

# Olive Production in California

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## Historic Background

Olives have been cultivated around the Mediterranean Sea for at least 5,000 years. They were first brought to California in the 18<sup>th</sup> century by the Spanish padres, and were planted at all the coastal missions south of San Francisco. Early commercial plantings were done with materials gleaned from these orchards, which are the origin of the ‘Mission’ cultivar. All other cultivars historically important in California (notably ‘Manzanillo’ and ‘Sevillano’) were brought to California before 1905. Prior to 1900, the California olive industry focused on oil production. However, because California oil producers could not compete with cheaper European products, the industry switched focus to pickled table olives. The “California black-ripe” curing method was developed in 1905. By 1910 canned black-ripe olives had become the major California olive product, with the center of production in Tulare County. A small proportion of olives, normally those too small to can, were used for oil <sup>[1,10]</sup>.

California olive acreage has remained stable for most of the past century at around 30,000 acres (Figure 1) <sup>[7]</sup>. Fluctuations after 1970 reflect increased demand for California olives with the popularization of olives on pizza <sup>[6]</sup>, and an expansion of olive acreage into the southwestern San Joaquin Valley following the completion of the California Water Project in the mid-1970s. However, foreign competition in the

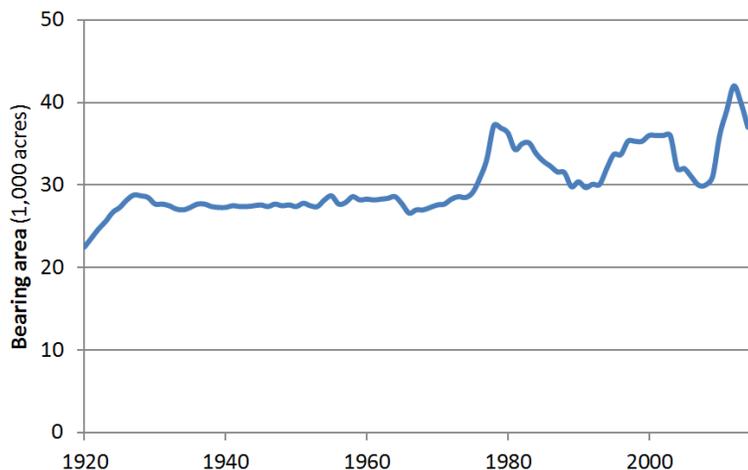


Figure 1: Area of olives harvested in California since 1920 <sup>[7,9]</sup>.

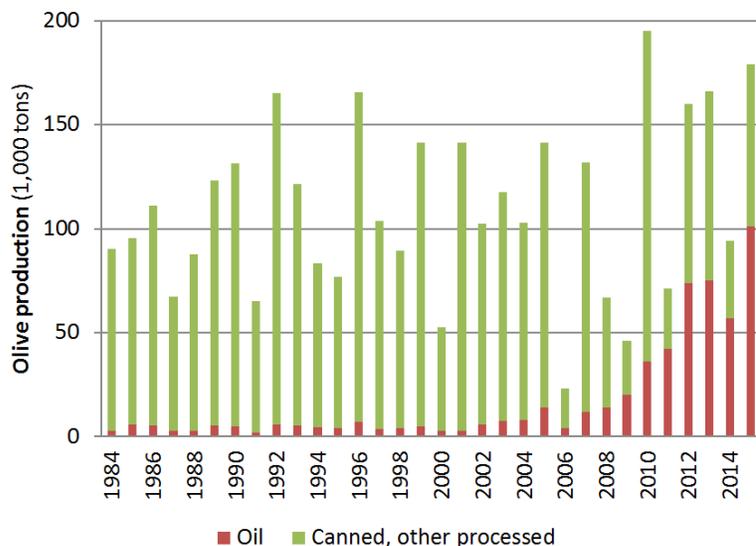


Figure 2: Utilization of California olives since 1984 <sup>[8]</sup>.

table olive market increased <sup>[6]</sup> and most of the new plantings eventually failed because of verticillium wilt and olive knot <sup>[1]</sup>, so expansion was short-lived. A rapid shift in production systems and utilization has occurred since 2000. Traditionally, olive orchards are grown at low densities (<100 trees/acre), and are hand-

harvested. In the 1980s high-density (HD) systems (~100-340 trees/acre) were developed, which can reach full production somewhat earlier and can be harvested with tree shakers for the first 15 years<sup>[5,11]</sup>. In the mid-1990s, a Spanish nursery pioneered a “super-high density” (SHD) system, where trees are grown in hedgerows at densities >600 trees/acre. Harvesting is completely mechanized using over-the-row equipment. These SHD systems are expensive to establish but the trees reach full production within four or five years, and are much cheaper to harvest<sup>[10]</sup>. However, SHD systems are currently only well-adapted for three oil varieties: ‘Arbequina’, ‘Arbosana’, and ‘Koroneiki’. The first California SHD orchard was planted in 1998. Today, most new California oil-olive plantings are in SHD systems<sup>[5]</sup>. Because

of reduced costs, combined with California oil’s historically higher quality standards and a growing domestic demand for olive oil due to perceived health benefits of a “Mediterranean diet”, California olive oil has become better positioned to compete with imported oils<sup>[4]</sup>. Oil olive orchards also have a relatively low water requirement of about 2 acre-feet per year<sup>[5]</sup>. Production has been rising steadily. Meanwhile, because of high labor and water costs and falling prices, table olives have become less profitable, and many orchards are being removed in favor of higher value crops like almonds or citrus<sup>[2]</sup>. As a result, in 2015 about 60% of California’s olive production was for oil, up from an average of about 4% prior to 2000<sup>[8]</sup> (Figure 2).

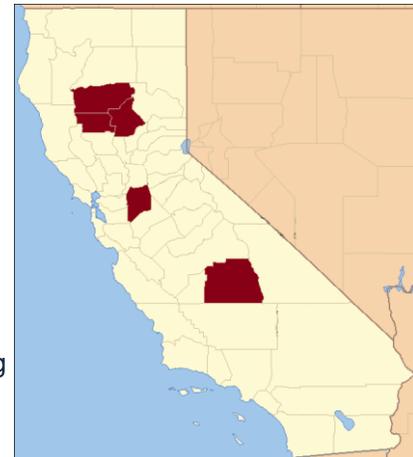
### Today’s Production

The US produces less than 1% of the world’s olives. The major producer is Spain, followed by Italy and Greece<sup>[3]</sup>. California is the only important olive growing state in the US. California olive production is mostly in the San Joaquin and Sacramento valleys, although some acreage is reported throughout California<sup>[9]</sup>. Tulare County is the leading producer, with about a third of California’s bearing acres in 2012. Tehama, Glenn, Butte and San Joaquin counties also had important acreage in 2012<sup>[9]</sup>.

Most table olives are grown in lower-density orchards, while oil olive orchards now mostly favor SHD systems. Some of both types are also grown in HD systems<sup>[5]</sup>.

‘Manzanillo’, which can be used both for table olive and oil production, has been the most popular variety since the 1960s. ‘Mission’,

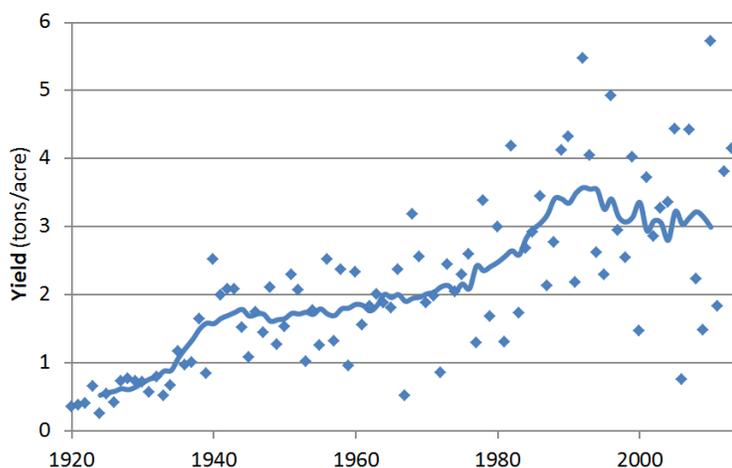
another dual-purpose variety, and ‘Sevillano’ are also popular for table olives<sup>[1]</sup>. Older oil olive orchards mostly grow Italian varieties<sup>[10]</sup>. However, most new oil olive orchards use the varieties adapted to SHD plantings, with ‘Arbequina’ accounting for about 70% of oil production<sup>[11]</sup>.



**Figure 3:** Top olive-producing counties in California<sup>[9]</sup>.

## Yield

Olives are subject to alternate bearing, so yields fluctuate greatly from year to year. However, on average yields have risen steadily over the 20<sup>th</sup> century<sup>[7,9]</sup>. This is mostly due to improvements in cultural practices such as irrigation and fertilization, since by and large the same varieties have been used since the early 1900s<sup>[1]</sup>. Average yields for the past ten years have ranged between 1 and 6 tons/acre fresh fruit<sup>[7,9]</sup>.



**Figure 4:** Average California olive yields since 1920<sup>[7,9]</sup>. Line represents the 10-year average.

## Fertilization

According to surveys taken every four years from 1993-2009, olive growers applied on average about 75 lbs N/acre each year. Annual phosphate applications ranged between 30-80

lbs P<sub>2</sub>O<sub>5</sub>/acre, and potash applications between 20-56 lbs K<sub>2</sub>O/acre. All nutrients were applied on average once or twice a year<sup>[9]</sup>.

## References

1. Connell, J., 1994. History and scope of the olive industry. In: Sibbett, G.S., Ferguson, L., (Ed.). Olive Production Manual- 1<sup>st</sup> Edition. University of California Agricultural and Natural Resources Publication 3353. p. 1-9.
2. Danovich, T., 2015. California olive growers cutting down orchards. Modern Farmer, April 7, 2015. Available online at: <http://modernfarmer.com/2015/04/california-olive-industry/>
3. FAOStat. Available online at: <http://faostat.fao.org/site/339/default.aspx>. Accessed July, 2016.
4. Menker, S., 2016. California's olive oil revolution. Gro Intelligence Weekly, May 20, 2016. Available online at: <https://gro-intelligence.com/insights/californias-olive-oil-revolution>.
5. Sibbett, G.S., Ferguson, L., Fichtner, E., 2013. Best practices for growers. Available online at: <http://olivecenter.ucdavis.edu/learn/growers>.
6. Taylor, J.M., 2000. The Olive in California. Ten Speed Press, Berkeley, CA.
7. USDA NASS. Historical Data. Available online at: [https://www.nass.usda.gov/Statistics\\_by\\_State/California/Publications/Historical\\_Data/index.php](https://www.nass.usda.gov/Statistics_by_State/California/Publications/Historical_Data/index.php) (Accessed July, 2016)
8. USDA NASS archive: Noncitrus Fruits and Nuts Reports. Available online at: <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1113> (Accessed July, 2016)
9. USDA NASS. Quickstats. Available online at: <http://quickstats.nass.usda.gov/> (Accessed July, 2016)
10. Vossen, P.M., 2007. Olive oil: history, production, and characteristics of the world's classic oils. HortScience 42, 1093-1100.
11. Vossen, P.M., 2013. Growing olives for oil. In: Aparicia, R., Harwood, J., (eds). Handbook of Olive Oil: Analysis and Properties. Springer Science + Business Media New York, 2013. p. 19-56.

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