

# Rural Migration News

## Blog 192

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### Alternatives to Hand Labor in U.S. Melons

Watermelons, cantaloupes, and honeydews are cucurbits, a plant family that includes cucumbers and pumpkins, squash, and zucchini. Most melons are consumed fresh in summer. Melons are over 90 percent water, and the cost of transporting them long distances can equal production costs, especially in summer when there are many fruits and vegetables to transport.

#### Production and Trade

The U.S. had 8.2 billion pounds of melons available in 2018, or 25 pounds per person, including 15.7 pounds of watermelon, seven pounds of cantaloupes, and 2.5 pounds of honeydew and other melons. Watermelon per capita availability has been stable over the past decade, but cantaloupe availability declined from 11 to seven pounds, and honeydew three to 2.4 pounds per person from 2000.

U.S. melon production included 4.4 billion pounds of watermelons in 2018, 1.6 billion pounds of cantaloupes, and 517 million pounds of honeydews from 111,400, 60,700, and 14,900 acres, respectively. The value of watermelons, \$657 million in 2018, exceeded the value of cantaloupes, \$332 million, and honeydews, \$90 million, combined.

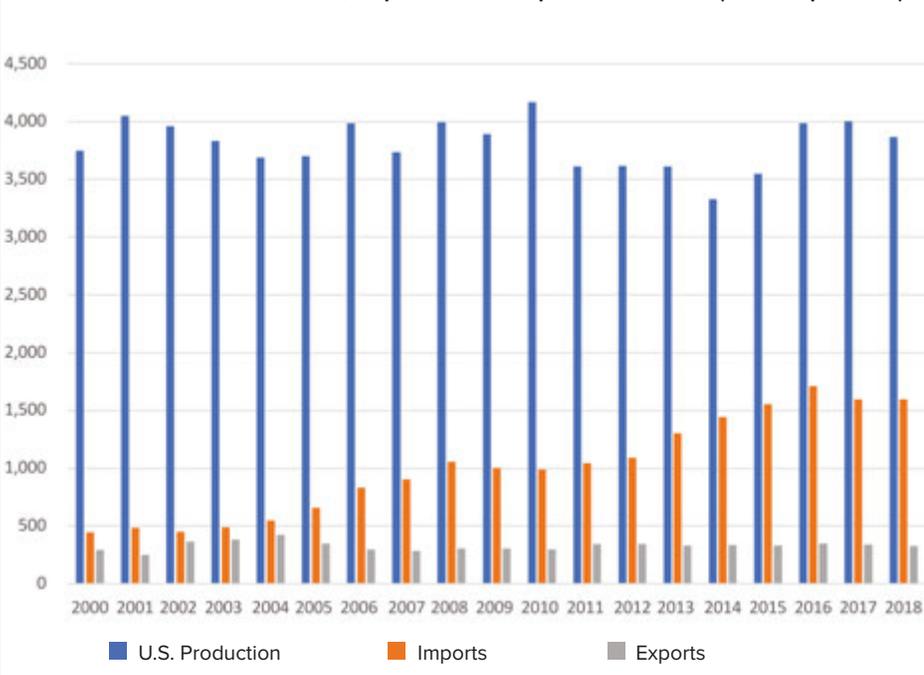
Florida, Texas, California and Georgia are the leading producers of watermelons, and California (8.3 million hundredweight in 2018) and Arizona (3.7 million hundredweight) are the leading producers of cantaloupes. Cordele Georgia is as the Watermelon Capital of the World and Mendota California is the Cantaloupe Capital of the World.

China produced two-thirds of the world's watermelons and 54 percent of the world's cantaloupes in 2017. The U.S. ranks sixth, after Turkey and Iran and other countries, in melon production, and is a net importer of melons; a third of the melons consumed in the U.S. are imported. Half of U.S. melon imports are watermelons primarily from Mexico, and most of the other melon imports are cantaloupes from Guatemala.

U.S. watermelon production is stable at almost four billion pounds a year, while imports are increasing and account for a third of US watermelon consumption. Exports have been stable at less than 10 percent of U.S. watermelon production.

U.S. cantaloupe production is decreasing, down a third over the past two decades to average 1.5 billion pounds a year. Imports are stable at a billion pounds a year, but they are a rising share of decreasing US consumption, 40 percent, while exports are stable at about 10 percent of US cantaloupe production. Mexico accounted for 82 percent of the \$319 million of watermelon imports in 2018, and Guatemala

U.S. Watermelon Production, Imports, and Exports, 2000-18 (Million pounds)



accounted for 55 percent of the \$227 million worth of cantaloupe imports in 2018.

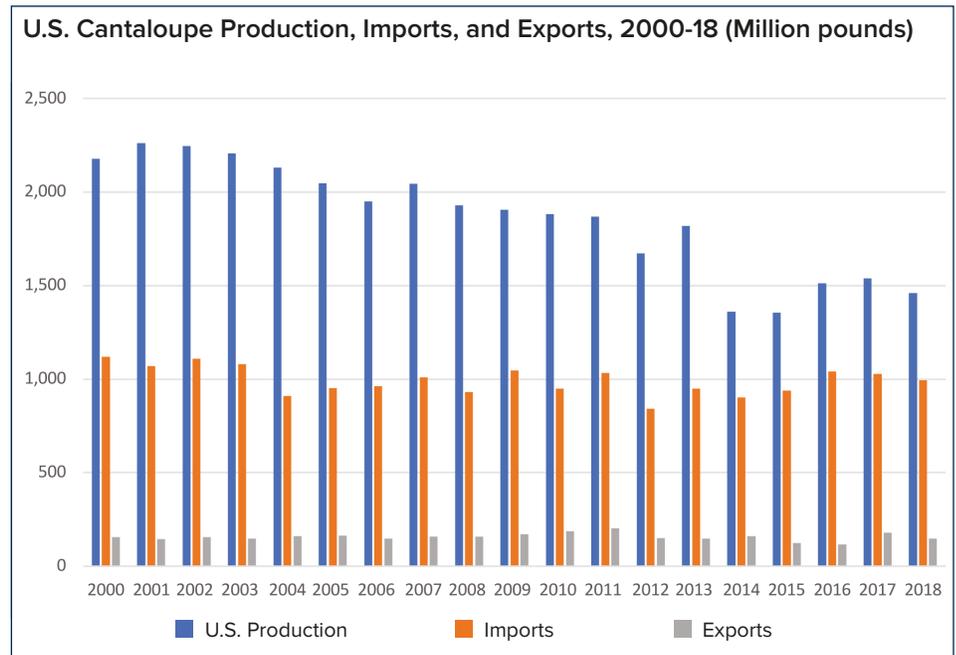
Melons were switched from vegetables to fruits in USDA data after 2011, but remain in NAICS 111219 Other Vegetable and Melon Farming in employment data. USDA includes melon production and trade data in the E Tables of the Fruit and Tree Nuts Yearbook.

## Labor

Watermelon seedlings (plugs) are often transplanted into raised beds covered with plastic mulch, with water and fertilizer provided by drip irrigation systems. Vines spread and bees pollinate the flowers. Most watermelons are seedless, and smaller personal-size watermelons that weigh five to seven pounds are gaining market share from larger 15 to 20 pound seedless watermelons. Seeded watermelons that weigh more than 20 pounds are losing market share.

When sugar levels near the center of the melon approach 10 percent, cutters walk through fields, identify ripe melons, and use a knife to cut the melons from the stem and roll them into rows with pale underside up. Loaders pick up the melons and throw or hand them to stackers riding on trucks or buses that move slowly through the field and load watermelons five to seven high in the vehicle. Used school buses are lower to the ground than trucks, making them easier for workers to load. Melon trucks and buses often have six inches of straw in the bottom to provide padding, and carpets on the side walls. Melons are taken to packing sheds, where they are sized and packed in heavy cardboard bins for transport to retailers.

The H-2A job offers of melon farmers guarantee workers at least the hourly AEWB but offer a piece rate



to a crew of workers for each bus or truck they load. Typical piece rates in 2020 were \$20 to \$30 per busload for field cutters who identify and roll ripe melons and \$80 to \$100 per busload to share between the 10 field loaders who pass ripe watermelons from one worker to another and on to the stackers in the bus or truck.

A crew of 10 loaders and stackers who earn \$120 a day for seven hours of work at \$13 an hour must fill 12 busloads a day or almost two busloads an hour. Drivers and others who are paid on a daily basis earn \$100 a day for seven hour days, about \$14.30 an hour or slightly more than the AEWB.

Harvesting and marketing are 30 to 40 percent of total production costs. Florida harvests watermelons almost year-round, but the Florida harvest peaks in May and June. Levy and Gilchrist counties in northern Florida account for about 20 percent of Florida's watermelons, but grower prices are highest for watermelons produced during the winter months in southern Florida.

Cantaloupes are usually planted from seed in raised rows, with drip irrigation installed six inches beneath

the surface. Many melon fields are a quarter section, with 150 acres of the 160 acres planted to allow room for equipment. In the past, fields were picked daily or every other day during the two weeks that a field was harvested, but newer varieties such as Harper can be picked in one or two passes through the field.

Cantaloupes are harvested by workers who follow a conveyor belt that moves in front of them through the field. Ripe cantaloupes separate easily from the vine, and workers place them on a belt that conveys them to packers who size and pack melons into 38-pound cartons; the number of melons in the carton varies from nine to 23 depending on their size. Cartons are stacked on pallets, placed in trailers, and the fruit is cooled using forced air. Night harvesting reduces the need to cool harvested fruit.

Cantaloupe fields are picked three to five times during the two week period when most melons ripen, down from daily picks over 14 days in the past. A typical harvest crew is 21 people, including nine pickers, five packers, two box makers, three loaders and a driver and a supervisor. The crew picks and packs 200

### Harvesting Watermelons: Bus



Source: [https://www.lancasterfarming.com/news/old-school-buses-abound-for-watermelons/article\\_2cafe594-f4a9-5a4f-8c28-10c0cf74b36.html](https://www.lancasterfarming.com/news/old-school-buses-abound-for-watermelons/article_2cafe594-f4a9-5a4f-8c28-10c0cf74b36.html)

### Harvesting Watermelons: Truck



Source: <https://www.mdfarmbureau.com/its-time-to-schedule-your-watermelon-harvest-vehicle-inspection/>

to 300 cartons an hour or 1,800 to 2,700 cartons in a nine-hour day.

Most central California growers hire harvest workers directly rather than obtaining harvest crews via contractors, and pay hourly wages of \$13.50 to \$14, slightly above the state's \$13 an hour minimum wage in 2020, Adding 30 percent for payroll taxes makes hourly labor costs \$17.50 or \$368 an hour for the 21-person crew. At 250 cartons an hour, harvest labor costs are \$1.50 a carton. Workers employed 50 hours a week at \$13.50 an hour earn \$675 a week.

Average yields are 800 to 1,000 cartons an acre. For a grower price of \$8.75 a carton, a 900 carton per acre yield generates gross revenue of \$7,875 an acre. Land rent and growing costs are \$1,500 an acre or \$1.67 per carton, harvesting costs are \$1.50 a carton, the cost of the carton is \$1 or more, and cooling and marketing costs add \$1 a carton, for total costs of \$5.15 a carton or \$4,655 an acre.

Some melons are shed packed, which means that crews of up to 30 pickers follow longer conveyor belts that extend over more rows

and place ripe melons on a belt that conveys the fruit to a truck or gondola traveling alongside the machine. Harvested melons are transported to a packing shed for washing, grading and packing.

CDFA reported that California harvested 467,500 tons of cantaloupes valued at \$188 million in 2018 from 31,500 acres, suggesting almost 15 tons an acre and average grower revenues of \$5,970 an acre. California accounted for 57 percent of U.S. cantaloupes and 100 percent of U.S. honeydews. California's 12,000 acres of watermelons yielded 360,000 tons worth \$116 million in 2018, an average 30 tons and \$9,700 an acre.

### Alternatives and Outlook

Watermelons are the most valuable melon grown in the U.S., and all are hand harvested, some with the help of mechanical aids, such as conveyor belts that trail behind trucks. Loaders pick up and place ripe watermelons onto the belt for transport to a truck or other packing platform where workers stack watermelons for shed packing or sort and pack them into bins if they are field packing. An experimental machine uses an audio system to locate and identify ripe watermelons, cut them, and roll them into a row for pick up, that is, the machine replaces cutters but not loaders.

California cantaloupe growers confront several challenges. First is increased cantaloupe production in other states that have lower transport costs to consumers. USDA reported that California and Arizona accounted for 80 percent of the 14.6 million hundred weight of U.S. cantaloupes produced in 2018; some growers believe that the California-Arizona share is lower and is declining as newer varieties of cantaloupes are planted east of the Mississippi river that do not require hot and arid climates.

California and Arizona traditionally grew western varieties of cantaloupes that were harvested every day during a two-week period and emitted ethylene as they ripened, giving them a short shelf life. These western varieties have been replaced by long-shelf-life varieties that have a high sugar content when harvested but do not continue to emit ethylene and thus do not continue to ripen, reducing flavor and taste. The acreage of newer ethylene-extended shelf-life varieties that continue to emit ethylene and have a longer shelf life is expanding to replace the long-shelf-life varieties.

Harvest labor remains a major challenge. A mechanical harvester that picks all of the fruit in one pass through the field means that up to 20 percent of the cantaloupes must be discarded because they are unripe. The machine carries seven sorters to remove unripe melons and dirt clods, reducing labor costs from the usual crew of 30 that follows a conveyor belt and picks melons that are packed in the field.

A machine can harvest 12 to 15 acres a day so that, over a 30-day harvesting period, a 15-acre per day machine could harvest 450 acres and 70 machines could harvest the state's cantaloupes. The harvest moves around the state, as melons ripen first in southern California, then the San Joaquin Valley, and finally the Sacramento Valley, so that machines could follow the harvest.

The melon harvester was developed by a large grower, which highlights several issues common to mechanizing specialty crops, including the need for uniformly ripening crops that can withstand machine handling. Melons that were bred for yield and flavor, disease resistance, and shelf life may have to be modified for optimal machine harvesting, a process that can take years and must

gain consumer acceptance. There may be trade offs between desirable traits, as when a melon sturdy enough for machine harvesting may have less flavor.

The market for melon harvesters is small, which makes it hard to attract significant investments from private machinery firms, prompting growers to design and refine their own machines. Finally, there is no coordinating mechanism to link plant

breeders and machinery companies to facilitate cooperation between plant scientists and engineers and with the entire supply chain to promote harvest mechanization, as helped to mechanize the harvesting of processing tomatoes in the 1960s.

The second challenge is rising import competition from Central America, where labor costs are lower, costs of shipping by sea are low, and trucking from ports such as

### Conveyor Belt Hand Melon Harvesting



Source: <https://www.desertsun.com/story/news/2018/07/13/california-grower-develops-harvesting-machine-reduce-need-workers/764128002/>

### Mechanical Melon Harvester



Source: <https://www.desertsun.com/story/news/2018/07/13/california-grower-develops-harvesting-machine-reduce-need-workers/764128002/>

Miami and New Orleans to supermarkets that serve most Americans is cheaper. New varieties are extending the melon import season from winter into spring and fall.

U.S. cantaloupe production may continue to shrink as imports rise, further discouraging investment in machines. The U.S. is the only high-wage country among the world's leading producers of cantaloupes, after China, Turkey, Iran, Egypt, India, and Kazakhstan, so that a US harvester may not generate sufficient sales at home and abroad to justify the necessary investment. Rising import competition from Central America could intensify due to lower labor costs and cheaper shipping by sea to ports such as Miami and New Orleans. New varieties are extending the melon import season from winter into spring and fall.

For these reasons, most U.S. watermelons, cantaloupes, and honeydews are likely to continue to be hand harvested for the next decade, albeit with ever more sophisticated mechanical aids that make hand workers more efficient and productive. The alternative would be is a once-over harvester that accepts lower marketable yields in exchange for lower harvest costs.



Source: <https://www.aarp.org/food/diet-nutrition/info-2017/melons-food-fact-trivia.html>

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