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# Scientific Cultivation of Muskmelon (*Cucumis melo* L.)

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## Abstract

**M**uskmelon [*Cucumis melo* L.] being a warm season crop grown in tropic regions throughout the world for its unique taste and flavour and consumed as a dessert. The major growing states in India are Uttar Pradesh, Haryana, Punjab, Rajasthan and Madhya Pradesh etc. It thrives best in sandy loamy texture soils and the desired temperature is 20-25 °C. About 1.5-2 kg seeds are enough for one-hectare area. Seeds are sown in pits (60 cm x 60 cm x 45 cm) at a distance of 150-200 cm between channels and 60-90 cm between hills. Recommended doses of manures and fertilizers should be applied. Harvesting of fruits is done by the defined maturity indices and later on harvested fruits can be stored at 5 °C with 95% relative humidity for 5-10 days. The regular inspection is necessary to raise a healthy crop.

## Introduction

**A**mong the cucurbits, muskmelon (*Cucumis melo* L.) is known for its unique flavor and taste. It is most commonly grown in tropical regions of the country. It is also known as nutmeg melon or kharbooj. It is an important crop of Africa, Middle East, Asia, South-East Asia, Japan, USA, South and Central America, France, Spain, Israel and Eastern European countries. In India muskmelon is cultivated on river beds for obtaining an early harvest. Muskmelon is a diploid species (2n=24). There are seven polyploid species of *Cucumis* including *C. ficifolius* (2n= 28,72), *C. prophetarum* (2n=48), *C. zevheri* (2n=48), *C. heptadactylis* (2n=48) and a few others (Swarup V., 2016). The melon, *Cucumis melo* belongs to the genus *Cucumis*, subfamily *Cucurbitaceae*, tribe *Melothrieae*, subtribe *Cucumerineae* and family *Cucurbitaceae*. The genus *Cucumis* has been divided into two sub-genera, *Cucumis* and *Melo*. The subgenus *Melo* is divided into four groups namely; *metuliferus*, *anguria*, *melo* and *hirsutus*.



Figure 1: Mature fruits of Muskmelon



Figure 2: Sliced view of ripen fruit

## Origin and Distribution

**M**uskmelon is said to be a native of tropical Africa more specifically in the eastern region, south of Sahara Desert. The secondary centers of diversity

are Central Asia, Southern Russia, Iran, Afghanistan, Pakistan, North-West India and China. It was first cultivated in Egypt during 2400 BC. It was introduced into the USA by Columbus in 1494. It is now grown both in the Old World and the New World.

## Botany

**I**t is annual vine, having hairy trailing stems with clasping tendrils. It is a polymorphic species where most cultivars are andromonoecious but other sex forms are also available. Leaves orbicular to ovate to reniform, usually five angled, sometimes shallowly three to seven-lobed, hairy or somewhat scabrous, 3-5 inches across. The flowers are in yellow colour in which the staminate flowers are clustered whereas; the pistillate ones are solitary on short stout pedicels. The seeds are non-endospermic (Bose *et al.*, 2002). It is the polymorphism present in leaf, flower, fruit shape and colour, allowed the horticultural classification of melons into seven groups.

Table 1: The chief characteristics of the horticultural melon groups are mentioned as following table.

Horticultural group	Characteristics			
	Surface/ skin	Flesh colour	Aroma	Sex form
<i>Cantalupensis</i> Naud. Cantaloupe/ Muskmelon	Netted, warty or scaly	Orange, sometimes green	Aromatic musky	Andromonoecious
<i>Inodorus</i> Naud. Winter melon	Smooth or wrinkled	White or green	No musky colour	Andromonoecious
<i>Flexuosus</i> Naud. Snake melon	Slightly rough	Whitish	Nil	Monoecious
<i>Conomon</i> Mak. Oriental Pickling melon	Smooth skin	White	Little odour	Andromonoecious
<i>Dudaim</i> Naud. Mango melon	Smooth or mottled	White	Mild musky odour, acid flavour	Andromonoecious
<i>Momordica</i> , snapmelon/ phoot melon	Smooth	White or pale orange	Low in sugar, mealy	Monoecious
<i>Agrestis</i> Naud. Wild types	Fruit inedible	-	-	Andromonoecious

## Area and Production

**T**he production of cantaloupes and melons in the world is 28 million tonnes. In India, the area under muskmelon is 54 ('000) hectares with a production of 1231 ('000) MT (Horticultural Statistics at a Glance, 2018). The major melon growing states are Uttar Pradesh, Haryana, Punjab, Rajasthan, Madhya Pradesh, Andhra Pradesh, Maharashtra and Gujrat.

## Importance and Uses

**M**uskmelon consumed as dessert mainly. Per 100 g of edible portion of muskmelon contain 78% edible portion, 95.2% moisture, 17 k-cal energy, 3.5 g carbohydrate, 32 mg calcium, 14 mg phosphorus, 1.4 mg iron, 169 µg carotene and 26 mg Vitamin C (Bose *et al.*,

2002). Muskmelon provides relief in constipation, acidity, diarrhea etc. It maintains skin texture, removes oil spots, prevents baby from birth defects and regulates blood flow during menstruation etc.

## Climate and Soil

**T**he muskmelon raised as warm season crop. The optimum temperature for its growth is 20-25 °C. The seeds show poor germination if the temperature falls below 18 °C. High temperature and low humidity at fruit ripening stage enhance the sweetness and aroma of the fruits. Muskmelons are susceptible to frost but tolerant to drought. Muskmelons thrive best in loamy to sandy loamy texture of soil and the desired pH should be 6-7.5.

## Methods of Sowing and Planting

**M**uskmelon is direct seeded and transplanted. Seeds are sown in pits and on raised beds while in riverbed cultivation seeds are sown in trenches. The pits of the dimension, 60 cm x 60 cm and 45 cm depth are dug at distance of 150 – 200 cm between channels and 60 – 90 cm apart from hills. Generally, 5-6 seeds are sown in each pit at a depth of 1-1.5 cm. Later on, when the plants are well established, only 2 or 3 plants in each pit are allowed to grow and the rest are uprooted.

Table 2: Time of sowing and transplanting

Region / Cultivation type	Time of sowing / Sowing period
In Northern plains	If directly sown; Middle of February to early March If seedling raised; End of January or first -week of February
In western and southern regions	October/November to January
In riverbed cultivation	In November

## Seed Rate

**A**bout 1.5 to 2 kg seeds is required for one hectare for open pollinated varieties whereas, for F<sub>1</sub> hybrids is about 500-800 g per hectare.



Figure 3: Close view of muskmelon seeds

Table 3: Improved varieties of muskmelon

Name of the cultivar	Parentage	Released from
Arka Rajhans	Selection from a local variety of Rajasthan	IIHR, Bangalore
Arka Jeet	Selection from a local variety of Lucknow	IIHR, Bangalore
Pusa Sharbati	Kutana x PMR-6 (USA)	IARI, New Delhi
Pusa Rasraj	F1 Hybrid; M-3 (monoecious) x Durgapura Madhu	IARI, New Delhi
Hisar Saras	Selection	HAU, Hisar
Hisar Madhur	Selection from a local type	HAU, Hisar
Punjab Sunehri	Hara Madhu x Edisto	PAU, Ludhiana
Annamalai	Selection	Annamalai University, Tamil Nadu
RM-43	Selection	Agricultural Research Station, Durgapura, Rajasthan
Durgapura Madhu	Selection from a local variety of Rajasthan	Agricultural Research Station, Durgapura, Rajasthan
MHY-5	Durgapura Madhu x Hara Madhu	Agricultural Research Station, Durgapura, Rajasthan
MHY-3	Durgapura Madhu x Pusa Madhuras	Agricultural Research Station, Durgapura, Rajasthan

## Manures and Fertilizers

**T**he requirement of fertilizers varies with the soil type, fertility status, climate/ season and location wise.

FYM should be applied to the soil at the time of land preparation. The dug pits are also filled with manure and fertilizer mixture, a week prior to sowing of seeds. In the case of nitrogenous fertilizers, only one-third of quantity is mixed with the soil at the time of field preparation. The rest of nitrogen is given as basal applications twice during the early stages of vine growth, the first after 25-30 days of sowing followed by the second after another 25-30 days.

## Irrigation

**T**he crop should be irrigated at 4-6 days interval during summer. While giving the irrigation care should be taken that fruit do not come in contact with water and over-watering should be avoided, particularly at fruit maturity stage.

## Intercultural Operation

**L**ight hoeing during initial stages of vine growth helps to check the weeds. Dry grass or straw mulches are recommended for mulching so that fruits do not come

in contact with water.

#### Harvesting

The fruits for home consumption or local market are harvested at full maturity. The maturity indices for muskmelon are full slip stage (the mature fruits separate/ slips easily from the stem leaving a complete scar) and half slip stage (only half of the stems separates leaving an incomplete/ half scar). At the fruit ripening stage, the rind becomes soft, skin colour changes from green to yellow, yellow-green to brown, slight odour at blossom end and development of an abscission layer or crack at the stem attachment point.

Normally the fruits ripen after 6 to 10 weeks of anthesis, or 90-125 days after seed sowing depending on the cultivar.

#### Storage

Muskmelon fruit being climacteric ripen during transportation and storage. The harvested fruits can be stored for 5-10 days at 5°C and 95 percent relative humidity.

#### Yield

The average yield is about 10-12 tonnes per hectare (Choudhary et al., 2013).

### Important Diseases

#### i) Powdery Mildew

This is a fungal disease caused by *Erysiphe cichoracearum*. Symptoms first appear as white nearly or fluffy, somewhat circular patches or spots which appear on the under-surface of leaves. Severely infested leaves become brown and shriveled and defoliation may occur. Fruit of the affected plants do not develop fully and remain small.

**Control:** Karathane @ 6 g in 10 litre of water or Bavistin @ 1 g per litre of water control the disease, if sprays are given when the first initial symptoms appear. The sprays will have to be repeated at least thrice, at 5-6 days interval. Varieties like Campo and Jacumba are resistant to powdery mildew.

#### ii) Fusarium Wilt

The causal organism of this disease is a fungus identified as *Fusarium oxysporum* subsp. *Niveum*. In young seedlings, cotyledons droop and wither. In older plants, leaves wilt suddenly and vascular bundles in the collar region become yellow/ brown.

**Control:** The disease can be checked to some extent by drenching the soil with captan and hexacap or thiride 0.2% to 0.3% solution. Resistant varieties like Golden Gopher, Harvest Queen and Delicious-51 should be grown.

### Pest

**Aphids:** These small green insects (*Aphis* sp.) damage the plants by sucking the leaf sap. In young stage, cotyledonary leaves crinkle and in severe case the plants become wither while in grown up vines the leaves turn yellow and plant loses its vigour and yield.

**Control:** The aphids can be easily controlled by spraying metasystox @ 0.1-0.2% or rogor 0.1-0.2%.

### Conclusion

Muskmelon is one of the most loved and cultivated fruit in tropic regions throughout the world. Muskmelons are considered powerhouse of health as they are loaded with so many nutrients. Other than the health benefits it fetches good market price that attract growers to adopt its cultivation. Thus, cultivating muskmelon is like a bucket filled with health as well as economic benefits.

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