

THE PRACTICE OF GROWING FROM SEED

A Guide

The Pennsylvania Seedling Cooperative

A guide created by



ALLIANCE
for the Chesapeake Bay

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A guide create by the Alliance for the Chesapeake Bay
with review by Penn State Extension.

This information in this edition is dated April 2026.

Thank you!

PROGRAM OVERVIEW

Who is the Alliance for the Chesapeake Bay?

The Alliance restores the lands and waters of the Chesapeake Bay watershed. Our collaborative and action-oriented approach delivers on-the-ground solutions, technical assistance, and builds capacity to achieve healthier lands and cleaner water.

We envision clean water and resilient landscapes, cared for by all the people who live, work, and play in the Chesapeake Bay watershed.

Since 1971, the Alliance for the Chesapeake Bay has brought together diverse stakeholders with a goal of addressing the state of the Bay. Through its many partnerships, the Alliance has been unique in its ability to empower and ignite stewardship for the Bay. This has been accomplished by our ability to engage partners, volunteers, and communities who live, work, and play in the watershed, in stewardship through participation in our programs.

Our program teams Green Infrastructure, Agriculture, Stewardship and Engagement and Forests develop programs and acquire funding that helps to address resource concerns across varying environments with a unified goal of improving the state of the Bay. To meet the growing demand for tree seedlings used in Alliance riparian buffer and reforestation efforts, the PA Forest team has developed a program we call the Pennsylvania Seedling Cooperative (PASCoop).



Reforestation is one of the many tools used in the pursuit of a healthy watershed.

PROGRAM OVERVIEW

The History of the Pennsylvania Seedling Cooperative

In 2019, a volunteer approached the Alliance with a proposal to grow tree seedlings for the PA Forest Team to use in reforestation efforts and buffer plantings. This volunteer's system for growing seedlings has since become the prototype for this program, and her efforts quickly engaged two additional volunteer growers. This trio of volunteer growers are an invaluable resource to the PA Forests Team. Through practice, trial and error and endless record keeping, they have produced thousands of seedlings for reforestation throughout Pennsylvania's portion of the Chesapeake Bay Watershed.

A priority in the initiation of PA SCoop was to address seedling scarcity and shortage for reforestation, and this trio of growers has given the Alliance the capacity to not be affected by this concern. These volunteers have allowed us to share their knowledge and experience, adapted into this guide, to assist others who are interested in participating in the program. This guide can be used so you can also transform your backyard (and/or front yard) into a seedling nursery as part of the PA SCoop Program!

A veteran grower and Alliance staff member transplanting seedlings in a backyard nursery that will later be out-planted for reforestation in PA.



PROGRAM OVERVIEW

Program Accessibility

The Alliance has been successfully engaging communities and volunteers in tree plantings, through the installation, tending and monitoring of sites. We believe that watershed conservation efforts will be most successful when the diverse communities living within the watershed are thoroughly engaged. By developing a seedling growing program, the Alliance seeks to further engage community members by providing resources for volunteers to participate directly by growing seedlings that will be used for our tree planting projects. This guide will provide those volunteers with the necessary resources to participate in the program.

Some ways you can participate in PA SCoop:

- Grow trees- whether you want to grow a hundred or thousands of seedlings, there is a way for you to be involved!
- Support pots that have already been seeded. We refer to this as 'fostering' seedlings.
- Clean and fill pots at volunteer nursery days. Help along the way goes far!

Views into the end of growing season acquisition days. The supply of volunteer grown seedlings is vital to the success of Alliance and partner based reforestation projects in the watershed.



PROGRAM OVERVIEW

Position Description of a Pennsylvania Seedling Coop Volunteer

This information has been included for program reference, and is not the formal stand-alone document

A **Pennsylvania Seedling Coop (PA SCoop)** volunteer is a long-term volunteer that plants, germinates, grows, and fosters seedlings that are destined to be planted in a reforestation project (typically a riparian forest buffer). The goals of the PA SCoop program are to increase public education and engagement at all levels of reforestation efforts in PA by involving volunteers, in addition to increasing the availability and variety of seedling stock for use in reforestation plantings.

Specific Duties of the Position:

- Plant, germinate, grow, and care for native tree and shrub species that are identified as needed by the Alliance. Activities can include watering, weeding, pest management, and more.
- Communicate regularly with Alliance staff to update and ensure growing success and support plans for future reforestation plantings.

Qualifications:

- Passion for trees and forests, growing plants, improved watersheds, and natural land management. Knowledge of native plants is a plus (although you can expect to gain a lot along the way!).
- Reliable in caring for plants daily in a variety of seasons and makes proper care arrangements when away from the seedlings.
- Able to bend, stoop, kneel, dig, and do some minor lifting. Plant care requires digging, weeding, watering, pest management, and organization. Most of the physicality required of this role is considered mild to medium.
- Has space, watering devices, and the tools to host seedlings.
- Is organized in tracking seedling progress and needs and species breakdown and success.
- Is prepared to be outside in various weather conditions and elements at their own discretion.
- Uses report forms and email to communicate work with the Alliance.
- Has attended a PA Seedling Coop training, signed a release and volunteer agreement.

PROGRAM OVERVIEW

Position Description of a Pennsylvania Seedling Coop Volunteer

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Benefits of participation:

In this role, volunteers will have the opportunity to learn more about forestry, engagement efforts, native plant knowledge, plant care, and more. Volunteers are actively encouraged to develop new skills in ways that are relevant to their interests. Volunteers will be a key part of local conservation efforts and have the chance to get to know like-minded people and be an active part of the south central PA conservation volunteering community. Work with SCoop can be credited towards other volunteer programs (e.g. Master Watershed Stewards) or service hour program requirements.

Supervision:

SCoop volunteers report directly to the Pennsylvania Forests Projects Manager.

Hours and Location:

SCoop volunteers should be based in south-central Pennsylvania. Work is all done at their nursery site and on the volunteer's own schedule. Caring for seedlings can require daily attention depending on weather conditions. Specific time commitment can vary depending on roles and involvement with this program.

PROGRAM OVERVIEW

Pennsylvania Seedling Coop Volunteer Agreement

This information has been included for program reference, and is not the formal stand-alone document.

Code of Conduct

- Volunteers agree to perform volunteer responsibilities willingly and courteously to the best of my abilities. I will follow all safety guidelines while filling my role. I agree to follow instructions and guidance as instructed by PA SCoop training, Alliance staff, and partners.
- Volunteers show respect to everyone involved in PA SCoop work (volunteers, organizational partners, landowners, and Alliance staff) and strive to create a safe environment for everyone. I understand that failure to uphold these community values will result in my dismissal from the program.
- Volunteers understand that the Alliance is an apolitical organization and agree that when I am representing the Alliance, I will not display anything overtly vulgar, obscene, religious, or political in my dress or conversation.

Role Responsibilities

- Volunteers agree that the materials issued to me by the Alliance, including all seeds
- and seedlings, are a loan, and will be returned to the Alliance at the completion of the relevant growing seasons to be planted into forest buffers. I understand that I do not own the seeds or seedlings and related supplies and will not take it upon myself to distribute them as I see fit, but always make sure that the plants will be returned to the Alliance or its identified partners. Before distributing anything directly, I will verify with Alliance staff about the distribution of seedlings and supplies for the sake of grant report tracking.
- Volunteers agree to follow all required reporting relating to my work and seedling growing in a timely manner. I understand that this reporting is required by the funders of Alliance programs and vital to the overall work efforts. I will follow all instructions given related to my work execution.
- Volunteers have attended a PA SCoop training and received a copy of the PA SCoop role description and I understand all that this position entails. I am able and willing to fill this role to the best of my ability and will alert the Alliance promptly if this is no longer the case and return all seedlings, equipment, and materials that were issued to me.

PROGRAM OVERVIEW

Pennsylvania Seedling Coop Volunteer Agreement

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Communication

Volunteers agree to communicate any needs or issues relating to my site work, other volunteers, landowners, or partners to my contact at the Alliance in a prompt manner.

I recognize that the Alliance cannot fully support me without open communication.

Volunteers will report any negative incidents that occur during my volunteerism duties to my Alliance contact when they happen. These include but are not limited to:

- Injury to myself or others
- Damage to loaned equipment
- Interactions with with people, plants, or wildlife that resulted in physical harm
- Incidents of bullying or harassment
- Any events that resulted in the need to contact emergency services in any capacity

GETTING STARTED

What Funding or Equipment is Provided by the Alliance?

In order to get started in the Growing from Seed Program, access to certain equipment is necessary, which will depend on the scale of production. The Alliance can help in acquiring this equipment in order to ensure the success of seedling production. The following is a list of the required and/or useful equipment:

Equipment provided by the Alliance:

- Pots and trays
- Soil
- Fertilizer

Expected equipment contributions of the volunteer grower:

- Tables, pallets or some other structure to get pots off the ground.
- Wheelbarrow or bucket/trough to mix soil and fertilizer
- Access to water, a hose, and an appropriate hose head(a watering can will suffice depending on scale)
- Tags
- Baggies/containers (paper lunch bags, ziplocks, etc)
- Sharpies/pencils
- Stratification medium (sand, vermiculite, coco coir, sphagnum moss)
- Scarification materials (sandpaper, mortar pestle, blender, scissors, etc)
- Bleach, hydrogen peroxide, SaniDate 5.0 or another sanitizer for pots and seeds
- Shade cloth (recommended 30-50%) and supports if the area is not already partially shaded

The Alliance can assist in procuring some of the above materials depending on each volunteer's situation and level of involvement. For that reason, there exists a regular dialogue between Alliance staff and volunteer growers.

GETTING STARTED

Some materials that veteran growers have acquired throughout their years of trials. A seed refrigeration (left) and heating (right) unit to support stratification and successful germination of tree and shrub species.



METHODS

The following section describes potential methods for daily and/or seasonal tasks that will be completed depending on the scale of your seedling production. As one progresses into their seedling growing experience, preferred methods will evolve.

Sanitizing pots

A grower should sanitize pots to support a healthy seedling and reduce the risk of soil borne pathogens, or other fungi, bacteria, or pests as pots used by volunteer growers are reused.

Below are some potential methods for sanitizing pots. These operations are best done in a shaded area to allow the solution to wet the surfaces as long as possible:

SaniDate 5.0

- Begin by removing organic matter that may be present on the inside and outside of the pots and trays. Using a toilet bowl brush works well to efficiently remove any debris. The surfaces do not need to be “clean” but rather free from caked on debris such that the sanitizing solution can reach all surfaces.
- One of our growers recommends using the product SaniDate 5.0, and follows this protocol: fill a tray with the 25 corresponding pots, submerge the tray into a SaniDate solution for 5 minutes. The pots need to remain moist/wet with SaniDate for 15 minutes (this may require dunks back into the solution). The pots can then air dry and be stored for use.
- If following the directions on the bottle, add 1.6-5.4 fl. oz. of SaniDate 5.0 to 5 gallons of water. Treated surfaces must remain visibly wet for at least one minute. Then allow items and/or surfaces to air dry.

Bleach

- Begin by removing organic matter that may be present on the inside and outside of the pots and trays. Using a toilet bowl brush works well to remove any debris.
- Use a 10:1 water to bleach solution in a tub of water or even in a lawn hose end sprayer
- Wet down or submerge the pots thoroughly and allow them to air dry. The bleach solution should remain on the pots for approximately 3-5 minutes to be properly sanitized.

METHODS

Filling pots

Possible methods for filling pots that promote desired soil levels. Some considerations in regards to appropriate soil levels include the following:

- **Low soil level:** If a pot's soil level is too low, it reduces the potential root area of a plant. This could ultimately affect the success of the plant once it has been out planted.
- **High soil level:** If pots are overfilled, watering becomes a challenge. Soil and seeds can easily be displaced from the pot; additionally, there is a lack of physical space for water to remain at the top of the pot and be absorbed into the soil when completing watering routines.
- **Soil Compaction:** Compaction of the soil into the pots is important to consider as well. Over-compacting can make nutrients less readily available to the plants, decrease the ability of water to infiltrate the soil, and even limit the rooting depth of the plant. This all relates to the total pore space and the number of macro versus micro pores. Methods to properly remove air space from potting soil are described below.

For all of these reasons, the soil should be about ½ inch below the top of the pot.

Steps to achieve the recommended soil level:

1. Fill a tray with 25 pots.
2. Loosely overfill the pots. Be sure to check the edge pots, as they are often neglected.
3. Pick up the tray and drop it about 6-12 inches straight down to settle the soil, then water the pots. This drop and watering will compact the soil an appropriate amount as not to negatively affect root development.
4. Add in more soil to each pot to replace what was displaced and/or compacted until the pots have an approximate 0.5 inch space from soil level to the top of the pot.
5. Then move all the pots into a new tray. Moving pots to a new tray is necessary and prevents any soil from falling between and around the pots, which can cause plant roots to grow from one pot into another.

METHODS

If picking up and transporting a tray with 25 pots is not an accessible practice, below describes an additional potential method to appropriately fill pots:

1. Prepare a tray with 25 pots.
2. Stage a wheelbarrow, bucket, or trough with soil nearby, and begin filling each pot one-by-one with the appropriate amount of soil. Tap the pots down onto a hard surface or use your hands to compact soil to an appropriate level (ensure that it is not over compact or under compacted).
3. Move pots into the tray as necessary for your comfort, then water them in. Add more soil until the pots have an approximate 0.5 inch space from soil level to the top of the pot.



A veteran grower and Alliance staff filling pots using the method mentioned above.

METHODS

Watering Seedlings

Depending on the scale of your growing, seasonality, and weather conditions, watering seedlings can become a very time-consuming task.

Watering within the root zone:

- Water smaller transplants/seedlings more frequently, but less deep because the root zone is smaller. Smaller seedlings are still developing their root system; for this reason, a grower will often see signs of water and heat stress more rapidly in this seedling size. If you see signs of heat stress, the first sign is usually a wilting or drooping appearance to the leaves. Consider giving your seedlings an additional watering.
- Water larger plants to a deeper depth since they have a large root zone. As a plant grows above ground, its root system is expanding within the container. A good rule of thumb for watering more mature containerized plants is to water when a pot feels physically light. When you do water, irrigate until you see water dripping out of the bottom.

Watering frequency is dependent on wind, heat, seedling size, and many other factors. Find a watering schedule that works for you and your trees!

A good rule of thumb if there is any uncertainty in watering practices: water a seedling daily from spring through fall until water runs through the bottom of the container.

A recommendation from growers is to decrease watering frequency as it gets closer to the outplanting date. This decreased access to water in theory creates a resource pressure situation, forcing the roots to expand/grow. This is a part of the hardening off process to help a seedling be successful at outplanting or for overwintering.

Understanding the pH of your water can alter how you might fertilize or alter the frequency of fertilization. Native seedlings generally do well in a pH between 5.5-7.0, although this is species dependent. Anything above or below this may cause stress to seedlings.

Two volunteer growers hand-water seedlings.



METHODS

Fertilizing Seedlings

Fertilizing seedlings is important in order to promote healthy growth. Seeds provide a nutrient reserve for seedlings, called the endosperm or perisperm. Seedlings rely on this for radical emergence and germination. This nutrient reserve is limited, so timing the addition of fertilizer is key.

The Alliance volunteer growers historically have used Osmocote 14-14-14, water soluble beads/pellets. 14-14-14 relates to the percentage of Nitrogen (N), Phosphorus (P) and Potassium (K). NPK are the three primary macronutrients that plants require to grow. There are many other micronutrients that plants need to be supplemented, which are also present in Osmocote 14-14-14. Osmocote 14-14-14 feeds for 3-4 months, (although it varies depending on ambient temperature and watering frequency). This means that ideally all seedlings should be fertilized by late April to early June, in order to allow seedlings to enter into winter dormancy phases at the appropriate seasonality. Osmocote 14-14-14 is a controlled release fertilizer, so applying it to your seedlings early will not negatively influence growth; fertilizer burns and leafing out too early should not occur. Fertilizing too late in the growing season risks seedlings not entering dormancy at the appropriate timing.

A few methods to incorporate fertilizer for your seedlings are described below:

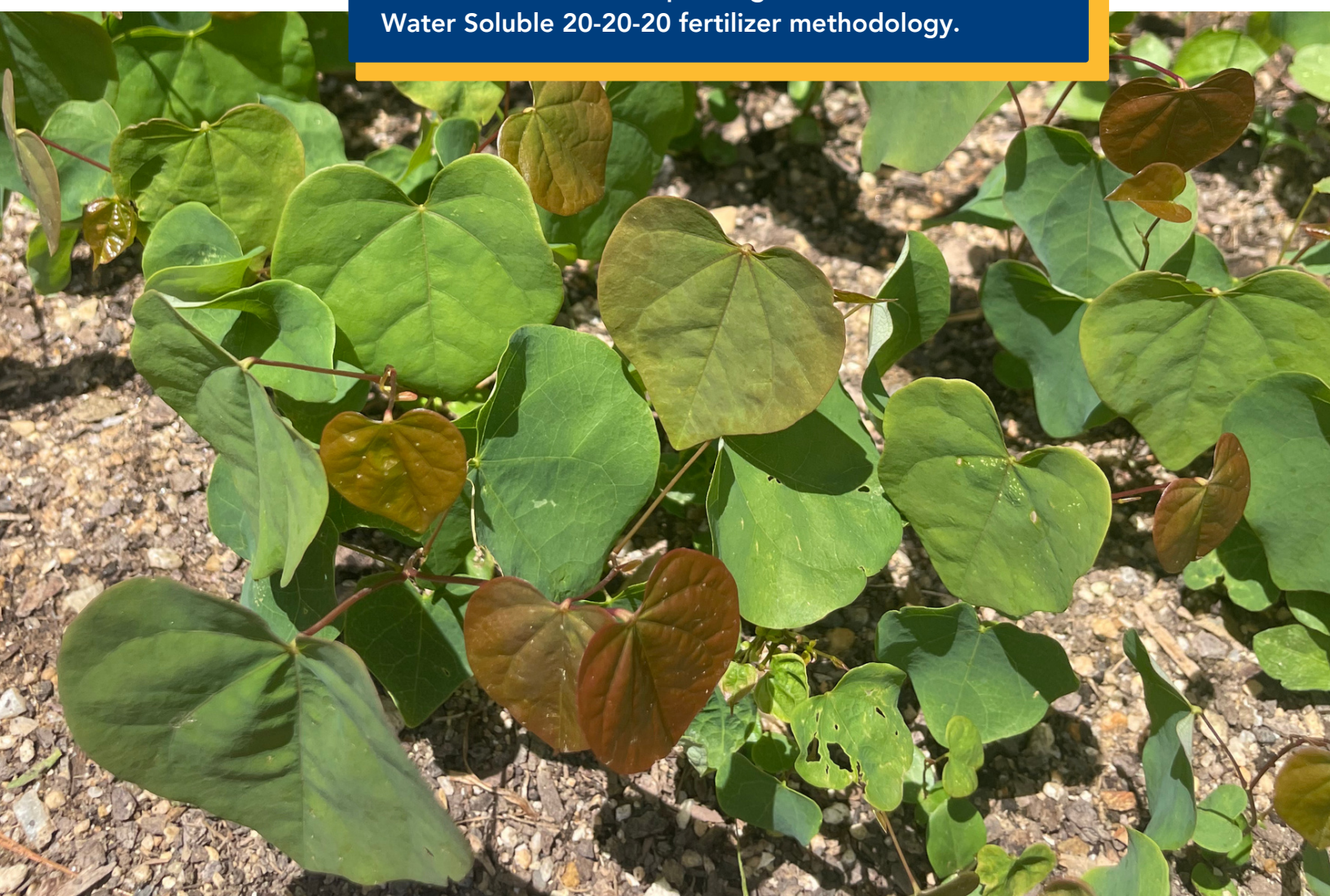
- For every one cubic foot of soil, add ¼ cup of Osmocote 14-14-14.
- Top dress each pot with ½ to 1 teaspoon of Osmocote 14-14-14.
- Top dress a flat (the tray of 25 pots) with ¼ cup of Osmocote 14-14-14.

Some volunteer growers use field beds, essentially growing many seedlings for later transplanting. This is a good practice if working with a species that is documented to have a low germination rate, or if implementing natural stratification on seeds. One historical grower fertilizes field plots with the use of Peters Water Soluble 20-20-20. In field beds approximately 6x3x2ft, 1 tablespoon of Peters 20-20-20 is dissolved into 1 gallon of water and applied via a watering can. This process is repeated every two weeks from May-August. An Osmocote top dress can also work in field beds; the amount applied will vary depending on the size of one's field bed, but should still be applied around May to ensure proper timing of hardening off.

METHODS

In general, a grower should be conscious that they are not over- or under-fertilizing. Under-fertilizing can create plants that are more susceptible to disease, injury, or death. Over-fertilizing is wasteful and allows for the potential to leach excess fertilizers into undesired areas.

The Alliance acknowledges that the above fertilizing methods have proved to be best practice for our grower operations, for more precise fertilization rates and types soil testing should be completed before discerning an appropriate fertilizer.



Redbud (*Cercis canadensis*) seedlings growing in a field bed for later transplanting. These received Peters Water Soluble 20-20-20 fertilizer methodology.

METHODS

Other General Seedling Care

Taking care of containerized seedlings often requires other small tasks. Below are some common ones that help promote efficient out-planting.

Weeding:

Whether it be through the potting soil, birds, wind, or another mechanism, weeds will pop up in containerized seedlings. It is best practice to pull weeds out, so resource competition is not a concern for the native seedlings.

Pruning:

Plants sometimes will grow multiple stems. Having multiple stems can make it difficult to place the tube onto the seedling while in the field, which sometimes risks a stem being snapped off if caution isn't taken. It is best practice with restoration-based seedlings to prune to one main stem. Some species need to be pruned prior to being outplanted due to their height. If a plant is greater than 3ft tall, it is likely best to prune before Alliance staff gather container stock for the season. This is extremely species dependent; however, **most plants' main leader should not be pruned**. Pruning should not take place during important growth and reserve periods; prune as close to outplanting as possible.

Monitoring for pests and/or herbivory:

As you water or complete rounds of your plant stock, it is important to visually monitor for pest and/or herbivory presence.

Pests can present as a variety of different signs on native plants and can cause many varying symptoms. Alliance staff may be able to identify or give a best guess as to what is causing symptoms on your seedlings.

A proactive way to discourage herbivores is with the use of cages. The Alliance can generally provide these for you upon request. These herbivore or squirrel cages are a necessity, usually for acorn and nut-like seeds. Some examples of species you may consider protecting with cages in the nursery setting are oaks, hickories, hazelnuts, walnuts, etc.

Other General Seedling Care

This image shows the use of herbivore cages in a veteran grower's front-yard nursery. The cages have proactively helped protect many acorn and nut seedlings from deer, squirrels, rabbits, and other herbivores.



METHODS

Other General Seedling Care

Culling:

Culling is the process of removing or throwing away plant stock that is dead, diseased, or weak in order to improve the overall quality of the remaining plant stock. Culling is important in all stages of the growing process.

Some instances where you might consider culling:

- Radicles that have an obvious kink or bend in them, or if a radicle does not emerge at all, consider culling as the kinked plant is unlikely to survive.
- A plant that has a strangling root or other root system issue.
- Plant stock that is obviously dead or diseased should be culled.
- If a plant appears healthy, but a grower feels it will not make it through outplanting stress, consider adding it to the overwintering group rather than culling it.



This represents an example of a plant that should be culled. The stem has an extreme curl that will cause eventual girdling and death of the plant.

Desired final or target product:

A seedling that is ready for outplanting should maintain the following characteristics to promote survival:

- Have accumulated one to three growing seasons. The Alliance can help with overwintering seedlings that need additional seasons of growth prior to outplanting.
- The plants are approximately 6 inches to 3 feet in size. Outliers are hickories and sometimes oak species.
- Have one main stem, whether it be pruned or grown as such.
- Maintain an overall healthy appearance

These specimens are for reforestation and conservation purposes, not landscaping, so also take this idea into consideration.

Collecting Seeds

Seeds are the reproductive structure of a plant and are the result of pollination. Seeds are the primary mechanism for the continuation of a plant species. Of significance, growing from seed provides expansion in the genetic diversity of a species. It is important to consider that as you collect seed from a parent plant, a grower is selecting certain plant traits and characteristics. This is why the ideas regarding seeds described below should be considered.

Collection locations and geographies:

Collection locations will vary depending on your goals as a grower. If a grower is collecting on private land, always ask for permission from the landowner to collect seed. Always be aware when collecting in parks, an individual tree may look like a target species, but cultivars are commonly planted in park settings. Here are some locations current growers target for seed: from private land (once permission and connection have been established), cemeteries, wild roadside sources, rural areas, favorite hikes and many other locations. If a grower is uncertain about where to collect, reach out to Alliance staff or a veteran grower for some advice. Additionally, Alliance staff can oftentimes provide seed from certain species.

Of the utmost importance, ensure that the individual you are collecting from is truly the species you are targeting!

The Alliance encourages and recommends that seeds be collected from the state in which the eventual seedlings are to be planted; if you are a part of the Pennsylvania Seedling Cooperative, gather seeds exclusively from the state of Pennsylvania. If you are an organization working within a particular county, watershed or subwatershed, consider ecotype seeds; this ensures a species is adapted to a specific local environmental condition.

Importance of Ecotype:

An ecotype is a subset of a species that has adapted to a specific geographic environment. This results in a genetically distinct species from other members of the same species found in different environments. It is desirable to use plant material, seed or propagule, genetically similar as possible to the plant community which originally existed.

For this reason, the Alliance recommends collecting seed from a community type that the seedlings will likely be planted into. Many of the seedlings grown by PA SCoop growers go into riparian habitats, so it is recommended to collect seeds from riparian habitats. Ecotype can be more specific, by county or many other factors, and a grower can develop ecotype practices that they see fit.

Collecting Seeds

Collection ethics:

Ethical seed collection should be a priority for growers. If a grower is collecting seed ethically, they are considering the impact their collection will have on the individual plant, wildlife that depend on the species for forage or respite, and the landscape at large. It is important to consider the long-term implications of unethical seed collection on the environment.

Values to consider when collecting wild seed:

- Gain permission to collect in areas where permission seems necessary.
- Respect and value local traditions- follow indigenous guidelines.
- Don't collect seeds from rare or threatened species
- Don't collect seed if you are not entirely sure of an individual's identity. Some native plants have an invasive look-alike, and it would be a shame to install them into reforestation projects.
- Don't collect from the first individual of a targeted species you encounter. Ensure that more than one individual of the targeted species exists.
- Only take what you need- a good guideline on this is to never take greater than 10% of the seed an individual produces. The individual you collect from should still have the potential to replace itself and feed wildlife or other organisms that may rely on the species as a food source.
- Don't collect from the same individual every year- it is important to diversify genetics
- Collect from populations that are obviously viable. This might mean collecting from individuals that appear healthy; if a tree has an insect infestation or an obvious disease, it should not be collected from. Collecting from an obviously viable source could entail collecting from a landscape that appears to be healthy and not stressed.
- Document provenance- it's cool to keep a record!

Collecting Seeds

Determining a healthy and viable seed:

Collecting seed that is healthy and will allow for a successful seedling begins with the mother tree. A tree should appear to be growing vigorously, appear healthy, and be mature enough to collect from without affecting natural regeneration. It should not have any obvious signs of stress, insect infestations, or cankers. Consider that the expressed traits a parent tree displays will likely be present in offspring.

Once you have determined a collection tree is healthy, here are some considerations for determining if set seed is viable:

- Cull seed that has any obvious grub or insect holes.
- Seeds that lack normal texture
- Seed that seems desiccated
- Seed that seems smaller than others collected from the same individual

Some growers have relied in the past on the float test to determine the viability of oak, hickory, and other nut-like seeds. Recent research states that the float test is not likely to be a reliable measure of seed viability and to trust your visual assessment of these seeds.

Germination rates will vary greatly by species. Anticipate and account for the fact that you will grow less seedlings than seeds you sow.



Examples of collected seeds.

Collecting Seeds

Seed Storage:

Long term storage-

- Successful long term storage of seeds is an excellent option for many tree and shrub species within Pennsylvania. The key to doing this successfully is to thoroughly process the seed, remove moisture and store at a proper temperature.
- Processing the seed: remove fruit, drupe or other flesh away from the seed. The flesh will easily mold and negatively impact the health of the seed. Remove seeds out of seed pods; seed pods can harbor insects, moisture and other factors that can negatively impact seed viability.
- Allow seeds to air dry entirely before placing them in cold storage. Recommendations are to store seeds in paper envelopes or bags as they help to wick away or absorb moisture. If you did not thoroughly process seed, store in a ziplock or other airtight container with a paper towel or other moisture absorbing material.
- The most important factor in successful long term seed storage is to keep them in a cool, dark setting. Research suggests temperature between 32-41 degrees Fahrenheit.

Storing seeds prior to stratification and/or scarification:

- Best practice for shorter term storage of seeds prior to stratification and/or scarification is to place seed stock in a dark space at 32-41 (or colder) degrees Fahrenheit, processed at a growers desired level.
- Seeds can be stored successfully between 50-60 degrees Fahrenheit only for short periods of time.
- Moisture should still be managed in short term storage.

Vegetative Growing

Whether you want to call it cloning, asexual propagation or vegetative growing, the process of asexual propagation implies the use of genetically identical material creating a new seedling. There are some species native to eastern riparian forests that should almost exclusively be grown by cutting; consider the life history of a species and how it is understood to spread across a landscape (e.g. a segment of a black willow, elderberry or dogwood would break off during flood and take root downstream).

Implications of growing vegetatively:

- Disease transmission and disease susceptibility
- Low level of genetic diversity; decrease sexual reproductive success at a local scale
- Plants with clonality are advantageous in resource acquisition, successful establishment of offspring in new environments and generally reach sexual maturity before

Species that a grower should consider growing from cutting rather than seed are: black willow, shrub willows, shrub dogwood species and elderberry. These three species have been successfully grown by cutting over the past few growing seasons.

Species that will likely perform well, but have yet to be tested are: viburnum, alder, ninebark, swamp rose and box elder. Arguably, any livestock species, or species inclined to produce adventitious roots could do well as a cutting.

Given these implications, it is still important to consider growing these species by seed. However, asexual propagation is an excellent tool and should be considered when growing from seed isn't a viable option.

VEGETATIVE GROWING

Vegetative Growing

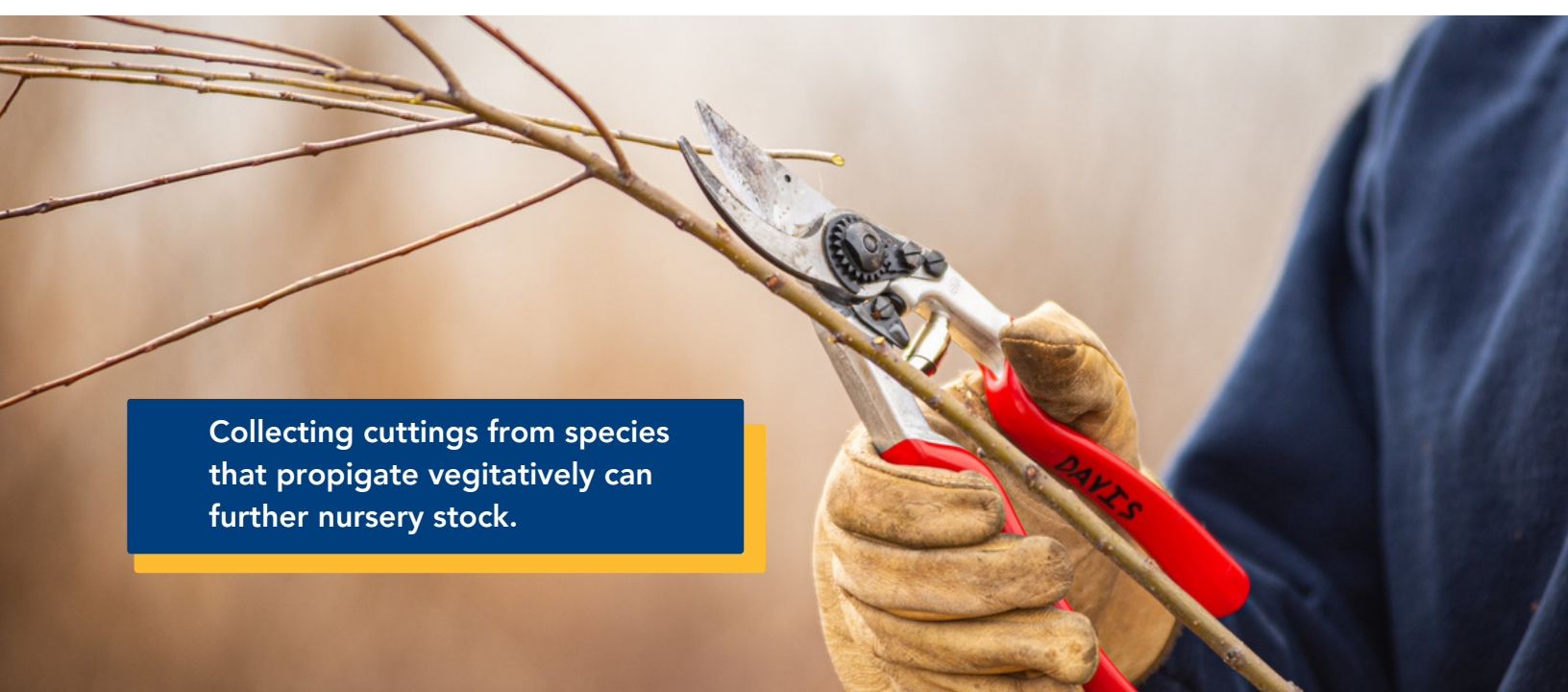
Techniques and considerations in asexual propagation:

The process of making a cutting will differ based on what species you are targeting and what time of year one is gathering plant material. Hardwood cuttings can generally be taken in the winter, and softwood cuttings generally do best taken in very early spring, but this is not true across all species. The Alliance encourages you to consult a historical grower or a trusted resource.

How you create a cutting is dependent on many variables. Consult vegetative growing literature for best cutting practices based on species as well as hardwood and softwood cuttings, for guidance.

Across the board:

- Collect from an obviously healthy individual
- Don't harvest at times that are inopportune for the plant you are taking from- important not to prune plants when they are in important growth stages, and won't make for successful cuttings anyway
- Apply a cutting hormone to help with encouraging root growth; some exceptions can be made if you're working with species that grow adventitious roots rapidly.



Collecting cuttings from species that propagate vegetatively can further nursery stock.

RESOURCES/ CONTACTS

Be sure to check out our website for more resources and information on the PA SCoop program and other forestry opportunities:

allianceforthebay.org/project/pennsylvania-seedling-cooperative/



Volunteers make this program a success!