

The Edible Forest in Fargo

& Going nuts in North Dakota

- Jim Walla, Fargo
- Volunteer (esp. community orchards, tree research).
- Nurseryman and consultant (Northern Tree Specialties), slowly retiring again.
- Former research forest pathologist (NDSU, retired).
- Mostly, just a tree guy.

The Edible Forest in Fargo

- A project of the Northern Plains Botanic Garden Society
- In Yunker Farm, a city park in north Fargo.
 - Just east of the airport along North University Drive (1211 28th Ave. N.)
- One of several types of gardens.
 - Rain, butterfly, Chrysanthemum, Woodland, Japanese, Children's, Fairy, Edible Forest
- All gardens free and open 24/7 in growing season
- See Botanic Garden | Northern Plains Botanic Garden Society | Fargo (npbgs.org) or follow on Facebook. Memberships \$20/year

Edible Forest - about

- Edible Forest goal
 - Provide an attractive, educational, & productive demonstration orchard
- Demonstrating:
 - What can be grown here, and what might people like in their home landscapes
 - Management of various fruits, good cultivars, pruning, top-work grafting, etc.
- Still young – most planted in 2020, and on-going
 - Main fruit in 2nd year was raspberries, blackberries, currants, gooseberries, cherries
- About 30 kinds of fruit and about 100 cultivars/selections in 2021
 - Handouts
 - https://www.npbgs.org/files/ugd/71f506_a1fad58ce6ff463d87b67d081747fc7f.pdf
- Tours provided – timing depends on interest
 - Public tours announced on NPBGS Fb page
 - Private tours by arrangement with me
- Occasional demonstrations, e.g., top-work grafting, pruning

Examples of unusual fruits for ND - Mulberry

- Common further south, some in zone 4b, rare in 4a.
- Most here are *Morus rubra* x *M. alba* hybrids.
 - Not nice form – sharp branch angles and dieback like Siberian elms
 - Usually dry, bland fruit, if they fruit at all
- Trader mulberry (*M. alba*) is a cold-hardy tree with nice form and good berries.
- Northrop (likely hybrid) – small berries like Trader and hardy (rarely sold).
- Illinois Everbearing (hybrid) – big berries, but rarely last 5 years here.

Trader mulberry (patented)

- Has interesting history, as passed down through the family.
- William Trader brought many trees with him when he immigrated from Germany.
- It's thought that the tree that is now Trader mulberry was one of those trees, and was planted about 1892.
- The Trader family still owns that farmstead, and family members have been enjoying mulberries from that original tree for generations.
- After other attempts had failed, I was asked to try my hand at propagating it.
- We got some going, planted them out, they grew well, and we thought it would be something others would be interested in growing.
- I started selling them in 2015, other nurseries licensed in 2020, and it's becoming widely available (only from online nurseries this spring, though).

Examples of unusual fruit for ND - Blackberry

- Blackberries are generally considered NOT cold-hardy for ND.
- There are some less-than-commercial-quality cultivars that are at least zone 4a hardy.
- Nelson blackberry (from Fedco Seeds) seems to be the most cold-hardy
 - Delicious berries; plants are VERY thorny and moderately suckering.
- Doyle's blackberry (from DoyleBlackberry) is also hardy
 - Pretty good berries, and plants are thornless and non-suckering; canes are trailing.
- Arapaho and Lawton blackberries have yet to prove themselves
- Will plant Freedom blackberry (Z5, thornless, suckering) this spring.
 - Will be managed for primocane production, and canes will be pruned off each spring

Growing blackberries

- Grow them just like raspberries.
 - In beds for suckering types
 - On trellises for trailing types
- Not just any blackberry – need those that will handle our winters
- Different blackberries taste different, just like different apples
 - The cold-hardy cultivars are smaller berries than commercial types, but taste good.
 - Arapaho blackberry in my nursery was the best-tasting I ever had.

Going nuts in North Dakota

- Really, gRowing nuts
- Few people grow any kind of nut trees or shrubs in ND.
 - Fewer yet use the nuts from those they grow or see.
 - And still fewer are aware of the kinds of nuts that can be grown here.
- I'm trying to put the nut growing puzzle together.
 - Much yet to learn, but I know there are several good opportunities.
- We need to start growing more nut trees and shrubs so we in ND can build on what is already known.
- More community orchards and arboreta should include nut trees.
 - That's where I think people will most likely realize what they can grow.

Some nuts that can be productive in ND

- Hazelnuts
- Black walnuts
- Butternuts
- Buartnuts (butterhearts)
- Hickory
- Pecan
- Hican
- Chestnuts

How to grow them – site selection for ripening

- For many of these, ND is on edge of where quality nuts will mature.
 - Partly due to short growing season
 - Partly due to lack of enough heat units
- Certain sites can add heat units
 - Planting in a larger town where there is a heat-island effect
 - Planting on the south side of a porous windbreak*
 - Can increase daytime temp 2-5 F
 - Can increase growing degree days (GDD) base 50 by 600/season (~25% increase)
- Avoid planting in frost pockets, e.g., bottom of narrow river valley.

*Davies, K.M., Jr. 1990. Microclimate Evaluation and modification for northern nut tree planting. NNGA Ann. Rep. 81.

How to grow them – soil considerations

- All grow best on well-drained loam
- Some require low pH
 - American chestnut (4-6); we have low pH some places, but need to seek them out.
 - Can amend soil with peat moss, sulfur, acidifying fertilizer – temporary fix
- Some prefer low pH, but can handle higher pH
 - Chinese chestnuts, hickory
- Most susceptible to heavy soil
 - American chestnut
- Most susceptible to drought
 - Pecan, butternut
- Some do well on wide range of soils
 - Hazelnut, black walnut, hickory

How to grow them – protecting from wildlife

- SQUIRRELS! Also mice, deer, crows, and others.
- Squirrel management is most important
 - Keep them from climbing the trunk (barrier).
 - Keep them from jumping into the branches, e.g., wide tree spacing & pruning.
 - Dry and store nuts in areas protected from rodents
 - Trapping or other removal can help
 - Timely harvest
- Deer and mouse/vole management as with other fruits
 - Fencing to prevent browsing of young trees and keep bucks from rubbing
 - Basal wrap to prevent girdling

Hazelnuts – *Corylus* species

- European and Turkish hazelnuts not hardy here
- American and beaked hazelnuts native here, but relatively low quality
- American x European and American x Asian hybrids produce larger, thinner-shelled, sweeter nuts than American and Asian plants, and are more disease resistant and cold hardy than European plants.
- Easiest and most reliable nut for ND, but there is wildlife competition.
- Grow superior seed lines and cultivars of hybrid hazelnuts
- Multi-stemmed, slowly suckering shrubs or small trees
 - Generally 8-15' tall.
- Undergoing rapid development for commercial production
 - New cultivars will be great for home use.

Hybrid hazelnuts - growing

- Plant close (6-10') for good pollination (wind-blown pollen)
 - Plants have separate male and female flowers, but are not self-fertile.
- Need different mating types for pollination (ask at nursery).
 - Growers usually get cultivars for nut production along with a good pollenizer seed line, or they get superior seedling/seed lines.
 - One pollenizer plant per 6 quality nut plants.
- Seed lines will have some less desirable plants, about 40% in one case, so buy accordingly and plan on thinning to the best plants.

Hazelnuts - harvest

- The nuts easily ripen before freezing temps come.
- The nuts remain in the husk until the husk dries.
- Depredation can start as soon as the nuts are mature.
 - Need to monitor for nut maturity, and harvest if depredation starts.
- Nuts are mature when you can roll them out of the husk.
 - At that time, husks can be picked and laid out to dry.
 - When the husks are dry, they can be agitated so the nuts fall out.

Hazelnuts – what to plant

- Grow superior cultivars or improved seed lines if you want quality nuts.
- The best cultivars currently available to the public:
 - Northern Blais, Aldera among top yields in UMHDI study (Grimo Nut Nursery)
 - NITKA, [Photon coming] (Z's Nutty Ridge)
- Superior seed lines available as seedlings or seeds from multiple sources
 - Difficult to keep wildlife from digging up seeds, so best to grow out in protected container.
- Riverbend Hazelnuts, Horace, ND – occasional clones (very limited supply), seedlings, and seeds of very good lines.
- UMHDI cultivars not available to public yet, but should be in a few years.
- Nursery list at <http://www.midwesthazelnuts.org/buy-plants.html>
- The best plants are changing fast – those good in Zone 4a will generally be those recommended by the Upper Midwest Hazelnut Development Initiative (UMHDI).
 - Don't confuse with the Hybrid Hazelnut Consortium (less hardy plants).

Black walnut – *Juglans nigra*

- Not native here, but southeast SD and southern MN (zone 4b).
- Found planted across ND, and often spread by seed.
- Nut quality of seedling trees is generally poor.
- Cultivars have thinner shells, kernels that extract well, and earlier ripening.
- Nuts are often left in hull too long enough, so the kernel is discolored and much stronger-tasting.
 - Learn how to care for the nuts.

Black walnut - growing

- Grafted tree could bear in 3-5 years, vs 15+ for seedlings.
- Self-fruitful, but more productive with good pollenizer.
- Deer are very attracted to black walnut trees, so protect the trees.
- Squirrels will start picking before the nuts are mature.
 - Keep squirrel access as limited as possible.
 - Install a nut-hiding place so the squirrels will pick nuts and deliver to your spot.

Black walnut - harvesting

- Flavor of nuts has poor reputation in ND.
 - Different, “stronger” flavor than people here are used to.
 - Partly due to poor handling.
 - Flavor preferred by many further south, so partly due to past experiences.
- Nuts are ripe when the hull near the stem can be pushed in with fingernail.
 - That may happen before or after the nuts drop
 - If husk is still firm, let sit for a week and try again.
- Roll husk on ground with “heavy foot” and then extract nut from the husk.
 - Wear old shoes and gloves because husk juice will leave a black stain
- Rinse nuts to remove most of husk remnants, and then dry 4-5 weeks in mesh.
- Once kernels are extracted, freeze to keep fresh.

Black walnut – what to plant

- ➔ Plant grafted cultivars that bloom late, ripen early, and have quality nuts.
- Not predictable with seedlings, even from good seed lines.

Cultivar	Calculated Maturation*	Northern limit	Nut Quality	Source of grafted trees**
Weschcke	Sept. 22	Northern border	VG	Grimo, Perfect Circle
Sparrow	Sept. 29		F-VG	Burnt Ridge
Sparks 127	Sept. 30		G	
Stegmiller	Oct. 1, proven	To central ND	VG	
Sparks 147	Oct. 5	Southern third	F-VG	Grimo
Wiard	Oct. 6		G	
Elmer Myers	Oct. 9		E	
Thomas Myers	Oct. 13	Southeast corner	VG	Perfect Circle

* Rough estimate with limited information, for Bismarck

**For those where a source is not listed, search for other sources, custom-order, or graft your own.

Butternut (white walnut) – *Juglans cinerea*

- Not native here, but Grand Rapids to Duluth, MN area.
- Occasionally found planted in ND.
- One of the shorter nut trees, with average mature height of 40+ feet.
- Nut quality of non-cultivar trees is usually poor.
- Cultivars have thinner shells and kernels that extract better.
- Butternut canker has decimated butternuts in their native range.
 - A type of disease that should not threaten butternuts in ND, except at a site where it happens to be brought in.

Butternut – growing and harvesting

- Zone 3 hardy, and no issue with time of nut maturation.
- Less tolerant of very dry conditions than other walnuts.
- There can be issues with frost damage to flowers.
 - Grow where soil stays colder longer in the spring.
- Self-fruitful, but more productive with good pollinizer.
- Maturation days not known, but is generally not threatened by cold.
- Mature when husks lighten, when nuts drop, or when squirrels start picking.
- Slit husk and pop off with hammer, then after-ripen for about 3 weeks

Butternuts – what to plant

- I found no maturation times; plant those with highest quality nuts.
 - Those with large nuts that crack out well.

Cultivar	Nut size	Cracking	Pollen release	Productive	Other	Source of grafted trees
Kenworthy*	Very large	good	early	Moderate	Good taste	Grimo
Beckwith	Medium	Very good	late	Most regular		Grimo
Bear Creek	Medium	good	early	Very, but biennial		Grimo
Chamberlin	Medium	Very good		Yes	Good taste, very hardy	Grimo
Weschcke*	Medium	Excellent		Very	Self-hulling, extremely hardy	

*Recommended by Gary Stegmiller

Buartnuts – butternut x heartnut hybrid

- Some call them butterhearts
- Hybrid - combines disease resistance, easy-cracking nuts of heartnuts with cold-hardiness of butternuts
- Very vigorous growers
 - Probably would want to grow them hard in ND so they would harden off
- What to grow
 - Mitchell is the only grafted buartnut available – Grimo
 - Some reports that Mitchell is a pure heartnut, but I don't know if that came from Grimo
 - Perfect Circle is just starting with a “Cornell selection” that appears excellent.

Hickory – *Carya* species and hybrids

- Shagbark, shellbark, and hybrid hickories are the main edibles.
 - Shellbark not known to be hardy here.
- Shagbark native in far southeastern MN, and tree is fully hardy in ND.
 - Can be a great landscape tree and diversify plantings.
 - Nuts of most shagbark hickories would not mature in our short season.
- Nuts often called the best tasting in the world.
- Nut quality of non-cultivar trees is usually poor
 - Thick shells, kernel hard to extract, long maturation season.
 - Plant cultivars with quality nuts that mature here.

Hickory - growing

- Very slow-growing on shagbark hickory roots, and prefer pH <6.5.
 - Much faster growing on northern pecan roots, and widely adapted.
- Grafted tree on pecan could bear in 3-5 years, vs 15-20.
- Many are self-fruitful, but more productive with good pollenizer.
- Some cultivars pollen-sterile, so require pollenizer.

Hickory - harvesting

- Nuts are mature when (or just before) hull sections start separating.
- Crack nut vertically in nut-cracker.

Hickory – what to plant

Cultivar	Maturation	Size, Cracking	Other	Source (varies)
Weschcke	Oct. 1 in Bismarck, proven for ND	Medium, Excellent	Pollen-sterile	Grimo, Perfect Circle, Future Forest
Nielson	Same as Weschcke	Large, Good	Pollen-sterile	Grimo
Porter	14 days after Wesc	Medium, Good	Good pollenizer	Grimo, Future Forest
Ryan	14 days after Wesc	Large	Pollen-fertile?	Grimo
Anthony #1	3 days before Wesc	Medium, Excellent	Could be best for ND	No scion sources?
Crown Point	3 days after Wesc	Medium, Very good	Variable nut size	No scion sources?
Cedar Rapids	6 days after Wesc	Large, Good		Scions available
Bauer	6 days after Wesc	Large, Good		No scion sources?
Fox	9 days after Wesc	Medium		Scions available

Pecan – *Carya illinoensis*

- There are southern, northern, and ultra-northern pecans.
 - Different in hardiness, nut size, and nut maturation time.
 - Northern and Ultra-northern pecan trees hardy in at least zone 4a
 - Some nurseries say “northern” for “ultra-northern”
- Ultra-northern native along Iowa – Wisconsin border.
- Only trees with early nut maturation will produce edible nuts at least some years in ND
 - On the margin, so not all years in zone 4a, and fewer in zone 3a.
 - P3 is 50% in Bismarck, maybe 70% in Fargo and 40% in Grand Forks.
- I would not recommend pecans for some northern areas of ND.
 - Might be exceptions in pockets or with shelter.

Pecans - growing

- Less tolerant of prolonged drought than others.
- Best is planting seeds at final site and grafting cultivar when big enough.
- Female and male flowers on the recommended cultivars do not open at same time, so we need two flowering types.
 - Type 1, protogynous – females flowers open first.
 - Type 2, protandrous – male flowers open first.
 - Having both improves chances of early pollen for early stigmas, and late pollen for late flowers.
- Adding Growing Degree Days will improve chances of nut maturation.

Pecan – What to grow

Cultivar	Flowering type	Calculated Maturation Days*	Comments	Source** (2022)
Iowa	1	135	Large, but poor cracking	
Gibson	1	138	Cracks and tastes great	
James Early	1	140	High Quality	
P3	1	140-145 (~Oct. 10 in Bismarck)		
Snaps	1	140	Good cracking. Good pair with Carlson 3	Grimo
OC-6	2	139	Among best tasting	
Carlson 3	2	139	Thick shell, good quality	Grimo
Warren 346	2 (1?)	140	Good quality, shells well	Grimo, RockBridge
Martzahn	2	142	Good taste	
Green Island Beaver (Cornfield)	2	144	(some say earlier)	

* VERY rough estimate with limited information

**All sold out in 2022; for those not listed, the only option is grafting your own

Hican – hickory x pecan hybrid

- Can be hybrid between pecan and any hickory species.
- Among the best-tasting nuts.
- Some people get very sparse crop, while others get good crop.
- One of few that is likely to produce good nuts from seedlings.
 - But production would be later on seedling than a grafted tree.

Hican – What to grow

- There are a few dozen cultivars.
 - Burton, T-92, McAllister, Pleas, Burlington most common.
- No data found on relative nut maturation times among cultivars.
- Burton is the only hican on which I could find information to indicate the nuts would mature in ND. If I were to try another, it would be T-92.
 - Burton nuts should ripen about the same as Weschcke hickory.
 - Noted to be annually productive of good-quality pecan-like nuts.
- Best pollination with another hican?
 - Overlapping pollination with hickories (early) and pecans (late) can work.
- I would pair Burton with a hickory, e.g., Porter.

Chestnuts – *Castanea* species

- The least hardy tree talked about today.
 - If the tree grows reasonably well, it will produce mature nuts.
- Several species, mainly American, European, Chinese, Japanese.
- American are most cold-hardy, but prefer pH <6, get chestnut blight, and produce small nuts (3/8”).
- Chinese tolerate higher pH soil, resist chestnut blight, and produce large nuts (1”+), but most are reliably hardy only to zone 5.
- European are similar to Chinese, except susceptible to chestnut blight.
- Japanese are similar to Chinese, except lower nut quality.
- Some hybrids can give us the best of these traits, but none perfect.
 - Main issues in ND are cold-hardiness and soil pH.

Chestnuts – growing and harvesting

- Chinese and its hybrids will do better in heavy soil and higher pH soil than American
 - With heavy soils, planting on a mound can get them off to a good start.
 - pH can be adjusted with peat or sulfur – mainly for a good start.
- Grafted tree could bear in 3-5 years, vs 8-10 for seedlings (both variable)
- Nuts grow in spiny burs that deter people, but not squirrels.
 - Mature when (or just before) bur starts splitting.
- Nuts do not store well – a few months in refrigerator.
 - I like them best fresh, not roasted.

Chestnuts – what to grow

- Grafted chestnuts have a history of shortened life-span in zones 4-7.
 - 20-25 years estimated for grafted vs. 100+ for seedlings
- Best info available – GROWING SEEDLINGS IS LIKELY BEST FOR ND
 - Most Chinese and American chestnuts grow true from seed, so can avoid graft issue.

Chinese & hybrids	Species**	Comments	Seedlings/Seeds	Grafted trees
Szego*	C – J – chinquapin hybrid	Chestnut blight S, relatively cold hardy	Perfect Circle, Red Fern	Perfect Circle
Luvall's Monster*	C – J – A hybrid	Male-sterile, relatively cold hardy	Perfect Circle, Red Fern, Route 9	Perfect Circle
Jenny	C		Route 9	Perfect Circle
Resilient	C – open-pollinated		Red Fern	
Iowa Golden	C – open-pollinated		Red Fern	
Chinese/American	C – A		Grimo (if they can be sent to US)	
American				
Podoll trees*	A	Clones or seedlings		

*Probably most cold-hardy

**C=Chinese; J=Japanese; A=American