

# Crop Profile for Grapes (Table) in California

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## General Production Information

- **Production.** California is ranked number one in production of table, wine, and raisin grapes in the United States, producing 97% of the table grapes grown in the United States and more than 10% of the world's production (5,8). Table grape production in 1998 was 694,000 tons (66.5 million 21-lb equivalent boxes), valued at \$806 million (8). Average production from the five-year period 1994-1999 was 706,000 tons (67.2 million 21-lb equivalent boxes), with average annual value of \$865 million (8).
- **Acreage.** Bearing grape acreage in California in 1998 was 691,664 acres, of which about 115,000 acres (16%) were table grapes (5). This acreage figure includes acreage of varieties used solely for table grapes (e.g., Flame Seedless, Red Globe, Perlette, and many others) and an estimate of the acreage of Thompson Seedless grapes that are harvested as table grapes, about 35,000 acres. Thompson Seedless acreage is also a major variety for raisin and wine production. Organic growing acreage accounts for 1.5% of the total grape growing acreage (California Certified Organic Farmers, personal communication).
- **Ranking.** Grapes are the number two ranked commodity in California, following dairy production. Table grape production in 1998 was valued at \$788 million (8).
- **Varieties.** Thompson Seedless and Flame Seedless grapes are the primary varieties used to produce table grapes. Other important varieties are Red Globe, Ruby Seedless, Crimson Seedless and Perlette. Over 50 varieties in total used for table grapes in California (8).
- **Growing Regions.** About 85% of California's table grape production is in the Southern San Joaquin Valley region, with the Coachella Valley region accounting for the bulk of the remaining production (5,8). San Joaquin and Merced counties in the Northern San Joaquin Valley account for less than 0.5 % of production.
- **Primary Counties.** The major table grape production counties are Kern, Tulare, Riverside and Fresno, with much smaller production from Madera, San Joaquin, San Bernardino, Kings, Merced and Imperial counties (4,8).
- **Exports.** In 1997, table grapes ranked 4<sup>th</sup> for California exports, valued at \$330,800,000 (8).

- **Costs Per Acre.** The estimated total cost to produce an acre of table grapes in 1998 was \$6,841 per acre (\$5559/ac operating costs, \$214/ac cash overhead costs, and \$1067/ac non-cash investment costs) (47).
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### **Production Regions**

Grapes are grown in all areas of California with the exception of the high country. The University of California identifies six regions for grape production within the state:

1) The northern San Joaquin Valley: San Joaquin, Calaveras, Amador, Sacramento, Merced, and Stanislaus Counties; 2) The Southern San Joaquin Valley: Fresno, Kings, Tulare, Kern, and Madera Counties.; 3) The Coachella Valley: The Coachella regions of Riverside, Imperial, and San Bernadino Counties; 4) North Coast: Lake, Mendocino, Napa, and Sonoma Counties; 5) Central Coast: Alameda, Monterey, San Luis Obispo, Santa Barbara, San Benito, Santa Cruz, and Santa Clara Counties and 6) South Coast: San Diego, and Western Riverside counties. Each region has distinct climatic and geologic differences that lead to different cultural and pest management practices.

roduction of table grapes is largely centered in the Southern San Joaquin Valley region, although a significant portion of production comes from the Coachella Valley region (5). The remaining regions account for less than 1% of the state's production.

- **Southern San Joaquin Valley:** *85% of total table grape production.* Includes Fresno, Kings, Tulare, Kern, and Madera Counties. This region focuses more on a mixture of grape production, with wine and raisin grapes being produced in addition to table grapes. The Southern San Joaquin Valley region is the inland region from south of Merced to the Tehachapi Mountain Range. The region represents a wide variety of soil types. Light to medium textured soils with low organic matter predominate this region. Most vineyards are planted on flat land.
- **Coachella Valley:** *14% of total table grape production.* Includes Coachella regions of Riverside and Imperial counties, though table grapes are produced solely in Riverside County. This desert region is the inland region surrounding Indio, north of the Salton Sea. Soils are generally low in organic matter and nitrogen.
- **Northern San Joaquin Valley:** *<1% of total table grape production,* primarily from San Joaquin and Merced counties. Includes San Joaquin, Calaveras, Amador, Sacramento, Merced, and Stanislaus Counties, with production almost exclusively focused on wine, but with a very small amount of raisin and table grape production. The Northern San Joaquin Valley region is the inland region from Sacramento to Merced. Light to medium textured soils with low organic

matter predominate this region. Most vineyards are planted on flat land.

- **North Coast:** *0% of table grape production.* Includes Lake, Mendocino, Napa, and Sonoma Counties. The North Coast region is located north of San Francisco and includes the region from Napa to Ukiah.
  - **Central Coast:** *0% of table grape production.* Includes Alameda, Monterey, San Luis Obispo, Santa Barbara, San Benito, Santa Cruz, and Santa Clara Counties. The Central Coast Region is located south of San Francisco, from Livermore to Santa Ynez.
  - **South Coast:** *0% of table grape production.* Includes wine grape growing regions of San Diego, and Western Riverside counties. The South Coast region is located near San Diego and includes the region from Escondido to Temecula.
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## Cultural Practices

Cultural practices for grape production vary widely, depending on the intended use of the crop (i.e., table, wine, or raisin), the growing region, and the management preferences of the grower. Pest management priorities are also impacted by the intended use where, for example, control of pests that cause cosmetic damage to the fruit can be much more important in the production of table grapes than in wine and raisin grapes.

**Table Grape Varieties and Production.** There are over 50 varieties of table grapes grown in California, 18 of which are considered major varieties. Thompson Seedless and Flame Seedless are the two dominant varieties produced in California, followed by Red Globe, Ruby Seedless, Crimson Seedless and Perlette (5,8). Table grape production primarily occurs in the warm, dry inland valleys, with most of the production being in the Southern San Joaquin Valley region (Fresno, Kern, Kings, Madera, and Tulare Counties) and Coachella Valley region. Sandy loam to clay loam soils are preferred.

**General Practices.** Vines are pruned during the dormant season and, for cane-pruned varieties, canes are tied to the trellis wires before spring growth starts. Pre-emergent herbicide applications are applied during the dormant season, and most contact herbicide applications are made from fall through late spring. Nitrogen and zinc fertilizers are applied in the spring, with potassium and boron fertilizers applied in fall through winter. Drip irrigation has recently become the preferred method of irrigation,

though furrow irrigation still dominates in the southern San Joaquin Valley. Other production practices include canopy management (i.e., vine training, shoot positioning, leaf pulling, and trunk suckering), vineyard floor management (i.e., cover cropping, cultivation and mowing), pest management, and harvesting. Cultural practices such as irrigation and floor management can play a role in pest management. Once harvested, the grapes are picked, field packed, kept in cold storage, fumigated with SO<sub>2</sub>, and transported to markets.

### **Pests Of California Table Grapes**

The following summaries of grape pests and their management are based, to a large extent, on the summaries compiled and distributed by the University of California Integrated Pest Management Project (UC-IPM Project)(2,24,38,48). These guidelines were authored by many different specialists and advisors from the University of California's Cooperative Extension. We wish to acknowledge this contribution.

The following pest management summaries are also based on publications and documentation from the UC Division of Agriculture and Natural Resources, the UC Sustainable Agriculture Research and Education Program, California's Department of Pesticide Regulation, the Lodi-Woodbridge Winegrape Commission, the Central Coast Vineyard Team, and other sources of documentation on grape pest management. The summaries are also based on extensive comments and suggestions from individuals from the agricultural community and members of the California Grape Advisory Team, who include: Jenny Broome, Associate Director, UC SAREP; Paul (Augie) Feder, Agricultural Policy Specialist, U.S. EPA Region 9; Karen Ross, President, California Association of Winegrape Growers (CAWG); Joe Kretsch, Project Coordinator, Sun-Maid Raisin Best Management Practices Program; Rick Melnicoe, CAPIAP; Linda Herbst, CAPIAP; Charlie Goodman, Research Manager, Office of Pesticide Analysis and Consultation, California Department of Food and Agriculture (CDFA); John Steggall, Office of Pesticide Consultation and Analysis, CDFA; Mike Vail, Viticulturist, Vino Farms, Inc.; Frank Zalom, Director, UC Statewide IPM Program; Jennifer Curtis, Environmental Policy Consultant to the Natural Resources Defense Council (NRDC); Richard Matoian, California Grape and Tree Fruit League. Special thanks to the following individuals for their helpful reviews of sections in their area of expertise: Drs. Jeffrey Granett and Amir Omer (phylloxera), Dr. Kent Daane (mealybugs), Dr. Alex (Sandy) Purcell (sharpshooters), Dr. Mike McKenry (nematodes), Dr. Doug Gubler (powdery mildew, measles) and Dr. Tim Prather (weeds).

The grape pests in this document are separated into major insect and mite pests, minor insect pests, nematodes, major and minor diseases, weeds, and vertebrate pests. The order of each pest is presented based on its importance to the pest management system, in terms of pesticide use, control efforts, or actual or potential damage.

Except where otherwise noted, the pesticide use data presented in the following summaries are based on

69. Wickerhauser, O., R. Smith and L. Varela. 1998. Sonoma Valley Vintners & Growers Alliance and University of California Cooperative Extension.. Development of Integrated Pest Management Approaches for Wine Grape Growing areas of Sonoma Valley.
70. Wilson, L.T., D.L. Flaherty and W.L. Peacock. 1992. Grape leafhopper. *In* D.L. Flaherty, L. P. Christensen, W. T. Lanini, J. J. Marois, P. A.. Phillips and L.T. Wilson (eds.) Grape Pest Management. University of California Division of Agriculture and Natural Resources Publication No. 3343.

## Appendices

### PLANT GROWTH REGULATORS

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#### GIBBERELLIC ACID

**Description.** Gibberellic acid is applied on nearly all table grape acreage. It is applied at a median rate of 0.02 lb ai/ac, although the rates for bloomtime application are much lower than the rates at berry set. It is applied at bloomtime to thin the number of berries per cluster, and at berry set to enlarge the berries.

#### ETHEPHON

**Description.** Ethephon (ETHREL) is used on 8% of table and raisin grape acreage at a median application rate of 0.25 lb ai per acre. Ethephon increases color, sugar content and decreases the acidity of grapes. It has the negative effect of reducing berry firmness and reducing storage life. It can also reduce the vigor of vines.

#### HYDROGEN CYANAMIDE

**Description.** Hydrogen cyanamide (DORMEX) is used on about 3% of table grape acreage at an application rate of about 15 lb ai per acre. This plant growth regulator is used to increase budbreak in areas of low winter chill, particularly in the Coachella Valley. It is used on approximately 50% of the grape acreage in this region.

### POST-HARVEST PESTS