



Northern New York Agricultural Development Program
2020 Project Final Report

**Establishing New Commercial Fruit Crops for Northern NY:
Juneberry, Honeyberry, Aronia, and Elderberry**

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Background:

Our goal is to increase the number of specialty fruit crops available to Northern New York (NNY) market farms by evaluating varieties and production practices for four high value fruits: Juneberries, Aronia berries, Honeyberries, and Elderberries.

JUNEBERRY (*Amelanchier* spp.)

Juneberry with its sweet flavor and “superfruit” antioxidant content has the potential to be a major novel fruit crop in Northern New York. These small, multi-stemmed shrubs or trees are native to every U.S. state except Hawaii, and wild-harvested Juneberry fruit

were a favored food and medicine for Native American cultures and early European settlers.

Since the inception of NNYADP-funded Juneberry research, our objectives have been to:

1. Develop a Juneberry nursery – a living collection of Juneberry plants that includes wild-collected, novel lines native to the Northeast and that have commercial fruit production potential, along with all current commercially available fruit-producing cultivars;
2. Evaluate the performance of commercially available cultivars and promising wild lines in replicated field trials; and
3. Promote the potential for Juneberry fruit production on orchards and market gardens.

HONEYBERRY (*Lonicera caerulea*)

The blue Honeyberry (*Lonicera caerulea*) is a perennial, fruit-producing shrub that is a member of the honeysuckle family and is native to cool temperate forests of western North America, Asia, and Europe. Domesticated subspecies of *Lonicera caerulea* have been cultivated in northern Japan for hundreds of years, and the Japanese refer to the fruit as “the elixir of longevity.” The current surge in commercial production of Honeyberry in North America has been facilitated by breeders in Oregon and at the University of Saskatchewan that have produced numerous cultivars with large, exceptionally flavorful fruit.

Honeyberry is well adapted to cold climates, has few pests or diseases, produces the first mature fruit of the season (earlier than strawberries), and can therefore offer NNY growers an exciting new specialty fruit for fresh market sales.

2020 research objectives were to manage a field trial of promising commercial Honeyberry cultivars on the Cornell Willsboro Research Farm and develop a comprehensive data set of flowering dates for all the entries.

ARONIA

Aronia is a genus in the Rose family that includes three species of multi-stemmed, deciduous shrubs native to the eastern United States. Commercial fruit cultivation of *Aronia* in the United States began in 2007 in Iowa. Numerous scientific studies have documented exceedingly high antioxidant and other beneficial phytonutrient levels in *Aronia*, leading to the fruit being labeled a “superfood.” As a result, fruit production in North America has grown rapidly and has blossomed into a multi-million dollar industry that includes more than 60 unique value-added products.

Aronia cultivars are well adapted to cold climates, have few pests or diseases, and are capable of producing fruit throughout the growing season. These benefits, in addition to the burgeoning value-added market, make *Aronia* an exciting new specialty fruit crop for NNY growers.

2020 research objectives were to manage the Willsboro Research Farm trial of commercially-available *Aronia* cultivars that was established in 2017, and to collect a

third season of data on plant growth, flowering, and fruit yields.

ELDERBERRY (*Sambucus* spp.)

In 2020, preparations were made to add an elderberry variety trial composed of American (*Sambucus canadensis*) and European (*Sambucus nigra*) varieties to the new commercial fruit plots on the Willsboro Farm. Elderberries are very productive, widely adapted, native perennial shrubs that tolerate a range of soil types.

As another member of the “superfruit” class, elderberries have traditionally been prized for their high phytonutrient levels, and they are an economically important fruit crop in Europe (greater than blueberries). While elderberry production is developing rapidly in the US, 95% of the elderberries consumed here are still imported from Europe, so the potential for further domestic market growth is high, and elderberries could be a profitable crop for NNY growers.

2020 Willsboro Farm Results:

Juneberry Nursery

Nursery plantings were weeded, fertilized, irrigated as needed, and monitored for disease and insect issues during the growing season.

Juneberry Variety Trials

A1601 Commercial Fruit Producing Varieties: Cool spring temperatures delayed flowering in all the Willsboro Juneberry trials (Table 1). As in past years, the commercial varieties flowered later than both the ornamental varieties and wild-collected lines. It is interesting that most of the commercial fruit-producing varieties start flowering about the same time. *Nelson* is the one outlier as it tends to flower later than the other entries.

All the Juneberry plants put on solid growth and increased heights in 2020 (Figures 1-3). After four years of evaluations, the commercial Juneberry varieties in trial A1601 can be divided into two groups according to plant form and height: a taller group with longer, more vertically oriented shoots, and a shorter group with a “shrubbier”, branching growth habit.

The six varieties in the taller group, *Thiessen*, *Martin*, *Northline*, *JB30*, *Smoky*, and *Honeywood*, tend to produce higher yields of larger, more flavorful and easier picking fruit than the shorter growing varieties (Tables 2). *Lee#8*, *Pembina*, and *Regent* make up the shorter group, while *Nelson* and *Parkhill* are intermediate in height, growth habit, and fruiting characteristics. Both *Nelson* and *Parkhill* yielded well in 2020, but their fruit tends to be smaller and more difficult to pick than fruit on the taller varieties.

Juneberry fruit flavor appears to correlate well with fruit size as larger fruits tend to be more flavorful than smaller fruits. In future studies we would like to see if we can improve fruit size and flavor for a given variety through pruning and fertility management.

A1602 Ornamental Varieties: As in past seasons the three ornamental varieties *Prince William*, *Princess Diana*, and *Autumn Brilliance* flowered profusely (Photo 1), but failed to produce any harvestable fruit. The plants are healthy and taller than any of the fruit-producing varieties, but for the past four years they've consistently channeled their resources into vegetative growth instead of fruit production.

A1702 Wild-Collected Lines: The entries in this trial exhibit a range of growth and fruiting habits (Table 2). 2020 fruit yields were markedly higher than in past years and the harvest data provided us with a measure of the production potential for these wild-collected lines. Four years into the trial the three most promising lines are 13-472, *Greenhouse morph*, and 13-449. 13-472 are tall plants that have consistently produced nice yields of flavorful fruit that ripen evenly. *Greenhouse morph* was slow to flower and fruit during the first few years of the trial, but produced good yields and nicely flavored fruit in 2020. 13-449 also had some plants that performed exceptionally well in 2020. It will be interesting to see how the higher-producing entries perform relative to the other trial entries in the next couple field seasons.

Honeyberry Trial

A Honeyberry variety trial (H1801) designed to evaluate 15 commercially-available cultivars was planted at the Cornell Willsboro Research Farm in the spring of 2018. Entries include *Boreal Beauty*, *Boreal Beast*, *Honeybee*, *Boreal Blizzard*, *Tundra*, *Indigo*, *Borealis*, *Aurora*, *Blue Belle*, *Blue Hokkaido*, *Blue Lightening*, *Blue Moon*, *Berry Blue*, *Blue Pacific*, and *Blue Bird*. Replicated plots of three additional varieties: *Cinderella*, *Blue Diamond*, and *Blue Palm* were planted in 2020.

Many of the established plants flowered and produced a few fruit, but not enough fruit to provide useful harvest data. Honeyberry plantings require more than one cultivar with overlapping flowering periods for effective pollination, so flowering periods were characterized for each of the established honeyberry cultivars (Figure 4). Plant heights were also recorded to document seasonal growth (Figure 5), and the plants were monitored for diseases and insects.

Aronia Trial

The Willsboro Research Farm *Aronia* spp. variety trial includes four fruit-producing varieties: *Nero*, *Select*, *Viking*, and *Galicjanka*, and two ornamental varieties: *McKenzie* and *Autumn Magic*. All the *Aronia* cultivars exhibited solid growth in 2020 with little to no disease or pest pressure. The plants started flowering on May 25, 2020 and finished flowering on June 1, 2020.

Fruit yields were exceptional. While we were surprised by the early fruit yields produced in 2019, yields increased dramatically in 2020 for all cultivars (Figure 7). *Aronia* appears to be well suited to NNY growing conditions, and could be a very profitable crop for growers that can connect with value added markets. A number of regional farmers excited by our early interest in and data for producing aronia in northern New York are experimenting with aronia plantings.

Elderberry Variety Trials

A randomized complete block experimental design with four replications was employed for the new elderberry trial. Thirty-inch-wide beds with two drip irrigation lines per bed were constructed and covered with 4-foot-wide landscape fabric mulch for weed control.

COVID-19 postponed the delivery of four American elderberry varieties (*Nova*, *Ranch*, *John's*, and *York*) and two European varieties (*Samdal* and *Samyl*), so planting is rescheduled for spring 2021. Other possible varieties to add to the trial are currently being evaluated. The first planting will be closely monitored for factors influencing establishment under Northern New York growing conditions and climate.

Overall Impact

This NNYADP “Super Fruits” project has attracted numerous inquiries from regional growers, from growers elsewhere in New York State and the U.S., and internationally. Requests for information have been handled by telephone, email, and by referral to NNYADP fruit research project results reports posted at www.nnyagdev.org. (Also see Outreach section.)

Next Steps:

1. Continue to maintain established research trials and collect performance data, including growth habit, flowering and fruiting times, disease incidence and susceptibility, and fruit yield to aid growers in selecting juneberry, honeyberry, and aronia varieties well suited to NNY now, and for elderberry selection once these trials have produced substantive selection data.
2. Fine tune pruning and fertility management practices to optimize fruit quality and yields.
3. Evaluate in-row mulch material options.
4. Experiment with potential companion groundcovers.
5. Update and advance the resource information that growers need to successfully establish, manage, harvest, and market these specialty fruits.

Outreach:

As noted earlier, we fielded numerous requests for juneberry, honeyberry, and aronia production information in 2020, and are in the process of developing NNY production fact sheets for these uncommon fruits. Trial results continue to be shared during field days, twilight meetings and extension events across NNY.

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For More Information:

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Photo 1. *Princess Diana* ornamental Juneberry cultivar flowering in the Willsboro Research Farm trial in 2020. Photo by Michael H. Davis

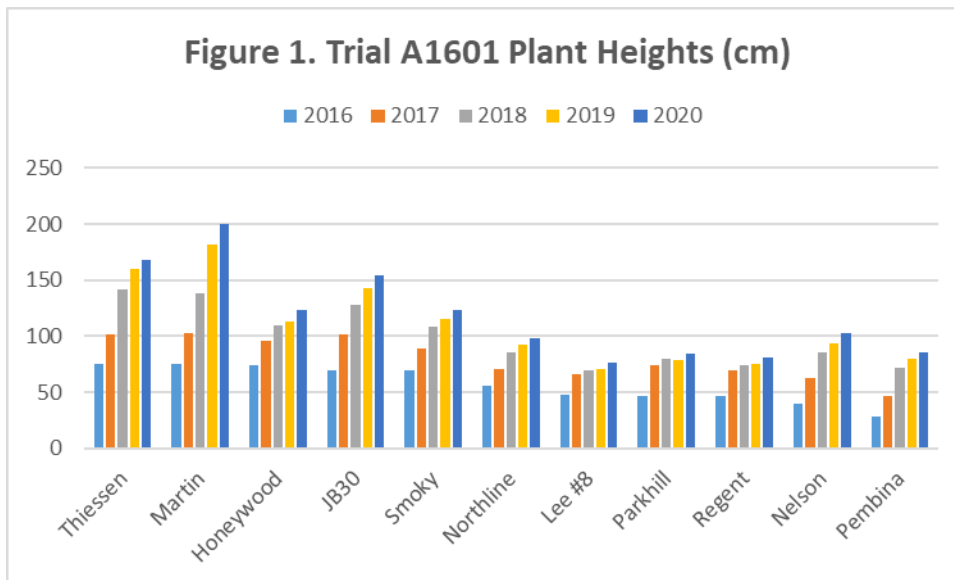


Figure 1. Trial A1601 Mean Plant Heights (cm) for 11 commercial fruit-producing varieties of Juneberry, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020

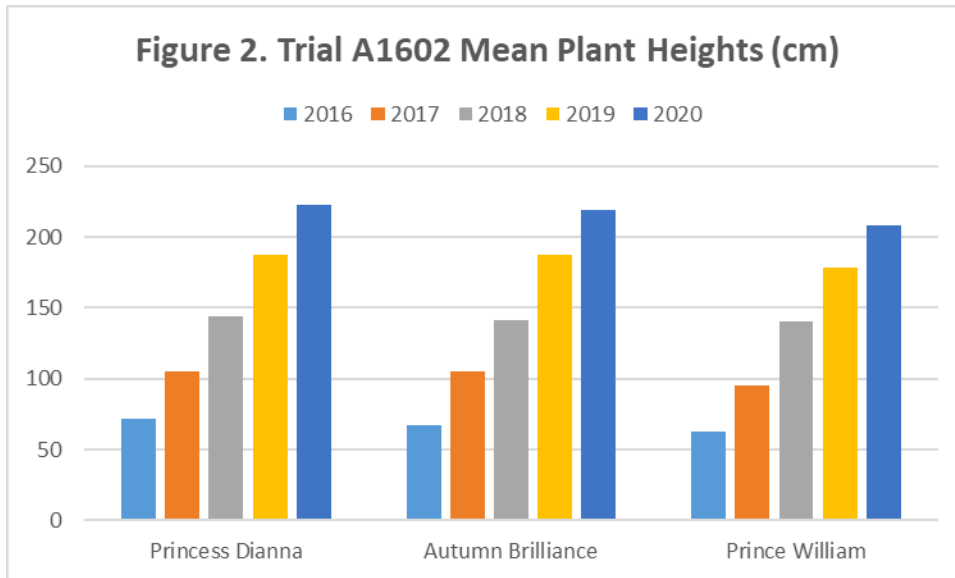


Figure 2. Trial A1602 Mean Plant Heights (cm) for 3 ornamental varieties of Juneberry, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020.

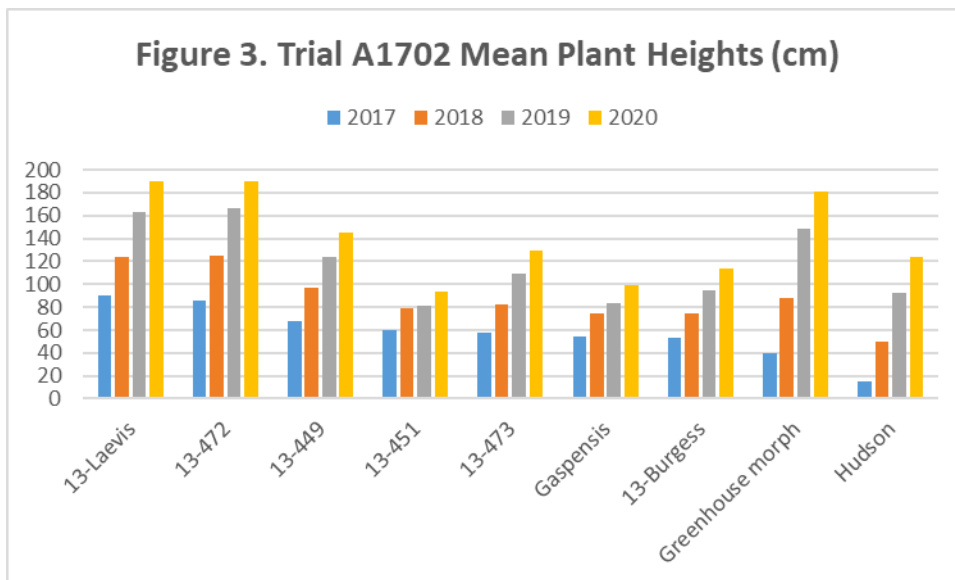


Figure 3. Trial A1702 Mean Plant Heights (cm) for 9 wild-collected varieties of Juneberry, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020.

Table 1. 2017, 2018, 2019 and 2020 mean flowering dates for commercial, ornamental, and wild-collected Juneberry varieties, Willsboro Research Farm Juneberry trials, Willsboro, NY, NNYADP.

Table 1. 2017, 2018, 2019 & 2020 Mean Juneberry Flowering Dates				
Trial A1601	Commercial Varieties			
<u>Variety</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Honeywood	May 5	May 14	May 17	May 17
JB30	May 4	May 14	May 14	May 17
Lee #8	May 5	May 14	May 17	May 18
Martin	May 6	May 13	May 14	May 17
Nelson	May 8	May 14	May 17	May 19
Northline	May 8	May 15	May 16	May 17
Parkhill	May 2	May 11	May 12	May 17
Pembina	May 6	May 13	May 15	May 17
Regent	May 4	May 15	May 17	May 18
Smoky	May 7	May 14	May 15	May 17
Thiessen	May 4	May 13	May 14	May 17
Trial A1602	Ornamental Varieties			
<u>Variety</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>
Autumn Brilliance	May 2	May 10	May 12	May 14
Princess Diana	May 2	May 10	May 12	May 14
Prince William	May 2	May 10	May 12	May 14
Fergie	May 6	May 15	May 20	May 19
Trial A1702	Wild Collections			
<u>Collection ID</u>		<u>2018</u>	<u>2019</u>	<u>2020</u>
13-451		May 10	May 10	May 14
13-Burgess		May 10	May 10	May 14
13-Laevis		May 10	May 8	May 4
13-449		May 10	May 10	May 14
Hudson		No flowers	No flowers	No flowers
13-472		May 10	May 8	May 3
Greenhouse morph		No flowers	May 10	May 14
13-473		May 12	May 12	May 16
Gaspensis		May 10	May 10	May 14

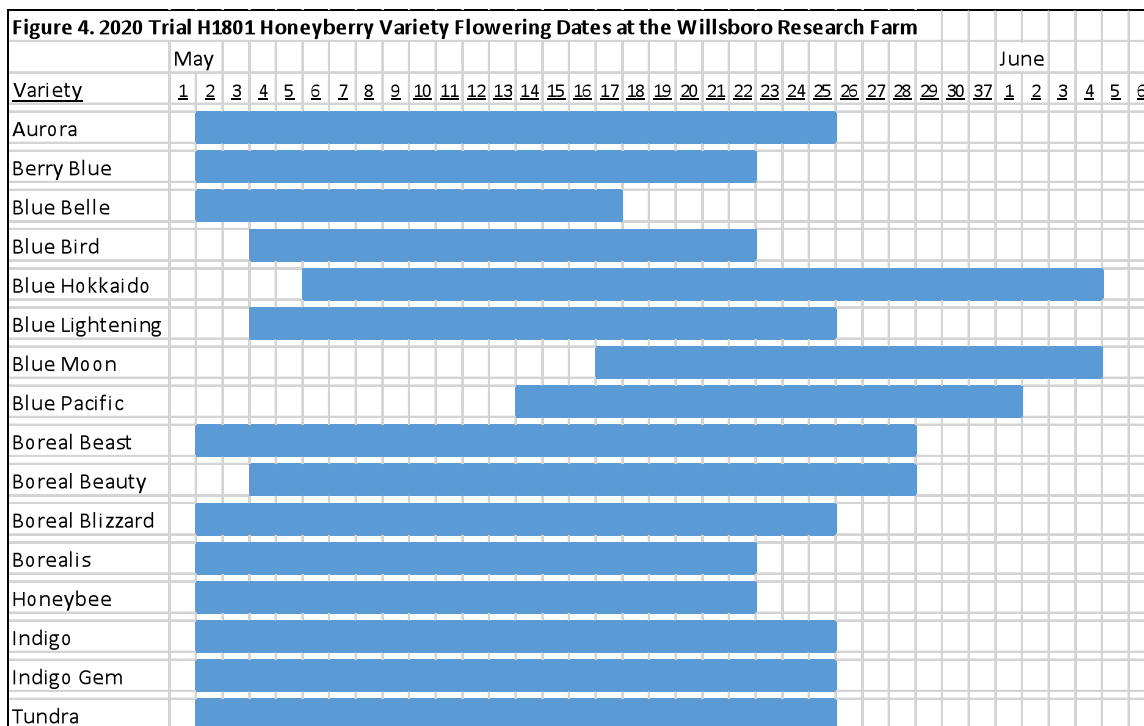


Figure 4. Trial H1801 Honeyberry Variety Flowering Dates for 16 Varieties, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020.

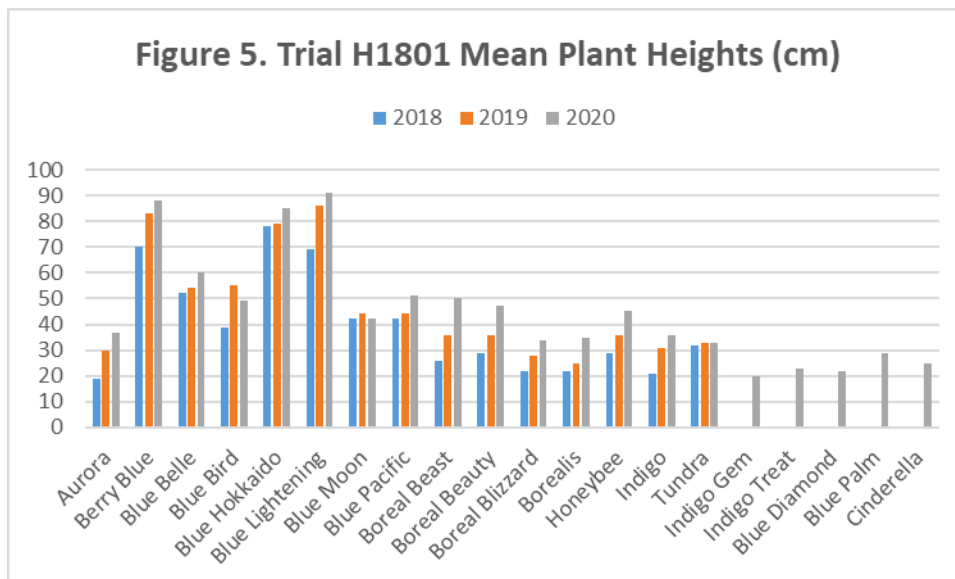


Figure 5. Trial H1801 Mean Plant Heights (cm) for 20 Honeyberry Varieties, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020.

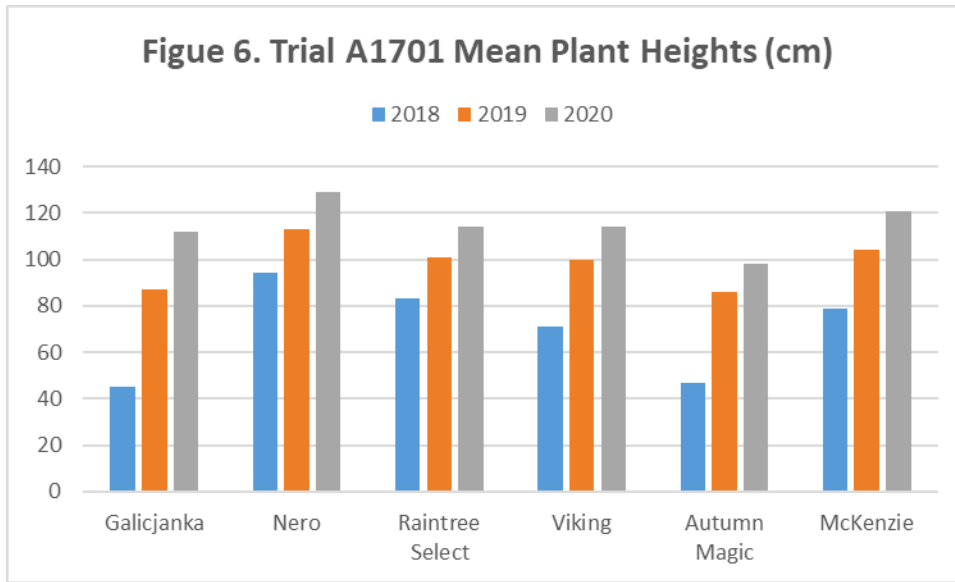


Figure 6. Trial A1701 Mean Plant Heights (cm) for 6 Aronia Varieties, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020.

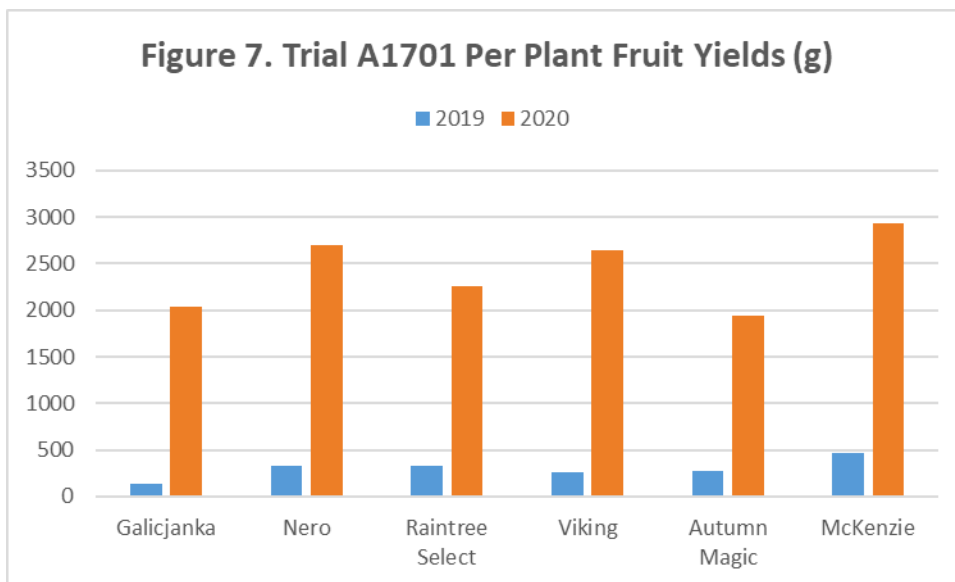


Figure 7. Trial A1701 Mean Per Plant Fruit Yields for 6 Aronia Varieties, Willsboro Research Farm Trials, Willsboro, NY, NNYADP, 2020.