

# INTRODUCTION TO Wine Grape Trellising, Training, and Pruning Terms



UNIVERSITY OF GEORGIA  
EXTENSION

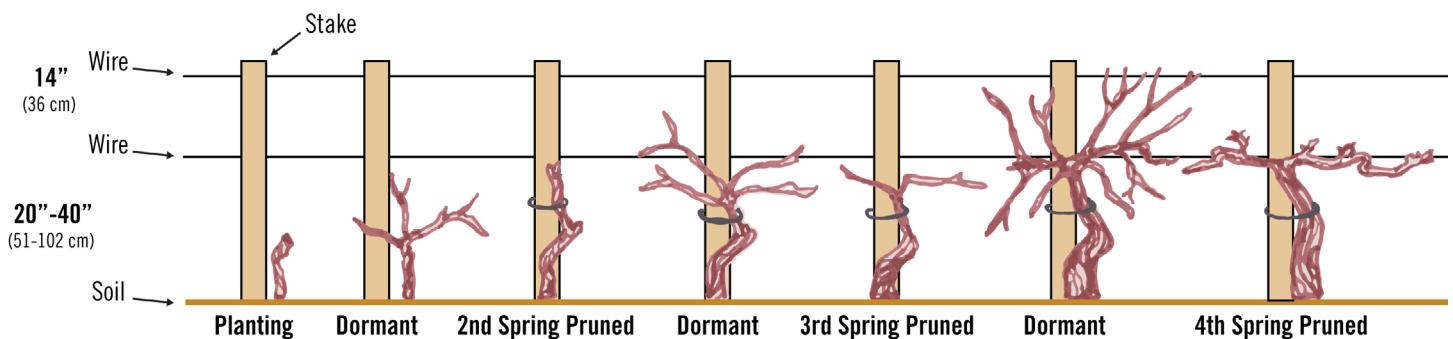
*Reviewed by Sarah R. Lowder, UGA Extension Viticulturist  
Original manuscript by Rachael White and Cain Hickey*

There are many ways to manage grapevine growth, and many grape-growing regions implement unique and preferred training methods. Vine growth management is achieved by applying a trellising system, which is a framework of metal cross arms, wires, and support posts that are used to direct grapevine vegetation to maximize fruit quality and production. Trellising and pruning combinations will sometimes be referred to as “training” systems, but “trellising,” “training,” and “pruning” are not interchangeable terms. Understanding the different forms of trellising and pruning can be a challenge for new growers. The goal of this publication is to provide a general introduction to some of the more common trellising and pruning terms used to describe grapevine management systems. There is a glossary at the end of this publication.

The management of grapevine growth can differ dramatically from one vineyard to another, or even within a single vineyard if multiple cultivars are planted. There is no perfect trellising and pruning system combination that is optimal for every site or cultivar (e.g., ‘Chardonnay’ and ‘Norton’ have drastically different trellising methods). In fact, differing trellising systems can be successfully used for the same cultivar, although one may be more productive than another.

Pruning methods can be changed after the vineyard has been in production for several years. However, the initial pruning decisions impact the early growth of the vineyard as well as ease of establishment and early management (Figure 1 shows establishment of cordon training and spur pruning in a young vineyard). Conversely, trellising systems are not easily changed once the grapevines reach the fruiting wire. In some cases, in order to change a trellising system, the entire vineyard needs to be replaced. For this reason, the initial choice of trellising system and its associated pruning strategy are two important vineyard design decisions that will impact management over the lifespan of the vineyard.

## Cordon System



**Figure 1.** Pruning measures to establish a cordon-trained, spur-pruned vine over three years after planting.

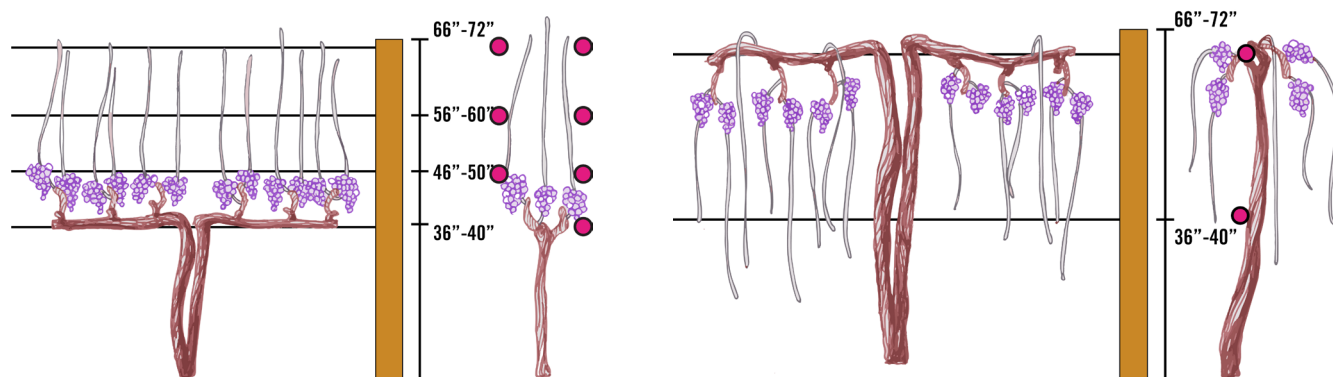
There are several considerations when choosing a trellising system including cultivar vigor and available soil resources at a site. Vigor is the rate of shoot growth and can be estimated in annual shoot length or dormant cane pruning weight. For example, single canopy trellising systems (Figure 2) are generally better suited for less vigorous cultivars and sites where vines do not grow as quickly due to environmental conditions. A divided canopy system (Figure 3 through 5) may be better suited for vigorous cultivars planted on a site that has nutrient rich soil or environmental conditions that foster rapid plant growth. The vigor of a site can differ even between vineyards in close proximity. Budget may also be a limiting factor in trellis system choice, as divided canopy systems initially cost more in trellis infrastructure compared to single canopy systems. Growth habit of the cultivar should also be taken into consideration. Some cultivars have a “trailing” habit and lend themselves to a trellising method that allows the vine growth to drape and sprawl (e.g., ‘Norton’ on high wire). Whereas other cultivars have an upright habit that easily allows for management in an upright system (e.g., ‘Chardonnay’ on vertical shoot positioning, or VSP). Throughout many growing regions in the U.S., the most common way to train *Vitis vinifera* and their hybrids is VSP trellising with spur pruning. The following text describes various trellising systems and discusses training and pruning methods.

## Trellising systems

Trellising systems generally refer to the infrastructure system of wires and posts needed to support and direct the canopy of a grapevine. The canopy of the grapevine refers to the green, growing areas of the vine, including leaves, flowers/fruit, and shoots. The goal of a trellising system is to manage and direct grapevine shoots to maximize the sunlight exposure of the leaves, which optimizes vine health and fruit production. Depending on the trellising system selected, growth can be oriented into single or divided canopies. Note that a “training system” is the combination of physical structure (trellis) and vine manipulation (training).

### Single canopy

Single canopy systems often don’t produce as much fruit per vine compared to divided canopy systems. However, single canopy systems are sustainable on a lower vigor site, and are easier to install and manage compared to divided canopy systems. The VSP, a single canopy system that can be adapted for different pruning measures, is one of the easier, most cost-effective, trellising systems to establish. This system requires two to four sets of catch wires positioned vertically on either side of the support posts to guide shoot growth vertically (upward) from a low fruit zone (Figure 2). VSP permits greater vine planting densities per unit of land which can help offset the lower crop yield per vine when compared to horizontally divided systems. VSP, and other single canopy systems, require less labor to manage relative to divided canopy systems. The single high wire system is a popular trellis system used for the production of American juice grape cultivars as well as some hybrid wine grape cultivars (Figure 2).

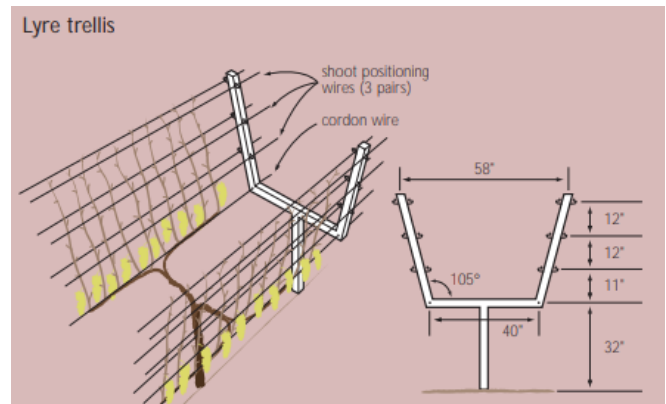


**Figure 2.** The image on the left depicts a VSP system in which the fruiting wire is between 36 and 40 inches from the ground. The shoots in this system are trained upward in a single canopy. The image on the right depicts a single high wire training system with the fruiting wire placed 66 to 72 inches from the ground. The shoots in this system trail downward on either side of the fruiting wire.



## Divided canopy

Generally, vigorous sites and cultivars are appropriate for divided canopy trellising systems. Divided canopy systems separate the canopy horizontally or vertically using more wires and cross arms than single canopy systems. In situations where soil mineral nutrients and water resources are unlimited, vines grown on divided canopy systems can intercept more sunlight and produce greater crops compared to vines grown on single canopy systems. However, canopy division, particularly horizontal division, generally results in the need for wider row spacing and consequently fewer vine numbers per unit of land when compared to vines trained to single canopy systems. The canopy can either be divided horizontally or vertically. Depending on the system, the fruit zone can be trained to a high fruiting wire (at eye level or approximately 5 feet) or low fruiting wire (around waist level or approximately 3 feet). Shoot growth is directed vertically, downward, or both, depending on the intended shoot training within the trellising system.



**Figure 3.** Diagram of the Lyre trellis that divides the fruit zone horizontally while positioning the shoots upward.

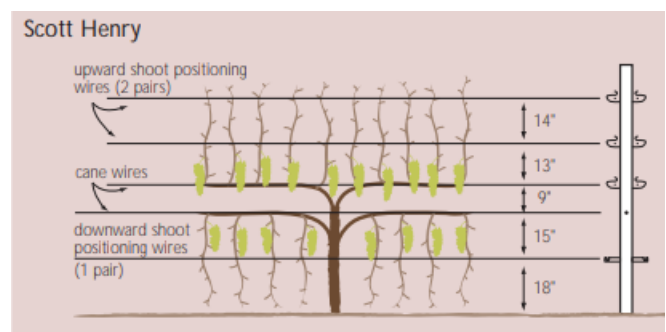
*Figure adapted from Dokoozlian (2003).*

## Horizontally divided canopies

Horizontally divided systems are generally more recognized by industry members than vertically divided systems. They generally take up more horizontal space than single canopy or vertically divided canopy systems. Vines trained to horizontally divided systems can produce large crops. However, divided systems have increased initial costs due to the need for more wires and hardware. Divided canopies have the potential for increased fruit production per vine compared to single canopy systems because the amount of exposed leaf area and the number of fruitful shoots per linear foot of row are increased. Some horizontally divided systems employ a low wire with shoots trained upward, as in the Lyre system (Figure 3). Alternatively, a high wire system can be installed whereby vines are trained in a draping fashion such as in the Geneva double curtain system, or GDC.

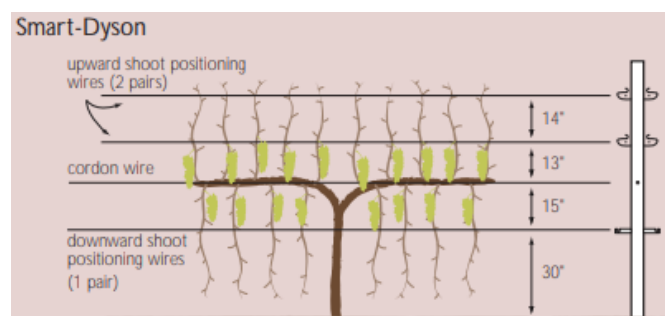
## Vertically divided canopies

Vertically divided systems can allow for closer row spacing relative to horizontally divided systems. In fact, the single canopy, VSP system can be easily converted to a vertically divided system in vineyards with ample row spacing. Scott Henry (Figure 4) has a divided fruit zone with one vegetative canopy trained upward and another trained downward. Smart Dyson (Figure 5) has a similar shoot training method but has only one fruit zone. Vertically divided systems involve significant upkeep to maintain shoot positioning and prevent the lower canopy from reaching the vineyard floor. Note that proactive weed management strategies are imperative to prevent shading and congestion of the lower canopies in vertically divided systems.



**Figure 4.** Scott Henry trellising system with divided fruit zone and divided vegetative canopy.

*Figure adapted from Dokoozlian (2003).*



**Figure 5.** Smart Dyson trellising method with one fruit zone but a divided vegetative canopy.

*Figure adapted from Dokoozlian (2003).*

## Dormant pruning

Dormant pruning is the method by which one removes excessive, older wood from the grapevine, leaving selected growing portions of the plant for the upcoming season. Pruning is conducted in the dormant season (December to March) and is essential throughout the life of the vineyard to prevent overgrowth and reduce wood diseases. Most fruit is produced from shoots that emerge from buds contained on 1-year-old wood. Thus, pruning is the first crop regulation practice of the year. In the first two years of establishing new grapevines, pruning results in the retention of strong shoots to become trunks. In the third and fourth year after establishment, the vine can be trained onto the chosen trellising system to direct new growth. Once a vine reaches commercial maturity (usually three to five years after planting), there are two primary types of pruning to consider: cane pruning and spur pruning.

### Cane pruning

Cane pruning is practiced with head training. Cane pruning retains 1-year-old, dormant canes (large portions of the previous season's green shoots) by tying them to the fruiting wire (Figure 6). Canes have buds that produce fruitful shoots in the upcoming growing season. Cane pruning results in the retention of less perennial wood compared to cordon training and spur pruning. Cane pruning may thus reduce the incidence of wood diseases compared to cordon training and spur pruning.

### Spur pruning

Spur pruning is practiced with cordon training. Cordons are typically established in the third or fourth year after vine establishment. Canes become cordons after they have been retained for two or more seasons. Shoots that grow off of the cordons are then cut back to one to three buds (Figure 7). This pruning method is repeated in the dormant season every year. Cordons may need to be renewed every five to 10 years, depending on the spur density and productivity of the vine.



**Figure 6.** A vine that has been cane pruned to replace an unproductive cordon.



**Figure 7.** Two count buds and one basal bud on a spur.

# Glossary

**Bud** – Typically refers to buds contained on 1-year-old grapevine wood (e.g., canes and spurs) from which fruitful shoots grow in the spring

**Cane** – A former green, vegetative shoot that has become dormant; 1-year-old grapevine wood that generally contains fruit-producing buds

**Catch wire** – The trellising system wire used to guide canopy growth and maintain its physical position to optimize leaf exposure

**Cordon** – A former cane that is a lateral extension of the trunk along the fruiting wire and is at least 2 years old; also refers to a training type (“cordon training”) with which spur pruning is commonly implemented

**Dormant pruning** – The selection and retention of fruitful, 1-year-old grapevine wood through cutting and discarding older, undesirable, and diseased grapevine wood; spur or cane pruning methods are most common

**Fruiting wire** – The wire on which the fruiting cane or cordon is tied; the wire that bears the crop weight

**Head** – The region of a vine where the vertical grapevine trunk meets the horizontal fruiting wire; refers to a training type (“head training”) with which cane pruning is commonly implemented; can also be referred to as the “crown” region

**Shoot** – The green stems and leaves that grow from dormant grapevine wood; shoots grow from buds in the spring then become canes once leaf fall occurs and dormancy is initiated in the late fall and early winter

**Spur** – 1-year-old grapevine wood that is cut back to one to three buds that produce new shoots the following season; a “short” or “spurred” cane position

**Training** – (1) Timely and directional manipulation and positioning of vegetative shoots and semi-permanent trunk and cordons (arms) within a trellis framework; (2) the region of the vine from which 1-year-old grapevine wood is retained for fruit production (e.g., head training, cordon training); or (3) the dimensions of semi-permanent, perennial grapevine wood (e.g., trunk, cordons) within a trellis framework

**Training systems** – The combination of physical structure (trellis) and vine manipulation (training)

**Trellising systems** – The physical framework and arrangement (architecture) of end posts, line posts, cross arms, and wires used to guide and direct woody and vegetative (green) grapevine growth

## References

- Dokoozlian, N. K. (2003). Trellis Selection and Canopy Management. In *Wine Grape Varieties in California* (pp. 16-21). UCANR Publications.
- Herrera, E. (2000). *Growing Grapes in New Mexico* (publication number C483). New Mexico State University College of Agriculture, Consumer and Environmental Sciences. [https://aces.nmsu.edu/pubs/\\_circulars/CR483](https://aces.nmsu.edu/pubs/_circulars/CR483)
- Hickey, C., & Hatch, T. (2018). *Dormant Spur and Cane Pruning Bunch Grapevines* (publication number 1501). University of Georgia Extension. <http://extension.uga.edu/publications/detail.html?number=B1505>
- Kwiek, E. *Vineyard Trellis and Training*. WineMakerMag.Com. Retrieved from <https://winemakermag.com/article/1388-backyard-vineyard-trellis-and-training>
- Lockwood, D. W. *So You Want to Grow Grapes in Tennessee* (publication number PB1689). University of Tennessee Agricultural Extension Service. <https://extension.tennessee.edu/publications/Documents/PB1689.pdf>
- Lockwood, D. W. (2015). *Basic Considerations for Pruning Grapevines*. University of Georgia and University of Tennessee Cooperative Extension. <https://grapes.extension.org/basic-considerations-for-pruning-grapevines/>
- Puckette, M. (2016). *Illustrated Grape Vine Training Methods*. Wine Folly. <https://winefolly.com/review/grape-vine-training-methods-illustration>
- Smart, R., & Robinson, M. (1991). *Sunlight into Wine; A Handbook for Winegrape Canopy Management*. Winetitles, Australia.
- Wolf, T. K., Ed. (2008). *Wine Grape Production Guide for Eastern North America*. Plant and Life Sciences Publishing.

The permalink for this UGA Extension publication is [extension.uga.edu/publications/detail.html?number=C1162](https://extension.uga.edu/publications/detail.html?number=C1162)