

Ethnic Peppers (*Capsicum* spp.): Chiles or Chilies (Mexican/Central American) and Ajis (Caribbean)

Fact Sheet FS1112

Cooperative Extension

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Quick Facts

Core nutritional value:

- Rich source of Vitamin A, and dietary fiber.

Approximate yield:

- Pablano 28,000-31,000 lb/A; Aji dulce N/A; Jalapeno chile 24,000-42,000 lb/A (transplants)

Growing areas:

- Hardiness Zones 3-11

Major consumers:

- Hispanics, Africans, other ethnic groups in the U.S.

History and Common Names

“Chiles” are ethnic peppers (*Capsicum* spp.) that include Pablano pepper (*Capsicum annuum* L.), Aji dulce (*C. chinense* Jacq.), and Jalapeno (*C. annuum* L.) peppers. They are New World peppers with origins in Central and South America somewhere around Bolivia and Peru. These peppers are among the earliest of domesticated crops believed to have been part of human diet for close to 10,000 years. The spread of “chile” as it is called in Spanish (or “chili” in English) throughout the world has been associated with the voyage of Columbus to South America in the 15th century. It was recorded that Columbus introduced chile (then called the “Red pepper” to distinguish it from the then widely known black pepper [*Pipernigrum* L.]) to Europe from where it spread into Africa and Asia. Today chile is found all over the world across the temperate, sub-tropical and tropical climates. In the United States, chile was first commercially grown in New Mexico around the 17th century. A wide variety of popular chiles are grown in the United States including Anaheim/New Mexico, Cayenne, Cubanelles, the Habaneros and Scotch bonnet, the yellow Hungarian wax, Italian long hots, and many others.

Significance

The most significant quality of chiles is the relative content of capsaicin, the chemical substance that determines the degree of pungency (hotness) of the taste. Pungency is measured in Scoville Heat Units (SHU) and ranges from 0 (zero pungency) as in bell/sweet peppers, Aji dulce and pimientos, to over 800,000 (violently pungent) SHUs in habaneros, and more than 1.4 million SHUs in the recently discovered Indian Ghost Pepper which now holds the record as the hottest. Jalapeno and Pablano peppers (Fig. 1) are among the popular types of chiles sold in most of the United States East Coast states. Pungency in these chiles is a moderately hot 1,500-5,000 SHUs. Caribbean markets for Aji dulce prefer them with no heat. Since they cross very easily with Habaneros and can become very hot, it is important to isolate Ajis from Habanero plantings, especially if seed is to be saved from year to year. As food, chiles are a rich source of Vitamin A, known generally to boost immunity. Chiles are used for food flavoring, as a coloring agent and as pharmaceutical ingredients. Capsaicin has been linked to several health values including pain relief, prevention of the spread of prostrate cancer cells, lowering the risk of Type 2 diabetes, and the treatment of asthma, coughs, sore throat, arthritis, etc. The peppery heat stimulates secretions that help clear mucus from stuffed up nose or congested lungs. More recent findings have shown that topical capsaicin is a treatment option for osteoarthritis pain. Capsaicin is also found to have strong insect repellent properties and used to preserve a host of agricultural products including grains, meat and wood. Recently, some chile varieties have been developed and marketed as ornamental plants to showcase the strikingly attractive fruit shapes and colors.

Growing Conditions

Chiles are tropical plants and many are perennials that have been adapted to short season annual production, ranging from 3-6 months in temperate climates. In the field, chiles perform

best under full sunlight. Most can be grown in the greenhouse under controlled temperature, light, water and relative humidity. Optimum growing temperatures are between 70 and 85°F (~21 and 29°C). Plants may drop their blooms at temperatures higher than 90°F (~32°C) during the day and 75°F (~24°C) in the night, and at slightly lower temperatures, pollination is reduced resulting in poor fruit set or small, misshapen fruit. For field production, chiles can be grown successfully during the summer months in Plant Hardiness Zones 3 to 11.

Production

Soil and fertilizer requirements

Chiles thrive in fertile and well-drained soils. They will grow in a pH range 4.3-8.3 but optimally between 6.5-6.8. Fertilizer requirement depends on soil nutrient status which is best determined through a soil test. In the absence of a soil test, commonly used fertilizer formulas include N-P-K 6-6-6; 6-3-6; and 10-10-10. Where available fertilizer formulation options permit, all required P and 50% required N and K are applied to the seedbed during land preparation. The remaining N and K may be applied 3 to 4 weeks after transplanting. In general with the 10-10-10 formulation, side dressing with 500 lb/A (~560 kg/ha) is recommended at transplanting, followed 4 to 6 weeks later (or at flowering) with another 500 lb/A side dressing. Where deficiency symptoms appear, it may be necessary to apply magnesium and iron supplying fertilizers such as Magnesium nitrate or sulfate and EDHA-chelated iron. Liquid fertilizers may be applied through the irrigation system (fertigation) to supply both macro and micronutrients after the initial fertilizer application during land preparation.

Planting

Plastic-covered raised beds (36-48 inches wide, 4-8 inches high; and 5-6 feet between centers of adjacent beds) are recommended to minimize standing water and conditions that may lead to disease incidence and to reduce weed pressure. Planting can be done from early to mid-May in southern New Jersey and late May to mid-June in northern parts of the state after the frost risk is over. The use of transplants is recommended as this method produces two 2-3 times higher yield than direct seeding. Transplant production in heated greenhouses should begin with seeding 6-8 weeks before anticipated field planting. Aji dulce are slow to start and will yield significantly more fruit if started 9-12 weeks before transplanting to the field. Transplants should be set 2-3 inches deep with the root ball completely covered by field soil. Seedlings can be planted 12-18 inches apart in single rows or in staggered double rows on each plastic covered bed. Due to larger size and branching growth pattern, some chile varieties (e.g., Pablano and Aji dulce) perform better in a single row while all types grown in either single or double-row systems may benefit from support provided by staking. Staking ensures high quality harvest by reducing fruit contact the soil and branch breakage due to fruit weight.

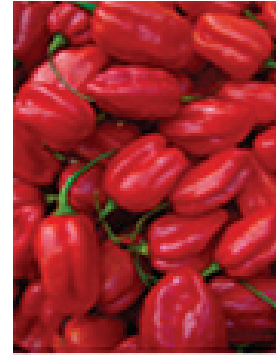
Management

When planted on bare ground, chiles are susceptible to early weed interference and yield may be reduced drastically if weeds are not controlled at the proper time. If manual weeding is the method adopted, hand weeding is required, the first done within 2-3 weeks after transplanting and the second 2-3 weeks after the first weeding. Herbicides approved for EPA Crop Group 8 (peppers) and listed in the pepper section of the annual *Commercial Vegetable Production Recommendations for New Jersey* (njaes.rutgers.edu/pubs/publication.asp?pid=e001) are appropriate. Plastic mulch will drastically reduce weed pressure and is recommended to increase earliness to fruiting and overall yield. White plastic may be recommended for later spring plantings to avoid burning the plants while late summer plantings will also benefit if grown on silver/reflective mulch to repel virus-carrying aphids. Major insect pests of chiles include the pepper weevil (a rare pest in New Jersey), beet armyworm, tomato fruit worm, looper, melon thrips and aphids. Bacterial speck and spot, *Phytophthora* root rot and mosaic viruses have been reported in chiles. Scout plants routinely to detect

Pablano pepper



Aji dulce



Jalapeno chile



Fig. 1. Some "chiles" commonly sold in the United States East Coast.



Fig. 2. Field appearance of ripe and unripe chiles (ethnic peppers); (top l-r): Jalapeno, Pablano, Aji dulce

insect and disease outbreaks and apply recommended control measures as soon as they are detected. Consult the annual *Commercial Vegetable Production Recommendations for New Jersey* for appropriate pesticides and other crop protection guides for peppers.

Harvesting and Yield

Chiles are picked manually for the fresh market, and may be picked green or ripe depending on the purpose of the harvest. The time to harvest varies widely by variety, as is the harvesting duration, which may continue over several weeks until frost terminates the process in Fall. Fruit yields for Pablano pepper under experimental conditions in New Jersey could be as high as 31,000 lb/A, 30,000 lb/A for Serrano, and 42,000 lb/A for Jalapeno. Experimental data indicate Aji dulce produce prolifically, upwards of 1.7 million small, lightweight fruit/A totaling as much as 20,000 lb/A if transplants are placed in the field as early as possible after the danger of frost has passed. Plantings delayed as little as 3-4 weeks later will yield significantly less, and as with all ethnic peppers, the yield under grower's conditions may vary considerably from these estimates.

Handling

Chiles are stored for fresh market the same way as bell peppers. Barring moisture loss, freshly harvested chiles will keep for 3 to 5 weeks if stored between 45 to 50°F and 95% relative humidity. Below 45°F chiles are sensitive to chilling injury. Fruit that show blossom end rot symptoms (dark, sunken lesions at or near the blossom end) and pepper speck (spot-like lesions that penetrate the fruit walls) will not store well and should be discarded. Chiles are typically packaged for wholesale markets in a smaller carton holding 5-15 pounds of fruit, while retail packaging can include individual or combinations of type and/or color in clamshells or on stretch-wrapped trays holding 0.5 to 3 pounds.

Nutritional Information

Red chile (serving 76 g [2.65 oz]):

- Calories - 5
- Protein - 0.7 g (0.02 oz)

- Carbohydrate - 3.5 g (0.12 oz)
- Total fat - 0.1 g (0.004 oz)
- Fiber - 0.6 g (0.02 oz)
- Rich in Vitamin A and high in Vitamin C, and dietary fiber.

Seed and Plant Sources*

Almost all commercial seed companies have a selection of pepper types and cultivars. The following is a sample of companies that offer ethnic pepper types.

Cross Country Nurseries, PO Box 170; 199 Kingwood-Locktown Road, Rosemont, NJ 08556-0170, 908-996-4646; www.chileplants.com/

Enchanted Seeds, P.O. Box 6087, Las Cruces, NM 88006, 505-233-3033; www.enchantedseeds.com/

Johnny's Selected Seeds, 955 Benton Avenue, Winslow, Maine 04901; www.johnnyseeds.com/

Seed Savers Exchange, 3094 North Winn Rd, Decorah, Iowa 52101, 563-382-5990; www.seedsavers.org/

Seminis, Inc. 800 North Lindbergh Blvd., Saint Louis, MO 63167, 314- 694-1000; us.seminis.com/

Stokes Seeds, PO Box 548 Buffalo, NY 14240-0548, 716-695-6980; www.stokeseeds.com/cgi-bin/StokesSeeds.storefront

W. Atlee Burpee & Co, 300 Park Avenue, Warminster, PA 18974, 800-333-5808; www.burpee.com/

Willhite Seed, Inc., P.O. Box 23, Poolville, TX 76487-0023; www.willhiteseed.com/index.php

Additional Information*

homecooking.about.com/library/weekly/blhotchiles.htm

www.elise.com/recipes/archives/002089jalapeno_pepper_jelly.php

edis.ifas.ufl.edu/WG034

www.worldcrops.org

www.hort.purdue.edu/newcrop/

*Information in this reference appears with the understanding that no discrimination is intended and no endorsement by Rutgers Cooperative Extension is implied.

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