HORTICULTURE NOTE NO. 11

Cauliflower

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Common name: CAULIFLOWER

Botanical name: *Brassica oleracea var botrytis*

WHAT THE PLANT LOOKS LIKE

Cauliflower is a member of the cabbage family. It has dark green waxy leaves, rather like banana leaves. The part of the plant which we eat is the dense flower head, with its thick, branching petioles (flower stems) which forms in the centre of the leaves. This edible part is known as the curd.

WHERE IT GROWS

Cauliflower is a temperate (cool climate) vegetable so it grows best at higher altitudes. The lower altitude limit is about 1400 m in the floors of the highland valleys. The upper limit is the same as the upper limit for human settlement and cultivation.

Some tropical varieties form heads at lower altitudes, at the cool times of the year.

Cauliflowers are quite tolerant of frost. Many varieties are adapted for forming larger heads in cold environments.

SOILS AND FERTILIZERS

Cauliflowers prefer well drained soils high in organic matter, of loam or clay loam texture, and slightly acidic. In soils which are too acidic (below pH 5.5) lime is required for good growth.

Amongst common vegetable crops, cauliflowers have one of the highest requirements for nitrogen, phosphorus and potassium.

Base dressings

On newly cleared gardens, plant out cauliflowers with 15:15:15 NPK fertilizer, applied at a rate of 1000 kg/ha. This is 500 g fertilizer (or one full large fish tin) for an area of 2 m x 2 m.

On ground which has been cropped once or twice, use 15:15:15 NPK with triphos, mixing 4 bags of NPK to 1 bag triphos. Apply this mixture at a rate of 1500 kg/ha or 500 g (one full large fish tin) for an area of 1.6 m x 2 m. If triphos is not available use 15:15:15 at 1750 kg/ha or 500 g for an area of 1.4 m x 2 m.

Side dressings

About 4 weeks after transplanting apply the following side-dressing: 2 parts ammonium sulphate mixed with 1 part muriate of potash. Apply at 250 kg/ha or 1 teaspoonful per plant.

Apply a second similar side dressing about 8-10 weeks after transplanting.

Trace elements

Two trace element problems are very common in cauliflowers in Papua New Guinea.

A deficiency (lack) of boron causes 'brown curd'. In mild cases the curd is a little discoloured and there is a brown hollow area in the stem. It may still be possible to sell

these cauliflower. More often part of the curd is brown on top, and the brown dead area extends down the petioles and along the main stem. In severe cases there is no curd, but only a brown piece of decaying tissue.

A deficiency of molybdenum causes 'whiptail'. Thin strap-like leaves take the place of the normal wider cauliflower leaves. The affected leaves are often twisted and sometimes develop on one side of the plant only. In severe cases, the plant is stunted and no curd forms.

Trace element sprays are needed to prevent both these problems. Mix 10g ammonium or sodium molybdate with 50g borax or 25g solubor in 10 litres water. Spray onto seedlings about 1 week before planting out.

VARIETIES

Cauliflower varieties can be divided into two types:

Long maturing varieties develop large white heads. Short maturing varieties have small curds but are more suitable for warmer areas.

The following varieties are suggested:

In high altitude areas (2200 m), long maturing varieties:

Phenomenal 4 months. 4-4 1/2 months to maturity from transplanting. Large curds. Blanching required (see under 'Harvesting'). Seed source: Yates Cooper.

Paleface. 5-6 months to maturity. Large compact curds. Self blanching. Seed source: Yates Australia; New World.

Deep Heart. 4 1/2 months to maturity. Moderate sized curds. Blanching required. Seed suppliers. New World, Yates Cooper; Watkins, Yates Australia.

In medium altitude areas (1400m to 2200m) short maturing varieties perform better:

Snowball Y. 4 months to maturity. Small compact curds. Blanching required. Seed source: Yates Australia, New World.

Snow Diana. 3 months to maturity. Hybrid. Blanching required. Seed source: Yates Australia, New World.

Early Rumsey Snow. 3 1/2 months to maturity. Seed source: New World, Yates Australia.

Other varieties which perform well at medium altitudes are Phenomenal 4 months, Phenomenal maincrop and Selection 174 (Yates Cooper, Yates Australia).

In low altitude areas:

Snow Queen. Small tight curds. Blanching required. Seed source: Takii Seed Company.

HOW IT IS GROWN

Sowing

There are 250 - 400 cauliflower seeds per gram. To plant 0.1 ha you will need 10 - 15 g. This allows for the loss of the weaker plants. If you plant in trays at 2 seeds per hole, and discard the weaker plant, you will need 20 - 30 g seeds for 0.1 ha.

Before sowing, hot water treatment of the seeds is good practice, as it will prevent many common diseases. (See Horticulture Note. No. xx).

Sow the seeds into seedling trays or seed boxes. For further information on seed sowing, nursery care and transplanting, refer to Farming Note No. 10.

If non-sterile soil is used, avoid soil that has previously grown cauliflowers or other brassicas.

Seedbeds can be used to raise cauliflowers. Newly cleared areas only should be used for seedbeds.

One to 2 weeks before transplanting, spray the seedlings with the trace elements as discussed under 'Soils and Fertilizers'.

Transplanting

Transplant when the seedlings are 7 - 10 cm high, 6 - 8 weeks after sowing. "Harden off" the seedlings by moving the seedling boxes into the garden 1 week before transplanting.

The best time to transplant is normally late in the day. If the soil is very dry, delay transplanting until rain falls. In slightly moist soils, moisture stress can be reduced if the top third of the larger leaves is cut off. Water the young plants after transplanting.

Plant about 50 cm apart in rows, with about 75 cm between rows. Use a closer spacing for small heading varieties.

For continuous harvesting, plant a new crop of cauliflowers about every 2 weeks.

Spraying

Use a weekly spraying programme to ensure that the crop stays free of the major pests and disease. See the section on PESTS and DISEASES.

Weeding

Keep the cauliflower crop free of weeds by hoeing between plants and between rows.

HARVESTING, STORAGE AND YIELDS

At the first sign of curds forming, the crop should be blanched. 'Blanching' means protecting the curd from sunlight which makes it go yellow. Blanching is done by walking through the crop and breaking the top half of 2 or 3 large leaves so that they fold over to cover the curd.

In hot weather, curds may be ready for harvest only 3 - 4 days after blanching. In cooler weather it may take 2 weeks. Curds are ready for harvest when they are fully developed in size, but still compact and white. Curds which have started to open up are not marketable. Therefore it is better to harvest a little early rather than too late.

When cutting cauliflowers, leave a few leaves attached to the curd for protection during transport.

At each harvest, a new set of curds are blanched while mature ones are cut. A good cauliflower crop should give 3 harvests with 40% of the curds cut in the first harvest, 20% in the second harvest, and

15% in the third.

Very well-managed crops can yield 95% marketable curds, though a 75% yield is satisfactory.

Curds which are yellow, too small, or over-mature should be kept for home consumption.

Cauliflowers, if stored at 1 - 2°C, will keep for 4 weeks after harvest. However, at higher temperatures, they go bad quite quickly.

HOW IT IS USED

Cauliflowers are usually cooked by boiling or steaming, and served as a vegetable on their own or with other vegetables. They can be used in soups and stews or they can be used raw in salads.

PESTS AND DISEASES

Insect pests

The main insect pest is diamond-back moth. For information about control, refer to Entomology Bulletin No. 8.

Diseases

Black rot is a widespread problem. For details of symptoms and control, refer to Plant Pathology Note: No. 28.

Another problem is Alternaria leaf spot. It appears as roughly circular light brown patches on the leaves, about 1-2 cm across. The patches are made up of a series of rings. This disease also often causes brown patches on top of the curd. Alternaria leaf spot can be controlled by hot water treatment of seeds, and regular spraying with Dithane M45 or Bravo.

Remove and destroy all crop debris immediately after harvest.

Ringspot has symptoms on the leaves similar to those of Alternaria leaf spot. However the round patches on the leaves usually have tiny black pinhead spots around the outer edges. Ringspot is controlled by hot water treatment of seeds, removing crop debris after harvest and spraying with Benlate or Bravo.

Downy mildew can be severe if fogs last for several hours in the morning. Irregular shaped, light brown patches have small tufts of white "cotton wool" on the underside of the leaf. Control with hot water treatment of seed, and spraying with copper based sprays or Ridomil MZ.

FURTHER READING

Farming Note No. 10. Vegetables. Department of Agriculture and Livestock, Port Moresby. Revised 1982.

Thistleton, B.M. (1987). Control of diamond back moth in brassicas. Entomology Bulletin No. 8 (revised). Harvest 8 (1): 26-28..

Tomlinson, D. (1985). Black rot and leaf scald of crucifers. Plant Pathology Note No. 28. Harvest 11 (3): 124-125.

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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