suggestions by the growers.

- Need to use every part of the berry—pulp, juice, and seeds. Animal pet food business is another suggestion. Some products may be able to replace cranberries, since they are not doing too good right now. Could combine cranberries and aronia, but not sure if it would totally replace.

- Not sure, more interested in developing more products on the commercial markets.
- The cranberry industry has done a good job of advertising their product. The aronia berry has no national exposure to the public to inform the general consumer of it.
- Big investment into incorporating it into the thanksgiving season. People love cranberries for their cheap price and people don't know if they want to buy aronia. Looking for a market based on perennial culture.
- Yes, since aronia is Midwest and cranberries are mainly east coast. Don't see it necessarily replacing cranberries right now but people will start once they see the benefits and uses. Midwest is important it grows here well and is native here. People want organic.

Room in Market for Increase

FERC asked growers, 'Is there room in the market to increase aronia production?' All five of the growers interviewed believe that there would be room in the market to increase aronia production. Comments from growers regarding this question also indicated that when more processors see the need for it then farms will be contacted more often. A representative from Berham Farms in Brooklyn, Wis. says that there is probably room for an increase in production but there is frustration with having a lot of growers but not enough commercial places to buy it. The representative also noted some pressure from overseas, mainly from Poland, who can sell them for cheaper than in the U.S. Another representative from Levi's Indigenous Fruit Enterprise in Keota, Iowa said that we should be growing as many aronia berries as soybeans. Star Valley Flower in Gays Mills, Wis. noted that the market is in need of a continuous producer and that customers are looking for producers that have more acreage. More acreage would draw more customers.

Grow Other Crops

FERC asked growers, 'Do you grow other crops in addition to aronia berries?' The growers that were interviewed were split on this question. Three reported growing other crops while two stated that they only grow aronia. Star Valley Flowers solely grows aronia for only one customer in the area. The representative from Levi's Indigenous Fruit enterprise also does trials in honey berries and sour cherries, but mostly sells aronia.

Out of the three farms that sell other crops besides aronia, the majority of their sales come from aronia with the exception of Star Valley Flowers who only sells aronia to one firm. Levi's Indigenous Fruit Enterprise say that ninety percent of his sales come from fresh berries and ten percent from jelly, his trials in honey berries and sour cherries have no substantial sales. Tom from Meristem Nursery in Papillion, Nebraska indicated that seventy percent of his sales come from aronia.

Volume Produced Annually

The growers' volume of aronia produced ranges from a couple acres of plants and \$55,000 in revenue to over \$1.8 million in revenue annually. Secondary research indicates that one bush will produce 20 pounds of fruit a year. Tom, from Meristem Nursery, says that he sells aronia for propagation operations, amounting to a few hundred plants and does some on-farm processing.

Individual Business Interviews

Individual responses can be found in the ‘Completed Interviews folder’ provided electronically with the supporting documentation.

Competitive Analysis

Aronia Growers in the United States

The following companies were identified through the Midwest Aronia Association and other online sources. Revenue and employee counts are provided when available through Hoover’s business database. See the folder titled “Competitive Company Information” for files with additional details about the listed businesses.

Company Name	City/State	Phone Number	Revenue	Employees
Sawmill Hollow Family Farm	Missouri Valley, IA	712-648-2432	\$1.8M	14
Bellbrook Berry Farm	Brooklyn, WI	608-217-2686	\$0.21M	2
Pitspone Farm	Kendall Park, NJ	732-297-0594	-	-
Chokeberry Farms LLC	Shenandoah, IA	712-246-2981	\$66.31K	1
Company Name	City/State	Phone Number	Revenue	Employees
Blazer Farmz LLC	Easton, MO	816-226-7985	\$143.03K	3
Black Squirrel Vineyard and Winery	Council Bluffs, IA	712-566-2681	\$240K	3
SweetAire Farm	Darlington, MD	410-457-5683	-	-
Barham Gardens	Blanchardville, WI	608-438-7254	-	-
Simply Incredible Foods	Port Edwards, WI	715-909-0020	\$730K	6
Meristem Farm and Nursery	Papillon, NE	402-306-4500	\$82.63K	1
Star Valley Flowers	Gays Mills, WI	608-735-4100	\$260K	6
Aronia Unlimited	Minneapolis, MN	612-822-4040	-	-
Levi's Indigeneous Fruit Enterprise	Keota, IA	319-961-1438	\$72K	2
BerryView Orchard	Mt. Morris, IL	815-734-7551	\$55K	2
Sunset Valley Organics	Corvallis, OR	541-752-0460	-	-
Lenz Organic Farms	Maquoketa, IA	563-543-0984	-	-
Henry Fields Nursery	Aurora, IN	513-354-1494	-	-
Starck Bros	Louisiana, MO	800-325-4180	-	-
Van Drunen Farms	Mommence, IL	815-472-3100	\$103K	300
McKay Nursery	Waterloo, WI	800-236-4242	\$170K	4
Coldbrook Farms	Crete, IL	708-227-2807	-	-
CurrantC	Straatsburg, NY	845-266-8999	\$610K	5

Market and Industry Analysis

This industry analysis will provide information and trends on markets relevant to the production of aronia berries. The fifteen interviewed companies fall into one or more of these market segments.

Industry Analysis

The industry analysis below depicts the revenue, profit, annual growth rate (2010-2015), annual growth rate (2015-2020), exports, and number of businesses for the researched industries as reported by IBISWorld.

Industry	Revenue	Profit	Annual Growth 10-15	Annual Growth 15-20	Exports	# of Businesses
Fruit Juices	\$13.6 bn	\$668.4m	2.3%	1.4%	\$1.0bn	207
Canned Fruit and Vegetable Production in the US	42.4 bn	1.4 bn	0.8%	1.4%	4.1bn	3,308
Nutritional Supplements	\$17.6 bn	\$1.7 bn	6.4%	3.0%	\$709.9	1,015
Wineries	18.7 bn	1.4 bn	2.6%	3.8%	\$1.6bn	5,978
Fruit and Nut Farming in the US	29.0 bn	4.6 bn	6.4%	2.7%	12.6bn	79,359

Juice Production in the United States

Products include fruit and vegetable juices. Citrus juice dominates the juice production market with 50.5 percent of sales. Mixtures of fruit juices follows with 13.5% of sales in the industry, then juice of any other single fruit or vegetable at 13%. Grape juice itself has 7% of sales, followed by mixtures of vegetable juice at 6.1%. Cranberry juice, a major competitor against aronia, has 5.% of sales and then apple juice with 4.5%.

Major companies within the juice production market include PepsiCo, Coca Cola, and Dr. Pepper. PepsiCo has the largest market share at 22.7%. Some of their brand names within the juice industry include brands like SoBe, Naked, Tropicana, Ocean Spray, and Dole. Coca Cola follows Pepsico with 14.2% market share and brand names like Hawaiian Punch, Mott's, Clamato, and Mystic. Finally, Dr. Pepper has the third largest market share with 9.9% with brands such as Hawaiian punch, Mott's, Clamato, and Mystic. The rest of the 53.2% of the market is distributed between other, smaller companies. (Kahn, 2015)

Canned Fruit and Vegetable Production

Products in this industry use fruits and vegetables and integrate them into canned juices, jams and jellies, sauces, and dehydrated fruits. The 'other' category is the leader in this industry with 21.4% of sales revenue. Fruit and vegetable juices follows closely with 19.3% of sales along with ketchup and other tomato-based sauces ringing in 18.9% of sales. Canned fruits and vegetables and soup/stews account for 17.3% and 13.0% respectively. Lastly, the dried and dehydrated fruits category, which is a

specialty way of using and selling aronia berries, is 10.1% of sales revenue total for all fruits and vegetables.

Major companies within the canned fruit and vegetable production market include Campbell Soup Co, Kraft Heinz Co, Seneca Foods Corp, and Ocean Spray cranberries inc. Campbell has the largest market share percentage at 8.9%, known for its variety of their brand named soups. Kraft Heinz Co follows with 6.9% of the market share with products such as Heinz ketchup and other such condiments. Seneca Foods Corp, a processor and distributor of canned fruits and vegetables, takes in 2.3% of the market share with Ocean Spray Cranberries Inc at 2.1% right behind, with well-known brand names such as Cran-Apple juice and Craisins. (McGinley, 2015)

Nutritional Supplements

Products in this industry include standard vitamin and mineral supplements, as well as sports nutrition products and herbal supplements. Vitamins and minerals dominate this industry with 31.6% of the sales, followed by herbs and botanicals with 17.0%. Protein powder and specialty dietary supplement account for 13.9% and 13.1% of sales, respectively. The “other” category holds 8.3% and meal replacement and weight loss products with 8.1%. Lastly, specialty and elite sports nutritionals round out the list at 8.0%.

Major companies within the vitamin and supplement manufacturing industry include NBTY and Otuska America Pharmaceutical. NBTY is the leading company in the industry with 9.5% of that market share and include brands like Nature’s Bounty, Osteo Bi-Flex, Pure Protein, Body Fortress, MET-Rx, and Ester-C. Otuska America Pharmaceutical is right behind NBTY with 8.4% market share with brand names of Pharmavite LLC and Nature Made. (Yucel, 2015)

Wineries in the US

Products in this industry involve the overall process of making wine and include different varieties of wine, wine blends, and wines made from other fruit sources. Chardonnay dominates this industry with 27% of sales, followed by Cabernet Sauvignon with 20%. Zinfandel and Riesling bringing in about 17% of sales revenue. Merlot (11%), Pinot Grigio (11%), Pinot Noir (8%), and Sauvignon Blanc (6%) fall towards the bottom of the sales revenues percentages respectively.

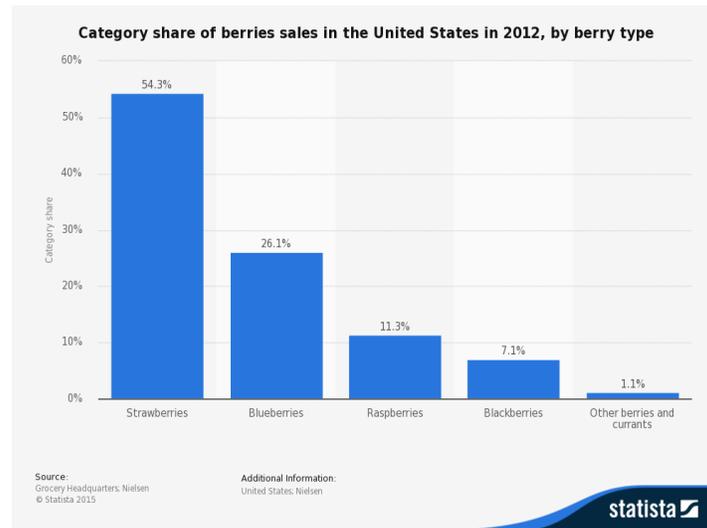
Key Major companies within the wine industry in the US include E. and J. Gallo winery, constellation Brands Inc and the wine group Inc. E. and J. Gallo winery is the leading company in the industry with 24.9% of the market share and markets more than 60 brands of wine including popular brands such as Andre, Barefoot and Carlo Rossi. Following E. and J. Gallo Winery, Constellation Brands Inc accounts for 13.6% of the market share with brands names of Arbor Mist and Robert Mondavi. Finally, The Wine Group Inc has the third largest market share of 7.8% with brand names of Cupcake and Flip-Flop. The rest of 8.7% of the market is shared among ‘other’ smaller companies. (Petrillo, 2015)

Fruit and Nut Farming in the US

Products in this industry include fresh fruits and nuts. Grape farming dominates the fruit and nut farming industry with 23.3% of sales revenue followed by almond farming with 21.8% of sales revenue. Apple farming accounts for 11.9% of sales along with the “other” category containing about 9.6% of sales. Berry farming is towards the bottom of the market with strawberry farming 9.6% of sales and cherries, blueberries and cranberry farming combined at 7.3% of sales or \$2.1 billion. The Aronia berry

farming market would fit greatly into the berry farming category. There are no major companies in the Fruit and Nut Farming market in the US. (Neville, 2015)

The chart below, from Statista, shows that the portion of the market that would contain aronia berries captured only 1.1% of sales in the United States in 2012.



Market Need and Growth Trends

CBS News published an article titled, 'Aronia berry: Rebranding helps a new superfood catch on' in July 2014. In the article, they state that the aronia market is a multi-million dollar industry. The article, like others, reports on the fact that, 'Aronia boasts a unique lineup of nutritional qualities. The berry has one of the highest antioxidant values ever recorded for any other fruit,' (CBSNews, 2014). The article goes on to state that: It's difficult to provide overall yearly production numbers or even a common price per pound. Midwest Aronia Association president, Melissa Ehrman Johnson, says her group, which has members in 12 states and Ontario, Canada, has farmers fetching anywhere from .50 cents per pound to \$7.50 a pound.

The market for aronia berries is predicted to grow as awareness of the benefits of the fruit continues to increase. Chris Kilham, writing for FoxNews.com in June 2013 cited research supporting the beneficial anti-inflammatory properties of aronia and said that the combined compounds in the berry are anti-bacterial, anti-viral, anti-diabetic and cancer fighters. Regarding the market outlook, Kilham stated the following:

In the world of berries, antioxidant activity is a major factor in the endless jockeying for position as top berry. Aronia has greater antioxidant activity than cranberry, blueberry, strawberry, cherry, pomegranate, goji and mangosteen. You can think of aronia as the King Kong of antioxidant berries. This awesome antioxidant power gives growers of the berry confidence that super-stardom for aronia is close at hand.

Aronia berry products are already in the market, and some have received coveted USDA Organic

certification – the highest standard of agriculture purity in effect today. Unlike strawberries and many other fruits, aronia is naturally pest-resistant and does not require the use of agricultural toxins. This spells good news for those who do not want unhealthy chemicals in their fruits. In the contest for ever healthier foods, aronia is surely a winner in the making. With science demonstrating significant benefits to health, farmers planting large acreage and the media increasingly boosting its fortunes, it's only a short matter of time before aronia, the North American super berry, leaps to prominence in juices, jams, jellies and many other products.

A USA Today report from July 2014 supports the idea that the market for aronia is growing. The article starts out with, "A new fruit that research says packs more antioxidants than popular "superfoods" like blueberries, acai berries and goji berries is establishing itself in the aisles of mainstream grocery stores, showing up in everything from juices to powdered supplements to baby food" (Beck, 2014). The article provides a brief history of the fruit and then states, 'Now, farmers throughout the upper Midwest are planting the shrubs by the thousands every year.'

The reason behind the interest in growing the fruit is the health benefits of the berries. Beck reported on an interview with expert Stacey Loftus of Hy-Vee foods where Loftus says she does not think interest in aronia is a passing fad.

Consumers are taking notice of the potential health benefits, said Stacey Loftus, Hy-Vee's health and wellness supervisor. Research published last year in the Journal of Agriculture and Food Chemistry, says aronia's oxygen radical absorbance capacity (ORAC) — a standard measurement of antioxidant strength — shows the berry has one of the highest values ever recorded for a fruit. (Beck, 2014)

The article includes interesting data on the growth of aronia products on the market. In fact, it states that Old Orchard juices and Beechnut baby foods have introduced blends that contain aronia.

More than 440 new products containing aronia — mostly in juices, wines and other drinks — have been introduced worldwide in the last five years; about 60 of those are in the United States, according to the 2013 University of Nebraska-Lincoln Food Processing Center's Product Traffic Report, supported by the U.S. Agriculture Department to track new food products. (Beck, 2014)

The USA Today article cites the North America Aronia Cooperative as saying that the current economic impact of their growing cooperative is about \$85 million including "plant sales, berry sales, processing charges, harvesting equipment, growing supplies, irrigation equipment and the sale of finished aronia products" (Beck, 2014).

Harvest Public Media published a podcast and accompanying blog post about how niche crops go mainstream in January of 2014. In this article, the story of Andrew Pittz and the Sawmill Hollow Family Farm is told as an example of a profitable switch from mainstream crops to a niche product. Other crops mentioned in the article include sweet potatoes and fenugreek (primarily grown for medicinal purposes). It also discusses working with major companies, such as Birds Eye Foods, to do some trials of crops that would potential benefit them, sharing the risk with a large company for initial test periods is safer for small farms.

Resources for Growers

North America Aronia Cooperative

Formed in 2014, the North America Aronia Cooperative is a membership organization of farms that grow aronia berries that includes members in South Dakota, Nebraska, Iowa, Wisconsin, Missouri, Minnesota, Illinois and Quebec Canada. The cooperative can supply 20 million pounds of fruit annually. They sell "pure, not-from-concentrate aronia juice" and "whole berry puree."

Phone: 402-699-2582

aroniacoop.com

Sawmill Hollow Family Farm, Iowa

According to the USA Today report, the Pittz family, owners of the farm, work with Iowa State University to promote the berry as a value-add crop. They have "taught others how to plant, grow and market the almost black-purple, pea-sized berries. They even share best practices for pruning the bushes for maximum yield, which they developed over nearly 18 years of trial and error." According to the article, the Pittz family reports that, "a mature bush at four to five years can produce up to 20 pounds" (Beck, 2014).

Midwest Aronia Association

The Midwest Aronia Association (MAA) is a network of aronia growers, distributors, cleaners, planting and harvesting equipment suppliers, processors, and wholesale grocers. The MAA's goal is to promote a healthy social and political environment for aronia and improve the marketability of aronia produced through promoting, education, and research. They have network members from California, Illinois, Iowa, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New York, North and South Dakota, Wisconsin, and Ontario, Canada.

Website: midwestaronia.org

Email: Info@midwestaronia.org

Aronia Berry Services of Northeast Iowa

Aronia Berry Services of Northeast Iowa began in early March 2011 when the founder overheard a segment on an agriculture radio station talking about a berry with substantial health benefits. In June of that same year they started planting plants by hand after attending a meeting with the Midwest Aronia Association. They have also visited Poland to further their research in the fruit. Their service help farmers start out their growing of aronia by selling plants to get you started, planting them, and harvesting them.

Website: aroniaberryservicesofneiowa.com

Email: Dean@absnei.com

Akron Apple & Aronia Inc.

Tony Heisterkamp was interviewed as part of the potential customers survey of this project. He had a lot of knowledge about the aronia industry and believes it can be successful. He has a network of aronia growers (that meet specific standards) that he buys berries from and then sells them to companies in the juice industry. Tony also works for National Aronia Growers which is the marketing arm for aronia berry growers. They also set the price for aronia berries that they purchase.

Phone: (712)-540-0127

Soil Suitability Analysis Aronia Berries

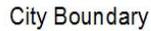
Soil Suitability

 Suitable

 Marginally Suitable

 Not Suitable

 River

 City Boundary

 Farm Id
Acres

 pH will need Adjusting

 Interstate Highway

 County Road

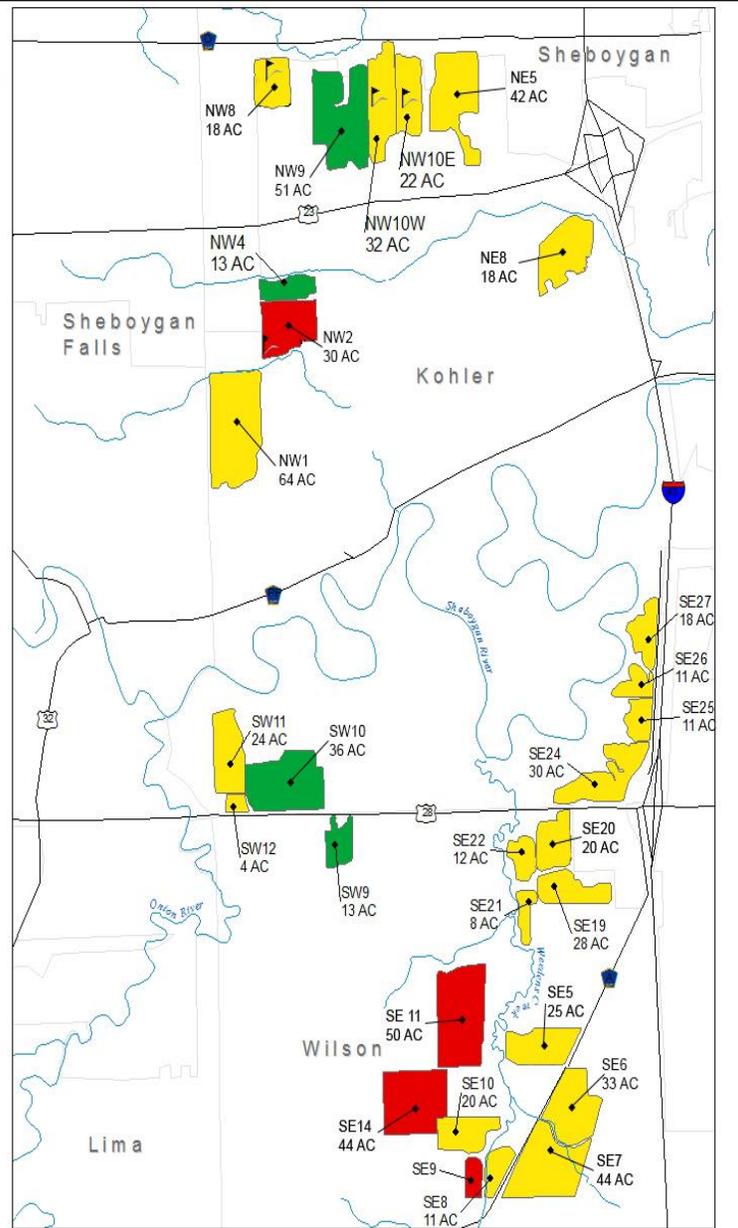
 State Highway

N
1:28,000

Farm suitability for aronia cultivation was based on soil color, texture, depth to water table, drainage, average pH, and average organic matter percent. Information provided by USDA, soil survey and soil analysis of farm by Rock River laboratory.



Map created by Matthew Schmus GIS Specialist



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Note: Where possible, reference materials have been provided along with this report for educational purposes. IBISWorld and First Research reports may not be reproduced, and are available for purchase through ibisworld.com and firstresearch.com.

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http://www.alibaba.com/product-detail/Commercial-Berry-Washing-Machine-Mango-Cleaner_60183839289.html?spm=a2700.7724838.30.38.q2ZiKL

http://www.alibaba.com/product-detail/5-ton-LXJ-5-Model-showering_60356367068.html?spm=a2700.7724838.30.50.q2ZiKL

¹¹ Storage: http://www.alibaba.com/product-detail/cold-room-motor-freezing-fruit-and_60382669870.html?spm=a2700.7724838.30.31.mNI9vt&s=p

http://www.alibaba.com/product-detail/Commercial-and-Industrial-Refrigeration-And-Freezer_1239865202.html?spm=a2700.7724838.30.70.mNI9vt

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http://www.alibaba.com/product-detail/Prefab-refrigerator-chiller-walk-in-cool_655349146.html?spm=a2700.7724838.30.46.oOePba

http://www.alibaba.com/product-detail/fruit-storage-container-plastic-cargo-containers_60271105974.html?spm=a2700.7724838.30.93.H3hD4O

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Appendix - Interviewed Companies

This is a summary list of the companies that were successfully contacted to help complete this project.

Purchasers

Hummingbird wholesale	Eugene, OR	541-686-0921	http://www.hummingbirdwholesale.com/	Dried Fruit
Country View Dairy	Hawkeye IA	563-422-8633	http://www.countryviewdairy.com/	Yogurt
Irv and Shelly's	Chicago, IL	847-510-0595	https://www.freshpicks.com/	Aronia Berries
Organically Grown	Eugene, OR	541-689-5320	http://www.organicgrown.com/	Wholesaler
Northwest Wild Foods	Burlington, WA	360-757-7940	https://nwwildfoods.com/	Whole/Frozen
Milne Company	Prosser, WA	509-786-2611	http://milnefruit.com/	Juices
Akron Apple and Aronia	Akron, IA	712-540-0127		Aronia Berries
EncoreFruit	San Dimas, CA	909-394-5640	http://www.encorefruit.com/index.php	Concentrate
Anonymous				
FruitSmart	Grandview WA	509-786-3500	www.fruitsmart.com	Juices
SVC USA Washing INC.	Othello, WA	509-488-6563	www.svz.com	Berries
Hummingbird wholesale	Eugene, OR	541-686-0921	http://www.hummingbirdwholesale.com/	Dried Fruit
Willy Street Co-op - East	Madison, WI	608-251-0884	https://www.willystreet.coop/	Co-op
Rosebud Botanicals	Afton, IA	641-340-4182	http://rosebudbotanicals.com/index.html	Body care
Willy Street Co-op - West	Middleton, WI	608-284-7800	https://www.willystreet.coop/	Co-op
Oneota Food Co-op	Decorah, IA	563-382-4666	http://oneotacoop.com/	Co-op

Growers

Black squirrel winery and vineyard	Council Bluffs, IA	712-566-2681	https://blacksquirrelvineyard.wordpress.com/	Grower
Barham Gardens	Blanchardville WI	608-438-7524		Grower
Meristem Farm and Nursery	Papillon, NE	402-306-4500	http://www.meristemfarmandnursery.com/	Grower
Star Valley Flowers	Gay Mills, WI	608-735-4100	http://starvalleyflowers.com/	Grower
Levi's Indigeneous Fruit Enterprise	Keota, IA	319-961-1438	http://www.aronialife.com/	Grower