

# "Torrey Squirrels"

by Buford Pruitt (Torreya planter in Brevard NC)

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Objective: To determine whether the Eastern gray squirrel (*Sciurus carolinensis*) can be employed in the assisted migration of *Torreya taxifolia*.

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## Introduction

Historically, Torreya Guardians have been wary of seed predation on Florida torreya by the gray squirrel because of their appetite for its large seeds. However, my brief literature review indicates that the gray squirrel may be useful to Guardians, as this rodent is known to distribute significant numbers of the large seeds of torreyas and other species into microhabitats conducive to torreya establishment, bury seeds to suitable germination depths, cull seeds containing seed-predator insects & other debilitating factors, and occurs within a suitable geographical range.

Therefore, I have assembled the information below so that Torreya Guardians can take a closer look at the roles that the gray squirrel might provide in (1) enlarging the geographic range of the Florida torreya northward of the range of the torreya pathogen and (2) significantly increasing the torreya populations within that enlarged range.

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*LEFT: One of 14 Florida Torreyas that Buford Pruitt germinated from seed and planted into his forest in [Brevard, North Carolina](#). (Dec 2022)*

Torreya Guardians already know that the Eastern Gray Squirrel can affect our assisted migration tactics. This rodent (1) raids mother trees of their seeds, (2) steals potted seeds, and (3) caches seeds in developed areas and wildlands that can germinate and grow into naturally occurring individuals and colonies. Although we know this third thing, and we are happy about it when new seedlings “volunteer,” we have historically focused on the first two annoyances. In my view, this is because our historical charge has been to propagate and migrate. Obviously, we cannot increase the population until we learn how to propagate and nurture it. I believe we have now done those two things well enough to start looking at natural colonization strategies.



Being a wildlife biologist who sees mammals as the natural dispersers of Florida torreyas – not wind or water or birds – I suggest that wildlife biologists such as me assess the **potential for expanding:**

- (1) colony sizes of existing artificially planted trees
- (2) leapfrog colonizations near existing artificial individuals and colonies, and
- (3) large-scale colonizations within national and state forestlands.

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*LEFT: Torreya germinated from 2011 seeds in rodent-protected pots.*

However, as Daniel Boone exhorted, we must be sure we are right before we go ahead. My literature research indicates that there is **only one good candidate for spreading the Florida torreya in the Eastern U.S., and that is the Eastern gray squirrel.** Ergo, I have focused below only on that species.

#### Seed Dispersal Behavior:

The gray squirrel forages for, among other things, the relatively large seeds (= fruits, nuts) of trees such as the walnut (*Juglans nigra*), hickories (*Carya* spp.), oaks (*Quercus* spp.), and chestnuts & chinkapins (*Castanea* spp.). Chestnut trees historically were particularly reliant on gray squirrels, but the pines, beech, hazel, and oaks also benefit greatly, and so probably does the Florida torreya.

Foraged seeds that contain seed-predator insects are eaten immediately, whereas pristine seeds are stored for later consumption, especially as winter food. Seeds are stored individually via burial to depths of at least one inch, one source claiming below the frost line. Seeds may also be deliberately cracked before burial, it is said to prevent germination. Seeds are generally stored relatively closely to the finding gray squirrel's nest tree, but can also be dispersed over an area of up to seven acres. One study revealed that gray squirrels can re-find up to two-thirds of the nuts they buried.

Gray squirrels employ a mnemonic storage technique called “spatial chunking” (also seen in rats), where seeds are sorted and buried according to size, type, and possibly taste and food value. By spatial chunking, zoologists mean that, for instance, hickory nuts will be buried in one area and oak acorns in a separate place. It has also been found that gray squirrels store preferred seeds in wide open spaces, possibly to increase a robber's risk of predation when randomly foraging away from cover. Presumably, the storing squirrel experiences less risk because it knows where its seeds are buried, can go directly to them, and thus be less jeopardized by predators.

Another way that gray squirrels try to prevent neighboring squirrels from stealing their stores is the tactic of “deceptive caching;” that is, they only pretend to bury a nut, especially if they see another squirrel watching them.

### Insect Seed Predator Control:

As mentioned above, gray squirrels immediately consume insects that are already imbedded within found seeds. Furthermore, while nest-caching squirrel species store pristine and insect-containing seeds together and thus increase seed-predator insect populations, the gray squirrel's habit of storing only pristine seeds and doing so separately acts to limit seed-predator insect populations.

### Forest Regeneration:

Gray squirrels are important in forest regeneration, much more so than other North American squirrel species. This is because **only the gray squirrel stores most of its hoard in individual caches scattered over a wide area in locations that include those that do not already have forest tree cover**. Studies show that gray squirrels bury 97% of the seeds they find and immediately eat only the 3% that contain insects. Studies show widely variable rates of gray squirrels' re-finding their caches, one being 70% and another only 36%. The remaining seeds were eaten by other animals (one study lists 20%) and only 10% germinating. Nevertheless, **the 10% or so that do naturally germinate are likely to be the ones furthest from the nest tree and thus naturally disseminated**. The net effect of planting so many healthy & insect-free seeds is that vigorous & genetically superior trees are selected for in the forest regeneration process.

**Other North American species of squirrels tend to use nest caches**. For example, the red squirrel (*Tamiasciurus hudsonicus*) stores most of its seeds in tree cavities and buries only 11% of them. Seeds stored in tree cavities will not germinate nor aid in forest regeneration. **The red squirrel is thus considered a seed predator and not a forest regenerator**.