

## November 2020 Short-form Advice for Receiving and Planting Torreya Seeds (written by Connie Barlow)

TO TORREYA SEED RECIPIENTS:

I know our website's **Propagation and Learnings pages are huge and unwieldy**, so I will give you my own renderings of the most important things to consider in becoming a planter in a northward state. But these are just my ideas, and my ideas geared for **rewilding** the tree — giving it regrowth forest for habitat, whether you first get a seedling going in a protected pot or put the seed directly into the ground in the next few weeks. Crucially important, too, for generating seeds as quickly as possible is having **some portion "orchard style"**, where the torreyas can get lots of sun. Necessarily, that requires ongoing human help to mow or whack down the plants that would otherwise quickly overtop it, and maybe also to provide water in a severe drought. For orchard-style best practices, visit that section of the Propagation page and know that **Jack Johnston** has the most experience, so he's the one to ask for detailed advice.

- TORREYA GENUS SURVIVES BY BEING A MOUNTAIN SPECIES. Do spend some time on the **Natural History of Torreya webpage**: <http://www.torreyaguardians.org/torreya.html> There you will learn that the California sister species and all the Asian species are in **mountainous terrain**, which means each can accommodate big shifts in climate and do so rapidly by using nothing more far-ranging than squirrels to disperse its seed to better elevations and slope aspects. Our species assuredly was Appalachian, until the Pleistocene forced it southward — and thankfully, **our geography of river flows made that southward shift possible** for the floating seed to rapidly make the trip with no animal helper needed. In contrast, Europe's lousy geography made it lose hemlocks and Liriodendrons and Magnolias (and I think Liquidambar) when the frosts came. However, **geography in the eastern USA becomes a liability when one needs to return north**. On the natural history page, notice the maps of our **3 major "glacial refuges"** and the extinct or relict plant associated with each. I tend to think that more plants went extinct in SE USA as the Holocene warming happened, but owing to lack of volcanic ash in eastern North America, we just **don't have the macro-fossils** to chart presence/absence/movement the way we can chart that through the coastal western USA (and genus Torreya pollen cannot be distinguished from conifer near-relatives). BTW: What about helping out **Franklinia** there in S. Indiana too? One of our Torreya planters in NC, **Brent Martin** (whom Jack recruited originally), is selling Franklinia seeds

right now: <https://www.alarkaexpeditions.com/new-alarka-tee-s> Brent also sells the native genus that Jack Johnston specializes in for his volunteer botany-serving actions in S. Appalachians: 2 species of **Stewartia**. I don't have the mental bandwidth for visibly promoting folks to help those native species move north and to find ideal habitats to grow in the wild, but I think I'll include Brent's info and seed sale webpage when I put out the word for folks to propose plans for putting Torreya seeds to use now. It sure would be great if somebody were to **foster a group to experiment in rewilding Franklinia northward!** (Ditto **Florida yew**, though that is surely impossible until deer populations are taken back down to reasonable numbers by humans, wolves, or mountain lions.)

• **APPLY WHAT WE KNOW.** For 20 years this species has been astounding me. And various volunteers have stumbled onto important insights. Notably, we know that the **seeds are recalcitrant; they die if dried or frozen for long-term storage** — so get them into some sort of soil site as soon as possible, and store short-term in an open plastic bag with semi-moist sphagnum moss. I have killed some myself in the opposite way: by letting the surrounding moss get too wet. **Fred Bess** (Cleveland, OH) has paid special attention to learning Torreya responses to **stratification techniques**, so absolutely go to Fred's webpage and scroll down till you get to the Feb 2016 entry with a photo of germinating seeds. As well, we know **rodents** are ruthless. Pots are raided, seed beds are raided (if not protected by wire below as well as fully above). And certainly forest soils are raided if seeds are freeplanted without being put in at least 3, better 4 inches deep. And even then **tunneling voles** may find them, so one has to stay away from ideal tunnelling areas, like fallen logs and old spanning roots of dead trees. Hence, I use a table knife to test the soil all around before putting in a seed. It is easy to tell when the knife hits a tunnel. So planting a seed 4 inches deep is never a sure bet, and less so if there are any vole tunnels nearby. Maybe in the wild, Torreya genus anywhere in the world successfully launches a generation only rarely when (a) **squirrels** adequately disperse and bury seeds away from the parent but then a hawk wipes out the squirrels for several years thereafter or (b) **White Oaks have a mast year** in their habitat or at least aren't experiencing a winter population crash owing to it being the year following a mast year. And there are more tedious considerations, too, such as don't put them anywhere within a quarter-mile of a **bird feeder**. We had terrific success with our 2008 planting of potted seedlings at the Lake Junaluska NC site — until voles started eating out the roots and lower bark, seemingly from a combination of not shaking out the potting soil sufficiently when planted (usually soft soil attracts voles) and having the little forest surrounded by seasonal residences that had bird feeders spilling seed onto the ground in summer, then sudden abandonment in the fall,

so boom and bust resources for voles. We also know that unless you have a nearly deer-free forest, like the steep slopes of dense forest in western N. Carolina mountains or reliably deer-poaching rural neighbors surrounding Clint Bancroft and Shoal Sanctuary, **deer are going to nibble back any small green thing** on the brown forest floor in winter that they don't recognize as poisonous; hence, plant so that the fronds of Christmas Fern will give them camo. Then deer wreak havoc again when the trees get several feet high because the bucks will find them ideal for **antler itching off velvet**, just as right now one can see that bucks tend to use 3-foot high hemlocks for same, year after year bashing them into shrubbiness. (See Fred Bess's page for buck-rubbing photos.)

- PAY ATTENTION TO INDICATOR SPECIES FOR FINDING BEST (AND AVOIDING WORST) SITES. Volunteers who have only **flat ground** to plant on have to be especially careful to find places neither too dry nor subject to periodic flooding. **Paul Camire** in Michigan has this type of woods — so it was he who taught me that, while sugar maples may be good indicator species for planting torreyia, red maples are not (presumably silver maples are bad indicators too). **Red (and silver) maples** can stand periodic water-logging. **Daïen Ballard** of NH had only hummocks and just a bit of larger gradual slope on his otherwise swampy lands; so when I paid a site visit it was very clear that **boreal trees that can thrive with sphagnum moss** on the surrounding ground were horrific places for torreyia to have to try to live. Indicator species are really good for distinguishing really bad places and really good places. In the S. Appalachians, my sense is that **liriodendron and hydrangia and various delicate herb species like cohosh** suggest really great spots. **Sassafras and Mountain Laurel and dogbane** and anything evergreen overtopping are terrible. **Christmas Ferns** are ideal northward indicators, as well as being good camo. Maybe northward folks will be able to distinguish other ideal indicator plants, too, as the years roll on.

- BE PATIENT AND BE HUMBLE ABOUT WHAT WE DON'T KNOW — SO CONSIDER CAREFULLY WHERE AND HOW TO PLANT, EXPERIMENT, AND REPORT YOUR RESULTS ONGOINGLY. Consider that genus *Torreya* (late Jurassic) is nearly as **ancient** a survivor as Ginkgo (middle Jurassic). It is absolutely amazing at **establishing new leaders after severe browsing** in even its first season above ground, and thereafter even better as the laterals develop. We humans tend to fret when some free-planted seeds take **3 or 4 winters before showing anything above ground**. Yet that very tendency may be exactly what enabled it to survive the K/T meteor catastrophe. Surely, there were seeds safely still underground no matter what time of year the meteor struck.

**Torreya is also very patient above ground too.** As with hemlock, sugar maple, and American beech, it is unperturbed by having a dense deciduous canopy above it; it simply grows slowly and especially laterally, sending out branches more outward than upward, even sprawling on the ground. And even when mature, it doesn't mind having to forestall producing seeds until a canopy opening happens over a portion of it — enough sun to produce seeds but only on the exact branches where the sun hits. My visits to **California torreyas** made that really obvious. And in California, the Torreya has to even survive beneath evergreen conifers: especially Coast Redwood and Douglas-fir. Go to the California torreya page and especially my later interpretation of what I saw there posted in Video 23. As with Coast Redwood, **the roots can be far older** than even the enormous trunks, because the root crown easily creates basals, which are main stems in waiting. If a fire or tree-fall wipes out the main stem, **basals spring up in profusion from the root crown** — their purpose being to keep the roots alive in the aftermath and then, later, will turn at least one of those basals into a new leader. Growth can then be astoundingly fast above-ground after a fire or trunk-fall because no new roots need to be grown (redwoods and torreya excell at that). So what is evident, especially in the NW Napa Valley wild sites of Torrey on north-facing slopes (indicator of reaching climate end of tolerance) is that repeatedly a stem will grow, then bend or grow laterally to try for a shaft of sunlight, but if no shaft found, it bends down and dies while a new basal takes off into a different direction in search of light. In contrast, **in Florida native range since the 1960s**, that skill is put to use solely for the purpose of surviving the above-ground cankers and leaf diseases, which, in my view, are all native diseases that became lethal to Torreya only when it was weakened by (a) having gotten stuck in its peak glacial locale and then (b) suffered reduction of cold ravine water seepage when its immediate higher elevation watershed of long-leaf pine was clearcut. (Whether the stem canker lethality in Torreya State Park and surrounds is native or exotic is still indeterminate, so my view is controversial. See the **Endangerment** page for more detail on the disease-causality disagreements: <http://www.torreyaguardians.org/extinction.html> )

Okay, that's more than enough for you to contemplate in your prepping to become a guardian for some precious seeds. I may decide to post a more refined version of this as a pdf link on the website, especially if I hear from other experienced planters that this is not contrary to what they have observed and that it is actually a good summary of helpful advice and overall perspective.

For Torreya,  
Connie