

Ben's Paperpot Cheat Sheet

Direct seeding might seem fast, but if you take a long view it is often slow. The weather could take a sudden turn, causing poor or very slow germination. Seeds must stay wet, requiring a lot of irrigation. Direct seeded crops often need thinned to achieve good spacing, requiring lots of time.

Transplanting eliminates variables and speeds up a farm. No more waiting weeks or months in cold weather for seeds to germinate. Thinning is eliminated because crops are spaced right from the beginning. Seeds are germinated in controlled environments, so germination rates are higher (and seed costs lower).

From a lean thinking point of view, all this adds up to a lot of eliminated waste—defect, motion, and waiting waste, to name a few.

The paperpot system is the most efficient transplant method I know of. We now transplant all of our crops with the HP-10 model transplanter with the exception of baby greens in summer—those crops germinate dependably well in the ground and that time—and big crops like tomatoes, potatoes, and peppers. I purchased all components from www.smallfarmworks.com.

We have even found ways to transplant green beans, carrots, radishes, and many other crops not conventionally transplanted.

Have you priced seeds lately? Transplanting is the best way to ensure every seeds turns into a crop that sells. In my experience, the extra costs of transplanting—money for pots and bit of your time—usually more than pay back.

Here are three tips:

1. Don't think of the paperpot system as transplanting; think of it as direct seeding sprouted seeds. With this method, your plugs are going into the ground very young—sometimes just two weeks old. I aim to transplant just after true leaf—as small as possible without risk of throwing soil over the plant.

The plug size is relatively small, and my crops are always more successful if they go in small.

2. Prep your soil by removing large debris. I prep our beds for transplanting by loosening with a broadfork and sometimes a tiller, then raking them with the 30" bed rake sold by Johnny's. This removes anything near the surface that is one inch or more in diameter. The beds are not as nice as my direct seeded beds but a bit nicer than those I transplant into by hand.

3. Follow all the other rules of good transplanting. This includes watering your trays well on transplanting day, watering new plants in well, and avoiding hot afternoon transplanting.

Here is the chart I use indicating hole and paper size for each of our crops:

Crop	Seeder size	Paper chain size	Notes
Basil	Hand seeded	4"	3 seeds per cell
Green beans	Hand seeded	2"	1 seed per cell
Edamame	Hand seeded	2"	1 seed per cell
Beets	4mm	4" for lg, 2" baby	Pellets not needed
Carrots	4mm	2" double seeded	Pelleted seed
Fennel, bulb	Hand seeded	4" every other cell for 8" btw plants	1 seed per cell
Green onion	4mm	2"	Aim for 3 per cell
Head lettuce, salanova	4mm	6"	Pelleted seed
Mizuna	2.8mm	2"	Aim for 4-6 seeds per cell
Radish	2.8mm	2"	Aim for 1-2 seeds per cell
Romaine heads	4mm	4" every other cell for 8" btw plants	1 seed per cell
Salad mix, baby	2.8mm or hand seeded	2"	4-6 seeds per cell, sometime easier to seed by hand
Shallots	2.8mm	2" or 4" depending on size desired	Aim for 1-2 per cell
Spinach	5mm	2" baby leaf or 4" mid-size leaf	3-4 per cell
Turnip	2.8mm or hand seeded	6"	Aim for 3-4 per cell

The paper chains come with 2", 4", and 6" spacing options and cost between about \$2 and \$4. They contain 266 cells, about 1" in diameter. The paper cells are held together with water-based glue. Note: The paper chains are approved by many, but not all, organic certifiers. They decompose with time; I usually pull them out at harvest time and add them to my compost pile.

Following are photos of the system in use on our farm. Enjoy and good luck!



I'm teaching my son to load rods into the paperpot ends.



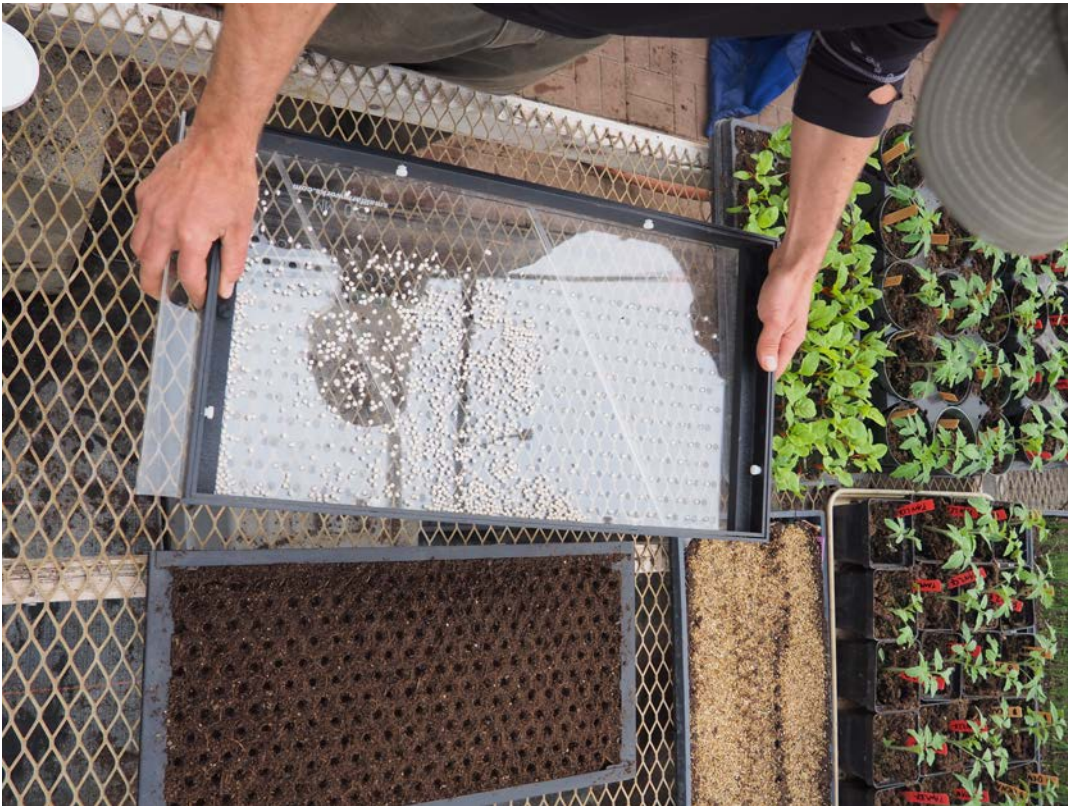
Paperpots are then stretched over a frame.



I fill the pots with Vermont Compost Fort V. The mix is chunkier than some but has never been a problem for me. Mix should be pre-moistened, as when filling plastic trays.



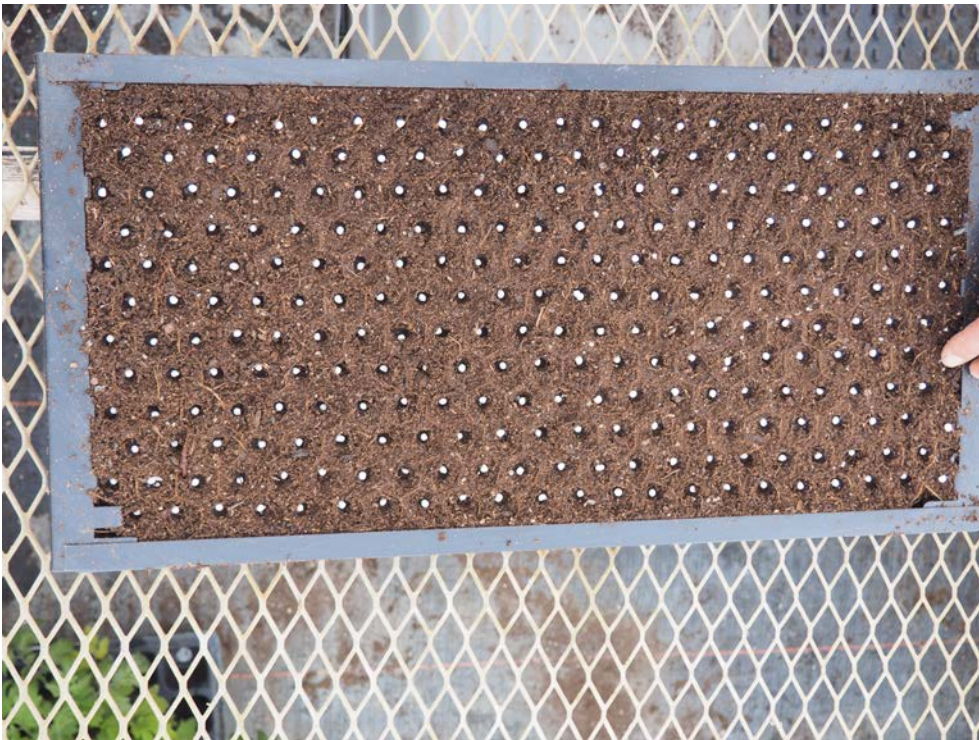
A plexiglass dibble board makes 266 impressions. Press hard!



Next pelleted seeds are poured in and shaken about.



In a few seconds, they each find a hole. I recommend using plenty of seeds to make the job go faster.



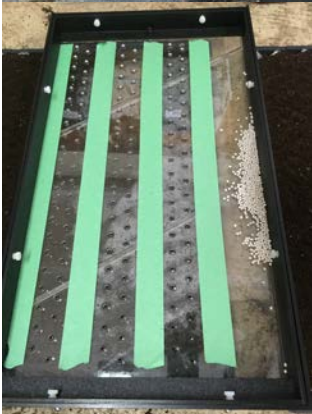
The plexiglass plates are lined up and seeds drop through.



Finally, I spread vermiculite and place in our germinating chamber.



Greens and turnips (bottom left)



To double your spacing, seed every other cell, as shown. I use painters tape to mask off holes I don't want to populate.



Hakurei turnips, 6" spacing, 3 rows per 30" bed. There are 3 seeds per cell in these field turnips. It took just a few minutes to transplant four trays.



Salad mix in background was planted with the paperpot system. Foreground was direct seeded the same day. See a difference? I paperpot the first couple of Spring outdoor salad plantings—this gets a crop to market three weeks ahead of direct-seeded crops.



Edamame seeded by hand. Paperpotting costs more and takes a bit more time than direct seeding, but the rewards are great germination and perfect spacing.



French Breakfast radishes with one to two seeds per 2" cell.



My son helps transplant green beans. With transplanting I can achieve outdoors harvest three weeks ahead of direct seeded beans.



The transplanter works well in the greenhouse. These greenbeans went in April 1 and we will harvest in early June.



A major advantage: great spacing on carrots.



Transplanted carrots were not as perfectly straight as direct seeded carrots, but 80-90% were marketable, and they tasted great. I used to direct seed in November and December and wait until April for sizable growth. Now I can transplant in April and grow something else (usually spinach) November through March.



Transplanting carrots in the field at 3 rows per 30" bed for large size carrots. I will transplant up to five rows per 30" beds for smaller carrots.



A tip for carrots: don't let them get too large. This is maximum size I'd recommend transplanting. The taproot needs time to straighten out. Plant into loose soil and keep soil consistently moist after transplanting for the best shot at straight carrots.



Spring onions, one or two seeds per cell.



Prepping soil with a 30" bedrake.



Greenhouse Hakurei turnips, 3 rows per 30" bed, 6" chains with 4-6 in each cell. In the field I go down to 3 per cell for larger turnips.



Turnips, beets, and radishes grow away from one another.



Fresh turnips and radishes in late March, seeded late January and transplanted two to three weeks after seeding.



Baby salad mix: Dane and Defender



Transplanting baby salad mix



Three weeks later, ready for harvest. With direct seeding, I was accustomed to waiting 14 or 16 more weeks from seed to harvest in winter. Transplanting cuts that cycle time in half. It's like building another greenhouse.



Romaine heads, 8" apart, tucked between rows of April tomatoes.

See the Paperpot video on the “Buy” page to see the paperpot transplanter in action on our farm.