

Growing

CAULIFLOWER

in hawaii



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FIFTIETH ANNIVERSARY

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About the Author

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Foreword

Cauliflower is a relatively minor crop in Hawaii. The major portion of Hawaii's population of oriental extraction has not been exposed to this crop.

Approximately 300,000 pounds of cauliflower were produced in 1954 on 35 acres with a wholesale value of \$43,000. In the same period, 200,000 pounds of fresh and 45,000 pounds of fresh frozen cauliflower were imported from the mainland for the local market.

Varieties And Climatic Requirements

The varieties of cauliflower are grouped into early, medium, and late maturing strains. The uniformity and heading ability of a strain are more important than its varietal designation.

The early strains of the Snowball type mature in 50–60 days after transplanting. Some medium strains require 70–80 days, while the late types may require as much as 150 days to mature.

The cauliflower strains differ in the character of the foliage and in the manner in which the inner leaves enclose the developing curd (head) and protect it from sunlight. Such protection is important where the crop matures during bright, sunny weather, since it prevents the occurrence of a yellowish discoloration of the curds. Another important difference in strains is the amount of leafiness in the head. Some strains have an undesirable tendency to develop small leaves that extend out through the branches of the head. This condition is especially noticeable when high temperatures occur at the time of curd development.

Some early maturing varieties are: Snowball A, Primosnow, Snowdrift, and Burpeana. Super Snowball and Snowball M are of the medium maturing group. Snowball X and Y, and Helios are in the late maturing group.

The Pacific Coast strains, Christmas, March, April, Late Pearl, and Mission Special, are late maturing types adapted to long, growing seasons.

The mainland varieties and strains of cauliflower are adapted to the cooler growing conditions of the higher elevations from 2,000–4,000 feet. The early strains are adapted to the lowlands only during the cool winter months. The medium and late strains should be grown during the winter months in the higher elevations because the low temperatures may cause *buttoning* (premature formation of small heads) in the early varieties.

The Pua Kea variety produced by the Hawaii Agricultural Experiment Station is adapted for year-round growing in the lowlands.

The cauliflower requires generally warm temperatures during the early growing season, and cooler weather as the curds begin development.

Soil Requirements And Preparation

The cauliflower requires a fairly fertile, well-drained soil with a good water-holding capacity. The pH of the soil should be between 6.0–7.0. The soil should be relatively free of rootknot nematode.

The soil should be plowed fairly deep and manure or compost should be plowed in to a depth of 6–8 inches. The soil should be disked or harrowed to a fine texture.

If the pH of the soil is below 6.0, the field should be limed to raise the pH to a point between 6.0 and 7.0.

In fields heavily infested with rootknot nematode, the soil should be fumigated with DD or EDB 2–3 weeks before planting.

Planting And Seedling Bed Maintenance

The cauliflower is usually planted in seedling flats or beds and transplanted to the field.

One ounce of seeds will produce about 3,000 plants and 3 ounces will produce enough plants to set an acre. The seeds should be disinfected before planting with a seed disinfectant such as Arasan, Semesan, or others (except copper oxide, which may be injurious). The seeds are planted $\frac{1}{4}$ - to $\frac{1}{2}$ -inch deep, either by broadcast lightly or in rows 2–3 inches apart.

On loose, light soils in dry areas the seedling beds should be of the sunken bed type or flat bed type to insure a good soil moisture supply. On heavier soils or in wet areas, the seedling bed should be of the raised bed type to improve soil drainage.

The soil in the seedling beds should be treated for nematodes, damping-off disease organisms, and weed seeds, if they are likely to be a problem. Methyl bromide or Formaldehyde 1–30 with water will control all three pests. DD or EDB soil fumigation will control the nematodes.

The seeds planted $\frac{1}{4}$ – $\frac{1}{2}$ -inch deep should sprout in 3–5 days. The seedlings will be ready for transplanting to the field in 3–6 weeks, depending upon the variety planted. The early varieties will be ready for transplanting much sooner than the medium and late varieties. The seedlings should be watered and sprayed or dusted regularly with an insecticide-fungicide mixture (Zineb, Captan or Maneb—Malathion) or a similar mixture to control the insects and diseases. Once a week watering with a solution made of 1 or 2 teaspoonfuls of a water soluble fertilizer such as Hyponex, Nutri-leaf, and others, in a gallon of water, will aid in the rapid and steady growth of the seedlings.

Seedlings that are left stunted in the seedling beds will usually form small button-sized heads prematurely after transplanting.

Transplanting To The Field

The transplanting distances between both plants in the rows and the rows themselves depend upon the variety or strain to be grown. The rows are usually spaced 2–3 feet apart, with the spacing between plants 12–15 inches apart for the smaller, early strains. The late, large strains are spaced 18–24 inches apart between plants.

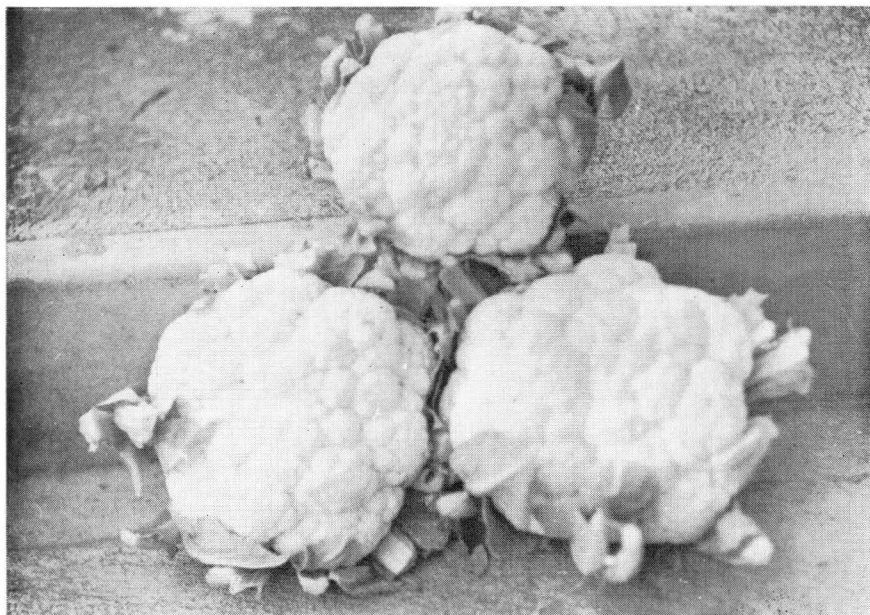
Leggy seedlings should be transplanted deeper than the normal, healthy seedlings. Weak and spindly seedlings should be discarded.

Fertilizer Application

The cauliflower crop on most soils requires about 1,000 to 1,500 pounds per acre of a complete fertilizer such as 8-12.5-6, 8-16-8, 8-12-14, or 8-8-8. An additional side dressing of about 200–300 pounds per acre of sulfate of ammonia at the start of curd formation will help to increase the size of heads.

The first application of fertilizer should be made at the time of transplanting, or soon thereafter, at the rate of 500–750 pounds per acre of a complete fertilizer. The second application (also of a complete fertilizer) is made 3–4 weeks later at the rate of 500–750 pounds per acre. Then at the start of head formation the crop should be top dressed with sulfate of ammonia at the rate of 200–300 pounds per acre.

In some areas the deficiency of boron and molybdenum may prevent the crop from making normal growth. Under these conditions boron and molybdenum should be applied to the crop either as a foliar spray or mixed in the fertilizer. Boric acid at 1 pound per 100 gallons of water, or borax at 2 pounds per 100 gallons of water, should be applied 1–2 weeks after transplanting and at the start of head formation. One foliar application of sodium molybdate of 1–2 ounces per



Snowball cauliflower grown at Kula, Maui

100 gallons of water should be sufficient to correct a molybdenum deficiency. For soil applications 10–20 pounds of borax per acre and 2 pounds of molybdenum per acre should be sufficient.

Caution: An overdose in applying either boron or molybdenum will be toxic and harmful to the crop.

Boron deficiency symptoms may appear as follows: small branches in the center of the curd develop small, concentric, water-soaked areas. In severe cases both the outer and inner portions of the head are affected. The symptoms may appear at various stages of maturity and increase with growth. The smaller leaves around the curd may be deformed, stunted, and buttoned. The stem may show water-soaked areas and, when cut longitudinally, hollow areas may appear near the curds. In severe cases the heads may not develop at all, with the dying back of the growing points.

Molybdenum deficiency on cauliflower appears as strap leaves and poor or no head formation. The strap leaves, consisting of mostly mid-ribs, will appear on the new growth.

Cultivation And Irrigation

The cauliflower crop should be cultivated to prevent weed growth and surface crusting of the soil. Cultivation should be shallow to prevent root injury of the crop especially during the heading stages.

The crop should be irrigated whenever necessary, depending upon the rainfall and moisture-holding capacity of the soil. The crop will be delayed in maturing, and the size of the head will be reduced, if the plants are permitted to wilt from loss of water.

Insect And Disease Control

The insects most commonly found infesting the cauliflower plant are: aphids, cabbageworm, cabbage webworm, the red spider mites, and cutworms. The web-

worm, cabbage looper and cabbageworm can be controlled by the use of DDT sprays or dusts. For sprays, use 2 pounds of 50 percent DDT in 100 gallons of water. For dusting, use a 2½-5 percent dust. To control these insects after head formation, use Rotenone compounds.

The aphids can be controlled by the use of TEPP* or Malathion sprays or dusts. For sprays, use ¼-½ pint 20 percent TEPP in 100 gallons of water, or 2 pounds of 25 percent wettable Malathion powder in 100 gallons of water. For dusting, use a 2 percent Malathion dust. The red spider mite can be controlled by sulfur sprays or dusts.

The spraying or dusting should be done thoroughly and at regular intervals.

The cutworms attack the seedling stages of the plant. Damaged plants appear as though they had been cut off near the ground. To control the cutworms, spray or dust the base of the seedlings with Toxaphene, using 4 pounds of 40 percent Toxaphene in 100 gallons of water, or a 3-5 percent dust.

The most common diseases of cauliflower are the wire stem and black leg diseases in the seedlings stages, and black rot, Downy mildew, and bacterial leaf spot in the maturing stages.

The wire stem and black leg diseases are caused by the *Rhizoctonia* and *Phoma* fungi. They are best controlled by seed treatment with a seed disinfectant for wire stem and hot water treatment at 122°F. for 25 minutes for black leg. The appearance of the disease in the seedling bed may be controlled by the use of a 1-2000 solution of mercuric chloride as a drench.

The black rot and bacterial leaf spot diseases are caused by the bacteria *Xanthomonas* and *Pseudomonas*. These diseases are seed borne, and the best means of control is by the hot water treatment at 122°F. for 25 minutes. The agricultural antibiotics are reported to control these diseases when applied as seed treatments using 250 ppm solution for 10 minutes.

Downy mildew may become serious in the cool, wet areas and seasons. It appears as fluffy, purplish-white growth on the lower leaf surfaces, leaving yellow spots on the upper surfaces. Sprays using Zineb, or Captan will control this disease.

When applying insecticides and fungicides read the labels carefully and follow directions accurately. Do not use chemicals which are not registered for cauliflower. Apply the chemicals only in the amounts and at the times called for.

If the instructions specify two pounds in 100 gallons of water per acre, for instance, do not use more than this amount. If a period of 14 days is specified between last spraying and harvest, do not harvest within a lesser period of days.

By following instructions you are able to keep within the residue tolerance limit set up under regulations of the Pure Food and Drug Act of the Federal Government.

Harvesting And Marketing

As the heads develop and approach the right stage for harvesting, one or two inner leaves should be bent inward at the mid ribs to protect the curds from sunlight and keep the curd white. Curds exposed to sunlight will turn yellow.

The heads should be harvested at the right stage of maturity, when the curd is compact and smooth in appearance. Ricy or overmature curds appear irregular and uneven, with spaces showing in the curds.

***Caution:** TEPP is a deadly poison. Handle it with care. Do not apply within 3 days of harvest.

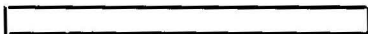
Harvesting should be done once in 2-3 days since all of the heads will not be ready at the same time.

The heads should be cut off the plants with enough leaves left (1-2 whorls) to protect them. The leaves are cut off about 2-3 inches above the head to protect the curd from bruising.

To prevent bruising of the curds, the heads should be packed in half crates of one layer only.

References:

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