

Corn Production in California

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Background

Corn was the most important crop in the early Spanish missions and became well established in the coastal valleys. In the second half of the 19th century, however, corn was displaced by small grains and other crops. Attempts to grow corn in the Sacramento and

San Joaquin Valleys were at first unsuccessful because the pollen perished under the hot and dry conditions. New varieties bred and tested under Central Valley conditions were better adapted and allowed to expand the corn production area ^[3].

Production area

Grain corn

Since 1950 corn production has increased considerably in California ^[5]. Between 1950 and 1957 alone, the grain corn area increased from 40,000 acres to 260,000 acres (Figure 1). This expansion extended the production from the Delta to the San Joaquin Valley, where land became available due to restrictions in the cotton acreage. Favorable corn prices, adapted hybrids, improvements in corn management, and machinery innovations contributed to this expansion ^[2]. Corn price continued to be an important factor affecting the area planted to corn in the following years. The largest area harvested as grain corn was recorded in 1984 with 375,000 acres. Since then, however, the acreage has decreased and averaged 160,000 acres since the turn of the century ^[5]. The drop in production in the late 80s, early 90s was due to low prices, reduced water availability and higher energy costs for pumping ^[2]. Since the late 1950s when detailed data have been reported, more than 90% of California's grain corn acreage has been harvested in the Sacramento Valley and the San Joaquin Valley, with the latter having a slightly bigger share ^[4]. The leading counties in 2012

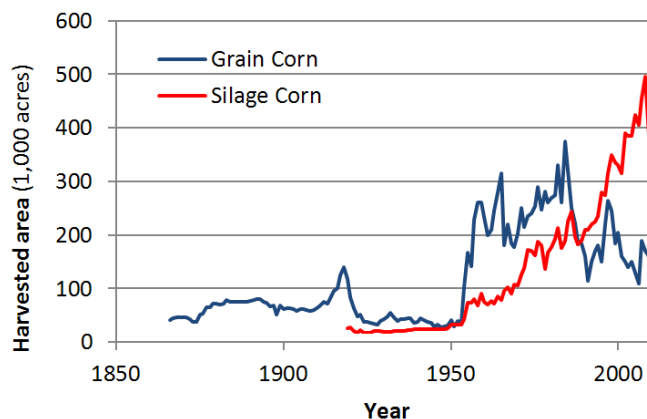


Figure 1: Harvested corn acreage in California from 1866 to 2011 ^[5].



Figure 2: Location of the five leading grain corn producing counties in California ^[4].

were Sacramento, Sutter, Yolo, Merced and San Joaquin (Figure 2).

Silage corn

The increase in the area harvested as silage corn has even been more impressive. While 32,000 acres were harvested in 1950, the area harvested had increased to almost 500,000 acres by 2008 [5]. Since the 1970s, more than 80% of the acreage harvested in California has been located in the San Joaquin Valley, with Tulare, Merced, Kings, Stanislaus, and San Joaquin being the dominant counties (Figure 3). San Joaquin Valley’s share on the silage corn acreage has even increased in recent years, reaching about 95% [5]. The nearly exponential increase in the acreage harvested as silage corn in California is entirely due to increased production in the San Joaquin Valley. In the rest of the state, the area harvested as silage corn fluctuated between 14,000 and 50,000 acres with no clear trend over time. The strong increase in silage corn production was closely related to an increase in milk production, indicating that the expansion of the dairy industry was the main driver behind the increased silage corn production (Figure 4).

With approximately 30,000 acres harvested, sweet corn is produced on a much smaller scale [5].



Figure 3: Location of the five leading silage corn producing counties in California [4].

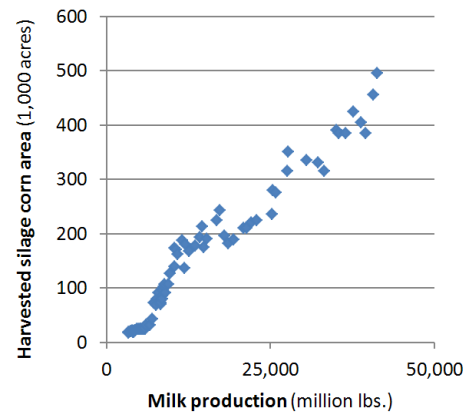


Figure 4: Relationship between silage corn and milk production in California [4].

Yield

Corn yield has also increased considerably since the 1950s (Figure 5). Between 1866 and 1948, annual grain yield increased by roughly 5.5 lbs/acre. Since then, however, it increased by an average of 140 lbs/acre each year [5]. Currently, the grain yield is close to 190 bu/acre (5.25 tons/acre). Silage corn yield increased almost linearly since 1919 from 7 tons/acre to 26 tons/acre in 1987. Since then it has stabilized, fluctuating between 23 and 27 tons/acre [5].

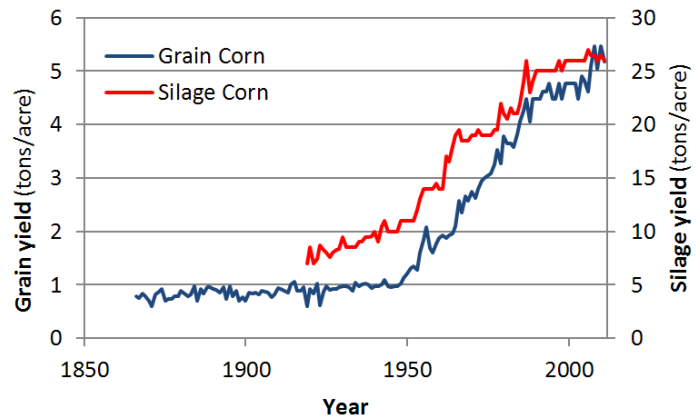


Figure 5: Development of grain and silage corn yield in California from 1866 to 2011 [5].

The steady yield increase in corn yield can be attributed to improved varieties, better fertilization, weed and insect control; and other cultural practices ^[2]. On average of the years

from 2007 to 2011, grain corn yield in California was 22% higher than the U.S. average, while silage corn yield was 41% above the national average ^[4].

Fertilization

A survey carried out in the San Joaquin Valley in 1999 revealed that on average 205 lbs N/acre were applied, with application rates ranging from 120 to 305 lbs/acre. UN32 was the most widely used mineral fertilizer, followed by urea, anhydrous ammonia, ammonium sulfate

and various blends. More than half of the growers applied N by means of shanking it in. Other common practices were broadcast application followed by watering the N in and application with furrow or flood irrigation ^[1].

References

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