Establishing a Chestnut Tree Education/Demonstration Plot
4-H Camp Palmer
Fayette, OH 43521

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THE
AMERICAN
CHESTNUT
FOUNDATION

A note from the author:

I became interested in growing American chestnut trees in 2009. At that time I had never seen an American chestnut tree growing in Northwest (NW) Ohio and I also did not know if the chestnut tree was native to the region. Subsequent research indicated that indeed the American chestnut tree was a native of this area. Since my enlightenment, I have taken a proactive approach towards helping folks in NW Ohio learn about the chestnut tree.

In the early spring of 2013 I received permission from the Ohio Division of Forestry to establish a "Chestnut Education/Demonstration Plot" in the Maumee State Forest – "Tree Improvement Area" located four miles south of the Lange Tree Farm. This was a real learning experience because while I had read about demo plots I could not find very much information on actually establishing a plot. I swapped a lot of emails with various members of The Ohio and The American Chestnut Foundation and was able to get a ton of helpful information and advice.

In May of 2013 I was invited to be part of a small group that would advise the 4-H Camp Palmer staff on how to better manage the wooded areas of the camp. During the discussions I mentioned the possibility of the establishment of a "Chestnut Education/Demonstration Plot". I indicated that if they were interested the Lange Tree Farm and friends would establish the plot.

The following narrative is my attempt to document my experience establishing a "Chestnut Education/Demonstration Plot" at 4-H Camp Palmer.

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Walter H. Lange, Lange Tree Farm,
The Ohio Chapter – The American Chestnut Foundation

1. Why?

The American Chestnut Tree was hit by blight sometime prior to 1904.

Before the blight, American chestnuts were majestic forest trees, sometimes called "the Redwoods of the East." A keystone species, one in four trees of the eastern US forest was a chestnut. These huge trees were highly valued since the golden hardwood resisted rot and its crop of sweet nuts fed abundant wildlife and generations of Americans. In NW Ohio, chestnuts grew along Lake Erie and in the Oak Openings Region, west into Indiana, and north up into Michigan.

The 4-H Camp Palmer "Chestnut Education/Demonstration Plot" is an education tool designed to help distinguish among several species of the chestnut family (Castanea) commonly found in North America. We are hoping to spark some interest in restoring the American chestnut tree to NW Ohio to benefit our environment, our wildlife, and our society.

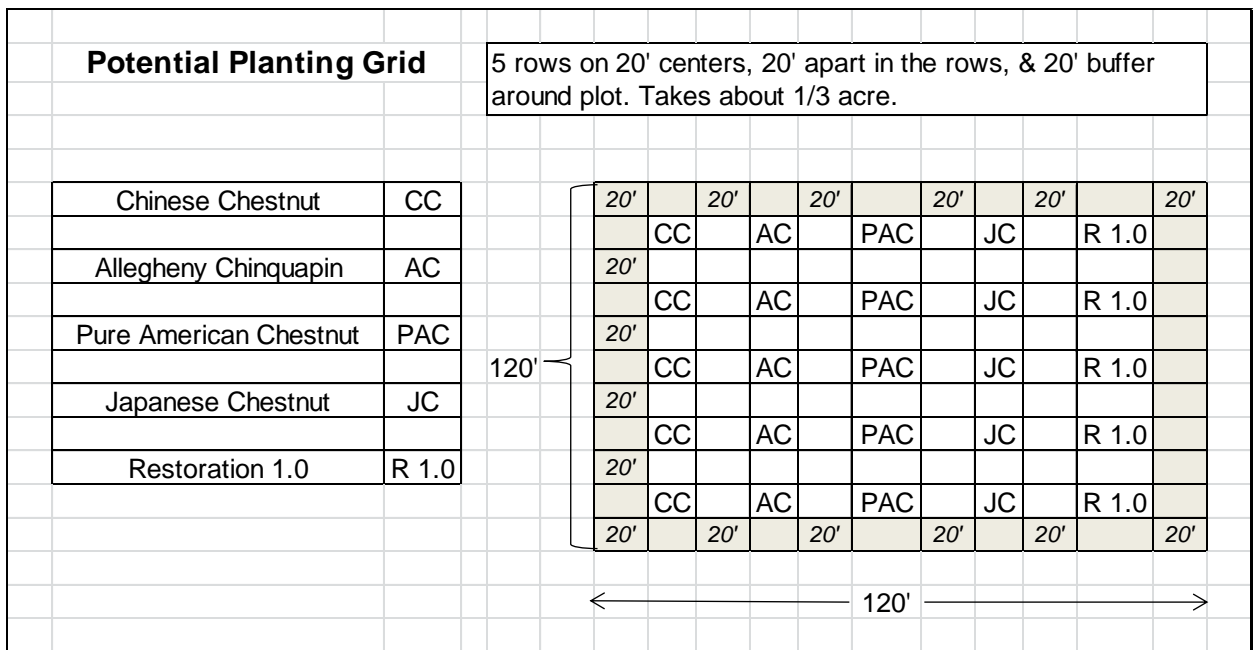Following are The American Chestnut Foundation's "Top 5 Reasons to Save the American Chestnut":

- ✓ **Healthy forests** – restoring the chestnut will improve biodiversity in our forests.
- ✓ **Restoring an American legacy** – the American chestnut is an important part of our history and culture.
- ✓ **Food for wildlife** – chestnut trees provide an abundant and nutritious food source for animals.
- ✓ **Reclamation** – fast-growing and tolerant of poor soils, the American chestnut can help turn degraded landscapes into forests.
- ✓ **Road map for the future** – we are creating a template for restoration of other threatened species.

2. Ideal Site:

a. Well drained, sandy soil that is somewhat acidic with a soil pH range from 5 to 6. We did not do a soil test at the 4-H Camp Palmer site because it is somewhat sandy and has many white pines growing. The rule of thumb for NW Ohio is that if white pine will grow on the site there is a good chance that chestnut will grow on the site.

b. A public site with a volume of traffic that will encounter the signage. The 4-H Camp Palmer site has over 6,000 visitors annually.

c. The site should be far enough north so that Phytophthora root rot is not an issue. This should not be a problem in NW Ohio.

3. **Space requirements: (See Potential Planting Grid)**
   a. The 4-H Camp Palmer site consists of five of each of the following: pure American chestnut, "Restoration 1.0" Chestnut, Chinese chestnut, Japanese chestnut, and Allegheny chinquapin chestnut. These were planted plantation style for ease of maintenance.
   b. If planted on 20 x 20 spacing and a 20 ft. buffer, then about 14,400 square feet or approximately 1/3 of an acre is required.
   c. Note that one can plant more or less than five trees, and could even plant more or fewer types of chestnuts.
   d. We used 20 x 20 spacing in a plantation style to give the mowing machine operators plenty of room to turn around and maneuver around the trees.

Potential Planting Grid		5 rows on 20' centers, 20' apart in the rows, & 20' buffer around plot. Takes about 1/3 acre.			
Chinese Chestnut	CC				
Allegheny Chinquapin	AC				
Pure American Chestnut	PAC				
		120'			
Japanese Chestnut	JC				
Restoration 1.0	R 1.0				

Planting grid (120' × 120'), rows of: CC, AC, PAC, JC, R 1.0 (repeated for 5 rows, spaced 20').

20'	CC	20'	AC	20'	PAC	20'	JC	20'	R 1.0	20'
	CC		AC		PAC		JC		R 1.0	
20'	CC		AC		PAC		JC		R 1.0	
	CC		AC		PAC		JC		R 1.0	
20'	CC		AC		PAC		JC		R 1.0	
20'	20'	20'	20'	20'	20'					20'

← 120' →

4. **Ideal time to plant:**
   a. For seed or bare root seedlings, plant in the spring whenever soil conditions permit, usually mid-March to the end of April.
   b. For containerized trees, you can plant at almost any time that the soil is pliable and as long as follow-up maintenance occurs.
   c. At 4-H Camp Palmer we planted the pure American and American Hybrid - "Restoration 1.0" Chestnut, in the fall of 2013 because the trees were available. We planted the Chinese and the Allegheny chinquapin in the spring and planted the Japanese chestnuts in the fall of 2014.
   d. Most of the trees were purchased from Empire Chestnut Company: empirechestnut@gmail.com. Some of the trees were donated by The American Chestnut Foundation via Sara Fitzsimmons, an American Chestnut Foundation Research Technician at Penn State University.

5. **Site preparation and Planting:**
   a. Lay out the plot and mark the location of each tree.
   b. Our planning started in early August so we were able to kill the sod using "glyphosate". Note that we should have worked on killing the grass in early July so a second application of herbicide could have been applied.
   c. Prior to planting we used a tractor - mounted rototiller to till each individual site. It really helped to break up the old sod and make a better planting site.
   d. Since 4-H Camp Palmer is located 30 miles from my farm, it was necessary to make a list of all the tools needed for whatever was taking place during a work day.

Chestnut Education/Demo Plot at 4-H Camp Palmer Site Prep & Planting tools and materials
Site Prep: The 1/3 acre was mowed as low as the mower would allow
Layout Tools: Measuring tape or wheel, marking flags, marking paint, long string
✓ Measure in from the fence line to establish a base line for all measurements
✓ Start 20' from and parallel to the Base Line. Use marking flags at the starting point
✓ Layout 5 rows parallel to the Base Line. The rows should be 20 feet apart
✓ Mark 5 trees per row - 20 feet apart
✓ Mark out 4 x 4 squares, each tree will be planted in the center of the square
✓ Kill the sod by apply a weed killer such as "glyphosate".
Mowing & Rototill - Lawn Mower & Tiller
✓ Mow the entire site again if needed
✓ Mow as low as possible where each tree will be planted in the 4 x 4 square
✓ Rototill the 4' x 4' square - it is important to thoroughly till these individual sites
Planting Trees:
✓ VERY IMPORTANT: Seedling Trees MUST be planted at the same depth at which they were originally grown. Seed should be planted no more than 1" below ground.
✓ Tools: pointed shovel, pruning shears, stake pounder, scoop shovels for mulch
✓ Supplies: Trees, short shelters, mulch mats & staples, stakes, water wagon, buckets, mulch, rakes
Planting Instructions for Planting Seedlings:
✓ Check this article: *"Planting Chestnut Seedlings"* by Paul Franklin and Tom Saielli published in *The Journal of The American Chestnut Foundation* – January/February 2013, Pages 12-14.
✓ Plant trees in center of the 4 x 4 square
✓ Trees MUST be planted at the same depth as they were originally grown
✓ Check the root system for long straggly roots which will need to be pruned back
✓ DO NOT wrap long roots around the hole

1.	Dig tree hole at least two times wider than the tree ball with sloping sides. Dig hole to a depth so the located root flare, at the first order lateral root, will be at finished grade.
2.	Create a firm soil mound at the bottom of the planting hole.
3.	Spread roots over soil mound so that root flare is at finished grade and the tree is straight and place some dirt around the roots.
4.	Determine where you are going to place the stake for the tree shelter. It needs to be a few inches from the trunk so it will not injure any roots when you pound it in.
5.	Backfill with the soil and firmly pack around the roots in order to exclude air.
6.	Water thoroughly
7.	Put down the mulch mat. Make sure it is parallel to the squares sides, and staple in place
8.	Carefully place a "short" tree shelter over the tree and put in a stake
9.	Fasten the tree shelter to the stake
10.	Place mulch 2 to 3 inches deep around the tree leaving three inches (3") adjacent to the tree trunk free of mulch.
11.	DO NOT make a TEE-PEE with the mulch against the tree shelter
12.	Critter issues – deer, rabbits, mice, and voles love chestnut trees.
13.	Wire cages and/or perimeter fencing is highly recommended to protect from deer.
13.	Our wire cages were made from Tractor Supply fencing as follows: Welded Wire 2" by 4" mesh fence, 100 ft. long rolls, 48" in height. A 9' foot length of fence rolls into a circle of about 3' in diameter. The wire circles were held in place with two 6' tee posts and releasable cable ties. The releasable cable ties make it easy to remove the wire cage for weeding and pruning. (See photo)

The photo shows Charly McCaw, a row sign, a critter cage and the author.

Deer & Rabbit Fence + Rodent Guard/Tree Shelter		
Wire - 2 x 4 mesh	2" x 4" mesh x 4', 3 rolls'	$180.00
Steel Posts	6' Tee Post, 50 x $4	$200.00
Cable ties	Releasable -- 100	$8.00
Tree Shelters	2' - 25 @ $2	$50.00
	Total Critter Cages	**$438.00**

6. **Other planting issues**:
   a. Initially we considered using 48" Tubex – Tree Shelters around each tree. But we reconsidered this and reduced them to 15" – 18" and installed the wire cages.
   b. Weed control around young trees is very important. We put down 3'x 3' mulch mats and covered them with 3 inches of mulch.
   c. You can also just use herbicides to control weeds.
   d. Mowing the plot several times per year is recommended.
   f. Note that there are many different options for planting and maintenance of chestnut trees, but these procedures worked very well for us. Contact The American Chestnut Foundation staff for any questions about using alternate methods.

7. **"Signage" – Individual Rows** (See photo)
   a. The signs are 8" x 10" and cost $5 for the plastic materials and $15 each for engraving, a total of $100 for five signs.
   b. The laser engraving was done by Fine Lines Laser Engraving, finelines@embarqmail.com
   c. Another option available is to contact your local Career Center and see if a student in the "machine trades shop" could do them.
   d. The 5 cedar 9" x 11" backer boards were cut from a 1" x 12" x 8' cedar board that cost $16.00. (You could use treated ¾" plywood. Some stores will sell a ½ sheet that is 2' x 8')
   e. Square Post: we bought 4"x 4" x 10' treated deck posts and cut them in half at a 45° angle. Cost about $48.
   f. Tip: when screwing the plastic to the cedar board, be sure your holes in the plastic are a bit larger than the screws. Back the screws ¼ turn after being tight. The plastic needs to be able to expand and contract unless you like wavy signs.

Cost of Row Signs		
Posts (4 x 4 x 10')	3 x $16.00	$48.00
Plastic for Signs	5 @ $5	$25.00
Laser Engraving	5 @ $15	$75.00
Cedar Backer Board	1" x 12" x 8', 5	$16.00
	Total Row Signs	**$164.00**

8. **Building the Kiosk**

Cost of the Kiosk		
Treated 6 x 6 Posts	6 x 6 x12' cost $60 x 2	$120.00
Concrete Mix	8 bags x $4	$32.00
Roof Metal – cut to length	26 sq. ft. x $2.35	$60.00
Nuts, bolts, screws, etc.	roof & framing	$30.00
Carriage Bolts	Galvanized ½" x 12" 2@$3	$6.00
Ash Boards	(5/4 x 9" x 8 '), 7 x $20	$140.00
Kiosk Roof Framing		
To set width of posts	2 x 6 x 8'	$20.00
Cross Bracing	2 x 4 x 10' - 5 @ $8	$40.00
Rafter ties	10 x $1	$10.00
Pointed Stakes (4)	Cut from a 2 x 4 x 8'	$4.00
Kiosk Signage		
Stain for front boards	Cabot Stain	$10.00
Tamper Proof bolts	12 x $3	$36.00
Chestnut Foundation	3 Panel Sign	$300.00
Thank You Sign	Fine Line Laser Engraving	$150.00
	Total for Kiosk	**$958.00**

Kiosk Construction procedures

a. A router was used to round off the four edges of the 6 x 6 post. The posts are very rough and a ½" quarter round router bit worked fine.

b. The camp let us use a portable generator for our power tools and to charge the batteries on the portable tools.

c. We build the post frame work in the shop. The outside width of the posts is 93". The top and bottom 2 x 6 x 8' cross beams overhang each 6 x 6 by 1½".
We used 3" deck screws as fasteners.

d. Building the frame work in the shop enabled us to make sure everything was really square. The photo shows the cross bracing and builder Bill Keener along with the author.

e. We dug the holes about 3 feet deep by 2' wide and placed a 2" x 8" x 16" cement block in the bottom of each hole for the post to sit on. Make sure your holes are exactly the same depth, check using a 2 x 4 and a level.

e. We used the tractor to lift the frame work and set it in the holes.
f. Check again to make sure it is level.
g. Brace the structure using the 4 stakes and the 10 foot 2 x 4. You need to hold it in place for about one week until the concrete is dry.
h. We back filled the holes with chunks of old brick and concrete along with 4 bags of ready mix concrete. Fill the hole about 1/3 full with rocks and dump a bag of concrete mix and cover with water.
i. Repeat the above until the hole is filled.
j. We used the camp tractor to fill in around the base with some crushed stone that the camp had available for road maintenance.

Materials & Tools for Installation of the Kiosk frame work	
Item #	
1	bags of concrete -- 8
2	Tractor to lift frame and set in the hole
3	Driver BITS, square, 6/8 star, Phillip's
4	2 flat 2 x 8 x 16 cement block for bottom of holes
5	Ladder 6' and Two 8'
6	Level -- 4 foot & Post level
7	post hole diggers
8	rocks from rock pile - place around posts
9	Saws All
10	screws, bolts, etc.
11	shovels flat & pointed
12	sledge hammer to drive in brace stakes
13	water for the concrete
14	Skill saw for cutting boards
15	Portable generator

Building and Installing the Roof

a. We built the roof frame work at home in the shop and designed it so we could then set it on top of the "post frame work" with the "ridge board" ultimately resting on the top of the 6 x 6 posts.

b. We used "hurricane brackets" to attach the trusses to the 2 x 6 x 8' cross members. (See photos)

c. The 2 x 6 x 8' cross members will replace the top 2 x 6 x 8' cross members of the installed "post frame work".

d. Again, the roof frame work will be set on top of the installed "post frame work". The ridge board will sit on top of the 6 x 6 posts.

e. The two 2 x 6 x 8'cross beams will be secured to the 6 x 6 posts with ½" by 12" carriage bolts.

f. The ends and the fascia are covered with rough saw ash boards.

Installation of Roof - List of materials, tools etc.			
Item		**Item**	
1	1.25 x various width ash Boards for center	14	4 foot Level & Post level
2	2 x 4 - Native oak or maple for cross bracing	15	Plywood for work surface
3	Roof medal and green screws	16	Portable Drills
4	Battery Chargers for portable tools	17	Various deck Screws, many sizes
5	Pencils	18	Saw Horses -- 4
6	Circular Saw	19	Sawzall
7	Driver BITS, square, 6/8 star, Phillips	20	Scaffolding
8	Extension Cords	21	Blocks of wood to level scaffold.
9	Generator & Gasoline for Generator	22	Shim stock
10	Hand Tools - hammers, etc.	23	Small Drill bit for pilot holes, etc.
11	Ladders, 6' and TWO 8'	24	Carpenter Squares - 2
12	Large Drill Bits - 3/8 to 5/8 by 12"	25	Table for a work surface
13	½" Power Drill	26	Water Cooler & Cups

Placing the roof structure on the Wood Frame

a. We were very careful while building the roof structure to make sure we would be able to use the tractor to lift the structure and gently lower it down onto the "post frame work" and have the cross members of the roof rest on the 2 x 6 cross members of the "post frame work".

b. We then removed the top 2 x 6 cross members on the "post frame work" and lowered the roof structure so it rested on the ridge board.

c. The two 2 x 6 x 8' cross beams on the roof structure were secured to the 6 x 6 posts with ½ by 12" carriage bolts.

d. 2 x 4 braces were installed from the bottom of the roof structure to the outside edge of the 6 x 6 posts at about a 45 degree angle.

e. The metal roof sheeting and ridge cap were installed. The scaffolding was a really big help for roofing the kiosk.

Installing the center boards

a. Cut/ripped a 4" wide ash board into 2" x 1" nailing strips. 4 are needed.

b. The router was run down one edge of each nailing strip.

c. One strip was screwed to each post.

d. The wide ash boards were attached to the two nailing strips with 2.5" deck screws at about a 35 degree angle.

e. The exposed screw heads were covered with the remaining nailing strips.

f. As a final touch, we put a coat of Cabot light beige stain on the horizontal ash boards.

g. A 4' x 8' sheet of ¾" exterior plywood could be used in place of the ash boards.

Nicholas Heban and Charley McCaw applying "Cabot" stain to the horizontal ash boards. (Note the diagonal bracing)

9. **"Signage" –for the Kiosk**
   The American Chestnut Foundation has two very nice signs available:
   a. The photo shows the "Single Panel"
      fence post sign that measures 24" x 36"
      and costs approximately $150.
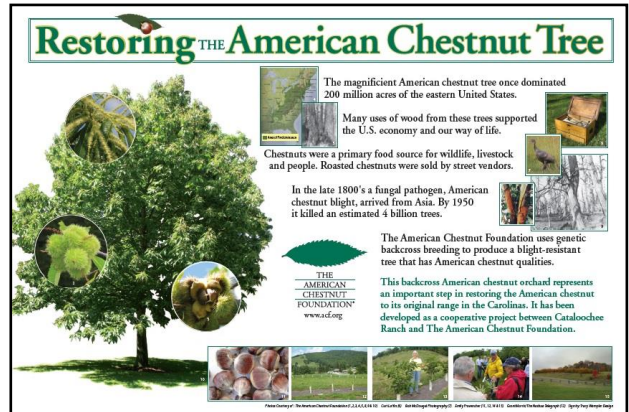
   b. The center photo below shows the "Triple Panel" sign. It has 3 parts that measure 22" x 34".
      We used the triple panel sign that cost approximately $300 and the custom made *4-H Camp
      Palmer* and *Thank You* sign from Fine Line Laser Engraving.

Attaching the sign panels

a. The three panels were attached to the ash boards using stainless steel – tamper proof bolts.
b. The 4-H Camp Palmer sign and the Thank You sign were attached using stainless steel – ¾" hex head screws.
c. The photo shows the back side of the Kiosk.
   The vertical strips serve two purposes:
   1) They help maintain the alignment of the horizontal ash boards.
   2) They cover the end of the tamper proof bolts and hide the nut.
d. The vertical strips are 1" x 4" ash cut long enough to cover the back side.
e. We used the router to make a ½" round corner on each edge.

The "*Chestnut Education Plot*" sign

a. The sign was traced onto a 4" wide ash board using 3" stencil letters.
b. A router was used to carefully cut out each letter.
c. The interior of each letter was stained with black walnut stain.
d. The sign was then given a coat of Cabot light beige stain.
e. The photo shows the finished Kiosk sign

NOTE: The table on the next page is a summary of the expenses for the trees and materials used for establishing the chestnut education/demonstration plot at 4-H Camp Palmer. I did not document the time it took to complete the project.

Authors Note:
   I sure hope this helps others establish a Chestnut Education/Demonstration Plot. I have certainly left a lot of questions unanswered. But this narrative will give the reader an idea on how to go about establishing a chestnut education/demonstration plot.
   I can be contacted at: walter.lange@utoledo.edu

Summary of Expenses for Materials

4-H Camp Palmer		
Chestnut Education Plot - Expenses		
Chestnut Trees	**Quantity**	Some trees were donated and the others were purchased from Empire Chestnut Co. www.empirechestnut.com
American	5	
Chinese	5	
Japanese	5	
Chinkapin	5	
Restoration 1.0	5	
	25	
Total Cost of Trees	**$90.00**	
Row Signs		
Posts (4 x 4 x 10')	3 x $16.00	$48.00
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Laser Engraving	5 @ $15	$75.00
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	Total for Kiosk	$958.00
Total out of pocket materials costs		**$1,650.00**