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Grape Trellis – How To's

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What makes a good trellis? The first thing needed is a good plan. Having a good plan will allow you to save **time and money**. Following is a brief outline that will help you organize your thoughts and plan for success. I think that you must "begin with the end in mind". You will be happier with your finished product if you have a good idea of how you want your vineyard to look. Function will be important and you must know how you will manage your vineyard. Remember to plan for ease in working in and harvesting your grapes by allowing adequate space for machinery access.

What makes a good trellis?

Site preparation – don't start until the site has been properly prepared –this may cause delays as you to wait until the weather permits.

Wire – buy the best you can find. The mild steel wire (#9) will not stand up to the stresses of weight and will need to be replaced in a short time. Learn about the high-tensile types of wire available. When purchasing wire, ask about the psi and the galvanization.

Posts –there are things that you should know about wood and steel posts. Not all posts are created equal. I'll share some important post information with you so you can make a good informed decision.

Tools – Invest, borrow or share costs with a friend or business partner. Regardless of the job, proper tools will make your life easier and more pleasant. Cheap tools will not give you satisfactory function. Buying those made of high-grade steel will be a good investment. Recommended tools are listed and described below.

Braces – Proper bracing will be the most important part of the structure that will support your grape vines during production. By properly constructing the braces, you will have trellis strength to support a bumper crop. Your braces may be the MOST important part of the trellis. They have a big job to do. This is NOT the place to save money or "cut costs". The fence industry has standards that recommend the height and spacing of these posts. The height of the posts and the depth that they are placed in the ground will establish the load it can support.

Proper Installation – Proper installation (for the soil type) is essential for the posts to support the weight of the crop. Fence companies have developed standards for the best outcome.

I'll try to tell you some of the basics you should know as you plan your installations.

Wooden posts may be treated posts. There are 3 basic types of treatments:

CCA – Copper chromate Arsenic – This is a water-based treatment, where the treatment chemicals are mixed with water. The posts are kiln dried, bundled, and placed in a closed, cylindrical vat. The vat is filled with the treatment and pressurized. Depending on the rating desired, pressure and time is varied. When finished, the bundles are removed and air-dried in the yard. Good for "in ground" applications.

Wolmanized – This is an oil-based treatment, where posts are soaked in the treating solution. More popular for finished lumber, landscape timbers, and square posts. Most applications are for above or "on-ground" applications.

Creosote – Creosote is manufactured using by- products of the coke industry. The original long lasting fence post, these were difficult to find for a while as they were outlawed in many areas due to environmental concerns. New generation creosote is actually environmentally friendly, as organisms in the ground consume the carbon by- product. These posts are treated similar to the method used for CCA. One bonus to creosote posts – as they stand in the ground, the oil has a tendency to seep toward the bottom, concentrating the treatment where it is needed most.

Treatment Ratings – Both CCA and Creosote posts are rated by the amount of treatment per square foot contained in the post. Common CCA post ratings include 0.28, 0.40, 0.60, and 0.80. This means 0.28 pounds of treatment per square foot. O.28 posts are for above ground use, 0.40 is the minimum treatment for in-ground use, 0.60 is for damp, in-ground application, and 0.80 is the utility company standard for poles. Creosote posts are rated at 2, 4, 6, and 8 pounds of treatment per square foot. The application standards are basically the same as those for CCA posts.

Posts may come in different shapes:

Round Posts – These are by far superior for trellising applications. These posts use a whole tree, sized and cut to length before treating. Greater strength and resistance to bowing, cracking, and checking make these the post of choice for quality fence or trellis projects.
Square Posts – These posts are cross-sectional cuts from a large tree. Styles include 4X4, 6X6, 6X8, and landscape timbers. While initially better looking, long-term use as fence posts is a problem. These posts are generally treated for **above- ground**, not in- ground, use. They are also very susceptible to twisting, checking and bowing, due to the fact that the grain of the tree has been cut.
A post with a **flat side** is also **prone to bowing** and will have a much shorter life as the inner wood is exposed to the elements.

You must decide what **kind of wood** to use. Good old hedge posts will give you long lasting, rather rustic looking posts. These are not as available as they once were. They are not straight posts and can be challenging to work with as they become very hard as they season (age). Pine posts are not all equal. Remember that the longer the tree grew, the stronger the post. Faster growing yellow pines are now usually produced on tree farms and are harvested at an early age.

Red pine varieties, also a soft and fast growing pine, have limbs which grow in a band around the tree. This growth pattern will cause weakness when the tree becomes a post. Lodge pole pine posts come from trees that are much slower growing. The branches are randomly spaced on the tree trunk. Because they are slower growing, they are rated to have a longer life and treating these posts increases their life-span. If you are using a 30- year wire, it makes sense to use posts that have a long life, too. A word of caution about pricing: If it sounds too good to be true, it probably is. Know who you are buying from. We have known of good people who thought they were getting "a deal" only to find out a few years later that the posts were misrepresented. Good posts will come from a live tree. There are posts on the market (may be at discounted prices) that have come from trees that were not living or were damaged by forest fire.

The **steel posts** may be painted or galvanized:

Painted – This is the traditional steel post used for trellising. These come in 1.25 and 1.33-pound grades, which are indicative of the weight per foot. Good for use with short spacing. Not recommended for use with class 3 product, as rusting of the post will prematurely age wire where it contacts the rusty post. The 1.25 lb post may be used at every plant both for stake and trellis.
Galvanized – This is a hot-dip galvanized version of the traditional painted steel post. Generally available in 1.33 and 1.5 pound grade. These posts are very resistant to rust, and generally last as long as the class 3 wire before showing signs of deterioration/rust. Strongly recommended for use with class 3 wire. The 1.5-pound post is recommended for trellises over five feet tall and GDC's.

Correct installation of the posts will save you lots of grief. There are basically 3 types of installation:
Driven posts – The firmest way of setting posts. Pointing the post is **not** recommended – points cause the post to go crooked, and also require cutting through the treatment, thus exposing untreated wood. Generally installed with the small end down, alignment is sometimes difficult, especially in rocky, rough terrain. <u>The main strength of driven posts is that the natural compaction of the surrounding soil is not disturbed.</u> This is very important. We have had customers who have for various reasons had a combination of driven posts and augured posts. When equal pressure is put on the posts, the driven posts will remain standing and the others have been pulled out of the ground.

Augured and Tamped Posts – This is a labor-intensive way to install posts if done correctly. This installation requires auguring the hole, inserting the post, and then tamping all the dirt removed back in. Hydraulic tampers work best. This method works well around facilities where space is limited, and provides perfect alignment if done correctly. Holding characteristics are very good.

Concreted Posts – Firmness depends on soil conditions – does not compress soil around posts. If concreting posts, the bottom of the hole should be "belled" to keep frost from heaving the post out of the ground. This is a labor intensive, expensive way to set posts. Post manufacturers do not recommend this method because the concrete traps the moisture to the posts and causes early rotting and failure.

Braces must be built before wire can be put up. The 2 main types of braces are the tie back and the H brace. I prefer the H brace because you have less wasted space at the end of the row, vineyard maintenance (i.e. mowing) and you don't have a wire to trip you or someone else. The H brace is actually easier to install and provides an upright post for signage. To build the H brace you will need the following (in addition to your posts):

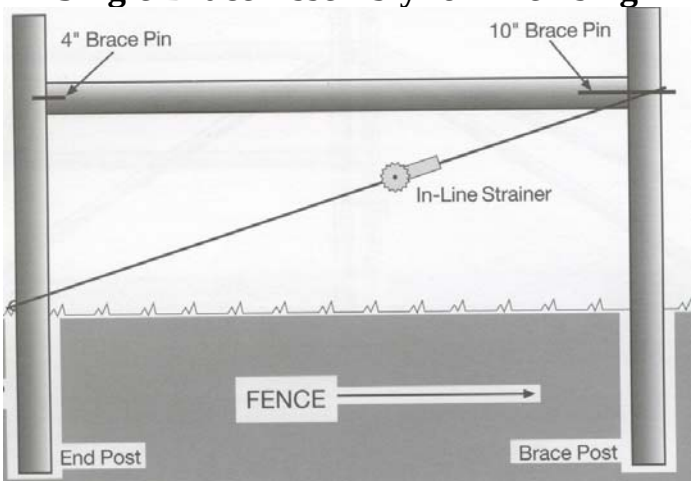
Brace Pins – These are used to hold the top rail in place. They should be 3/8" in diameter for up to ten-foot braces and galvanized for long life. For one H brace you will need one short (4" or 5") and one long (10"). **Do not** use nails or rebar, as these will cause premature rusting of the twitch wire.

Smooth Wire – Used for twitch wire and also as a guide wire when setting posts. Must be high-tensile, class 3, for strength, low cost, and longevity.

In-Line Wire Strainer - Used to tension the twitch wire on your brace assembly.
Below is a picture of an installed H brace. The in-line wire strainer is an steel ratchet type device that is installed with a detachable handle.

I've included a drawing of a **properly constructed H brace**. Note the placement of the twitch wire and the in-line strainer. As you are planning your vineyard rows, it is good to remember that the braces (regardless of the type you use) will take additional resources, so plan for longer rows. Short rows require the same bracing as the long rows. Brace construction requires additional time and materials, therefore adding to the cost.
Brace post width should be approximately 2 X the height of the trellis. Using a 10' post for the top-rail (or cross-member) is preferred as it allows better placement of the vines.
The twitch wire must always be a **double** wrap. To accomplish the double wrap, guide the brace wire through the staple in the end post, up over the 10" pin in the brace post, back down and through the staple and over the 10" pin again. Install a ratchet type wire strainer on the brace wire. Tighten the brace wire until the brace post moves approximately ¼" away from the soil. The twitch wire MUST be anchored securely or the brace will fail.

Single Brace Assembly for Trellising



Crimp Tool and Sleeves – Used for joining (splicing) wire. Also used to install the in-line on the twitch wire. One long crimp is recommended, as this will match the breaking strength of the wire.

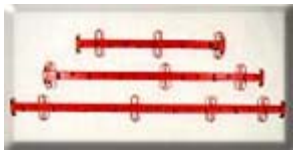
Cutting Pliers –Used for cutting wire and stripping knots. Must be high quality. Cutting high-tensile wire with regular diagonal cutting pliers is difficult and hard on the hands. My personal recommendation is Knipex. These are made of hard steel in Germany and have long life if used properly**. Do not** use a twisting motion, always hold them straight with the wire.

Smooth Wire Puller – An optional tool with many uses. Can be used to pull individual wires if slack is found after tensioning. Can also be used to pull twitch wires together if using crimp sleeves instead of in-line strainers.

***Stretcher Bars**- Specially designed tools incorporating a steel bar with welded-on steel triangles and wedges used to tension (pull) the fixed-knot fence together. The wire is sandwiched between the bar and wedge. Two are needed to do center pulls. These are available in three different lengths for use on different heights of fence.
***Boundary Strainer/Chain Puller** – Used to pull the stretcher bars together. Two are needed for most fencing projects up to 75 " tall. Three are strongly recommended: 96" and 120" fixed knot. Come-alongs may be used, but they need to be high quality and have at least 18' of cable to properly tension fence. **Don't use the $9.95 Wal-mart special** – they have short cables and are not strong enough to properly tension the fence.

**These are used when installing exclusion fence.*

Boundary Strainer



Stretcher Bars

Smooth Wire Puller

Wire – There are typically three types of galvanization used in the wire industry. They are as follows:

Merchant grade- dipped in galvanization vat and pad wiped off –basically a shiny wire with no stated amount of zinc coating

Class I – typically used on standard field fence and smooth wire- has a stated zinc coating less than half Class III products- better than merchant grade coating and will extend the life of the product.

Class III – High quality wire that doubles the life expectancy of the wire over Class I and triple the life over a merchant's grade coating.

Wire Comparison Chart

Wire Gauge	12.5 gauge	9 gauge	10.5 gauge	10 gauge	11 gauge	12.5 gauge	12.5 gauge	14.5 gauge	14.5 gauge
Description	Hi-tensile	Low tensile	Med tensile	Low tensile	Low tensile	Low tensile	Med tensile	Low tensile	High tensile
Tensile strength/grade	Grade 175	Grade 60	Grade 125	Grade 60	Grade 60	Grade 60	Grade 125	Grade 60	Grade 125
Min. breakload on wire	1345	1030	1610	860	685	460	960	270	565
Wt of zinc coating-galvanization									
Class I		0.40 oz	0.30 oz	0.30 oz	0.30 oz	0.30 oz	0.30 oz	0.20 oz	0.20 oz
Class III	0.80 oz	0.80 oz	0.80 oz	0.80 oz	0.80 oz	0.80 0z	0.80 oz	0.60 oz	0.60 oz

Added to this chart is the high-tensile smooth wire Class 3 galvanized product that has a tensile strength of 200 and a minimum breakload of 1740, available in rolls of 1320’, 2640’ or 4000’.

Staples (Barbed) - Barbed staples give added holding power, minimizing the staples working themselves out of the posts due to the natural expansion and contraction of the wood. Staples should be heavy 8 gauge steel with Class 3 galvanization. They should always be positioned at a 45 degree angle to the grain of the post. This application and the barb will help your staple remain securely in the post as it expands and contracts and as it supports your loaded fruit wires. DO NOT pound the staples completely into the wood, allow a small space for the fence wire to move slightly.
Staples are available in lengths 1 ¼” to 2”.

If you have questions, call John at 217-285-2347 (office) or 217-473-6725 (cell)