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.

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.

Harvest, Storage and Packing
Depending on variety, bok choy is ready to harvest between 30 to 60 days from seeding. To harvest cut entire plant off at ground level, then remove any damaged leaves and trim root base. Pack loosely into boxes to allow adequate air circulation. Bok choy is easily bruised and care must be taken at harvest to avoid cracking ribs and bruising leaves. Storage and shipping requires temperatures to be held at or near 0°C with a relative humidity of 95-100%.

Physiological Disorders
Common crop production problems are premature bolting and occasional black spot (pepper spot).

Insects
Insects which can cause damage to bok choy include aphids, flea beetles and diamond back moth larvae. Flea beetles and aphids are the most common and can easily render a crop unfit for sale. No insecticides are registered on bok choy.

Weeds
Unavailability of registered herbicides requires manual and mechanical cultivation, and should commence before weeds become established.

Bacterial soft rot is the most prevalent and occurs when there is excessive soil moisture.

There are a number of factors which can cause bolting, such as extended periods of hot or cold weather and nutrient deficiencies. Bok choy is also sensitive to long photoperiods (16-hour days for a month), which can induce flowering in some varieties.
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 (Erisyphe 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.