

# KEYS

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## TO PROFITABLE PRODUCTION

### KEYS TO PROFITABLE WATERMELON PRODUCTION

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Tom Longbrake, Jerry Parsons and Roland Roberts\*

Watermelons are widely adapted to Texas climatic conditions. Sixty-five counties grow a minimum of 100 acres annually. During the 3-year period of 1975-77, an average of 57,000 acres was grown while 51,300 acres were harvested for sale. Watermelons accounted for 27 percent of the acreage and 9.3 percent of the value of Texas vegetables during 1977.

## Production Areas

Most of the acreage is located in South, South Central and East Texas areas. The South Texas production is centered around San Manuel, Falfurrias and Hebbronville where deep, light, sandy soils are prevalent. The Dilley-Pearsall area has good production and is 2 to 3 weeks later than South Texas because of cooler temperatures. In South Central Texas the production centers are located around Luling and Hempstead. Watermelons are grown over a wide area of East and Northeast Texas but the major shipment center is around Henderson. Production then moves into North Central Texas around De Leon and westward into the High Plains around Plainview. Small acreage is grown in the Rio Grande Valley as a late fall crop.

## 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 in mid-May, progressing to heavy volume during June from the Falfurrias-Hebbronville 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 Central Texas areas supply markets during July and August. The High Plains have 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

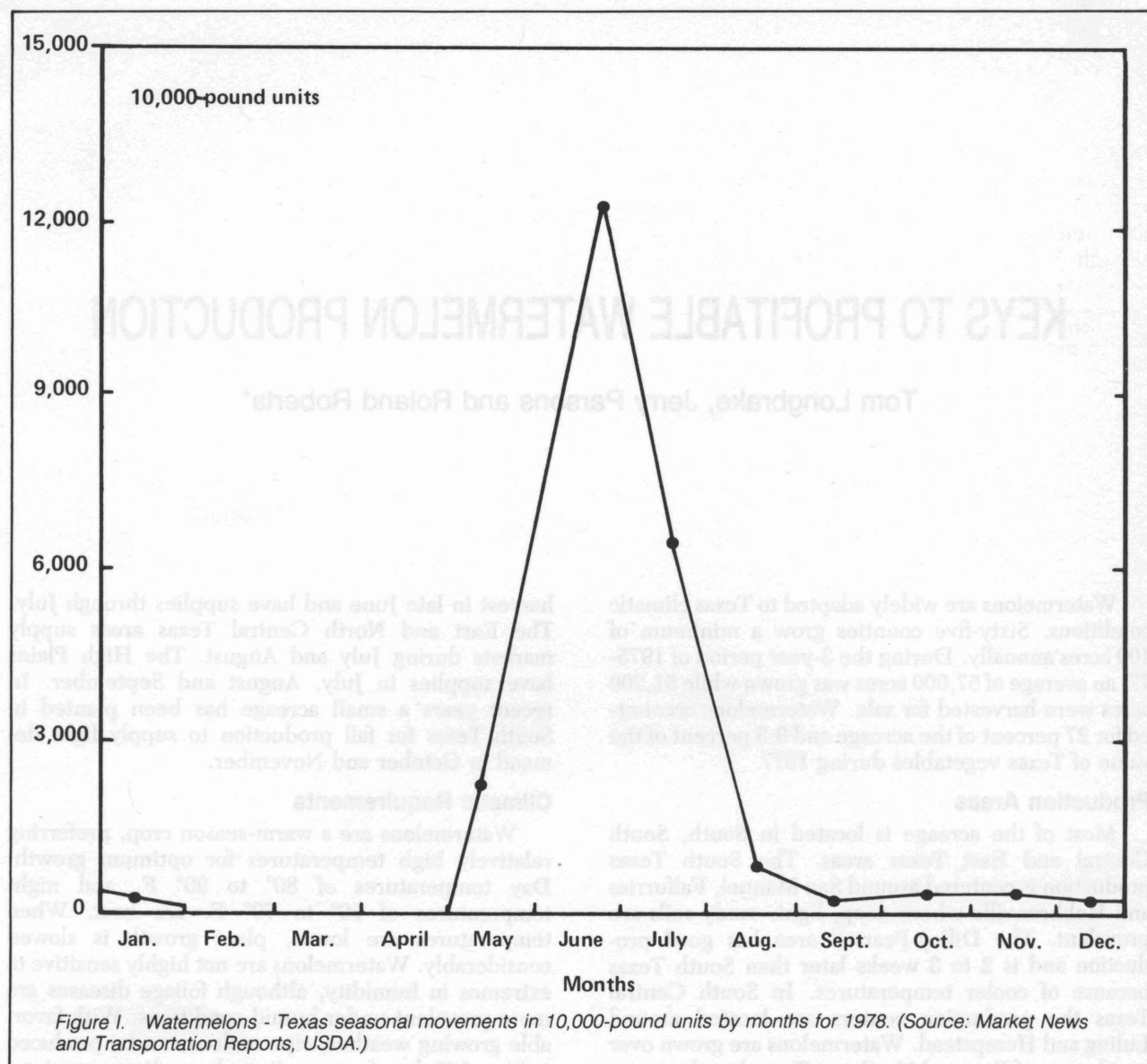
Watermelons are a warm-season crop, preferring relatively high temperatures for optimum growth. Day temperatures of 80° to 90° F. and night temperatures of 60° to 70° F. are best. When temperatures are lower, plant growth is slowed considerably. Watermelons are not highly sensitive to extremes in humidity, 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 are preferable to light sands because of less moisture stress during dry periods and less leaching of nutrients during wet weather. Since heavy soils generally produce slower growing plants, use light soils that warm up quickly in spring for producing watermelons for early market.

Fine sands, locally known as "blow sands," produce the best watermelon when adequate fertilizer and moisture are present. In the more open, flat

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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.

### 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 the beds should precede planting.

Apply fertilizer 3 to 6 weeks before planting to allow for good soil moisture accumulation. 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 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 the favorable change for the next spring crop. Watermelons grow best in deep sands where the soil pH is between 6.0 and 7.0. 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.

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 weeds, grass and 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

In South Texas, apply 150 pounds per acre of 10-20-10 or 12-24-12 fertilizer just before or at planting time. In Central and East Texas, 200 pounds per acre of 10-20-20 or 400 pounds of 5-10-15 are recommended before planting. Apply the fertilizer in a deep furrow, then cover to a depth of 8 to 10 inches or chisel to a depth of 8 to 10 inches. Spacing between rows varies from 10 to 12 feet on South and West Texas irrigated land. In the Central and East Texas nonirrigated areas, row spacing ranges from 13 to 16 feet. A sidedressed application of ammonium nitrate or ammonium sulfate (20 to 30 pounds N per acre) is recommended at the time the vines begin to run. Some growers prefer to sidedress with about 150 pounds per acre of the balanced fertilizer used for the preplant treatment. When heavy rains cause exces-

sive leaching of fertilizer or plants show a very light green color, make a second sidedressing of fertilizer. 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.

### Varieties

The two major watermelon varieties produced in Texas are the Charleston Gray strains and Jubilee. Charleston Gray is the principal variety grown in South Texas because of its high yield, earliness, disease resistance, good eating quality, dark-red flesh, thick rind, good shipping qualities and resistance to sunburn. Along with the Charleston Gray types, Jubilee is grown in Central Texas and is becoming more dominant in East and North Central Texas. Jubilee is generally a larger fruited, high yielding variety when moisture is adequate.

Gray-rinded melon varieties include Charleston Gray, Calhoun Gray, Charleston Gray 133, Charleston 76 and Sunshade.

Striped (light green with dark-green stripes) melon varieties include Alsweet, Crimson Sweet, Jubilee, Garrisonian, Louisiana Queen and Triple Sweet.

Black Diamond, Texas Giant, Tom Watson and Peacock are dark green-rinded melon varieties.

Small icebox melons weighing 6 to 12 pounds include Sugar Baby. Yellow-meated, large melon varieties include Tendersweet and Dessert King.

(For further descriptions see table 1.)

Table 1. Fruit characteristics

Variety	Avg. wt. pounds	Flesh color	Rind color	Rind thickness inches	Shape	Seed color	Adapted use		
Charleston Gray	25-35	red	gray/green	1/2-3/4	oblong	black	Shipping	Roadside	Home
Charleston 76	25-35	red	gray/green	1/2-3/4	oblong	black	Yes	Yes	Yes
Charleston 133	25-35	red	gray/green	1/2-3/4	oblong	black	Yes	Yes	Yes
Sunshade	25-35	red	gray/green	3/4-1	oblong	black	Yes	Yes	Yes
Calhoun Gray	25-35	red	gray/green	1/2-3/4	oblong	tan	Yes	Yes	Yes
Jubilee	28-45	red	green-stripe	3/4-1	oblong	black	Yes	Yes	No
Alsweet	25-35	red	green-stripe	1/2-3/4	oblong	brown	No	Yes	Yes
Crimson Sweet	20-30	red	green-stripe	3/8-1/2	round oblong	dark brown	Yes	Yes	Yes
Garrisonian	28-40	red	green-stripe	3/4-1	oblong	white	Yes	Yes	No
Louisiana Queen	25-35	red	green-stripe	1/2-3/4	round oblong	white	Yes	Yes	No
Triple Sweet	10-15	red	green-stripe	1/4-3/8	round	seedless	No	Yes	Yes
Black Diamond	30-50	red	green	3/4-1	round	black	Yes	Yes	No
Texas Giant	30-50	red	green	3/4-1	round	black	Yes	Yes	No
Tom Watson	30-45	red	green	3/4-1	very long	tan-brown	Yes	Yes	No
Peacock*	12-18	red	green	1/2-3/4	oblong	dark brown	Yes	Yes	No
Tendersweet	22-32	yellow	green-stripe	3/4-1	oblong	brown	Yes	Yes	No
Dessert King	22-30	orange	green-stripe	3/4-1	round	gray black	Yes	Yes	No
Sugar Baby	6-12	red	green	1/4-1/2	round	brown	No	Yes	Yes

\*Western Texas only



## Planting and Thinning

Watermelon seed germinate best when planted in soil at least 65° to 68° 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 temperatures below 60° F.

Drill seed at the rate of 1 to 2 pounds per acre at a depth of  $\frac{1}{2}$  to  $1\frac{1}{2}$  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.

Seed transplant watermelons in 3×3-inch containers 21 to 25 days before desired date of setting in the field. To prevent stunting or excessive wilting when moving plants from greenhouses, harden plants for 4 to 6 days before transplanting. Use a foliar application of antitranspirant to seedlings before removing them from the greenhouse. If handled properly and weather conditions cooperate, transplants may produce marketable fruit 7 to 10 days earlier than seeding direct into the field. However, commercial growers have shown that watermelon transplants are not economical.

Black plastic or dark paper mulches covering the rows absorb heat and warm the soil faster than bare soil. In general, seeding or transplanting through such mulches speeds up maturity of watermelons 7 to 10 days over that of unmulched soil. Large scale use of mulches has proven uneconomical in Texas.

## 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.

Prefar at 5 to 6 pounds per acre is one of the safest herbicides for controlling germinating grass seeds and certain weeds in watermelons. To reduce the chemical cost per acre, spray Prefar in a band 2 to 3 feet wide over the seed row and incorporate or mix it 3 to 4 inches deep before or after seeding. A power take-off rotovator with tines set 3 to 4 inches deep and rotating 300 revolutions per minute at a tractor speed of 2 miles per hour does the best job of chemical mixing with the soil. A spring-tooth harrow, with teeth straight down or a Lilliston rolling cultivator, pulled over the row twice after spraying Prefar does the second best job. Seeding and reseeding, if

necessary, can be done safely in Prefar-treated soil. Four to 6 quarts of Prefar plus 2 to 4 pounds of Alanap combined control more types of weeds than Prefar alone. When chemicals are used, keep mechanical cultivation to a minimum and, if necessary, make it shallow.

Treflan or Dacthal controls germinating weed and grass seeds and should be applied as a lay-by application between the watermelon rows before vines begin to run. Treflan requires incorporation into the soil either with a power rotovator, disk harrow or with a double pass using a spike-toothed harrow. Avoid spraying Treflan directly on watermelon plants. Read the labels carefully to determine which weeds and grasses are controlled with the chemicals.

## Irrigation

Six to 8 inches of timely rains 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, sprinkle 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 moisture stress. 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.

## Pollination

The male and female flowers are born separately on the watermelon plant. The female flowers must be pollinated for fruit set. Honeybees are the principal insects that pollinate watermelons. At least one strong colony of honey bees for each 2 to 3 acres of melons is recommended to insure a good set. Pollination is a must, and poor or partial pollination may result in misshapen fruit.

Most efficient pollination with bees occurs when beehives are placed throughout the field 150 yards apart. The second most efficient placement would be around the edges of a field at 150-yard intervals. The third most efficient placement is to place all hives on one side of a field. When placed on the downwind side, bees fly upwind to feed and return downwind loaded with pollen. Consider insect control methods as they relate to bee safety and beekeeper investment. Watermelon growers need bees, so treat the beekeeper fairly.

## Disease Control

Diseases are a major factor in determining the success or failure of watermelon production in Texas. Follow recommended control practices to 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. Use fungicides such as Bravo®, Difolatan® or Maneb® at 7- to 10-day intervals. *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. Bravo®, Difolatan® or Maneb® will control downy mildew if applications are started early in the season and repeated at regular intervals. 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 seedborne. Use certified, disease-free seed, treated with a fungicide such as Thiram, 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. Inject nematocides, such as D-D, Telone, Vapam and Vorlex in the soil before planting if nematodes are present.

## Insect Control

The major pests attacking watermelons are aphids, squash bugs, cutworms, spider mites, leafhoppers and cucumber beetles. Applications of Sevin® (carbaryl) control cucumber beetles and squash bugs. Parathion controls aphids, cutworms and leafhoppers, but do not apply within 7 days of harvest. Control leafminers and spider mites with parathion or ethion. 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.*

## 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. This facilitates shipping and handling ease at the produce warehouses.

## Marketing

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.

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