

CULTIVATION OF WATERMELON

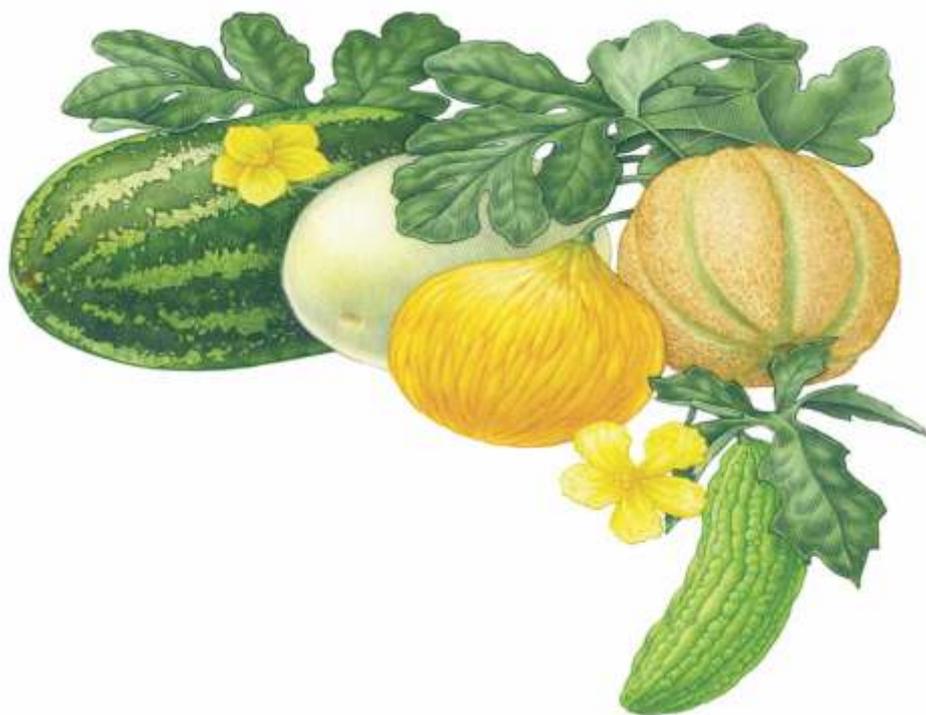


Zarai Taraqati Bank Limited

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Zarai Taraqati Bank Limited

**Planning & Research Department
(Research & Publications Unit)**

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SUMMARY

Watermelon (*Citrullus lanatus var. lanatus*) is a vine-like (scrambler and trailer) drought tolerant annual flowering plant with long and weak trailing stem, which is five-angled. The watermelon originated in Southern Africa. The name of watermelon had also been found in Holy Bible. In the 7th century, watermelon was being cultivated in India and by the 10th century had reached in China. It is enriched with nutrients i.e. vitamins A, B6 and C, lots of lycopene, antioxidants and amino acids. It's water content can help us to keep hydrated and juice is full of good electrolytes which helps us to prevent from heat stroke. Over consumption can cause nausea, diarrhea, indigestion and bloating. Watermelon is also frequently used to make a variety of salads, most notably fruit salads.

Production wise, China is the largest producer of watermelon in the world. Watermelon produces in Pakistan from early April to mid June. Pakistan ranks 30th in watermelon production and its share is only 0.3 percent in the whole world. Watermelons grow best on saline sandy loam or slit loam soils and between 18°C and 35°C during growing season. Best sowing time for Southern Punjab is January, February and June and for Central Punjab is February, March and July. Watermelon needs moderate nutrient requirements as compared to other vegetable crops. Watermelon is irrigated by furrow irrigation, sprinkler and drip irrigation techniques.

Watermelon faces biotic stresses like Verticillium wilt, Fusarium wilt, Powdery mildew, Charcoal rot etc. Many insects like aphids, thrips, larve, pickleworm, cucumber beetle, cut worms etc. attack on the crop of watermelon.

Watermelon is considered optimum for harvesting when their flesh matures to produce a sweet flavor, crisp texture and deep red color. It should be stored at 10°C to 15°C and 90% relative humidity. Watermelons are sold in road side markets and farmers markets. An important consideration in successful marketing is to have adequate facilities for transporting the crop to market outlets. Production of seedless watermelon is almost same as seeded watermelon except some differences. Seedless melon is developed by within-row planting of both seedless and pollinator with the ratio of seedless to pollinator plants ranging from 2:1 to 5:1. Watermelon vary in size, shape and colors.

2. INTRODUCTION

2.1 Botany of Watermelon



Kingdom:	<u>Plantae</u>
Order:	Cucurbitales
Family:	Cusurbitaceae
Genus:	<i>Citrullus</i>
Species:	<i>C. lanatus</i>
Variety:	<i>lanatus</i>

Watermelon (*Citrullus lanatus* var. *lanatus*,) is a vine-like (scrambler and trailer) flowering plant. Watermelon is an annual plant with long, weak, trailing or climbing stems which are five-angled and up to 3m (10ft) long. Young growth is densely woolly with yellowish-brown hairs which disappear as the plant ages. Leaves are stemmed, large and pinnately-lobed, stiff and become rough when old. The plant has branching tendrils. Flowers grow singly in the leaf axils and corolla is white or yellow inside and greenish-yellow on the outside.

The flowers are unisexual, and both male and female flowers occur on the same plant (monoecious). The male flowers predominate at the beginning of the season and the female flowers, which develop later have inferior ovaries. The style is united into a single column and the large fruit is a kind of modified berry called pepo. This has a thick rind (exocarp) and fleshy center (mesocarp and endocarp). Wild plants have fruits up to 20cm (8in) in diameter while cultivated varieties may exceed 60cm (24 in). The rind of this fruit is mid to dark green and usually mottled or striped and the flesh contains numerous pips and is red, orange, pink, yellow, green or white.

2.2 Top Ten Watermelon Producers (as of 2012)

Country	Production “000” Metric Tons
China	136,588
Turkey	3,683
Iran	3,467
Brazil	2,053
United States	1,867
Egypt	1,637
Uzbekistan	1,182
Russia	1,151
Mexico	1,037
Algeria	1,224
Total World	167,854

2.3 Health Benefits of Watermelon

Watermelon consists about 92 percent of water. This is a refreshing fruit soaked with nutrients. Each juicy bite has significant levels of vitamins A, B6 and C, lots of lycopene, antioxidants and amino acids. There's even a modest amount of potassium, Moreover this quintessential summer fruit is fat-free, very low in sodium and has only 40 calories per cup. A study published in the American Journal of Hypertension found that watermelon extracts help to reduce hypertension and lower blood pressure in adults. Its water content can help to keep us hydrated. This can also protect us from heat stroke. Watermelon may be helpful in reducing risk of cancer as it carries antioxidant properties.

2.4 Health Risks

The consumption of more than 30mg of lycopene daily can potentially cause nausea, diarrhea, indigestion and bloating (American Cancer Society).

2.5 Uses

Entire watermelon is an edible fruit, even its rind. In places like China, the watermelon is stir-fried, stewed and often pickled like a vegetable. Pickled watermelon rind is very popular in Russia. Watermelon, fruit is referred by botanists as a pep or a berry which has a thick rind (exocarp) and fleshy centre (mesocarp and endocarp).

Watermelon fruit, loosely considered a type of melon although not in the genus *Cucumis* has a smooth exterior rind (green, yellow and sometimes white) and a juicy, sweet interior frequently used to make a variety of salads, most notably fruit salad.

3. ORIGIN AND DOMESTICATION OF WATERMELON

Watermelon is thought to have originated in Southern Africa, where it is found as wild crop. In the 19th century, Alphonse de Candolle a botanist of that time considered the watermelon to be indigenous to tropical Africa. *Citrullus colocynthis* is often considered to be a wild ancestor of watermelon and is now found native to North and West Africa.

Evidences of its cultivation in the Nile valley has been found from the second millennium BC onward. Watermelon seeds have been found at Twelfth Dynasty sites and in the tomb of Pharaoh Tutankhamun. Watermelon has also been mentioned in the Bible as a food eaten by the ancient Israelites while they were in bondage in Egypt. In the 7th century, watermelons were being cultivated in India and by

the 10th century had spread to China, which is now the world's largest watermelon producer.

4. WATERMELON CROP IN PAKISTAN

Watermelon crop is a drought tolerant crop, not only grown in irrigated zones but also in arid zones of all provinces of Pakistan. It is cultivated in Pakistan from early April to mid June. Pakistan ranks is 30th in watermelon production and its share is only 0.3 percent in the global production. In Pakistan it is grown in the interior areas of Province Punjab and Sindh. In terms of production, Punjab ranks first, Balochistan second, Sindh third and fourth KPK having share of 55.87%, 21.29%, 10.29% and 11.84% respectively. In Punjab Province, Bahawalpur, Khanewal, D.G. Khan, R.Y. Khan, Shaikhupura, Multan, Vehari and Bahawalnagar are the major growing districts.

5. CLIMATE REQUIREMENTS

5.1 Temperature

Watermelon is sensitive to cold temperature and even a mild frost can severely damage the crop. The best average temperature range for watermelon during the growing season is between 18°C and 35°C . Temperatures above 35°C or below 10°C will slow the growth and maturation of the crop.

5.2 Soil Requirement

Watermelon grows best on non-saline sandy loam or silt loam soils. Light textured fields warm up faster in the spring and are therefore favored for early production. Very sandy soils have limited water-holding capacities and must be carefully irrigated and fertilized for high yield potential. Clay soils are generally avoided for watermelon culture, but they can be productive if irrigated with care to prevent prolonged saturation of the root zone (a condition that favors the development of root rot pathogens) and to allow good drainage between irrigations. The soil should have a pH of 5.8 to 6.6.

6. CULTIVATION PRACTICES

6.1 Seed Bed Preparation for Seeded Watermelon

Field should be prepared thoroughly by plowing or harrowing and removing different types of plant debris. It should also be pulverized and leveled; furrows are made 2m apart. Watermelon is known to be sensitive of manganese toxicity, a frequent problem in low pH soils. Seedlings of watermelon react to manganese toxicity with stunted growth and yellowish, crinkled leaves.

Older plants generally exhibit brown spots on older leaves that may be mistaken for symptoms of

gummy stem blight. The best solution of manganese toxicity is to apply lime in autumn at different rates based on the results of soil test. A pH of 6.0 should be maintained for maximum yields. One kg healthy seed is required for one acre of land.

6.2 Propagation

Watermelon transplants can be planted into the field after all danger of frost has been passed and when the soil temperature is at least 15°C, with a tractor-pulled mechanical transplanter or by hand.

6.3 Planting Period

Normally two crops can be grown in a single year, one during the winter season and the other during the kharif season. Best sowing time for Southern Punjab is January, February and June and for Central Punjab is February, March and July.

6.4 Days to maturity

Maturity period is usually 80 to 90 days for baby bush varieties and 90 to 100 days or more for the larger varieties.

6.5 Fertilization

Watermelon has moderate nutrient requirements compared to other vegetable crops, because of its deep rooting. It is an efficient crop in extracting nutrients from the soil. A high-yield watermelon crop will typically contain less than 180 kg/ha of nitrogen (N) in its biomass.

Soil with greater than 20 ppm bicarbonate extractable phosphorus requires little or no phosphorus fertilizations. Soil below this level may require as much as 168kg/ha of P₂O₅ with phosphorus requirement increasing in the colder soil. Soil with more than 120 ppm exchangeable potassium (K) can support high-yield watermelon production without fertilizations, although a maintenance application of up to 168 kg/ha of K₂O can be used to maintain long-term soil fertility.

Soil below 120 ppm exchangeable potassium should be applied and fertilized with up to 68 kg/ha of K₂O to ensure peak production. Phosphorus should be applied at preplantation. Potassium application can be made preplant, while after planting as a side-dress application or delivered in irrigation water (fertigation). Nitrogen application is typically split between a small preplant application and one or more in-season applications. In drip-irrigated culture, small weekly nitrogen fertigation may be used to time nitrogen delivery with crop uptake rate.

6.6 Irrigation

As watermelon is a deep-rooted crop therefore it can tolerate a significant degree of lack of soil moisture in the beginning however, peak production requires timely irrigation. After crop establishment (either by seed or transplant), irrigation may be held for a period of several weeks to encourage deep rooting. However, irrigation should be managed to minimise water stress throughout the fruit set and fruit sizing periods. Water stress, during early fruit development can result in small, misshapen fruit and the occurrence of blossom-end rot which is physiological disorder in which the blossom end of a fruit ceases to grow and becomes dark and leathery.

6.6.1 Techniques of Irrigation

There are three techniques of irrigation for commercial purpose production of watermelon which are following:

1) Furrow Method

In the past, watermelon was usually irrigated by this method, Irrigation depends on soil moisture status.

2) Drip Irrigation

In recent years, many growers have adopted drip irrigation technique. Drip irrigation lines are typically buried in the center of the soil beds. The irrigation system may be renovated in each production season or left in place for a number of years, depending on the grower's management scheme and crop rotation. Drip irrigation scheduling is determined by potential Evapotranspiration (ET_o) estimates and crop growth stage.

3) Sprinkler Irrigation

Currently, watermelon crop is irrigated by some type of sprinkler irrigation system. This system includes center pivot, linear move, traveling big-gun, permanent set and portable aluminum pipe with sprinklers. Any of these systems are satisfactory, if they are used properly by farmers, despite of significant differences exist in initial cost and labor requirements.

6.6.2 Frequency of Irrigation

It can vary from once a week early in the season to daily during times of peak water demand. Some growers use drip irrigation lines placed in every other furrow after crop establishment. While this approach

may not provide the full yield potential of a buried, in-row system, it does provide improved irrigation control compared to furrow irrigation, and the system is portable, which eliminates management issues, associated with crop rotation. Regardless of irrigation technique, care must be taken to minimize wetting of the bed tops. Fruit in contact with moist soil may develop unsightly ground spots and fruit rots.

7. PROTECTION MEASURES

7.1 Weed Control

Shallow mechanical cultivation and hand hoeing are needed to control weeds before plants have vines. Pruning roots and vines with cultivating equipment slows melon development and reduces yield. Several herbicides are available that will control germinating broadleaf weeds and grasses in seeded and transplanted watermelons if used properly. Chemicals are economical when used as narrow-band applications in the planted rows. Other chemicals can be used as a lay by their application between the rows before vines begin to run. Herbicides are applied with shallow incorporation and transplants are placed with the roots below the treated zone. Post-emergence herbicides are used to control grasses. Methyl bromide was commonly used in the past for field fumigations, but currently metal sodium is used for preplant weed suppression.

7.2 Diseases and Their Control Measures

Watermelon is susceptible to several diseases that attack on roots, foliage and fruit. Disease control is essential in the production of high-quality watermelon. A preventive programme that combines the use of cultural practices, genetic resistance and chemical control is needed usually to provide the best results.

7.2.1 Verticillium wilt (*Verticillium dahlia* and *V. alboatrum*)

Verticillium wilt causes yellowing of the foliage and wilting. In severe cases entire plants may die off. Fungicides are generally not economical for control of Verticillium wilt. The disease may be controlled through the use of resistant cultivars and pathogen-free plants. Soil solarisation, by covering the soil with transparent polythene sheets during summer in sunny climates can also be helpful.

7.2.2 Fusarium wilt (*Fusarium oxysporum f. sp. neveum*)

Race 1 (*Fusarium oxysporum f. sp. Neveum*) is present in many type of soils. It typically affects runners on one side of the plant, but in advanced stages it may cause the wilting of the entire plant. Watermelon varieties with resistance to Fusarium Race 1 are available. Avoid acid soils or fields with a

history of Fusarium wilt or root rots/vine declines. Late plantings should not be situated nearby and downwind of early planted cucurbit fields where foliar or virus diseases already exist. Use drip irrigation or avoid frequent sprinkler irrigation with small volumes of water. The use of disease-resistant varieties is an economical means of controlling diseases. Several varieties have resistance to Fusarium wilt.

7.2.3 Powdery mildew (*Podosphaera xanthii*)

This disease can rapidly cover leaves, causing reduced crop growth and premature defoliation. Subsequently, losses in fruit yield and quality owing to sunburn may occur. Repeated fungicide applications are often necessary to avoid economic damage owing to powdery mildew. Selection and rotation of effective fungicides is critical for controlling powdery mildew epidemics, especially in growing areas where fungicide resistance in the *P. xanthii* population has been reported.

7.2.4 Charcoal rot (*Macrophomina phaseolina*) and Monosporascus vine Decline (*Monosporascus cannonballus*)

These soil borne diseases are most often observed when temperature is high and plants are stressed. Both diseases frequently occur in the desertic conditions. Death of crown leaves combined with grey stem lesions are symptoms associated with charcoal rot. Monosporascus vine decline may cause complete canopy collapse when fruit is of two to three weeks from harvest. Structures diagnostic for *M. cannonballus* can be seen as small, black, round structures protruding from the dead root tissue of affected plants.

7.3 Insects/ Pest Control

Watermelon is susceptible to a variety of insect pests. Pests attack do not always result in economic injury, so certain insect management practices can be used to ensure cost-effective control decisions. Insects cause injury to the leaves, stems, roots and melons. The developmental stage of the plant at the time of attack is often governed by the plant parts injured by different insect pests. However, some insects feed specifically on one plant structure and others may feed on several structures.

7.3.1 Root Maggots

The seedcorn maggot, *Hylemya platura*, is the predominant species of root maggot found in major watermelon production areas. The adult similar to the housefly. It has many bristles on its body. The larvae or maggot is creamy white, ¼ inch long at maturity and legless. The body tapers sharply from rear to head. The

maggot stage is damaging stage. Root maggots tunnel in the seeds or the roots and stems of seedlings. Seeds usually succumb to secondary rot organisms and fail to germinate after attack. Seedlings often wilt and die due to lack of water uptake. Damaged seeds may fail to germinate or may produce stunted plants. Several practices may be used to help control maggots. Previous crop litter and weeds should be turned deeply several weeks prior to planting, so there is adequate time for decomposition. Planting should be done during optimum conditions for rapid germination and seedling growth. Early plantings should be preceded by incorporation of a recommended soil insecticide. Plants should be maintained stress free until they are beyond the seedling stage.



7.3.2 Wireworms and Whitefringed



Wireworms, mostly *Conoderus spp.*, and whitefringed beetle (WFB) larvae, *Graphognathus spp.*, can reduce stands dramatically if present in moderate numbers (one per square yard).

7.3.3 Cucumber Beetles

Several species of cucumber beetles may attack on watermelon. The most common species are spotted cucumber beetle (*Diabrotica undecimpunctata*), striped cucumber beetle, (*Acalymma vittata*) and the banded cucumber beetle, (*Diabrotica balteata*) are found occasionally, they may damage watermelon. The beetles have been responsible for most economic damage. Beetles feed on the stems and foliage of the plant. Beetles feed on the stems until the plants become less attractive because of hardening, after which more foliage damage is apparent. Feeding begins on the undersides of the cotyledons or true leaves. If beetle population is high during the seedling stage, stand reductions can occur.



7.3.4 Larvae

Larvae may feed on all underground plant parts and usually cause insignificant amount of damage. Occasionally, larvae cause direct damage to the melon. The damage consists of small trail like canals eaten into the surface of the rind. The most severe consequence of larval damage is the introduction of secondary disease organisms. Cucumber beetles can be controlled with foliar applications of insecticides when 10 percent or more of the seedlings are infested. The natural feeding behavior of cucumber beetles leads to their avoidance of insecticidal sprays therefore through spray coverage is impactive. The most cost-effective application method is to band over the top and direct sprays to the base of the plant. There are no recommendations for control of the larvae.



7.3.5 Aphids

The melon aphid, *Aphis gossypii*, and the green peach aphid, *Myzus persicae* are common in melons. Aphids are soft-bodied, oblong insects that rarely exceed 3/32 inches. Adults may be winged or wingless, most often wingless. Aphids are slow-moving insects that live in colonies on the undersides of leaves. Aphids feed on the leaves with their piercing-sucking mouthparts. As they remove plant sap, the leaves curl downward and take on a puckered appearance. Heavy populations cause plants to turn yellow and wilt. This reduces photosynthesis, thereby reducing quality and yield. Several insecticides are effective on light to moderate populations of aphids. If winged aphids are found easily (10 percent of plants infested), treatment is warranted. Thorough coverage is essential because aphids live on the undersides of leaves.



7.3.6 Thrips

Several species of thrips may inhabit watermelon fields, but they are not very well understood as pests. Immature thrips are wingless, the adults have wings with hair like fringe. The thrips that cause early foliage damage often are different from those present during the period of heavy fruit set in spring plantings. This damage is caused by the thrips rasping the leaf surface before its expansion. The most severe damage occurs during the periods of slow growth. Damage is quickly outgrown during periods of rapid growth; usually no treatment is required.



Thrips can be controlled with foliar insecticide applications. No treatment thresholds have been developed for thrips. As a rule of thumb, treatments generally are not necessary if thrips are damaging only the foliage.

7.3.7 Cutworms

Cutworms feed at night and remain inactive during the day, either on the soil surface or below ground. Cutworms can attack on all plant parts, but the most severe damage occurs when they feed on young seedlings or developing melons. Cutworms damage young plants by chewing on the stem slightly above or below ground. Stand reductions may occur.



Cutworms can be difficult to control, but understanding their behaviour can help to control them. If cutworms are found, treatments should be made either by incorporation of a soil insecticide or direct spray.

7.3.8 Pickleworms and Melonworms

The pickleworm, *Diaphania nitidalis*, and melonworm, *D. hyalinata*, are migratory insects. Plantings of watermelons that are harvested by early July are unlikely targets. Extremely late plantings are subject to attack and should be monitored for developing infestations.



7.3.9 Rindworms

“Rindworm” is a term that describes any worm that may attack the rind of fruit. It does not refer to specific specie. The most common worms that may fit this description are cutworms, corn earworms, loopters, and beet and fall armyworms. When the rind is attacked, the insect must be identified correctly because no insecticide will control all of the aforementioned species.



8. HARVESTING AND HANDLING

8.1 Field Maturity

Watermelons are considered optimum for eating/harvesting when their flesh matures to produce a sweet flavor, crisp texture and deep red color. Some newer cultivars, range of color from light red to yellow.

Determining maturity of melons without tasting one is not easy. External rind appearance does not always predict good internal flesh quality and full maturity. Because of consumer demand for sweet, flavor watermelon, total sugar contents are important quality factor.

8.2 Harvesting

Before planning watermelon harvest operations, consider

- 1) Buyer's requirements.
- 2) Availability of labour.
- 3) Equipment for harvesting.
- 4) Grading and packing.
- 5) Availability of trucks for transportation to market.

Harvesting and handling costs are much higher than growing costs. Therefore, watermelon must be harvested at the right stage of maturity and handled gently enough to avoid damage to ensure market quality. Watermelon should be cut from the vine rather than pulled, twisted or broken off. Pulling stems out provides an entrance for bacteria and fungi that can cause souring and can decay the internal flesh. As watermelons are cut from their vines, the bottoms, which are subject to sunscald should be turned down. Cutters should carefully lay watermelons at the edge of roadways in the field for loaders to pick up and pass to stackers in a field truck. The typical field harvesting crew may range from nine to twelve people, including two to three cutters, four to six loaders, two stackers and one truck driver.

9. POST-HARVEST HANDLING

9.1 Storage

Watermelon is not adapted to long-term storage. Normally the upper limit of suitable storage is about three weeks. However, this will vary from variety to variety. Storage for more than two weeks triggers a loss in flesh crispness. Storing watermelons for several weeks at room temperature will result in poor flavor. However, when fruit is held just a few days at warmer temperatures, the flesh colour tends to intensify. Sugar contents do not change after harvest. Watermelon flesh will tend to lose its red colour if held too long at temperatures below 10 °C. It should be held at 10 °C to 15 °C and 90% relative humidity. Sugar contents does not change after harvest, but flavor may be improved because of a drop in acidity of slightly immature watermelons. Chilling damage will occur after several days below 5 °C. The resulting pits in the rind will be

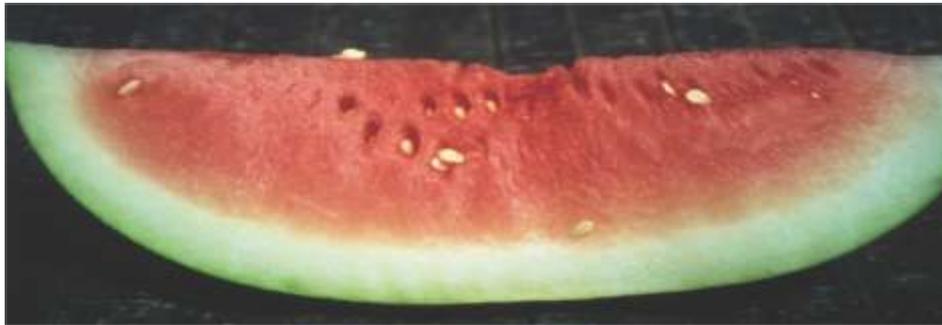
invaded by decay causing organisms.

9.2 Market Preparation

After harvesting, watermelons are usually sold at farmers market as per kilograms. The bulk of the commercial crop is shipped out. Many are sold from smaller fields through temporary or permanent road side stands or at farmers' markets. Some growers sell their fields to shippers or brokers as harvest time approaches. An important consideration in successful marketing is to have adequate facilities for transporting the crop to market outlets. Although earliness usually results in higher prices quality and maturity should be of prime importance in marketing watermelons.

10. SEEDLESS WATERMELON

Production of seedless watermelon (more correctly called triploid melons) is similar to production of seeded (diploid) melons but some differences exist. Triploid watermelon seed has more difficulty in germination and to establish in the field. A pollinizer variety must be planted in the field with the triploid melon. A row of pollinizer variety should be alternated with every two rows of triploid melon.



10.1 Technique of Seedless Watermelon Production

Common seedless watermelon planting configurations are in proportion of 1 row of the seeded variety (pollinator) for every 2 to 3 rows of the seedless variety. In within-row plantings, the ratio of seedless to pollinator plants ranges from 2:1 to 5:1. As the seedless to pollinator ratio increases, the number of bee hives should be increased to ensure pollination.

Germination of triploid watermelon seed is inhibited at temperatures below 80° F. In addition seed coats of triploid watermelon is thicker than seed coats of seeded watermelon seed. These thicker seed coats tend to adhere to the cotyledons during emergence and damage plants or delay emergence. Because of the strict

temperature requirements and the emergence problems associated with the thickened seed coats, getting a satisfactory stand of triploid melons by direct seeding in the field is difficult. Because triploid seed is expensive (20 to 30 percents each), over seeding and thinning is not an option.

11. VARIETIES

Watermelon fruit is available in many sizes, shapes, and colors. The shapes vary from round to oblong, with colors ranging from light green to almost black. The fruit skin color can be solid, striped, or marbled. The edible portion of the flesh can be yellow, pink, pink-red, bright red, or deep red. Availability of seedless varieties are also available as well as seeded varieties. While most of the “seeds” are thin, whitish, edible structure, there may be a few normal appearing seeds. Here are some recommended cultivated varieties, or “cultivars”, grouped by flesh color.

11.1 Varieties by flesh Colour

11.1.1 Red

- Madera
- Fiesta
- Oasis
- Royal Sweet
- Star bright
- Crimson Sweet
- King of Hearts
- Queen of Hearts
- Summer Festival
- Royal Charleston
- Sugar Baby (ice box type)
- Sweet Beauty
- Sweet Favorite

11.1.2 Yellow

- Sunshine
- Yellow Baby
- Yellow Doll
- Golden Crown
- Golden Midget

11.1.3 Seedless (Hybrid Triploid) Cultivars

- Hybrid 313
- Triple Sweet
- Tiffany
- Crimson Trio
- Scarlet Trio

11.2 Recommended Varieties for Punjab

The following varieties of watermelon are recommended for general cultivations in Punjab.

11.2.1 Sugar Baby

It has small fruit which can be planted just four feet apart. It has red flesh.

11.2.2 Sweet Beauty

It also matures in 80 days and it was developed in America in 2004 and has red flesh.

11.2.3 Golden Midget

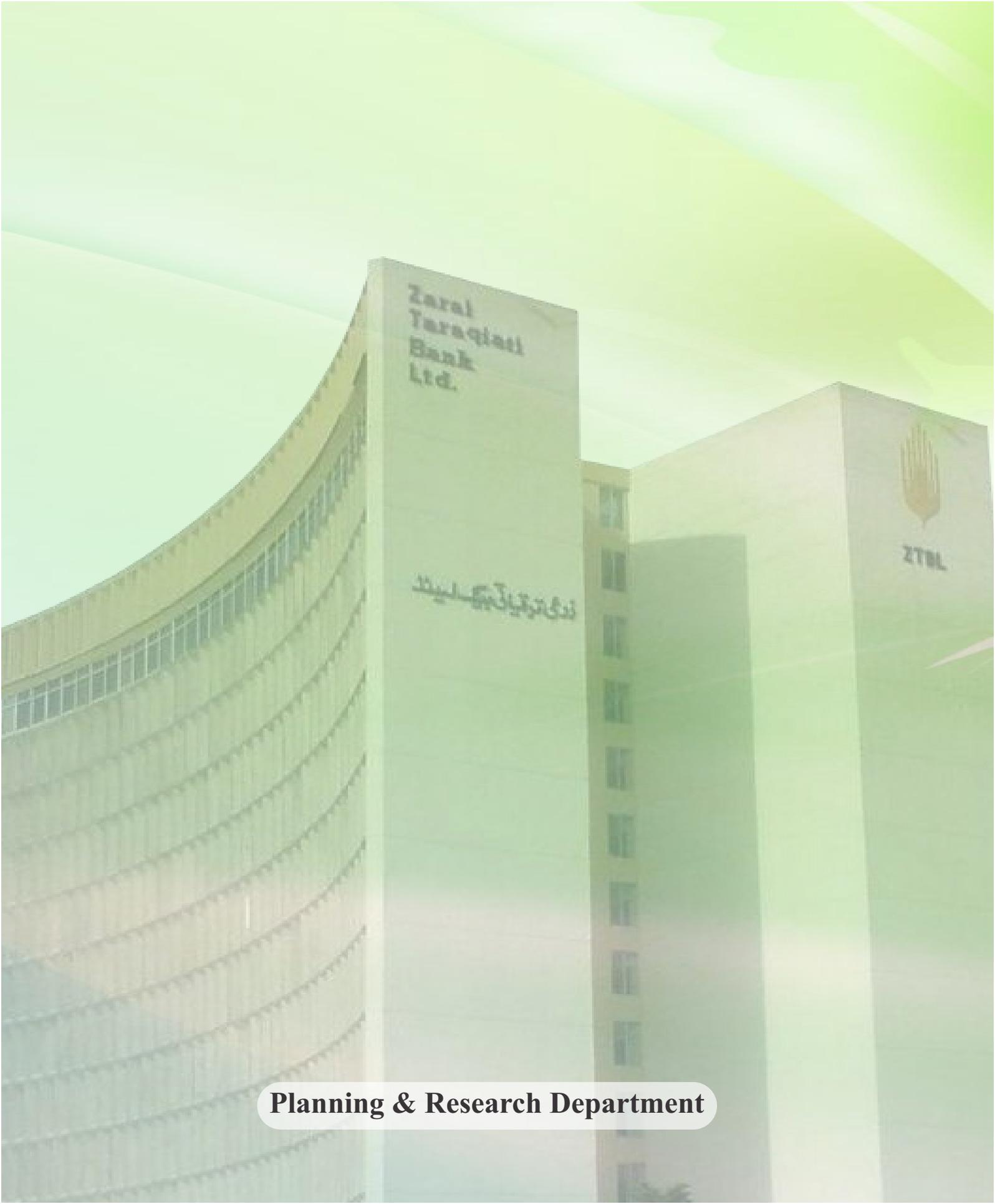
It matures in 70 days and has pink flesh and sweet taste. It bears petite yellow skin.

12. REFERENCES:

1. George E. Boyhan, M. Graberry and W. Terry Kelley, Commercial Watermelon Production by the University of Georgia College of Agriculture and Environmental Sciences.
2. Production Guidelines of Watermelon.2011. Department of Agriculture, Forestry and Fishers, Republic of South Africa.
3. www.agribusiness.com.pk

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