Combined Proceedings IPPS 74:585-589. 2024.

# Sand Bed Propagation

Kevin Zuidervliet

Octoraro Native Plant Nursery, 6126 Street Road, Kirkwood, Pennsylvania 17536 USA

kevin@octoraro.com

Keywords: acorns, sowing, mist, seed, oak

**Summary**

Octoraro Native Plant Nursery has been successfully propagating a variety of species of plants in their sand bed system for years. It is a low-cost system that allows dense planting of seeds. This method is especially effective with acorns, small seeds, and plants that have a low germination rate. Below you will find a detailed description on how to build the sand beds, the technique for sowing seeds, and an in-depth guide on how to harvest oak trees bare root while they are in leaf.

## INTRODUCTION

Octoraro Native Plant Nursery is a wholesaler of native trees and shrubs in Lancaster County Pennsylvania. We produce +350,000 native plants per year that are primarily used for riparian buffer plantings and reforestation. We have a propagation facility that sits on a very small footprint and because of that we need systems that allow us to propagate a lot of plants very efficiently.

The sand bed system that we use was developed in conjunction with Bill Barnes who consulted with us as we constructed our new propagation facility. It is made up of several layers which you can see being constructed in **Figure 1**. The layers are as follows:

1. Greenhouse floor - concrete or tamped stone.
2. Weed fabric.
3. Biotherm heat tubing - Biotherm heat tubing or a similar product creates an ideal temperature for seeds to germinate.
4. Round pebbles - To protect the heat tubing from not being punctured.
5. Aluminum flashing - Acts as a heat dispersal layers as well as a protects the heat tubing when you are digging plants.
6. Weed fabric - This keeps plant roots from going deeper than this layer.
7. Pure sand - High quality sand that does not have any additives or chemicals is necessary to create plants that have a robust root system.
8. Mist nozzles - These hang over the sand beds to create a humid environment.

**Figure 1**. Sand bed construction consists of layers of materials.

**Sowing and Harvesting**

Sowing seeds is very simple for plants that have small seeds or are wind dispersed. Simply sprinkling them evenly over the surface of the sand is all that is needed. Seeding too thickly is preferred as you can always cull plants to a proper spacing. Acorns are planted using your hand as a plow to create a straight row at approximately one inch depth. The acorns are dropped into this furrow at .5”-1” spacing and another furrow is made. This second furrow pushes sand in both directions which is what covers the first furrow. As the acorns germinate, they push themselves slightly above the sand (**Fig. 2A**). Once the plants are fully germinated, they do not appear in rows but create a canopy (**Fig. 2B**).

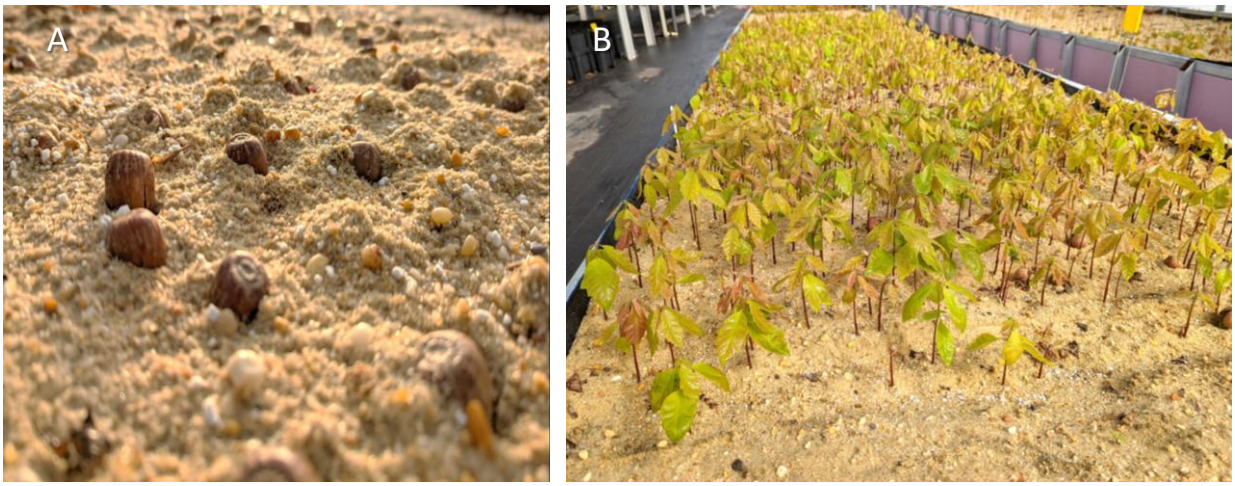


**Figure 2**. Oak propagation in the sand bed. A. Germinating acorns. B. Oak seedlings.

We have developed a specialized process for harvesting plants in leaf. This is especially effective for oaks. We harvest plants in leaf so that we can “flip” our sand beds as many times a year as possible. The more times you can sow and harvest from your sand beds the more efficient space is. This is essential for any propagation facility no matter its size.

Twenty – four hours prior to harvesting we apply BioPlex Transplant Concentrate and Plant Enhancer. We do this in a bucket with a sump pump and a hose at a rate of 5 fl. oz. per 10 gallons. When we harvest plants, we do so very gently so as not disturb that fine root system that the plants have developed in the sand. The plants go straight into a bucket which contains a hydration gel and mycorrhizal slurry (**Fig. 3**). From here the plants are potted. As soon as one tray or one plant is potted it is placed on a wagon and mist is applied. This keeps the plant from transpiring which is essential as the plant begins to establish itself in the pot. As wagons are filled, they are brought into a greenhouse and placed on the floor under mist nozzles which are run at a rate to keep 100% humidity in the space (**Fig. 4**). This rate depends on the weather and size of the greenhouse. At this point, BioPlex is reapplied. Immediately after potting and while the plants are transitioning it is important to keep the leaves wet for 1 week as the plant establishes. After that week the mist can be slowly scaled back until it is off. This weaning off period typically takes 7-10 days.

**Figure 3**. Harvesting oak trees into buckets with a mycorrhizal and gel slurry.

**Figure 4**. A greenhouse that is being filled with potted oak trees under mist.

## Conclusion

Using the sand bed method can be an incredibly space efficient tool that allows propagators to produce 1000's of plants on a small square footage. The technique used to produce plants on that space is specialized but as the system is used, propagators will learn best methods which have been outlined in this paper. When sowing seeds, it is important to do so densely as the more plants in the sand that germinate the more finished product you will get at the end.

Using tools such as a mycorrhizal slurry, mist systems, and Bioplex you are able to harvest plants in leaf which ensures multiple crop rotations. This system is excellent for growers who are operating on a small square footage and are trying to produce the most plants possible.