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Microgreens are specific vegetables, herbs, and flowers that are harvested when quite young, generally at the first true leaf stage of growth, but sometimes at the seed leaf (cotyledon) stage. The greens are used for gourmet salads, as garnishes, or sprinkled over entrées and desserts. In addition to their versatility and potential profitability, microgreens are nutrient-dense, intensely flavorful, and simply beautiful. When grown in a greenhouse with supplemental heat or indoors under lights, you can quickly produce microgreens year-round, even at high latitudes, through the depths of winter.

## MATERIALS

To get started growing microgreens, you will need a few supplies. Many you will most likely have on hand:

- **Planting media**, such as potting mix, or soilless media designed specifically for microgreens production. For potting mix, we recommend Johnny's 512 Mix, Johnny's Germination Mix, or Vermont Compost Fort Light Mix. To reduce the risk of soilborne disease, do not use a potting mix that includes unfinished compost.
- **Trays** (1020 flats or 20-row seed flats)
- **Something to cover the seeds after sowing** (paper towel, vermiculite, humidity dome, or white plastic tray)
- **Heating mats, circulation fans, and lighting** (for indoor or off-season production)

## SEED SELECTION

Seed selection is an important step. It may be best to start with just a few varieties and diversify later or start with a prepared mix. Johnny's offers mixes designed to produce a range of colors, flavors, and textures with compatible growth rates.

Many varieties are ready in 2 weeks, but that time can extend up to 4 weeks and beyond depending on varietal selections and environmental conditions. Coordinate sowing times to produce a mix of varieties at their optimal size and flavor. For example, mustard and radish greens grow faster

than beets, chard, or carrots. This may take some trialing, so keep detailed records.

To further assist you, see our [Microgreens Comparison Charts](#) in the Johnny's catalog or on our website — varieties are grouped by whether they are fast- or slow-growing.

## SITE SELECTION

Due to the fragile nature of the product, microgreens are most often grown in greenhouses or other protective structures. Adequate temperatures, ventilation, and lighting are important. Growing on raised platforms or tables eliminates frequent bending over to tend plants.

## SOWING

Growers normally sow seeds into either standard 1020 flats or 20-row seed flats containing 1–1½ inches of potting-mix. Broadcast seed thickly on the growing medium with seeds 1/8–1/4" apart, and press seeds firmly into the growing medium for maximum soil contact:

- Small seeds: 10–12 seeds per square inch
- Large seeds: 6–8 seeds per square inch

Seeding too densely can result in lack of air circulation and increased risk of disease. Using a sifter or colander can be helpful to sort seeds by size and determine appropriate seeding density.

Gently water-in to avoid washing away the seeds. Cover seeds to maintain consistent moisture during the germination period. You can cover seeds with wet paper towels, finely sifted vermiculite, a small amount of potting mix, an inverted white tray, or a humidity dome. If using a tray or dome, be careful to remove the cover or ventilate during sunny, warm conditions; otherwise, the temperature may

rise too much and inhibit germination. If using paper towels, they should be kept moist and can be gently removed in just a few days. Most of the seed coats will be removed with the towel, which is helpful when it comes time to wash the final product.

## SUCCESSIVE SOWINGS

Because of the one-cut nature of this crop, succession planting is necessary to produce a steady supply of microgreens. Sowing dates and quantities of seed sown should be based upon customer demand, delivery schedules, and individual growth rates. Growth rates are affected by both variety selection and environmental conditions; we recommend that you keep detailed records in order to fine-tune your system.

## TEMPERATURE

Ideal soil temperature for germination and growth is dependent on the specific need of each variety; for example, the optimum temperature for heat-loving crops like basil is higher than that for cooler-loving brassicas. Consult the growing information on the Johnny's website or catalog for specific growing information for each variety. However, in general, optimal ambient temperatures are 65–75°F/18–24°C. **Temperatures above 75°F/24°C can inhibit germination in some varieties and increase disease pressure.** Moderate nighttime dips are acceptable, but steady, higher temperatures encourage full-speed production.

## AIR CIRCULATION

Good air circulation is important for preventing disease and encouraging healthy growth. Be careful not to seed too densely. Use horizontal airflow fans to ensure that your greenhouse or growing environment has a steady flow of air.

## WATERING

Consistent moisture is important for good germination. Once germinated, water flats of microgreens regularly, but do not keep the media saturated at all times, as this can lead to disease. Either top or bottom-water depending upon your growing system. If top-watering, you can use a mister, gentle nozzle, or spray bottle. Bottom-watering options can include ebb-and-flow benches or floors, or hydroponic systems.

## FERTILIZER

For growing media that hold some fertility, such as potting mix, plain water is usually best. Watering with a dilute fertilizer solution is appropriate for

media (such as foam or coir sheets) with no inherent nutrient value, or for slow-growing species that might exhaust fertility before reaching harvest stage. If fertilizing, incorporate fertilizer into the growing medium before sowing, or use a bottom watering system for liquid applications to avoid accumulating fertilizer residue on the leaves. Take care to prevent any "off-flavors" that can sometimes derive from fish-based fertilizers.

## DISEASES

Because they are planted so densely, micro greens can be prone to disorders, such as damping off, associated with poor air circulation and saturated media. Ensure air movement with horizontal airflow fans, use clean media and water sources, use appropriate seeding density, and take care not to over-water.

## TIPS FOR CHALLENGING VARIETIES

There are two things that make some varieties more difficult to grow than others.

1. **Large seed size:** larger seeds have a harder time making good contact with the growing media and need to be pressed firmly into the soil and covered sufficiently to keep the seeds moist during germination. When seeds are larger there is also an impulse to sow fewer of them, especially for varieties that have multigerm seed, like cilantro, beets, and chard. However, the size of the seed allows for the extra space they might require, and they should still be sown 1/8-1/4 inch apart.
2. **Slower germinating varieties:** when varieties are slow to germinate, both over- and under-watering can be problematic, so take care to keep flats consistently moist (but not saturated) and ensure good air circulation to minimize disease. For varieties that require warmer temperatures for good germination, providing supplemental heat will also aid in quicker germination.

## OFF-SEASON GROWING

Growing microgreens off-season indoors or in a greenhouse in Northern latitudes will require some extra effort. You will need supplemental lights, fans to circulate air, and possibly a heat mat to raise the temperature of the growing medium, and/or supplemental heat to raise ambient temperatures.

Many plants respond to artificial light differently than natural light. Light duration, intensity, and the distance from the lighting fixture to the crop are all

factors that will determine the growth rate and quality of your finished product. If the light source is too weak or located too far from the crop, stretching or “legginess” may occur. Crop color may appear washed-out when the light intensity is not sufficient. If the light is too close, the crop can dry out quickly or appear burnt.

### **DAYS TO MATURITY**

Because microgreens grow quickly, each day can make a big difference in plant size and yield totals. The number of days to maturity varies not only between varieties but upon growing conditions such as temperature, moisture, and sunlight. If you are growing under protected cover outside, environmental conditions may cause the number of days to maturity to fluctuate significantly.

### **HARVEST, PACKAGING, AND STORAGE**

Microgreens are typically harvested when they develop the first set of true leaves, with the cotyledons still attached, generally between 1–2 inches tall. Each variety’s appearance and taste will give you an indication of its optimal harvest period. Some trialing will be helpful.

Microgreens can either be sold as a live product or cut and sold bagged or in clamshells. Selling live product in trays can save labor and extend shelf-life.

One-cut harvesting of microgreens is standard practice. As much of the weight is in the stem, microgreens sold by weight are usually clipped as close to the stem base as possible without getting the medium in the finished product. If selling a live product, cut the growing medium itself into the desired size.

Unless selling a live product, refrigeration is necessary to maintain freshness and quality after harvest — under the proper conditions, the shelf life is 5–10 days.

For more information about marketing your microgreens, see our article [Guide to Year-Round Microgreens Production](#).

### **REFINING AND ADJUSTING YOUR SYSTEM**

Because so many variables can affect growth rates and yield, we recommend trialing varieties and taking detailed notes about growth rates and yield for your specific growing situation. As you compile your data, you may notice similarities between crop types. For example, you may find that most

radishes will yield similar amounts per flat, as will many of the other brassica varieties. You can use this information to extrapolate among varieties within plant families.

For more information on sowing density, growth rates, and average yield, please see our [Microgreens Yield Trial 2017](#) comparison chart, which details the sowing densities and corresponding yield data for 29 different microgreen varieties.