

A rural farm scene featuring a large red barn with a gambrel roof and a tall metal silo to its left. A dirt road leads from the foreground through a field of green crops towards the barn. In the background, there are more trees and a white house partially visible on the right. The sky is filled with large, white, fluffy clouds. The overall scene is peaceful and idyllic.

Planting the seeds for a successful 2021 garden

Thursday, March 18, 1:00 p.m.

Introduction:



Alex Macmillan
Farm Manager, CU Boulder
Alex.Macmillan@Colorado.edu







Today's talk will cover:

- ▶ Starting from Seed
- ▶ Garden Prep and Design
- ▶ Soil and site selection
- ▶ New products and varieties to look out for



Where to get your seeds

Johnny's Selected Seed,
<https://www.johnnyseeds.com/>



Burpee,
<https://www.burpee.com/>



There are dozens of high quality seed vendors to choose from, these are a few of my go to brands.

High Mowing Seeds,
<https://www.highmowingseeds.com/>



Buy your seeds early this year!

Pelleted vs Non Pelleted Seed

- ▶ A pelleted seed is a seed that has been coated in a special clay.
- ▶ This clay helps pull moisture close to the seed, giving the user a higher germination percentage.
- ▶ Often easier to seed than non pelleted
- ▶ Multiple seeds per pellet (when feasible)



Starting from Seed

▶ Required Materials:

- ▶ Seeds
- ▶ Plastics
- ▶ Soil
- ▶ Something to take notes
- ▶ Plant tags or tape
- ▶ Marker
- ▶ Hose with water breaker or watering can

Optional Materials:

- Grow Light (T5, LED, MH/HPS)
- Germination Mat
- Germination Soil
- Vermiculite



Germination Equipment

- ▶ This is 100% optional as a sunny window will work well. I have one of these at home and in addition to starting my own veggies, I've found this to be a great tool for overwintering plants indoors.
- ▶ Equipment list:
 - ▶ Storage Rack
 - ▶ Timer
 - ▶ 4 bulb 2 ft T5 Light
 - ▶ (not shown) Germination Mat



Seedling Planning:

- ▶ Some plants take longer to sprout into a young plant than others. Knowing the time it takes a plant to grow out of the seedling stage will help you plan out and know when you should seed.
- ▶ Also some plants have different germination requirements – tomatoes, peppers and other warm season crops require a high temperature to germinate and grow well in the seedling stage. Knowing which plants can be grown together will help with your overall success.
- ▶ Some plants are difficult to start from seed (ex; strawberry) and may only have a 10-30% successful germination rate. So don't feel bad if your not getting 100% of all the seeds to sprout.



Colorado Planting Timeline Guide

Table 1 – Vegetable Planting Guide

Vegetable	Germination Temperature ¹			Plant Spacing ²	Planting Depth	Days to Germination	Typical Days to Harvest	Age of Transplant (weeks)
	Min.	Optimum	Max.					
Cool Season Crops³								
Beets	40°	80°	90°	4-6"	¼-1"	7-10	60	
Broccoli ⁴	40°	80°	90°	18"	½"	3-10	65T ⁴	5-7
Cabbage ⁴	40°	80°	90°	18"	½"	3-10	85T ⁴	5-7
Carrots	40°	80°	90°	2-3"	¼"	10-17	70	
Cauliflower ⁴	40°	80°	90°	18"	½"	3-10	65T ⁴	5-7
Kohlrabi	40°	80°	90°	7-9"	½"	3-10	50	
Leeks	40°	80°	90°	4-6"	¼"	7-12	120	
Lettuce (leaf types)	35°	70°	70°	7-9"	¼"	4-10	60	
Onion, green	35°	80°	90°	2-3"	¼"	7-12	60	
Onions, dry (seed)	35°	80°	90°	4-6"	¼"	7-12	110	
(sets)				4-6"	1-2"			
Parsnips	35°	70°	90°	5-6"	½"	15-25	70	
Peas	40°	70°	80°	4-6" or 3"×8"	1"	6-15	65	
Potatoes	45°			12-15"	4-6"		125	
Radish	40°	80°	90°	2-3"	½"	3-10	30	
Spinach	40°	70°	70°	4-6"	½"	6-14	40	
Swiss Chard	40°	85°	95°	7-9"	1"	7-10	60	
Turnips	40°	80°	100°	4-6"	½"	3-10	50	

Table 1 – Vegetable Planting Guide

Vegetable	Germination Temperature ¹			Plant Spacing ²	Planting Depth	Days to Germination	Typical Days to Harvest	Age of Transplant (weeks)
	Min.	Optimum	Max.					
Warm Season Crops								
Beans, snap	55°	80°	90°	6" or 4" x 12"	1-1½"	6-14	60	
Cantaloupe ⁵	60°	90°	100°	36-48"	1-1½"	3-12	85	2-3 ⁵
Corn	50°	80°	100°	12" x 30" 9" x 36"	1-1½"	5-10	60-90	
Cucumbers	60°	90°	100°	6" trellised 24-36" untrellised	1"	6-10	55	2-3 ¹
Eggplant	60°	80°	90°	18-24"	¼"	7-14	60T ⁶	6-9
Pepper	60°	80°	90°	15-18"	¼"	10-20	70T ⁶	6-8
Tomato	50°	80°	100°	trellised: 24" between plants	¼"	6-14	65T ⁶	5-7
Squash, Summer	60°	90°	100°	36-48"	1-1½"	3-12	50	2-3 ⁵
Squash, Winter	60°	90°	100°	36-48"	1-1½"	6-10	100	2-3 ⁵
Watermelons	60°	90°	110°	36-48"	1-1½"	3-12	85	2-3 ¹

Seeding 101: Concepts

- ▶ Make sure to read the seed packet as some plants have different requirements. Keep the seed packet or take a picture for reference.
- ▶ If possible, use a soil mix specifically for starting seeds (Germination mix or seed starting mix). These mixes have smaller particles and different water holding properties than normal potting mix. While standard potting mix will get the job done, you will have more plants with germination mix.
- ▶ Prior to seeding, fill your tray with media. Once all the trays are full water them in. You want to get the soil 100% saturated with water prior to seeding. Failing to do so can result in uneven germination and areas of soil that will dry down in an undesirable way.



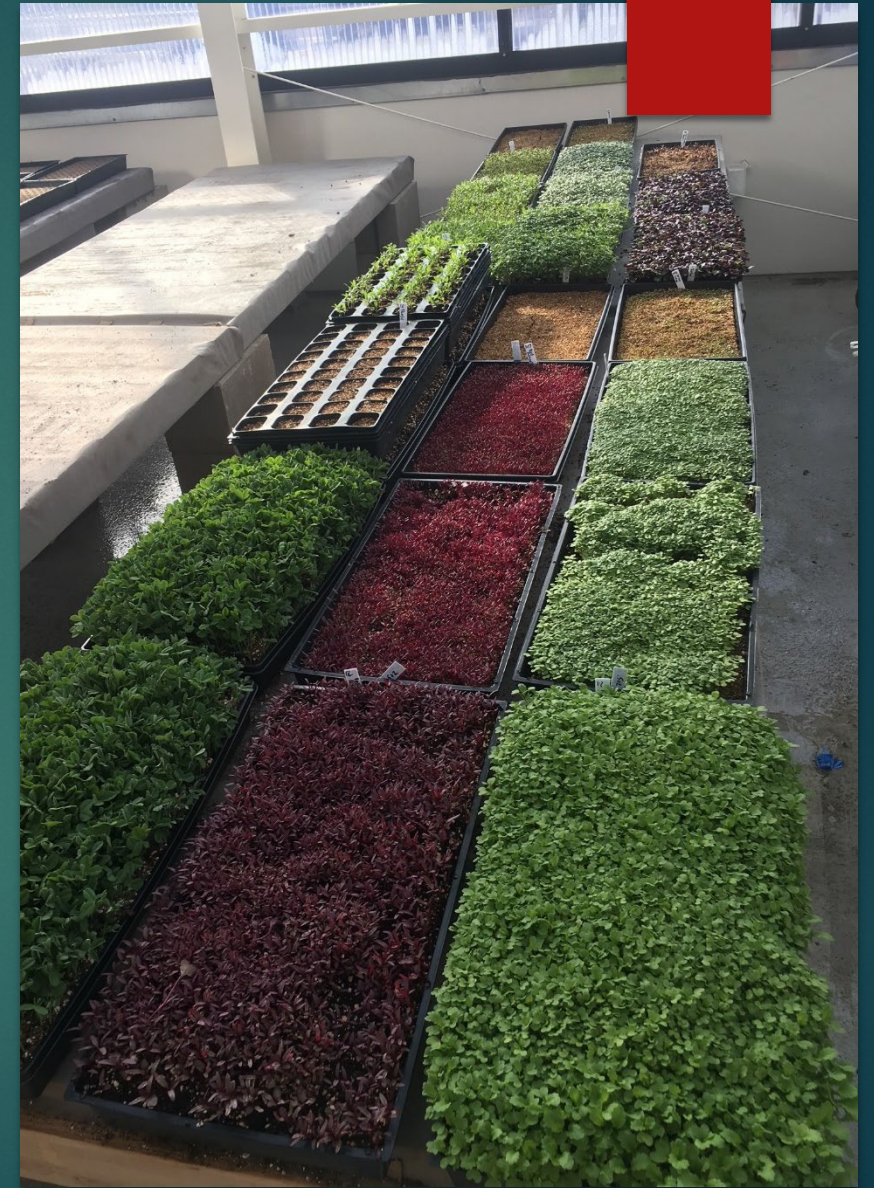
Seeding 102: Methods

- ▶ Once tray is properly prepped, use a pencil or pen create a dibble or hole in each cell to the proper depth.
- ▶ Place the desired number of seeds in each dibble. For plants with a low germination percentage best to over seed.
- ▶ Cover with top soil or vermiculite
- ▶ Water in completely
- ▶ Immediately after seeding, place in a dark space. Leave for 24-48 hours.
- ▶ A humidity dome of some sort should be used during the first 1-2 weeks. A daily mist of water will help ensure high humidity. (Top dressing seedlings helps keep moisture close to the plant when sprouting.)



How to practice? Microgreens!

- ▶ Growing micro greens is just about identical to seeding your crops for transplant. So if you can get some seeds started you can grow your own microgreens and vice versa.
- ▶ At CU Boulder we use 1020 trays (reusable) with promix BX. Top dress with vermiculite or more promix (pea shoots always get promix).
- ▶ Germination process is almost the same (can omit dark period if top dressing is used).
- ▶ Can be grown with or without fertilizer.



Seeding 103: Direct Seeding

- ▶ This method is not suited for every type of vegetable but can save significant time when executed properly.
- ▶ Correct seed depth is important.
- ▶ Correct and consistent seed spacing is important.
- ▶ (If possible) seed prior to a rain event.
- ▶ If rain is not forecasted make sure to thoroughly water in the freshly planted seeds. Take care not to compact or erode the soil where you seeded.
- ▶ If low temperatures or snow/frost/hail damage is a concern, use a ground cover such as reemay to protect your crops.



Ground Cover – Floating Row Cover

- ▶ A cheap, easy and renewable way of protecting your crops from frost/snow/hail and low temperature damage.
- ▶ Can be used for season extension.
- ▶ Many names for basically the same product (fiber composition may differ): Reemay, Agronet, Agribon to name a few.
- ▶ Recommend a mid – high weight ground cover. They offer the most protection and durability. Expect 3-5 seasons of use.
- ▶ Light weight covers work well but can often be ripped by the wind. Expect 1-3 seasons of use.
- ▶ Acts as a barrier for young plants helping keep the plants pest free.



Ground Cover Tunnels

- ▶ Ground cover can be used with stakes to make a small greenhouse like structure.
- ▶ This is a great way to harden off tender plants.
- ▶ The ground cover can be tucked in and covered with soil to form a barrier around the plants.
- ▶ On warm days they should be open to allow fresh air in and closed at night.
- ▶ When using this technique, you can expect to plant 2-3 weeks earlier than normal and 2-5 weeks season extension





While the seedlings sprout, lets
move onto garden design and
prep and planning

Water & Nutritional Planning

- ▶ Understand what fertilizer you are going to use and how does it work with your overall goals
- ▶ Know how you plan on irrigating and fertilizing. A soaker hose and some quick connection parts can make watering a breeze. If something is easy to do you're more likely to do it.



Garden Prep

- ▶ The goal in soil management is to increase the organic content by 4-5% a year. This can be achieved in several ways: compost, green manure and with direct fertilizer inputs.
- ▶ Remember that manures can take years to break down and may only release 30-50% of the total nitrogen content in the first year. It is still important to incorporate fertilizers even when applying manures annually.
- ▶ Unamended Colorado soil is not the best. Amendments should be made to a depth of at least 6-8 inches. The best time to incorporate manure is in the fall, after everything is harvested. A power tiller will make short work of this task.



Compost Application Rates

Table 1. Routine Application Rates for Compost

Site	Incorporation Depth ²	Depth of Compost Before incorporation ¹	
		Plant Base Compost and other compost known to be low in salts ³	Compost Made with Manure or Biosolids for which the salt content is unknown ⁴
One-time application—such as lawn area	6-8 inches	2-3 inches	1 inch
	3-4 inches	1-1½ inches	½ inch
Annual application to vegetable and flower gardens – first three years	6-8 inches	2-3 inches	1 inch
	3-4 inches	1-1½ inches	½ inch
Annual application to vegetable and flower gardens – fourth year and beyond	6-8 inches	1-2 inches	1 inch
	3-4 inches	1 inch	½ inch

- 1 3 cubic yards (67 bushels) covers 1,000 square feet approximately 1 inch deep.
- 2 Cultivate compost into the top 6-8 inches of the soil. On compacted/clayey soils, anything less may result in a shallow rooting depth predisposing plants to reduced growth, low vigor and low stress tolerance. The 3-4" inch depth is shown as an illustration of how application rates need to adjust when the deep cultivate is not practiced.
- 3 Plant based composts are derived solely from plant materials (leaves, grass clippings, wood chips and other yards wastes). Use this application rate also for other compost known, by soil test, to be low in salts.
- 4 Use this application rate for any compost made with manure or biosolids unless the salt content is known, by soil test, to be low. Excessive salts are common in many commercially available products sold in Colorado. Based on soil tests of commercially available compost, this application rate may be too high for products extremely high in salts.



Garden Design

- ▶ This is the fun part!
- ▶ Keep plants that have similar requirements together.
- ▶ Make sure to give plants that will grow upward and outward plenty of space to grow into (tomatoes, peppers, cukes, pumpkins, etc...)
- ▶ Include some flowering plants to attract pollinators – my favorite is sweet allysum.



Site Selection and Prep

- ▶ South or West facing is the best location for your garden.
- ▶ Important to know where/how you will get water to your plants.
- ▶ Prior to planting you should do your best to ensure the surrounding area is free of weeds. An easy/organic way of killing weeds is with vinegar. Simply make a 1:1 solution with water and spray weeds early in the morning on a day when full sun is expected. This will make the surrounding area smell like vinegar for a little bit, but it's a safe and cheap alternative to using herbicides.
 - ▶ This method of weed control is non discriminatory and will injure/kill whatever it's sprayed on



Raised Bed Design



Container Design Ideas



Make sure containers have drainage holes, if not drill some – at least 3

Container Soil Amendments Tips

Choose your favorite potting soil and add some water storing crystals to the soil. These crystals help hold additional water in the soil, helping extend the time in-between watering.





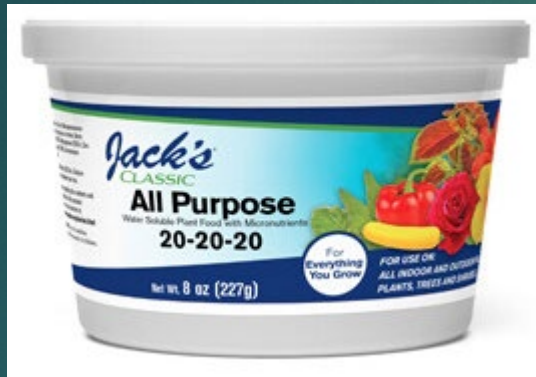
Products for a successful start

Recommended Products:



Product	ProMix Soil	Fox Farm Ocean Forest	Jiffy Seed Starting Mix
Available at:	Hardware Stores	Hardware store & Hydroponic shops	Hardware store & Hydroponic shops
Cost:	\$45/3.8 cu ft bail	\$35-45/ 3cf bag	\$6/ 12qt bag
Notes:	Great value, no additional nutritional benefits from this soil. Go with the BX version.	My personal go to soil. It cost's more but comes with lots of nutritional value.	Using this soil style for germination will give you better results.

Recommended Products:



Product	Jack's 20-20-20 Fertilizer	Damm 1000 Red Water Breaker	Seeding Heating Mat
available at:	Garden Supply Stores, Online	Garden Supply Stores, Online	Garden Supply Store, Online
Cost:	\$10-20	\$17	\$15-20
Notes:	My go to all purpose fertilizer. Works great for everything except cactus/succulents	The best water breaker out there. Will produce a very gentle and soft water pattern.	Will help raise the temperature of the soil which will result in faster + healthier transplants

Recommended Products:

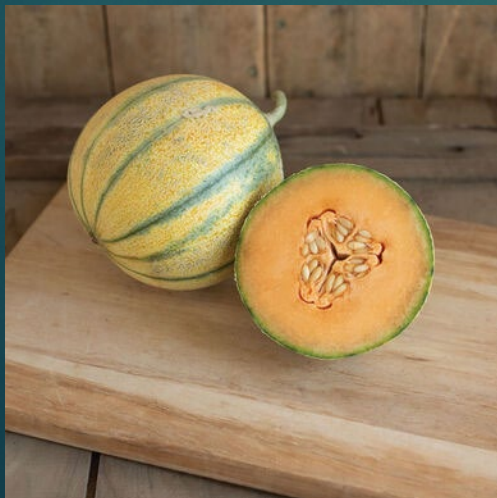


Product	Paper Pots	Jiffy Seed Starting Kit	1020 Tray	72 Cell Tray
Available at:	Gardeners Supply	Hardware Stores, Online	Hardware Stores, Online	Hardware Stores, Online
Price:	\$5	\$15	\$1-2/Tray	\$1-3/Tray
Notes	Fill with your soil of choice. Does not come with plastic tray. Can plant paper pots directly in soil.	Complete kit, everything you need to start seeds is included.	Can be washed and reused. If you run into multiple different kinds of 1020, buy the thickest plastic version.	Can be washed and reused. Uses less soil than a 1020 tray. Easier to transplant than plants started in a 1020.

New Varieties For 2021!



Griselet, Johnny's Seed



Green Bee, Johnny's Seed



Newton Basil, Johnny's Seed





Join us again on Thursday
April 15th at 1pm for the next
series – Master your Garden