

UNIVERSITY OF KENTUCKY

COLLEGE OF AGRICULTURE

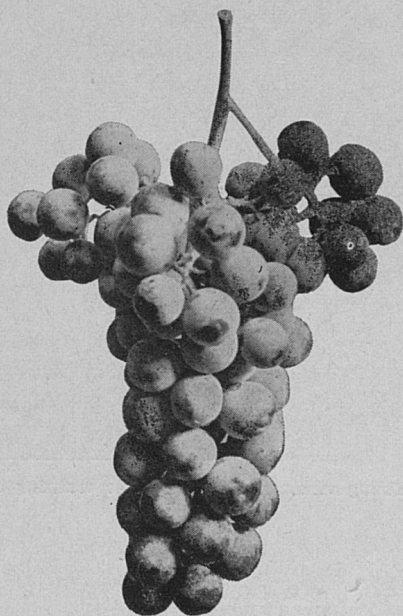
Extension Division

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CIRCULAR NO. 209

(Revised)

GRAPES FOR THE HOME



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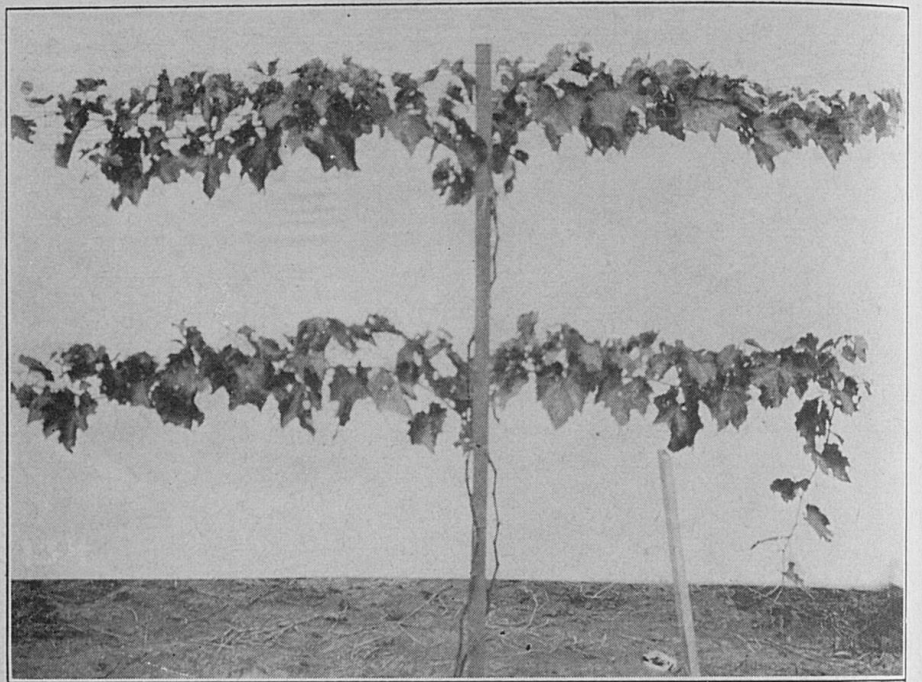


Figure 1. Young vine, first season after training on trellis

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Grapes For The Home

By A. J. OLNEY

The grape is as easily grown as any fruit in the home garden. It comes into bearing within three or four years after planting. It requires but little land for each vine; if ground is limited, its branches may be trained over walls, fences or buildings which could scarcely accommodate any other useful vegetation. Its enemies are few and can usually be controlled with simple apparatus and materials.

PROPAGATION

Layering. The easiest way to propagate a few new vines from an old one is to bend a cane to the ground and cover part of it with soil so that roots will form, thus making a new plant. A year later the original layered cane is cut where it enters the ground, thus separating it from the parent vine. The new vine may then be planted wherever an additional vine is desired. Layering is done most conveniently in early spring.

Hardwood Cuttings. If many additional vines are required it is customary to use hardwood cuttings. Commonly these are made late in the fall, after the leaves have fallen from mature vines. Well-ripened canes of medium size should be selected and cut into sections containing two or three buds each. The lower cut should be close beneath a bud, and the upper an inch or two above a bud. This is done mainly for convenience in handling the cutting later. Cuttings seven to ten inches long are preferred. When made in quantity they should be tied in convenient bundles of twenty-five or more, with the tops all one way. Then the bundles should be buried, upside down, in damp moss, sand, or other earthy material, in a cool cellar, to remain until spring, or placed under a mound of earth in a well-drained place, with the earth packed firmly around each bundle and all the bundle covered with at least four inches of earth. In late March or early April the bundles should be dug and



the cuttings planted one by one, six to eight inches apart, in straight rows three feet or more apart. The young vines so produced should have frequent cultivation. They may be kept growing in the nursery row for either one or two seasons, as preferred, before transplanting to their permanent situation.

SOIL AND PLANTING

The grape grows well and fruits freely in a wide variety of soils, altho certain varieties are somewhat particular in their requirements. In Kentucky any good, well-drained corn, potato or tobacco land may safely be selected for the vineyard.

The details of planting are simple but important. The hole should be large enough to accommodate the roots without crowding. Usually about 18 inches in diameter and about 10 inches deep. After placing some top soil in the bottom of the hole, the plant is put in place at about the same depth it grew originally, and the roots spread out, and covered with soil, which should be tramped firmly. Finally the hole is filled to the ground level.

Usually the vines are planted in the spring, tho they may be set in the fall with safety. If planted in fall it is an additional safeguard to cover the tops with earth after setting, removing it in spring before the buds swell. If to be planted in spring, the vines should be ordered early, when purchased from a nursery, so that they may be received and planted while still in a dormant condition. The standard planting distance is 10 feet apart in the row, and rows 8 or 9 feet apart. Preferably the rows should run north and south.

PRUNING AND TRAINING

The best time for pruning grape vines is in the early spring. Winter killing is common, which makes it desirable to prune after severe cold weather is past. Pruning should not be done while the wood is frozen, because frozen canes are brittle and much damage may be done if handled in that condition. Bleeding occurs if late spring pruning is done. Grape growers prefer to prune before bleeding is excessive, but there is no evidence to show that bleeding is harmful.

Vigorous growth of a newly set vine is promoted by removing all canes but the strongest and cutting that back to two or three buds.

The young vine may be allowed to run on the ground during the first season or it may be tied to a stake. If only moderate growth has developed the prevailing practice is to cut back the vine again severely, leaving only two or three strong buds on the best cane. These produce shoots that will be used the following year to form the permanent trunk or trunks of the mature vine.

Many different systems of pruning and training the grape have been described and advocated. However, only two or three fundamental principles of vine growth are necessary to clearly understand the intricacies of grape management. The many combinations of pruning and training that have been advocated all have the same objects in view, namely, to so distribute the parts of the vine that, with the least effort, the foliage may be exposed freely to sun and air, that leaves and fruits may be protected readily from pests, and to ensure proper maturing and facility in gathering the fruit.

Every healthy, mature vine in winter will be seen to have a number of brown, woody canes which grew from buds into tender shoots the previous season and gradually hardened into canes during the fall. The flowers and fruit are produced on the lower joints of shoots that develop from buds on these canes, and a shoot may produce one to five clusters of grapes. A strong, mature vine may produce two or three hundred such buds, each potentially capable of developing a new shoot. Experience has shown that the buds should be reduced by pruning to a few dozen at most. Various opinions as to how and where the desired number of buds shall be selected have given rise to the many systems of pruning and training. On the many vigorous canes found upon an unpruned vine in winter, about 40 buds should be retained for growth and production the following season. The grower may allow 40 buds on 20 canes by cutting back each to two buds, thus forming the so-called "spurs." Any remaining canes should be removed completely. Or 40 buds may be retained on only four canes, leaving ten buds to each, etc.

The Kniffin System. Experience on the University farm as well as in commercial practice confirms the belief that the so-called Kniffin system of management, in its various modifications, meets the requirements of an economic plan and harmonizes also with the known facts of growth and production. This system requires the

construction of a simple trellis of only two wires. As in ordinary farm fencing, a stout post, a foot or more longer than the intermediates, is set at each end of a row, firmly braced and thoroly tamped to withstand the strain upon the wires. As the row may stand for many years, it is best to use a durable kind of post. Locust is preferable altho red cedar or other lasting woods may be used. The intermediate posts should be not less than $7\frac{1}{2}$ feet long, set about 20 feet apart, spaced for two vines between, and about 2 feet deep. Galvanized No. 10 or No. 11 iron wire should be stretched along the row, the upper close to the tops of the intermediate posts, and another two feet lower. These should be stapled to the posts, but not tightly to the intermediates, and the wires on one end post should be of ample length so that they may be released easily for restretching.

The form of the Kniffin system which has been most used at the Kentucky Experiment Station requires two upright main trunks, one extending only to the lower wire, the other to the upper. Another form of this system uses only one trunk with branches extending laterally on both wires; otherwise the treatment is practically the same. There is little difference in yield.

In the first of these plans the aim is to develop two strong shoots near the base of the vine. These should be tied at intervals to a stake so that they make straight trunks and, if the trellis is in position, one may have its tip pinched off when it reaches the lower wire and the other when it reaches the upper wire. This pinching back usually causes the development of lateral branches, two of which should be trained in opposite directions on each wire and tied loosely. All other shoots should be removed. In the spring a strong shoot commonly grows from each bud of these horizontal canes, and upon the first few joints of these spring shoots the flowers and fruit are produced.

The Kniffin system of pruning and training is distinctly a renewal system by which, at pruning time each year, wood which is two years or more old is replaced by the ripened canes of the current season's growth. The system permits the removal by a single cut, of most of each arm with the drooping canes which have grown from it. Before cutting off these arms, however, the pruner should

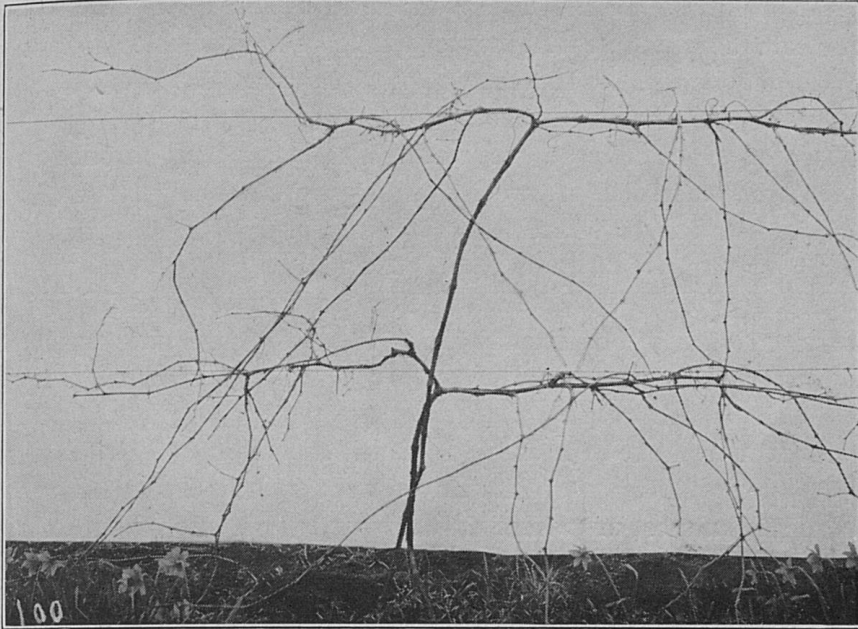


Figure 2. Two-trunk Kniffin in winter.

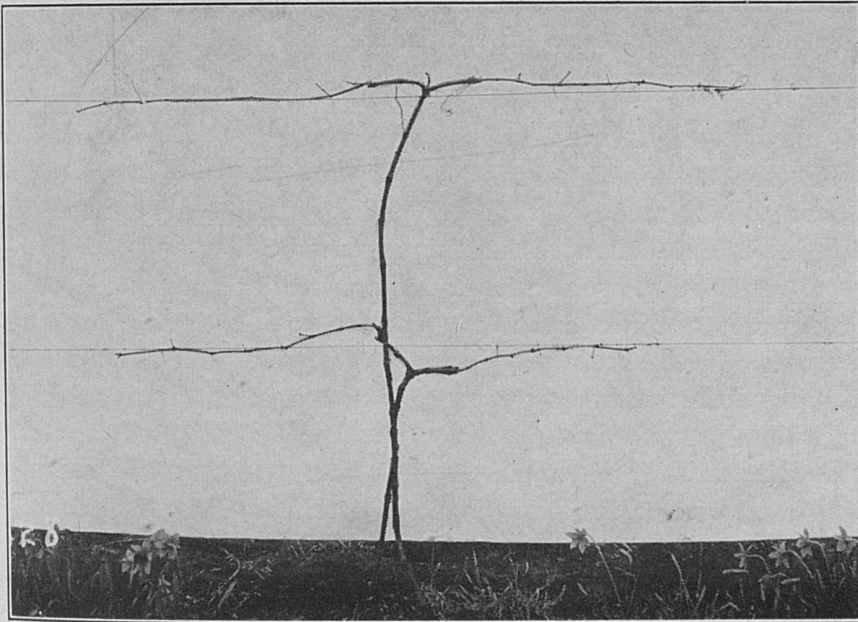


Figure 3. Two-trunk Kniffin, pruned. Same method of pruning is used with a single-trunk vine.

first examine the head of the trunk and the base of the arm to find, on each side, the best well-matured cane of medium size and length which may be used to succeed the two-year arm that is to be cut off. Often, one or more canes are found near the head of the trunk, one or two of which may be "spurred," that is cut back to one or two buds from which shoots are likely to grow in spring for use as renewal canes a year later. A vine before and after pruning by the Kniffin system, is shown in figures 2 and 3.

Pruning a Neglected Vine. The problem of pruning a long-neglected vine is often confusing. The usual methods cannot be applied to such a vine. Often there are many old trunks that must be given drastic cutting if the vine is to be properly shaped and trained. A number of healthy canes which matured their wood and buds the previous season should be kept to bear fruit. These may be selected almost anywhere on the vine, but if one wishes to bring the vine finally under better control he should reserve a sufficient number of the best canes he can find near the base or at least on a central trunk, and remove all other branches, both young and old. Sometimes, when the object is to produce crops from the old vine while new vines are growing to maturity, the easiest method is to cut back all young canes to two buds.

CULTIVATION

The grape, like the orchard fruits, is distinctly benefited by systematic shallow cultivation, particularly in the early part of the growing season. If cultivation is not practicable a mulch of grass clipping or straw may be used to advantage.

Cover Crop. A good practice, which is widely followed is to sow a cover crop of some kind in August, to provide a mat of vegetation on the ground, prevent winter washing of the soil and make winter pruning easier. This cover crop, turned under in spring, provides additional humus. Rye, barley or oats are often used, sometimes with the addition of winter vetch. The rye-vetch combination has been used with satisfaction on the Experiment Station farm.

FERTILIZERS

Usually it is possible to maintain the fertility of the vineyard by annual application of barnyard manure. If manure cannot be had,

the use of nitrate of soda or sulfate of ammonia is suggested, at the rate of one-half pound scattered thinly around each vine in early spring. Nitrogen seems to be the most important element needed while phosphorus and potassium are of considerable less direct value. Phosphorus especially is valuable in promoting the growth of cover crops and usually should be used to supplement nitrogen. Whether or not to use commercial fertilizer may be demonstrated best by applying fertilizers to one section of the vineyard and observing the effect on vigor and yield of fruit.

VARIETIES

The varieties commonly grown east of the Rocky Mountains are of diverse origin, but many of them are direct descendants of one of the wild American species, *Vitis labrusca*, or fox grape, which is native of the northeastern states and grows southward along the mountain regions to Georgia. Others are hybrids of two or more native species, or one of these and *Vitis vinifera*, the latter being the common grape of Europe and of our Pacific coast states. The pure *vinifera* grape is not easily grown in Kentucky but some of the benefits of this remarkable species may be had thru the many valuable hybrids which can be successfully grown here. Many hybrid varieties are more or less self sterile and will be unproductive if planted at a distance from other varieties. However, if such well-known native varieties as Concord, Worden, Moore Early and others are freely interplanted, this failure of the hybrids is easily rectified.

The commercial grower will do well to make the greater part of his planting of the *Concord* variety. It succeeds practically everywhere in this latitude and no other variety gives such assurance of continuous productiveness, vigorous health and hardiness, combined with good quality. *Moore Early* and *Worden*, both earlier than *Concord*, may sometimes be used to advantage to satisfy the demand for grapes in the early part of the season. *Niagara*, a handsome and productive variety, will meet the limited demand for a white grape, and *Catawba* for a late variety, but it is doubtful if any of these will yield a better profit than the *Concord*. For the farm garden or the small home garden in town, the case is quite different. While *Concord* may well be included in every home vineyard, how-

ever small, the family will be better satisfied by a variety of kinds which prolong the season of ripe fruit.

Varieties for the home. The varieties suggested below are recommended for those who are unfamiliar with the characteristics of many grape varieties. They are not submitted as the only desirable ones suitable for home planting. For those who wish to make still larger collections for exhibition or for their personal pleasure, there are other kinds of interest and value which have been tested upon the Station grounds and which will be suggested on application to the horticultural department.

Red varieties.

AGAWAM—Quality excellent, productiveness variable.

BRIGHTON—Quality excellent, lacks productiveness, self-sterile.

CACO—A good general-purpose variety; does not always color well.

CATAWBA—An old standard variety. Also used for wine.

DELAWARE—The standard of quality, berries small, vine weak.

LUCILLE—Good quality, productive but cracks badly.

White varieties.

GOLDEN MUSCAT—Handsome late variety; excellent dessert quality.

NIAGARA—The standard mid-season white dessert grape.

PORTLAND—An excellent early dessert variety.

Black varieties.

CONCORD—Probably the best general-purpose grape.

FREDONIA—New; promises to be the best early black variety.

MOORE EARLY—An old standard, quality only fair.

SHERIDAN—New; a promising grape similar to Concord but ripens later and has better quality.

WORDEN—Good quality; shatters and cracks.

Wine varieties.

CATAWBA, CLINTON, DIANA, IVES, NORTON.

CONTROL OF INSECTS AND DISEASES

Black Rot. This is the most serious disease of grapes in Kentucky. The disease is carried over from year to year on the old canes and is spread to the young shoots and leaves when growth

starts in the spring. The first conspicuous appearance is on the half-grown grapes, as small black or brownish spots that enlarge rapidly. Finally the berry becomes shrivelled and mummified. Since the infection takes place several weeks before it can be observed on the fruit, sprays to be effective must be applied early. Dry weather during the spring period when the spores are spread may prevent infection and this explains why there is little damage in some years. Unfortunately, the weather is not a reliable guide for spray practice.

Berry Moth. The adult is a moth that lays its early eggs on the blossoms and later eggs on the berries. The first-generation larvae feed on the blossoms and the small berries. The berries in the cluster usually are webbed together. The second-generation larvae which occur in midsummer feed on the inside of the berries. The berries develop purple spots, usually followed by cracking and rotting. Since the work of this insect results in rotted berries it is commonly confused with the rot disease. Lead arsenate in the recommended spray schedule usually is effective in controlling berry moth.

Grape Flea Beetle. In an occasional year the grape flea beetle, a glossy, greenish-blue insect somewhat under $\frac{1}{4}$ inch long, appears in destructive numbers upon the grape buds just as they are swelling, and eats the heart out of them. A spray of one and a half pounds of lead arsenate to each 50 gallons of the delayed dormant spray or cluster-breaking spray, should be used if grape flea beetles appear.

Grape Leaf-Folders. The name is descriptive of the habits of the larvae of this little black moth. The larvae fold the leaves over on the top surface and skeletonize them by feeding from the inside of the folds. Lead arsenate used in the spray is effective. In home plantings where the grape leaf-folder is commonly found, hand picking of the folded leaves is recommended. Supplemental winter clean-up measures aid in its control.

Green June Beetles. This is a very annoying pest that attacks the ripe fruit and destroys the clusters. As the fruit is ripe at the time of the attack, arsenical sprays cannot be used. If the June bug is troublesome, the fruit should be picked as soon as ripe.

Sometimes it is practical to jar these clumsy beetles from the fruit into a pan of water and kerosene. Usually jarring must be repeated daily for several days. An excellent method of preventing damage from green June beetles in the home vineyard is to sack the fruit.

Leafhoppers. Several species of leafhopper attack the grape in Kentucky. All are minute, triangular-shaped insects which pierce the tissues of the leaves and suck the cell sap. In late July they may appear in large numbers on the undersides of the leaves. When disturbed they fly in swarms. The first evidence of leafhopper injury occurs as small, whitish or yellowish spots on the leaves. In severe attacks the leaves become brown or yellowish and may wilt and fall. Either leaf injury or defoliation interferes with the proper ripening of the grapes and reduces the sugar content. The growth and vigor of the vine are reduced also. Since the young insects do not develop wings until they become mature, spraying is most effective just before the time the oldest ones develop wings. Use $\frac{2}{3}$ pint of 40-percent nicotine sulfate solution, with a good soap spreader, for each 100 gallons of spray solution. Spray the undersides of the leaves, using pressure. Apply in the middle of the day, when the temperature is high. For 3 gallons of solution, use $\frac{1}{3}$ ounce of nicotine sulfate solution and $1\frac{1}{2}$ ounces of soap.

Rootworm. The adult is a beetle which feeds on the foliage and its work may be recognized by the chain-like marks on the leaves that result from its habit of feeding. The larvae feed on the roots, devouring the smaller ones and stripping the bark and eating out pits and burrows from the larger ones. The vines become stunted or may be killed. Since the adults feed on the leaves, control consists in spraying with lead arsenate. (See spray schedule.)

Scale Insects. Occasionally grape canes are attacked by two species of scale insects, the grape scale, and the San Jose scale. Of these the San Jose scale is by far the most destructive. Both may be controlled by dormant spraying as indicated in the spray schedule. Spraying is not recommended unless the insects are present.

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SPRAYING

The following spray schedule, for use of the commercial grape grower, may be varied to suit conditions found in the home vineyard. Some may desire to use only the most important sprays. These are marked with an asterisk (*). Since black rot spreads from year-old canes to the young canes early in the spring, the delayed dormant spray should not be omitted. The preblossom and postblossom sprays are most important for the protection of the fruit. Black rot cannot be controlled successfully if spraying is delayed until the rot appears on the fruit. Thoro spraying with good pressure is important.

GRAPE SPRAY SCHEDULE

TIME	USE	FOR
1. Dormant season	Oil emulsion 2% or Lime-sulfur 1-8	Grape scale or San Jose scale (omit if no scale).
*2. Delayed dormant. New growth about 1 inch long.	Bordeaux 8-10-100	Black rot, mildew.
3. Cluster-breaking 2 weeks after No. 2 or when shoots are 4 to 8 in.	Bordeaux 8-10-100	Black rot.
*4. Preblossom, when first blossoms are opening.	Bordeaux 8-10-100 Spreader (see note)	Black rot.
*5. Postblossom, when bloom is nearly complete.	Bordeaux 8-10-100 Lead arsenate 5 lbs. Spreader (see note)	Black rot. Berry moth.
6. Just before berries touch, or when size of pea.	Bordeaux 8-10-100 Lead arsenate 3 lbs. Spreader (see note)	Black rot. Berry moth. Root beetle.
7. June 22-25.	Nicotine sulfate, 40%, $\frac{1}{2}$ pt. Soap, 2 pounds Water, 100 gallons	Leaf-hoppers (Spray under leaves).
8. July 22-25.	Repeat spray No. 7 if leaf-hoppers still numerous.	

* The most important sprays in black-rot control.

NOTE. The use of a spreader, beginning with the preblossom spray, increases effectiveness. For 100 gallons use 1 pint of fish oil (made for spraying), or 2 pounds of fish oil soap, or 2 pounds of cheap toilet soap. (Dissolve soap in hot water.)

PREPARATION OF BORDEAUX MIXTURE

Dissolve 8 pounds of finely powdered bluestone (copper sulfate) in a wooden or "granite iron" bucket of water (if crystals are used, use hot water and suspend in cloth sack 2 inches into the water). Mix 10 pounds of chemical hydrated lime with water into a thin paste and strain into the tank or barrell containing 50 to 60 gallons

of water. Dilute the bluestone solution to 8 to 10 gallons and add it to the lime water, stirring well. If poison is to be added stir 3 pounds of lead arsenate into the paste, dilute, and pour into spray tank while stirring. Make up to 100 gallons.

For 3 Gallons: If only a little Bordeaux is needed use 4 ounces of bluestone, 5 ounces of chemical hydrated lime, $1\frac{1}{2}$ ounces of lead arsenate, and 3 gallons of water, and mix as directed above. Use Bordeaux mixture while fresh.

SANITATION

When winter pruning is done, remove and burn all mummified fruits, dead wood and prunings. Berry moths over-winter in fallen grape leaves and, to a less extent, in other trash. Leafhoppers overwinter as adults in tall grass and weeds. Anything that can be done to destroy the hibernating quarters helps to control these insects.

PROTECTION BY SACKING

In the garden the clusters may be protected by sacking, in lieu of the postblossom sprays. Sacking is not only protection from diseases, insects and birds, but is a means of producing perfect clusters of fruit. For this purpose, the ordinary grocer's 2-pound manila sacks are satisfactory for most varieties, or 3-pound sacks for exceptionally large clusters. It is best to apply them soon after the blossoming period is past, while the grapes are not over $\frac{1}{8}$ inch in diameter, but they may be used to advantage even when the berries are two thirds grown. A number of sacks at a time may be sheared down from the top on each side for a distance of one and one-half inches. After pinching off the leaf which is attached opposite, a sack may be drawn up over the young cluster, folded over the stem and pinned snugly above the fruit. Sacking, of course, is not feasible for the commercial grape grower, but is highly satisfactory in the amateur's vineyard and is almost indispensable for one who hopes to take prizes in a fruit exhibition, for it is an excellent means of protecting the fruit and bringing it to a state of perfection.



Figure 4. Grapes sacked for protection against black rot and insects.

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