

***Amelanchier alnifolia* (Saskatoon berry)**
– a new berry crop with good perspectives
for commercial cultivation in Europe



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Agenda:

1. Systematics and the origin of the species
2. Description and characteristics of selected species
3. Saskatoon Berry (*Amelanchier alnifolia* Nutt.)
4. Characteristics and the use of fruit
5. Growing of Saskatoon Berry in Canada
6. The possibility of Saskatoon Berry cultivation in Europe, including in Poland
7. Questions !!!

SASKATOON BERRY *Amelanchier* spp.) **Fruit of the Prairies**




(*Amelanchier sp.*) - Saskatoon Berry,
Juneberry, Juneblush, Serviceberry, Shadberry



Genus *Amelanchier*

- different species

Species	Cultivar	Uses
<i>Amelanchier alnifolia</i> (Nutt.) 	Altaglow Honeywood Northline Pembina Smoky Thiessen Martin	Ornamental (white fruit) Fresh/Processing Fresh/Processing Fresh/Processing Processing/Freezing Fresh Fresh/Processing
<i>A. alnifolia</i> x <i>A. stolonifera</i> (hybrid)	Parkhill Regent	Fresh/Processing Ornamental (foliage)
<i>A. oblongifolia</i>	Success	Ornamental /Fresh
<i>A. x grandiflora</i>	Autumn Brilliance Ballerina	Ornamental

***Amelanchier alnifolia* (Nutt.)**

- Family: ***Rosaceae***
- Sub-Family: ***Pomoide***
- Genus: ***Amelanchier***
 - Medium size shrub or small tree
 - Flowers in racemes, bright white
 - Fruit is round, dark blue and resembles blueberries – no relation at all (sometimes white fruit); can be mechanically harvested
 - Cultivation on wide range of soils
 - Winter hardiness up to Zone 2 (-30°C)



Genus *Amelanchier*



Genus *Amelanchier*



Amelanchier grandiflora



***Amelanchier alnifolia* (Nutt.)**



Amelanchier alnifolia (Nutt.) – Saskatoon Berry



Amelanchier alnifolia (Nutt.)

- Saskatoon Berry

FRUIT



- Fruits are spherical, mostly navy blue or dark blue with bloom, sometimes purple,
- An average weight of **0.5-0.8 g**, diameter: **10-15 mm** (up to 18 mm),
- The fruits are juicy, **very sweet** and tasty,
- They contain a lot of sugar, very little organic acids, high in antioxidants and minerals and vitamins (A, B and C).
- **With high nutritional and health benefit values.**

The SASKATOON BERRY

- Popular and widely used by many North American Indian tribes,
- The fruits were a staple food; along with chokecherry, pincherry, buffaloberry
- Fresh eating, drying, processing and medicinal use (different parts of shrub: roots, bark, stems/twigs-root tea etc.)
- Wood to make umbrella handles, fish poles

The SASKATOON BERRY

Berries contain:

- 78-81% moisture
- Up 19% sugar, mainly glucose and fructose
- Small amount of protein, up to 9%
- Small amount of fat, up to 5%
- 19% fiber
- Malic and citric acid



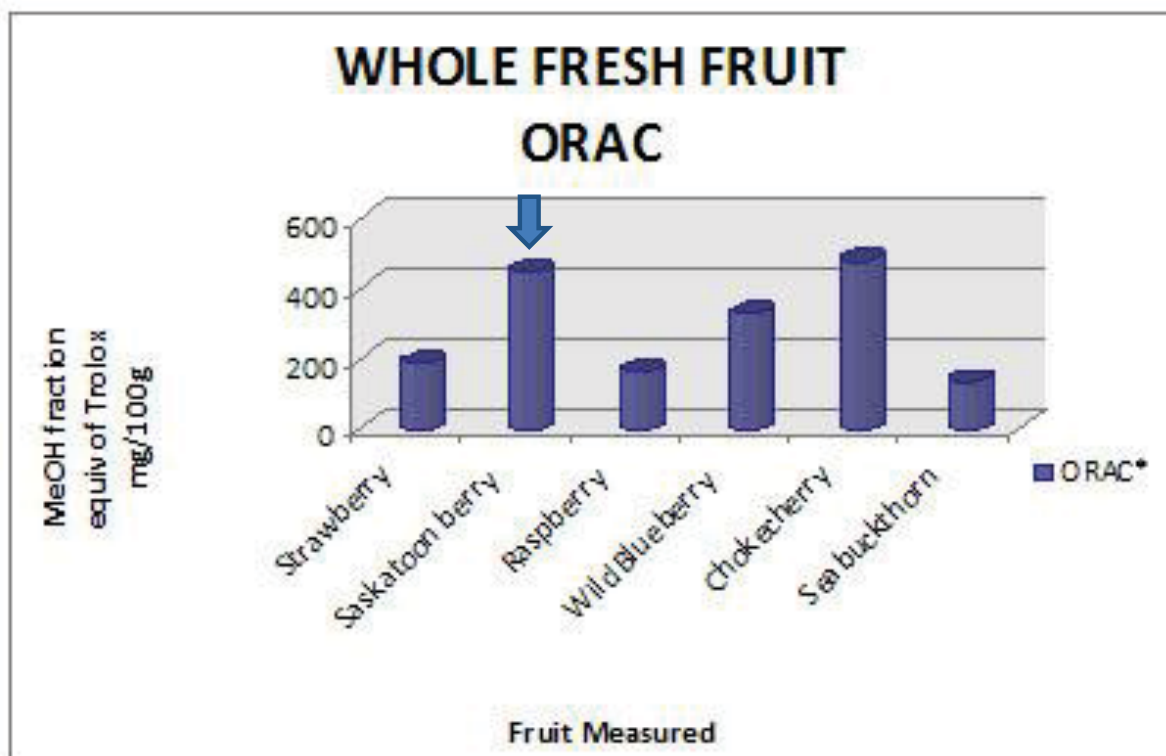
**The content of minerals and vitamins in fresh fruits of Saskatoon berries
by G. Mazza (2005)**

Component	Content in 100 g	% of daily demand
Energy	85 kcal	
Fibre (total)	5.9 g	20%
Sugar (total)	11.4 g	8%
Calcium (Ca)	42 mg	4%
Magnezium (Mg)	24 mg	6%
Iron (Fe)	1 mg	12%
Manganium (Mn)	1.4 mg	70%
Potassium (K)	162 mg	3%
Sodium (Na)	0.5 mg	5%
Vitamine C	3.6 mg	4%
Vitamine A	11 mg	1%
Vitamine E	1.1 mg	7%
Ryboflavin (Vit. B ₂)	3.5 mg	>100%
Biotyna (vit. H)	20 mcg	67%

Mazza G (2005). Compositional and functional properties of Saskatoon berry and blueberry. *Int. J. Fruit Sci.* 5 (3):99-118.

The antioxidant capacity of selected fruits

The **ORAC** (**O**xygen **R**adical **A**bsorbance **C**apacity) value is one of the methods used to measure the total antioxidant activity in fruit.



The ORAC values show saskatoon berries are naturally high in antioxidants and rank high in both fresh fruit and in fruit pulp relative to other common fruits.

Saskatoon Berry - use of the fruit

1. Fresh fruit (dessert):

- a/ U-pick (PYO)
- b/ fruit markets
- c/ retail chains.

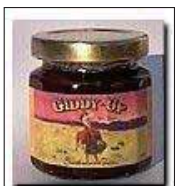
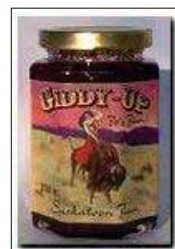
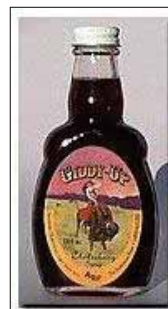
Can compete effectively in terms of taste and price, e.g. blueberry.



2. Fruit-processing & freezing industry:

- a/ widely use in the processing and production of jams, preserves, juices, syrups, ice cream, desserts, wines and liqueurs, etc.
- b/ buckery – fillings of cakes
- c/ drying

A great addition to the other sour fruits



SASKATOON BERRY PRODUCTS - Canada



SASKATOON BERRY PRODUCTS - Canada



Websites for the Saskatoon berry producers and processors:

<http://www.prairieberries.com/products.php>

<http://www.albertafruit.com/>

<http://www.mts.net/~stoons/P02.html>

<http://www.pfga.com/>

http://www.agr.gc.ca/cb/index_e.php?s1=n&s2=2001

<http://www.gov.mb.ca/agriculture/crops/fruit/bld01s01.html>

<http://www.pickyourown.org/canadaal.htm>

<http://www.prairieberries.com/retail.php>



Saskatoon Berry (*Amelanchier alnifolia*) *commercial and amateur cultivars*



CULTIVARS:

1. 'Buffalo'
2. 'Honeywood'
3. 'Martin'
4. 'Nelson'
5. 'Northline'
6. 'Pembina'
7. 'Pearson'
8. 'Parkhill'
9. 'Pasture'
10. 'Quaker'
11. 'Regent'
12. 'Smoky'
13. 'Success'
14. 'Thiessen'.

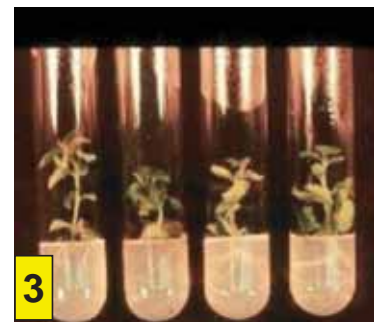
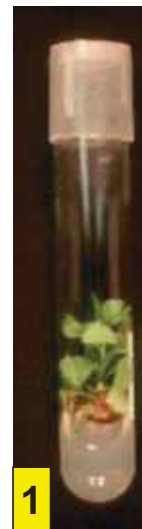
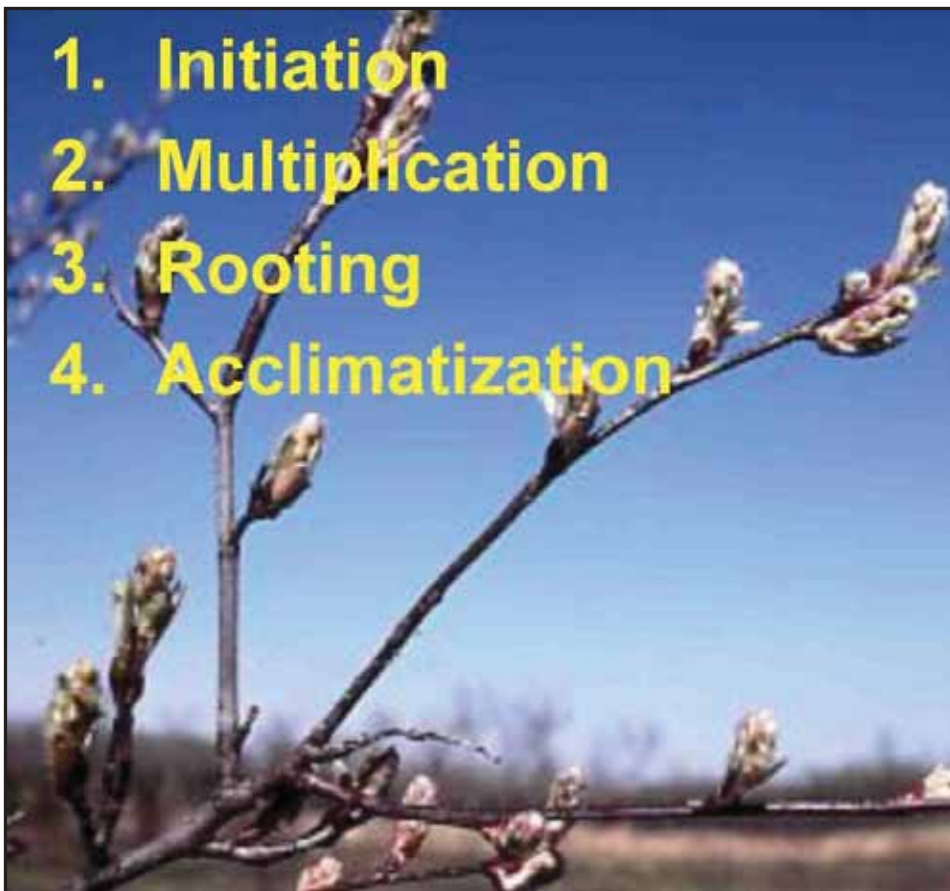


Propagation:

1. **Seed propagation** (least expensive but high variability among seedlings up 30%) - not acceptable for commercial plantings
2. **Grafting** (on *Cotoneaster*, *Malus*, *Pyrus*), however significant % incompatibility
3. **Divisions** of root cuttings, suckers, hardwood cuttings - low success
4. **Softwood cuttings** - good success in some cultivars
5. **Tissue Culture (*in vitro*)** – recently the most popular

Tissue Culture (*in vitro*) - micropropagation

1. Initiation
2. Multiplication
3. Rooting
4. Acclimatization



Tissue Culture (*in vitro*) - micropropagation



Establishing of commercial plantation in Canada



**1-year-old plant
propagated by
(*in vitro*)**



**Manual planting in prepared w furrow
(line) or using the planter
Planting dencity: 4.5 x 0.8-1.0 m**

Saskatoon berry commercial plantation in Canada



Saskatoon berry commercial plantation in Canada



Spring – during flowering of shrubs

Commercial Saskatoon Berry Industry*

Country/region	Acres planted	Acres producing	Number of growers
Canada	4,260	3340	900
Alberta	2,200	1,700	394
Saskatchewan	1,300	1,086	254
Manitoba	500	370	122
BC	125	85	60
Ontario	90	63	40
East Provinces	45	36	30

***Sources:** i) Statistics Canada 2007;
 ii) Saskatchewan Agriculture WebPage , 2008;
 iii) Alberta Agriculture Food and Rural Development Mr. Forrest Spencer
 (fruit horticulture specialist) personal communication -October 19, 2008

Commercial production is practiced by growing berries in plantations to achieve consistent yields and marketing the berries to consumer and processor markets

Commercial Saskatoon Berry Industry

- ✓ Yields may vary between 2,300 to 8,000 pounds per acre (up to 15,000 lbs irrigated plantation)
- ✓ Between 700 to 1,000 plants are planted per acre
- ✓ Production starts 4 years after planting
- ✓ Long-living shrubs on commercial plantations with good care can grow for 20-30 years or more,
- ✓ Economics issues:
 - A high development cost
 - The time required for orchards to provide a return on their initial investment:

<http://www.agriculture.gov.sk.ca/Default.aspx?DN=6b8ffe92-0a86-45b1-95d9-302c42c726f0>

1 lb = 0,45 kg

1 acre = 0,40 ha



FRUIT HARVESTING of Saskatoon Berries

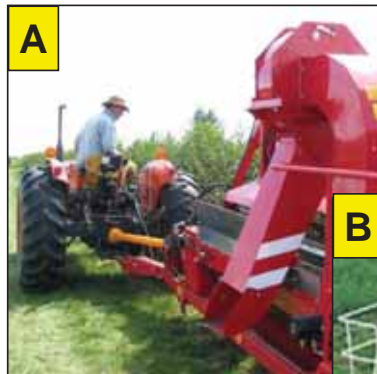
1. Hand pick:

- U pick operations
- Family farms
- Commercial



2. Mechanical

- Blueberry harvesting equipment
- different harvesters:
A/ half-row – Joanna 3 (Poland)



- B/** selfpuld) – Joonas (Finland)



Saskatoon fruit picking by harvester in Canada, 2006



Saskatoon fruit picking by harvester in Canada, 2009



Saskatoon fruit picking by harvester Joonas1500 in Canada



Commercial Saskatoon Berry Industry – Problems, in Canada

1. Pathogens:

- Leaf and Berry spot (*Entomosporium*)
- Saskatoon/Juniper rust
- Blackleaf (Witches' Broom)
- Powdery mildew

2. Fireblight

- *Erwinia amylovora*

2. Insects:

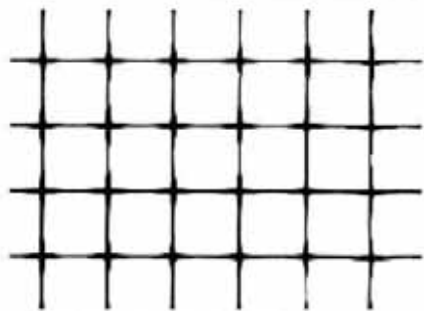
- Woolly Elm Aphid
- Saskatoon Saw Fly
- Apple Curculio



Commercial Saskatoon Berry Industry Problems



- **BIRDS !!!**
- RODENTS (VOLES)
- DEER



1/2 INCH MESH



More websites for Saskatoon Berries

- <http://www.agr.gc.ca/pfra/shelterbelt/shbpub53.htm>
- <http://www.saskatoonfarm.com/proguidea.htm>
- <http://www.albertafruit.com/farms/html>
- <http://www.stoonpie.ca/>
- <http://www.mts.net/~stoons/Index.html>
- <http://www.saskatoonberry.com/>
- <http://www.dnagardens.com/catalogue.htm>
- [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/econ7053](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/econ7053)

**The possibility of Saskatoon Berry
cultivation in Europe, including in Poland**

Prospects for cultivation in Europe, including Poland

- In Europe(incl. Poland), Saskatoon Berry is still very little known and not widespread in the cultivation,
- We can expect great interest in cultivation of the Saskatoon Berry by the growers (and amateurs) similar to:
 - the dynamic development of growing Aronia and blueberries,
 - as well as the emergence of new opportunities for the export of Saskatoon fruits for the European Union market,
 - and the fact of the merging by Saskatoon fruits the positive characteristics of both species mentioned above, i.e. the ease way of Aronia growing and/with good taste value of blueberries,
- **It seems that there is a large potential for the development of Saskatoon Berry as the new crop for dessert fruit and processing, provided growers profitable prices.**

SASKATOON BERRY - new crop for commercial cultivation in Europe, on example of Poland (1)

- ❖ Well adapts and grows in a variety of environments, with the exception of extremely dry and wet locations,
- ❖ **Plants are much less soil requirements than high-bush blueberry**
- ❖ Plants with high frost resistance, withstand winter temperatures down to -30°C, and flowers are tolerant to the late spring frosts,
- ❖ Bloom is in the beginning – middle of May,
- ❖ Plants are self-pollinating and self-fertile,
- ❖ Fruit ripens after 25 June to mid-July,

SASKATOON BERRY - new crop for commercial cultivation in on example of Poland (2)

- ❖ Plants are not infected by diseases and pests, and thus chemical protection is very limited extent,
- ❖ On large commercial plantations 3-5 cultivars are recommended, due to the cross-pollination and extension of fruit harvesting,
- ❖ Spacing planting for machine fruit harvesting: 4.5 x 0.8-1.0 m (about 2.500 /ha,
- ❖ **First yields in 3-4th. years, full yields in 6-7th. years after planting and plants can produce 10-15 tons of fruit /ha,**
- ❖ Fruit picking on commercial plantations can be done using different types of harvesters, similar or used for blackcurrant.

Establishing of new plantation and plots

– Experimental Orchard at Dąbrowice, (near Skierniewice, 2011)





27.03.2012



7.05.2012



20.05.2012



7.06.2012



5.07.2012

BIRDS - BIG PROBLEM IN GROWING OF SASKATOON BERRY !!!



pigeon



blackbird



fieldfare



starling

METHODS OF PROTECTION OF SASKATOON FRUIT AGAINST BIRDS



Saskatoon Fruit harvesting

– Experimental Station at Dąbrowice, central Poland



12. 07. 2012

8.07. 2013





**Fruit harvesting in 2013
3- year-old bushes, cv. Smoky**



**Fruit harvest in 2013
4- year-old bushes, cv. Nelson**



**Fruit harvest in 2013
4- year-old bushes, cv. Thiessen**

BUSHES AFTER PICKING OF FRUIT BY HARVESTER



The effectiveness of fruit picking - 98-100%





SD Dąbrowice, zbiór 2013 r. - owoce odmiany Smoky

Saskatoon Berry (*Amelanchier alnifolia*)

Plants are much less demanding in relation to the soil than highbush blueberry

This species is difficult to vegetative propagation

The most effective method of propagation - *in vitro*

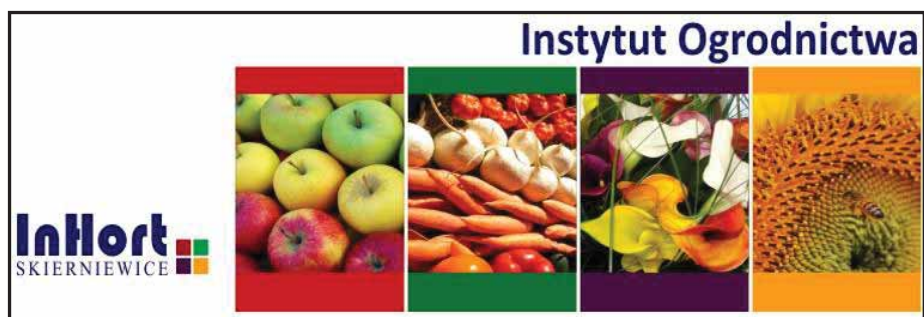
The only condition to fulfill is to provide planting material for plantations, which are still missing in our country.



8 week plants propagated by *in vitro*

Saskatoon Berry – studies/projects conducted at the Research Institute of Horticulture in Skierniewice, Poland

- 1. Cultivar trails at the Experiment Station at Dąbrowice:**
 - Experiment I - 8 genotypes (cultivars and breeding clones), established in 2006
 - Experiment II - 10 genotypes (cultivars and breeding clones), established in 2010,
- 2. The pilot breeding program and crosses in 2009 and the subsequent years of 2010-2013.**
- 3. Studies on propagation methods:** in vitro, cuttings and layers in the project "Basic Research" Task - 31, in the years 2011 -2013.
- 4. The National research project:** "Development of growing technology, harvesting and processing of Saskatoon fruit as well as clinical assessment of their health-related values" – in preparation



THANK YOU FOR YOUR ATTENTION