

# Eastern Hazelnuts Move Toward Commercialization

**NNGA**

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**Quebec**

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**Znutty.com**



# Eastern Hazelnuts Move Toward Commercialization

## Overview:

- Trade Associations for hazelnut commercialization
- Orchard type combines with tree type
- Commercial harvesting equipment based on orchard type
- Post harvest processing
- Cooperatives



# Hazelnut Commercialization - Trade Associations

- Hazelnut have been hybridized for over 97 years
- Efforts documented in NNGA library for 100+ years.
- Many false starts in planting orchards as it can take **over 10 Years** for Eastern filbert Blight (**EFB**) to show up.
- We now have:
  1. **Hazelnut Consortium,**
  2. **Upper Mid-West Hazelnut Dev. Initiative (UMHDI),**
  3. **Ontario Hazelnut Association (OHA)**
- All working to bring about hazelnut selections.



# Trade Associations for Hazelnut Commercialization

## Hazelnut Consortium (HC) is:

- Rutgers University, Oregon State University, the Nebraska Forest Service/University of Nebraska--Lincoln and the Arbor Day
- Working to develop disease-resistant, widely adapted hybrid hazelnuts.
- Searched the world for EFB resistance and are propagating the best selections.
- Rutgers will have selections available for “test” plots in 2019’.
- Selections are of “tree” form for USDA Zones 7/8 and maybe 6? Colder Zones?



# Trade Associations for Hazelnut Commercialization

## Upper Mid-West Hazelnut Dev. Initiative (UMHDI),

- Through research, industry development, and outreach education we are working to realize the vision of our early-adopter growers: to create a sustainable hazelnut industry.
- UMHDI has field trials of the best selection found to date based on native bushes and hybrid bush form for USDA Zones 3?/4/5/6



# Trade Associations for Hazelnut Commercialization

## Ontario Hazelnut Association (OHA):

- Lead growth of a hazelnut industry in Ontario.
- Promote development, sale and export of hazelnut agricultural products.
- Provide educational opportunities.
- Create a network for information and resource sharing, research and project collaboration.
- Actively advocate for hazelnut industry growth and development.
- Plantings are tree form from regional selections, Oregon and Grimo nursery.
- USDA Zones 6b/7. USDA Zones 4 to 6a are needed.



**All Groups are working to provide clones!**

# Status of Hazelnut Cultivars for Commercialization

## Why Not Seedlings?

- UMHDI found if seedlings are planted one can expect 120 lbs. to 1300 lbs. of kernels per acre.
- Some seedlings are good for pollination insurance to widen the time window that pollen is available. Also to find the next best tree to propagate.
- Seedlings will have unpredictable harvest dates and pollination dates?
- Should expect 2000 to 4000 pounds per acre for a good commercial orchard using known clones.
- Clones are tissue cultured or layered trees.

## What is a good tree to Propagate For the Northeast?

# Status of Hazelnut Cultivars for Commercialization

## Characteristics needed for Eastern clonal orchards

### Nitka

USDA Zone # 4 hardy

Kernel Percent 50-55%

Short husk

Very thin shells and round kernels

### Tree form/bush form

Very Hardy catkins

Heavy Pollen Producer

Very Hardy wind tolerant flowers

18 years no EFB

Ripe End of Aug. /1<sup>st</sup> week of Sept.

### Photon

USDA Zone # 4 hardy

Kernel Percent 44-48%

Short husk

Thin/Avg. shells and round kernels

### Tree form

Very Hardy catkins

Heavy Pollen Producer

Very Hardy flowers

20 years no EFB

Ripe 2<sup>nd</sup>/3<sup>rd</sup> week of Sept.

**Tree  
vs.  
Bush?**





# Orchard Type Combines with Tree Type

**U-Pick** – No Equipment needed just consumers willing for the harvest experience/ambiance. Great to advance both marketing and Justification.

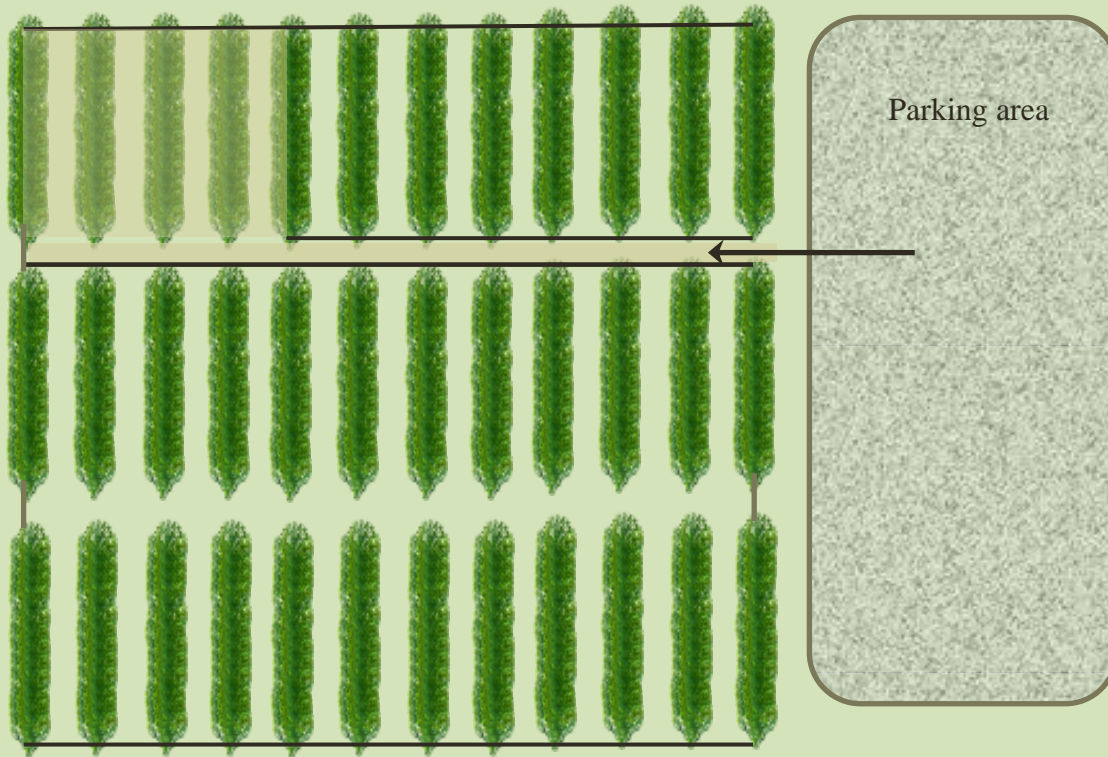
**Hedgerow** – Newer vision of orchard modeled after Aronia berry harvesters having similar growth habits to the American form of hazelnut bushes

**Orchard** – Single stem habit modeled more closely to the European hazelnut genetics of dropping nuts when ripe.

For simplicity this discussion is limited to monoculture at this time!

# Orchard Type Combines with Tree Type

**U-Pick Orchard** -Bush form lends itself for customer picking of bushes. No ladders needed and orchard can be maze like. 500 to >900 bushes per acre.



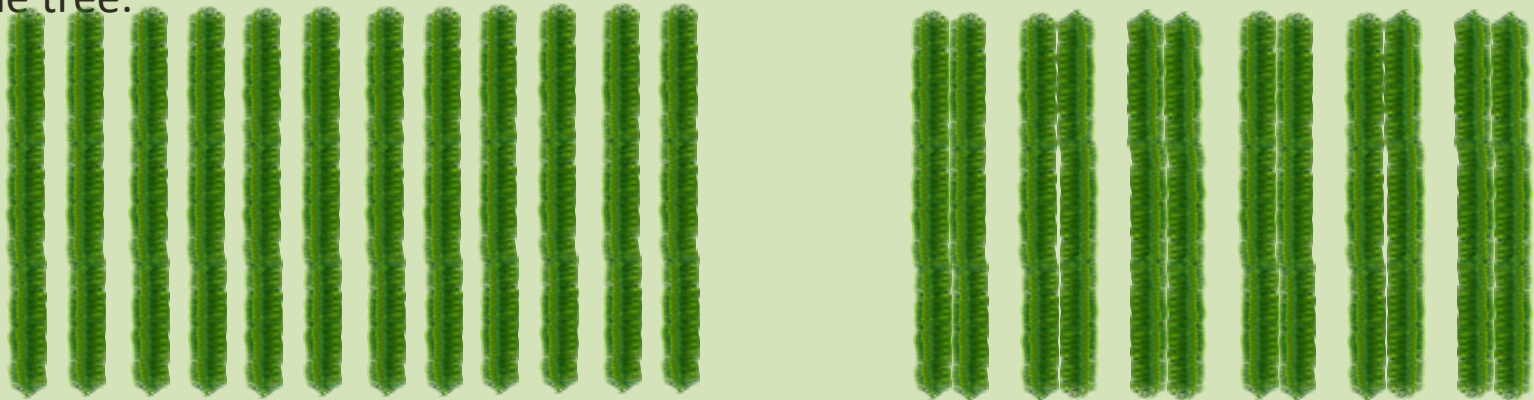
**U-Pick orchard layout**

**Great for existing U-Pick operations  
or getting started in hazelnuts!**

U-Pick operation needs parking and facilities. Bush form with tight spacing in row at 5' to 8' feet apart and 14/16" feet spacing between rows. Rope off area to be picked. Can be followed by Blueberry/Aronia berry harvester!

# Orchard Type Combines with Tree Type

**Hedgerow Orchard** – Bush form of tightly spaced bushes in row and between rows for mechanical harvesting of nuts and husks together straight from the tree.



**Hedge row orchard layouts for even spaced and alternate spaced rows**

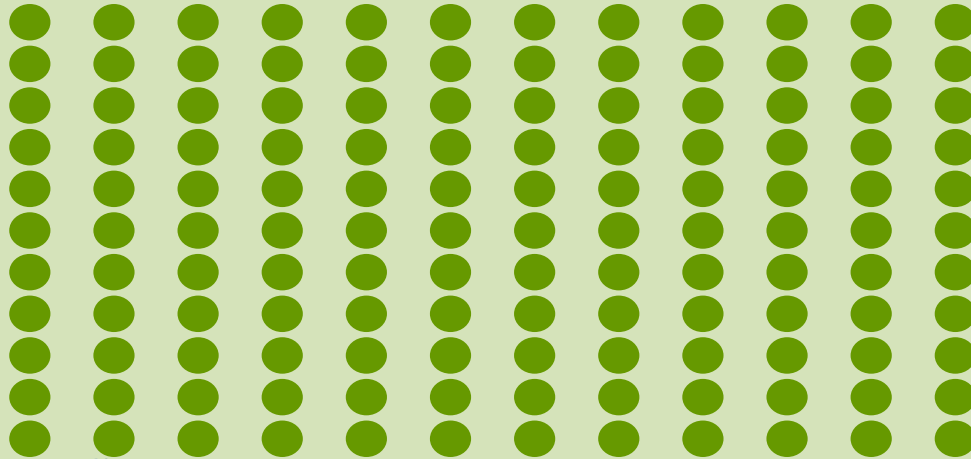
Bush form of tightly spaced trees of 3' to 7' feet apart in row and 15'/16' between rows. Spacing dependent on the varieties planted. If bush is small (<8' feet) then tighter spacing. If bush is hybrid and 12 feet tall then farther spacing.

Can plant as close as 3 feet in row if very small bush or just cut out unproductive seedlings if seedlings were planted.

Again 500 to 900+ bushes per acre depending on size of the cultivar.

# Orchard Type Combines with Tree Type

**Single Stem/Tree Form Orchard** - Traditional Western European orchard where nuts fall to the ground and are harvested via sweepers/vacuum.



Single Stem Tree orchard layout

Tree variety must have husks that allow the nuts to fall freely. Hybrid trees tend to be smaller than full European (*Corylus avellana*). Spacing of 10 to 15' feet in row and 16' to 18' between rows for 160 to 290 trees per acre. To get better yields early you can double plant in row and remove alternate trees in row when crowded. Some hybrids can be planted as bush or tree form.

What do we mean when we say bush form or tree form?

# Equipment Needed is based on tree/bush form

## Bush form –

- The hazel is allowed to grow suckers and a multi-stem bush forms.
- Native bushes (*Corylus americana*) tend to be less than 8' feet and have flexible stems. Some hybrids will grow 14'+ feet and still remain flexible for an Aronia/Blueberry harvester to bend and beat off husks with nuts.
- Must have the characteristic of hanging on to the nuts for some time when ripe. Generally longer husks.



# Commercial Harvesting Equipment Based on Tree/Orchard Type

Equipment used to harvest hazelnuts is based on tree/bush form

## Tree form –

- Suckers are removed from base 2 to 4 times a year and only a single stem is allowed to grow.
- Limbs and trunk are much stiffer.
- Tree must have the characteristic of dropping nuts when ripe.
- Generally will have a short husk.
- Nuts are swept and/or vacuumed up



# Commercial Hazelnut Harvesting Equipment - Bush

## Blueberry harvesters

To use commercial harvesting equipment on hazelnuts, the nuts must be ripe at the same time within a given row. This means they must be clones or hang on to the nuts long enough for all nuts to be ripe within the row.

Blueberry harvesters often beat on the branches to have the husks with nuts drop. Moveable plates at the base of the bush capture the nuts and are conveyed to a bin. Some nuts are lost to the center of the bush and have to be hand harvested. Will want the wider bushes trimmed to keep the center small .



## Blueberry harvesters:

Oxbo

BEI (defunct)

McKibben Mfg.

Haven Harvesters

Littau Harvesters

Blue Line Harvesters

[www.usedblueberryequipment.com](http://www.usedblueberryequipment.com)

Used to new \$<20K to \$240K+



# Commercial Hazelnut Harvesting Equipment - Bush

## Aronia harvesters

Aronia berry harvesters bend half of the bush to the side and then beat on the branches. Plates near the ground capture the nuts and convey to a bin. Less nuts should be lost to the center. Bushes can be 12' feet tall and stems up to 1.25" thick. May/will have to trim out the larger maturing branches.



## Aronia harvesters:

Weremczuk from Poland, Sold by:

[www.aroniaberryservicesofneiwawa.com](http://www.aroniaberryservicesofneiwawa.com)

New \$31K Joanna pull behind half row harvester to \$240K+ both halves self propelled





# Tree Form Bush versus Tree

Bush harvesting offers significant advantages

- No dirt, debris from orchard floor
- De-husker removes husk, leaves, bugs sticks
- Much faster harvest over sweep/windrow and vacuum.

# Commercial Hazelnut Harvesting Equipment - Tree

**Single Stem/Tree Form Orchard** - Traditional European orchard where nuts fall to the ground and are harvested via sweepers/vacuum.



## **Vacuum Harvester:**

ChianChia from Italy,

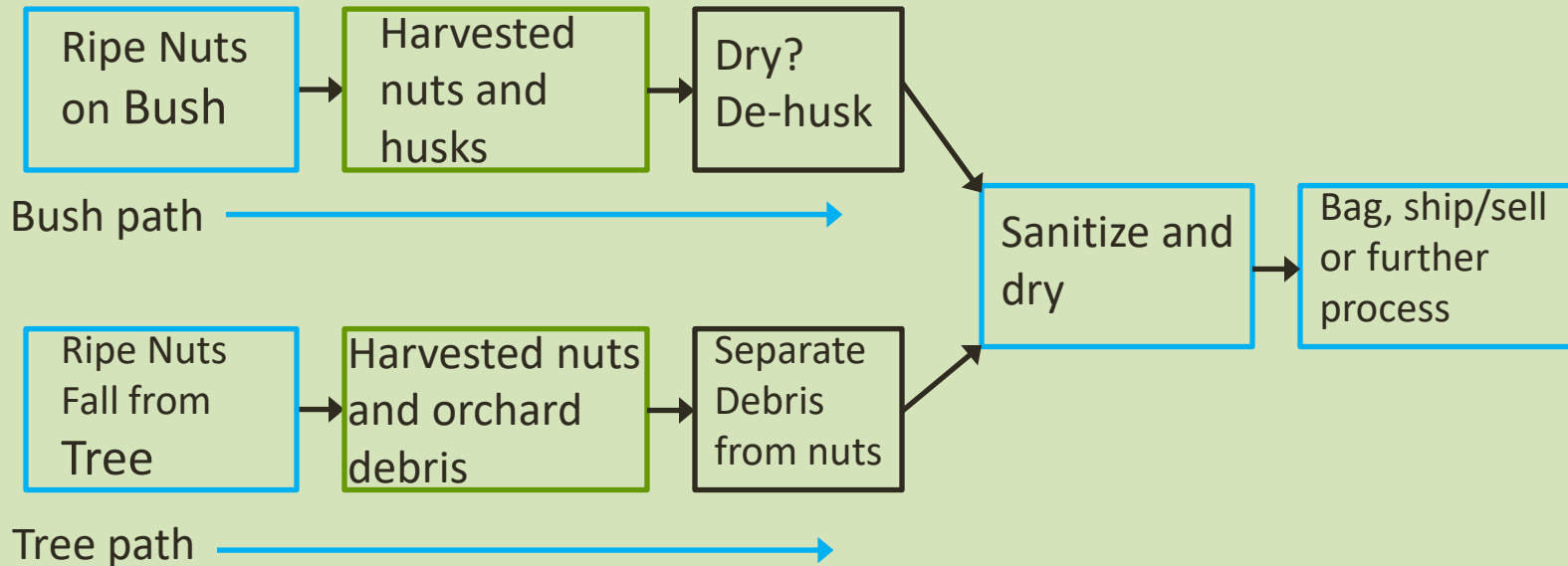
Sold by: <http://bdimachinery.net/>

New \$<7K K530 3pt. Hitch vacuum harvester



# Post Harvest Processing – In Shell

Harvesting in bush form is somewhat different than tree form.



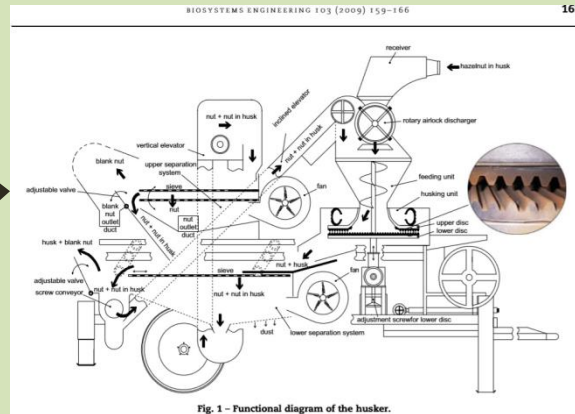
We covered the harvesting but now we may need different equipment to de-husk and separate debris or just debris.

# Post Harvest Processing – In Shell

Need to separate the bugs, dirt, sticks, leaves from the nuts.

Bush Form

Dry? and De-husk



## De-husker

Mfg. in Turkey/China approx. \$6K FOB.  
No known importer in USA?

Tree Form

Separate Debris from nuts

## Vacuum Harvester:

ChianChia from Italy,  
Sold by: <http://bdimachinery.net/>  
New \$9.2K S98/120 Cleaner/Separator



# Post Harvest Processing – In Shell

## Need to sanitize, dry and size nuts.

- Sanitize via chlorine or oxygen based solutions  
pull remaining blank/shriveled nuts floating
- Dry via natural sun (e.g. a green house) or  
forced air at 104 degrees to  $\leq 6\%$  moisture.
- Size to USDA standards\*
  - Jumbo----- No maximum----- 56/64 inch.
  - Large----- 56/64 inch----- 49/64 inch.
  - Medium----- 49/64 inch----- 45/64 inch.
  - Small----- 45/64 inch----- No minimum.
- Sort out misshaped, discolored, insect damage,  
attached husks, split/broken, mold, stains, etc.

Note: \*USDA Hazel inspection instructions.pdf

# Post Harvest Processing – In Shell

Need to sanitize, dry and size nuts.

Equipment to be scaled for volumes



Farm based sizer



Farm based dryer



Larger volume nut sorting conveyor



Cooperative based industrial scale sizer in Oregon

# Post Harvest Processing – In Shell To kernel

## Shell to Kernel –

- Once the shell is cracked for kernels it is considered processed. The facility must be licensed.
- USDA is currently upgrading standards with the Food Safety Modernization Act.
- Need cracking and separator equipment
- Separate whole kernels from halves and final sort.
- Less than perfect kernels can be pressed for oil and flour. Eliminating waste while generating income.
- For individual farmers equipment and regulation is a barrier to entry. Especially for new farmers or small orchards.

# Next steps?

Equipment, processes and specifications are barriers to entry!

A daunting problem for a budding farmer.

The problem is minimized with the aid and support of a cooperative.

**This is why cooperatives are formed to assist a region.**



# Cooperatives - Next step

## Cooperatives –

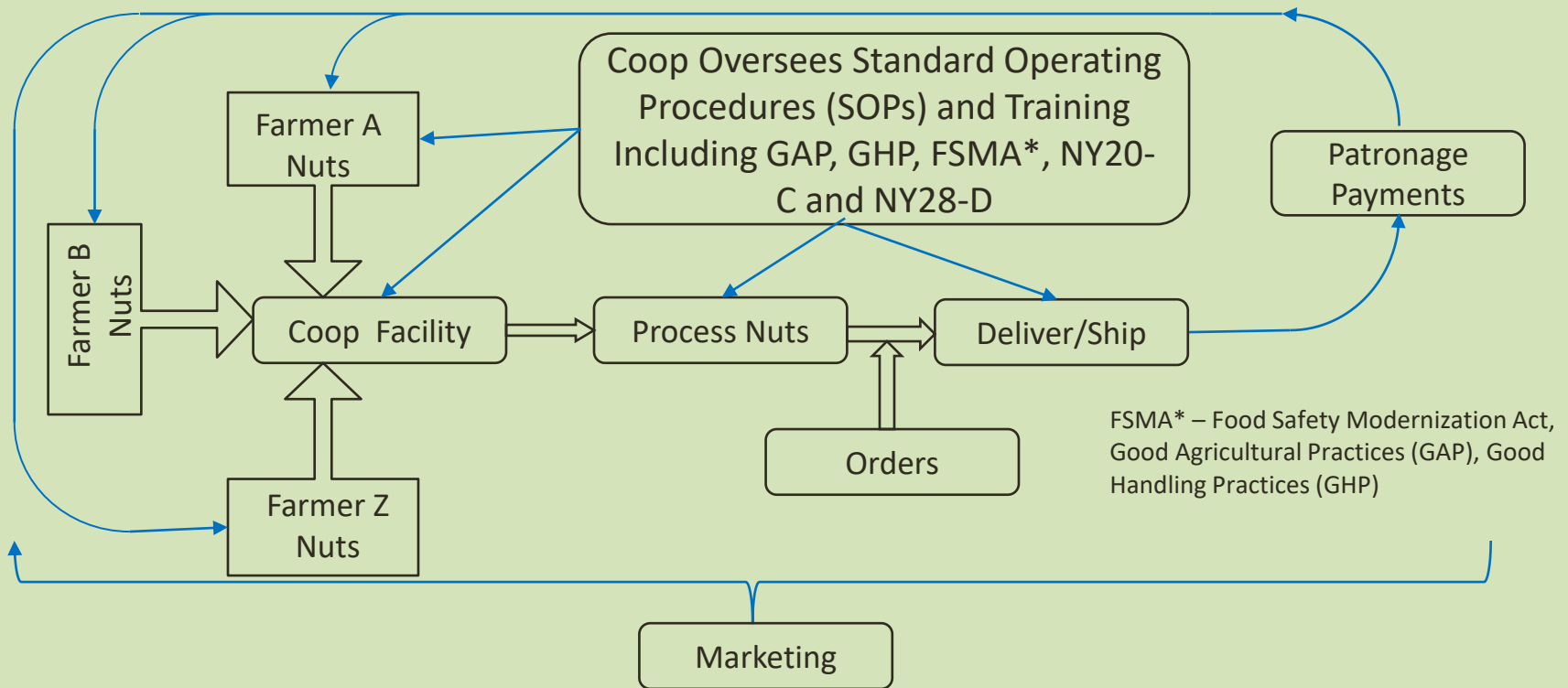
- Aggregate harvests and process on shared equipment.
- Eliminates many steps for the farmer including:
  - Sanitizing, drying, sorting, bagging, sales and marketing and safety regulations.
- Share profits back to farmers based on patronage
- May enable equipment rental/services for orchard specific harvesting, planting, fencing. Rock picking, etc.
- Safety in numbers with knowledge shared
- Provide voice and presence to government

# Cooperatives

## Existing Cooperatives –

- Nut cooperatives have existed in Oregon and California for many years.
- 2014 The American Hazelnut Company formed with 16 growers as members in four Mid-western states. Working closely with the UMHDI and their Hazelnut Processing Accelerator.
- There are now two chestnut cooperatives, Chestnut Growers Inc., in Michigan and Rt. 9 Cooperative in Ohio.

# How a Coop. Works



The cooperative receives nuts from multiple farmer members. The coop sanitizes, dry/cool the nuts, sells in shell or cracks out the kernels and then bags and ships. The customers start out as direct sales to customers and retail stores. As volumes build the coop can further process and sell wholesale. Further processing includes, pressing the nuts for oil and separate out the flour. Hazelnut shells are extremely high in BTUs and are great for wood pellets and bioenergy.

# Cooperatives - Current Efforts

## Forming a Cooperative –

- Forming New York’s first nut cooperative.
- The nut cooperative will be called **New York Tree Crop Alliance** or “**NYTCA**” . After J. Russel Smiths book - “Tree Crops”
- Based in the Finger Lakes, 100 mile radius and hope to serve nut farmers throughout the region.
- Looking for more members!



# NY Tree Crops Alliance <sup>TM</sup>– Efforts

- Find source(s) of support for coop.
- Procure equipment in stages, properly sized.
- Manage, equipment, people, and facilities.
- Train operators, and farmers with SOPs.
- Find sources to aid the knowledge of Educators like Cornell Cooperative Extension (CCE) Agents.
- Fund methods to outreach and educate those that have interest in growing nut trees(a.k.a. find members).
- Mentor, Assist and support those beginning the process.
- Expand nursery stock.
- Continue R&D for regional needs and continued growth.

# Thank You !

**Cultivar “Nitka”  
from the NYTCA  
Cooperative**



**New York Tree Crop Alliance (NYTCA) web site coming soon**

Find us at: **Znutty.com**



# UMHDI – Regional Support

## Upper Midwest Hazelnut Development Initiative



### Hazelnut Processing Accelerator

Research • Outreach Education • Business Development • Processing Incubator



A private/public partnership to support the emerging hazelnut industry in the Upper Midwest:

Project Coordinator, Jason Fischbach, Food and Energy Woody Crops Specialist, [jason.fischbach@ces.uwex.edu](mailto:jason.fischbach@ces.uwex.edu), 715-373-6104



Working to provide small to midsized processing equipment until hazelnut farming is large enough to support large commercial scale processing.

# UMHDI – Regional Support

## Current Processing Incubator Equipment

The purpose of the Accelerator is to research, develop, test, and optimize hazelnut processing equipment while also providing a subsidized processing facility for growers and processors to use as a means to lower barriers to entry. The capacity and efficiency of the processing line will increase as better equipment is acquired, process flow is improved, and as necessary to meet processing demand from growers. You can help with the continual improvement process through contribution of equipment, time, and funding. Contact Jason Fischbach at 715-209-2715 or [jason.fischbach@ces.uwex.edu](mailto:jason.fischbach@ces.uwex.edu) to learn how to get involved.

## Stage 1 Processing Equipment (De-Husking, Grading, and Size-Sorting)



Nut Dryer



Barrel De-Husker



Low-Cost Aspirator  
(Husk-Nut Separation)



2-Channel Roller-Sizer



1-Channel Roller-Sizer



Drum Sizer

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Jason Fischbach,  
“Folks are invited  
to visit us and kick  
the tires at any  
time.”

The location of the  
item is below the  
picture.