

Seed Starting Success

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Why grow plants from seed?

- More options – color, size, disease resistance
- Cost of seeds vs. transplants
- Control over growing conditions
- Fun and educational!



Seed sources

- Catalogs
- Online
- Nurseries
- Big Retailers
- Organized swaps
- Friends



Life-cycle terminology

Annual - A plant that completes its life cycle, from germination to setting seed, in one growing season.

Biennial – A plant that completes its life cycle in two years. The first year it grows leaves, stems and roots. In the second year it produces flowers, fruits, and seeds.

Perennial – A plant that comes back year after year.

Genetic terminology

Hybrid - created by cross-fertilizing plants for desired features in offspring, creating a new variety that is superior to either parent plant.

Open-pollinated – Grow true to type without hybridization. Seeds may be saved and will produce the same plant in future sowings.

Heirloom – variety that has been grown reliably, carefully preserved and handed along from generation to generation. Usually open-pollinated.

Other terminology

Organic - Grown without the use of synthetic pesticides and fertilizers, and is not genetically modified seed.

Treated – Seed is coated with chemical ingredients (usually anti-microbial) to improve germination and growth.

GMO (Genetically Modified Organisms) – variety that has had DNA sequence modified by genetic engineering techniques.

When to sow?

Based on average last frost date – refer to seed packet or charts. Delaware County's date is around 5/31, but late frosts do happen!

Crop	Sow seeds indoors	Transplant seedlings into the garden	Direct sow seeds
Asparagus	n/a	Apr 21 - May 6	n/a
Beans	n/a	n/a	Jun 5 - Jul 3
Beets	n/a	n/a	Apr 10 - Apr 24
Broccoli	Mar 27 - Apr 10	May 8 - May 22	n/a
Brussel Sprouts	Mar 27 - Apr 10	May 8 - May 22	n/a
Cabbage	Mar 27 - Apr 10	May 8 - May 22	n/a
Cantaloupe	n/a	n/a	May 22 - Jun 5
Carrots	n/a	n/a	Apr 24 - May 22
Cauliflower	Mar 27 - Apr 10	May 8 - May 22	n/a
Chard	n/a	n/a	Apr 24 - May 8
Collards	Mar 27 - Apr 10	May 8 - May 22	n/a
Corn	n/a	n/a	Jun 5 - Jun 19
Cucumbers	n/a	n/a	Jun 5 - Jun 19
Eggplants	Mar 27 - Apr 10	Jun 5 - Jun 19	n/a
Gourds, Squash and Pumpkins	n/a	n/a	Jun 5 - Jun 19
Kale	Mar 27 - Apr 10	May 8 - May 22	n/a
Kohlrabi	Mar 27 - Apr 10	May 8 - May 22	n/a
Lettuce	Mar 27 - Apr 10	Apr 24 - May 22	Apr 24 - May 22

Indoors or out?

Considerations

- Date to harvest vs. season length
- Germination requirements
- Response to transplanting
- Available space and equipment
- Seed size & rarity
- Weeds & pests



Plants to start indoors

Long season, heat loving crops

- Tomatoes
- Peppers
- Eggplants

Cole crops

- Broccoli
- Cauliflower
- Kale
- Collards

Flowers

- Most perennials
- Small-seeded annuals
- Rare varieties

Slower-growing herbs

- Basil
- Parsley
- Dill

Plants to direct sow

Legumes

- Beans
- Peas
- Nasturtiums

Greens

- Lettuce
- Spinach
- Chard

Cucurbits

- Cucumbers
- Squash
- Melons
- Pumpkins

Root crops

- Radish
- Beets
- Carrots
- Turnips

Others: Sunflowers, Lupines, Corn, Cilantro

Starting seeds indoors

Supplies:

- Containers
- Starting mix
- Labels

Environment:

- Light source
- Temperature control
- Water source
- Air circulation



Containers



Source: yougrowgirl.com

Recycled



Source: gardenbetty.com



Source: www.greenhousemegastore.com



Purchased

Jiffy Pellets and Pots



Source: www.farmandfleet.com

Pellets



Source: harriseseeds.com



Peat pots

Source: www.huntersgardencentere.com

Starting mix

Pre-mixed: convenient,
consistent, sterile

Homemade: more
affordable for large
quantities

- 1, 3.8 cubic foot bale of peat moss
- 4 cubic feet of commercially prepared compost
- 2 cubic feet perlite
- 2 cubic feet vermiculite
- 2 cups of dolomite lime
- 3 cups of organic slow release fertilizer



Source: www.lowes.com



nwedible.com

Vermicompost

The size and growth of vegetable seedlings and transplants will be noticeably improved with the use of Worm Castings. Mix 1 part to 3 part soil or seed starting mix.



Source:
<https://vermicompostingne.wordpress.com/>

Wetting

Batch mix: Place mix in container, add water

Overhead watering: Use a fine sprayer or watering can

Mix should moist & crumbly but not saturated



Source: www.toddsseeds.com



Labels



Source: www.rareseeds.com



Source: www.rabbittalk.com

Purchased labels
Popsicle sticks
Plastic knives/forks



Light

Natural

LED

Fluorescent

- Grow light
- Cool + Warm bulbs

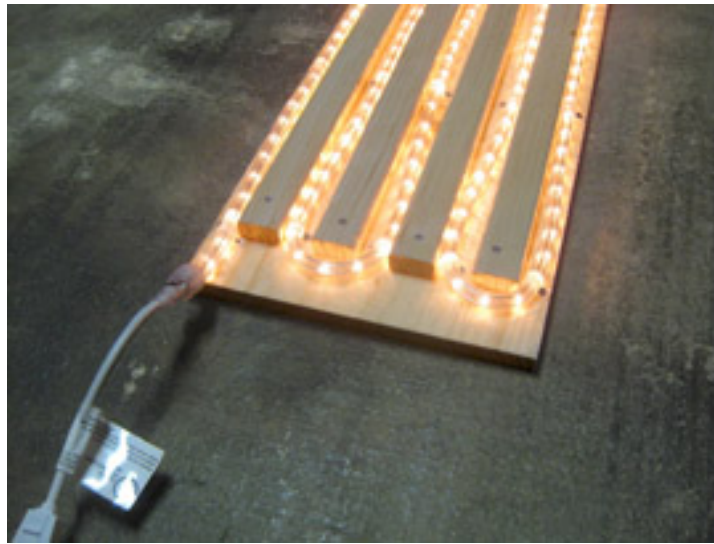


Heat

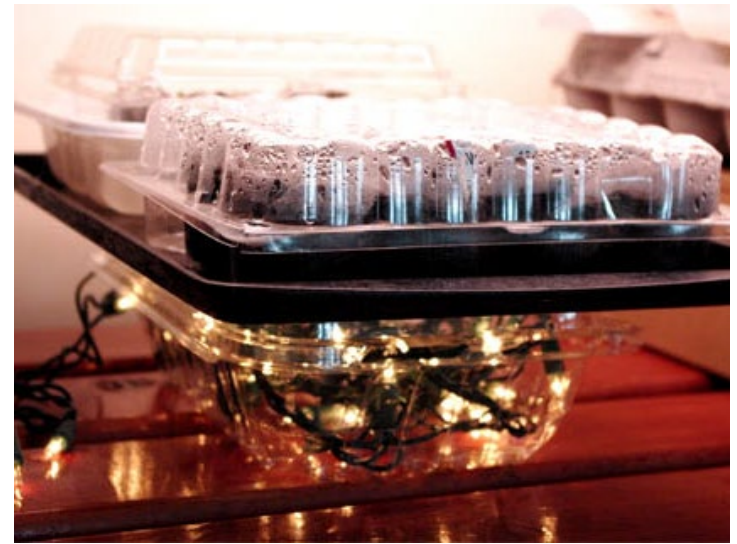
Heating mats
Warm appliance
DIY



THE **HYDRO** STORE



Source: www.vegetablegardener.com/



Source: dabbletree.vrya.com/

Moisture

Pre-germination
humidity domes

Bottom watering

Overhead watering



Source: www.therustedgarden.com/



Source: harvesttotable.com/

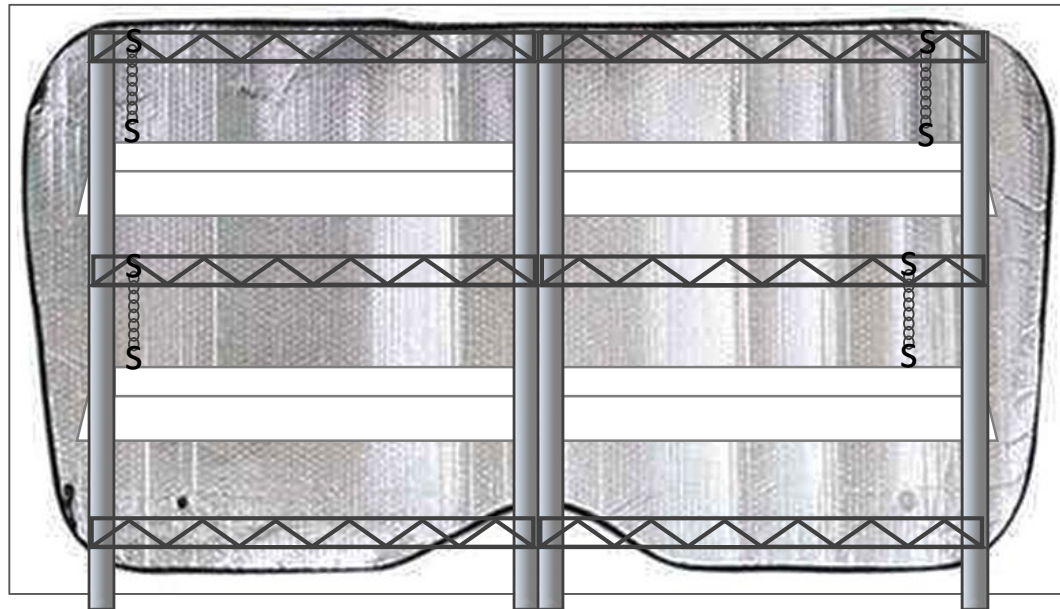
DIY Grow System



DIY Grow System

Components:

- (2) 3-Tier Shelving Units (size approximately 23in x 13in x 30in.)
- (2) 4-Foot Shop Lights
- (4) Fluorescent Light Bulbs
- (1) Outlet Strip with Timer
- (4) Extra S-hooks
- (1) Windshield reflector



Planting strategies

Thinning – seeds are spaced closely and thinned to accommodate growth.

Potting up – seeds are started in confined quarters, seedlings are then transplanted to larger containers.

Succession planting – seeds are started every few weeks to ensure a continuous supply of short-lived varieties.

Simultaneous starts and seeds in ground

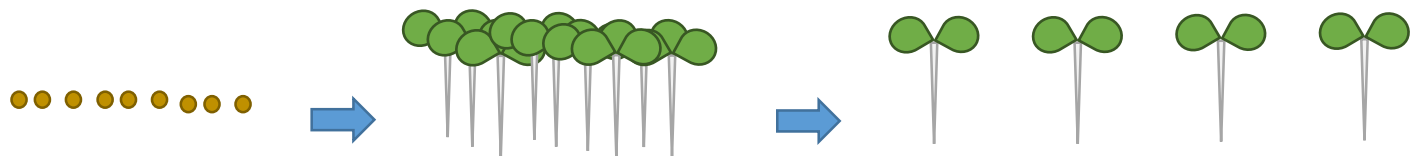
Varieties with different days to maturity

Thinning

Seeds are sewn thickly and either pulled, snipped, or transplanted after germination.

Advantages – makes up for low germination, most vigorous seedlings can be selected, more seedlings in less space.

Disadvantages – requires more seeds and handling, more risk of root damage in transplants, must thin promptly to avoid overcrowding.



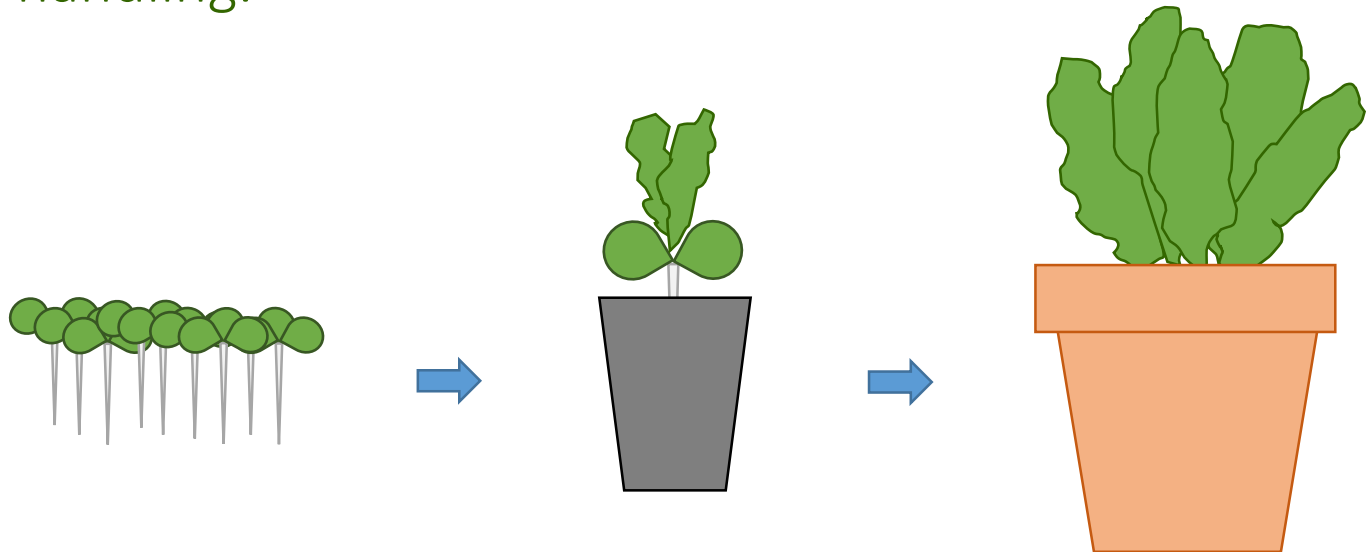
Tip: enjoy lettuce and greens thinnings as microgreens!

Potting up

Seedlings are moved to larger containers as they grow

Advantages – Allows larger seedlings to have more time indoors before planting outside, improves root mass development.

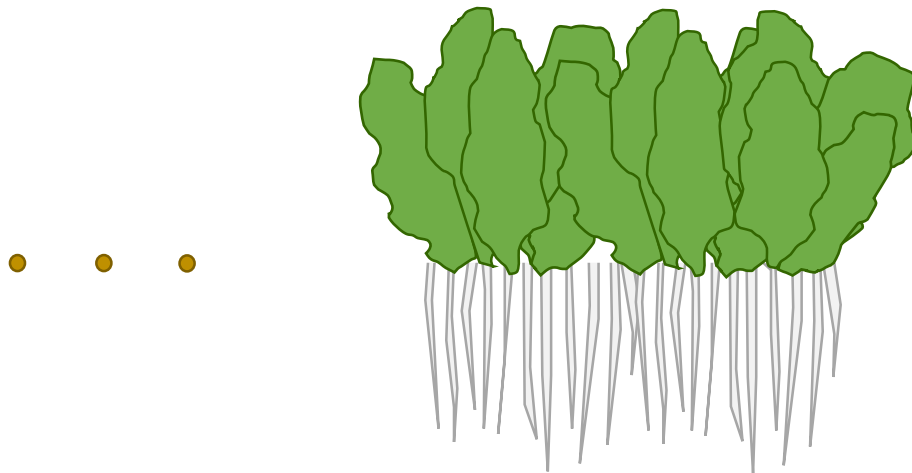
Disadvantages – requires more space, containers and handling.



Simultaneous Seeds and Starts

Seeds are planted in the ground at the same time as seedlings started indoors.

Seedlings give a spring/early summer crop, seeds give a late summer/early fall crop. Good way to enjoy some early and fresh, and have more for larger harvest and preservation. Perfect for greens and basil!



Varieties with different days to maturity

Seeds are planted in the ground at the same time, but are ready to harvest at different intervals.

“Days to harvest” based on seeding date for plants that are typically direct sown, based on transplanting date for plants that are typically started indoors.

Variety	Days to Maturity
Beefsteak	96
Early Girl	75
Sweet 100	60

Seed pre-treatments

Imbibition (soaking): Good for larger, dry wrinkly seeds (beans, peas, lupines, nasturtiums, beets, chard) - Soak 8-12 hours in water, enough to plump up seed.



Source: planetnatural.com

Scarification (abrading): Good for seeds with hard coats - Scratch coat with file or nick with a razor blade.

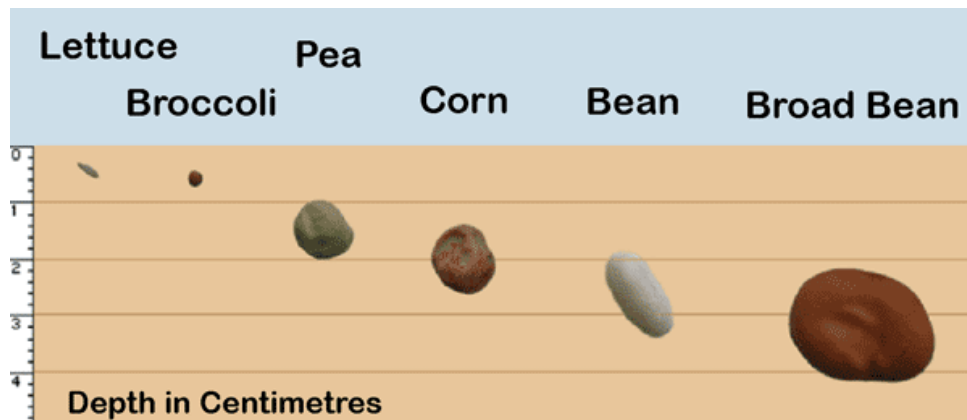
Stratification (freezing): Good for perennials that need freeze-thaw cycles to efficiently germinate.

Planting seeds (in or out)

Depth – seed should be planted no deeper than diameter. Make furrows or divots for larger seeds, surface sprinkle small seeds and cover with a bit of soil.

Position – Point shoot end up, if discernable.

Arrangement – Sow in long rows or place one or more in the center of a division.



Source: www.urbanfoodgarden.org



Source: www.growbiointensive.org

Caring for seedlings

Pre-germination – keep warm and moist.

Post-germination – remove cover or dome, provide lighting.

With growth – keep watered, move light source as needed, use a fan or light touch to develop strength.

Before transplant – “harden off” seedlings by putting them outside in a protected spot for a short time. Increase time/exposure to elements over a period of weeks.



Common Problems

No germination – bad seeds, too wet or too dry, too cold.

Lanky, light colored seedlings – not enough light.

Damping off – seedlings fall over and die, usually too cold, too wet, or non-sterile pots or soil used.

Stunted, yellowing seedlings – too wet.



Source: organicgardening.about.com



Source: extension.umn.edu

Transplanting

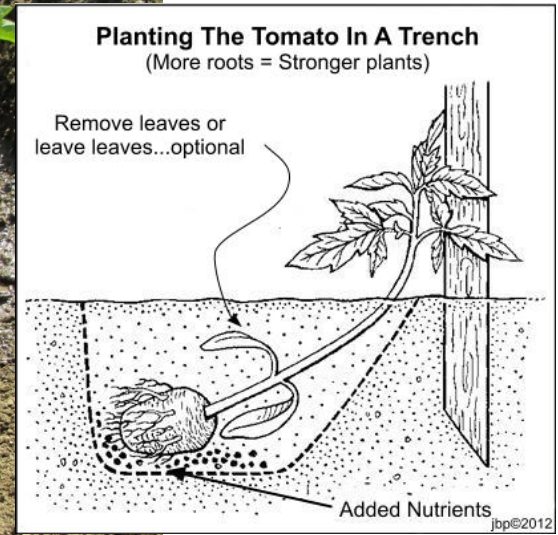
Timing – Err on the later side or use frost protection. Check forecast, avoid cold or hot spells or very wet weather.

Conditions – Plant when overcast or in the morning.

Soil – Soil should be proper pH, loose and well-aerated. Dig hole large enough for root base (and some of stem, depending on species).

Supports – Stakes and trellises should be in place prior to planting to avoid future root damage.





Tip: Bury tomato and
cole crop stems to
increase root
production and add
stability



Additional inputs

Inoculum/Mycorrhizae – Formulations containing beneficial bacteria or fungi.

Starter fertilizer – Depends on soil levels and crops.

Compost/manure – must be well-rotted and weed seed-free.

Mulch – prevents evaporation, prevents weeds. Dried grass clippings great for small seedlings.

Pest control – Mechanical: row covers, cloches. Chemical: Dusts and sprays (organic and conventional options).

Direct sowing tips

- Check forecast
- Decide how to spend your time
...sowing OR thinning/transplanting
- Know your seedling morphology and expected germination time
- Be prepared to “babysit”
for a few weeks
- Keep an eye out for pests
and predators
- Prepare markers in advance

Season extenders



Row Covers (source: gardeners.com)



Cloches (source: gardeners.com)

Season extenders



Cold frames (source: HGTV.com)



(source: savvygardening.com)



Greenhouses (ana-white.com)



(source: gardeners.com)

Winter sowing

The best of both worlds!

- Uses recycled containers
- No lights or heat required
- Allows for extra-early garden work
- Good for cold-tolerant crops and perennials
- Seedlings are naturally hardened-off at transplant time



Winter sowing

1. Cut container and poke drainage holes
2. Add soil and seeds
3. Tape and label
4. Put outside with cap off
5. Remove lids on nice days after germination, cover at night



Source: www.gardengatenotes.com

Saving seed

- Can save seed from open-pollinated varieties
- Be careful with outcrossers, must isolate varieties for genetic purity.
- Lettuce, herbs, flowers, and greens – let flower and collect dried flower heads, separate seed from chaff.
- Beans/peas – let pods dry and collect dried seeds.
- Tomatoes, peppers, squash – soak seeds to remove fruit. Dry and store.



Storing seed

- Put seeds or entire packet in storage bag or jar.
- Can organize in plastic boxes, albums, or binders.
- Keep cool, dark, AND dry...can add silica gel, tissues, or dry milk to absorb moisture.
- Can store in refrigerator, but do not freeze.
- Test germination several weeks before sowing date.

Don't judge each day
by the harvest
you reap, but
by the seeds
that you plant.

~Robert Lewis Stevenson



www.beyogabelove.com