A collaboration between:

Strawberry Production in California

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Background

With strawberries being a highly perishable fruit, the California strawberry industry developed within easy reach of large population centers early in the 20th century [5]. In 1926, 40% of the strawberry acreage was located in Los Angeles and Orange Counties, 25% on the Central Coast surrounding San Francisco, 19% in Sacramento County, and 12% in the San Joaquin Valley [5].

Yields in California were much higher than yields in any other strawberry-producing regions in the United States because of the mild climate which allowed harvesting strawberries over a long period extending from April until November [5]. Thanks to the long harvest period, some strawberries could be shipped to the inter-mountain states and to eastern markets. In early spring and from late summer through fall California berries did not meet competition with locally grown berries. However, only a small proportion of the harvest, mainly from the Sacramento region, was shipped out of state in the 1920s and 1930s [5, 6]. Transportation costs were high, limiting the quantities which could be shipped and sold to prices attractive to both consumers and growers [6].

In the 1930s, California strawberries accounted for only 6-7% of the total U.S. production [6]. Before the Second World War, most strawberries in California were produced for the fresh-fruit market, with only a minor portion of the total crop being manufactured into preserves [6]. Back then, the Pacific Northwest dominated the marked for preserved strawberries due to lower production costs [6]. In a UC publication from 1939, Thomas concluded that "*Probably California cannot seriously compete with the Pacific Northwest in either small-package quick-freeze or in barreled frozen-pack strawberries, because of the higher costs of production in this state. The low labor and land costs in Washington and Oregon, coupled with the fact that ordinarily growers there do not irrigate, materially favors reduced costs compared with those of California. In addition, the quality of the berries grown in California, partly because of the varieties used, is not considered as desirable for preserving purposes*" [6].

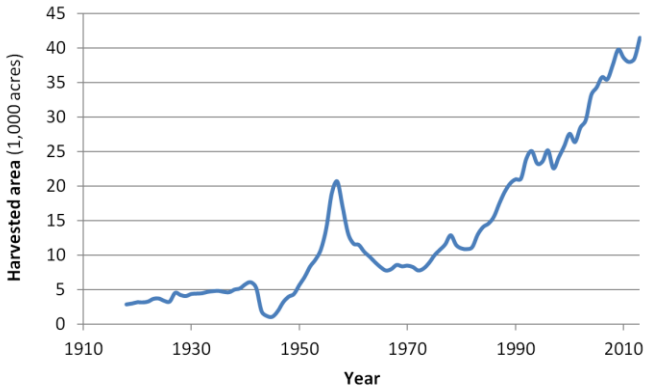

Figure 1: Area of bearing strawberries in California since 1918 [8].

The situation changed dramatically after the Second World War and California became the nation's leading producer of strawberries with astonishing rapidity [1]. The first postwar decade was a "boom" period in strawberry production, particularly in California (Figure 1). The Salinas Valley became the largest commercial strawberry producing area in the world. The successful production and marketing of frozen strawberries were the dominant factors in California's dramatic surge to the forefront of the industry [1]. At the same time, the population growth in California provided growers of fresh

strawberries with two of the largest markets in the nation, namely the Los Angeles area and the San Francisco Bay area, within easy transportation distance. In addition, improved facilities for delivering a perishable product to more traditional eastern markets were developed [1].

Between 1945 and 1957, the acreage increased from 1,100 acres to more than 20,000 acres (Figure 1). In 1957, over 550 million pounds of strawberries were harvested in the U.S. with California accounting for over 40% of this total [1]. Freezing became the major method of utilization. However, this rapid expansion in production was not met with a similar increase in demand, resulting in overproduction, principally of frozen strawberries [1]. After the boom, the acreage dropped within a few years to below 8,000 acres and most strawberries in California were again produced for the fresh market. The acreage started to expand again in the 1970s. But it wasn't until 1989 that it exceeded 20,000 acres again [8].

The strawberry production area continues to grow by an average of about 800 acres per year, reaching 41,500 acres in 2013 (Figure 1) [8]. Approximately 75% of the strawberries produced in California are now harvested for the fresh market, while about 25% are frozen for the processed market [3]. California's market share has increased further over the years. Approximately 90% of the strawberries produced in the U.S. are now harvested in California [7].

Yield

Strawberry yields in California have been higher than in most other parts of the U.S. since the early 20th century, thanks to the mild climate that allows for a long harvest period [5]. Before the Second World War, yields generally ranged between 40 and 80 cwt/acre (Figure 2) [8]. After the War, yields started to increase. Slowly at first, but at a much higher rate in the 1960s, reaching 320 cwt/acre in 1969. This strong increase was principally attributed to the use of a new fumigant in soil preparation, as well as other factors including the virtual elimination of the cyclamen mite, and particularly favorable climatic conditions [1]. Yields have continued to increase by an average of close to 9 cwt/acre, exceeding 700 cwt/acre in 2012 [8]. Improved management practices and high-yielding, well adapted varieties have contributed to this increase. Many varieties have been bred at the University of California. Today, University of California varieties are planted on more than half of the state's acreage [3].

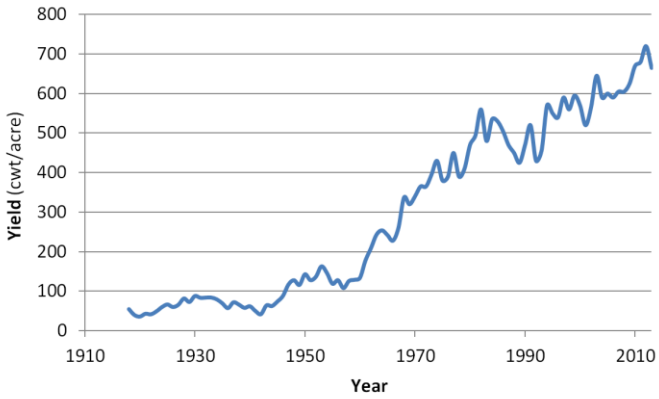

Figure 2: Strawberry yield since 1918 in California [8].

Regional Production

Today, strawberries are primarily produced along the coast from Santa Cruz in the north to Ventura County in the south (Figure 3). In 2012, about 60% of California's strawberry acreage was located in Monterey and Ventura County, while Santa Barbara, San Luis Obispo and Santa Cruz Counties contributed a combined 35% of the state's acreage [4].

In Southern California, the main production season is from September to June, while on the Central Coast, strawberries are mainly produced between March and December. A small proportion of the production is harvested in the San Joaquin Valley, primarily for the processed fruit market [3].

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

Fertilization

Based on USDA survey data, the annual nitrogen application rates to strawberries averaged 225 lbs/acre between 1992 and 2010 [7]. The application rates were highest in 1992 but remained relatively stable since then (Figure 4).

The potassium application rate averaged 133 lbs K_2O/acre since 1992, while the average phosphorus application rate was 113 lbs P_2O_5/acre (Figure 4) [7]. Both phosphorus and potassium application rates increased over time.

A study carried out during the 2009/10 and 2010/11 production seasons in 26 commercial strawberry fields located in the Salinas and Pajaro Valleys found that the preplant application of controlled release fertilizer is almost universal. The seasonal nitrogen application rates ranged from 125 to 430 lbs/acre. Preplant application rates of controlled release fertilizer varied from 45 to 120 lbs/acre. The remainder was fertigated during the growing season [2].

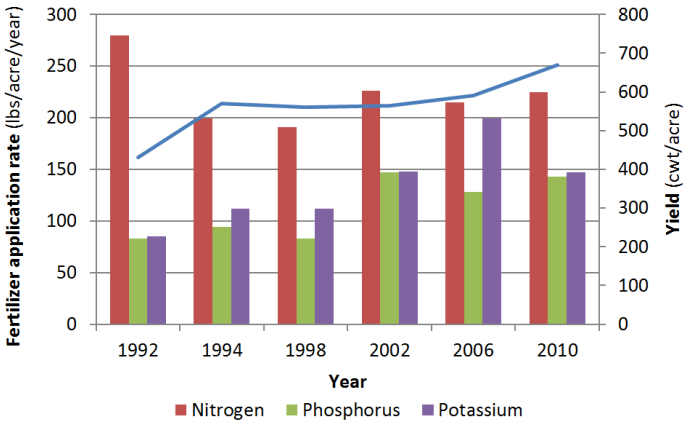

Figure 4: Fertilizer application rates to strawberries in California [7].

References

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This document is available online at https://apps1.cdfa.ca.gov/FertilizerResearch/docs/Strawberry_Production_CA.pdf

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