

# Chinese, Napa, Pe-tsai and Celery Cabbage

## Description

Chinese cabbage, a member of the Brassica (mustard) family, also commonly known as celery or napa cabbage, is reported to be the first brassica cultivated in North America. Demand for this vegetable has grown with its increasing popularity in western kitchens.

This variety produces large, savoyed leaves with thick succulent midribs and has a sweet mild cabbage flavor and crisp texture when eaten raw. The flavor is also somewhat milder than traditional green cabbage when cooked. Chinese cabbage is excellent used raw in salads and side dishes, and is also popular used in stir fry dishes, soups, and pickled. Chinese cabbage can also be substituted for green cabbage in a wide range of western dishes.

## Cultivars

There are two principal types of Napa cabbage. The loose leaf type known as Chihili or Mitchihili forms a long cylindrical head, which can reach 17 to 21 inches (38 to 46 cm) in length and 7 to 9 inches (15 to 20 cm) in diameter. The other, known as Wong Bok, forms a compact drum-

shaped head which is slightly taller than its width. They grow to about 9 to 11 inch (20 to 25 cm) in height and 7 to 9 inch (15 to 20 cm) in diameter. Market research indicates the Wong Bok variety is also favored by consumers. Chinese cabbage cultivars can differ greatly in plant size, days to maturity and disease tolerance. Producers will need to choose varieties best suited to their particular soil and growing conditions.

## Climatic and Soil Requirements

Chinese cabbage is relatively easy to grow, and thrives best during cooler periods of the growing season. Ideal temperature for plant development is between 13 to 18°C, although a number of cultivars can tolerate higher temperatures provided there is ample soil moisture.

Chinese cabbage can also withstand light frost in the fall, but leaf tissue damage can occur with alternate freezing and thawing. Chinese cabbage performs best on well drained medium textured soils. Soils with pH levels of 5.5 to 7.6 are required with 7.0 being ideal. Sandy or porous soils are not recommended for Napa production due to poor water and nutrient retention capacities.

## Seeding and Spacing

Plant either by direct seeding or transplanting. Use the same soil preparation, fertilization and cultivation practices you would use for regular cabbage. If transplanting, it is important to harden off plants prior to setting out in field to avoid plant stress, which can cause premature bolting.

Between row and in-row spacings will be determined by the variety planted. When direct seeding, plant at a depth of 0.70 inch (1.5 cm).

## Fertility

Refer to Tables 1 through 9 for this crop. For general recommendations in the absence of a soil test, refer to Table 10 in the fertility section.

## Irrigation

Irrigation is essential to maintain uniform soil moisture for plant development and successful production of Chinese cabbage. Irrigation should be applied early in the day to allow plants time to dry before evening. This also facilitates lower field temperatures during the day, which is an additional benefit during warmer days of midsummer.

## Pest Management

### Diseases

There are a number of crucifer diseases which can infect Chinese cabbage. The severity and occurrence depends on location and growing conditions. Downy mildew (*Peronospora parasitica*) and powdery mildew (*Erysiphe polygoni*) can infect Chinese cabbage at any stage of plant development, and can render heads unfit for sale. This can also be followed by secondary infections of bacterial soft rots that can also cause crop loss. Other common diseases are leaf spots caused by *Alternaria* spp., *Phoma lingam*, blackleg (*Phoma lingam*), and white rot (*Sclerotinia sclerotiorum*). Club root, rarely a problem in Manitoba, is a soil borne fungus (*Plasmodiophora brassicae*) which invades the roots and adversely affects water uptake. Acid soils with high moisture content favour

the development of Club-root. Once established, the pathogen persists in the soil for several year.

### Insects

Insect pests that feed on cole crops can also cause damage in Chinese cabbage. The most common insects include aphids, diamond back moth larvae, imported cabbage worm and cabbage looper. Chinese cabbage is also susceptible to flea beetles and cabbage root maggot.

### Weeds

At present there are no herbicides registered for use on Chinese cabbage. Hand or mechanical cultivation is employed to control weeds, and should commence before weeds become established.

## Physiological Disorders

The most common problem in Chinese cabbage development is bolting. Bolting is the premature production of seed heads on plants. When bolting occurs, plants fail to mature which results in unmarketable product. Studies have shown that bolting response is genetically controlled, with some varieties being more prone to bolting than others. Environmental factors are also attributed to bolting, and extended periods of both low or high temperatures increases the probability of plants bolting. Interruption of plant growth caused by nutrient deficiency can also contribute to premature bolting.

## Harvest, Storage and Packing

Maturity for Chinese cabbage varies depending on variety and growing conditions, but is usually 55 to 70 days. Cabbage is harvested when heads are fully developed. To harvest, cut plants off at ground level, remove any damaged or discolored leaves and trim root base. Pack loosely in boxes, allowing for good air circulation while in storage. Studies indicate the Wong Bok variety will store for over two months when kept at temperature of 1°-2°C and relative humidity over 90%, with minimal concentrations of ethylene gas. Appropriate storage conditions should be established quickly after harvest to maximize storage life.