

Wilt (*Fusarium oxysporum* fsp. *niveum*): Wilt is one of the important diseases which cause severe crop loss in watermelon. An integrative approach should be followed to manage this problem.

- Use disease free transplants and seeds from reliable sources
- Soil solarization with plastic mulch over fallow soil during summer months
- Remove and destroy the infected plants periodically to reduce inoculum density
- Don't save the seeds from fields where the *Fusarium* wilt has been observed



Symptoms of Wilt

Biological control: Treat the seeds with biocontrol agents like, *Trichoderma*, *Pseudomonas*, *Bacillus* etc. Drench the young seedlings with the suspension of biocontrol agents like *Trichoderma*, *Pseudomonas*, *Bacillus* etc.

Seed treatment

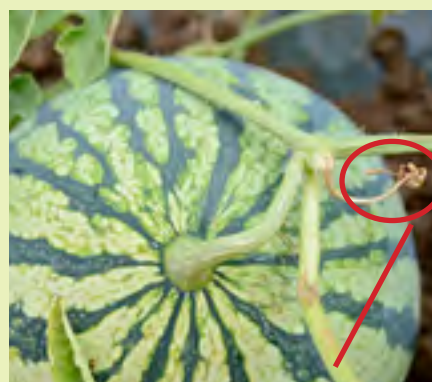
Seed treatment with talc based formulation of biocontrol agents @ 30- 50g/kg of seeds. Mix the talc formulation of the bio-agent in water in such way to form slurry/ paste. Mix the seeds thoroughly in the slurry to form a thin coating over the outer layer of the seeds. Keep the treated seeds in a container or in a bag under shade for a maximum period of 16 hours before sowing. Place/ sow the seeds deep (10-12 cm) in the soil for better crop establishment and disease control.

Seedling drench

Drench the root zone of the plant @ 50ml biocontrol agent suspension per plant. Prepare the suspension @ 25g/ litre of water. This treatment to be carried out after 15-20 days of sowing (2-4 leaf stage) when seeds were not treated or in a field with the history of wilt disease.

Harvesting

- Normally harvesting of watermelon starts 30-40 days after flowering.
- Harvest indices of watermelon are given for information which the farmers can use as a guide.
- Harvest the fruits when it produces heavy dull sound upon tapping.
- Maturity of the fruit is indicated when fruits surface on the ground level produces light yellow colour.
- When the tendrils at the base of the fruit are dried is also an indication.



Drying of tendril

Storage of seeds (Applicable to varieties not for hybrids)

Dry the seeds to reduce the moisture level below 10–12% Add finely grounded Tirphal / Boric acid powder @ 2 g / kg of seeds to reduce storage pest attack.

Quantities of input for 1 ha and 1000 square meter of watermelon

Inputs	1 hectare = 10000 square metre	1000 square metre
Seed rate	1 kg	100 g
<i>Trichoderma viride</i>	30 g	3 g
<i>Pseudomonas fluorescens</i>	50 g	5 g
Carbendizim or thiram	2 g	200 mg
Butachlor	2 kg	200 g
Farmyard manure	20 tonnes	2 tonnes
Urea	110 kg	11.0 kg
Single Super Phosphate	312 kg	31.2 kg
Muriate of Potash	83 kg	8.3 kg
Granubor	10 kg	1 kg

Crop Calendar

S. No.	Operations	When to do	Days
1	Land preparation	Before sowing	0
2	Application of fertilizers	Basal dose: Before sowing Top dressing: 10-15 days after vining	1 30-35
3	Sowing of seeds	After land preparation	1
4	Seed treatment	During sowing	1
5	Watering	At regular interval of 7-10 days	
6	Application of herbicide	Third day after sowing	3
7	Weeding	As and when required	15, 30,45
8	Pruning	One month after sowing	30
9	Fruit thinning	After fruiting	60-70
10	Spraying of pesticides	As and when required	15, 30, 45
11	Harvesting	35-40 days after flowering	85-90



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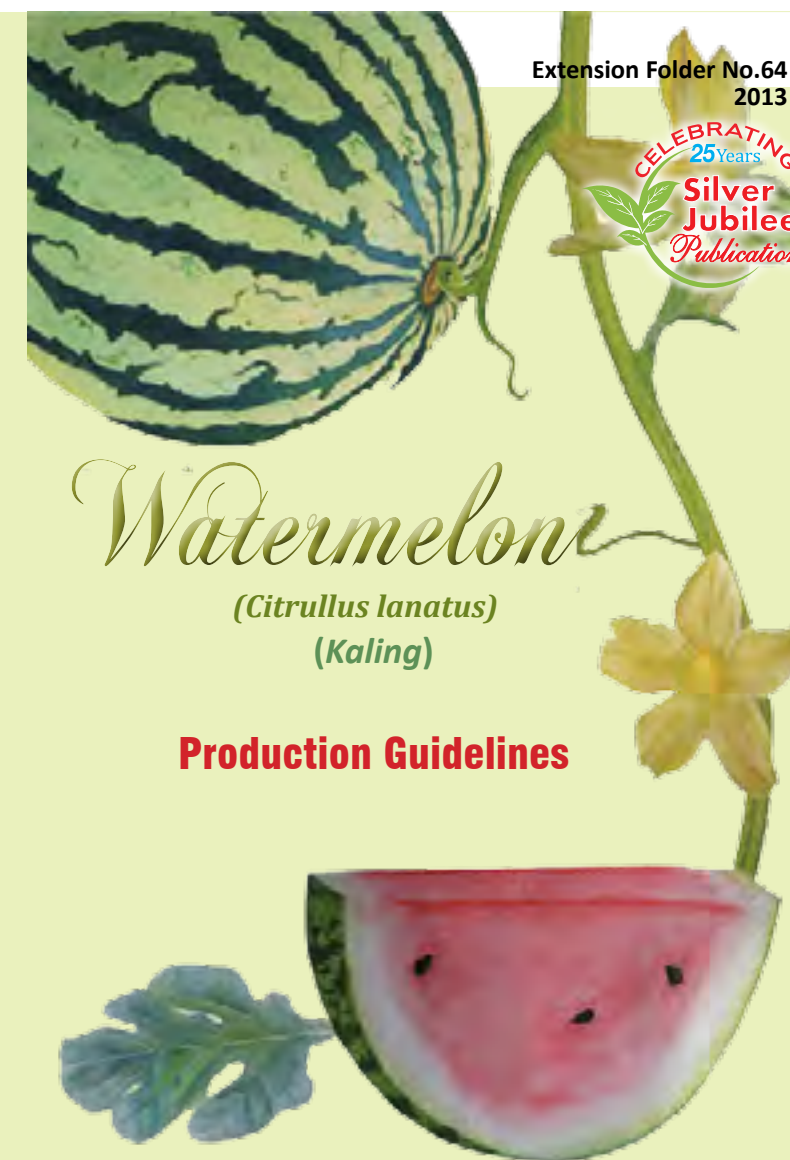
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Watermelon
(*Citrullus lanatus*)
(Kaling)

Production Guidelines

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Introduction

Watermelon (*Kaling*) is an important cucurbitaceous vegetable grown in different parts of India and it is a common summer season vegetable crop. In Goa, the crop is generally grown during November to April depending on the availability of water. The crop requires hot dry climate with warmer days and cooler nights. As most of the farmers are not having adequate water supply during summer months, many will prefer to sow the seeds in November and the harvesting takes place during February. Though many varieties are released farmers prefer hybrids as they fetch better price due to their high yield and sweetness. Watermelon is an excellent desert fruit and the juice makes a good refreshing and cooling beverage. Fruit contains 92 % water, 0.2% protein, 0.3% minerals and 7 % carbohydrates in a edible flesh.

Soil and land preparation

Watermelon can be grown on a wide variety of soils. Sandy loams are the best for early crop, while high yields are recorded in loamy soils. Well drained soil with high organic matter is preferable for the cultivation.

Prepare the land by ploughing at right moisture content using a tractor or power tiller drawn plough to get the required soil tilth.

Sowing Season

November to December

Varieties/ Hybrids recommended

There are many varieties and hybrids of watermelon released by research institutes and private seed companies. Arka Manik, Asahi Yamato, Arka Jyoti, Augusta, Sugar Baby are some of the varieties/ hybrids commonly preferred by the growers due to higher yield and sweetness.



Seed rate

Seed rate depends on the variety or the hybrid. Normally 3 kg/ha for small seeded types and 5 kg/ha for large seeded types is recommended.

For high yielding hybrids seed rate of 0.75 to 1 kg is sufficient per hectare.

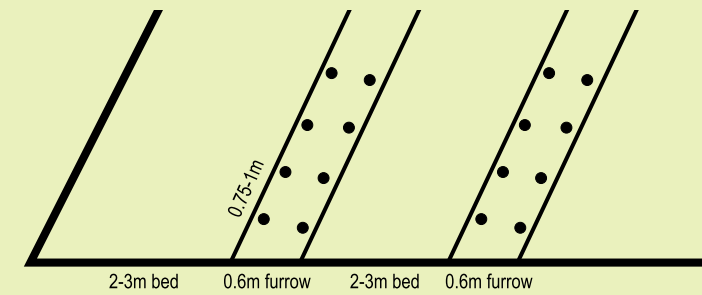
Seed treatment

- Treat seeds with biocontrol agents viz. *Trichoderma viride* @ 30 g/kg seed or *Pseudomonas fluorescens* @ 50 g/kg seed or
- Treat seeds with fungicides viz. Carbendazim @ 2g/kg of seed or Thiram @ 2g/kg of seed
- Make slurry of *Trichoderma viride* or *Pseudomonas fluorescens* with little water and mix the seeds and dry in shade. Sow the seeds immediately.
- Don't combine fungicide treatment and biocontrol treatment together.

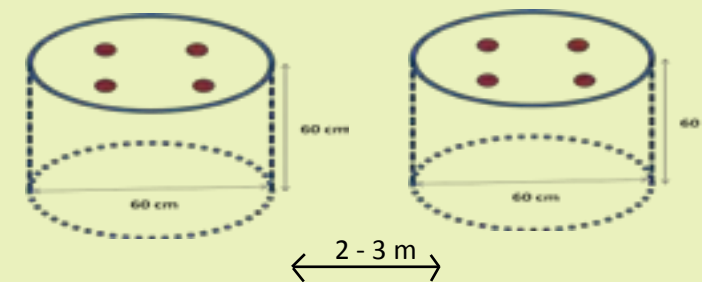
Sowing method

Two different methods of sowing is recommended

Furrow method: Open furrows at a distance of 2-3 metres apart. Sow the seeds on either side of the furrows. Allow the vines to trail on the ground. Two plants/ hill should be maintained. In a furrow plant to plant spacing should be 0.75 to 1m



Pit method: Prepare pit of 60 cm diameter and fill with sufficient quantity of organic manure before sowing. 4 plants/ pit should be maintained. Pit to pit distance should be 2-3m.



Weed management

Spray Butachlor @ 2kg/ha after 3 days of sowing

Remove the weeds by hand weeding after 15, 30 and 45 days of sowing.

Pruning

Prune the excessive vine growth manually to restrict vegetative growth and promote higher female:male flower ratio. If apical shoot is pinched and 2-4 side shoots are allowed to grow, it gives significantly higher yield. Thin the fruits to retain only maximum of 4-5 fruits per vine to improve fruit size and yield.

Water management

Irrigate at regular intervals of time as watermelon responds well to irrigation. Over watering frequently is not recommended as it promotes excessive vegetative growth. Stop the irrigation during ripening as it will adversely affect fruit quality and leads to fruit cracking.

Don't allow water stagnation.

Avoid water stress during pre-flowering, flowering and fruit development stages.

Irrigate only the root zones and avoid wetting the vegetative growth, flowers and fruits

Nutrient management

Apply 20 tonnes/ha farmyard manure well before sowing and mix thoroughly with the soils

Recommended dose of fertilizer

At sowing	Top dressing
25 kg Nitrogen (55 kg urea) + 50 kg Phosphorus (P_2O_5) (312 kg Single Superphosphate) + 50 kg Potassium (K_2O) (83 kg Muriate of Potash) for one ha at the time of sowing	25 kg Nitrogen (55 kg urea) at 10-15 days after vining. Don't apply nitrogenous fertilizers at flowering and thereon

Insect management

Thrips management: Incidence of thrips is observed during the crop growth stage.

Spray Imidacloprid (Trade name – Confidor) @ 0.5 mL/Litre water to manage the thrips infestation.

Note - Do not use lindane 1.3% dust, copper and sulphur dust, as these are phytotoxic

Disease management



Thrips damage