### Weeding

Weeding is important during the seedling stage, as young plants are very sensitive to weed growth which competes with water, nutrients and sunlight. Therefore, three to four hands weeding cum earthing up may be necessary depending upon the weed pressure. While doing hand weeding, care must be taken to avoid damage to the roots. A weed free condition is necessary till the plants have reached the root or bulb formation stage.

Watermelon vines should be mulched to keep down the weeds and conserve moisture, but the mulch should not be applied until the soil is thoroughly warm in the initial stage. Straw, sawdust, crop residues are the best mulching materials.

### **Intercultural operation**

After germination starts; check the breathing holes and pinch more holes if required. It is important to open the plastic in very hot day, and cover in the evening as the temperature falls. The plastic cover is removed when the seedling attends 5-6 leaf stage. Retain one or two healthy seedlings per mound if direct seeded. When the vine reach about 1 meter; apical shoot should be pinched off to encourage side shoots to grow. Apply urea top-dressing to encourage healthy branching.

Once flowering starts lay straw or dry grasses between the mounds so that the flowers and fruits at later stage are prevented from direct contract with soil, thus prevent fruit rot. These materials will also retain soil moisture. For better size and yield; three to four fruit per plant or vine are allowed to develop. Fruiting before the 12<sup>th</sup> node should be removed while those after the 12<sup>th</sup>-17<sup>th</sup> node are best. To maintain uniform fruit size, keep only 3-4 fruits per vine. This practice gives significantly higher yield.

### Harvest

Depending on the variety and climatic condition; watermelon can be harvested after 80 to 120 days. The stems should be cut off with secateurs or sharp knife. Do not pull or twist the fruit from the vine. This can result in break/removal of rind tissue, which is likely to decay. Therefore, keep about 2-2.5 cm long stem to prevent from stem-end rot. Pick the fruits carefully and put in row in the field before it is transported to prevent from breaking.

### **Insect and pests**

The most common insect pests affecting watermelons include cutworms, cucumber beetles, aphids, thrips, and fruit flies. Among others cucumber beetles are the most destructive. Some of the cultural practices reduce the potential injury by certain insects. Planting of watermelon when optimum growing conditions insure rapid seedling growth, for example, minimizes the period when plants are vulnerable to injury from seedling insect pests, such as cutworms and beetles. Beetles can be controlled by spraying Malathion 50 EC 1ml/liter of water two to three times in a month during vegetative growth. Collect and destroy all affected fruits. Flies are less during hot or dry season and more in rainy season. Cultivate watermelon during dry season. Aphids, thrips and white flies can be controlled by keeping away weeds, crop rotation, and in severe cases use recommended insecticides. Treat seed with fungicide (thiram) to repel mice and rates from destroying watermelon seed in the field.

### **Diseases**

Diseases that affect watermelon are similar to those of pumpkins. The following are some of the common diseases of watermelon.

**Bacterial Wilt:** Bacterial wilt causes runners to wilt, and eventually causes the entire plant to die. It is transmitted by cucumber beetles feeding on the young watermelon plant. Prevention consists of controlling cucumber beetles with foliar insecticides.

**Powdery mildew:** Powdery mildew also affects only the leaves, causing white, powdery mold on the leaf surfaces. Powdery mildew can be controlled with fungicide sprays.

Sunscald or Sunburn: Sunscald (sunburn) damage is caused when the rinds are exposed to intense sunlight. Sunscald lowers quality by making the melons less attractive and may cause them to rot. Buyers usually will not purchase watermelons with sunscald damage. Sunscald can be avoided if the plants develop and maintain a leaf canopy that shades the melons from direct sunlight. Sunscald is more serious among darker-colored varieties, such as Sugar Baby, kabuki and black ball.



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# Agriculture Research & Development Centre Bajo, Wangduephodrang

# Department of Agriculture MINISTRY OF AGRICULTURE & FORESTS



# Watermelon (Package of practices)

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# **Background**

Watermelon (Citrullus lantatus) is a popular dessert vegetable belongs to the family Cucurbitaceae (gourd family) which includes pumpkin, squash and cucumber. It is a warm weather crop. Watermelons vary in shape; from globular to oblong. External rind colour varies from light to dark green and may be solid, striped or marbled. The pulp colour of most commercial varieties is red. The fruit is generally eaten raw. Fruit size varies from 2-15kgs depending on variety. Watermelon has very high-water content (93ml/100g edible portion). It contains carbohydrates (5mg), calcium (8mg), phosphorous (9 mg), ascorbic acid (8 mg) and vitamins (0.64 g) per 100 g of edible portion. Watermelons need five things to grow and produce fruit: sun, water, bees, nutrients, and a lot of space. They thrive in sandy or sandy loam soil. Give each plant at least 1.5 -2 meter of space, as their vines spread rapidly. Although watermelon produces both male and female flowers; hand pollination or honeybees must pollinate the watermelon blossom for fruit to be produced. Water melon can be successfully grown in fields, greenhouse and poly houses. Farmers can make good profits from cultivation of watermelon, if proper cultivation methods and farm management practices are followed.

There are many watermelon varieties all over the world but major ones introduced in Bhutan are;

Black ball (Bajo Kharimuza 1) Kabuki (Bajo Kharimuza 2)

Sugar baby

All varieties of watermelon share a distinct mouth-watering, thirst quenching, sugary flesh encased by a solid rind. Some watermelon types have higher sugar content and are sweeter; and some varieties have different colored rind and flesh.

#### Soil

Watermelon crop can be grown successfully in well aerated sandy or sandy loam soils and clay soil with good organic matter. The ideal P<sup>H</sup> range 6.0 to 7.5 is best for watermelon farming.

# Field preparation

Prepare the land by clearing all the vegetation covers and plant debris. Avoid using same field which other cucurbits were planted. Incorporate about 9MT of well decomposed organic matter or manure in soil. In one acre of land it is estimated to have about 900 mounds. On each mound, apply about 10kgs of fully decomposed compost or FYM. After soil pulverization or fine tilth, prepare mounds at a height of 15 cm and with a diameter of 70 cm. The spacing of the mount should be about 1.5 to 2 meters apart.

## Nursery management

Select seeds of high yielding variety. Watermelon seeds need special care during germination, as the embryo is enclosed in hard seed coat. Temperature and moisture control is important to success, and too much moisture during germination can kill the seed. Under research and development centre (ARDC) Bajo condition; the best time for watermelon seed sowing is mid February to early March in greenhouse; so that the fruits can be harvested during start of summer season. Direct seedling in the garden has very low success because outside climate is difficult to control or predict. Therefore, seedling has to be raised under protected condition. For one acre of land about 1500 watermelon seeds are required. In one acre of land about 1300 seedlings density are required. Seeds in group of 2-3 are sown 2-4 cm deep in container (Poly pot); seedlings are later thinned to 1 per pot and later transplanted when 10-14 com high. Watermelon seed germinate in about 7-8 days. Seedlings must be transplanted and watered as soon as possible after they have been obtained from the nursery. Seedlings should be kept cool and moist in shade before transplanting.

Nursery seeding is done during first week February and transplanted in mid March through early April. The crop can be harvested between first week of June and early July.

## Transplanting/planting

Watermelon can be either direct seeded or transplanted. When direct seeding is used; 2-3 seeds are planted in each mound. The mound is than covered with plastic sheet (plastic caps); to increase temperature and maintain moisture for germination. It is also helpful to protect from leaf feeding beetles during seedling stage until it is removed. The plastic sheets are covered on the bamboo splits forming a conical shape. The open end should be covered with soils to prevent from being blown away by wind. The plastic should have some breathing holes to regulate temperature. Before dibbling the seeds in the soil irrigate the mound.

For seedling transplants; dig holes of 30cm wide, 30cm length and 10cm deep (do not plant too deep). Use of transplants not only reduces seed cost but also ensure 100% seedling density. After transplanting keep the soil moist. It is best to have a watering schedule because the fruits become stressed when pattern changes and this affects the fruit development and the spray program.

When transplanting, remove the seedlings from the plastic pots with the soil without damaging the roots. It is recommended to irrigate the nursery seedlings a day before actual transplanting. After transplanting provide plastic cape like in direct seeded method.

