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Title: Cane vs. Spur Pruning; Considerations for New and Mature Vineyards

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Objectives:

1. To compare cane pruning versus spur pruning of grapevines in selected trellising/training systems for new vineyards. Factors to be evaluated will include:
   - difficulty of training pruning crews and time required with each
   - cropping – impact on ripening time, yield and fruit quality
   - suitability for mechanical harvest
   - disease control
   - cultivar differences
   - training system differences
2. For mature vineyards utilizing spur pruning where cordon renewal is needed:
   - using cane pruning only as a way to establish new cordons
   - transitioning from spur pruning to cane pruning to eliminate the need for

cordon replacement in subsequent years

Justification and Description:

Cane pruning involves:
- removal of canes that bore the previous season's crop
- selection of canes that grew the previous summer on each side of the trunk at each load-bearing wire and securing them to the wire.
- pruning these canes back to the desired bud count.
- selecting a second cane originating near load-bearing wires and on the same side of the trunk and pruning it back to two buds to form a renewal spur from which a cane may be selected during the next year's pruning to be a fruiting cane.
- removal of remaining canes.

Spur pruning involves:
-selecting canes growing directly from nodes situated on cordons or spurs located on cordons and spaced about 4 to 6 inches apart. Depending on the type of grape, these shoots will have either an upward growth habit or a drooping growth habit. The type of trellis constructed will be influenced by the direction of cane growth.
- selected canes should be pruned back to about 2 to 4 buds in length to form spurs. Shoots will grow from nodes on the canes and will develop clusters.
During the next dormant pruning, one cane from the spur, generally, the lowest one 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 directly off the cordon, they may be utilized for spurs instead. The desired distance between spurs on a cordon will depend on the type of grape with *V. vinifera* being about 3 to 4 inches and other types being 4 to 6 inches.

Which to use? Many growers elect to use a certain type of pruning based on what others are using or what they have heard. Misconceptions exist regarding each type of pruning and similar reasons are often given to justify selecting either type (4).

Ravages of Time:
With increasing vine age, spurs on cordons may become damaged or weakened and lose the ability to produce the yields and quality that they once could (1). Spurs may die leaving blind wood (barren spaces having no spurs) on cordons, resulting in a reduction of yield potential. Damaged cordons can be a reservoir for diseases that may cause problems with the vine, and eventually with adjacent vines. When this occurs, it is time to evaluate the level of lost production and/or fruit quality and to consider steps to rejuvenate the vines.

Cordons can either be replaced, maintaining the spur pruning system or they can be removed and the vine can be transitioned to a cane pruning program. With either option, the initial steps are the same:
- if a desirable cane arising from the trunk or the head of the vine close to the load-bearing wire

exists, the cordon can be removed, the cane can be secured to the wire and cut back to the desired bud count.
- if, however, a suitable replacement cane does not exist, cutting back a cane in the desired region to form a renewal spur should give rise to a desirable replacement cane to be utilized the following year.

Depending on the desired pruning system, selected canes should be handled as described earlier. One advantage of cane pruning in the mature vineyard is the reduction in wood diseases such as Eutypa and Botryosphaeria.

This facet of the proposal will be an extension and expansion of earlier work on cordon replacement. Points to be investigated include:
- impact on yield and fruit quality (data collected in a previous study indicated that yield reductions were minimal to none where acceptable replacement canes existed.
- time involved in cordon replacement and in cane pruning transition

Procedure:
This work will be an extension of demonstrations conducted in grape growing areas of both Tennessee and Georgia utilizing new and mature vineyards, multiple cultivars and different training/trellising systems (5). Spur pruning as opposed to cane pruning will be discussed with and demonstrated to growers. High wire systems to be used include bilateral cordon (spur pruning) and umbrella kniffen (cane pruning).

Inspection of mature vineyards will focus on the extent of blind wood on cordons and used to make an estimate of yield loss as a result. Where suitable canes for replacement of cordons or trunks do not exist, steps will be taken to encourage growth of acceptable candidates in the coming year by developing a spur at the base of the cordon, the head of the vine or on the trunk just below the load-bearing wire.

Vineyards will be revisited during the summer and fall to evaluate treatments in new and mature vineyards. Follow up visits will focus on selection of renewal canes and their establishment as cordons or for converting over to a cane pruning system. End of season visits will be made to assess the success of the various strategies used in vines. Yields and cluster counts will be collected on replacement canes and cordons to aid in decisions regarding cordon replacement.

Information generated through this project will be made available to growers via SRSFC reports and newsletters and through grower meetings.

Conclusions:

For most grapes cultivars, the decision to use spur pruning versus cane pruning is generally a matter of personal preference. In some cultivars, the first few count buds on a shoot may be less fruitfult than those further out on a shoot, which may account for utilizing cane pruning as

opposed to spur pruning. However, with many other winegrape cultivaars, bud fruitfulness tends to be more uniform across nodes, allowing them to be pruned to short two to three bud spurs without reducing potential yield (6). Observations by Khanduja et al led them to conclude that the pattern of flower bud initiation in the buds of grapevines is a varietial caharacteristic that may be influenced by the enivironmental conditions in which the vine is made to grow (7).

In his publication titled "Pruning Wine Grapes," Mark Chien (8) offered the following comparisons of spur vs. cane pruning:

Spur Pruning	**Cane Pruning**
Traditional in warm areas Easier ?	Traditional in cool areas Fewer pruning cuts
Faster ?	Better bud fertility
Less labor (no tying)	Less shoot thinning
More uniform shoot growth across a longer vine space	Do not have to renew spur positions
Double pruning for frost avoidance	Less permanent wood, possibly less disease pressure and fewer problems with trunk diseases
Easier to mechanize and preprune	Less perennial wood may reduce overall vine vigor

One strong argument in favor of spur pruning in some areas is the ability to utilize delayed pruning on early bud break cultivars to reduce the potential for frost damage. Likewise, double pruning and delayed pruning might be considered as ways to lessen the potential for canker diseases such as *Botryosphaeria* and *Eutypa* on spur pruned vines.

With increasing vineyard age, spurs may become weaker or die completely leading to the development of "blind wood" on cordons of spur pruned vines. As a result, vine yields and fruit quality will decline, adversely affecting the economic returns from the vineyard. Canker diseases such as Botryosphaeria and/or Eutypa may develop over time. While canker diseases are often considered to be problems in older vineyards, indications are that they may start in relatively young cordons. When this occurs, pruning cuts need to be made back into healthy wood, which often entails removing the entire cordon. Reverting to cane pruning techniques temporarily to redevelop cordons on vines or as a new management style may be utilized to retain the productive life of a vineyard in many instances.

Impact:

The decision regarding spur pruning versus cane pruning for a new vineyard may vary among growers, vineyard location and cultivar selection. However, this does not mean that that system needs to be used throughout the life of the vineyard. Monitoring the performance of

the vineyard over time is necessary to make decisions that can affect the long-term productive life of the vineyard.

References:

1. Are Your Grapes Ready for Cordon Renewal. http://fruitgrowernews.com/artiucle/are-your-grapes-ready-for-cordon-renewal/

2. Basic Considerations for Pruning Grapevines. http://www.extension.org/pages/70332/basic-considerations-for-pruning-grapevines

3. Cane and Spur Pruning. http://www.knightsbridgewinery.com/cane-and-spur-pruning.

4. Cane vs. Cordon Pruning. https://www.lindenvineyards.com/cane-vs-cordon-pruning.

5. Training Systems for New York Vineyards. http://www.fruit.cornell.edu/grape/pool/training.html.

6. Grapes 101: Bud Fruitfulness and Yield. https://grapesandwine.cals.cornell.edu/newsletters/appellation-cornell/2012-newsletters/issue-10/bud-fruitfulness-and-yield/

7. Grape Vine Buds. P. 281. https://link.springer.com/article/10.100%2FBF02861042.

8. Pruning Wine Grapes. www.pawinegrape.com/uploads/PDFfliles/Documents/Viticulture/pruning2012.pdf.