

## Propagation of *Packera aurea*, *Eutrochium fistulosum* and *Sagittaria latifolia* at Kind Earth Growers

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### Summary

Kind Earth Growers specializes in growing native plants from seeds. Production is mainly in cell trays. This paper describes the propagation and production strategies

for three different crops including golden ragwort (*Packera*), Joe-pye weed (*Eutrochium*) and duck potato (*Sagittaria*).

### INTRODUCTION

Kind Earth Growers (**Fig. 1**) is a wholesale nursery operation in Bucks County Pennsylvania; growing native perennials, largely from seed, in plug trays. As I outline how we grow these species, it is important to factor in our water quality and location as these conditions can change how plants respond in the greenhouse environment. Kind

Earth pulls its water from a single well, pH 7.0-7.6, hardness >260mg/L. The water is injected either with 93% sulfuric acid at a rate of .6oz per 100 gallons or Sprint 330 Iron chelate at a rate of .025oz per 100 gallons, applied at grower discretion. Bottom heat is the main heat source for early stages of growth and runs from January through

April. Seeds are germinated at 72 F and plants are grown on from 55-60 F. Our methods are centered around manipulation by hand. Seeds are sown over 288 trays with graded vermiculite carrier and a set of sieves. Seedlings are singled down from this tray into larger sizes by our transplanters (see photo to left). Plants start in a standard peat-based propagation mix and are transplanted into a peat based plug mix or a peat free compost and pine fines mix depending on species and time to availability.



**Figure 1.** The Kind Earth growers' team in 2024.

We incorporate slow-release fertilizer at the low rate given by the manufacturer, and supplement that weekly as-needed with various liquid salts, typically 150 ppm N maximum. Because of our water quality we use an acidic complete fertilizer two weeks in a row, followed by a neutral or basic fertilizer for the third week. We inoculate religiously with *Trichoderma* products, and I attribute that to our lack of significant root disease. Our IPM program leans heavily on beneficial insect releases.

Finally, I would like to mention that we focus on growing a plant that is not only healthy, and able to survive direct planting into the landscape, but capable of propagating and supporting its community for years to come.

### ***Packera aurea* (Golden ragwort)**

*Packera* is a low growing semi-evergreen perennial in the Asteraceae and this picture is the original patch where seed was collected in our first year of operation 2016 (Fig. 2).



**Figure 2.** *Packera aurea* seed production stock.

We grow two distinct variants, our open pollinated variety from Bucks County and a *Packers aurea* which is solely vegetatively propagated, which we procure via tissue culture. The open pollinated variety has a smaller habit in almost all parameters, purple coloration on the leaf underside is less intense, it grows much better in full sun and

produces viable seed. Some argue the vegetative variety is a better garden plant being more handsome, and because the seed it produces does not germinate. It is believed that the low seed fecundity of the vegetative form is due to the common characteristic of most Asteraceae to be self-sterile. Both plants are vigorous growers and excellent groundcover.

The first set of ripe seed is on or around May 14<sup>th</sup>. It's ready when the light lime green seeds begin to turn beige at their core, the seed will ripen fully to a ruddy brown and the pappus will fluff out all at once near the end (**Fig. 3**). Keeping your eye on the weather can be important as the seed is dispersed quickly in rain or wind. The first round is the best, I suspect the beautiful and diminutive, white-crossed seed bug may be the culprit, eating the late seed more thoroughly. As many as three rounds of ripening can occur, usually by May 21<sup>st</sup>.



**Figure 3.** Initial seed ripening stage.

We have found that managing a garden plot with many of these plants can dramatically increase the volume, quality, and reliability of the seed they produce. Rub the seed on a sieve to remove the pappus and winnow it before storage. Stratify seed for 30 days, up to two years before losing viability.

Seeds take 4-8 days to germinate. This is a cool season crop, so lower light levels and slightly lower nighttime temperatures don't cause the finish time to fluctuate dramatically. Using peat free media pushes finish time to 4-5 weeks. Our last week to transplant into a finished size is week 40. The most prominent insect pest is aphids, check early and often.

Should you miss your seed or struggle to germinate it, the many tips can be pulled off plants as young as 12 weeks old (**Fig 4a**). The youngest reliable division from seed grown plants is pictured above. Side shoots will sprout from the base of the cutting so get that towards the center of the plug.

We also use tissue culture plants to multiply plants (**Fig. 4b**). It's best to get good contact between the very base of the plantlet without burying the small basal leaves. We plant them in p128 trays. The biggest issue with vegetative propagation is *Phytophthora* crown rot and botrytis. Treat them until sale.

Once the tissue culture plants are inserted into the tray, they are held in our humidity tent for hardening off. Cut the mist down as quickly as possible. Allow the plantlets to flag between mist events from day 2 onward. We often use a silicone surfactant on day 1 at labelled cutting rate.

**Table 1** shows the times to finish a seed, division and tissue culture crop.



**Figure 4.** Vegetative propagation in *Packera*. A. Side shoot divisions. B. Plants arriving from the tissue culture vessel. C. Individual plantlet. D. High humidity tent for tissue culture plantlets.

**Table 1.** The time to finish a seed, division and tissue culture crop in *Packera aurea*.

Starting size	Finish size	Weeks to finish
Sown seed	288	3-4
288 from seed	128	2-3
288 from seed	72	3
128 from seed	Dp50	3-4
Divisions	Dp50	3-4
Stage 3 tissue culture	128	3-4
128 from tissue culture	Dp50	3-4

***Eutrochium fistulosum* (Hollow stem Joe-pye weed)**

Joe-pye weed (aside from having a great first name) is a beautiful meadow and road-side weed, often to 9 feet tall with whorled leaves (**Fig. 5**).



**Figure 5.** *Eutrochium fistulosum* in flower.

The seed ripens around September 15<sup>th</sup> and can hang on the plant into October. The pappus does not separate easily from the seed so don't bother. The seed will germinate without treatment or ideally with a stratification of 1 to 15 days to help it imbibe moisture. Longer stratification times often reduce viability. Caterpillars and pollinators love it as well as aphids, thrips, and mites. Late summer weather, or overwatering, will bring leaf spot.

Joe-pye germinates in stages over 5-9 days. Seedlings grow vertically with such enthusiasm that they need to be pinched before the plug is ready for transplant. The plugs at left aren't quite rooted through but have begun stretching. To the right is the proper trim height to promote a sturdy habit in the finished plant. Get the crown buried slightly at transplant to ensure a strong connection with the media.



**Figure 6.** Seedling plug production in *Eutrochium*. A. Young seedlings beginning to stretch. B. Pinched plants.

An exclusive selection of double flowering *Eutrochium fistulosum* is ‘JoJo’ (**Fig. 7**).



**Figure 7.** ‘JoJo’ *Eutrochium fistulosum*.

‘JoJo’ plants are shorter than the species, topping out at 5’ while retaining its vigorous habit. The leaves are dark green, and the stems have red/purple tint. Color

saturation in the flowers is excellent especially in full sun. The flowers will persist into October as they will not get pollinated or produce seed. Strikingly, the flowers and stems turn black at dormancy providing good winter interest. While it may not provide nectar or pollen it attracts caterpillars, aphids, thrips, mites, and their associated predatory insects.

*Eutrochium fistulosum*’s hollow stem and whorled arrangement cause some irregularities when making cuttings and keeping stock plants. To combat these issues, I grow the mother pot tall and harvest cuttings down the stem rather than up. Three-year-old ‘JoJo’ stock plants are forced in the propagation house. The goal is to leave 7-9 solid nodes and pinch the tips off. These tips are not good for rooting, their hollow stem cause them to warp and bend under the substrate rather than develop healthy callus. The plants average 5 productive stems per plant (**Fig. 8**).

After pinching, we remove the large leaves from the top to allow light in, as the

top two nodes will push cuttings. The expanding shoots will be ready between day 14 and 20 from pinch. Each node, being whorled, will produce 3-7 cuttings. This first flush amounts to 100 cuttings per stock pot, conservatively.

Take cuttings before stems get too large. If you let them get long, they will need their leaves trimmed, which is time consuming.

Take the cuttings before this happens! The leaves expand incredibly fast, and furthermore they will continue to expand after you cut them, so go a little earlier than you think is ideal.

We stick them in 128's and under the mist tent. Mist requirements are medium-low. Cuttings will take 2-4 weeks to root.



**Figure 8.** 'JoJo' three-year-old stock plants. A. Growth after nine weeks. B. Pinched plants with large top leaves removed. C. Shoots developed after pinching. D. Shoots ready to take cuttings.

You can now prepare the mother stock plants for another round of cuttings (**Fig. 9**). Method, time, and quantities will be similar to the first flush. Transplant into larger size quickly, when there is something like 6 nodes pinch the plant and root the tips. We aim to finish crops before mid September to make sure the plants have enough time to create winter buds. Usually our last dp50's get planted week 34.



**Figure 9.** Stock plants cut back to induce a second round of cuttings.

**Table 2.** Production schedules for *Eutrochium fistulosum* from seeds or cuttings.

Seed Propagation		
Starting size	Planted into:	Weeks to finish
Sown seed	288	4-5
288 from seed	128	2-3
288 from seed	72	3
128 from seed	Dp50	3-4
'JoJo' Cutting Propagation		
Mother plant	1st flush cuttings	11-12
Mother plant	2nd flush cuttings	14-15
Unrooted cuttings	128	2-4
Unrooted cuttings	tip cutting	7-8
128 from cuttings	Dp50	3-4

### ***Sagittaria latifolia* (Duck potato)**

Wetland plants are at the heart of what we grow at Kind Earth and play a crucial ecological role such as nutrient and sediment capture, soil stabilization, groundwater recharge, floodwater mitigation, food, and cover for wildlife.

Wetland habitats are not currently preserved, protected, or managed with the care that they need to be to maintain the health of our land and water.

*Sagittaria* is an excellent plant for use in wetland restoration and stormwater management (**Fig. 10**). It is still able to tolerate dry spells, possibly due to its (edible) underground corms. White flowers with butter yellow centers bloom as early as July but can appear as late as September. The seed ripens September 15<sup>th</sup> through October. Stratify the seed for 60 days up to two years and we find a short freeze helps break seed dormancy. *Sagittaria* should be given plenty of fertilizer, a characteristic of many wetland plants such as *Typha*. Aphids are the main pest in a greenhouse setting.



**Figure 10.** Duck potato (*Sagittaria latifolia*) growing in dry earth cracks can tolerate wet or dry soils.

The edible corms are also excellent propagation material (**Fig. 11**). These corms vary in size considerably, often growing larger or smaller depending on the size of the pot, quantity of fertilizer, and how late in the season they began to form. A single *Sagittaria* plant will produce 3-12 corms on long stolons, 10-16 weeks from germination. Once they have formed, main plants have a habit of going dormant a little while after, which is problematic for sale.

Corms may resprout the same season from the terminal claw-shaped bud, but it takes some time. Corms that have formed fully can be plucked off the stolon, put damp in a bag and stored in the fridge, 60 days to 9 months. Keep an eye out for fungal growth in the bags. To sprout; float them in warm water until the terminal grows. Once roots have begun to expand, break the plant off, plant it, and put the corm back in the water to resprout. This next set of plants will be smaller and more delicate, plant them with the corm this time. We sprout them March through July. Sprouting before March will result in dormancy as early as May.



**Figure 11.** Sprouting *Sagittaria* corms.

*Sagittaria* germinates best in fully saturated soil, we grow many wetland species in ebb and flood benches simply plugged up to hold water. One could put the propagation tray into a solid flat to hold enough water in the media. Trays can be drained but kept wet once germination is complete. Seedlings are small, which contributes to a lengthy stay in the prop tray. Manage the inevitable algae by disturbing the soil surface with a fine mist nozzle operated by hand.

Because of the role these plants play in the environment they respond well to fertilizer. Seedlings are fertilized weekly at 100 ppm N. Once transplanted into larger sizes you can apply 200 ppm N twice weekly.

Higher incidences of fertilizer will finish your plugs faster but the plants will be “softer” which is not ideal when they will be planted in a colder or drier landscape. When you’re growing wetland plants, don’t dry them out.

**Table 3.** Production schedule for *Sagittaria latifolia* from seeds.

Starting size	Finish size	Weeks to finish
Seed sown	288	4-5 (5-8d to germ)
288	72	2-4
Seed sown	Mature corms	10-16
Fridged corm	Terminal plant (1st)	5-7
Fridged corm	Sprouted corm (2nd)	8-10