

MICROGREENS

A GUIDE TO GROWING MICROGREENS FOR THE HOME GARDENER

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Assorted microgreen trays.

WHAT ARE MICROGREENS?

Microgreens are young, immature edible seedlings typically harvested seven to 14 days after germination. Most microgreens are started from vegetable and herb seeds. Unlike traditional gardens, microgreens are a quick crop requiring minimal investments of time and space. The main differences between microgreen cultivation and traditional gardening are most microgreens are grown indoors or in climate-controlled environments and microgreens are densely planted, whereas vegetables and herbs in traditional gardens are spaced out for mature size, and microgreens are harvested at a juvenile growing stage.

WHY GROW MICROGREENS?

Growing microgreens gives people access to fresh, nutritious greens year-round without needing garden space. Microgreens can be used in the same context as traditional greens and make great additions to salads, wraps, sandwiches, smoothies and as garnishes. Microgreens serve as a great source of fiber, essential minerals, vitamins and antioxidant compounds. They also add color, texture and flavor to many dishes (Xiao, Z.; Lester, G.; Luo, Y.; and Wang, Q. (2012). Assessment of Vitamin and Carotenoid Concentrations of Emerging Food Products: Edible Microgreens. *Journal of agricultural and food chemistry*. 60. 7644-51. 10.1021/jf300459b. 2012; Di Gioia, F.; and Santamaria, P. (2015). The nutritional properties of microgreens. In: Di Gioia, F.; and Santamaria, P. (eds.), *Microgreens*. Eco-logica editore, Bari, (pp 41–47).

Mushroom soup with beet microgreens.



Cowpea microgreens.



Cabbage microgreens over pickled onions, pork and polenta.



Corn microgreens grown in complete darkness.



Corn microgreens grown in the dark (left) and in light (right).

GROWING MICROGREENS

LIGHT AND LOCATIONS

Microgreens can be grown almost anywhere: indoors in front of a window, under grow lights, outdoors on a porch or in a greenhouse. Depending on the edible plant you are growing, microgreens can even be grown in a dark closet or drawer! Flavor changes can be found in edible plants when grown in the dark. Many consumers believe corn and sunflower microgreens purposely grown in the dark have a sweeter, more delicate flavor.

TRAY SELECTION

All shallow containers with drainage holes work well for microgreen growth. Growers can choose conventional seed starting trays or reuse containers often found in the household, such as produce clamshells, take-out containers or cookie trays. Just be sure if you are reusing containers to sanitize them between their original use and starting your microgreen seeds. Microgreens can be grown with or without soil. This publication will focus on microgreens grown in soilless media. Soilless media is basically potting soil. It is not the same soil as found in the yard. Rather, it consists primarily of organic components such as peat moss, vermiculite and perlite. Hydroponic pads or water retaining mats are two soilless options.



Recycled containers with added drainage holes.





Mustard greens seeded thickly into a recycled plastic cookie tray.

MICROGREEN CROP SPECIES

Most vegetable crop species can also be grown as microgreens. Some common selections include vegetables in the brassica family, such as broccoli, cabbage, mustard and kale; legume family members, such as peas, clover, and beans; and aromatic herbs, including basil, dill, cilantro, etc. However, any vegetable or herb will work, as other common microgreens include beets, sweet corn, sunflowers, radish and many others. While most vegetable species are suitable to microgreen crops, vegetables to avoid include solanaceous crops (tomato, eggplant, peppers, etc.) The foliage of these plants has many trichomes (hairs) that would affect the mouthfeel of the consumer. Solanaceous crops also tend to build up solanine in their leafy tissue, which can cause stomach upset if consumed in high quantities. When selecting seeds, use fresh, properly stored, quality seed to achieve even germination and a dense crop. If using older seed, you may need to sow your seeds more densely to achieve a similar effect.



Swiss chard microgreen tray.



Seeding recycled microgreen trays.

PLANTING

Begin by filling trays evenly with moistened soil. Adequate soil depths typically range from 1 to 4 inches deep. Moisten soil before planting the seed. A good rule of thumb is when you squeeze the soil in your fist, water should barely stream out. The more uniform the soil surface, the more uniform your microgreen crop. Sow your seeds evenly over the soil surface. For the cell trays, count out desired seeds per cell, but in an open tray an even sprinkling of seeds over the soil surface will work fine. How densely you sow your seeds will depend on how quickly you intend to harvest your microgreens. Crops harvested at the cotyledon stage can be sown more densely than those intended for harvest at the “first true leaf” stage. Cover the seeds with a thin layer of soil and gently water. Heat mats and humidity domes are not necessary but can help speed up germination and retain tray moisture, respectively, and should be considered in growing microgreens in cooler temperatures or in cooler environments. If using humidity domes, check the trays daily as mold can quickly develop when air flow is restricted.

The soilless media does not need to be fertilized prior to planting. Additional fertilizer treatments are also not required as the plants are harvested at such an immature stage.

HARVESTING

Microgreens are harvested at different stages based on crop and consumer preference. Generally, most microgreens will be ready for harvest between seven and 14 days after the seeds emerge from the soil surface. The two most popular stages of harvest are pre- and post- “true leaf” stages. Cotyledons appear first and are embryonic leaves. In dicots (most vegetable and herb crops), two rounded cotyledons will appear first opposite of one another. In monocots, such as corn, one cotyledon leaf will emerge, then the first true leaf. Experimentation is encouraged to find the stage that you prefer. Try consuming some of the microgreens when they only have cotyledons emerged and wait a few more days and eat them again to experience flavor differences once the first true leaf has emerged. Flavor preferences vary among people. Experiment a little to see what you like best.

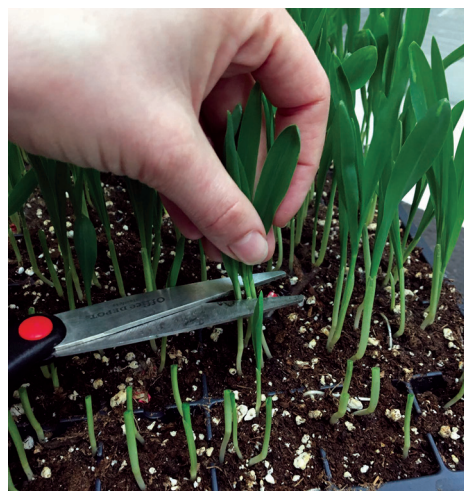
When ready to harvest, use a sharp, clean pair of scissors. **BONUS:** Corn plants can yield a second microgreen crop when harvested above halfway up the plant.

Harvested microgreens can be stored for as long as two weeks in an airtight container in the refrigerator. For longer storage, wash only immediately before use.

TROUBLESHOOTING MICROGREENS

Are you experiencing uneven germination? Many factors play into uniform growth.

- **Temperature.** Warm-season crops require warmer soils for germination. Heat mats will facilitate fast, even germination. Many microgreen growers will set heat mats between 80 to 85 degrees Fahrenheit. Leave the microgreen trays on the heat mats for 24 to 72 hours. As an alternative to heat mats, the top of most refrigerators will serve as a warm base for your seed trays.
- **Seed depth.** If your seeds are sown at different depths across your tray, they will not germinate uniformly. Seeds that are planted too deep will be delayed in reaching the soil surface. To remedy this, smooth out your planting surface and sow seeds directly on that surface. Apply only a thin layer of soil to tuck them in. This will promote an even stand of microgreen crop.
- **Light quality.** Most seeds do not need light to germinate; however, there are a few exceptions like lettuce, carrots, chamomile and dill. Light is a major factor in quality of growth. If growing indoors under low light conditions, you’ll need to supplement natural light with artificial light. Grow lights are easily found in general stores and online. Place the lights above the seed trays so that the entire tray receives direct light. If a portion of the tray is not receiving direct light, the plants in that area will stretch toward the light, leading to misshaped, poor growth.
- **Water.** Plants need water to live, but too much water will kill them. Your trays should be moist but not saturated. If you lift the corner of the tray, they should feel heavy but should not be leaching water constantly from the base. If the tray feels light, add more water. Too much water results in seeds rotting and mold growing on the surface of the soilless media. Too little water and the seed coat will not break open and you will have delayed germination.



Harvesting corn microgreens with clean, sharp scissors. Photo by Kaylee Deynzer.



Mustard green microgreens with cotyledons (round leaves) and first true leaves (lobed leaves).

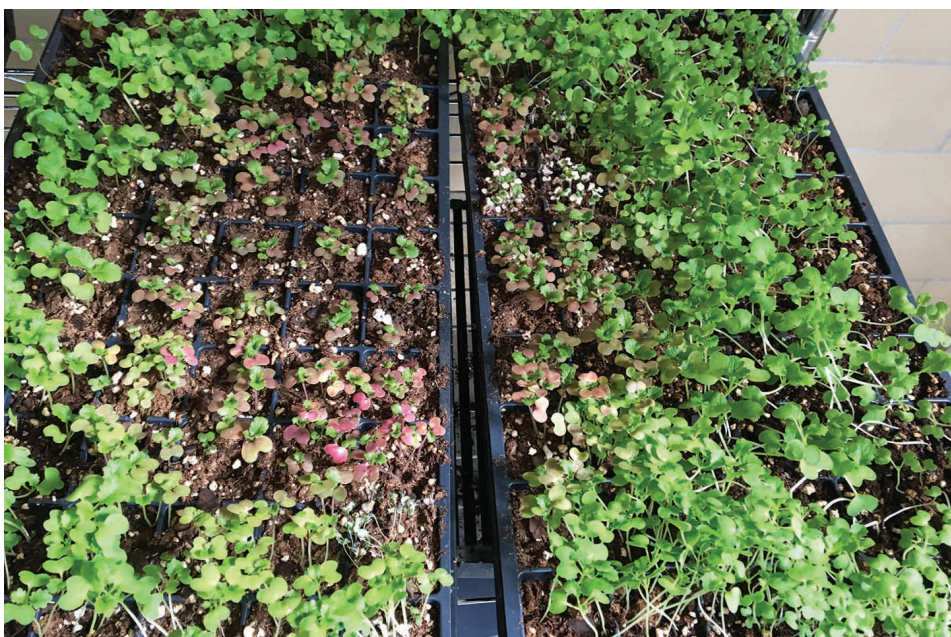


By harvesting the corn microgreens toward the top of the plant, the corn will continue to grow a second crop!

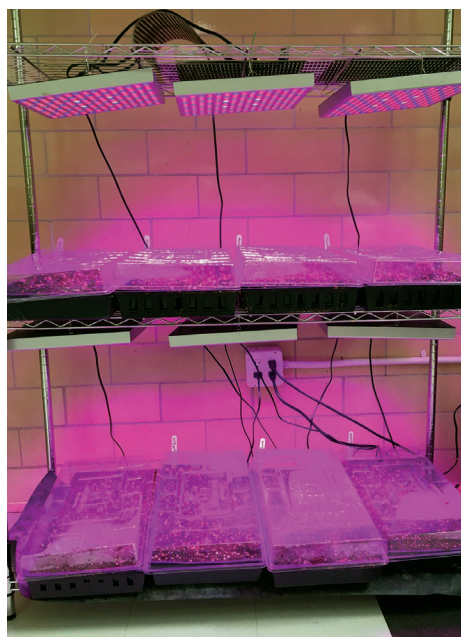


Harvesting too much soil with your greens? Consider if your container is too deep or your soil line is too low. If you find that you need to angle your harvesting scissors too drastically toward the base of your growing bin to harvest your greens, there is a greater likelihood that the tips of your harvesting scissors will pick up growing media.

Are you seeing mold? Because microgreen seeds are sown very close together, sufficient airflow is important to avoid mold formation. If your humidity dome remains on your trays too long, the prolonged period of high humidity may encourage mold formation. Any crop that grows mold should be discarded and the trays sanitized. Prevent mold by removing humidity domes within a day or two of germination. Placing microgreen trays in a sunny location not only facilitates growth but allows microgreen leaves to dry between watering. Microgreen root hairs are commonly mistaken for mold. Because microgreen seeds are generally sown very near the soil surface, the root hairs may be seen on the soil surface and will resemble mold. Any unusual growth that migrates up the stems of your microgreens is mold. If in doubt, restart your microgreens. You will have a new full crop in no time!



Grow lights were placed too close to seed tray. The outer plants stretched toward the center, while center plants were over exposed to ultraviolet light, stunting their growth.



Grow lights to supplement lighting are placed at least a foot above trays.



Mustard green microgreen tray. Photo by Kaylee Deynzer.



Harvested mustard microgreens.

NOTES

AUTHORS:

Celine Richard, Graduate Student, LSU School of Plant, Environmental and Soil Sciences
Kathryn Fontenot, Associate Professor, LSU School of Plant, Environmental and Soil Sciences



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William B. Richardson, LSU Vice President for Agriculture
Louisiana State University Agricultural Center
Louisiana Agricultural Experiment Station
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LSU College of Agriculture

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