

AMP P1: RE-ESTABLISH AMERICAN CHESTNUT TREES

Strategic Management Opportunity Category(s): FDCV12

Primary Objective: To re-establish American chestnut hybrid trees in rockrat management compartments.

The range of the American chestnut tree at one time approximated the range of *Neotoma magister*. Encompassing almost 500,000 square miles, it was once one of North America's most important trees. Its virtual disappearance as a reliable producer of hard mast is thought to be one of the early factors that possibly initiated and over time contributed to the long term decline of the rockrat in the northern third of its range.

A mature American chestnut tree can reliably produce as many as 6,000 nuts per tree, each year. White oaks produce approximately 1,000 nuts per tree and red oaks produce about 2,000 nuts per tree, and neither family of oaks produces acorns reliably. Chestnuts also provided wildlife a high-energy food that contains roughly 11 percent protein compared to oaks that average 6 percent. Chestnuts also contain around 16 percent fat and 40 percent carbohydrates. This combination of attributes is why trying to reestablish American chestnut hybrid seedlings within habitat sites is a high priority adaptive management practice.



Figure 1 American chestnut trees, in the form of sprouts and saplings still persist on many rockrat sites.

An article in the Journal of The American Chestnut Foundation concluded: "*Following the release of blight-resistant material in the near future, American chestnut is likely to provide a valuable new species option for integration into mine reclamation projects. Fast growth, combined with high tolerance to a range of environmental conditions may allow American chestnut to rapidly establish within the degraded environmental conditions characteristic of mine reclamation sites.*" It's a "high tolerance of a range of environmental conditions" that may contribute to the success of trying to establish hybrid American chestnut trees near rockrat activity centers.

In partnership with The American Chestnut Foundation, the Arboretum at Penn State has a hybrid chestnut seed orchard. Both Game Commission and Bureau of Forestry nurseries are cooperators. In the near future both hybrid chestnut seeds and seedlings will become available for planting in rockrat management compartments. An initial project will be to plant a cluster of 50 chestnut tree seedlings in a created ½ to 1 acre opening (see AMP C2) that bridges a mixture of surface rocks (MZ2) and soil (MZ3). Best sites are well drained, moderately acid, sandy loams that are in full morning sun, or more simply where wild chestnut sprouts still persist, Figure 1. The spacing of the planted seedlings in the cluster will be largely determined by places where digging will be successful enough to accommodate the root system. At least 2 trees are necessary to make nuts, and they should be no more than 200 feet apart for efficient pollination.

To keep track of seedling survival rates, GPS the center of the cluster or its outside boundary. Digital photos are useful. Good record keeping is essential because either direct seeding or planting seedlings of any species within or near exposed rock islands is experimental. In fact you might want to experiment with direct seeding (AMP P3), planting container stock (depends on site accessibility), or planting bare root 2/0 seedlings. Tree protectors will help and make it easier to find and care for (weed, mulch, fertilize) seedlings. Another method that has innate appeal for rocky sites is grafting for blight resistance. The how-to-do-it is detailed at the indicated web site (see "More Information"). Grafting, however, is limited to sites where American chestnut sprouts still persist.

Because many rockrat sites are droughty to begin with, avoid planting during ongoing or anticipated droughts. Wet weather planting is recommended. Also make generous use of both organic and inorganic (= small surface rocks) mulch in a 3' radius around the seedling protector.

Planting details are elaborated on page 3 and 4 and in the "Handbook" referenced in Box 1 and at the web sites listed below under "More Information." But it will be up to you to adapt the recommended procedures for use in rock covered, droughty habitats.

Tree harvest cuts that abut a buffer zone (MZ3) of an active rockrat habitat site should be used to create a patch cut in the buffer zone with the objective of planting 50 or more chestnut hybrid 2/0 seedlings (see AMP C2). The best situation is if the patch cut includes part of a management compartment and if the timber harvest area is fenced to exclude deer.

STEPS

- 1) Locate a planting site and undertake the required site delineation (GPS) and preparation (usually tree removal).
- 2) Coordinate with your nursery to obtain hybrid seeds or seedlings. Larger 2/0 seedlings are recommended.
- 3) Undertake wet-weather planting in accordance with Handbook recommendations (Box 1) as adapted by you for use on rocky sites.
- 4) Keep records up to date. Maintain plantings: weed, mulch, fertilize, and upkeep of protective devices.

MORE INFORMATION

Starting from seed:

<http://www.ppws.vt.edu/griffin/grow.html>

Starting from seed:

<http://www.masschestnut.org/miscFiles/quickGrowingGuide.rtf>

Grafting <http://www.ppws.vt.edu/griffin/grafting.html>

PSU hybrid chestnut seed orchard

<http://www.arboretum.psu.edu/research/orchard.html>

BOX 1

Growing American chestnut, A Handbook

<http://chestnut.cas.psu.edu/PDFs/growbook.pdf>

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Congratulations! You have received American chestnut seeds for your planting project. Planting and growing chestnut trees is a rewarding challenge. There are some tips and tricks to growing chestnut trees. The goal of the Pennsylvania Chapter of the American Chestnut Foundation (PA-TACF) is to restore the American chestnut (*Castanea dentata*) to the forests of the mid-Atlantic. To do this, we must plant a lot of trees! To date, we have planted over 32,000 trees as part of our mission. If you plan to join our efforts, please take a few minutes to review the following information to get started.

DIRECT SEEDING VS. PLANTING SEEDLINGS

Decide whether to plant seeds or to plants seedlings. Before planting, be sure to keep your seed in cold storage (a refrigerator) away from apples and pears until you are ready to plant. The colder the storage, but above freezing, the longer the seed will keep. Typically, planting seeds is easier and less labor intensive than planting seedlings. Germination of “pure” chestnut species, as well as advanced hybrids, is very high, often 90%.

DIRECT SEEDING CHESTNUTS

1) **Plant early in the spring.** In the spring, plant as soon as you can work the soil In Pennsylvania, this is usually about mid-March. Try to plant as soon as you can work the soil

2) **Planting the seed.** Most chestnuts will have sprouted by this time. Be sure to plant with the radical facing down. If the radical is not present, then plant with the flat side of the seed facing down.

3) **Clip the radical?** Often, the radical will be very long. One may clip the radical to ease planting (Figure 1), but clip as little as possible, and be certain not to break the cotyledonal junction between the radical and the nut.

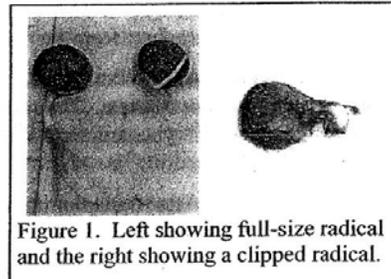


Figure 1. Left showing full-size radical and the right showing a clipped radical.

4) **Proper planting medium.** I like using Scott’s Moisture Control brand potting mix. For a cheaper option, one can use a 1:1:1 peat, perlite and vermiculite (PPV) mix. Some planters find this mixture too light. It is often good procedure with any mixture to mix native soil into the planting medium so that you have a final mix of 50% medium and 50% native soil. Mix water in with this mixture so that it is wet, but not soaking wet.

5) **Don’t plant the seed too deep.** Make a planting hole about 3-6 inches deep. Backfill the hole with the planting mixture. About 1/2 to 1 inch from the surface, place the chestnut, and then cover with the mixture. When placing the chestnut in the backfill, make a hole with your finger in the dirt to allow for placement of the radical.



6) **Make a good home.** Make a hole using a bulb planter, auger, shovel, or what you have available.

7) **Record what you do.** Be certain the planting position is well marked with identification elements.

PLANTING SEEDLINGS

Starting seeds indoors is a very reliable method of propagating chestnuts. It can be easier to protect your stock from would-be seed predators. Still, starting your chestnuts indoors carries with it its own pitfalls. Be sure to keep these things in mind when planting your seed inside.

PLANTING SEEDLINGS (continued)

- 1) **Large enough pots.** Deep containers are necessary to grow seedlings well. It is recommended that pots of about 12" in depth and 4" in diameter are used. Of course, the longer you plan on keeping the material, the larger the pot should be.
- 2) **Type of pot.** Pots can be made from one or two quart milk or juice cartons. Provide drainage by punching holes in their bottoms, or by removing the bottoms altogether (the open bottom air "prunes" the roots, reducing coiling (J-rooting) and often stimulating the production of rootlets). Commercial options are available. D40 cells and 1 to 5 gallon tree pots are most often used.
- 3) **Proper planting medium.** The growing medium should contain plenty of fibrous materials to help preserve the root ball at transplanting time and should contain other amendments to provide for lots of aeration. Soilless potting mixes are better than potting soils. A mix containing lots of composted bark is a good option. I like Scotts Moisture Control.
- 4) **Start seed early.** Start seed as soon as possible after receiving them in a greenhouse or sunny window. Generally, one can start their seed in January or February. Make sure you don't overwater the containers: keep the soil moist but not wet. Fertilize occasionally but with a dilute solution of a complete fertilizer.
- 5) **Harden Properly.** Seedlings started indoors will be ready for transplanting after the final frost of the season has past. At that time, begin to expose your plants to sun and brisk winds gradually. Introduce them to the outdoors by placing them under a shady tree or on a protected sunny porch. If you have a shadehouse available, try using 30-50% shadecloth for at least 2 weeks. Move them out into harsher environments slowly so they'll have time to acclimate.
- 6) **Carefully pluck the nut.** When outplanting the seedlings within the first few months of planting, be certain to remove the remaining nut from the seedling. Rodents will dig up the seedling in order to eat the nut.
- 7) **Prepare a good home.** When planting the seedling, make a hole at least 1.5-2 times as large as the root ball of the seedling you are to plant. Chainsaw or tractor mounted augers can make quick work of planting holes. Depending on the soil type, augers can "glaze" a planting hole, creating a hardpan like property in the hole. When planting the seedling, be sure to aerate the sides of the planting hole with a hand-held cultivator or plow.
- 8) **Water properly.** After transplanting, seedlings need lots of water. Water thoroughly for at least the first month after planting. For best success, water with 1 gallon per tree every week.
- 9) **Documentation.** Record everything you did! Especially note any changes made to a planting plan, if one was made. Label the planting hole properly. Before you plant, you'll need to determine what sort of maintenance regimen you'll be employing. Maintenance considerations include fertilization, watering, deer and other pest control, and weed control.

CALL OR E-MAIL US WITH QUESTIONS:

The PA Chapter of the American Chestnut Foundation
 Penn State Partnership Office
 206 Forest Resources Lab
 University Park, PA 16802
 814-863-7192
 mail@patacf.org



FOR ADDITIONAL INFO ON CHESTNUTS:

<http://www.charliechestnut.org>
<http://chestnut.cas.psu.edu>
<http://www.acf.org>
<http://www.patacf.org>

Thanks for helping to restore the American chestnut. Please consider taking one more step and become a member of PA-TACF.