HORTICULTURE NOTE: NO. 5

CHINESE CABBAGE AND PAK CHOI

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Common names: Chinese cabbage - develops a firm head.
Pak choi - develops an open head.

Botanical names: Chinese cabbage - *Brassica campestris* ssp. *pekinensis*
Pak choi - *B. campestris* ssp. *chinensis*

WHAT THE PLANT LOOKS LIKE

Chinese cabbage is grown for its large heads, with loosely or tightly packed leaves. The leaves are usually light green in colour. The leaves are crinkled in appearance and soft to cut.

Pak choi has dark green leaves with thick white leaf stalks. White veins can be seen on the leaves. It does not form a firm head.

WHERE IT GROWS

The original types of Chinese cabbage came from China and Japan.

Chinese cabbage and pak choi can be grown all year round in both the lowlands and highlands. Both types grow best where the average daily temperature is 15 to 20°C.

Tying a string around the head of Chinese cabbage will make it form a firm head. Better still, tropical varieties have been bred in Japan and Taiwan, which form good firm heads in the lowlands.

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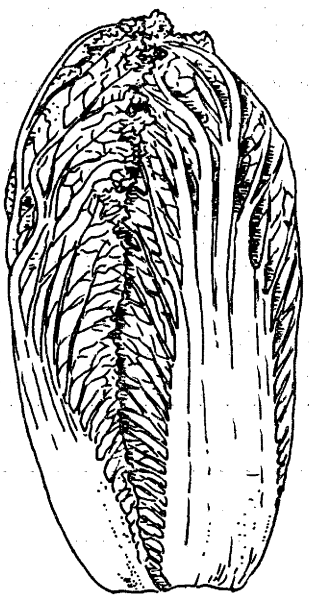

Chinese cabbage

Pak choi

SOILS AND FERTILIZERS

The best soil for Chinese cabbage and pak choi is a deeply dug, rich, sandy loam. For best results, plenty of decaying organic matter should be mixed with the soil. This will hold moisture during dry weather. The soil pH should be between 6 and 7. Growing on raised ridges during the wet season improves drainage.

Nitrogen is particularly necessary for good plant growth. An application of 200 kg per ha of 12.12.17 fertilizer before transplanting can be followed one month later, with up to 100 kg/ha of urea.

VARIETIES

In the lowlands, the best variety of Chinese cabbage to grow is Tropical Delight. It is heat tolerant and not as susceptible to bacterial soft rot as other varieties.

In the highlands many varieties can be grown. Preferred varieties include:

Tropical Delight (also known as Tropical King)
Saladeer
Wong Bok.

Pak choi variety Kwang Moon is the variety available in Papua New Guinea. It grows well both in the lowlands and in the highlands.

HOW IT IS GROWN

Seed

The best Chinese cabbage varieties are F1 hybrid, so seed cannot be saved from these types, even if they flower in Papua New Guinea. Seed must be imported from overseas, and bought in shops.

Pak choi will flower and set seed even in lowland Papua New Guinea. An article on producing and saving seed can be found in HARVEST 9 (2), pp. 1-4.

To sow 0.1 ha with Chinese cabbage, 25 g (about 7500 seeds) of seed is needed. To sow 0.1 ha with pak choi 40 g of seed (about 12 000 seeds) is needed.

Sowing

Seed can be sown into Jiffy 7's, plastic cups or trays. Sow two seeds per hole and thin to one plant after 7 to 10 days.

Transplanting

Transplant after 4 weeks, when the seedlings have 4 true leaves.

Seed sowing, nursery care and transplanting are described in Farming Note No. 10, Vegetables.

Plant spacing

Prepare ridges 1.2 to 1.3 m apart before transplanting. Two rows of plants are planted down each ridge. Space plants of Chinese cabbage 40 cm apart along each row with 40 cm between the two rows on each ridge. Pak choi should be spaced 30 cm apart along each row, with 30 cm between the two rows.

Irrigation

During periods of low rainfall, the crop should be irrigated once or twice every week. Either spray or flood irrigation can be used.

Weeding

The crop should be kept free of weeds, by hoeing between the plants and between the rows.

TIME TO MATURITY

From transplanting, Chinese cabbage takes about 6 weeks to maturity in the lowlands and about 8 weeks in the highlands.

From transplanting, pak choi takes about 4 weeks to maturity in the lowlands, and about 6 weeks in the highlands.

From a single sowing, pak choi and Chinese cabbage can be harvested over 2 weeks in the lowlands and about 3 weeks in the highlands. To grow these vegetables to supply the market all the time, a new crop should be sown every 2 weeks in the lowlands and every 3 weeks in the highlands.

HARVESTING, STORAGE AND YIELDS

Pak choi should be harvested when the plant is fully grown, but before the seedstalk starts to grow. Chinese cabbage is harvested when the head fills out and feels firm.

Chinese cabbage and pak choi will keep for a few days after harvesting, if they are kept in a cool, dark and well aired place. Sprinkle with water straight after harvesting and after transporting. This will help Chinese cabbage and pak choi stay fresher for longer when stored. If left in a pile with no ventilation, they will go bad very quickly. It is not good to store Chinese cabbage and pak choi in plastic bags as this causes them to sweat and become slimy. In a cold store at $0^{o}C$ and high humidity, they can be kept for about 3 weeks. Do not freeze.

In the lowlands, yields for pak choi range from 1 to 2 kg per square metre, and for Chinese cabbage from 2 to 3 kg per square metre. In the highlands yields for pak choi range from 2 to 3 kg per square metre, and for Chinese cabbage, from 3 to 6 kg per square metre.

HOW IT IS USED

The dark green leaves of pak choi contain vitamins A and C and iron. The white stems do not have so much food value. The main food value in Chinese cabbage is vitamin C. Vitamin C is easily destroyed by cooking and is washed away by water. These vegetables should only be cooked for a short time, and eaten while they are still slightly crisp. (See recommended method for cooking English cabbage: Horticulture Note No. 3, Volume 10, No. 3). Another way of cooking Chinese cabbage is to boil it in coconut milk, then eat the cabbage and milk soup.

INSECT PESTS

The main difficulties in growing Chinese cabbage and pak choi are the leaf eating caterpillars, diamond back moth (*Plutella xylostella*) and cluster caterpillars (*Crocidolomia binotalis*). The young larvae of these insects eat the leaves of all the cabbage family.

Diamond back moth grows faster at warmer temperatures, so it is a bigger problem in the lowlands than the highlands. Because new larvae grow so quickly, spraying plants with an insecticide does not always give good control of the insect. Particularly in the lowlands it is best to grow just one crop of the cabbage family, then remove and compost, bury or burn all the old plants before sowing seed for a new crop. The new crop should be planted on different ground.

Spraying every week with Orthene 75% SP (7 ml per 10 litres of water) or Ambush 10% (1.3 mls per 10 litres of water) is recommended for control of both these insects.

TAKE CARE: Do not harvest cabbage for 3 days after using these sprays.

Diamond back moth is discussed in Entomology Bulletin No. 8 (HARVEST Volume 8, No. 1).

Soil insects can do considerable damage to Chinese cabbage and pak choi. These include cut-worms, crickets and taro beetles. They can be controlled with a spray of DDT (mix 40 g DDT 25% in 10 litres of water) or lindane (mix 13 ml of Gammaphex 16% EC in 10 litres of water).

This recommendation will be changed when results of research are available.

Apply the spray as a soil drench before planting or around the base of young seedlings, not to the plants themselves. Cutworms are discussed in Entomology Bulletin No. 7 (HARVEST Volume 8, No. 3).

Other insecticides which can be used on Chinese cabbage or pak choi are listed by Thistleton (1983).

DISEASES

In the lowlands Chinese cabbage often becomes infected with bacterial soft rot, which causes the plant to die a few days before it is ready for harvest. The variety Tropical Delight, recommended for use in the lowlands is almost resistant to this disease. This disease is discussed in Plant Pathology Note No. 18 (HARVEST Volume 8, No. 3).

FURTHER READING

Bull, P.B. (1984). Horticulture Note: No. 3. Cabbage. *Harvest* 10 (3): 122-125.

Farming Note No. 10. *Vegetables.* Department of Primary Industry, Port Moresby. Revised, 1982.

Fitzgerald, J. and Bull, P.B. (1983). Producing and saving your own vegetable seeds. *Harvest* 9 (1): 1-4.

Thistleton, B.M. (1982a). Entomology Bulletin No. 7. Protection of seedlings from cutworm damage. *Harvest* 8 (3): 131-133.

Thistleton, B.M. (1982b). Entomology Bulletin No. 8. Control of diamond back moths in brassicas. *Harvest* 8 (1): 26:28.

Thistleton, B.M. (1983). Recommendations for the Control of Pests. *Technical Report* 83/4. Department of Primary Industry, Port Moresby.

Tomlinson, D. (1982). Plant Pathology Note: No. 18. Bacterial soft rot of vegetables. *Harvest* 8 (3): 141-143.

Van Greve, J.E.van S. (1983). Safe storage for small quantities of seed. *Harvest* 9 (1): 5-10.

FURTHER INFORMATION

For further information and advice on vegetable growing contact the Area Horticulturist in your region. The addresses for the Area Horticulturists are as follows:

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Copies of this Horticulture Note can be obtained from: The Publications Officer, Publications Section, D.P.I., P.O. Box 417, KONEDOBU.