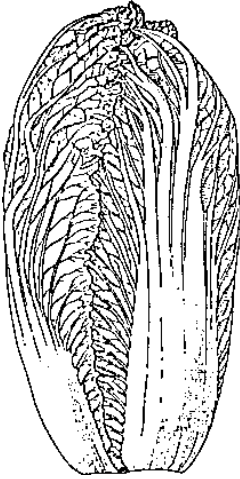


# ORIENTAL CABBAGE PRODUCTION



Oriental cabbage is actually not cabbage at all but is more closely related to what we know as mustard. The growth habit of these cultivars resembles that of cabbage, and in the U.S., they are commonly referred to as oriental or Chinese cabbage. Napa (a variety, but now used to mean a group of similar varieties) is usually what is called Chinese cabbage. Bok choy is included in this publication since the plant size, production, and harvest practices are similar to those used to produce Napa. Napa varieties produce fairly dense heads of overlapping leaves ranging in weight from 3 to 6 pounds. Bok choy, on the other hand, produces a loose head of large white petioles (leaf stems). These petioles are the desirable portion of the plant. The weight of a bok choy head is also in the 3- to 6- pound range. Actually, bok choy resembles celery except for the shape of the leaves. Shanghai cabbage is a type of short bok choy with light green petioles, also called green-stemmed bok choy. This type of cabbage is much smaller than the other types. It is in the 1- to 2- pound range.

## FERTILITY REQUIREMENTS

For the best quality product, oriental cabbage requires the soil pH to be 6.0 - 6.2. A moderately well-drained soil with good organic matter content and high moisture holding capacity is best for these crops. Tipburn, magnesium deficiency, and internal quality defects cause problems when the soil pH is lower than the recommended level or the crops are grown on droughty soils.

A soil test is the best method to develop a fertility program. Without a soil test, the following recommendations can be followed:

- On fertile soils, broadcast 800 pounds per acre of 5-10-10 or the equivalent followed by two sidedress applications of 30 pounds of nitrogen 10 and 20 days after transplanting.
- On less fertile soils, broadcast 1000 pounds of 5-10-10 and use the same sidedressing applications.
- On soils not needing limestone but having low to medium calcium levels, add gypsum to the soil to increase calcium levels. Calcium nitrate can also be used for sidedressing to supply both the needed nitrogen and calcium. Calcium can also be applied as a foliar spray, but basic requirements should be met through soil application. Banded fertilizers should be placed at least 4 inches to the side of the row and 3 inches deep to prevent root damage from the concentrated fertilizer. Even though boron may have been in the complete fertilizer, a foliar application of boron may be necessary and can be done by using Solubor when applying crop protection materials. For a direct-seeded crop, the first sidedress application should be applied only after the plants are 6 inches in height. A second application should be applied 10 days to 2 weeks later.

## PLANTING

The spring crop of oriental cabbage is usually transplanted in the southeastern United States. Transplanting methods are exactly like those used for cabbage, broccoli, or collards. In areas of the state other than the Sandhills or the Midlands, the crop needs to be on a slight bed. This is particularly important in the inland areas of the coastal plain where many soil types drain slowly. Row spacing is usually 36 inches with 12-14 inches between the plants. Wide beds with twin rows can be used, but due to the increased plant population, extra attention must be paid to fertility requirements and irrigation needs. The fall crop may be direct-seeded at the same plant and row spacing. A precision seeder of some type should be used since over seeding and thinning would be cost prohibitive because of seed and labor costs. Planting dates vary according to location. On the immediate coast, transplanting can begin as early as January 20, while the upper coastal plains should wait until around February 15. The Midlands and Piedmont regions can transplant around March 1. Coastal areas should direct-seed their fall crops by August 30 with other areas completing their seeding by August 15. Transplanting on the coast can continue until October 1, while other areas of the state should have the crop transplanted by the first week of September.

## IRRIGATION

Irrigation is essential for a timely, high quality crop of oriental cabbage. Frequent light sprinklings with small-bore sprinklers should be used to water up a stand. These small seeds will not produce and adequately stand under the normal autumn rainfall conditions in South Carolina. On light, sandy soils, direct-seeded crops will require daily, light irrigation applications until a stand is established. Heavier soils will require less frequent irrigation. Transplanted crops need to be watered-in after transplanting is completed. The amount of water needed depends on the stage of crop growth, weather conditions, and soil type as well as other factors. The most critical stage after establishment is when the head is forming. Inadequate water at this time will result in reduced uptake of calcium, resulting in a condition known as tipburn. This condition causes dead leaf tips within the head and makes the head unmarketable. During head formation, 1 to 1 1/2 inches of water per week is needed to maintain sustained growth rates and have the crop finish on time. Timely harvesting can mean the difference between making and losing money on these crops.

## CULTIVATION AND WEED CONTROL

During the early growth period, sweeps can be set fairly deeply to loosen rain-compacted soil. But as the crop begins to head, only very shallow cultivation should be done as the root pruning from deep cultivation stresses the plants. This delays maturity. Rolling cultivators work well on bedded crops. Very few weed control materials are labeled for use on oriental cabbage. Vapam, Dacthal, and Gramoxone are registered pesticides for use on these crops. **Always read and follow label instructions very carefully when using crop protection materials.** Spring crops have much less of a problem with weeds than fall crops.

## **INSECT AND DISEASE MANAGEMENT PRACTICES**

Recommendations for the control of a specific disease or insect problem can be obtained from your local Extension agent after proper identification of the problem. Some general problems which might be encountered are: the cabbageworm complex (cabbage looper, diamond-backed moth, and imported cabbageworm); aphids; cucumber beetles; and stink bugs (coastal areas). Vegetable weevils may be a problem in some coastal areas in the spring. Mole crickets (coastal areas) and cutworms may cause stand reductions particularly on direct-seeded crops. Nematodes, particularly the root knot nematode, can cause problems on the fall crop. Diseases which may be encountered are: downy mildew, Alternaria leaf spot, Cercospora leaf spot, black rot, bacterial soft rot, and turnip mosaic virus. Downy mildew is primarily an early season problem. The other fungal diseases can be managed with an eye to the weather and applying protectant fungicides in advance of disease-conducive weather. Alternaria leaf spot can be particularly damaging under South Carolina's climatic conditions, so protectants should be applied prior to seeing disease symptoms. Black rot can be managed best by using disease-free transplants, heat-treating seeds, and implementing a strict 3- to 4-year non-crucifer rotation. Bacterial soft rot is more severe on crops which have been fertilized too heavily with nitrogen, had late nitrogen applications, or are allowed to become over-mature before harvesting.

## **HARVESTING AND PACKING**

To maintain good quality, the crop should be field packed. Harvest early in the day during the hot parts of the year. Each head should be carefully cut straight across at ground level. Care should be given not to cut into the petioles left on the head. Bok choy should be allowed to wilt slightly before attempting to place the heads into the packing crate. This avoids the breakage of petioles which is very undesirable. Although your buyers will sometimes require a certain packing container or pack, these crops are usually packed similarly to cabbage -- by a certain head count per container with the net weight equaling at least 50 pounds. Vacuum-cooling, hydro-cooling, or top-icing maintains the quality of the pack.

## **VARIETIES AND SOURCES**

A number of varieties are available particularly for the Napa type of oriental cabbage. Takii and Sakata are two seed companies with home offices in Japan. These organizations conduct international business and offer many varieties. A number of U.S. companies also offer varieties of these crops. Some varieties perform better in the spring season while others are better performers in the fall season. Be sure to check with your seed supplier or county Extension agent concerning varietal characteristics.

**Type of Oriental Cabbage****Suggested Varieties**

Napa

*China Express*  
*China Pride*  
*Blues*  
*Tempo*  
*Jade*  
*Wong Bok*  
*Tropical Pride*

Bok Choy

*Joi Choi*  
*Lei Choi*  
*Japanese White Celery Mustard*

Shanghai Bok Choy

*Mei Qing Choi*  
*Ching-Chiang*

Reference to firm or trade name does not imply endorsement over other firms or products not mentioned.

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