



BASIL

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Basil (*Ocimum basilicum* L. and its varieties) is a popular herb known for its flavorful foliage. The fresh or dried leaves add a distinctive flavor to many foods, such as Italian style tomato sauces, pesto sauce and salad dressing. The essential oils and oleo-resins may be extracted from leaves and flowers and used for flavoring in liqueurs and for fragrance in perfumes and soaps.

Varieties – Many types of basil are available, depending on use. For fresh market production, select a basil with good flavor and attractive, dark green or purple foliage. Sweet basil (*Ocimum basilicum* L.) is the culinary classic. Italian, Lettuce Leaf and Opal are popular sweet basil varieties. Scented basil, such as Lemon, Licorice and Cinnamon basil, are used fresh or dried in potpourri, jellies, honeys, vinegars and baked goods. For production of dried leaves or essential oils, French, American or Egyptian basil may be grown. There are also several ornamental type basil.

Planting – All basil are tender annuals which are easy to grow, but are very susceptible to cold weather. They should be planted in late spring after all danger of frost is past. To produce high quality basil, grow it in full sun in warm, well-drained soil. Raised beds are highly recommended because they promote good drainage and warm quickly in the spring. A light sand to silt loam with a pH of 6.4 is best.

Basil may be grown in the field from seed or transplants. For a direct-seeded crop, sow seed thinly (8 to 10 seeds per inch) in a well-prepared seedbed. About 6 lbs. of seed are required to seed one acre. A small, manual seeder, or a commercial onion seeder, will provide an even seeding rate. To prevent the soil from crusting, cover with a fine layer of soil (approx. inch) mixed with vermiculite or peat and keep the soil surface moist. Plants should emerge in 8 to 14 days.

Basil may also be grown from transplants started in the greenhouse in late March to early April for the piedmont and coastal counties and mid-April to early May for the mountains. Trim transplants to encourage branching and plant into the field when about 6 inches tall (4-6 weeks old). Basil also roots readily from cuttings.

Space plants 2 to 3 feet between rows, depending on cultivation equipment, and 6-12 inches within the row. Double-row plantings on 2 to 4 foot wide beds increase yields per acre and help to shade out weeds. Large producers growing for oil plant 30,000 to 35,000 plants per acre. Planting dates may be staggered to provide a continuous supply of fresh leaves throughout the growing season.

For fresh-cut basil production, the use of mulch is highly recommended. Mulch conserves moisture, reduces weed growth, and keeps the basil leaves clean. Highest

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yields have been obtained with black, polyethylene mulch. Hardwood bark and straw also are good choices.

Fertilization – Do not overfertilize basil or flavor will be sacrificed for growth. Although specific recommendations are not available, generally it is suggested that 100 pounds each of N, P₂O₅ and K₂O per acre be broadcast and incorporated at time of planting or follow guidelines for fertilization of salad greens. If more than one harvest is made, sidedress with 15 to 30 pounds N per acre shortly after the first or second cutting.

Irrigation – Basil will not tolerate moisture stress. Provide a regular supply of water through drip or overhead irrigation.

Weed Control – Currently, there are no herbicide registrations for basil in NC with the exception of Devrinol, which may be used only on basil grown for oil production. Weed control is critical, however, because competition with weeds decreases the quality of fresh or dried basil leaves. To keep weed populations low, use high plant populations, shallow cultivation, or mulch. Mulch, plastic or organic, also helps retain moisture in the soil and prevents soil from being splashed onto the foliage.

Disease Control – There are no pesticides registered for disease control on basil. Prevention of disease through good cultural practices is the most effective means for healthy crop production. To help prevent foliar fungal diseases, keep foliage as dry as possible by watering early in the day so foliage dries quickly, or by using drip irrigation. To reduce soil borne diseases, rotate herbs to different parts of the field each year and remove and destroy all plant debris after final harvest.

A devastating basil wilt disease caused by a soilborne pathogenic fungus, *Fusarium oxysporum f. sp. basilicum*, was first discovered in the U.S. in 1991 and identified in N.C. in 1992. Plants infected with this disease usually grow normally until they are six to twelve inches tall, then they become stunted and suddenly wilt. Initial symptoms usually include brown streaks on the stems, discoloration of the internal stem tissue, and sudden leaf drop. Interestingly, only sweet basil is affected. Some of the specialty basil, such as lemon basil and purple basil, show some resistance to the disease.

The disease is introduced into fields, hydroponic systems, and greenhouse culture primarily through contaminated seed. Growers should only buy basil seed that has been tested for the fusarium wilt fungus. Currently, these tests involve growing out a large number of seed and looking for disease symptoms. This does not guarantee that the seed will be free of infection, but it greatly reduces the risk. If it is not possible to obtain tested seed, the seed should be soaked in cold water for four hours followed by a heat treatment of 20 minutes in 133-136 degree F water. Seed germination rates will probably be reduced by the hot water treatment, so a germination test should be conducted on a small lot of the treated seed to determine how much seeding rates need to be adjusted. Also, the hot water treatment causes a sticky layer to develop on the outer surface of seed making it difficult to handle.

Once a field has become infested with the fusarium wilt pathogen, infective propagules may persist in the soil for 8-12 years. During that time, growers should avoid growing sweet basil or members of the mint family. Mints will not exhibit symptoms of the disease but may carry over the inoculum from year to year. There are currently no products registered to help control this disease.

Insect Control – Javelin (*Bacillus thuringiensis*) is the only insecticide registered for use on basil in North Carolina. It is a biological control that kills a variety of caterpillars. If other insect problems become serious, other organic methods may be tried. Reflective mulches, beneficial insects, insecticidal soaps, traps and hand-picking may give some level of control.

Harvesting – Leaf yields range from 1 to 3 tons per acre dried or 6 to 10 tons per acre fresh. Foliage may be harvested whenever four sets of true leaves can be left after cutting to initiate growth, but when harvesting for fresh or dried leaves, always cut prior to bloom. Presence of blossoms in the harvested foliage reduces the quality, and consequently price, of the fresh and dried product. Frequent trimming helps keep plants bushy. For small-scale production of fresh-market basil, the terminal 2- to 3-inch long whorls of leaves may be cut or pinched off once or twice a week. This provides a high quality product with little stem tissue present. Basil can also be cut and bunched like fresh parsley. A sickle bar type mower with adjustable cutting height is commonly used for harvesting

large plantings for dried production. When harvesting for essential oil production, basil should be harvested during full bloom.

Postharvest Handling – For fresh market sales, after harvest, wash and dry leaves and remove all weeds and flowers. Only the highest quality basil with the best color and aroma should be used. Wholesale packs may be prepared by filling perforated plastic bags with one pound of loose leaves. For retail sales, small, uniform bunches of leaves may be tied and packaged. Keep all basil refrigerated until sold. The optimum storage temperature is 40° to 45°F. Lower temperatures may cause discoloration.

For a dried finished product, wash leaves, spread on screens, and sort out weeds and blossoms. To retain maximum color, circulate warm air (less than 130°F) around the leaves until dry. Sun-dried leaves tend to be brownish. Store in air-tight containers in the dark. For essential oil production, cut basil should be field dried for 1 to 3 days prior to collecting and distilling.

Further Reading

- Davis, J.M. 1995. *North Carolina Basil Production Guide*. North Carolina Cooperative Extension Service, N.C. State University, Raleigh. AG-477.
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- Simon, J.E. 1996. *Basil*. New Crop Factsheet. Purdue University, West Lafayette, Indiana.
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