

Welcome!

Starting out in Nut Trees



By: Jeff and Dawn Zarnowski

Znutty.com

Z's Nutty Ridge & Tioga County PA



Starting out in Nut Trees- Planning steps for success prior to planting nut trees.

September, 2019'

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Znutty.com

Why Grow Nut Trees?

Topics Covered:

1. Why perennial nut crops,
2. Where can we grow nut trees and how long does it take,
3. Plan ahead for success – Order of steps to take
4. Tree form and orchard type = harvesting method
5. Harvest Equipment bush and tree form
6. Lots of equipment = Cooperative needed and Formed!
7. Please support your NYTCA Coop at:
<https://www.gofundme.com/f/support-the-new-york-tree-crops-alliance>
8. Status of cultivar development and sources!

Why Grow Nut Trees?

Trees provide:

1. The best method for sustainable agriculture,
 2. Sequesters carbon,
 3. Filters the air of CO₂ and provides O₂,
 4. Builds the top soil, and minimizes erosion,
 5. Cools the earth by absorbing the sun then releasing Oxygen and moisture.
 6. Provides shade in the summer, and allows sun in the winter.
- Food for your family, and/or wildlife.
 - If you are going to plant a tree it might as well produce food.

Why Grow Nut Trees?

- Nuts are considered heart healthy by the USDA
- Studies have shown people who consume nuts — particularly raw tree nuts, such as almonds, cashews, walnuts, and more, which have been linked to lower cholesterol, better heart health, weight control, and even a lower cancer risk.
- Hazelnuts, also called filbert nuts, rank at or near the top in many health categories. They are a good source of protein, vitamin E, fiber, and B vitamins—and they have the highest concentration of folate out of any tree nut, according to [UMHS](#).
- <http://www.healthline.com/health-slideshow/go-nuts-health-benefits-nuts#8>

Where Can We Grow Nut Trees?

- New York and Pennsylvania USDA hardiness zones range from 3b to 7b.
- The zone indicates the typical low temperatures experienced during the winter.
- For reference we & Syracuse are USDA Zone 5b.
- Like North PA.



Chart ref.: planthardiness.ars.usda.gov/PHZMWeb/default.aspx

Where Can We Grow Nut Trees?

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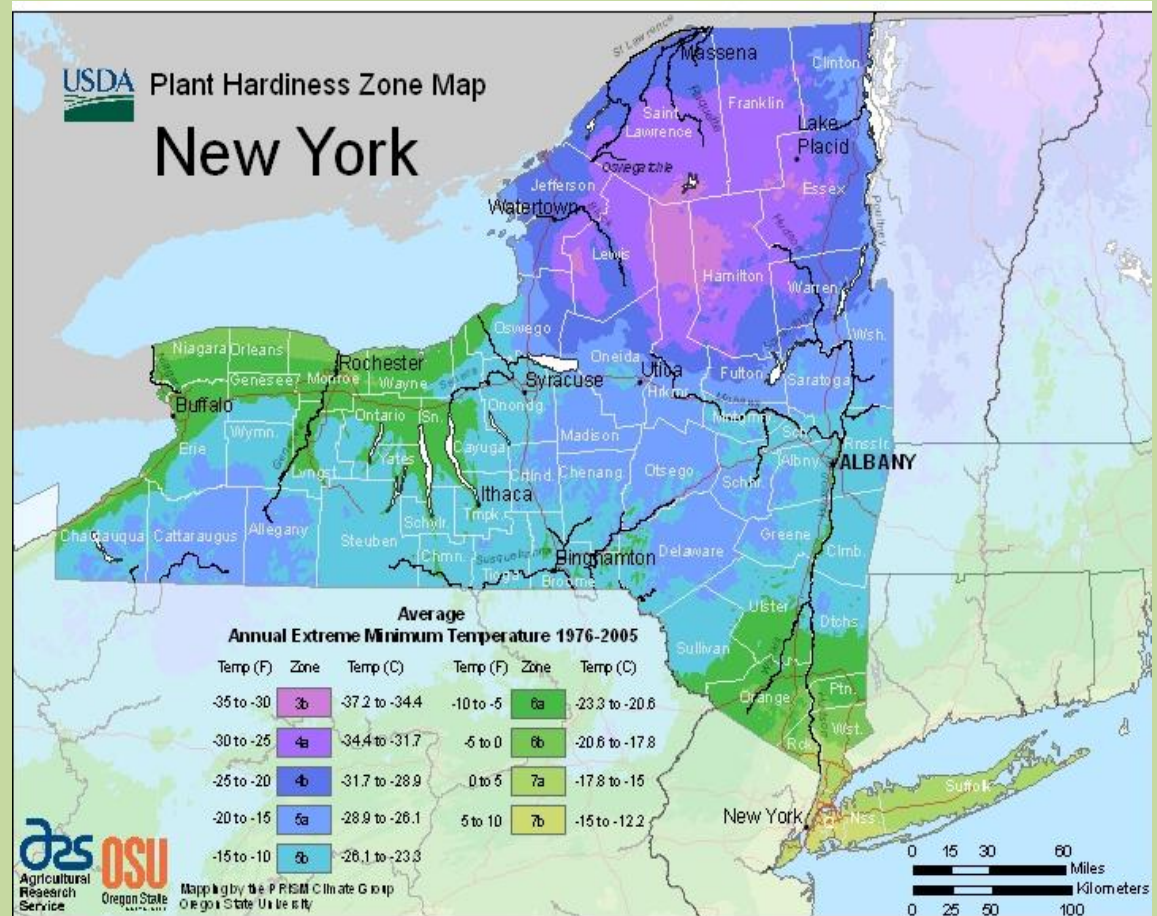


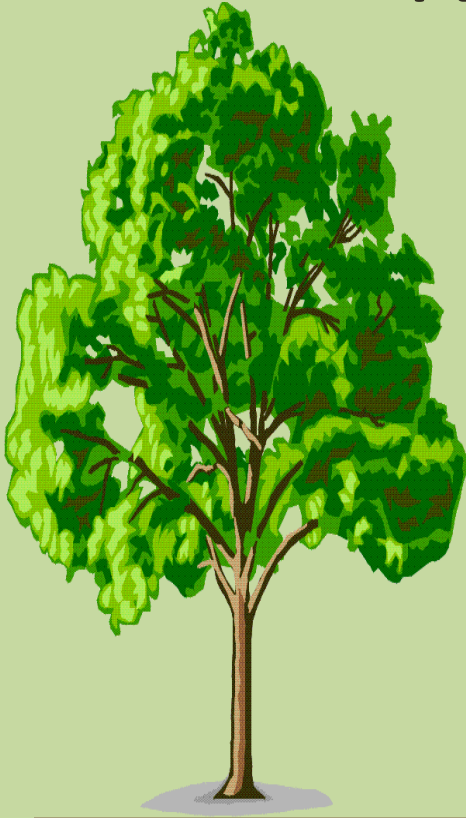
Chart ref.: planthardiness.ars.usda.gov/PHZMWeb/default.aspx

What Nut trees grow Where?

- **Black Walnut** *Juglans nigra*. Hardiness zones 4 through 8 and up to 100 ft. tall.
- **Butternut (aka. White Walnut)** *Juglans cinera*. Hardiness zone 3, and up to 65 ft. tall.
- **Chestnuts** American/Chinese/European/Japanese hybrids chestnuts zones 4b to 8. Timber type and up to 75 to 100 ft. tall and orchard type up to 30 ft. tall.
- **English Walnut aka Carpathian or Persian Walnut**
Juglans regia. Hardiness zones 5 to 7, doing best in zone ≥ 6 and up to 50 ft. tall.
- **Hazelnut or Filbert** *Corylus americana/avellana*. Hardiness zones 3b through 8. In bush form up to 6' to 12' tall and hybrid tree form 12 to 18' tall.
- **Heartnut or Japanese White Walnut**
Juglans ailantifolia var cordiformis. Hardiness zone 4 and up to 50 ft. tall.
- **Hickory - Shagbark**, *Carya ovata*; **Shellbark**, *Carya lacinosa*
Mockernut, *C. tomentosa*, pignuts etc. Zones 4 and up to 100' tall
- **Pecan (hardy northern)** *Carya illinoensis*. Pecans are actually a hickory and is the only species that is grown commercially. Zones 5b to 8 and grows from 60 to 120 feet tall.

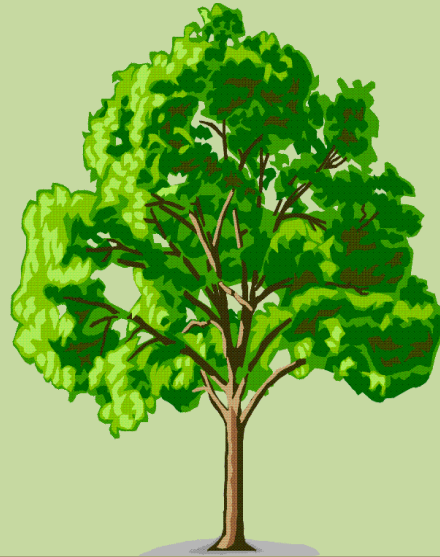
Nut Tree Mature Height

<https://plants.usda.gov>



Mature Height >60' feet

Black walnut
Chestnut – timber type
Hickory
Pecan



Mature Height 30' -60' feet

Butternut
English walnut
Chestnut – Orchard type
Heartnut



Mature Height 12'-30' feet

Hazelnut –tree form



Mature Height 8'-16feet

Hazelnut –bush form

How long before we harvest nuts?

On the East coast the wait is:

- Orchard type chestnut and hazelnut trees in only tree or four years!
- English or Heartnut walnuts in four to seven years.
- Pecan/Hickory cultivars typically over 10⁺⁺ years.

Nut Tree Summary

Tree	Hazelnut	Chestnut Orchard type	Black Walnut	Persian Walnut	Heartnut	Pecan/Hickory
Name	Corylus americana/ avellana	Castanea mollissima, sativa, etc.	Juglans nigra	Juglans regia	Juglans ailantifolia var cordiformus	Carya illinoensis, ovata, etc.
USDA Zones	3b -8	4 - 8	3 - 8	6 - 9	<4 - 9	4.8 - 7.5
pH range	5.4 - 7.5	4.5 - <6.5	4.6 - 8.2	6.5 - 7.5	6.0 - 7.2 ?	6.0 – 6.5
Soil type	all but heavy clay	Well drained	rich well drained	rich well drained	rich well drained	loam deep valley bottom
Height - ft.	6 - 35	30 - 45	60 - 90	40 - 70	35 - 60	60-120
Crown - ft.	6 - 35	25 -40	30 - 40	20 - 40	20 - 40	30 - 50
Preferences	loam	sandy loam	loam	loam	loam	Loam flood plain
Must have	EFB resistance	Blight resistance		Anthraco nose blight resistance		Zinc
Clonal Sources	yes	Yes + Grafts	some grafts	some grafts	some grafts	some + grafts
Harvest Method	pick up or tree harvester	pick up	pick up + tree shake	pick up + tree shake	pick up + tree shake	pick up + tree shake

Plan Ahead For Best Results

- We will review a short summary of the topics for successful hazelnut orchard.
- Take the steps outlined by each topic below in the order listed and you will minimize: your efforts, your risks and your costs, while maximizing the chances of your success.
- Hazelnut orchard is used as a reference, the steps for planning is reused for any nut tree crop.

Plan Ahead For Best Results

- **What USDA zone?**
- **What type of soil do you have? - GIS soil survey**
- **Condition of your soil? - Soil test**
- **Prepare the soil**
- **Orchard type and harvesting**
- **Maintenance schedule & repeat**
- **Business plan Costs, labor & expected results**
- **Chestnuts, Walnuts and other nut orchards**
- **References**

Plan ahead - Steps

- **What USDA zone?** map will tell you what hardiness zone you are in to aid in your tree selections. Locate your field on the [USDA interactive zone map](#). It is important to not buy the wrong tree for your zone.
- **What type of soil do you have - GIS soil survey** needs to be reviewed as to the type of soil do you have? Look up your field on [GIS soil survey web site](#).
- Hazels will do well in most all soil types except acid soils below 5.4pH and heavy clay soils. However, if the soil type is acidic through and through you will be better off to find a different field. Soils with some clay are okay.
- However, heavy clay soils will not drain and hazels like most trees will not do well, without extraordinary effort on your part and it is best to find another field to grow hazels.

Plan ahead - Steps

- **Condition of your soil - Soil test** is needed to see what it will take to grow healthy strong hazelnut trees. A soil test from [Dairy One](#) or your local Cooperative Extension Service, will tell you if you need to add lime and how much. The surface of the soil is often low pH, if it hasn't been farmed in a few years and that can be corrected with some lime. Most land requires liming every few years and it is to be expected. The soil test will tell you if the soil is deficient in any of the macro or micro nutrients and how much to add. Making adjustments is important, as **a tree can only grow as well as the most deficient nutrient allows.** These previous three steps should be taken before any planting endeavor not just hazelnuts.
- **A tree can only grow as well as the most deficient nutrient allows.**

Plan ahead - Steps

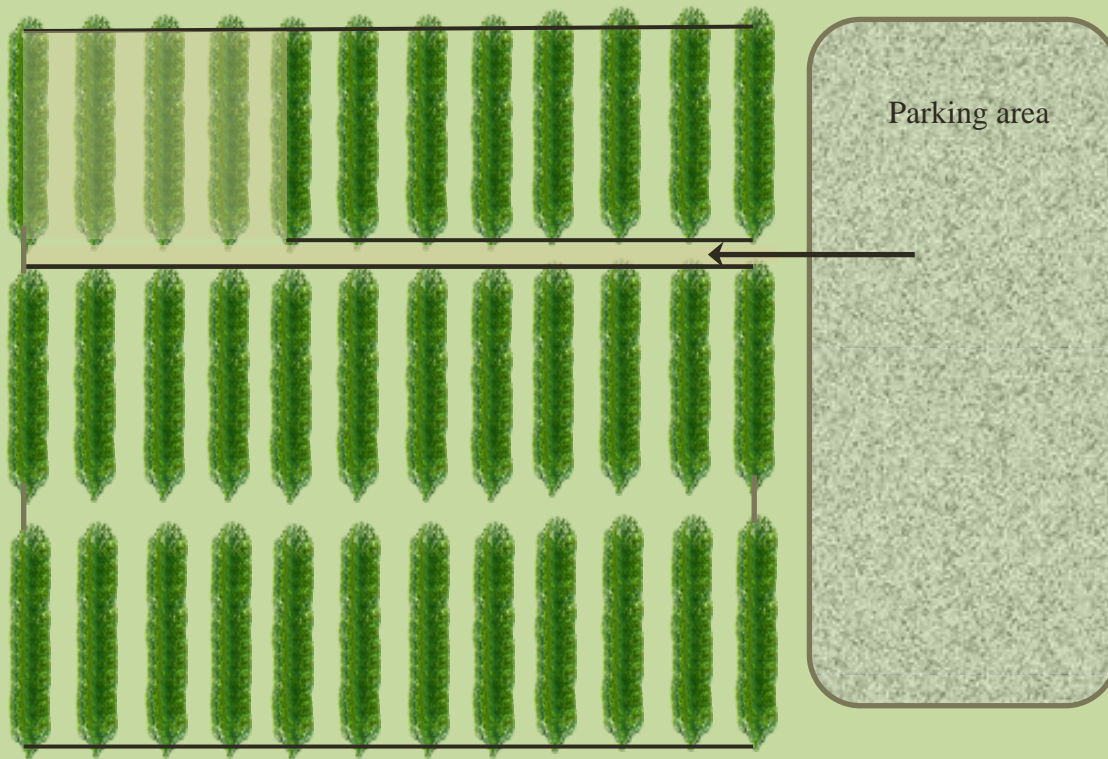
- **Prepare the soil** the land early in the planning stages,
- if possible the year before planting trees to make the recommended adjustments to your soil and land.
- This mean the orchard floor needs to be cleared of brush and rocks.
- The lime if needed will need to be worked in the soil. Lime only moves $\frac{1}{2}$ inch per year on its own and the more you can incorporate it by rototilling or disking it in the better.
- You will need to also add in any recommended amendments, purchased from your local farm store. You can start out just adjusting a strip where you plan to plant the trees, say typically 4 feet wide along the row with a walk behind rototiller. However, over time as the roots grow the whole field will need to be adjusted.

Plan Ahead - Steps

- **Orchard type and harvesting** requires planning once you know your options. Do you want to grow bushes or single stem trees?
- As bushes, hazel are often less than 10 feet and as trees less than 16 feet, so managing them is relatively easy. Are you planning to harvest a few trees or have a U-pick operation or a full blown commercial orchard? These two questions combine to give options if planned properly.
 - **If you are going to be hand picking or a U-pick operation** you will want to grow your trees as a bush. In bush form that are American hazelnuts or hybrids of American hazelnuts (*Corylus americana*) the branches generally remain flexible throughout their life and can easily be bent for easy picking.
 - **If you are planning a mechanized bush orchard**, the bush type hazels can be harvested with machine picking using a blueberry harvester. The harvester bends the branches over and beats the nuts off the tree where they are conveyed into a bin.

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 >600 bushes per acre.



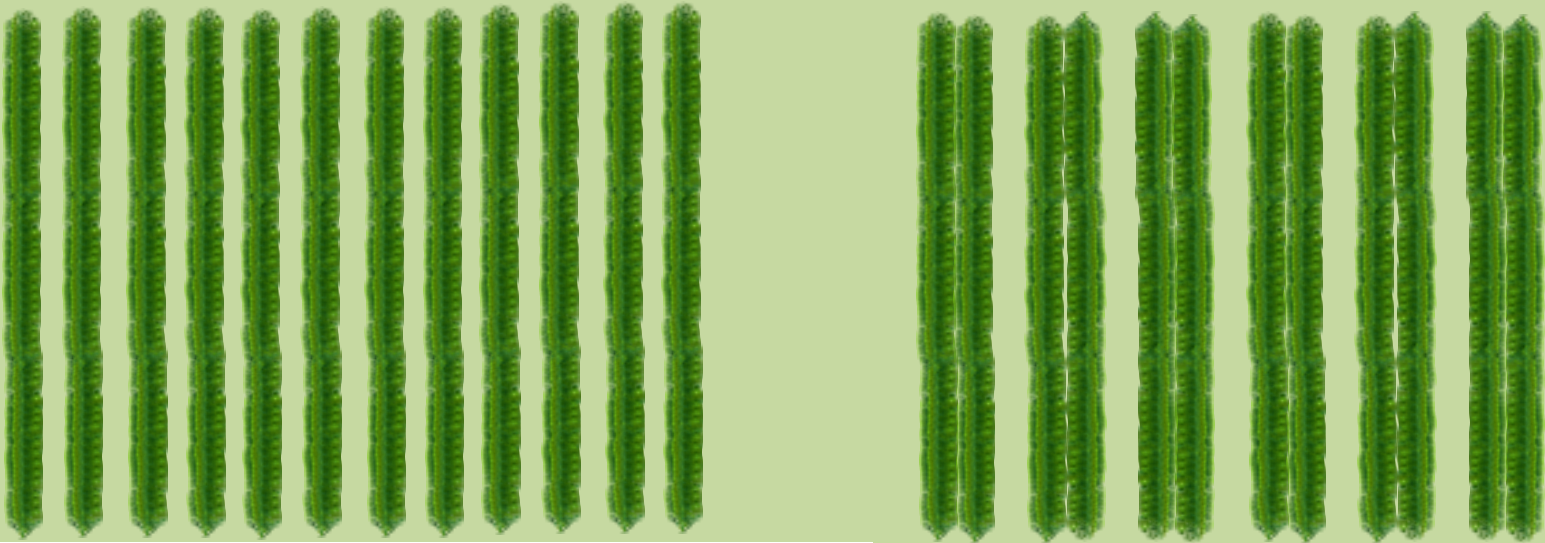
U-Pick orchard layout

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.

Discussion is limited to monoculture at this time as understory and polyculture provides further opportunity, diversification and sustainability.

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.

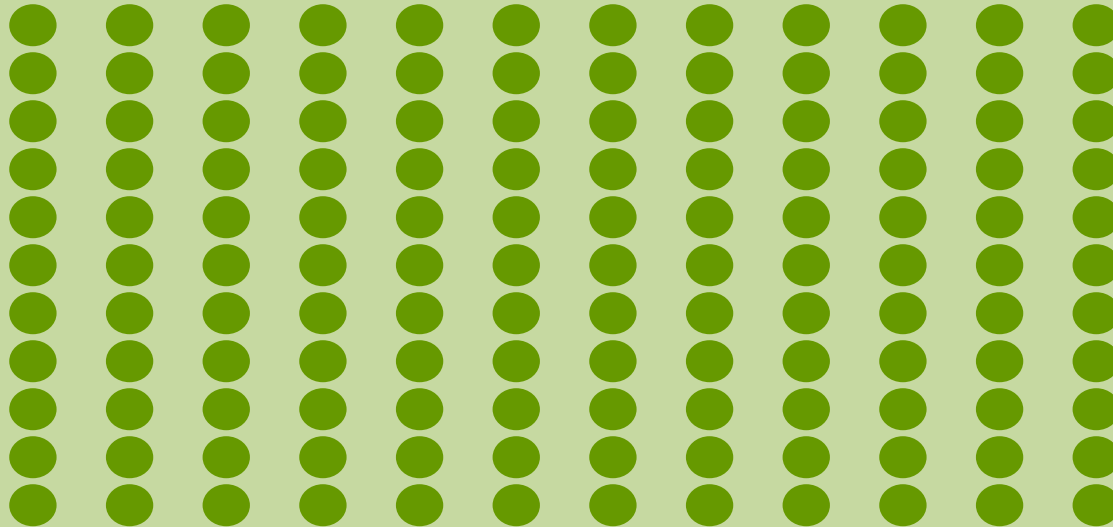
Need to know equipment used for harvesting to use alternate row spacing.

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 8 to 15' feet in row and 16' to 18' between rows for 160 to 340 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?

Plan Ahead - Steps

- **Orchard type and harvesting** requires planning once you know your options. Do you want to grow bushes or single stem trees?
 - **Most larger European hazels** (*Corylus avellana*) along with some American X European hybrids will grow taller and the branches become too stiff to allow bending for a safe U-pick operation or harvesting with an aronia/ blue berry picker. For this type of tree you **have two options**.
 - **Bush and coppice** - You can allow the hazels to form a **bush and just coppice** (cut out) the larger central leaders every few years to keep the branches flexible. This is easily done with the large pruners called loppers.
 - **Single Stem** Alternatively, you can grow **the tree as a single stem** by cutting away any side shoots that grow. When growing the taller tree form of orchard, the nuts are harvested once the nuts drop to the ground. You can pick up the nuts by hand or using a sweeper in combination with a vacuum or just a vacuum.
- **Once you know** the type of orchard you want, find the tree type needed for your USDA zone. Don't let the coppicing bother you as any tree requires some pruning every so often. Harvesting methods based on tree form is detailed in our book.
- **Tree spacing** based on orchard type. U-Pick up to 510 to 750 trees, Larger trees 270 to 510 trees per acre.

Plan Ahead - Steps

- **Maintenance early on requires-**
- **Water and Weeds** -that you diligently make sure the young trees have enough water for the first two years and keep all weeds away from the base of the tree.
- **Fertilization** - Since you made sure the soil was adjusted you won't need to do any fertilization the first two years for seedlings.
- **Watch for** leaf eating bugs like Japanese beetles, tent caterpillars or army worms. Japanese beetles can be greatly reduced by putting a couple of Japanese beetle traps outside of your orchard and monitor. Place traps before you see beetles.
- **Birds and rodents** - The orchard floor needs to be maintained for weed control, rodent control and enable harvesting.
- When the tree starts producing nuts a **leaf analysis** will let you know how well you are doing with fertilization and nutrients.

Plan Ahead - Steps

- **Protection** of your newly planted trees is most important for survivability and fast growth.
 - **Fence** - We recommend putting up a **fence** to keep the larger rodents and deer from munching on your trees. If you are only planting a few trees, instead of building a fence, you can encircle your tree with four **or five foot high metal fence**. The diameter of fence needs to be the overall tree width plus two feet beyond the branch tips, to keep the tree from the reach of deer browsing.
 - **Field mice and voles** - a hardware cloth tree tube around the base of the tree will protect them from having the bark chewed off your tree in the winter time.
- **Repeat** schedule on a yearly basis according to tasks based on the month of year. A month by month yearly calendar reminding you what to do when is detailed our book.

Plan Ahead - Steps

- **Business plan** for any adventure should be known ahead of time. Planning is always a great way to make sure you have the necessary time and money to see your project through to success, as you define it. For most it means cost payback and returns. For some is successful tree growth.
- **Chestnuts, Walnuts and other nut orchards** are conceptually just variants of a hazelnut orchard. We will detail what changes are needed for chestnuts and touch on walnuts, heartnuts, hickories, pecans and their hybrids.
- **References** on where to find information, procure hardware, trees, equipment and soil amendments to get you started in the right direction without wasting time or effort or guess work is located in the reference section of our soon to be published book.

Big News for nut growers

- Our region now officially has a NUT COOP.
- New York Tree Crops Alliance Cooperative – “NYTCA”
- What is a Nut Cooperative?
 - A nonprofit for growers of nut trees only!
 - Processes, markets and sells nuts for the members.
 - All profits go back to members based on nuts delivered to coop.

NYTCA in honor of J. Russel Smith, author of
“Tree Crops – A Permanent Agriculture”



NYTCA Cooperative Provides

Helps eliminate many burdens and risks to growers.

- Eliminates many steps for the farmer including:
 - Sanitizing, drying, sorting, bagging, sales and marketing and safety regulations.
- Shared equipment rental/services for orchard specific harvesting, planting, fencing. Rock picking, etc. Lowering barriers to entry.
- Safety in numbers with knowledge shared
- Provide voice and presence to government

NYTCA Coop.TM– Efforts

- Find source(s) of support for coop.
- Procure equipment in stages, properly sized.
- 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.
- Mentor, Assist and support those beginning the process.
- Expand nursery stock selections.
- Continue R&D for regional needs and continued growth.
- Please support your NYTCA Coop at:
<https://www.gofundme.com/f/support-the-new-york-tree-crops-alliance>

Eastern Hazelnuts Move Toward Commercialization

Overview:

- Status of hazelnut cultivars for commercialization
- Commercial harvesting equipment based on orchard type
- Post harvest processing
- How Cooperatives work



Status of Hazelnut Cultivars for Commercialization

Where are we?

- Hazelnut have been hybridized for over 98 years as hybridization of native blight resistant hazel trees to the European hazel in North America has been documented since 1921 (Weschcke 1953). Efforts documented in NNGA library for 100+ years.
- Noted Eastern Breeders include: Jones, Gellatly, Slate, Reed, Weschcke, Rutter, Grimo, Grinnell, Farris and others.
- Many false starts in planting orchards as it often takes **over 10 Years** for Eastern filbert Blight (**EFB**) to show up.
- We now have the **Hazelnut Consortium**, the Upper Mid-West Hazelnut Initiative (**UMHDI**), and the **Ontario Hazelnut Association (OHA)** all working to bring about hazelnut selections.



Status of Hazelnut Cultivars for Commercialization

Hazelnut Consortium (HC) is:

- Rutgers University, Oregon State University, the Nebraska Forest Service/University of Nebraska--Lincoln and the Arbor Day Foundation
- Working together to develop disease-resistant, widely adapted hybrid hazelnuts for commercial production.
- Professors have searched the world for nuts, tested for EFB resistance and have begun propagating the best selections.
- Rutgers will have selections available for “test” plots in 2019’.
- The selections are of “tree” form for USDA Zones 7/8 and maybe 6? Need to be tested in colder areas.



Status of Hazelnut Cultivars for Commercialization

Upper Mid-West Hazelnut 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.
- Modeled after the oak savanna and based on our native American hazelnut.
- 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



Status of Hazelnut Cultivars for Commercialization

Ontario Hazelnut Association (OHA):

- Lead development of a hazelnut industry in Ontario.
- Promote development, sale and export of hazelnut agricultural products.
- Provide educational opportunities.
- Set a vision for producers, aggregators, processors and retailers.
- Create a network for information and resource sharing, research and project collaboration.
- Actively advocate for the benefit of 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 needed.



All Groups are working to provide clones

Status of Hazelnut Cultivars for Commercialization

Why Clones?

- UMHDI found if seedlings are planted one can expect 120 lbs. to 1300 lbs. per acre. Expect an average of 200 pounds at 500/600 bushes per acre? Option overplant 2x or 3x and cull unproductive bushes.
- Seedlings are good for pollination insurance to widen the time window that pollen is available and ensure genetic variability for pest and weather patterns. Also to find the next best tree to propagate.
- 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?

Status of Hazelnut Cultivars for Commercialization

Examples of two varieties being propagated for 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 flowers
20 years no EFB
Ripe End of Aug. /1st 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
22 years no EFB
Ripe 2nd/3rd week of Sept.



Status of Hazelnut Cultivars for Commercialization

Examples of three more varieties being propagated for clonal orchards. The following six slides can be seen at:

<https://www.midwesthazelnuts.org> or downloaded [here](#).

Upcoming Releases

- 'Grand Traverse'
- OSU 541.147 'The Beast'
- NADF 10-50



Presentation by Aaron Clare at
the UMHDI Conference 2019 - Eau
Claire, WI

Status of Hazelnut Cultivars for Commercialization

'Grand Traverse'

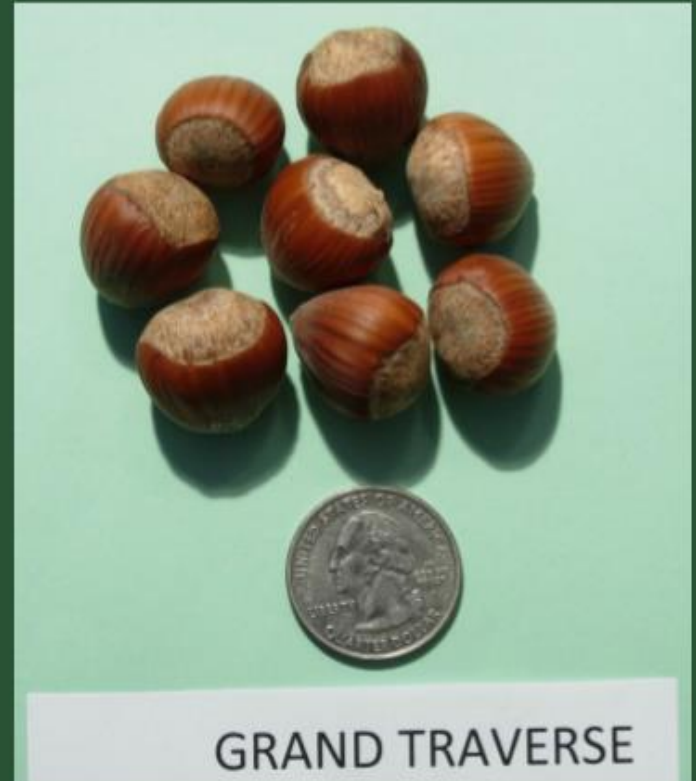
- Developed by Cecil Farris
- 'Faroka' x unknown *C. avellana*
- 75% *C. avellana*, 25% *C. colurna*
- EFB resistant and cold hardy in Nebraska which is Zone 5



Status of Hazelnut Cultivars for Commercialization

‘Grand Traverse’

- 11lbs per tree avg.
- Avg. kernel wt. of 1.3g
- 40% kernel
- Arbor Day Foundation and Great Plains Nursery in fall 2020



Status of Hazelnut Cultivars for Commercialization

OSU 541.147 'The Beast'

- 75% *C. avellana*, 25% *C. americana*
- EFB resistance from *C. americana* 'Rush'
 - OSU 541.147 = NY 110 x Avellana Mix 1990, and S-alleles tell us the pollen parent is OSU 226.118
 - NY 110 = *C. americana* Rush x DuChilly (Sathuvalli et al. 2012)
 - NY 110 is from George Slate's work in Geneva, NY.
 - OSU 226.118 = Tombul Ghiaghli x OSU 42.103
 - OSU 42.103 = Montebello x Compton



Status of Hazelnut Cultivars for Commercialization

OSU 541.147 'The Beast'

- At 6 years old it was producing around 17lbs of nuts
- 43% kernel
- Available from Arbor Day and Great Plains Nursery fall 2020



Status of Hazelnut Cultivars for Commercialization

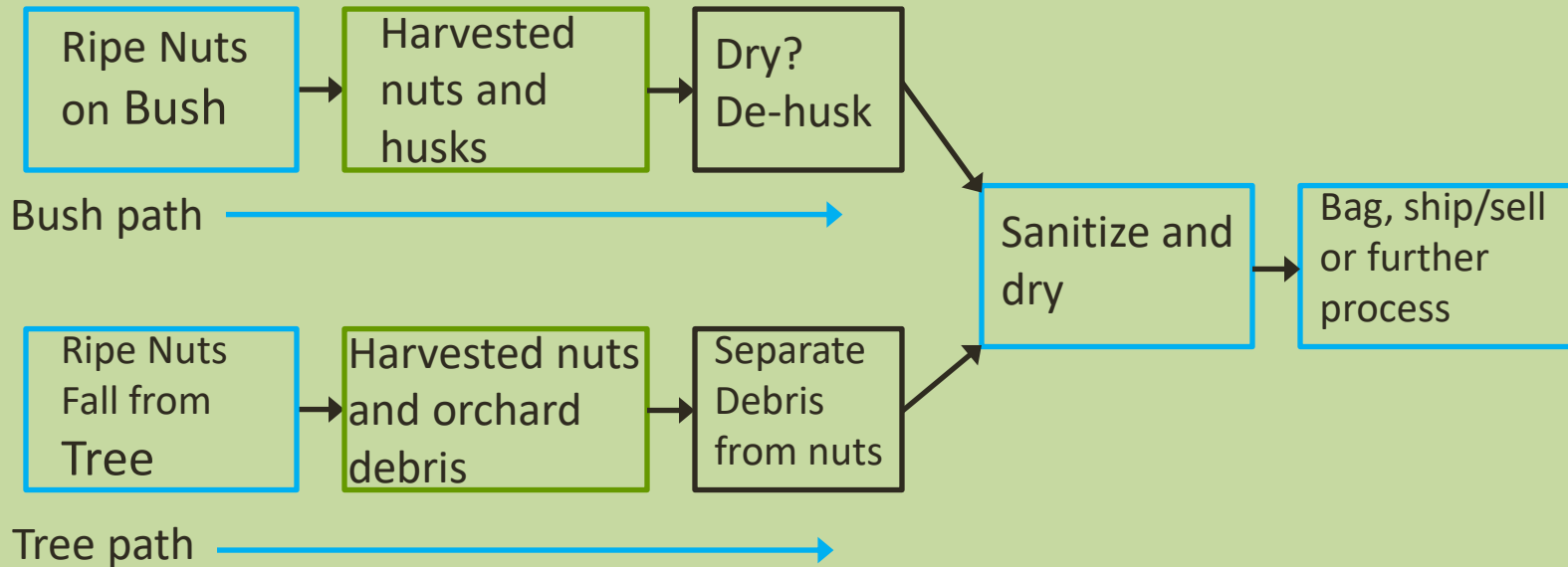
NADF 10-50

- *C. americana* x *C. avellana* hybrid from Arbor Day plot in Nebraska City.
- Seedling purchased from Badgersett Research Corp.
- Avg. kernel wt. of 1.0g
- 39% kernel
- 10-year avg. yield was 5.71lbs



Harvesting Equipment – Bush & Tree form

Harvesting in bush form is somewhat different than tree form.



Lets cover the field harvesting equipment

Commercial Harvesting Equipment Based on Tree/Orchard Type

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

Bush form –

- The hazelnut 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 for seedling trees. Generally longer husks. Not true for rows of clonal trees.



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. See video links below.



<https://www.facebook.com/1139354106122464/posts/2469159469808581?sfns=mo>

<https://youtu.be/XL6LUM4DDfo>

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



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

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



Hazelnut Harvesting Equipment – Tree Form

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,

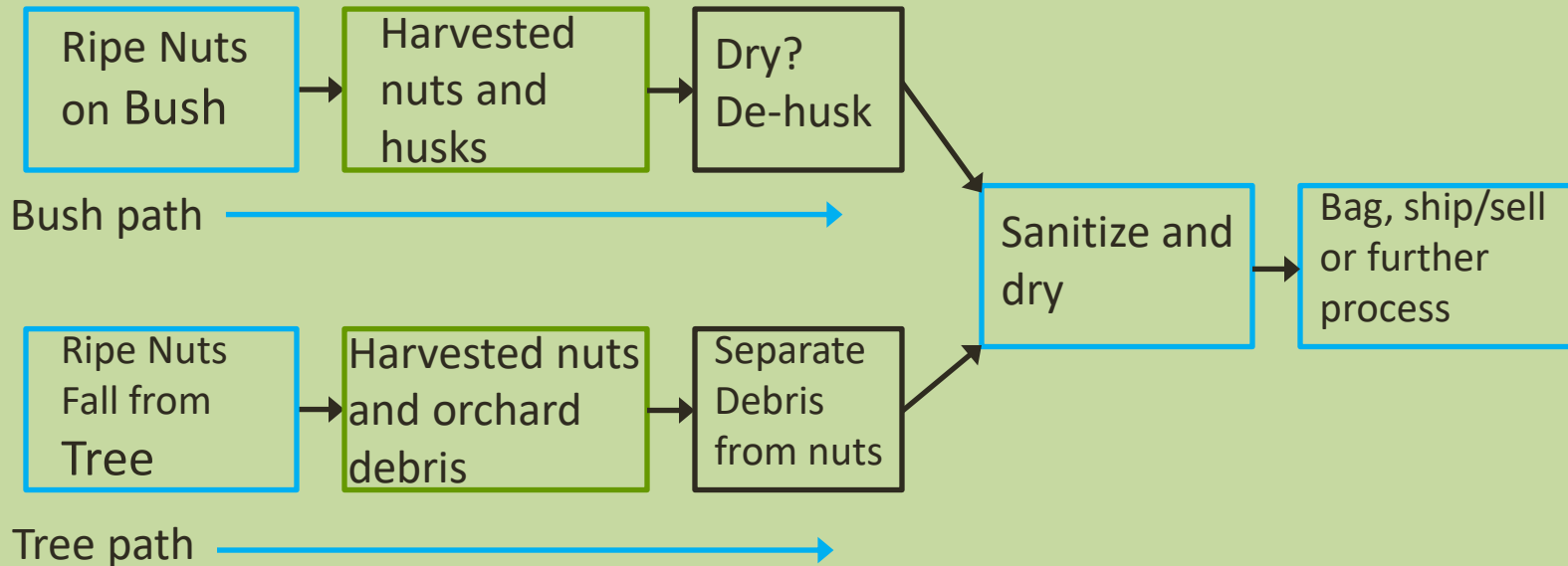
Sold by: <http://bdimachinery.net/>

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



Post Harvest Processing – In Shell

Harvesting in bush form is somewhat different than tree form.



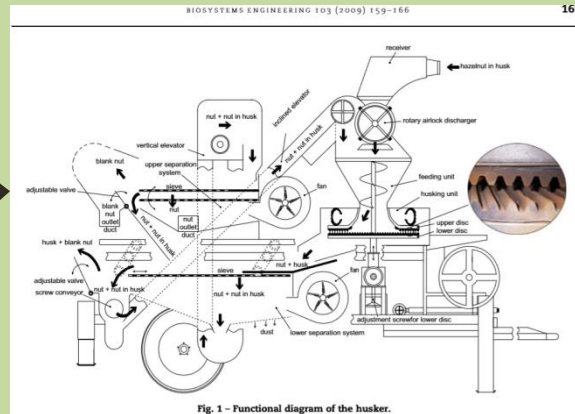
We covered the harvesting but now we may need different equipment to de-husk and separate debris or just debris.

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

Z's Nutty Ridge & Tioga County PA



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.

This is why cooperatives are formed to assist a region. ⁵¹

Cooperatives - Processes and Equipment

Cooperatives –

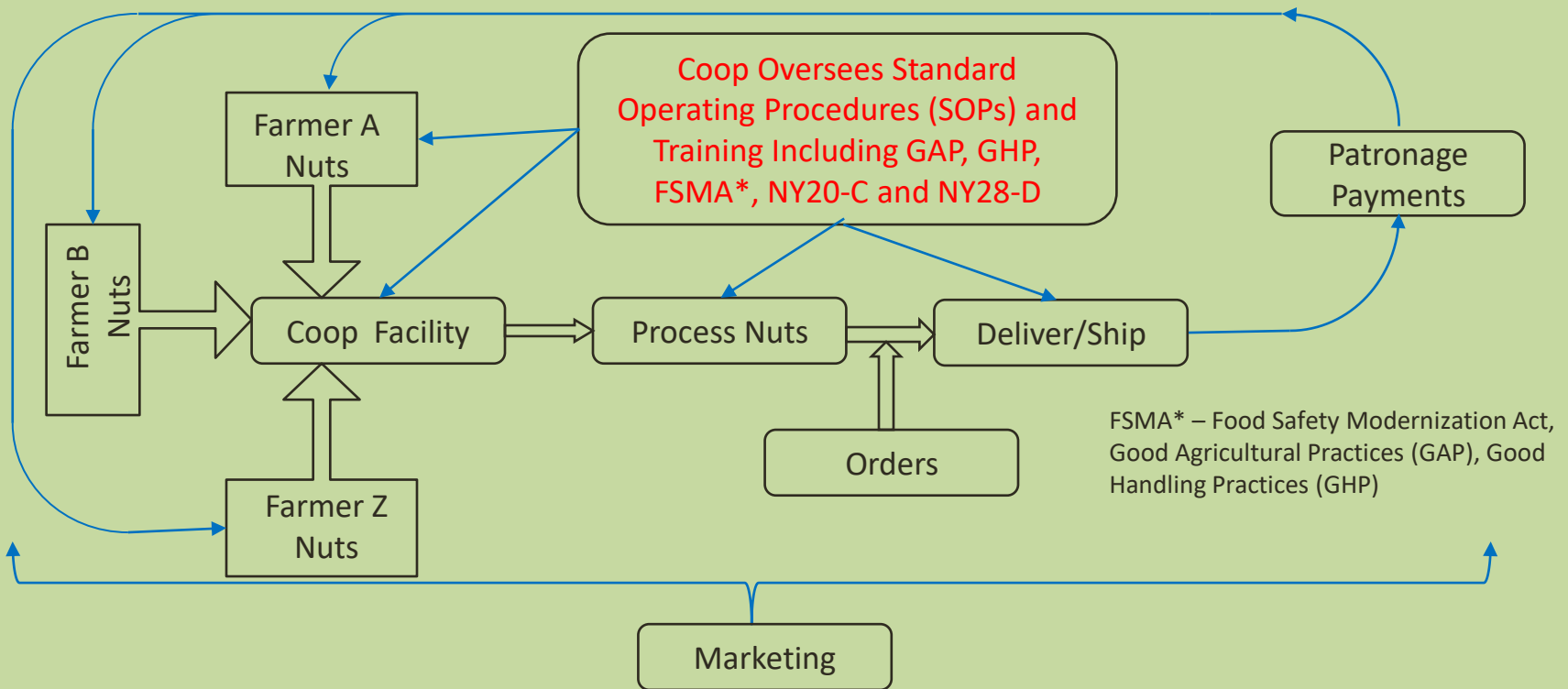
- Aggregate harvests and process on shared equipment.
- Eliminates many steps for the farmer including:
 - Sanitizing, drying, sorting, bagging, sales and marketing and safety regulations.
- Share profits back to farmers based on patronage
- May enable equipment rental/services for orchard specific harvesting, 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.

Big News for nut growers

- Our region now has a NUT COOP.
- **New York Tre Crops Aliance Cooperative** – “NYTCA”
- What is a Nut Cooperative?
 - A nonprofit for growers of nut trees only!
 - Processes, markets and sells nuts for the members.
 - All profits go back to members based on nuts delivered to coop.

NYTCA in honor of J. Russel Smith, author of
“Tree Crops – A Permanent Agriculture”



NYTCA Cooperative Provides

Helps eliminate many burdens and risks to growers.

- Eliminates many steps for the farmer including:
 - Sanitizing, drying, sorting, bagging, sales and marketing and safety regulations.
- Shared equipment rental/services for orchard specific harvesting, planting, fencing. Rock picking, etc. Lowering barriers to entry.
- Safety in numbers with knowledge shared
- Provide voice and presence to government

NYTCA Coop.TM– Efforts

- Find source(s) of support for coop.
- Procure equipment in stages, properly sized.
- 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.
- Mentor, Assist and support those beginning the process.
- Expand nursery stock selections.
- Continue R&D for regional needs and continued growth.

NY Tree Crops Alliance™ – Steps to Growth

- **The cooperative service area:**

- The cooperative should be able to initially serve a 50 mile radius encompassing:

- Central NY,
- Finger Lakes,
- Southern Tier.

- Quickly, expand to a 100 mile radius⁶.



- Thereafter expand to cover all of NY
- We want to encourage more farmer/growers to join the Coop.

NY Tree Crops Alliance TM— 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.

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, 715-373-6104



Working to provide small to mid-sized 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 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

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

The location of the
item is below the
picture.

UMHDI – Regional Support

Stage 2 Processing Equipment (Sanitizing, Cracking, Cleaning)



Impact Cracker

FOREST AGRICULTURE
Nursery



Spindle Cracker

Extension



Stainless Roller Sizer

FOREST AGRICULTURE
Nursery



Aspirator

AMERICAN
HAZELNUT

More information about the Upper Midwest Hazelnut Development Initiative and hazelnut processing in general can be found at : www.midwesthazelnuts.org .



“Nitka” from the NYTCA Cooperative

New York Tree Crop Alliance (NYTCA): nytca.org

Thank You!

Find us at: Znutty.com

