

Fruits & Nuts

Selecting Quality Grapes

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The grape is a very versatile fruit. The wide array of uses for it include fresh consumption (table grapes), raisins, jellies, jams, pies, juices, wines or blends with other fruits in numerous products. The degree of fruit ripeness needed will vary somewhat, depending on the intended use of the grapes. Therefore, an awareness of the ripening process and its impact on fruit quality is important for consumers as well as home and commercial grape growers. Grapes undergo many changes during the ripening process. As this process proceeds, it may be difficult to select the time at which the grape is ready for harvest.

Veraison is the start of the ripening period. It is physiologically related to coloration. White grapes will change from green to yellow or white. Red grapes change from green to light red and finally to dark red. Blue-black varieties will change from green to red to blue and finally to blue-black. At the same time, berries will begin to swell and become elastic. Sugar levels within the fruit will begin to increase rapidly.

A period of maturation stretches from veraison to the final stage of maturity. This stage may last upwards of 40 to 50 days. During this

time, the grape will continue to swell, gather sugars and lose acidity.

Physiological maturity of grapes is defined as the stage when the fruit reaches its largest diameter and maximum sugar content. Technological maturity defines the picking time in relation to the ultimate utilization of the grape. The dates of physiological and technological maturity do not always coincide. In this fact sheet, the term maturity will refer to technological maturity.

Factors Governing Grape Maturity

The rate at which grapes mature, as well as their time of ripening, is governed by several factors. Some of these may be altered by the grower. They include the following:

1. Selection of a variety that will mature its fruit within a specified season.
2. Temperatures throughout the growing season.
3. Crop load on the vines. Vines having a normal to less-than-normal crop load will mature their fruits earlier than vines having heavy crops.
4. Light exposure. Vines trained to expose

the highest percentage of leaves to light, especially those near the base of canes, mature their fruits earlier than vines having poorer light exposure. Maturity of fruits and canes are closely related. On a vigorous vine, the ripest fruit will be found on well-exposed shoots that mature into canes. The least mature fruits will be found on shaded shoots. These shoots may not harden off sufficiently to avoid substantial damage by frosts or freezes.

5. Healthy foliage. Leaves which are free from insect, disease or herbicide injury or nutrient deficiencies are more prone to normal maturity.
6. Vine vigor. Overly vigorous vines are characterized by a delay in fruit and wood maturity. Low-vigor vines generally mature the fruits and wood somewhat earlier than vines with normal vigor.

Grape quality will be less than ideal if the fruits are not harvested at the correct time. Grape berries of most varieties will reach full size and color several days before they are satisfactorily edible. These grapes are not mature in terms of sugar development.

Changes in grape ripening will occur only as long as the grapes remain on the vine. Harvested fruits will not continue to ripen. Leaving the grapes on the vines past optimum maturity will result in shattering (berry drop from the cluster), which will cause a decline in yields.

The proper time to harvest depends on the variety of the grape, the nature of the growing season and the particular use to be made of the fruit. For jelly making, it is best to pick grapes somewhat early to get a light, clear jelly that is free of crystals. Table grapes should be picked when the color and flavor are best and before the berries begin to shatter. They are usually harvested before grapes being used for other types of processing, such as juice and wine. These grapes are harvested at the stage of maturity needed by the processor. The time to pick grapes for wine will vary somewhat depending on the kind of wine to be made. Grapes used for dry wines are frequently harvested prior to grapes that will be used for sweet wines. Many grapes, such as muscadines, ripen unevenly. Two or more harvests may be needed to get the fruits at the desired stage of maturity.

Quality Criteria

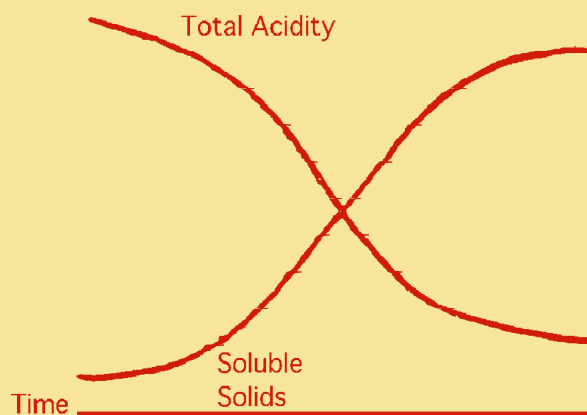
Quality of the grapes selected is very important. Clusters should be well-developed and well-filled. They should be free of sunburn or shot berries as well as berries that are scarred by thrips, powdery mildew or other pests. The berries should be firm, plump and have a typical shape and uniform color.

Changes During Ripening

As previously mentioned, many changes occur in grapes as they undergo the ripening process. Many of these factors may be observed or measured and used as a basis for determining the proper harvest time. These changes include:

1. Berry swelling. Final berry size may be reached before the fruit is fully ripe.
2. Accumulation of sugars in the berries. Soluble solids (primarily sugar) may be measured with a refractometer.
3. Decrease in acid levels. Acids may be determined by a titration process.

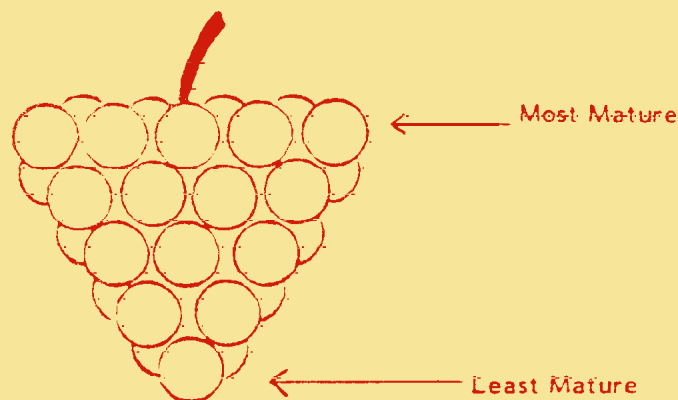
(The sugar/acid ratio may be the best measurement of maturity.)



Climatic conditions may affect the sugar/acid ratio. If ripening occurs during hot weather, the ratio will be high. Grapes will taste good at relatively low sugar levels. In cool weather, the acid levels will be higher and more sugar will be necessary for equal tastiness.

4. Tannins formed/skins change color. Remember that color formation will precede ripening.
5. Aromas formed.
6. Change in the color of the stem frame work from green to a light straw or yellow color.
7. Stem shrivelling.
8. Softening in the texture of the pulp.
9. Thickening of the juice.

10. Ease of berry separation from the cluster.
11. Browning of the seeds.
12. Freedom of separation of the seeds from the pulp.
13. Reddening or browning of the wood. Wood maturity is related to berry maturity.
14. Taste. This may be the best test for table grapes. Differences frequently exist in the taste of the berries within the cluster. Berries on the shoulders at the top of the cluster will be the most mature. Berries at the basal tip of the cluster will be the least mature. Use the tip berries when checking taste.



Marketing

To maintain the optimum quality and attractiveness of grapes, transport them to the market the same day they are harvested if possible. Do not hold fruit past one day unless proper storage facilities are available.

The less the grapes are handled, the less their quality will deteriorate. If possible, harvest into the containers in which the grapes will be sold.

Storage

The sooner grapes are placed in cold

storage following harvest, the better they are. It has been estimated that for each hour grapes are exposed to 90F temperatures following harvest, shelf life of the fruit is reduced about one week.

Grapes harvested fully mature appear to have some natural resistance to storage rots. If possible, avoid getting the fruit wet prior to placing in storage.

American bunch grape varieties do not store well for periods greater than 10 days to two weeks unless they are treated with sulfur dioxide. After this time, they tend to lose flavor and succumb to decay. Red grape varieties tend to store better than blue-black or white varieties.

The ideal storage conditions for most types of grapes are temperatures of 30 to 33F and about 90 percent relative humidity. Good air movement is desirable. If you do not have the capability of storing grapes under these conditions, remember that any cooling, such as in a refrigerator, will be beneficial. Placing grapes in plastic bags before storing in a refrigerator will help prevent shrivelling by maintaining higher relative humidity around the fruit.

Table 1. Grape Nutritional Information*

Serving = 10 table grapes	
Calories	40
Carbohydrates	10 grams
Calcium	6 milligrams
Phosphorus	7 milligrams
Potassium	105 milligrams
Dietary Fiber	1.5 grams

* Values will vary slightly with different maturity levels.

Extension PB 746, **Tree Fruit, Tree Nut and Small Fruit Cultivar Recommendations for Tennessee**, lists grape varieties suggested for the state and some characteristics of those varieties. Contact your county Extension office for this publication and others on grape production.