

2015

WATERMELON MANUAL FOR BEGINNERS



THE FRUIT OF SUCCESS



Watermelon farming:

Watermelons are large round fruits that thrive very well in dry lands. Some varieties have seeds while others are seedless. They are a good source of water in the diets of human beings but can also be used for making jams and other preservatives including jell preparation. They are also useful in flavoring summer drinks and smoothies. They are quite nutritious, for instance, one cup serving of watermelon can provide calories, vitamin C, vitamins A, B6, B1 and minerals such as potassium, magnesium, antioxidants among others. They can also be prepared as grilled watermelons as found in the case of watermelon stake which is commonly found in restaurants in certain countries

Climatic Requirements:

Watermelons require long, warm growing periods. Bright, hot days (27 – 35°C) and warm nights (16-21°C). Cooler temperatures and excessive rainfall slows growth, maturity and can cause growth abnormalities, poor fruit setting and hollow fruit. High humidity at the time of vegetative growth renders the crop susceptible to various fungal diseases.

Soil Requirements:

Watermelons can be grown on a wide range of soil types, Sandy loam rich in organic matter with good drainage is most ideal. Cultivation in heavy textured soils results in a slower crop development and cracked fruits. Soil should have a pH of 6 to 7. Apply lime if soil pH is too low.

Seed Requirements:

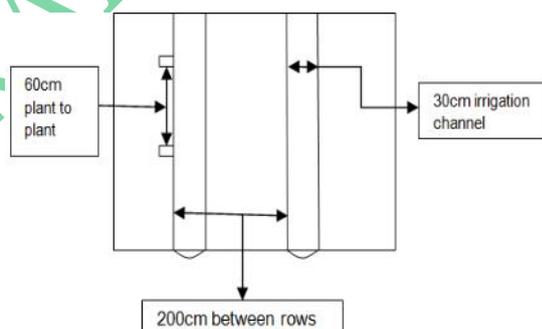
About 500gms per acre

Preparation of field:

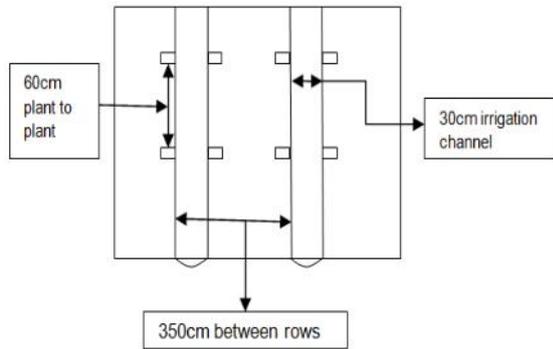
Plough the field to a fine tilth and form long channels of 2.0 or 3.5 meters apart depending on sowing methods and irrigation method

FURROW IRRIGATION

Single Row System: 2.0 – 2.5 m between rows and 60 cm between plants

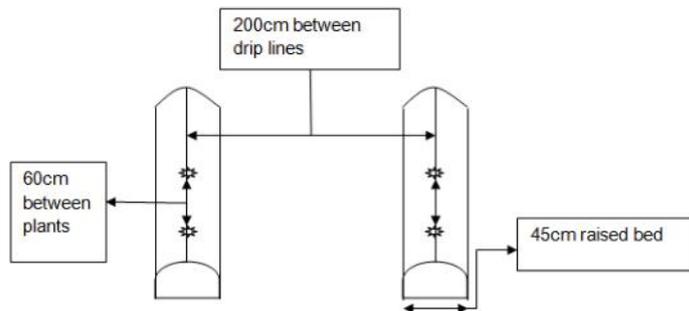


Double Row System: 3.5-4.0m between rows and 60cm between plants

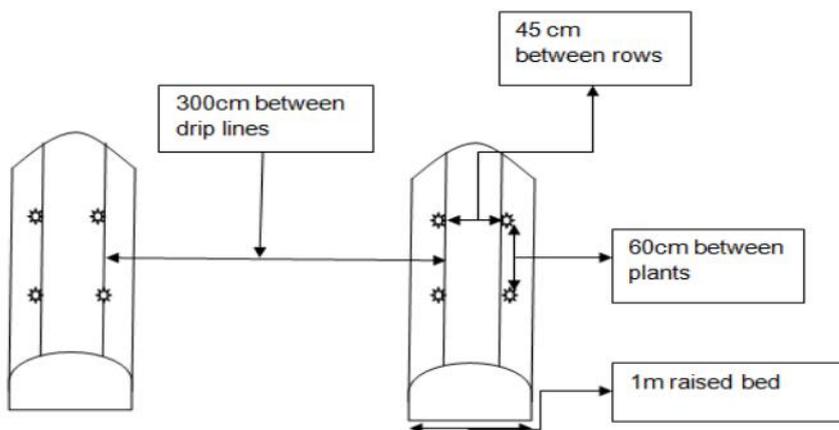


DRIP IRRIGATION

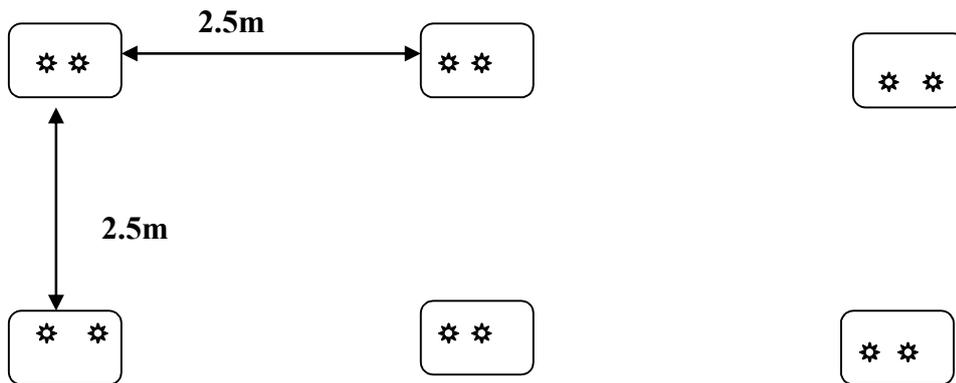
Single row



Double row



RAIN FED



Dig holes of 45cm wide, 45cm length and 30cm deep. Mix top soil with 2 spade full of manure and fill the hole leaving a space of 15cm. Sow two seeds per hole

Irrigation:

Irrigate the field before dibbling the seeds and thereafter once a week. Irrigation should be given at regular intervals of time. Irrigation after a long dry spell results in cracking of fruits.

Manures and Fertilizers:

Apply Farm Yard Manure (FYM) 8 tons/acre before last ploughing

Basal: 2 bags of NPK 17:17:17 per acre at the time of planting.

Top dress: 2 bags of CAN per acre in 2 splits at 25th and 40th days after planting.

- Avoid late applications or excessive nitrogen use in cold weather, as hollow melons may result.
- Excessive nitrogen application also favours the development of more male flowers.
- Micronutrients Spray (Ca, Bo, and Mg) is recommended depending on soil testing results at Vegetative, Flowering and Fruiting stage.

Note: Do a soil analysis

Intercultural Operations:

Crop Rotation: Watermelons should be rotated with cereals, legumes at least 2-3 seasons.

Weeding: Should be done regularly to keep the field clean. Avoid injuring the plants when weeding.

Pinching:

In watermelon, apical shoots are pinched when the vines are 1.5 m while allowing the side shoots to grow. This practice gives significantly higher yield. At the initial stages of fruit setting, malformed, diseased and damaged fruits are removed and only 2-3 fruits per vine are

retained. This results in increased fruit size and yield. To avoid disease spread, do not prune melons when vines are wet.

Pollination:

Watermelons require insects (honey bees) for proper pollination and fruit growth. Research has shown that each female flower must be visited, on average seven times by a pollinating insect to ensure proper fruit set. Insufficient pollination results in misshapen melons, which must be culled. Cold, rainy and windy weather reduces bee activity, which can cause poor melon production due to inadequate pollination. Early to midmorning is the best time to monitor bee activity. If numerous bees are not vigorously working watermelon flowers, two bee hives per acre is recommended.

Yield:

The yield of watermelon varies according to the system of cultivation, season and several other factors. The average fruit yield varies from 25-30 tons per acre.

Common watermelon varieties in Kenya

- ❖ Sukari F1-Kenya seeds company
- ❖ Asali F1-Royal seeds
- ❖ Kito F1-Seedco
- ❖ Sweetrose F1-Simlaw seeds
- ❖ Julie F1-Simlaw seeds

DISEASES

FUSARIUM WILT

Initial symptoms often include a dull, grey green appearance of leaves that precedes a loss of turgor pressure and wilting. Wilting is followed by yellowing of the leaves and finally necrosis. The wilting generally starts with the older leaves and progresses to the younger foliage. Disease can be spread through infected seed or via contaminated water and equipment.

Management

Plant in well-draining soils and avoid water logging; Crop rotation. Avoid using urea and ammonia based fertilizers, Nitrate is recommended. Soil solarization and fumigation.

DOWNEYMILDEW

Yellow spots on upper leaf surfaces, grayish, fuzzy growth on undersides of spots. Yellow mottling on leaves; dark brown lesions on leaves; leaves curling inwards; Spread by airborne spores and water splash

Management

Remove old plant debris. Do not overcrowd plants; avoid overhead irrigation, water plants through furrows. Spray: *Triadimefon, Tebuconazole, Propineb + Cymoxanil, Azoxystobin*

GUMMY STEM BLIGHT

Round or irregular brown lesions with faint concentric rings on cotyledons; brown or white lesions on crown and stems; soft, circular brown lesions on fruit; lesions on stems and fruit may be oozing an amber coloured sticky substance. Fungus can be spread infected seed, air currents or water splash; Survives on plant debris in soil; Disease emergence is favoured by warm, wet conditions

Management

Rotate crops every 2-3 years to a non-cucurbit to reduce disease build up in soil.

Spray: *Mancozeb, Copper Oxychloride, Chlorothalanil, Mandipropamid*

POWDERY MILDEW

White powdery spots on leaves and stems. Spots may enlarge and completely cover leaves. Grayish patches on older leaves. Defoliation may occur. Yields reduced. Disease emergence favoured by dry weather and high relative humidity

Management

Remove old plant debris. Plant in sites with good air circulation and sun exposure; do not overcrowd plants. Spray: *Triadimefon, Tebuconazole, Propineb + Cymoxanil, Difenoconazole, Azoxystobin*

DAMPING OFF

Causes young seeds to wilt and die and is common in low temperatures / wet weather

Control – Broad spectrum fungicides

ANTHRACNOSE

Anthracnose infection can occur on stems, leaves, and fruit. Angular, dark brown or black lesions on leaves with yellow border. Elongated lesions with sunken centres on stems and fruits. Symptoms on the fruit appear to have dark lesions with a slimy pinkish spore mass in the centre. Spread by wind and rain

Management

Rotate crops with non-cucurbits every 1-2 years to prevent disease build-up; Spray: *Difenoconazole, Azoxystrobin, Tebuconazole, Triadimefon, Propineb+Cymoxanil, Chlorothalonil, Mancozeb*

MOSAIC VIRUS

Mottled patterns on leaves, stunted plant growth, deformed leaves, mosaic pattern on leaves, leaf and fruit distortion. Transmitted by aphids

Management

Use reflective mulches to deter aphids; spray: *Deltamethrin, Imidacloprid, Thiamethoxam, Lambdacyhlothrins*

ALTERNARIA LEAF BLIGHT

The disease defoliates vines, reduces fruit yield, size and quality. It attacks oldest leaves, show round water soaked lesions

Management

Chemical control– *Chlorothalonil*

Cultural control– Resist varieties, crop rotation, remove or burn crop debris

BACTERIAL FRUIT BLOTCH

Small water-soaked lesions on top or sides of fruit which enlarge over surface; lesions on fruit may turn reddish or brown and crack. Oval water-soaked areas on fruits. Spread through infected seed or water splash; disease emergence favours wet conditions

Management

Rotate crops; avoid the use of overhead irrigation.

Spray: *Mancozeb + Copper or tebuconazole + copper*

COMMON PESTS

The most common pest that affects watermelons is the spider mites which thrive in the hot, dry season and the aphids which are common after cool seasons. Others include seed corn maggots, melon worms, cutworms, leaf miners, cabbage looper and cutworms.

MELON FLY

This is the major pest of watermelon. The damage by maggots results in rotting of young and ripened fruits or drying and shriveling of fruits before maturity. Maggots of this fly causes

severe damage to young developing fruits. Fruit flies are usually a problem as soon as female flower initiation takes place.

Management

The affected fruits should be regularly pinched off and buried in a pit. Place 3 Para Pheromone traps per acre to attract and trap male fruit flies.

Spray: *Deltamethrin, Lambdacyhlothrin, Alphacypermethrin*

REDSPIDERMITES

Fine stippling on leaves. Leaf undersides are silver-grey with fine webbing and yellow, orange or red dots. Mites feed on the plant sap and can defoliate vines in a few weeks in hot, dry weather. Defoliated plants tend to yield small, poor quality fruit.

Management

Cutting and burning of severely infested plant parts reduces further multiplication of mites. Ensure proper ventilation, irrigation and clean cultivation.

Spray: *Profesofos+cypermethrin, Abamectin, Emamectin benzoate*

CUTWORM

Cutworm larvae feed on young plants at the soil line, often severing the stems. If infection occurs later irregular holes are eaten into the surface of fruits. Larva causing the damage are usually active at night and hide during the day in the soil at the base of the plants

Management

Proper tillage will help eliminate some species of cutworms that may move off of cover crops.

Spray: *Deltamethrin, Thiamethoxam, Lambda-cyhlothrin*

APHIDS

Small, soft-bodied insects on underside of leaves and stems. Sticky honey dew or black sooty mold may be present. If aphid infestation is heavy it may cause leaves to yellow and/or distorted, necrotic spots on leaves and/or stunted shoots.

Management

Spray: *Deltamethrin; Thiamethoxam, Imidacloprid, Lambda-cyhlothrin, Methomyl, Acetamiprid*

THRIPS

Leaves distorted; leaves are covered in coarse stippling and may appear silvery; leaves speckled with black feces. Transmit viruses such as Tomato spotted wilt virus; once acquired, the insect retains the ability to transmit the virus for the remainder of its life

Management

Avoid planting next to onions or cereals where very large numbers of thrips can build up; use reflective mulches early in growing season to deter thrips

Spray: *Deltamethrin, Imidacloprid, Lambda-cyhalothrin, Lufenuron, Thiamethoxam, Acetamiprid*

WHITEFLY

Leaves turn yellow. They suck plant sap and excrete honeydew where moulds grow, which may affect plant growth and vigour. The tobacco whitefly is considered a major pest due to its ability to vector various virus diseases, which cause considerable damage to watermelons.

Management

Remove infested leaves as quickly as possible. Remove lower infested leaves of plants not totally infested

Spray *Deltamethrin, Thiamethoxam, Imidacloprid, Lambda-cyhalothrin, Acetamiprid*

PHYSIOLOGICAL DISORDERS

Physiological disorders are caused by non-pathogenic agents that affect fruit quality. Usually, aesthetic quality is degraded. The cause can be either one or a combination of environmental, genetic or nutritional factors.

BOTTLE NECKS

Symptoms and causes

Constricted growth at the stem end of the fruit, especially in elongated watermelons. Bottle necks or otherwise mis-shaped fruit can be caused by poor pollination & fluctuations in watering (Moisture Stress). Low temperatures can also cause mis-shapen fruits.

Management

Place two bee hives per acre to increase honey bee activity. Avoid spraying chemicals in morning hours during flowering period to encourage honeybee pollination. Proper irrigation at regular intervals

BLOSSOM ENDROT

Symptoms first appear as small, light brown spots at the blossom end of immature fruit. As affected melons grows, spot can enlarge rapidly to form dark water soaked, sunken, leathery lesions. This is caused by calcium deficiency or moisture stress or both. Excessive nitrogen fertilizer also can contribute BER by promoting vigorous vine growth and depleting available calcium in the soil.

Management

Proper soil pH (6.0 -7.0), apply lime if soil pH is too low. Ensure uniform and sufficient supply of moisture. Remove affected fruits. Reduce excessive nitrogen during fruiting stage. Calcium foliar spray to reduce the damage.

FRUIT CRACKING

Cracking is caused by cool temperatures during early fruit-filling period. Excess nitrogen, low boron levels, or heavy infrequent watering at fruit filling stage. Affected melons tend to be flattened in shape and feel lighter than usual

Management

To apply Boron before fruit setting or foliar sprays to reduce the damages. Reduce excess nitrogen and maintenance of adequate uniform soil moisture

WHITE HEART

White heart is white streaks or bands of undesirable flesh in the heart (centre) of the fruit. This is caused by excessive moisture and probably too much nitrogen during fruit maturation.

Management

Proper Irrigation and reduce excess nitrogen during fruit maturity stage

HARVESTING WATERMELON

Like most other fruits and vegetables, timing is everything when it comes to harvesting watermelon. Pick the fruit too soon and it won't be sweet. Wait too long to pick the fruit, and it may be mushy and unappealing. There are four steps to take to tell if your watermelon is ready for harvest. If all of these "tests" indicate that the watermelon is ready to be picked, you know you're in for a real treat.

- **Inspect the watermelon.** If it has lost its shiny appearance, you're off to a good start.
- **Thump the watermelon.** Rap it with your knuckles. If it sounds hollow inside, it's getting close to being ready.
- **Inspect the stem.** You should see a spiral coil near the stem of the watermelon. If the coil is brown and dried up, the melon is almost ready to be picked.

- **Inspect the bottom of the watermelon.** Look at the spot that was laying on the ground. If it's still white, the watermelon isn't ready yet. If the spot has turned a rich yellow color, go ahead and harvest the watermelon.

If you always follow these four steps when harvesting watermelon, you can be assured that the fruit you pick will be sweet, crisp and in peak condition to eat.

SIMPLIFIED WATERMELON SPRAY GUIDE

| Day | FUNGICIDE | INSECTICIDE | FOLIAR FEED | FERTILIZER |
|----------|--------------|--------------------------------|-----------------------------|------------------------|
| Planting | | | | NPK 17:17:17(20gms) |
| week 1 | Ridomil Gold | Emerald | Omex foliar feed Vegimax | |
| week 2 | Cotaf | Alphacymba | Omex foliar feed Vegimax | |
| week 3 | Ridomil Gold | Dynamec | Omex foliar feed Vegimax | CAN-10gms |
| week 4 | Cotaf | Alphacymba Bactrolure traps | BoomFlower | |
| Week 5 | Ridomil Gold | Alphacymba | BoomFlower | CAN-10gms |
| week 6 | Cotaf | Emerald 10ml/20l | Multi K Omex foliar feed | |
| week 7 | Ridomil Gold | Dynamec | Multi K Omex foliar feed | |
| week 8 | Cotaf | Alphacymba | Multi K Omex foliar feed | |
| week 9 | | Alphacymba | | |
| week 10 | | | | |

COST BREAKDOWN FOR ONE ACRE

| LAND | QUANTITY | PRICE | TOTAL |
|--------------------------------|----------|--------|--------|
| Leasing | 1 | 10,000 | 10,000 |
| ploughing | 1 | 2,500 | 2,500 |
| | | | |
| SEEDS | | | |
| Sukari F1 500gms | 1 | 12,000 | 12,000 |
| | | | |
| SPRAYING AND FERTILIZER | | | |
| Chemicals and fertilizers | 1 | 25,260 | 25,260 |
| | | | |
| LABOUR AND FUEL | | | |
| Weeding labour @2000/round | 2 | 2,000 | 4,000 |

| | | | |
|-------------------------------|----|--------|----------------|
| Agronomy support @2000/visit | 10 | 2,000 | 20,000 |
| Farm hand @5000/month | 3 | 5,000 | 15,000 |
| Fuel | 1 | 10,000 | 10,000 |
| | | | |
| TOOLS AND OTHER INPUTS | | | |
| Water pump | 1 | 25,000 | 25,000 |
| Water pipes | 15 | 500 | 7,500 |
| Jembes | 2 | 400 | 800 |
| 100L tank | 1 | 1,000 | 1,000 |
| Knapsack sprayer | 1 | 2,000 | 2,000 |
| TOTAL | | | 135,060 |

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