Aronia Nutrition and Horticulture
Aronia Berry: What is it?

An indigenous super fruit!
Aronia melanocarpa

(common name: chokeberry)
Aronia Super Berry

- Aronia melanocarpa is a shrub, indigenous to North America, which bears fruit similar in appearance to the blueberry.

- Native Americans valued its medicinal qualities (cold, flu, used in pemmican, teas, etc.).

- Today’s Europeans recognize Aronia’s health benefits and it is planted and processed extensively there.

- Poland is one of the major consumers of the fruit which can be used whole - fresh or frozen, juiced for jams, jellies, candies, beverages, frozen sorbets, wine and food colorings as well as dried for nutrient supplements, additives and colorings.

- Aronia’s deep purple to black color contributes to its health properties as well as its value as a dye.
Super Berry - Says Who?  Health Benefits:

Today, Aronia’s super health properties are being rediscovered:

In May 2010 the USDA Database for Oxygen Radical Absorbance Capacity (ORAC - a measure of a fruit’s antioxidant level). Aronia berries are one of the highest antioxidant fruits ever tested by the USDA. (http://oracvalues.com/). Note: USDA’s NDL recently removed the USDA ORAC Database from the NDL website due to mounting evidence that the values indicating antioxidant capacity have no relevance to the effects of specific bioactive compounds, including polyphenols, on human health.
More Health Benefit Information:

- Berry anthocyanins improve neuronal and cognitive brain functions, ocular health as well as protect genomic DNA integrity.

- Proanthocyanidins are vasoactive polyphenols in aronia berry that are linked to a reduced risk of coronary heart disease and to lower overall mortality. (anti-inflammatory)
What is an antioxidant?

An antioxidant is a molecule capable of inhibiting the oxidation of other molecules.

Antioxidant compound:
Polyphenol

What is oxidation?

Oxidation happens when oxygen interacts with cells - it is unavoidable. When oxygen interacts with cells - they die, but are replaced with new cells. It is a natural process and keeps the body healthy.
So, why is oxidation bad?

- A small percentage of cells damaged in the oxidation process become free radicals.
- They are “free” because they are missing a critical molecule that would keep them stable.
- When these cells become “free”, they travel through the body, stealing molecules wherever they can find them.
- This can damage the DNA of other cells and contribute to aging and disease.
Why are antioxidants good?

- The antioxidant molecule is capable of inhibiting the oxidation of other molecules.
- Antioxidants terminate harmful oxidation chain reactions by removing free radical intermediates, and inhibit other oxidation reactions.
- The dark purple pigments of Aronia contribute to its high ORAC value.
Other Aronia Health Benefits:

- **Rich in dietary fiber**
  - Aronia berries are an excellent source of fiber, that can help remove accumulated matter from the colon.
  - Consequently, they can aid the prevention of colon cancer and can contribute to healthy weight maintenance.
• Iron and vitamin C
  • 100 grams of dried aronia berries (about a handful)
    • provides us with 93% of the recommended daily intake of iron
      • plays a critical role in the body's oxidation processes and can only be acquired from external sources
    • provides us with 34% of our recommended daily intake of vitamin C
      • plays a central role in the formation of collagen (structural protein found in skin and connective tissue) and has numerous anti-aging benefits.
Boost cardiovascular health by improving:

- Blood circulation
- Blood vessel strength
  - Because of their ability to neutralize free radicals, which are a leading cause of cardiovascular issues.

From; http://www.naturalnews.com/041993_aronia_berries_fruits_antioxidants.html##ixzz2y4BopeoC
Combats inflammation & high blood sugar:

- A growing body of scientific literature has shown promising effects of chokeberry consumption on diseases ranging from cancer to obesity. These health-promoting effects may be due to the potent anti-inflammatory properties of anthocyanins.

- Uncontrolled inflation is now universally recognized as a common thread in many of our most prevalent and deadly diseases.

- Certain anthocyanins -- including those found in chokeberry -- have also been shown to improve blood sugar and the function of insulin.

If I want to grow, where do I get plants?

- Local nurseries (self-pollinators, only one plant is required)
- MAA website http://midwestaronia.org/aronia-connections/
- Internet searches
Why should I plant Aronia?

- “Super” health benefits
- Indigenous to North America
- A health food grown locally
- Eco-friendly, little or no need for herbicides or pesticides
- Tolerant of a wide range of growing conditions
- Tolerant of many soil types
- Resistant to many pests
- Wildlife resistant
What potential product opportunities does Aronia offer? Some are commercially available.

- Fresh and frozen fruits, ice cream/sorbet
- Juices, Beverages
- Candies
- Jams, Jellies
- Food coloring additives
- Wines
- Nutrient supplements
- Dried for teas, trail mix, cereals, cookies and breads
- Bakery
- Dyes, animal food, beauty products, etc.
Where can I find Aronia and Aronia products?

- **Limited Locations:**
  - Farmer’s Markets
  - State or County Fairs
  - Aronia Field Days and other events
    - See Events at MAA website: [www.midwestaronia.org](http://www.midwestaronia.org)
  - Health Food Stores
  - Local Supermarkets
  - Online searches (many besides those listed below)
    - [http://organicaronia.com/](http://organicaronia.com/) (local organic: Brooklyn, WI, booth at Expo)
What can I make with Aronia berries?
Beverages:
Bakery:
Cereals/Confections:
Jellies/Jams:
Sauces/Dips/Salsa:
Miscellaneous Uses:

- Cosmetics
- Animal Foods
- Food Additives
- Probiotics
- Diet Supplements
- Fruit Leathers
- Dyes
- Soap
- Powders
- Many More
So - Why not add Aronia to your diet?

Look for recipe ideas at www.midwestaronia.org and/or find us on Facebook.
Or – Find this recipe book on Amazon.com (90 recipes)
Horticulture: Cultivar Varieties, Planting Guidelines, etc.*

* This and the following slides are derived from: https://www.agmrc.org/commodities-products/fruits/aronia-berry
Cultivar Varieties, Planting Guidelines, etc.*

Cultivars

Wild aronia is different (but not by much) from the cultivated varieties we grow today in commercial production.

Commercially important cultivars in Europe and the United States include Nero, Rubina, Viking, Hugin, Galicjanka, Hakkija, Ahonnen, Kurkumacki, Serina, Morton (also marketed as Iroquois Beauty™) and McKenzie (Jeppson 2000; Strigl et al. 1995).
New research indicates cultivars such as Nero, Viking, and McKenzie were developed in Eastern Europe and are hybrids of Photinia melanocarpa and Sorbus aucuparia (European mountain ash).

There is very little genetic diversity among cultivated aronia. In fact, ‘Nero’, ‘Viking’, and ‘Galicjanka’ are nearly identical when compared through genetic markers (Smolik et al., 2011).
Galicjanka, a newly emerging cultivar developed in Poland, is marketed to producers as having a condensed ripening period.

This is a highly desirable trait to ensure uniformity across the for mechanically harvested fruit.
Plant Profile

- Aronia plants are long lived and survive for several decades.
- They are deciduous woody shrubs with 40 or more stems per bush at maturity (Trinklein 2007).
Aronia Tolerates Diverse Growing Conditions:

- They tolerate full sun or partial shade; however, in commercial plantings, full sun is recommended for uniform fruit ripening.

- They are well adapted to a wide range of soil drainage classes from poorly drained to excessively well drained.  
  - But they will do best in well-drained soils.
Harvest and Fruit Characteristics:

- Aronia produces loose clusters of 10 to 15 berries at the ends of shoots. Individual berries are firm and about one-quarter inch in diameter.

- The fruit ripen from late August through mid-September. The fruit tend to hang well on the plant, allowing for a broad harvest window of four to six weeks (Hardin 1973).
More Aronia Facts:

- Like other fruit crops, aronia develops its next season’s fruit buds while maturing its current season’s crop; hence a grower is always managing two crops at once.

- Aronia has a chilling requirement, meaning that a cold period, or rest, is required before flowering. Actual chill requirements have not been determined. Aronia grows best in zones 3-8.
Berry or Apple? That is the question!

- Although the fruit is often referred to as a berry, the plant is closely related to the apple and the fruit is a pome, not a berry.

- Unlike apples, however, aronia is self-fruitful and does not require a pollinator for fertilization and fruit set. Therefore, only one cultivar is required for fruit production.
Plant Spacing Recommendations

- **Hand harvest**
  - **Rows**
    - 8 feet on center
  - **Within rows**
    - **Marginal spacing:**
      - 6-8 feet.
      - This close spacing provides enough room to walk around and harvest fruit from all sides of the plant, but may be too small for a vehicle to drive between the rows.
    - **Optimal Spacing:**
      - 10 to 14 feet
      - This increased spacing will allow vehicle travel through the row and make it easier to remove fruit from the field.
Mechanical harvest

Rows

- Minimal spacing:
  - 10 feet on center is required to get equipment through the rows though very tight.

- Optimal spacing:
  - 12 to 14 feet

Within row spacing

- Minimal:
  - 3 feet on center for hedge-type plantings or
  - 6-8 feet on center for an individual plant system.

- Best:
  - 3-4 feet
  - At wider spacing, mechanical harvesters have difficulty reaching canes and fruit from the center of the plant.

Row Ends

- Minimal:
  - 30 feet on row ends is required to maneuver harvest equipment.
Pruning

• **Why**
  • Pruning is required to keep plants at a manageable size, to maintain yields and to facilitate mechanical harvest. As canes age, they become less productive.

• **When**
  • Annual removal of canes or stems greater than one inch in diameter is required.
  
  • **Mechanical harvest:**
    • Canes should be removed after their 4th-5th season to ensure that they are not too tall or too thick to go through a mechanical harvester.
    • Plants should be pruned during late winter or early spring before bud break.
    • Alternatively, the entire plant may be cut back to the ground every 10 years and reestablished.
      • Unlike annual pruning, this method will force the plant out of production for several years as the plant reestablishes itself.
Pests

• **Wildlife (Aronia is not as immune as common belief)**
  • Deer, birds, rabbits, and small rodents may be a problem.
    • A deer fence is essential for most new plantings to prevent browsing on young plants. Aronia releases a natural chemical to deter deer from browsing, but it is not sufficient to protect the plant.
    • Birds will typically not eat the fruit until it is nearly ripe. The degree of bird damage is highly variable year to year.

• **Insects (Aronia, related to apple could share same pests)**
  • Apple maggot
  • Brown marmorated stink bug
  • Cherry fruit worm
  • Grasshoppers
  • Japanese beetle
  • **Spotted winged drosophila**
  • Tarnished plant bug.
Pest Control

These pests are **not active in all regions of aronia production**, so **scouting** is important to determine if management is required.

- Approved insecticides for Aronia
  - Actara
  - Assail
  - Avaun
  - Entrust
  - Sevin
  - Pyganic (Organic)

- **Cautions**
  - Insecticide labels frequently change
  - May differ from state to state
  - Read labels before making applications
  - Contact your local county extension office for assistance
Diseases

- Cedar-quince (or hawthorn) rust
- Cedar-apple rust
  - Although healthy aronia plants seem to be very tolerant of these diseases.
  - Yield most likely will not be effected by these diseases but lesions will be present on the leaves
- Fire blight
  - Documented cases are very rare
Mulch and Weed Control

- **Mulch**
  - To control weeds
  - To conserve soil moisture.

- **Weed Control**
  - **Not Recommended:** (due to possible cane damage, resulting in fruit loss and disease susceptibility)
    - String trimmer (“weed eater”)
    - Mowing
  - **Recommended** (mulch or weed barrier weed control, especially during establishment)
    - Reduce weed seed population before planting any perennial crop through the appropriate use of cover crop or fallowing the ground.
Harvesting

The berries can be harvested by hand or with a mechanical harvester. In Europe, aronia is often harvested with a machine similar to the blueberry harvesters in the United States (Trinklein 2007).

Oxbo® International Corporation offers the Korvan® line of blueberry harvesters that include self-propelled and tow-behind models. Oxbo® has manufacturing locations in New York, Wisconsin and Washington. Weremczuk Agromachines® has developed the Joanna 3 half row and Victor full row aronia harvesters.

The Victor is available as a pull behind or a self-propelled model, while the Joanna 3 is a pull behind model only. Both the Oxbo and the Weremczuk are currently in use in the Midwest. These machines use rapid agitation of slow-spinning fingers to remove fruit from canes. These machines do NOT destem fruit.
Industry Harvesting Guidelines:

- Currently NO standards for harvest guidelines
  - Brix is often used to determine maturity
    - For fresh consumption, juice or soluble solids
      - Fruit can reach a brix of 18-24% if conditions are favorable
    - For wine production
      - Initial juice pH or titratable acidity (TA) may be used (6.5 target)
Questions?