

GROWING PAWPAWS FROM SEED



*Pawpaws: the first year they sleep, the second year they creep,
and the third year they leap!*

Pawpaws are very hardy and low maintenance plants if they are grown correctly.

Collecting and Storing Seed

The golden rule to growing a pawpaw tree from seed is to never let the seed dry out. So, when you have just finished the delightful experience of eating a pawpaw and you have decided to grow your own tree, place those seeds directly in the ground where you want to grow your tree. Not ready to grow your tree right away? You can put your seeds in a resealable plastic bag in the refrigerator¹. Leaving your seeds in room-temperature conditions will cause them to dry out, killing the tiny embryo and prohibiting germination.

Be sure to clean all the flesh off the seeds before storing. If the seeds are coming from rotted fruit, give them a five-minute soak in a diluted solution of bleach: a 1:10 ratio of bleach to water is recommended. The seeds need a minimum of 70 to 100 days of chilling at temperatures slightly above freezing. This is known as “stratifying” the seed—a fancy word that means you are mimicking what happens naturally to

¹ It is best to put the seeds into the refrigerator within the first 24 hours after cleaning. Sooner the better.



Image courtesy of Trevor Newman, known as The Fruit Nut, who is dedicated to exploring and popularizing uncommon and under-utilized fruiting plants. Check him out at www.thefruitnut.com.

temperate zone seeds when overwintering outside. Seeds not directly planted in the ground are typically chilled in the refrigerator between 32° and 40°F (or 0° to 4°C). Storing them longer than 100 days is fine since seeds collected during harvest season—late August through early October—often do not germinate until the following spring. For me, that could mean up to seven months in the refrigerator. Just keep an eye out that they do not begin to get moldy from being too damp.

Adding a damp medium, such as sand, to the bag can help maintain the needed moisture; however, if you have enough seeds in the bag, they need no extra medium. Be sure to poke a few needle-sized holes in the bag to vent excess moisture. I keep an eye on my seeds and simply rinse them if there is any fungal buildup.

A Pot is Not a Pot

A pot is not a pot, no it is not, not anymore! There are tall ones, short ones, skinny ones, fat ones, square ones, round ones, shallow ones, deep ones . . . What is one to do?

The one time you will catch me encouraging the “straight and narrow” is when it comes to growing pawpaws in pots. I am a big fan of growing pawpaws in deep (12+ inches) tree pots for a number of reasons: to accommodate the pawpaw’s deep tap root; to achieve good moisture retention; to avoid

spiraling of the tap root; and for ease of storing together. Given the right medium and space, germinating pawpaw seeds will send down a nine-inch tap root before shooting up a stem. Deep pots without large openings in the bottom hold moisture well, dramatically reducing frequency of watering and encouraging deep root growth. Straight, narrow sides guide the growing roots downward, preventing the roots from circling and becoming root bound. Tall, rectangular pots fit beautifully together in milk crates, making storage and transportation more efficient.

Popular in the nursery trade are root trainer pots, also known as air-pruning pots. Rectangular in shape, these pots encourage roots to grow down and out through large holes in the bottom where the dry air kills the growing tips. When the air prunes the bottom roots, more lateral roots are encouraged to grow, thus building up more root mass. The down side to this design is that it requires a mesh-bottomed surface to hold the pots a few feet above the ground, necessitating the need for more watering. They work, but they take work.

Watering plants in pots takes real dedication, one that life does not always accommodate. I like to design for neglect or low inputs when considering watering needs. The deep tree pots allow moisture to linger much longer than shallow pots and certainly longer than the popular air-pruned pots. I find that deep pots and balanced shade (30-50%) allows me to minimize watering needs for my potted pawpaws and many other nursery plants.

Note there are also creative reuse options, such as fashioning deep tree tubes from old tree shelters and tall milk cartons.

Germinating Seeds – Roots to Shoots

Pawpaws are slow to start but easy to grow.

The saying with pawpaws is that the first year they sleep, the second year they creep, and the third year they leap! With pawpaw trees, it's all about getting the roots well established. The motto to remember is "roots to shoots." Pawpaws seeds have high germination rates (over 90%) when a couple of key elements and a single virtue are considered. The elements are temperature and moisture. The virtue is patience.



My niece, Ruby Rasmey Judd, standing in front of a pawpaw tree at Long Creek Homestead holding a milk crate full of 1-year-old pawpaw saplings in 12-inch-deep pots.



Pawpaw seed sprouting its root!

ROBBING PETER TO PAY PAUL: POTTING MIXES

Peatmoss, vermiculite, perlite, and coconut coir all make great potting mixes; however, the environmental impact of these options does not justify the benefits. Peat and sphagnum mosses come from rich ecosystems that get drained, dug out, and shipped afar. Vermiculite and perlite also come from afar after they get blasted with energy-intensive high heat to cause expansion. While coconut coir—the pith from coconuts—often is an environmentally championed alternative that acts like a peat replacement, it, too, has a big footprint on the ecologies and people processing it half a world away. Using these products basically means you are robbing one ecosystem to build up another.

To make your own eco-groovy soil mix, you can buy the individual ingredients and mix them yourself or make your own from scratch. I recommend making a potting mix using a recipe of two parts sieved compost, two parts good topsoil, two parts composted tree bark or wood chips, and one part worm castings. Aged sawdust, if available, is also a good add, but must be rotted or else it robs nitrogen from the soil mix. I make my soil mix heavier than traditional mixes by adding more top soil than most, as I find it adds natural fertility and moisture-holding properties. This means I have to feed and water less.



Potting mixes ideally have healthy fungal networks and natural fertility

Regardless of your germination technique, consistent moisture is key. Pawpaw seeds should never dry out. How long it takes for your pawpaw seeds to germinate is determined by temperature.

Direct Seeding

If you direct seed in the autumn by taking the seed from a freshly eaten pawpaw and planting it where you'd like it to grow—known as “direct seeding”—germination will begin the following summer. The seeds will cold stratify naturally over the winter in the ground and then slowly begin to germinate as the soils warm again, usually revealing a growing shoot in July or August.

While direct seeding is a long affair that requires care to assure good and consistent moisture, it has the benefit of avoiding transplanting, which pawpaws certainly appreciate. For direct seeding, prepare your planting site by creating a well-draining topsoil two to four inches deep. Sow your seeds flat with approximately one inch of soil above the seed. Mulch well with straw or other mulch material to ensure good moisture retention and protect against extended hard freezes. Ideally, at this time you would mulch an extensive area to start the soil conditioning for the tree's future growth (see Planned Planting section in Chapter 4). Placing a piece of chicken wire or hardware cloth over the soil before mulching will help block curious rodents; just be sure to remove the protective covering before sprouting takes place the following summer. Young seedlings sown or planted in direct sunlight prefer shade for the first year or two, so create a shade structure or put in place a short (18") tree tube.

Slow but Sure Method

Seed germinating time can be sped up by starting seeds inside your home or any heated space. After you have stratified seeds in the refrigerator, place the seeds directly in deep pots using a moist potting mix that has been warmed to room temperature (75° to 85°F or 24° to 29°C) in your home or greenhouse. Insert the seeds, flat side down, with one inch of soil covering the seed. Maintain consistent moisture in the pots. I help maintain moisture in my pots during early-stage germination by mini-mulching with woodchips or sand on the surface. I also keep them in the dark (pawpaw seeds do not need light to begin the germination process)—this allows slow moisture evaporation and does not use up precious

GUERRILLA ACTION

Pawpaws readily grow from seed, as proven by the many pawpaw seedlings we have popping up all over our homestead—a result of raccoon feasting. While raccoons are the ultimate guerilla planters, we humans can also guerilla plant pawpaws in vacant areas. Consider making pawpaw seed bombs by encasing the seeds in balls of absorbent material, such as clay and compost, and tossing them into neglected areas such as urban waste lands, park edges, or your neighbor's yard. Or even easier: just throw a whole pawpaw fruit into those areas!

PAWPAW SEED GERMINATION: A FOUR-STEP PROCESS

1. The seed imbibes water.
2. The radicle splits the seed coat and emerges.
3. Root development occurs.
4. The green growing tip emerges above soil and expands its leaves.

temperature, thus increasing growth rates), if it is past the freezing date outdoors, plants can be moved outside to the shade of a deciduous tree or beneath a shade cloth in full sun. If you use shade cloth in full sun, 30-50% shade cloth is recommended.

Remember the mantra with starting pawpaws: patience, patience, patience—and consistent moisture.



Wyatt Judd showing off our simple, yet abundant, germination set up

The Deluxe Germination Method

To gain a couple of weeks in the germination game, I use a small heating mat that controls the temperature of my soil medium and causes my seeds to germinate the root tip in just 14 days. This is the fastest process I know of. Using this technique, my germination rates have been in the 90% range.

I received this germination method from pawpaw grower legend Jim Davis of Deep Run Pawpaw Orchard. Using just a single heating mat to heat the soil, a pair of turkey basting pans, and a lightweight seeding mix, seeds will begin germination in just 14 days. Now, I germinate hundreds of seeds at a time for my nursery business; the same method works well for even just a handful of seeds.

Be sure your mat has an adjustable thermostat and set it at 85°F.²

Place an empty aluminum pan on the mat, moisten the seedling mix, and layer it one-inch thick in the pan. Place pawpaw seeds flat, side by side, and cover the seeds with an additional one inch of moistened potting mix. Repeat up to three layers if you have enough seed. Regardless of having one or three layers, make sure the seeds have an

² The best heating mats have a small metal probe that are inserted into the potting medium to measure the actual temperature (versus the temperature of the mat heat). I often have to turn my mat up to 87°F or more to maintain the desired 85°F in the potting medium.

inch of seedling mix below and above them; think of it as pawpaw-seed lasagna! Cover your lasagna with an upside-down pan as the lid, and clamp together the two pans. Check every couple of days to be sure the potting medium stays moist. Seed coats will split in approximately 14 days; you will see the white root tip showing. Pick them out as soon as the root pokes out, then pot them with the root radical facing down in deep pots or directly in the ground where they will be grown. Note that placing a piece of insulation, such as folded cardboard, under the heating mat helps keep the heat from sinking into the surface below.

Squirrels and Chipmunks

Beware that curious squirrels and chipmunks like to root into pots in search of food and to bury their nuts; this can destroy your young pawpaw seedlings. Historically, I have lost upwards of a third of my nursery stock to such diggings; now I grow them in critter-proof A-frame structures covered in chicken wire. This method also conveniently supports the use of a shade cloth. An unused chicken coop or chicken tractor can be easily retrofitted into a pawpaw nursery. I have also reused an A-framed children's play set as a ready-made nursery.

I converted an old A-frame chicken coop into my pawpaw nursery by simply placing 50% shade cloth over the chicken wire. This is in full sun, but does not need constant watering thanks to the shade cloth and deep pots. It is safe from deer and nut-burying squirrels. As an eventual replacement for the shade cloth, I have planted honey locust trees around the coop that, once grown, will give perfectly dappled shade.

WHAT YOU NEED FOR DELUXE GERMINATION

What you need:

- Small seedling heat mat
- Digital control thermostat for heat mat
- Two aluminum turkey basting pans
- Lightweight seedling/potting mix



Timing

I begin germinating my pawpaw seeds in Maryland, which is located in USDA zone 6b, around mid-February using the deluxe method. I transplant the germinating seeds into pots in early March, allow the tap root to develop for six to eight weeks, and then place them outside under the shade cloth or under a tree in late April/early May when the shoots are emerging, the weather is warming, and the danger of a hard frost has passed.

I plant the small pawpaw seedlings that have sprouted in March in autumn of that same year when the leaves begin to change color; sometimes, I wait until the following spring. Doing this reduces the risk of the tap root outgrowing the tree pots. The pawpaw tap root, like most nut trees, is ready to shoot deep into the earth—not hang out in a pot. The seedling root will reach the bottom of a 12-inch-deep tree pot in just six months! Planting in early or mid-autumn³ reduces the concern about over-wintering potted pawpaws, which need protection from freezing. Those that I do over-winterize, I put in an unheated garage or in straw bale forts that buffer against hard freezes.

TRUE TO HEREDITY

“True to heredity” is a horticultural term meaning a plant that is grown from seed will be like its “parents.” Some fruit seeds, including pawpaws, have good genetic overlap; that is, they will likely have good fruit quality if their parents did. This is a good attribute when seeds are collected in a cultivated pawpaw orchard, as the plants grown from these seeds will have many of the high qualities of their parents. That said, seeds from cultivated pawpaws will not have the same guarantee of production and quality as a grafted cultivar.

If the pawpaws you have been eating and saving seed from are superior cultivars, then those seeds, quite possibly, will grow and produce a decent fruit without needing to graft a named cultivar onto it. In the nursery trade, these are called “select pawpaw seedlings.” They are not named cultivars, even though they may be seed from, say, the famed Shenandoah cultivar, but they will have a mix of the parents’ genetics. Select seedlings are fine for home-scale growing, but not always recommended for market production where the assurance of 100% quality that comes from grafted cultivars is a wise investment. Not to mention that it takes a seedling six or seven years to reach maturity and produce fruit, whereas a grafted plant takes only four or five years to fruit.

Collecting and growing out wild pawpaw seeds is a fine idea if you plan to graft them later; otherwise, you are rolling the dice on fruit quality. See the Resources appendix for quality seed suppliers.

³ Planting in early to mid-autumn is ideal. Avoid planting in late autumn when winter is near.



THANK YOU!

We hope you've enjoyed this short intro to the fantastic and amazing pawpaw.

It gets much more delicious the more you explore..

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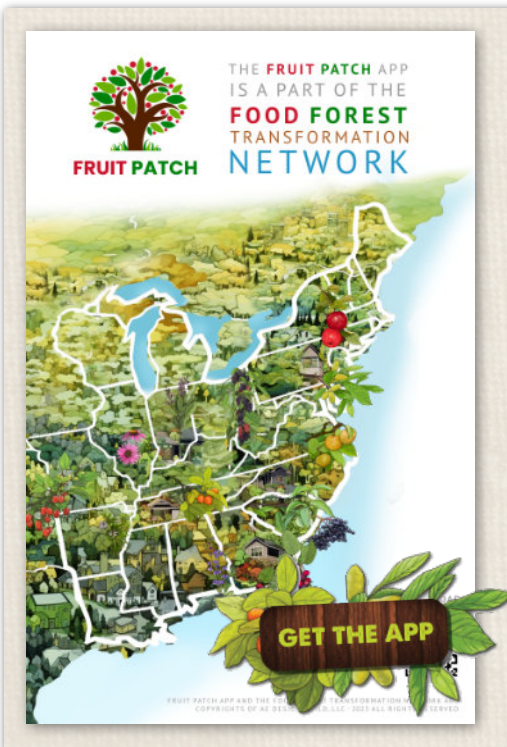
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Blessings, Michael & Ashley Judd



WHO IS MICHAEL JUDD?

Michael Judd has worked with agro-ecological and whole-system designs throughout the Americas for over two decades, focusing on applying permaculture and ecological design. His projects increase local food security and community health in both tropical and temperate growing regions. He is the founder of [Ecologia Edible & Ecological Landscape Design](#), [Project Bona Fide](#), an international nonprofit supporting agro-ecology research, and co-founder of [SilvoCulture](#), a Maryland based nonprofit which is helping plant 1 million nut trees in the Mid-Atlantic region. He is also the author of *For the Love of Paw Paws* – book and online course.

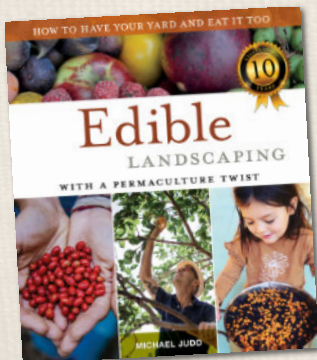
Michael lives with his family on a permaculture haven nestled along the foothills of the Blue Ridge Mountains near Frederick, Maryland. The Judds' homestead consists of 25 acres of mixed woodlands, food forests, gardens, and a nursery designed for experimentation and education.



Above: Michael Judd in a PawPaw Patch

Below: The Judd Homestead during PawPaw Fest

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