

Title: Cordon and Trunk Renewal; Practices for Maintaining Productivity in Mature Vineyards

Final Report

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Extension Proposal

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Objectives:

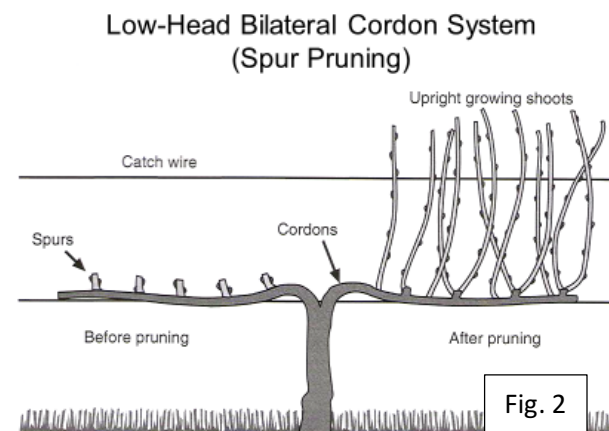
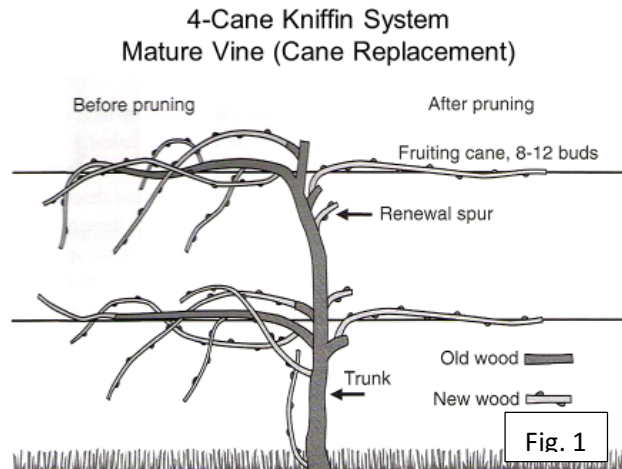
To demonstrate the value of cordon renewal and trunk renewal in regards to:

1. Maintaining higher yields and fruit quality and to illustrate the potential yield loss as a result of missing or weak spurs
2. Lessening disease problems through removal of dead or weak spurs
3. Extending the productive life of the vineyard through timely cordon and trunk renewal
4. Demonstrating procedures for renewing cordons and trunks on vines

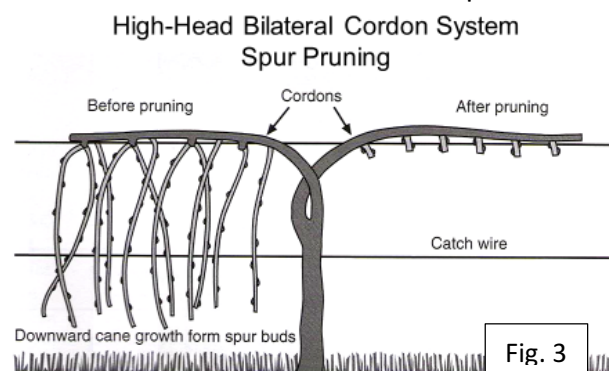
Justification and Description:

Cane renewal (replacement) and spur pruning are the two types of pruning systems used in vineyards.

Cane renewal consists of identifying the cane that bore the previous season's crop and removing it from the vine. A cane that developed from the trunk or a bud on the renewal spur is then selected to be secured to the load-bearing trellis wire. A second cane originating near the load-bearing wire and on the same side of the trunk is cut back to two buds. This is the renewal spur and may be the site from which a cane may be selected during the next year's pruning to be the fruiting cane. Similar operations will be conducted on the opposite side of the trunk and at each load-bearing wire for most training systems. Following this, all the remaining canes are removed from the vine and the canes selected for fruiting will be pruned back to the desired bud count.



nodes on the canes and will develop clusters.



With spur pruning, the cordon is a semi-permanent part of the vine and will be retained for several years. When developing this system, a cane (from now on referred to as a cordon) arising on each side of the trunk and slightly below the load-bearing wire is selected and secured to the wire. Depending on the type of grape, shoots arising from nodes on the canes will have either an upward growth habit (Fig. 2)(*V. vinifera* and some hybrids) or a drooping growth habit (Fig. 3) (American bunch, some hybrids and muscadines). The type of trellis constructed will be influenced by the direction of cane growth. Spurs (canes that will be pruned back to generally from 2 to 4 buds arising on the top or the bottom of the cordon, depending on the training system selected (Fig. 4). These spurs should be spaced about 5 to 6 inches apart on the cordon. Shoots will grow from

During the next dormant pruning, a cane from the lower portion of the spur will be selected and cut back to 2 to 4 buds and the old spur will be cut off just above it. If new shoots arise

Fig. 4



directly off the cordon, they may be utilized for spurs rather, instead. As before, spurs should be spaced about 5 to 6 inches apart on the cordon.

Most growers elect to use spur pruning over cane replacement pruning. Arguments in favor of it include that it is perceived as being easier to learn and to teach to vineyard workers and that the most fruitful buds tend to be those near the basal part of new shoots for many cultivars.

Both cordon and trunk renewal can be valuable practices in the mature vineyard. Cordon renewal is limited to use in spur-pruned vineyards, while trunk renewal applies to all

systems.

Methodologies:

Two vineyards, HRH Vineyards in Humboldt, TN and Yonah Mountain Vineyards in Cleveland, GA were selected for extensive demonstrations. Both vineyards are mature and have issues commonly seen with the passage of time, making them prime candidates for this project.

At HRH Vineyards, a 12-year-old block of Chambourcin on its own roots was selected. Vine spacing is 8 feet inrow and 12 feet between rows (454 vines per acre). Vines are trained to a high-wire bilateral cordon system and are spur pruned. Treatments were initiated on March 24, 2016, and consisted of:

1. Developing a spur from which a renewal cane will be selected. A cane arising at the base of a cordon or at the head of the vine was cut back to a 2-bud spur from which a replacement cane will be selected during the next dormant pruning. These spurs may be developed for either cordon or both cordons if deemed desirable, depending on the condition of the cordons. Existing cordons remained intact and were spur pruned as normal for the 2016 growing season.
2. Utilizing an existing cane to replace a cordon. Where suitable canes from 2015 were available, cordons were removed and replacement canes were trained to the trellis wire to fill this space. In some cases, this amounted to one cordon on a vine, but in some instances, both cordons were removed and replacement canes were laid down in each direction from the trunk and pruned to the desired length.
3. Retaining existing cordons. No cordons were removed and no canes were pruned back for development of replacement canes.

Data to be collected on cordon renewal treatments include:

1. Cluster counts/cordon/cane

2. Fruit weight/cordon/cane
3. Average cluster weight/cordon/cane

Trunk renewal treatments were done only at the HRH Vineyard site. Treatments included:

1. Retaining a shoot arising at the base of the trunk or just below the soil line and securing it to the trellis for development into a replacement trunk.
2. With vines having multiple trunks, one trunk was cut back to the soil line to encourage the development of a new shoot arising below ground level. This shoot was secured to the trellis in an upright position for future use as a replacement trunk.
3. Where significant trunk damage was apparent and the vines only had a single trunk, vines were cut off at ground level to force a new shoot to be used as a replacement trunk. This shoot was secured in an upright position to the trellis and will be topped to encourage lateral branching to be used as cordons.

At Yonah Mountain Vineyards, Sauvignon Blanc trained to a vertical shoot positioning system (VSP) was used. Vines were very vigorous. Treatments consisted of:

1. 1-sided cordon renewal (The decision to remove a cordon was based on the presence of weak spurs and/or blind wood on that cordon.)
2. 2-sided cordon renewal (2 renewal canes were retained on each side of the trunk with the 1st cane being trained on the lowest wire and the 2nd cane being trained on the middle wire as a backup. Plans were to retain the upper cane shortly after bud break, but this did not happen.)
3. Control (traditional spur pruning for VSP). Traditional canopy management operations were performed on retained cordons.

Data to be collected on these treatments were

1. Yield (lbs.) per cordon/cane
2. On the 2-sided cordon renewal vines, degrees Brix was measured on fruit from each of the canes to see if the fruit developed desirable soluble solids levels..

Results:

HRH Vineyards, cordon renewal

<u>Treatment</u>		<u>Cluster count</u>	<u>Fruit weight</u>	<u>Wt./cluster</u>
1	1 cordon replaced,	32	11.75 #	0.37 #
	1 cordon retained	41	11.5#	0.28 #
2	Both cordons replaced	29 clusters/cane	8.25#	0.28 #

3	No cordons replaced	45.25 clusters/cordon	15.5 #/cordon	0.34#
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Where suitable replacement canes existed, a cordon on one side of the trunk was removed and replaced with a cane and the cordon on the opposite side of the trunk was retained.

Approximately 22% fewer clusters of grapes were found on the replacement cane versus the cordon. However, cluster weights on the replacement canes were slightly higher than on the cordon, resulting in almost identical yields.

Replacement of both cordons at the same time versus replacing neither cordon did result in an average yield reduction of about 46% with the vines used in the demonstration. Part of the explanation for this could be that retained cordons were in good shape and possessed few, if any, weak or missing spurs.

Trunk Replacement -

All treatments for trunk replacement were successful. Cutting back a trunk on vines having multiple trunks and cutting back an entire vine to ground level were both effective in getting a replacement trunk. Concerns regarding excess vigor in a cane resulting from cutting back an entire vine were not forthcoming in this trial. Growth on replacement canes exceeded the trellis wire on which the load-bearing canes will be secured so topping canes during dormant pruning should result in development of laterals from which canes can be selected to be trained to the load-bearing wire.

Yonah Mountain:

<u>Treatment</u>		<u>Yield (lbs.)</u>	<u>°Brix</u>	<u>Notes</u>
1	Renewal side	9.23		
	Cordon side	3.52		
2	Double-sided renewal	15.6 (7.8 # on each side of trunk)	No difference among canes	High labor
3	No renewal	11.1 (5.55 # ave. per cordon)		

Yields from replacement canes in treatments 1 and 2 exceeded those of cordons in treatments 1 and 3. The percentage of weak or missing spurs on cordons in treatments 1 and 3 could account for the difference in yield. Regardless, the data suggests that cordon renewal was overdue for these vines.

Conclusions:

Over time, accumulated damage to cordons and trunks of vines will result in lower fruit yields and quality and reduced vine life. This decline in fruiting ability may be rather subtle, occurring over several years, or dramatic, occurring within a short period of time. Regardless, it does not

necessarily mean that diminishing returns from the vineyards is inevitable and irreversible. Removing a cordon having weak or missing spurs and replacing it with a cane from the previous year will result in little, if any, yield reduction and may actually give a yield increase during the year of replacement. Replacement of cordons on a regular basis every few years or as dictated by the loss of spurs on cordons can be an effective way to maintain productivity in a vineyard over time and possibly reduce disease problems that can accumulate in older vines.

Trunk replacement, while more drastic than cordon replacement, is of value in preventing reduction in vine yields and fruit quality. Trunk damage due to weather-related stresses, mechanical damage or chemical injury can lessen the vine's ability to give good crops of high-quality fruit.

Impact Statement:

Loss of spurs and development of blind wood on cordons frequently results in a significant reduction in yield. This is often a subtle process and the true extent of crop loss may not be recognized. Records of fruit yields and quality in addition to observations of vine condition are of value in anticipating the need for corrective strategies in vine maintenance. Timely replacement of cordons and trunks in the mature vineyard is a viable way to maintain production.