Bok Choys (Chinese Cabbages) *(Brassica rapa chinensis)*

Fact Sheet 1113

Cooperative Extension

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Quick Facts

Core nutritional value:

- Rich source of Vitamin A and C

Approximate yield:

- 8,000 -15,000 lb/A

Growing areas:

- Hardiness Zones 3-11

Major consumers:

- Asians and other ethnic nationalities

History and Common Names

The Bok (or Pak) choys (or chois) (also known as white or green, loose-headed or leafy non-heading Chinese cabbages) belong to the large family of Asian mustards that have been cultivated for over 6,000 years in China. Chinese cabbages had become a common part of the diet in southern China by the 5th century and also studied for its medicinal qualities. The cabbages were introduced to Korea in the 15th century where they became the staple vegetable for making "kimchi" (a traditional Korean dish of fermented chili peppers and vegetables). In the early 20th century, the cabbages were taken to Japan by returning soldiers who had fought in Manchuria during the Russo-Japanese War. Today Chinese cabbages (or Bok Choys for simplicity) are found in markets throughout the world.

Significance

Bok choys are highly valued for the pale green or white, thick, crunchy petioles (leaf stalks) with light to dark green wide leaves. All parts of the foliage are edible and some have a peppery taste. They are rich in vitamins A and C, and low in calories. Foods in the cabbage family have been reported to inhibit the growth of breast, colon or stomach cancer due to phytochemicals called indoles. However, consuming excessive amounts of cabbage may contribute to thyroid problems, possibly goiter. Drinking cabbage juice has been reported as a remedy for peptic ulcers.

Growing Conditions

Bok choys will grow under a broad range of temperatures. They grow best in hardiness zones 3 to 11 under cool, moist conditions. Optimum temperature range for growth is 59–68°F (15–20°C). High temperatures slow plant growth but these crops can tolerate temperatures above optimum if there is enough soil moisture. Although all varieties are somewhat frost tolerant, frost injury may occur with some types when the temperature falls below 26°F (–3°C). Premature seed stalk development (bolting) is a result of seedling exposure to prolonged low temperature (vernalization) when spring planting is done too early. Seedlings exposed to temperatures of about 40°F (4.4°C) for a week, or 50°F (10°C) for two weeks, or prolonged temperatures below 55°F (12.8°C) may be induced to bolt. The problem of vernalization can be overcome by planting bolt resistant varieties, use of transplants, or delaying direct seeding until late April or May in New Jersey (Hardiness Zones 5-7).

Production

The descriptions below apply to non-heading types of Chinese cabbages, which are included as shown in Fig. 1: large size bok choy, green petiole medium size Shanghai bok choy, white petiole medium size milk bok choy, large petiole Joi choy (a hybrid of bok choy), narrow petiole bok choi (specific

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name unknown), and choy tops (or baby bok choy). The other major groups of Chinese cabbages include the Choy sums (or flowering Chinese cabbages); and the Michichili and Napa types (which form dense heads), are not included in these descriptions.

Fig. 1. Some Bok (or Pak) Choy (or Choi) types found in United States grocery stores: (top l-r): Bok choy, Shanghai bok choy, Milk bok choy; (bottom l-r): Joi Choy (hybrid of Bok choy), narrow petiole bok choy, Choy tops/Baby bok choy.

Soil and fertilizer requirements

Bok choys perform optimally in fertile sandy loam soils with good water-holding capacity and pH 5.5-7.0; they grow optimally at 6.5-6.8. Steady supply of water is recommended for adequate yield and prevention of tip-burn caused by calcium imbalance. Raising the level of soil organic matter through compost should widen the range of acceptable soil types. A soil test is essential to estimate nutrient requirements. In general, for optimum performance, Bok choys require ~150-175 lb/acre (170-195 kg/ha) N (Nitrogen); ~70-150 lb/acre (75-170 kg/ha) P_2O_5 (Phosphorus); and ~130-175 lb/acre (145-195 kg/ha) K_2O (Potassium). Apply half of the N and all the other fertilizers during seedbed preparation. Apply the other half of N at planting/transplanting. Lime (Calcium or Magnesium Oxide) applications raise the soil pH above 7.0 in combination with additional organic matter and raised beds to improve drainage will help reduce the incidence of Club Root fungal disease.

Direct–seeding

Seed is available from a number of sources (see list below). Planting can be done from April through August. Bolt-resistant types can be seeded in the field in mid-April, others beginning in late May for early and mid-summer harvests. Fall plantings should start in the middle of August for October to November harvests. When direct seeding, plant seeds 0.70 inch (1.5 cm) deep with in-row spacing of 3 to 4.5 inches (7 to 10 cm) row spacing and 18-30 inches (40 to 60 cm) between row spacing. Plants should later be thinned to 9 inches (20 cm) in row. Smaller varieties only require 1-4.5 inch (2.5 to 10cm) in row spacing, and 9 inches (20 cm) between row spacing. Spacing varies with cultivar and/or type Early maturing types (35-45 days) require less space than the late types. Seed are sown at a rate of ~8-10 oz/acre (0.5-0.75 kg/ha) and hand thinned to one plant at the desired spacing.

Fig. 2. "Joi choi" in greenhouse nursery (top l), and in the field (top r); Shanghai/Baby bok choy growing under plastic mulch (bottom).

Transplanting

To avoid bolting for earlier harvests, seedlings can be raised in the greenhouse between late February and early May, then transplanted to the field in late April to early May. For June and early July harvests, seedlings with 3-5 fully expanded leaves should be transplanted April 20-May 10, and may be protected using floating row cover. Bok choys are not normally transplanted as bare-rooted plants. Transplants should be set in the soil to a depth of the first leaves [cabbages are alternate leafed so there are no pairs of leaves]. The growth habits of "Joi choi" and the Shanghai bok choy are shown in Fig. 2.

Management

Bok choys belong to the Mustards and Cabbages crop grouping by the US-EPA for pesticide classification and labeling. Pesticides labeled for EPA Crop Group # 5 may be used for control of Bok choy pests.

- When planted at recommended spacing, one manual or mechanical weeding within three weeks after planting is usually sufficient to attain acceptable weed control. At wide spacing, another weeding may be necessary two weeks later.
- Diamondback caterpillars, cabbage looper, beet armyworm, corn earworm, aphids, vegetable weevil, cabbage and seedcorn maggots, and flea beetles are major insect pests of bok choy.
- Potential diseases include downy and powdery mildews, leaf spots, blackleg, white rot and clubroot. Once a field is infested, clubroot must be managed by keeping soil pH above 7.0 and increasing drainage and soil organic matter. Occurrence of other diseases, as well as insect pests, is highly unpredictable and fields need to be scouted regularly for signs of these pests.

Harvesting

Bok choys mature within 35 to 60 days after sowing/transplanting depending on cultivar. The time to harvest and the technique to use are dictated by your market. Plants are harvested and packed as individual heads, or for specialty Oriental/Asian markets, 6-8 immature heads are bunched together. To prevent the petioles from cracking, which leads to reduced market value, leave cut heads to wilt slightly in the field for one hour before bunching.

Storage

Bok choys will not last long at high temperatures, however, when stored at 32 ± 2°F (0 ± 2°C) and 95 to 100% relative humidity; plants can maintain integrity and quality for 2 to 3 months. Remove any damaged or diseased parts before storage, pack loosely for good air circulation and in upright position in crates. Market conditions do not normally justify storing Bok choys.

Packaging

Bok choys may be sold as individual heads or packaged conventionally as other Chinese cabbages in 35 lb (16 kg) cardboard boxes or in 80-85 lb (36–39 kg) Western Growers Association (WGA) crates. For Oriental/Asian markets, baby Shanghai Pak choy can be bunched with three plants each, and packaged 24-36 bunches per carton, depending on the item. Buyers should be consulted for packaging preferences.

Nutritional Information

Bok choys (85 g [3 oz]):

- Calories: 14
- Protein: 1.0 g
- Carbohydrate: 2.73 g
- Total fat: 0.18 g
- Fiber: 0.84 g
- High in Vitamin A and C

Seed Sources

American Takii Inc., 301 Natividad Rd. Salinas, CA 93906; www.takii.com

Evergreen Y.H. Enterprises, PO Box 17538, Anaheim, CA 92817; evergreenseeds.com/

Harris Moran Seed Co., 3670 Buffalo Rd. Rochester, NY 14624; www.harrismoran.com/

Johnny's Selected Seeds, Foss Hill Rd., Albion, ME 04910; www.netcheck.com/johnnyseeds.shtml

Kitazawa Seed Co. 356 W. Taylor Street, San Jose, CA 95110; www.kitazawaseed.com/

Nichol's Garden Nursery, 1190 North Pacific Highway, Albany, OR 97321; www.nicholsgardennursery.com/

Stokes Seeds, Inc., Buffalo, NY 14240-0548, 416-688-4300; www.stokeseeds.com/cgi-bin/StokesSeeds.storefront

Sakata Seed America, Inc., PO Box 877 Morgan Hill, CA 05037; www.sakata.com/

Additional Information*

www.island.wsu.edu/CROPS/BOKCHOY.htm

casfs.ucsc.edu/

hort-devel-nwrec.hort.oregonstate.edu/chincabb.html

www.tainongseeds.com/ChingChang.html

pubs.caes.uga.edu/caespubs/pubcd/C809-w.htm

hgic.clemson.edu/factsheets/hgic1306.htm

www.worldcrops.org

www.hort.purdue.edu/newcrop/

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