

YEAR-ROUND LEAFY GREEN PRODUCTION



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All photos by LSU AgCenter. Cover photo: Greens, pictured up close, are not always green. Leafy greens come in many colors and are a great addition to your diet.

INTRODUCTION

Leafy green vegetables seem to have caught the world's attention. In general, greens contain antioxidants, fiber, vitamins and minerals and are thought to support immunity, heart health, brain function and healthy skin. Greens are also thought to reduce the risk of Type 2 diabetes. Not only are they a nutritional powerhouse, but they are also extremely versatile in the kitchen. From the classic Southern dish of smothered mustard greens to the modern trend of green smoothies, you can add leafy greens to almost any dish you like. The demand for greens is growing stronger than ever before — but how can we make year-round production possible?

Ideally, leafy greens are produced in the fall (September to November) and early spring seasons (mid-January to early March). Applying slight modifications, leafy greens can be produced and enjoyed year-round. Increasing seeding rates, the addition of shade, proper seed storage and utilization of heat-tolerant varieties will improve year-round production. Proper seed storage simply entails keeping leftover seed in the refrigerator or freezer. Cold storage helps seed retain viability year after year. In some cases, placing fresh seed in cold storage a few weeks prior to planting may help cool-season crops germinate quicker when they are planted out of season. This is especially true for spinach and beet seeds.

GROWTH REQUIREMENTS

Most greens prefer growing in cooler weather, around 50 to 68 degrees Fahrenheit. Although leafy greens are more tolerant to shade than other vegetables, they require at least five to seven hours of direct sunlight per day. Leafy greens also require a minimum of 1 inch of rain per week. If rain is limited, supplemental water can be applied through irrigation or watering by hand.

High temperatures can cause leafy greens to bolt. Bolting is the act of the vegetable beginning to flower and set seed. When this happens, the leaves become tough and bitter. To avoid this, leafy greens should be harvested when they're young, roughly three to four weeks after seeding. During the warmer months of spring and summer, greens should be sown at a higher density and harvested more frequently. During the fall and winter months, leafy greens are grown to full maturity before harvesting. Follow the recommended plant density rates as listed in the LSU AgCenter Louisiana Vegetable Planting Guide (publication No. 1980).



Above: Lettuce in the garden. Below: Greens bolting.





Clockwise from left: Kale grows in a garden bed. Seeds are planted closely. lettuce mixes grow in tightly spaced groupings. Seedlings are planted densely.

INCREASING SEEDING RATES

Commercial producers increase seeding rates of leafy greens in two manners.

1) When direct-seeding leafy greens into your garden, sow seeds thickly. Instead of thinning to LSU AgCenter-suggested stands, cut the rates in half. For example, see Table 1. The leafy greens will be harvested while immature, so ideal spacing is not necessary since the crop will not be in the garden for as long of a period as in the fall and early spring seasons.

2) If the intention is to plant leafy greens in a home hydroponic system or in containers, the same procedure applies. While you would normally plant one seed per starting cell, now we suggest planting three to four seeds and allowing all to germinate and harvesting at an immature stage. Leafy greens cannot be allowed to reach maximum growth in extremely hot or cold temperatures because they bolt before maturing. Once bolted, the greens taste bitter and tend to exude a milky sap that is not preferred by the consumer.



GROW HEAT-TOLERANT LEAFY GREEN CULTIVARS OR SWITCH TO LEAFY GREENS THAT THRIVE IN HEAT

Some common leafy greens are bred to survive warm and hot temperatures in the Southeastern United States. Breeders understand there is a demand for these crops year-round and have selected a few plants that do well. Typically, when reading through seed catalogues you will

see these cultivars with the notation “heat-tolerant” or “slow bolting.” Both terms indicate the cultivar being described is better adapted for out of season growth.

Below are names and descriptions of typical and atypical leafy green crops that have performed well in LSU AgCenter trials in the months of July, August and early September.

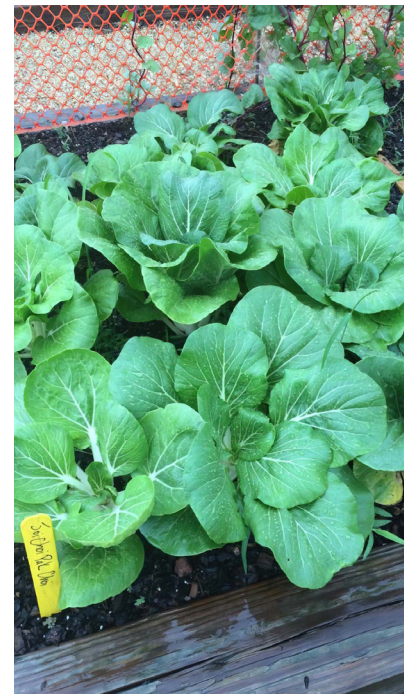
- **Amaranth or pigweed.** This plant is often considered a weed in the South. If left to go to flower and seed, you’ll never need to replant it again! Amaranths range in size, color, shape and uses, depending on the cultivar. Some are grown for cut flower production, while others are grown for the seed as they are packed full of protein and provide a nutty flavor to foods. Many people also consume the foliage. The foliage tastes somewhat like spinach and can be cooked or consumed raw. Direct-seed amaranth after the soil warms in the spring. Plant in direct sunlight as this is a green that needs the heat to grow. Amaranths range in size from 1 to 5 feet tall and wide. Typically, we do not want plants to grow over 2 feet tall as we are interested in consuming the new leaf growth. In the LSU AgCenter trial, we received 100% germination in July.



- **Malabar spinach** is actually a vine that produces thick, edible foliage and purple, edible flowers. Unlike traditional spinach, Malabar spinach loves hot, humid and full-sun garden sites. This is definitely a green that thrives in the heat and full sun. Avoid planting in the shade and provide a trellis for this plant. This crop can remain in the garden for years to come, especially during mild winters. Even if a freeze takes place, Malabar spinach will reseed itself year after year. Malabar spinach can be started from seed, cuttings or purchased as a seedling. Typically, people cook the foliage. It is often sautéed with ginger and soy sauce. Mix it with other veggies for a wonderful stir fry. The LSU AgCenter trials started with seedlings, and the Malabar plants grew into the other plots of leafy greens. This is a true winner for our hot and humid climate.



- **Tendergreen mustard green** is a tried-and-true heat-set leafy green cultivar. Direct-seed it into the garden and space 1 to 2 inches between plants. Allow this green to grow exactly like you would mustards in the fall and winter. It will size up nicely in about 35 to 40 days with a mature leaf height of 12 to 24 inches. If you are interested in heirloom gardening, this cultivar is considered an heirloom and has a wonderful old-fashioned taste. Plant in full sun as this green is made for the heat. In LSU AgCenter trials we received 100% germination in July.



- **Joi Choi pak choi** is the pak choi plant to grow if you want incredible growth in a short period of time. Joi Choi is a typical pak choi that can reach 1 foot in height. We received 100% germination in LSU AgCenter trials in July, and the cultivar performed very well in our summer heat. Space Joi Choi plants about 10 inches apart in the garden. Harvest when stalks are white and foliage is dark green.



- **Toy Choy pak choi** is a miniature pak choi that reaches only 4 to 5 inches in height. This cultivar matures in 40 days. In LSU AgCenter trials we received 80% germination of seeds sown in July. It should be harvested when stems are thick and white to light green in color and foliage is dark green.

- **Snow pea shoots** perform remarkably well in the summer. Sweet peas are vine-like in nature, but trellising is not necessary if the plant is harvested frequently. The sweet pea shoots and tendrils offer a unique experience to the consumer and appear beautiful on a plate. This green is slightly crunchy, sweet and delicious to eat straight from the vine. Dwarf Grey Sugar snow pea has been noted as growing well in Louisiana's warmer climate.



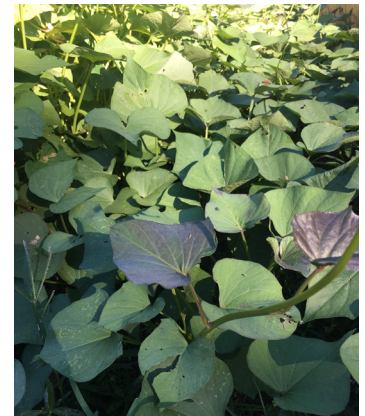


- **Southern peas.** Southern peas are always planted after the soil has warmed in Louisiana. Typically, we direct-seed southern peas from April through August. Most gardeners grow southern peas for the seeds in the pods (black-eyed, pink eyed, crowder and purple hull types), but did you know you can eat the leaf tips? For this study we looked at Mississippi purple hull peas and received 100% germination in July. Harvest throughout the season but only select the most tender new growth. Most people consume the tender tips raw and mixed with other greens.



- **Muir and Nevada summer crisp lettuces** are heat-tolerant lettuce cultivars that perform well 52 weeks out of the year. During the warm season, this crop should be seeded densely and harvested when the greens are young and tender. Planting these lettuce varieties in a partly shaded garden row will help reduce plant stress. Harvest lettuce in the morning and wash immediately in cool water to keep the lettuce crisp and remove any bitter white sap.

- **Sweet potato greens** offer another crop to harvest from the well-known sweet potato plant. While the sweet potato roots are growing underground, the tender new growth can be harvested in small amounts. Try to avoid over-harvesting, as this will take away energy from the plant that is necessary for the roots to grow. Once you have harvested your sweet potatoes, the remaining green foliage can be harvested as well. This is a wonderful plant to consume to reduce food waste and increase food diversity. Try making a sweet potato soup with both the greens and the roots!



MODIFYING LIGHT CONDITIONS

Reducing the amount of light plants receive can help to reduce plant stress and enhance growth during the warm season. Modifying light levels may be necessary when growing outdoors, in hoop houses or other semicontrolled environmental structures. Intercropping leafy greens in the understory of okra, tomatoes or other summer vegetables can provide shade and keep the soil temperatures cooler. Greens that are grown in containers or hanging baskets can be moved to a shadier part of the yard to receive filtered light. Leafy greens prefer full sun for at least five to seven hours. If they receive too much shade, the plants will stretch and become severely leggy. Since out-of-season greens are seeded at tighter spacings, minor stretching is normal as the plants will be harvested while the leaves are young. Because the leafy greens are seeded more densely during the warm season, a summer harvest of three to four plants would produce roughly the same biomass as harvesting one plant during the cool season.

If your yard is full sun, you can purchase a shade cloth (of no more than 50% shade) to place over a portion of the garden beds. This will slightly reduce daytime temperatures. Night temperatures are still hot in Louisiana's summer seasons, so even with a shade cloth, you may experience



Use a shade covering to help reduce stress on greens growing in warmer months.

some bolting.

Greenhouses and indoor hydroponic systems do not require light modification and can continue to be grown in full light conditions. Adjust the temperature to 60 to 68 degrees Fahrenheit in controlled environments.

TABLE 1: SEEDING RATES FOR IN- AND OUT-OF-SEASON LEAFY GREENS

Leafy Green	Typical In-Row Spacing	Out of Season In-Row Spacing
Amaranth	Follow seed packet recommendation	Grow in the warm season only
Collard Greens	6-12 inches	3-6 inches
Kale	6-12 inches (variety dependent)	3-6 inches
Kohlrabi	6 inches	3-6 inches
Lettuce – Batavia, Romaine, Butterhead	10-12 inches	5-6 inches
Lettuce – Leaf	4 inches	2 inches
Malabar Spinach	3-6 inches	Same
Mustard Greens	1-2 inches	Same
Pak Choi	10- 12 inches (variety dependent)	5-6 inches
Snow Peas	1-3 inches	Same
Southern Peas	4-6 inches	Grow in the warm season only
Sweet Potatoes	12 inches	Grow in the warm season only
Swiss Chard	6-8 inches	3-4 inches
Turnip Greens	1-2 inches	Same

TABLE 2: LEAFY GREEN FLAVOR PROFILES

Leafy Green Type	Portion of the Green to Harvest	Texture	Flavor	Eat When Fresh	For Cooking
Pak Choy	Total plant	Holds texture even when cooked	Mild		✓
Mustard Green	Total leaf	Becomes wilted when cooked	Spicy		✓
Amaranth	Total leaf	Smooth and soft	Mild, nutty	✓	
Malabar Spinach	Total leaf	Chewy	Mild	✓	✓
Southern Pea Tips	Leaf tips	Smooth		✓	
Sweet Potato Greens	Young leaves	Young leaves are soft and mild; older leaves can become tough	Mild, earthy		✓
Snow Pea Shoots	Total stem	Crunchy stems, soft leaves	Sweet	✓	
Spring Mix (mixture of various leaf lettuces)	Total leaf	Similar to lettuce	Mild	✓	



Planting greens in tight rows gives a nice visual appeal to any garden.



Greens are easy and fun to grow in raised beds year-round.

AUTHORS:

Kaylee M. Deynzer; 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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Luke Laborde, Interim LSU Vice President for Agriculture
Louisiana State University Agricultural Center
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