

## Save Your Seedlings for New Jersey's Sake !

*By Jean Epiphan, Rutgers Cooperative Extension*

New Jersey was predominantly forested for thousands of years until widespread clearcutting made way for agriculture and later, sprawling development. Currently, NJ has 40% forest cover from urban city shade trees to public parks, suburban canopies, small woodlots, and large preserves. About half of our current day forests are on public lands. The rest is privately owned, meaning, we the people of NJ, are responsible for half of our state's forests, their health and their persistence into the future. Our role is vital as forests store carbon, reduce urban heat island effects, provide vital habitat, protect soil, capture stormwater, and much more.

Unfortunately, NJ forests are in dire straits, and they need our help. Natural forest processes and tree health are being inhibited by multiple factors: invasive pests and pathogens that attacks trees (Appendix Table 1); severely overabundant white-tailed deer; spread of invasive plants; climate change; and site degradation factors like soil compaction (Appendix Table 2). Stressors to forests and trees, like invasive pathogens, decrease tree immunity which in turn facilitates greater susceptibility to further stressors, like climate extremes, creating a negative feedback loop. Furthermore, all these stressors harm germination and growth of native seedlings. According to many NJ forest studies and projections, there is a severe deficit of tree regeneration. This means we do not have enough seedlings and saplings in our landscapes to grow into future mature trees.

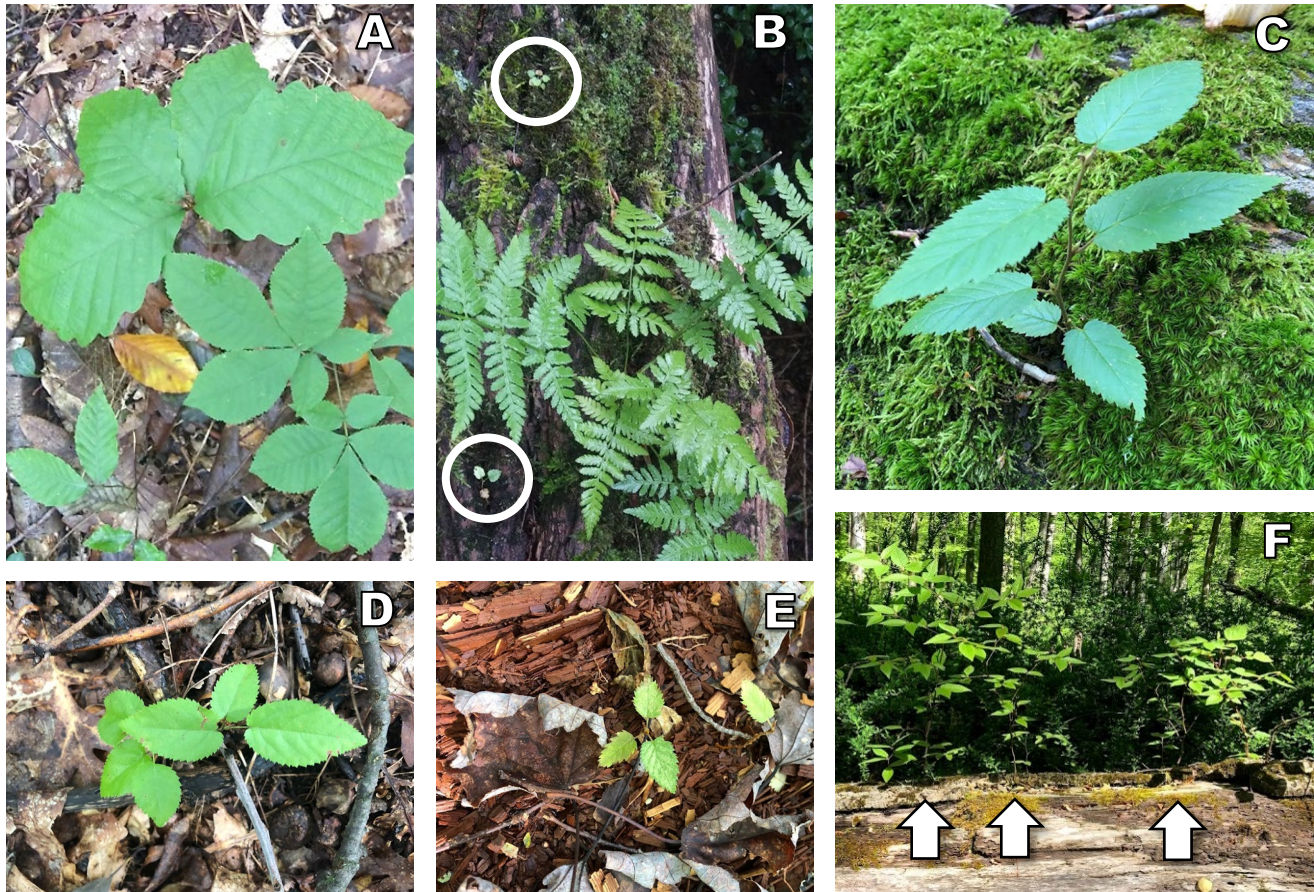
So, what can we do? The best way we can help is by saving native seedlings and saplings from deer damage and landscape stressors on our properties. Seedlings and saplings need special protection to grow healthy and become our future canopy trees.

**Step 1: Make conditions on your property favorable for tree seedling germination.** Native trees germinate best in healthy natural settings. Restoring natural processes and health in your landscape will help. Native seedlings germinate best in leaf litter, decaying logs, and moss (Figure 1).

- Refrain from blowing leaves and removing them. Native leaf litter helps provide important nutrients to topsoil as well as provide climate control for germination and plant roots. Plus, if you blow leaves, you could be removing the native tree seeds in the leaf litter too.
- Do your best to maintain moss if you have it; moss facilitates soil health and therefore plant health. Moss provides a gentle entry into the world for germinating tree seedlings.
- Keep decaying logs on your property, they encourage native seedling germination. They also provide valuable nutrients that promote healthy living soil.
- Consider reducing mowed lawn expanses so woody plants can germinate and grow without being mowed over. Mowing also compacts soil, which reduces soil quality and hampers woody plant root development and functionality.

- Stop using landscape cloth and heavy mulch layers – these are installed to prevent germination.

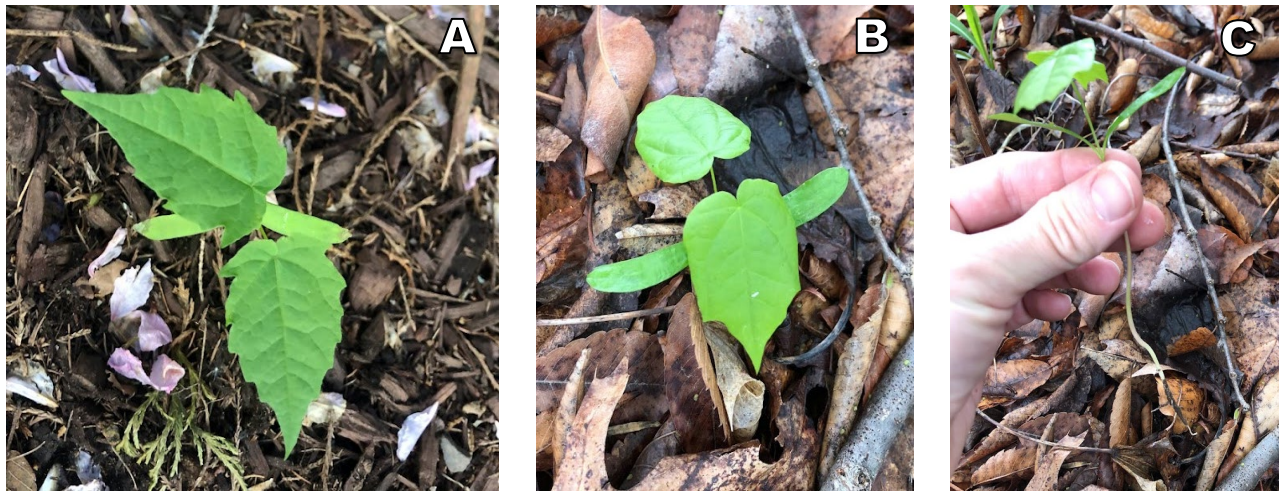
If a native seedling has germinated on your property, it is one sign that the microsite condition is favorable for its growth. This will make for a healthy growing tree if protected from deer and site stressors.



**Figure 1.** Native tree seedlings growing in natural settings. **A.** Chestnut oak (*Quercus montana*) and bitternut hickory (*Carya cordiformis*) seedlings among leaf litter. **B.** Black birch (*Betula lenta*) germinants emerging from moss on a decaying log among a spinulose woodfern. **C.** A black birch seedling growing out of moss covering a rock outcrop. **D.** Downy serviceberry (*Amelanchier arborea*) seedlings growing among leaf litter. **E.** Small black birch seedlings growing out of soft decaying wood from a fallen trunk. **F.** Three, three year old black birch seedlings growing out of a fallen log. Photo credits: Jean Epiphan.

**Step 2: Learn how to identify tree seedling species.** Knowing what you have growing allows you to know which seedlings to protect and which to pull out before they get big and require professional help. There are many common look-alike tree seedlings such as native sugar maple (*Acer saccharum*) and invasive Norway maple (*Acer platanoides*) that are important to learn to steward your property and neighborhood properly (Figure 2). Some plant identification apps can prove useful for seedling ID but beware as they are not always accurate. **Yours truly will be giving a free webinar on NJ tree seedling identification on April 25<sup>th</sup> 2024; to register, sign up here: [go.rutgers.edu/Tree Seedling ID Webinar Registration](https://go.rutgers.edu/Tree_Seedling_ID_Webinar_Registration).**





**Figure 2.** Look-alike maple germinant comparisons. **A.** Sugar maple (*Acer saccharum*) germinant, a native species. **B.** Norway maple (*A. platanoides*) germinant, an invasive species. **C.** Easy removal of a Norway maple germinant. Photo credits: Jean Epiphan.

**Step 3: Install protective barriers to seedlings and saplings.** The best form of protection to stop deer browse (as well as browse from other critters like rabbits and groundhogs) and buck rub is 6-foot tall wire mesh (Figure 3). This enables seedlings and saplings to grow and become mature trees that escape deer damage.

- Acquire a roll of 6-foot tall wire mesh with 2-inch x 4-inch mesh size; it is commonly available at hardware stores and fencing wholesalers.
- Wire mesh can be cut to create a single tree protective cylinder or tree cage; to achieve a 2-foot diameter cage you will need a 6.5-7-foot length of wire mesh.
- Next, install a metal fence post at least 4 feet tall; if using a 2-foot diameter cage install the stake 1-foot from your young tree.
- Then, secure the cage to the metal stake and use landscape staples to anchor the cage to the ground.



**Figure 3.** **A.** Buck rub that caused permanent damage and decay to the trunk of a hickory sapling. **B.** A protective, six foot tall wire mesh cage around a bitternut hickory (*Carya cordiformis*) sapling. Photo Credits: Jean Epiphan

This method allows for moderate branch expansion, air flow, viewability for monitoring, and is rigid enough to not require constant fixing and adjustments. For protection against girdling from the smallest of critters, a 1/4-inch wire mesh may be required at the base of the stem or a loosely wrapped piece of bird netting.

**Step 4: Reduce site stressors and restore natural processes to maintain soil health.** If your native seedling or sapling is surrounded by invasive plants, carefully remove the invasive plants. Invasive plants can inhibit the growth of native tree seedlings. Make sure the groundcover your seedling is growing in is natural (native leaf litter, moss, decaying logs). Refrain from blowing leaves; if you need to move leaves around, use a rake near your young trees. Make sure they get enough water during droughts and hot summer months; during these times water three times per week with at least 2 gallons of water for each 1" caliper tree size (this is also essential for your mature trees).

Let's all do our part to save our seedlings and saplings so we can have healthy future forests in New Jersey.

#### **Additional Resources:**

Forest Health Program in New Jersey. New Jersey Forest Service.  
[www.nj.gov/dep/parksandforests/forest/foresthealth/index.html](http://www.nj.gov/dep/parksandforests/forest/foresthealth/index.html)

Tree Decline in New Jersey Landscapes. Nick Polanin et al.  
[njaes.rutgers.edu/pubs/publication.php?pid=FS1061](http://njaes.rutgers.edu/pubs/publication.php?pid=FS1061)

Tree Problems Caused by People in the Suburban Landscape. Ann Gould & Mark Vodak.  
[njaes.rutgers.edu/pubs/publication.php?pid=FS1061](http://njaes.rutgers.edu/pubs/publication.php?pid=FS1061)

An overview of White-Tailed Deer Status and Management in New Jersey. Brooke Maslo.  
[njaes.rutgers.edu/fs1202/](http://njaes.rutgers.edu/fs1202/)

Community Based Deer Management. NJ Fish & Wildlife NJDEP  
[dep.nj.gov/njfw/wildlife/community-based-deer-management/](http://dep.nj.gov/njfw/wildlife/community-based-deer-management/)

Regional changes to forest understories since the mid-Twentieth Century: Effects of overabundant deer and other factors in northern New Jersey. Jay F. Kelly  
[old.npsnj.org/articles/effects\\_overabundant\\_deer\\_and\\_other\\_northern\\_nj.pdf](http://old.npsnj.org/articles/effects_overabundant_deer_and_other_northern_nj.pdf)

Shifts in dominant tree mycorrhizal associations in response to anthropogenic impacts, Insu Jo et al. [www.science.org/doi/10.1126/sciadv.aav6358](http://www.science.org/doi/10.1126/sciadv.aav6358)

New Jersey Native Regional Plant List 2022. Kathleen Walz & Jason Hafstad.  
[dspace.njstatelib.org/handle/10929/106553](http://dspace.njstatelib.org/handle/10929/106553)

Plant Communities of New Jersey: A Study of Landscape Diversity. Beryl Robichaud Collins & Karl H. Anderson. (Book)



**Appendix Tables:**

**Table 1.** Major invasive pests and pathogens to New Jersey and which native tree species they impact decreasing fitness or causing mortality.

<b>Pest or Pathogen</b>	<b>Susceptible Tree Species</b>
CHESTNUT BLIGHT	American chestnut ( <i>Castanea dentata</i> )
DUTCH ELM DISEASE (DED)	Elms ( <i>Ulmus</i> spp.)
DOGWOOD ANTHRACNOSE	Flowering dogwood ( <i>Cornus florida</i> )
SPONGY MOTH	Oaks ( <i>Quercus</i> spp.) are most susceptible; many other trees species can be susceptible
HEMLOCK WOOLLY ADELGID (HWA)	Eastern hemlock ( <i>Tsuga canadensis</i> )
ELONGATE HEMLOCK SCALE (EHS)	Eastern hemlock ( <i>Tsuga canadensis</i> )
BUTTERNUT CANCKER	Butternut ( <i>Juglans cinerea</i> )
ASIAN LONGHORN BEETLE (ALB)	Many tree species
EMERALD ASH BORER (EAB)	Ash ( <i>Fraxinus</i> spp.)
BACTERIAL LEAF SCORCH (BLS)	Oaks ( <i>Quercus</i> spp.) are most susceptible, especially the red oak group; many other tree species can be susceptible
BEECH BARK DISEASE (BBD)	American beech ( <i>Fagus grandifolia</i> )
BEECH LEAF DISEASE (BLD)	American beech ( <i>Fagus grandifolia</i> )
ELM ZIG-ZAG SAWFLY	Elms ( <i>Ulmus</i> spp.)
OAK WILT*	Oaks ( <i>Quercus</i> spp.) are most susceptible, especially the red oak group
THOUSAND CANCKER DISEASE*	Walnuts ( <i>Juglans</i> spp.), Black walnut ( <i>J. nigra</i> ) is most susceptible
SUDDEN OAK DEATH*	Oaks ( <i>Quercus</i> spp.)

\*not yet in New Jersey, but predicted to infiltrate soon

**Table 2.** Anthropogenic stressors that cause present and future tree and forest decline in New Jersey.

<b>Stressors Caused by Anthropogenic (human-associated) Impacts</b>	<b>Facilitates Pre-Mature Decline of Mature Trees &amp; Forests</b>	<b>Reduces Germination of Indigenous Tree Species</b>	<b>Reduces Seedling &amp; Sapling Growth to Mature Tree Sizes</b>	<b>Harms the Health &amp; Success of Our Future Forests</b>
INCREASE OF TREE & FOREST PESTS & PATHOGENS	✓	✓	✓	✓
OVERABUNDANT DEER		✓	✓	✓
INVASIVE PLANTS	✓	✓	✓	✓
CLIMATE EXTREMES	✓	✓	✓	✓
POST-AGRICULTURAL SOIL LEGACIES (tilling etc.)	✓	✓	✓	✓
WORMS IN SOIL (earthworms are NOT native to NJ soils)	✓	✓	✓	✓
SOIL COMPACTION (i.e. caused by mowers and machinery)	✓	✓	✓	✓
LAWN EXPANSES UNDER TREES	✓	✓	✓	✓
IMPACTS TO SOIL MICROBIAL LIFE & NUTRIENT CYCLING	✓	✓	✓	✓
LOSS OF MOSS	✓	✓	✓	✓
LEAF LITTER REMOVAL	✓	✓	✓	✓
VOLCANO MULCHING	✓	✓	✓	✓
HABITAT LOSS	✓	✓	✓	✓
WETLAND DEGRADATION & WETLAND ACREAGE LOSS	✓	✓	✓	✓
LACK OF WIDESPREAD AWARENESS & FOREST EDUCATION	✓	✓	✓	✓