

Sunflower Production in California

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Historic Background

Sunflower is native to North America, and has been cultivated by Native Americans throughout the US for several thousand years. It was introduced to Europe in the 1500s, where varieties for eating directly (known as “confection”) and for oil were developed, particularly in Russia. These varieties were re-introduced to the US in the late 1800s by Russian immigrants ^[7]. California first started to grow sunflower commercially in the early 1900s, and was one of the major US producers until after World War 2. Early California production was primarily confection seeds for roasting, with birdseed and hulled seeds as secondary markets. Most sunflower was grown in the Delta region, although by 1964 some acreage was starting to be grown in the Sacramento and San Joaquin valleys. However, production of sunflower seed as a field crop was already beginning to be threatened by competition from higher-value crops for land, and by lower priced competition from other states ^[1].

In the late 1960s, new high-oil Russian varieties began to be more widely planted in the US, and breeders developed the first hybrid seeds ^[7]. By 1972, certified sunflower seed was being produced in Yolo County ^[9]. The acreage of sunflower for certified seed, which commands a much higher price, increased through the 1980s and 1990s, while the acreage of sunflower as a field crop generally declined ^[11] (Figure 1).

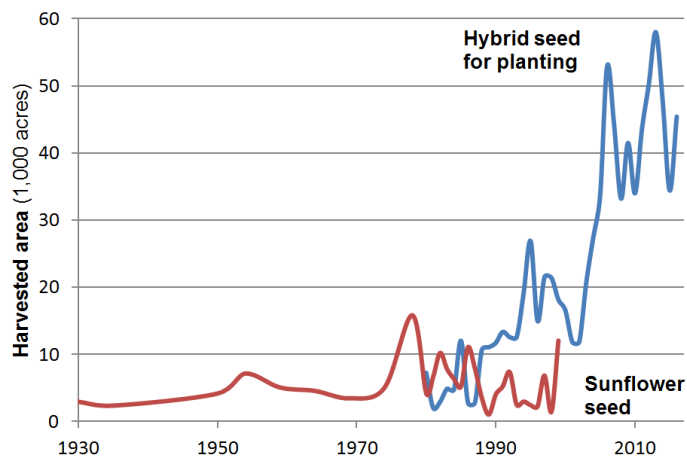


Figure 1: Area of sunflower harvested in California since 1930. Values prior to 1980 are averages based on censuses taken every four years. After 2000, only data for sunflowers grown for seed was reported ^[9,10,11].

By the turn of the century, all reported California sunflower acreage was for certified seed, and California produced more than 90% of the hybrid seed grown in the US. Acreage grew dramatically in the 2000s, more than quadrupling between 2002 and 2006 ^[11]. In 2009, sunflower was the largest seed crop in California by acreage ^[4] and in 2014 California grew about a quarter of the world’s supply of hybrid sunflower seed ^[5]. Acreage in the last decade has fluctuated widely, since demand for California hybrid sunflower seed depends on the state of the economies of major customers like Russia and Ukraine, as well as the worldwide prices of other crops ^[2].

Today’s Production

California accounts for less than 2% of US sunflower acreage ^[10]. However, it produces about 95% of the hybrid seed planted in the US. Russia, Ukraine, Eastern Europe and Argentina are also major markets ^[4,5].

Ninety-nine percent of California sunflower is produced in the Sacramento Valley ^[10]. In 2012, Yolo was the top sunflower producing county, accounting for almost 40% of the total reported acreage. Sutter, Solano, Colusa,

Glenn and Sacramento counties also have significant acreage (Figure 2). Production is limited in the San Joaquin Valley, as the heat can limit pollination ^[2].

Sunflowers are grown under both irrigated and dryland conditions. In 2012, about 60% of the reported acreage in California was irrigated; in Yolo County, about 75% of the acreage was irrigated. Historically this has been furrow irrigation. However, drip irrigation has become more common since processing tomatoes, with which sunflowers are often rotated, are now largely drip-irrigated ^[8]. Seed for both oil- and non-oil sunflower types are produced. However, the proportion of non-oil types declined steeply as overall acreage has risen: at the 2002 census almost 40% of sunflower acreage was non-oil types, while at the 2012 census it was only 5-10% ^[10].



Figure 2: Top sunflower-producing counties in California according to 2012 USDA census data ^[10].

Yield

Sunflower yields increased following the adoption of mineral fertilizers and irrigation in the 1950s ^[1]. Average yields of hybrid seed have tended to be stable or decrease since the 1980s, and are generally lower than the US average (Figure 3). The low per acre average yields are partly because hybrid seed production requires that rows of unharvested male pollinator sunflowers be alternated with the rows of harvested females ^[5]. In addition, California also produces foundation seed, the inbred females from which hybrids are produced. In some varieties, these inbred females may have very low yield potential ^[3].

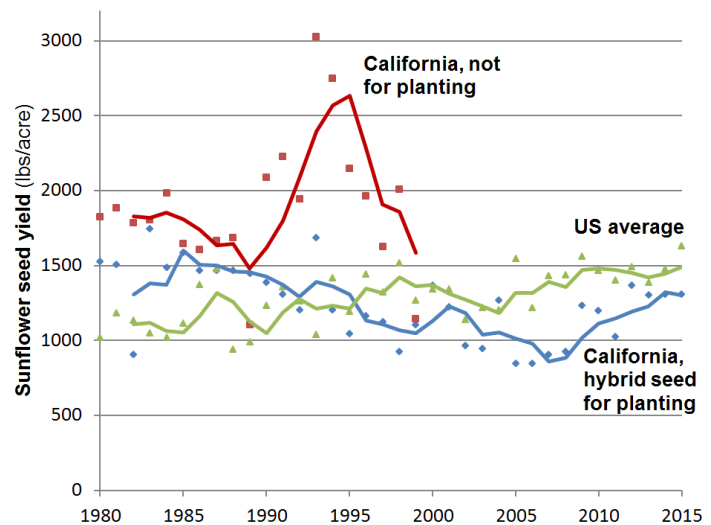


Figure 3: California and national sunflower seed yields since 1980. Lines represent the 3-year average ^[9,10,11].

Fertilization

According to the 2011 cost study for producing sunflowers for seed in the Sacramento Valley, a common production practice is to apply 8-24-6 as a starter fertilizer

during planting at a rate of 15 gallons/acre, followed by a sidedress application of 80 lbs N/acre injected as UN-32 ^[6].

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