

Potato Production in California

Patricia Lazicki, Daniel Geisseler and William R. Horwath

Background

Potatoes were an important market garden crop in California prior to the Gold Rush, and were the only vegetable crop that was not grown entirely for local markets ^[10]. Production of California potatoes increased in the late 1800s along with that of other vegetables as improvements in refrigeration allowed for transportation to the East Coast. Prior to 1900, most potatoes were grown on the islands of the San Joaquin-Sacramento Delta and near Half-Moon Bay, south of San Francisco ^[1]. During the 1930s Kern County and the Tulelake region, the current centers of potato production, developed important potato industries ^[1]. The 1930s and 1940s saw a large increase in total potato production, as both acreage and yields sharply rose ^[11] (Figures 1 and 2). “White Rose”, an old variety from New York, was found to be especially well adapted to Kern County conditions and became the leading California variety ^[1,6]. Improvements in potato harvesting, irrigation and fertilization also contributed to the production increase ^[1,7]. In 1969 Kern County was the county with the second highest potato production in the nation and California was the state with the third highest potato production ^[7].

Since the late 1950s, busier American lifestyles and a decline in household size have caused a shift in consumption from fresh potatoes to processed, especially as frozen french-fries. American fresh potato consumption in 2005 was about half of that in 1960 ^[3]. This has reduced the market for

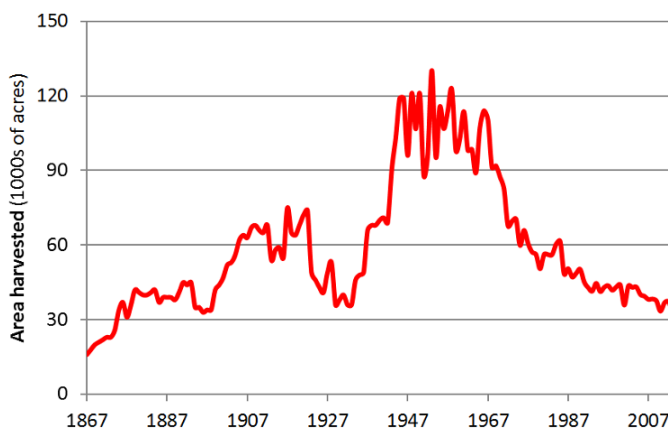


Figure 1: Acres of potato harvested in California since 1867 ^[11].

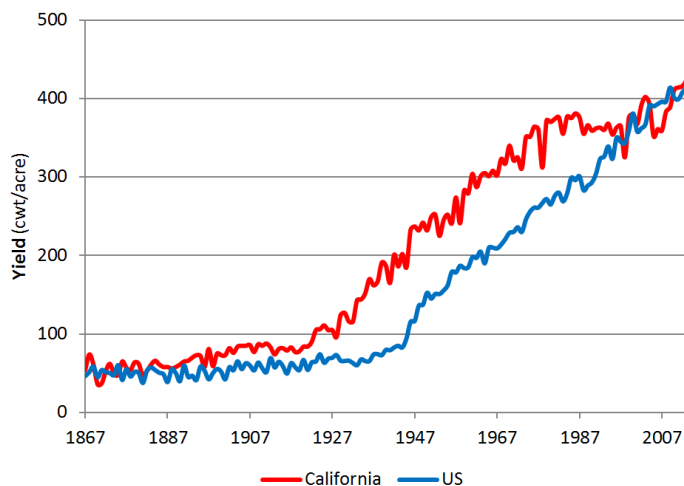


Figure 2: Average potato yields in California and the US since 1867 ^[11].

California potatoes, which are mostly consumed fresh although some are also grown for potato chips ^[1].

Yield

California potato yields, like those of the other Western states, are generally higher than the US average. Only Washington and Oregon attain higher yields ^[11]. Potato yields were relatively stable up till 1920, ranging between 50 to 100 cwt/ acre (Figure 2). Average California yield more than quadrupled between 1920 and 1980, from 84 to 370 cwt/ acre ^[11]. This increase was due in part to the introduction of “White Rose” to Kern County ^[7]. Otherwise, however,

this period saw little varietal improvement ^[1]. Improved cultural methods, i.e., increased fertilizer use and efficiency and better irrigation systems, also contributed to yield increases. Since 2005 yields have again started to rise, and in 2014 the average California yield was 470 cwt per acre ^[11]. A reason for this may be germplasm improvement, as most of the varieties currently planted were developed after 1980 ^[1,6].

Potato production in California

In 2014 California was the 9th largest potato producing state. The top producers are Idaho and Washington ^[11]. Potatoes are grown throughout the state (Figure 3). Because of the diversity of California’s climate, it is the only state which produces spring, summer, fall and winter-marketed potatoes ^[11]. California is the nation’s largest producer of spring potatoes, and the majority of California potatoes are spring-market potatoes grown in Kern County ^[11]. Kern County potatoes are normally grown on sandy soils and are planted in February and harvested in June ^[12]. Spring and summer-marketed potatoes (particularly red-skinned varieties) are also grown in the southern California desert valleys, being planted in late fall and harvested from mid-March to May ^[5]. The Tulelake region of Siskiyou and Modoc counties produces fall potatoes, mainly russets, which are planted in May and harvested in September or October. Fall potatoes are also grown on the peat soils of the Delta ^[12]. A survey of California growers in 2010 found 81% of potato acreage was sprinkler-irrigated; the highest proportion of any crop in the state. Only 2% was furrow-irrigated, and 17% was irrigated by drip or microsprinklers. The most widely grown varieties

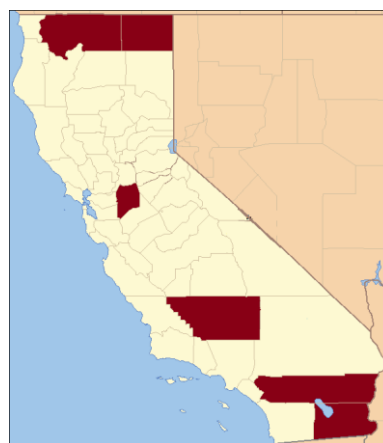


Figure 3: Location of the major potato producing counties in California, 2002-2012 ^[11].

have historically been “White Rose” in Kern County and the southern California desert valleys and “Russet Burbank” in the Tulelake region. “Red LaSoda” and “Kennebec”, a chipping variety, were grown throughout the state ^[1]. Today, the most widely grown variety is “Russet Norkotah”, an early maturity fresh market russet variety ^[12]. There is also a growing specialty market for potatoes with uncommon flesh and skin colors ^[13].

Fertilization

Based on University of California regional cost studies, Rosenstock and coworkers^[8] estimate that California potato growers typically applied about 248 lbs N per acre in 2010, a 31% increase from 1971. Some nitrogen is normally applied prior to planting and the remainder in-season through fertigation^[2,4,5]. Phosphorus and potassium are normally applied prior to planting.

A typical annual phosphorus application rate is about 100 lbs P₂O₅ per acre^[2,4,5]. Potassium is often not applied^[4,5]; however, rates as high as 150 lbs K₂O per acre are typical of Tulelake potato production^[2]. These rates are in line with national averages for fall potatoes reported by the USDA: 205 lbs N, 129 lbs P₂O₅ and 149 lbs K₂O per acre per year^[11].

References

- Brendler, R., Johnson, H., Lorenz, O., Mayberry, K., McCalley, N., Scheuerman, R.,...Tyler, K., 1983. Vegetable Crops. In: Scheuring, A.F., (Ed). A Guidebook to California Agriculture. University of California Press, Berkeley and Los Angeles. pp 63-185.
- Carlson, H.L., Klonsky, K.M., Livingston, P., 2008. Sample costs to produce potatoes: Klamath Basin in the Intermountain region. UC Cooperative Extension. Available online at: <http://irec.ucanr.edu/files/190390.pdf> (Accessed July, 2015)
- Guenther, J., 2010a. Potato Consumption. In: Bohl, W.H., Johnson, S.B., (Eds.). Commercial Potato Production in North America. American Potato Journal Supplement Vol. 57, second revision. pp. 7-9. Available online at: <http://vric.ucdavis.edu/pdf/POTATOES/Commercial%20Potato%20Production%20in%20North%20America%202010.pdf> (Accessed June, 2015).
- Guerard, J., 1987. Sample costs to produce potatoes: Kern County. UC Cooperative Extension. Available online at: http://coststudyfiles.ucdavis.edu/uploads/cs_public/74/a5/74a512d0-e084-45e8-9584-3c01cdfc77de/potatoes-1987-southsanjoaquin-kerncounty.pdf (Accessed July, 2015).
- Mayberry, K.S., 2000. Sample cost to establish and produce potatoes, Imperial County. UC Cooperative Extension. Available online at: http://coststudyfiles.ucdavis.edu/uploads/cs_public/0b/a5/0ba5f71e-5290-45b5-9b38-7190b7883388/potatoes.pdf (Accessed July, 2015).
- Potato Association of America, 2015. "Varieties". Available online at: <http://potatoassociation.org/industry/varieties> (Accessed July, 2015)
- Pusateri, F.P., 1969. California potatoes: historical background. Kern Vegetable Crops Newsletter, October 2007. Available online at: http://cekern.ucanr.edu/news_80/Kern_Vegetable_Crops_Newsletter/?newsitem=35235 (Accessed July, 2015).
- Rosenstock, T.S., Liptzin, D., Six, J., Tomich, T.P., 2013. Nitrogen fertilizer use in California: Assessing the data, trends and a way forward. California Agriculture 67, 68-79. Available online at: <http://californiaagriculture.ucanr.edu/landingpage.cfm?article=ca.E.v067n01p68&fulltext=yes> (Accessed July, 2015).
- Tindula, G.N., Morteza, N.O., Snyder, R.L., 2013. Survey of irrigation methods in California in 2010. Journal of Irrigation and Drainage Engineering 139, 233-238.
- Tufts, W.P., Allen, F.W., Brooks, R.M., Condit, I.J., Cruess, W.V., Davey, A.E., Davis, L.D., Erdman, H.E., Hansen, C.J., Hendrickson, A.H., Hodgson, R.W., Philp, G.L., Shear, S.W., Winkler, A.J., 1946. The rich pattern of California crops. In: Hutchison, C.B. (Ed.). California Agriculture. University of California Press, Berkeley and Los Angeles. pp. 113-238.
- USDA NASS. Quickstats. Available online at: <http://quickstats.nass.usda.gov/> (Accessed June 2015)
- Voss, R.E., 2004. Reducing fertilizer needs of potato with new varieties and clonal strains of existing varieties. FREP final report. Available online at: <http://www.cdffa.ca.gov/is/docs/Voss00f11.pdf> (Accessed June, 2015)
- Wilson, R., Culp, D., Nicholson, K., Peterson, S., 2014. 2014 Annual progress report: Potato variety development in Tulelake. UC ANR Research Report No. 263. Available online at: <http://irec.ucanr.edu/files/205762.pdf> (Accessed July, 2015)

Patricia Lazicki is an Assistant Specialist in the Department of Land, Air and Water Resources at the University of California, Davis.

Daniel Geisseler is an Assistant Cooperative Extension Specialist in Nutrient Management in the Department of Land, Air and Water Resources at the University of California, Davis.

William R. Horwath is professor of Soils and Biogeochemistry in the Department of Land, Air and Water Resources and the James G. Boswell Endowed Chair in Soil Science at the University of California, Davis.

The document has been prepared within the project "Assessment of Plant Fertility and Fertilizer Requirements for Agricultural Crops in California", funded by the California Department of Food and Agriculture Fertilizer Research and Education Program (FREP).

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

Last update: June, 2016