

# Research in Viticulture

## work aims at better quality of grapes and wines and at development of improved production methods

The following report was prepared by members of the staff of the Division of Viticulture at Davis, under the chairmanship of Albert J. Winkler.

**The Division of Viticulture** investigates all phases of grape growing and wine production.

It aims to discover the basic facts underlying practices not fully understood; to supply information that will lead to the development of better methods for grape and wine production; and to investigate ways to improve and maintain the individual quality of grapes, raisins, and wines.

The primary factors influencing the quality of a wine are: the variety of grape, and the production and aging procedures used in its preparation.

Testing of grape varieties as to the quality of wine which they are capable of producing is being continued along three lines: testing of new named varieties, of newly produced unnamed hybrids, and of old varieties by new procedures in an attempt to improve the resulting products.

The present varietal recommendations are based on continued studies conducted in all wine-growing regions of the state since 1934.

### Wine Production Tests

Improvements in wine production procedures are under study. A continuous method of heat treating grapes has been developed in co-operation with the Division of Food Technology and is presently being used in three wineries in the Fresno and Lodi areas. Controlled tests in these wineries show that a great deal more color is obtained and the quality of the resultant wine is at least equal to that produced from unheated musts.

Maturity studies of wine grapes concentrate on acid components, mainly tartaric and malic acids. Because of the technical difficulty of using the tartaric acid/malic acid ratio, attention is given to the Balling, acid ratio as a means of differentiating varieties according to their best utilization. Varieties with a low ratio have been found to be best suited for table wine production, and those with a high ratio to dessert wine.

Work is being intensified to determine the chemical composition of the aroma and flavor materials in grapes in order to increase production of more flavorful grapes and wines. The Muscat of Alexandria grape is being studied first because

its characteristic aroma makes the problems of isolation and concentration of the aroma material easier to follow by smell. The variety is available in large quantities from many different viticultural areas of the state, which will make possible a correlation of aroma content with area of growth as soon as methods for determining the amount of aroma have been perfected. Work is also in progress with several table wine varieties such as Cabernet Sauvignon and Sauvignon blanc.

### Grape Size and Quality

Factors affecting berry size are being examined. Work has indicated that girdling to increase size of berry of the seedless varieties should be done as soon as possible after the normal shatter of flowers following the end of bloom. The time of thinning, if the vines are not overloaded, has no effect on berry size increase.

Factors of quality of seedless grapes for canning are being investigated. The largest Thompson Seedless berries stem best, but stemming still offers difficulties, and a more suitable variety may be necessary.

The effect of number of berries retained to a cluster at thinning on the increase of berry size and coloring of seeded varieties is being examined.

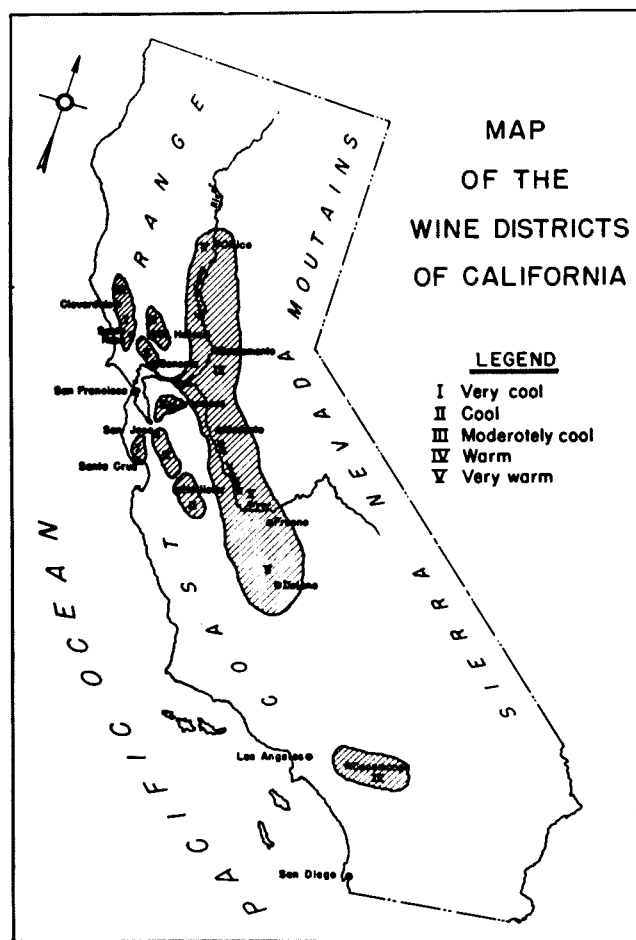
The effect of overcropping on fruit quality is under study. Results to date indicate that overcropping retards berry growth; results in abnormal Balling-acid ratios at a given degree Balling; in softer fruit; and in flat, thin wine, lacking color and stability. Studies of what overcropping may do to the vines are tied in with the maturity studies of wine grapes.

Work is underway on the response of Black Corinth, Thompson Seedless and other grapes to applications of plant growth regulators. Further research will determine the feasibility of using growth regulators commercially in seedless grape production. The injurious effects of 2,4-D and related compounds to grapes are being studied.

### Grape Storage, Breeding

In the research on grape storage, tests determine the effect of amount of crop, thinning practices, and maturity at harvest on the keeping quality of Thompson Seedless, Emperor, and Tokay. When storage facilities are provided, this work will be expanded into a comprehensive study of viticultural factors affecting storage quality.

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# Baby Klondike Watermelon

seeds of eight-inch watermelon of good eating quality commercially available in quantity

Glen N. Davis

The seeds of the Baby Klondike Watermelon—one of the midget melons—are available commercially in California.

Midget melons are of advantage for small families. They can be eaten in a single meal, and storage in refrigerator or cooler—if needed—is simple. They can be shipped to market in much the same manner as honey dew or Casaba melons.

One disadvantage is that midgets contain a considerably smaller percentage of heart flesh—compared to regions of seed—than do larger melons.

Baby Klondike is a late maturing,

round, green-skinned watermelon which at maturity weighs eight to 12 pounds. It has red flesh with small tan seeds, its flesh quality is good to excellent, and it is resistant to Fusarium wilt. Other pertinent data from the test plots at Davis are:

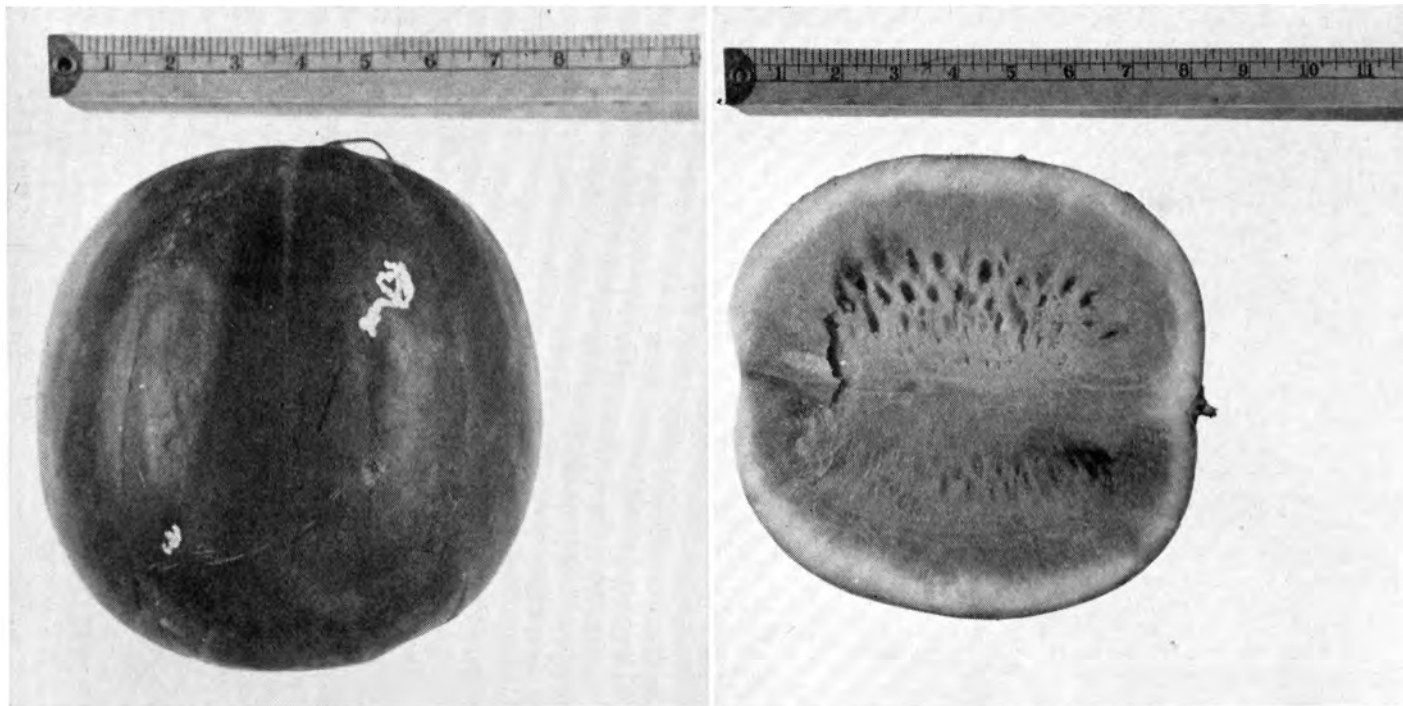
Average number of melons per acre . . . 2,896  
Average weight per melon . . . . . 11.4 lbs.  
Tons per acre . . . . . 16.1  
Average refractometer reading . . . . . 11.3  
Average shape . . . . . round

Baby Klondike originated from a cross of Baby Delight and Klondike R-7. This was followed by four generations of self-

pollination and selection. A plant from the fourth selfed generation was backcrossed to R-7. This again was followed by four years of self-pollination with selection. The seed from a single fruit of the fourth selfed generation was planted in isolation to grow the increase of stock seed for distribution. Small amounts of stock seeds were released to interested commercial seedsmen in the fall of 1949.

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*The above progress report is based on Research Project No. 906.*



Baby Klondike watermelon. Left, the whole fruit; right, longitudinal section.

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In the grape breeding program over 40,000 seedling vines of known parentage have been grown to fruiting, and data on the inheritance of fruit and vine characters obtained. Major objectives of the program are to develop seedless table grapes, varieties better adapted to wine and juice preparation, and rootstocks

resistant to phylloxera and nematode. Promising new varieties are tested thoroughly by comparison with standard varieties before release to growers. Nine table varieties and 75 wine and juice varieties are now undergoing comparison.

Over 100 rootstock plots in a variety of climatic and soil conditions are supplying data on vine vigor, yield, and fruit quality for fruiting varieties on the various rootstocks. The grape breeding pro-

gram involves breeding for resistance to virus diseases.

Fertilizer tests in all grape-growing areas from Mendocino to Riverside counties indicate some response to nitrogen on a number of soils, but practically no response to applications of phosphorus and potassium.

The application of trace-minor—elements, with the exception of zinc, have

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## VITICULTURE

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failed to produce results. Variation in the response to the application of zinc is under study. The problem of getting sufficient zinc into cane-pruned vines to correct little leaf is receiving further attention.

The level of the fertilizer elements in the plant tissues—such as leaf petiole—and its relation to probable intake of elements from the soil is being studied. This investigation aims at finding an indicator of fertilizer need in the plant.

Studies of the carbohydrate nutrition of the vine are concerned with the effect of amount of crop upon development of color in black vine grapes and wine quality. This experiment also considers the weakening and rejuvenation of the vines in relation to changes in carbohydrate food reserves. Another study investigates the influence of time of girdling and thinning on fruit development—coloring in red varieties—and the level of the carbohydrates in the wood of Thompson Seedless, Red Malaga, and Tokay.

## Brandy Production

Experiments determine the effect of numerous production factors on flavor and general quality of brandy. In this connection the grapes in the vineyard, the vinification or fermentation, the distillation and aging practices, and warehouse conditions are being studied.

Research compares brandies produced in batch or pot stills with those from the typical continuous columns. Differences in the newly distilled brandies made by the two methods are easily recognized by tasting and laboratory analyses. Changes during aging in wood under commercial conditions are being studied.

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*Paul F. Sharp.*  
 Director

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Maturing tests of brandies indicate that the conditions during the period of aging in wood have a relatively great influence upon the nature of the brandy.

Studies are in progress to make more specific recommendations for warehousing conditions.

Factors affecting the quality of neutral brandy and the resulting wines are being investigated. Various types of experimental dessert wines have been produced by using brandies of different character in equal portions of the same base wine. The extent of the influence of the brandy is being evaluated by periodic tastings. The microbiology of wines is being

studied to obtain a detailed understanding of the changes produced in must during fermentation and in wine during spoilage by yeast and bacteria.

Considerable progress has been made in a study of what happens to organic nitrogen and minor organic and inorganic constituents of must during alcoholic fermentation. This knowledge should help in an understanding of the general problems of wine spoilage and the use of wine in human nutrition.

Progress has been made in the preparation of conveniently handled pure yeast starters for wine fermentations, and field trials will start in 1952.

## DONATIONS FOR AGRICULTURAL RESEARCH

Gifts to the University of California for research by the College of Agriculture accepted in March, 1952

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Dow Chemical Co.....	5 lbs. S-1225; 4 lbs. 50% wettable Ovotran; sample of tech. K-1875
For investigations on control of northern fowl mite	

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