

# Table Grape Quality Factors

## causes of late maturing in 1946-47 and suggested procedure to improve quality in 1949

A. J. Winkler

Within the limit of a grape vine's capacity to bear fruit, the date of ripening is determined mainly by heat and can not be hastened by a reduction in crop.

The maximum amount the vine will bear without delaying maturity is an index to its bearing capacity. As the crop is increased beyond this point, the first effect is delayed maturity. A further increase in crop results in low acid as well as low sugar, waterberries, and drying of the berries at the tips of the clusters.

In 1946, in particular, and again in 1947 and 1948 much of the fruit had to be left on the vines long past the normal picking dates in most sections of the San Joaquin Valley in order to reach the necessary degree Balling for shipment.

The vineyards of California in the years 1946-48, produced an average of 219,000 tons more table grapes per year than they did during the relatively normal years of 1936-40. This was an increase of 55% in crop, while the increase in acreage amounted to only 4.5%

Some of the increase in yields may be credited to better vineyard care, such as more fertilization and better irrigation. The increase in the leaf surface of the vines resulting from the better vineyard practices would be relatively small—not so high as 55%.

Since 1930, the summation of heat required to bring the more important table grapes, when carrying normal crops, from full bloom to the minimum degree Balling requirement for shipment has been determined for numerous locations.

With temperature records and the blooming date known, it is simple to indicate when the fruit should be mature

for shipment, and the effect of seasonal conditions may be accounted for.

To indicate the effect of the large crops of 1946 and 1947 on the time of maturing—data for 1948 are still incomplete—the years 1932, 1933, and 1934 were chosen as a basis for comparison because they were years of normal crops and indicate the approximate seasonal fluctuation in the time of maturing.

### Heat Summation

Most of the samples of Thompson Seedless in Fresno County ran 18° Balling on July 28, 1932; August 10, 1933; and July 20, 1934. On these dates the summation of heat from full blossoms was 2,032, 2,030, and about 2,054 degree-days respectively. Although 1932 was about average, 1933 was late and 1934 was very early, the heat summation from full bloom was essentially the same.

In 1946, with a 44% increase in crop, the fruit of the same area did not reach 18° Balling until after September 8th, or not until 3,314 degree-days of heat had accumulated. This fruit should have tested 18° Balling about August 1st, the date on which a summation of 2,000 degree-days of heat following full bloom had been reached.

Similarly, in 1947 when the crop was 40% above that of the earlier years the fruit did not reach 18° Balling until after August 8th. On the basis of heat summation it should have been mature about July 18th.

Of equal importance is the influence of large crops on the per cent acidity at 18° Balling.

The acidity of fruit from vines carrying normal crops—1932, 1933, and 1934—at 18° Balling was 0.69%.

### The Summation of Heat above 50° F Required to Bring Grapes from Full Bloom to the Minimum Degree Balling.

Variety	Required degree Balling	Summation of heat as degree-days*
Thompson Seedless	18	2000
Red Malaga, Ribier when girdled	16	2000
Ribier, Red Malaga not girdled	16	2150
Malaga	18	2150
Tokay	17	2250
Emperor	16	3300

\* A degree-day is one degree F above 50° F for 24 hours. For example, if the mean temperature for a day was 70° F the summation would be 20 degree-days, and if the mean for June was 65° F the summation would be 450 degree-days.

In 1946 and 1947, the fruit had to be left on the vines for an extended period beyond the normal ripening date in order to attain the required Balling reading, and the acid content continued to drop. As a result, the acidity of the 1946 fruit at 18° Balling was only 0.51% and that of the fruit of 1947 was only 0.55%.

Normal Thompson Seedless from this region has a Balling-acid ratio of about 25.1 at 18° Balling, while that of 1946 was 36.1 and that of 1947 was 33.1.

Although these figures are for Thompson Seedless, the influence of the large crops of 1946-48 on the maturing and balance of the fruit of the other table grape varieties was similar.

### Improving 1949 Fruit Quality

The return to cultural practices in common use prior to the war—with the most up-to-date improvements—is the only means of insuring that the table grapes of 1949 will be of improved quality.

These operations in addition to good vineyard care are proper pruning, thinning, and girdling.

Pruning is the cheapest way to reduce the number of clusters and thus lessen the cost of thinning in the regulation of the crop of table grape vines.

The best control of crop and the highest quality fruit are obtained when

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The Effect of Amount of Crop on Thompson Seedless Vines on the Time of Maturing and on the Level of Acidity at 18 Degrees Balling.

	1932	1933	1934	1946	1947
Total crop in tons	2,231,000	1,939,000	1,958,000	2,918,000	2,824,000
Date when most samples of fruit were meeting 18° Balling requirement	July 28	August 10	July 20	After Sept. 8	After August 8
Heat summation from full bloom, degree-days	2032**	2030**	2054**	Over 3314	Over 2660
Average per cent acidity	0.68	0.67	0.71	0.51	0.55

\*\* Grapes were being shipped one and two days earlier, hence they were ready at 2,000 degree-days.

## WIREWORMS

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parable dosage. Thus, if one-half pint of total slurry is applied to 100 pounds of seed, this amount of insecticide should be used in each half pint of total liquid.

As a seed treatment BHC kills largely by contact action and as long as the high gamma forms are used does not repel the worms at the low dosages suggested. This chemical also acts as a stomach poison and fumigant. The worms upon coming in contact with the treated seed are almost immediately affected and stop feeding. In the laboratory 100% are sluggish and sickly or dead within two weeks. In the field within a few days, numerous worms are found on the surface of the soil as if trying to escape from the chemical, and those remaining in the soil adjacent to the seed are at first nervous, later sluggish, and gradually shrivel and die.

One seed treatment may kill from 75% to 90% of the wireworms in the immediate area of the beans. It is estimated that from 50% to 75% of the worms in the soil come up at the time of germination. The others remain at deeper levels in the soil and often come up later to feed on the plants. These worms coming up later may bore inside the stems of the beans, but usually this type of injury does not result in death of the bean plants. Because all the worms are not killed by a single seed treatment it may have to be repeated for each planting.

### With Fungicide

To prevent seed decay Spergon dust at four ounces or Arasan at four to six ounces per 100 pounds of bean seed may be combined with the BHC. Tests on

slurry applications combining fungicides with BHC are very limited. Manufacturers of the fungicides recommend the use of 1 1/3 ounces of Arasan SF or two ounces of Spergon SL per 100 pounds of bean seed. If one-half pint of slurry is applied to 100 pounds of seed then each half pint of slurry should contain the above mentioned amount of one of the fungicides in addition to 1 1/3 ounces of the 75% gamma isomer BHC material.

### Caution

BHC may injure lima beans if used at greater concentrations than suggested in this report and for this reason extreme care should be taken to measure accurately or weigh the amount of chemical needed. Seed treated with these chemicals should never be used for food or fed to domestic animals.

Seed treatment probably will not kill all the wireworms present in a particular field, so it will have to be repeated at every planting until the population is reduced to a level at which no economic damage occurs.

In the absence of sufficient information concerning the effects of the lengthy storage of BHC treated seed it is suggested that seed be treated within a few weeks of planting.

Operators should avoid breathing excessive amounts of BHC or other fungicides, and should wash thoroughly with soap and water following contact with these chemicals.

Most of the field experience reported here has been concerned with baby lima beans and it is suggested, therefore, that growers limit its use on large limas until more information concerning possible injurious effects is available.

This method is also being tested on other crop plants, but experiments indicate that a safe and effective dosage must be determined for each crop.

*W. H. Lange, Jr., is Lecturer in Entomology and Assistant Entomologist in the Experiment Station, Davis.*

*E. C. Carlson is Senior Laboratory Technician in Entomology, Davis.*

*L. D. Leach is Professor of Plant Pathology and Plant Pathologist in the Experiment Station, Davis.*

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## GRAPES

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slightly less severe pruning is accompanied with thorough thinning.

Ribiers should be pruned to basal or one-bud spurs, and the other short-pruned varieties—such as Red Malaga, Emperor, Malaga and Tokay—to two- to three-bud spurs; the number of spurs to a vine must vary with the size of the vine.

Thompson Seedless when pruned for the production of table fruit should ordinarily not carry more than three to four canes of eight to 12 buds each.

### Thinning

Such varieties as Red Malaga, Ribier, and Muscat that tend to set many shot berries should be flower-cluster thinned. This type of thinning can be done most efficiently when the shoots are six to 12 inches long. In general, the flower clusters should be reduced to one per shoot. The upper cluster is usually more shapely and slightly smaller and is favored. Many growers, however, retain the lower cluster with its large shoulders or wing.

Flower-cluster thinning improves quality because of the better setting of normal berries.

In those areas, where earliness is of greatest importance and where coloring at best is poor, 10 to 15 flower clusters to a vine would be ample for Red Malaga vines in full production. Ribier may carry a few more.

Too much fruit has been the rule with these varieties in the earliest regions.

Where zinc is deficient flower-cluster thinning will not increase the setting of normal berries.

The clusters of Tokay are usually too compact. Where this is the case, parts of the clusters should be removed by berry thinning which improves fruit quality and coloring. Usually the main stem is cut, retaining several of the upper branches of the cluster. A Tokay cluster of 80 to 90 berries is a desirable size.

The greatest increase—about 30%—is obtained when the thinning is done immediately after the drop of the flowers

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Estimated Costs for Wireworm Control\*

Method of control	Chemical	Amount of commercial product per acre	Amount of actual chemical per acre	Unit price dollars	Cost per acre dollars
Soil fumigation	Ethylene dibromide	10 gallons of 20% by vol.	2 gallons	1.91 per gallon	19.10
Soil fumigation	Dichloro-propane-dichloro-propene mixture	40 gallons	40 gallons (400 pounds)	0.165 per pound	66.00
Soil treatment	DDT	20-40 pounds of 50% wetttable powder	10-20 pounds	0.37 per pound	7.40 to 14.80
Soil treatment	BHC	2 lbs. 25% gamma purified	0.5 pound gamma isomer	3.65 per pound	7.30
Seed treatment on beans	BHC	4 ounces 25% gamma purified	0.0313 pound gamma isomer	3.65 per pound	0.46**

\* Both the cost and amounts used per acre are presented only as examples and will vary, depending upon the type of formulation used and the particular conditions under which these chemicals are used.

\*\* Estimated cost if 50 pounds of beans are planted per acre.