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Texas Commercial Vegetable Growers Guide

WATERMELONS

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Watermelons are widely adapted to Texas climatic conditions. During the two year period of 1986-87 an average of 43,500 acres were planted while 39,000 acres were harvested for sale. Watermelons accounted for 12 percent of the value of Texas vegetables sold during 1987.

Production areas

Most of the acreage is located in the South, South Central, North Central, North East, and East Texas areas. The South Texas production is centered around San Manuel, Falfurrias, and Hebronville where deep, light, sandy soils are prevalent. The Dilley-Pearsall area is 2 to 3 weeks later than the valley because of cooler temperatures. In South Central Texas the production centers are located around Luling and Hempstead. In North Central Texas the production centers are located around De Leon and Bowie where deep, light, sandy soils are found. Watermelons are grown over a wide area of East and Northeast Texas, but the major shipment centers are around Henderson, Texarkana, Dallas, and Houston. The westward region of watermelons is centered around Plainview on the High Plains.

Seasonal movements

Peak movements of Texas watermelons occur in June and July as shown in Figure 1. Harvest begins in the lower Rio Grande Valley in light volume during mid-May, progressing to heavy volume during June in the Falfurrias-Hebronville area. Supplies from the Dilley-Pearsall area begin in early June and last through July. The Luling-Hempstead areas begin harvest in late June and have supplies through July. The East and North

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Watermelons
Top Shipping States

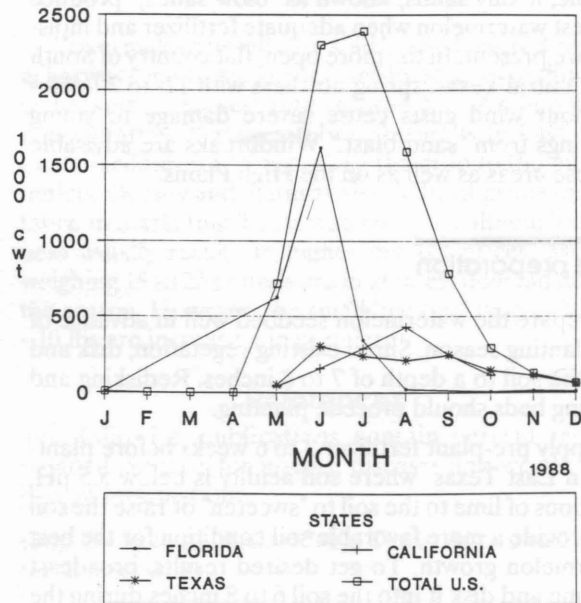


Figure 1.

Central Texas areas supply markets during July, August and September. The High Plains also has supplies in July, August and September. In recent years a small acreage has been planted in South Texas for fall production to supply light demand in October and November.

Climatic requirements

Watermelons are a warm-season crop, preferring relatively high temperatures for optimum growth. Day temperatures of 80 to 90 degrees F. and night temperatures of 60 to 70 degrees F. are best. Plant growth is slowed considerably when temperatures are lower. Watermelons are not highly sensitive to extremes in

humidity, although foliage diseases are more prevalent under humid conditions. With favorable growing weather, ripe melons can be produced in 90 to 120 days from seeding, depending on variety, soil type and season of the year. Accumulation of sugar in the fruit takes place during the last stages of ripening. Low sugar may be caused by excessive rains, severe drought or loss of leaves from disease or insect damage.

Soil types

Watermelons can be produced successfully on almost any type of soil that is well-drained, warm and fertile. Deep, sandy-loams with good moisture holding capacity are preferable to light, loamy sands which hold very little water in reserve. Drought stress and leaching occur less often on deep, sandy loams. To produce watermelons for the early market, plant on light, sandy soils that warm up more quickly and stimulate faster plant growth than heavier clay-loam soils.

Fine, loamy sands, known as "blow sands," produce the best watermelon when adequate fertilizer and moisture are present. In the more open, flat country of South and Central Texas, spring northers with 12- to 20-mile-per hour wind gusts cause severe damage to young seedlings from "sand blast." Windbreaks are advisable in these areas as well as on the High Plains.

Land preparation

Prepare the watermelon seedbed well in advance of the planting season. Shred existing vegetation, disk and turn the soil to a depth of 7 to 8 inches. Redisking and shaping beds should precede planting.

Apply pre-plant fertilizer 3 to 6 weeks before planting. In East Texas where soil acidity is below 5.5 pH, additions of lime to the soil to "sweeten" or raise the soil pH provide a more favorable soil condition for the best watermelon growth. To get desired results, broadcast the lime and disk it into the soil 6 to 8 inches during the early fall. About 3 to 6 months are required for the lime to react with the soil and bring about favorable change for the next spring crop. Watermelons grow best where the soil pH is between 6.0 and 8.0. A soil test is required to determine the pH and normally 1 to 2 tons of agricultural grade lime are needed per acre to counteract an acid condition.

Windbreaks

Where winds are a problem, windbreaks are planted during the fall, so that overwintering stubble will provide some protection for the young plants and developing fruit in the spring. In South Texas, speltz, a type of strong stemmed wheat, is seeded on either side of the intended watermelon row. Seeded in early October with proper moisture, speltz grows to about 3 feet by January or

February. Watermelons planted in rows running east and west receive the most protection since prevailing winds are southeast and northwest. Fall sown, tall growing Elbon rye provides good wind protection on the High Plains.

Since watermelon growers practice a 3 to 5 year crop rotation, preferably with a grass crop or pasture, land preparation in the fall may be done in strips. By leaving strips of grass and/or pasture stubble, erosion from wind and rain is reduced. The area between rows is usually disked under when watermelon vines begin to run. As vines begin to run in February and March, windbreaks are undercut to prevent competition, but they are left standing to provide wind protection for young watermelon vines.

Fertilizing

A broad range of soils from alkaline mineral soils to acidic sands are utilized for watermelon production in Texas. Consequently, it is difficult to make general fertilizer recommendations for the entire state.

Watermelons require between 40 and 60 pounds of N per acre. Preplant applications of 20 to 30 pounds N, followed by a sidedressing of 20 to 30 pounds N when the vines begin to run is an accepted practice. In areas of high rainfall or on extremely sandy soils, an additional 20-pound application at flowering may increase yield. Apply sidedress fertilizer 3 to 4 inches deep and 2 to 3 feet to each side of the plant row. If roots are being disturbed, move a little farther away from the plant row because roots will grow into the fertilizer.

Phosphorus is usually required for optimum production. Soils below pH 6.0 and above 7.5 chemically tie up P, reducing its availability. Band applied P is more efficient for plant use than broadcasting. The addition of 10 to 20 pounds of P as a starter fertilizer may be advantageous even on soil testing high in P.

Potassium is commonly deficient on sandy soils in East Texas, but it is usually plentiful in the mineral soils of South Texas. Soil testing can accurately predict K availability and should be used to determine need. Sixty pounds of K₂O is usually sufficient.

Lime increases yields on acidic soils when soil pH is below 5.5. Many soils utilized for melon production in East Texas require liming for maximum production.

Fertilizer applications are best when based on a soil test. However, general recommendations are as follows. In South Texas, normally 150 pounds /A of 10-20-10 or 12-24-12 is applied just before or at planting. In Central and East Texas, 200 lbs /A of 10-20-20 or 400 pounds of 5-10-15 are recommended before planting. Most watermelons are then sidedressed with ammonium nitrate or sulfate (20 to 30 lbs N/A) when the vines begin to run. Some growers prefer to sidedress with about 150 lbs/A of a balanced fertilizer. On the High Plains 20 to 40 lbs. of nitrogen plus 40 to 80 lbs. of phosphorus (P₂O₅)

equivalent) are applied preplant, followed by 20 to 40 lbs of N sidedressed under usual soil conditions. Potassium is seldom applied unless soil test shows need or loamy sands.

and improved disease resistance/tolerance by using hybrids. In some cases transplanting hybrids is a viable option.

Varieties

Charleston Gray and Jubilee account for the vast majority of the wholesale watermelon trade. These varieties combine wide adaptability, disease resistance, market acceptance and good yielding ability. However, there are many other varieties which may fit individual operations. The following table gives fruit characteristics of a number of commercial lines.

The table separates open-pollinated and hybrid varieties. In general hybrids are noted for uniformity, earliness and high yield. The main drawback is higher seed cost. However, the improved characteristics of hybrids have meant premium harvests and reduced operating costs for growers. Experienced growers have achieved greater yields, earlier maturity, higher quality

Planting and thinning

Watermelon seed germinate best when planted in soil at least 65 to 68 degrees F. at a 2-inch depth for 3 consecutive days before seeding. Seedling emergence should occur within 7 to 10 days. Watermelon seed will not germinate at soil temperature below 60 degrees F.

Drill seed at the rate of 1 to 2 pounds per acre at a depth of 1/2 to 1-1/2 inches, with deeper placement in drier soil. Extremes and uncertainties in weather conditions, including frosts and freezes during the spring, may necessitate replanting more than once. Final in-the-row spacing of plants in Texas under irrigation is 4 to 6 feet. Space dryland watermelons about 6 to 10 feet apart in the row with the rows 12 to 16 feet apart.

Table 1. Fruit characteristics of major watermelon varieties.

Variety	Avg. wt. (lbs)	Flesh color	Rind color	Shape	Adapted Use		Fusarium ² wilt tolerance	Anthracnose tolerance	Days to maturity
Open-pollinated					Shipping	Roadside			
Charleston Gray	25-35	red	gray/green	oblong	yes	yes	+	+	85
Calhoun Gray	25-35	red	gray/green	oblong	yes	yes	+++	-	85
Jubilee	28-45	red	green stripe	oblong	yes	yes	++	+	90-95
Allsweet	25-35	red	green stripe	oblong	no	yes	+	+	90
Crimson Sweet	20-30	red	green stripe	round/oval	yes	yes	++	+	85
Black Diamond	30-50	red	dark green	round	yes	yes	-	-	90
Tendersweet	22-32	yellow	green stripe	oblong	no	yes	-	-	85
Dessert King	22-30	Orange	green stripe	round/oval	no	yes	-	-	85
Sugar Baby	6-12	red	green	round	no	yes	-	-	75-80
Minilee	7-8	red	gray/green	round	yes	yes	+++	+	82
Mickylee	10-12	red	gray/green	round	yes	yes	+++	+	82
Hybrid									
Royal Sweet	25-35	red	green stripe	oblong	yes	yes	+++	-	80
Prince Charles	25-35	red	gray/green	oblong	yes	yes	+++	-	80
Royal Jubilee	28-40	red	green stripe	oblong	yes	yes	+++	+	95
Mirage	25-35	red	green stripe	oblong	yes	yes	+++	+	82

²Tolerant of some strains of Fusarium; use of a resistant variety does not insure freedom from disease, but rather lessens the chance of a serious problem.

Transplanting

A proven way to produce fruit 7 to 10 days earlier is through the use of transplants. The key to success with transplants is to obtain disease-free plants with 2 to 4 true leaves. It takes 3 to 4 weeks to produce plants this size. Avoid larger plants because they are likely to become root bound in their containers and never grow off well or produce satisfactorily in the field. The average watermelon grower is not equipped to produce quality transplants. When one considers the time and expense involved in transplant production, it makes sense to buy plants from a reputable greenhouse grower. Since transplants are extremely cold sensitive, never set them out before the mean last freeze date for your area. As a general rule, plant 7 to 10 days after the mean freeze date for a reasonable compromise between earliness and freeze danger.

It is helpful to use black plastic mulches in combination with transplants. Such mulches covering the rows absorb heat and warm the soil faster than bare soil. This promotes the early season growth of transplants.

Weed control and cultivating

Mechanical cultivation and use of hand labor are still very useful before watermelon plants have vined. However, chemicals, which control most broadleaf weeds and grasses from seed, are available at very reasonable costs per acre. When used properly, no damage to the watermelon germinating seed or growing plant occurs. When chemicals are used, keep mechanical cultivation to a minimum, and if necessary, make it shallow.

New post-emergent chemicals have revolutionized the control of grasses in watermelons. Read the labels carefully to determine which weeds and grasses are controlled with the chemicals. See reference section for further information on weed control.

Irrigation

Six to eight inches of timely rainfall or irrigations on a deep, sandy soil produce a good crop of watermelons. About 25 percent of the Texas watermelon acreage is grown under irrigation, most of which is located in South Texas. One to four irrigations may be required depending upon the spring rainfall.

For melons grown on sandy soils, sprinkler irrigation is preferred, applying 1 to 2 inches per acre on 12- to 16-day intervals. Avoid moisture stress if possible, since fruit quality and yield can be greatly affected. Blossom-end rot and bottle-neck fruit are symptoms of drought stress. Early morning irrigations are the most efficient; however, do not operate the sprinkler irrigation system

between 7 and 11 a.m. during the fruit-setting period as bees may be prevented from doing a good job of pollinating the open female flowers.

Drip irrigation along with plastic mulch is being used successfully in many watermelon fields. Filtration is an absolute must when using drip irrigation.

Pollination

Watermelon vines have two distinct types of flowers; male which only produce pollen and female flowers which bear the fruit. Insects, primarily honey bees, are necessary to transfer pollen from male to female flowers. Commercial watermelon production is not possible where insect pollinators are excluded or few in number.

Watermelons have a very distinct fruiting pattern. Male flowers appear first, followed by females 7 to 10 days later. Female flowers are usually open for only one day and must be pollinated on that day, or they will drop off. Adequate numbers of honey bees must be available at the right time to avoid losses from unpollinated flowers. Since there is a premium price paid for early production, it is best to get bees to the field within a week after the appearance of male flowers. Bees should remain in the field for approximately a month to insure fruit set. In most cases, leaving bees in the field for more than a month does not substantially improve the yield.

A good practice is to rent colonies from beekeepers who can supply the greatest number of frames covered with bees and the most square inches of brood. As a general standard, a strong colony will have at least 5 frames covered with bees and 600 square inches of brood at field introduction time.

The number of bee colonies needed for adequate watermelon pollination is influenced by the bees' attraction to surrounding crops and blooming weeds. For dryland production, which utilizes a relatively low plant population, one strong hive for every 2 acres insures a good fruit set. Irrigated melons would greatly benefit from 1 to 2 hives per acre.

Placement of the colonies is extremely important. Colonies located within a field will have about twice as many bees visiting the field's blossoms as there would be if the same number of colonies were located on the field's periphery. The main problem with placing hives in fields is the increased risk of killing bees with pesticide applications.

Consider insect control methods as they relate to bee safety and beekeeper investment. Watermelon growers need bees, so beekeepers should be treated fairly.

Disease control

Diseases are a major factor in determining the success or failure of watermelon production in Texas. Following recommended control practices will insure high yields of good quality watermelons. Anthracnose, a fungus disease, appears as small, brown-black spots on crown leaves, usually after vines begin to run. On the fruit, the disease causes sunken spots in the rind. Downy mildew is a common foliar disease of watermelons grown in Texas. The disease usually begins after the fruits begin to set and weather conditions are cool and damp. Yellowish to brown spots appear first on the upper surface of leaves near the crown. The undersides of leaves may exhibit a brown mold on wet mornings. These spots enlarge rapidly, causing the entire leaf to wither and die. Some varieties exhibit good resistance to downy mildew.

Fusarium wilt is caused by a soilborne fungus that may affect plants at any stage of growth. A cross section of the stem close to the soil line reveals a circular brown discoloration caused by the fungus plugging the water-conducting vessels. The disease is usually more prevalent on light, sandy soils. The disease can be seed-borne. Use certified, disease-free seed, treated with a fungicide and practice long crop rotations whenever possible. Alternaria and Cercospora leaf spots may also occur. Use the same control as for anthracnose and downy mildew. Gummy stem blight is a fungus disease noticeable on stems near the crown. Leaves are also affected. Using treated seed, practicing crop rotation and applying fungicides as for anthracnose and downy mildew control gummy stem blight.

Stem end rot is a fungus disease that attacks damaged tissues of the cut stem. Where the disease is a problem, pasting the cut stem with a copper sulfate paste (8 ounces per gallon of water with starch added for thickening) reduces losses. Watermelon mosaic and "pimples" are virus diseases that cause various degrees of stunting, leaf mottling and fruit malformation. The viruses overwinter in wild perennial weed hosts and are transmitted to watermelons by insects, particularly aphids. There is no effective commercial control for viruses, but green rind varieties are less affected by "pimples." Clean cultivation in and around the fields and proper insect control help.

Nematodes, particularly the root knot nematode, also reduce yields. Damage by nematodes results in stunting, loss of vigor and wilting plants. Avoid infected fields. See reference section for information on specific disease control.

Insect control

The major pests attacking watermelons are aphids, squash bugs, cutworms, spider mites, leafhoppers and

cucumber beetles. Prevent injury to bees by applying insecticides in late afternoon. If the wind is blowing across the field toward the beehives, move the hives a safe distance before spraying. Read and follow label directions concerning pesticide rates, time of application and safety precautions. See reference section for information on specific insect control.

Harvesting and handling

After harvest, load the melons directly into trucks for shipment to market or haul them to a central grading station for reloading and shipment. The melons are usually graded and sized during the loading operation. Use sufficient straw or paper padding to prevent damage to the melons during shipment. Pack four or five melons per fiberboard box because this facilitates shipping and handling ease at the produce warehouses.

Market

Watermelons usually are sold by the hundred-weight at harvest time. 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 the market outlets. Quality and maturity should be of prime importance in marketing Texas watermelons, although earliness usually results in higher market prices. Melons weighing 18 to 25 pounds are in greatest demand during the season. However, the small "ice box" type melons 6 - 10 lbs are increasing in popularity.

References

The following publications contain current recommended controls for insects, diseases and weeds, plus budget information:

Crop Budgets (Bulletin-1241), Texas Agricultural Extension Service.

Insect and Weed Control Manuals. Ag-Consultant, a Meister Publication, 3781 Euclid Avenue, Willoughby, Ohio 44094.

The Texas Plant Disease Handbook and Chemical Supplement, Texas Agricultural Extension Service Bulletin-1140.

Texas Guide for Controlling Insects on Commercial Vegetable Crops, Texas Agricultural Extension Service Bulletin-1305.

Quick Guide, Thomson publications, P. O. Box 9335, Fresno, CA 93791.

While these guides are helpful, an up-to-date product label is the legal authority for application of any chemical to watermelons in Texas.

...and improved disease resistance/tolerance by using ... in some cases to developing hybrids is a viable ...

Planting and thinning

...avoid later plants ... size. Avoid later plants ...

...the row with the row 15 to 16 feet apart ...

Weed control and cultivating

Variety	Open-pollinated	Planting	Thinning	Hybrid
Charleston Gray	Yes	Yes	Yes	Yes
Jupiter	Yes	Yes	Yes	Yes
Clinton Sweet	Yes	Yes	Yes	Yes
Tendercrop	Yes	Yes	Yes	Yes
Sugar Baby	Yes	Yes	Yes	Yes
Hybrid	Yes	Yes	Yes	Yes
Royal Sweet	Yes	Yes	Yes	Yes
Royal Jupiter	Yes	Yes	Yes	Yes

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