



## Northern NY Agricultural Development Program 2016-2017 Project Report

### Establishing New Commercial Fruit Crops for Northern NY

#### Project Leaders:

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#### Collaborators:

- Amy Ivy, Cornell Cooperative Extension of Clinton County and Eastern New York Commercial Horticulture Program
- Professor Marvin Pritts, Horticulture Section of the Cornell School of Integrative Plant Science, Ithaca, NY

#### Cooperating Producers:

- Jefferson County: Dani Baker, Cross Island Farms, Wellesley Island, NY
- Essex County: Mark Kimball, Essex Farm, Essex, NY

#### 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 three high value fruits: Juneberries, *Aronia* berries, and Honeyberries.

#### **Juneberry (*Amelanchier* spp.)**

Juneberry, with its sweet flavor and “superfruit” antioxidant content, has the potential to be a major novel fruit crop in NNY. As a member of the rose family, Juneberry is closely related to apples and pears, and the fruit is technically a pome. Wild harvested Juneberry fruit were a favored food and medicine of Native American cultures and early European settlers. These small, multi-stemmed trees or shrubs are native to every U.S. state except Hawaii.

Primary Juneberry research objectives are to:

1. Develop a Juneberry nursery – a living collection of Juneberry plants that includes wild collected novel lines that are native to the northeast and that have

- commercial fruit production potential, along with all currently available fruit producing cultivars — at the Cornell Willsboro Research Farm.
2. Evaluate the performance of commercially available cultivars and promising wild lines in replicated field trials.
  3. Test Juneberry plantings on fresh market farms in NNY.

### **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 Russian horticulturalists became interested in this fruit in the mid 1900s. The current surge in commercial production of Honeyberry in North America has been facilitated by breeders in Oregon and at the University of Saskatchewan who 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.

The objectives of this research in Northern New York in 2017 include:

1. To establish and manage a field trial of promising commercial Honeyberry cultivars on the Cornell Willsboro Research Farm.
2. To work with NNY farmers to establish two on-farm commercial Honeyberry cultivar trials. On-farm trials will provide growers with some exposure to this new fruit crop, while also providing information on cultivar performance across a range of NNY growing conditions.
3. Evaluate potential ground covers for Honeyberry plantings. Ideal groundcovers should inhibit weed germination and development, provide habitat and nectar for beneficial insects and pollinators, and not compete extensively with the Honeyberry plants for light, water and nutrient resources.

### **“Superfood” *Aronia***

*Aronia* is another genus in the Rose family that includes three species of multi-stemmed, deciduous shrubs native to the eastern United States. *Aronia* fruit cultivars have been grown commercially in Russia and eastern Europe since the mid-twentieth century. 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 over 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.

2017 *Aronia* research objectives include:

1. Plant and manage a field variety trial of commercially available *Aronia* cultivars on the Cornell Willsboro Research Farm.
2. Establish *Aronia* variety tests on commercial produce farms in NNY.

## **Methods:**

### **Willsboro Research Farm**

#### Juneberry Nursery

In 2017 a portion of our living Juneberry collection was moved to a new field location adjacent to the variety trials. The new location had better soil drainage, and the move allowed us to increase the plant spacing so that individual plants would have more growing space. Nursery plantings were weeded, fertilized, irrigated as needed, and monitored for disease and insect issues during the growing season.

#### Established Juneberry Variety Trials

Trials A1601 and A1602 (Photo 1) were weeded, fertilized, and irrigated as needed during the growing season. Data collection on established trials included plant growth, flowering dates, fruit set scores, and disease and insect notes.

#### New 2017 Trials

- Trial A1702, a replicated field test of nine of our promising wild-collected Juneberry lines, was planted in the spring of 2017. Selections included in the trial were *13-473*, *13-451*, *13-Laevis*, *13-472*, *Gaspensis*, *13-449*, *Hudson*, *13-Burgess*, and *Greenhouse morph*. A uniform selection of individuals from each lineage were transplanted from our nursery to the replicated variety trial. The new planting was maintained during the growing season and monitored for plant vigor, and disease and insect pressure. Baseline plant height data were also collected.
- A honeyberry variety trial (H1701) designed to evaluate 11 commercially available cultivars, was laid-out in the field and planting beds were constructed. We had difficulty obtaining planting material for several of the entries, including many of the most recently released cultivars. Four cultivars, *Berry Blue*, *Blue Moon*, *Blue Bird*, and *Blue Pacific* were transplanted into the trial in late October, 2017. The remaining entries, including *Borealis*, *Tundra*, *Aurora*, *Boreal Beauty*, *Boreal Blizzard*, and *Boreal Beast*, have been secured for planting in the spring of 2018.
- A replicated *Aronia* variety trial with four commonly recommended fruit producing varieties was planted in 2017. Entries included *Nero*, *Select*, *Viking*, and *Galicjanka*. For evaluation purposes, a non-replicated bed was also planted with *McKenzie* and *Autumn Magic*, two primarily ornamental varieties that reportedly produce smaller fruits. Additionally, a uniform bed of *Galicjanka* was established for a companion groundcover trial.

Willsboro Farm Juneberry, honeyberry, and *Aronia* variety trials were all established on a Stafford Fine Sandy Loam soil with subsurface tile drainage. Three foot wide planting beds were constructed with a Rainflow bed maker/mulch layer that installed two drip

irrigation lines (8" emitter spacings) 2" below the soil surface of each bed. Driplines were spaced 18" apart on the bed. Juneberry trial beds were covered with 1.1mm embossed black plastic mulch. The honeyberry and *Aronia* trial beds were covered with black landscape fabric mulch. All beds were spaced 15' apart on center. Juneberry and honeyberry plants were spaced 4' apart in a single row down the middle of each bed. *Aronia* plants were spaced 6' apart on the bed. A randomized complete block experimental design with four replications was used for all the variety trials.

## **On-Farm Trials**

### Essex Farm

Forty-four juneberries were transplanted from the Willsboro Farm nursery into a demonstration plot at Essex Farm on April 28 and 29, 2017. The demonstration plot is located on fertile loamy soil with subsurface tile drainage. Varieties included 10 commercially available cultivars: *JB30*, *Martin*, *Thiessen*, *Honeywood*, *Smokey*, *Northline*, *Regent*, *Nelson*, *Parkhill*, and *Lee#8*, plus *Gaspensis*, a promising wild collected line. All the juneberry transplants survived the move and some produced fruit. Essex Farm owner Mark Kimball was impressed with the juneberry flavor, and looked forward to a bigger harvest in 2018. Additional plot space was reserved at Essex Farm for a honeyberry planting in spring of 2018.

### Cross Island Farms

On April 15, 2017, we transplanted 20 juneberries from the Willsboro Farm nursery into a demonstration permaculture garden plot at Cross Island Farms (Photos 2, 3 and 4). The demonstration plot is located on a sloping heavy clay without subsurface tile drainage. Transplanted juneberry varieties included *Northline*, *JB30*, *Smokey*, *Thiessen*, and *Honeywood*, plus two wild collected lines, *Hudson* and *Gaspensis*. All but two of the *JB30* plants survived the first field season. Cross Island Farms co-owner Dani Baker noted that the two plants were in an especially wet spot during an especially wet spring, and they likely drowned. Samples of the dead juneberry plants were submitted to the diagnostic lab in Geneva, and they did not find any evidence of disease.

On May 24 we returned to Cross Island Farm to inspect the juneberry plantings and transplant a dozen *Aronia* into the permaculture garden (Photo 5). *Aronia* varieties included three fruit producers, *Nero*, *Viking*, and *Galicjanka*, plus two primarily ornamental varieties, *McKenzie* and *Autumn Magic*. All the *Aronia* transplants survived. On October 18 we returned again to check on the plants, and scout a location for a honeyberry planting in spring of 2018.

## **2017 Results:**

- All the transplanted juneberries in Willsboro Farm trial A1702 survived and put on growth in 2017. Baseline mean plant heights for each entry are shown in Appendix: Figure 1.
- Established juneberry trials A1601 and A1602 put on solid growth in 2017, as plant heights increased for all entries (Appendix: Figures 2 & 3).

**Table 1. Juneberry variety comparison, NNYADP New Fruit Project, 2017.**

<b>Table 1.</b>		
Trial A1601		
	Flowering	Mean Fruit Set
<u>Variety</u>	<u>Date</u>	<u>Score*</u>
Honeywood	5-May	2
JB30	4-May	1
Lee #8	5-May	2
Martin	6-May	0.5
Nelson	8-May	1.5
Northline	8-May	0.75
Parkhill	2-May	2
Pembina	6-May	1
Regent	4-May	4
Smoky	7-May	1
Thiessen	4-May	1
Trial A1602		
	Flowering	Mean Fruit Set
<u>Variety</u>	<u>Date</u>	<u>Score*</u>
Autumn Brilliance	2-May	0.125
Princess Dianna	2-May	0.5
Prince William	2-May	0.25
Fergie	6-May	2.75
*Fruit Set Score Range 0-9, with 0=no fruit		

- Trial A1601 varieties started flowering between May 2 and May 8 (Table 1), a solid 7-10 days earlier than in 2016. The earlier flowering coincided with a stretch of unseasonably cool, wet weather, and it was notable that we didn't observe any pollinators in the trial during this period.
- Three of the four Juneberry varieties in trial A1602 started flowering on May 2, while the fourth variety, *Fergie*, started flowering on May 8 (Table 1). As with trial A1601, few pollinators were observed in the trial during flowering and we assume this was due to the cool, wet weather conditions.
- Fruit set was very poor for all varieties in A1601 and A1602 (Table 1). It is possible that the lack of pollinators resulted in reduced fruit set. Alternatively, the plants may just still be too young to support a significant fruit crop. It was interesting that the two varieties that had the best fruit set in each trial, *Regent* and *Fergie*, were two of the shortest varieties.

- We lacked sufficient fruit to do an objective taste test, but an unofficial survey noted that *Thiessen* had incredible flavor.
- Rose chafers attacked the leaves in the nursery and field trials for a 10-14 day period in the middle of June, and Japanese beetles followed suit in August. We did not apply a control spray, but a control strategy may need to be employed if future infestations arise.
- *Autumn Brilliance*, *Princess Dianna*, and *Prince William* all had extensive powdery mildew on the leaves when plants were scored on July 6, but *Fergie* leaves were mildew free.

### **Outreach**

The “New Fruit” trials were featured at the Willsboro Farm Open House/Field Day on July 13, at a twilight meeting with growers on August 1, and to CCE Master Gardeners on September 19. Grower interest in Juneberries continues to expand as we’ve fielded questions from growers across the Northern New York region.

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### **For More Information:**

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