

WATERMELON PRODUCTION IN CALIFORNIA

VEGETABLE RESEARCH AND INFORMATION CENTER

Vegetable Production
Series



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PRODUCTION AREAS AND SEASONS

Watermelons (*Citrullus lanatus*) are produced in the northern Central Valley (Sacramento and Stanislaus Counties); Central Valley (Kern and Tulare Counties); and southern deserts (Imperial and Riverside Counties). Statewide, watermelons are planted from December to early July for harvest from mid-May to late October. Yields reach 40 tons per acre (90 t/ha) under ideal conditions. Lower yields often reflect depressed watermelon prices as much of the crop is left in the field.

WATERMELON ACREAGE AND VALUE

Year	Acres	Average yield (tons/acre)	Gross value/acre
1994	16,700	21.5	\$3,306
1993	17,500	21.0	\$3,377
1992	15,000	20.0	\$3,488

Source: *California Agricultural Statistics 1994* (Sacramento: California Department of Food and Agriculture, 1995).

VARIETIES AND PLANTING

Seeded varieties. Sangria and Fiesta are popular All-Sweet hybrids that are oblong and dark green with broken, light green stripes. The flesh is bright red with black seeds. Calsweet, the most popular open-pollinated variety, has striped skin and red flesh. Also grown is the hybrid Royal Sweet, with striped skin and dark pink flesh. Sultan is an early-maturing, high-yielding hybrid. Icebox watermelon varieties grown in the northern San Joaquin Valley include Sugar Baby, Baby Doll, and Tiger Baby.

Seedless varieties. Seedless (triploid) varieties have in recent years accounted for at least 30 percent of the California watermelon acreage. Commonly used seedless varieties in the desert valleys include Nova, Laurel, Wonderland, Fire Cracker, Quality, Ultra Cool, Millionaire, AC 532, AC 5032, and AC 5244. Due to the high seed cost of \$700 to \$1,200 per pound (\$1,540–\$2,640/kg) and low seed vigor, triploid varieties are almost always transplanted. Each seedless watermelon transplant costs 28 to 35 cents. Seedless watermelons require one row of pollinator plants for every two to three rows of seedless plants. Royal Sweet, Calsweet, and Sangria are used as pollinators. Fruit from the pollinators are sold as a separate product.

Conventional plantings. In the desert areas of Southern California, seeded watermelons are grown on 80-inch (2-m) south-facing beds. The beds are slanted to the south at 35 to 37 degrees to capture the incoming sunlight at a near-perpendicular angle, increasing absorbed energy. Seed is sown 0.5 inch (1.2 cm) deep using random-flow or precision air planters. After thinning the plants to 2 to 3 feet (60–90 cm) depending on the variety, growers work the beds to relocate the seed line, shaving soil off the top and into the furrow. After several passes with small tractor-mounted discs, the field is virtually flat with seed lines 80 inches (2 m) apart. Sidedress fertilizer is applied and new furrows are made for irrigation.

In the northern San Joaquin Valley, watermelons are planted on flat beds 80 inches (2 m) wide and 8 to 12 inches (20–30 cm) high. Seed is placed 0.5 to 0.75 inches (1.2–1.9 cm) deep. After thinning and sidedressing, furrows are reformed before irrigation.

Another way to plant spring watermelons during very cold weather is to use plastic bed mulch, transplants, and drip irrigation. To heat the soil and reduce weeds, black plastic film, 72 inches (1.8 m) wide, is laid flat on 80-inch (2-m) beds. About 6 inches (15 cm) of plastic is tucked at the edges to hold the mulch in place. The beds normally have a single drip irrigation tape placed about 6 inches (15 cm) below the surface. The transplants are set 24 to 36 inches (60–90 cm) apart.

SOILS

Watermelons grow best on nonsaline sandy loam or silt loam soils. Some can be grown on dune sand when given ample moisture and fertilizer. Seeded melons germinate best when the soil is 95°F (35°C). Black asphalt mulch is occasionally used to raise temperatures in the seed line.

IRRIGATION

For watermelons grown from seed, the first irrigation should continue until the beds are completely wet. After emergence, water may be withheld for a long period of time. If the plants are stressed for water when they start to set fruit, the melons will be small and blossom end rot will increase. Too much water may cause excessive fruit splitting when melons are 10 to 15 pounds (4.5–6.8 kg) or larger. Watermelons respond very favorably to drip irrigation. Applying water regularly increases fruit set, fruit size, and yield. The cost of drip irrigation, about \$200 to \$400 per acre (\$500–\$1,000/ha) prorated over multiple seasons, must be justified by higher yields.

FERTILIZATION

Growers in the southern deserts apply nitrogen (N) at 300 pounds per acre (336 kg/ha) and P₂O₅ at 250 pounds per acre (280 kg/ha). They commonly apply 35 gallons per acre (327 l/ha) of liquid ammonium phosphate 10-34-0 preplant. For sidedressing, a liquid solution of UAN-32 (urea-ammonium nitrate, 32-0-0) or AN-20 (liquid ammonium nitrate, 20-0-0) may be used as the N source. In the northern San Joaquin Valley, growers commonly apply N at 150 pounds per acre (168 kg/ha) and P₂O₅ at 80 to 100 pounds per acre (89–112 kg/ha). Potassium (K) may

be used if soil tests show low levels (less than 120 ppm extractable K).

POLLINATION

One to two bee colonies per acre should be placed in the field when male flowers begin to appear. Poor pollination often causes misshapen fruit. A watermelon plant seldom produces more than 2 to 3 harvestable fruit. While it is too expensive to remove all excess fruit, misshapen and split fruit may be culled in the field to allow the plants to channel nutrients into marketable fruit.

INTEGRATED PEST MANAGEMENT

Contact the UC Davis IPM World Wide Web site at <http://www.ipm.ucdavis.edu> or your local county Farm Advisor for current pest management information (*UC IPM Pest Management Guidelines*, UC Pest Management Group Publication 33).

Insect identification and control. Cutworms, aphids, spider mites, darkling ground beetles, leafhoppers, cabbage loopers, and leafminers are the most serious insect pests of watermelon. Rind scarring from worm damage is a serious defect that reduces market value.

Disease identification and management. Zucchini yellow mosaic virus (ZYMV), cucumber mosaic virus (CMV), and watermelon mosaic virus (WMV) are transmitted by aphids and can severely distort the fruit and vines and reduce yield. Charcoal rot (*Macrophomina phaseolina*) and powdery mildew (*Sphaerotheca fuliginea* or *Erysiphe cichoracearum*) may also require control. In the northern San Joaquin Valley, *verticillium* (*Verticillium dahlia* and *V. alboatrum*) may be a problem. *Verticillium* causes yellowing of the foliage and wilting in severe cases and may kill the plants. Plants may wilt if under stress, after fruit set, or after an irrigation. *Fusarium* wilt (*Fusarium oxysporum* f. sp. *neveum*) first affects individual branches and in advanced stages may cause the entire plant to wilt. Bacterial fruit blotch (*Acidovorax avenae* subsp. *citrulli*) is a major seedborne disease of watermelons outside California. While it has not been reported from the desert areas of Southern California, unseasonably wet weather may provide the conditions necessary for it to occur. Blossom end rot may be a problem when melons are grown under salt stress,

water stress, or waterlogging. Varieties vary in their susceptibility to this disorder. Rind necrosis may also be a problem. The rind discoloration rarely affects the flesh of the melon; however, melons with necrosis often sell at a reduced price. Some researchers believe a bacterium may be involved in causing this disorder.

Weed management. Most growers use only mechanical cultivation and hand hoeing for weed control in the low desert growing regions. However, herbicides are used in the northern San Joaquin Valley. Herbicides are applied with shallow incorporation and transplants are placed with the roots below the treated zone. Postemergence herbicides are used to control grasses.

HARVEST AND HANDLING

The criteria for picking watermelons include color change (the most reliable), blossom end conditions, and rind roughness. A sharp knife is used to cut melons from the vines; melons pulled from the vine may crack open. Harvested fruit are windrowed to nearby roadways, often located 10 beds apart. A pitching crew follows the cutters and pitches the melons from hand to hand, then loads them in trucks to be transported to a shed. Melons should never be stacked on the blossom end as excessive breakage may occur.

Loss of foliage covering the melons can increase sunburn. Exposed melons are covered with vines, straw, or excelsior as they start to mature to prevent sunburn. Each time the field is harvested, the exposed melons must be re-covered. Most fields are picked at least twice. Some fields may be harvested a third or fourth time depending upon field condition and market prices.

Seeded melons are sorted and packed in large, sturdy, triwall fiberboard containers. The melons are sorted according to grade: number 1, 14 to 26

pounds (6.4–11.8 kg), and number 2, 8 to 14 pounds (3.6–6.4 kg). Inferior melons may be sold at nearby markets; culls (discolored, misshapen, sugar-cracked, blossom-end rotten, and insect-damaged fruit) are discarded. Containers, which hold 60 to 80 melons and weigh 1,100 to 1,200 pounds (500–545 kg), are shipped on flatbed trucks to terminal markets or wholesale receivers. The containers are covered to prevent sunburn in transit. If buyers do not supply cartons and lids, shippers bill them for the cost of these items.

Seedless melons are sorted according to size and packed in cartons containing 3, 4, 5, 6, or 8 fruit. “Fours” and “fives” are preferred sizes; “sixes” and “eights” are common later in the season after the crown-set melons have been removed from the vine. The rough gross weight of a carton is 40 to 50 pounds (18–22.7 kg). Seedless melons may also be sold in large bulk containers.

POSTHARVEST HANDLING

Watermelons may lose crispness and color in prolonged storage. They should be held at 50° to 60°F (10° to 15°C) and 90 percent relative humidity. Sugar content does not change after harvest, but flavor may be improved due to loss in acidity of slightly immature melons. Chilling injury will occur after several days below 41°F (5°C). The resulting pits in the rind will be invaded by decay-causing organisms.

MARKETING

Limited supplies of California watermelons are available beginning in May. Production peaks in August and the season ends in November. Most California watermelons are marketed in the western United States and Canada. Major competition in the market comes from Mexico, Arizona, and Texas.

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