

Viticulture - Characteristics of the vine - Vine Propagation

TYPES OF PROPAGATION

- Nurseries
 - Mass selection & Layering
 - Seeds
 - Cuttings
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NURSERIES

- More common to use nurseries than for a grape farmer to plant seeds or make their own cuttings.
 - Depending on the location, the nursery may only be able to supply a limited range of varieties.
 - In most cases, nurseries are the best source for vine material.
 - Great advantage is testing plant material prior to sale to guarantee it is unaffected by viral disease.
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MASS SELECTION & LAYERING

- Farmers who don't use nurseries either use mass selection from their own vines, or layering.
 - Vine canes are buried in the ground then separated from the parent plant once they have established their own roots.
 - Layering occurs naturally.
 - Best way to propagate some species like *V. berlandieri* and *V. Rotundifolia* which is difficult to root from cuttings.
 - Layering can only be used on *V. vinifera* where no risk of phylloxera is present.
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SEEDS

- Vines are not often planted as seeds as propagation from cuttings is quicker and easier, and allows for grafting on to phylloxera-resistant rootstock.
 - Unless controlled pollination techniques have been used, it is difficult to predict the characteristics of plants grown from seeds.
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CUTTINGS

- Cuttings are pieces of parent plant (stems, roots, leaves) that develop into a new plant when placed into the right conditions.
 - A dormant cutting can be started in the spring and by fall will give a vine large enough to bear a cluster or two of fruit the next season.
 - Vines can be grown from 2 types of cuttings:
 - Dormant or hardwood, and green cuttings.
 - In commercial viticulture, hardwood winter cuttings from canes are used.
 - Softwood cuttings are used for research. They are more difficult to propagate but are available all year round.
 - Green cuttings are used when some grapes that don't root easily from dormant cuttings.
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DORMANT CUTTINGS

- Can be taken anytime after the vine lost its leaves until the buds begin to swell in the spring.
- Made from the new shoots (canes) that grew the previous growing season.
- The best wood is the first one to two feet of the base of the shoot where the buds are the closest together.
- Ideal thickness is pencil diameter, 3/4". Thicker cuttings are hard to handle, thinner wood may not be mature unless variety has naturally small shoots.
- Avoid woods that is soft, spongy and has a large pith.
- Best is dense, light green inside, and relatively small pith.
- Should be 12-18" long, bottom straight cut right below the bud, top cut diagonally at least 1/2" above the bud to make it easy to identify the top.
- The best cuttings have 4 or more nodes. 2 nodes suitable if cutting is healthy.
- Some growers make the diagonal cut on the bottom, either way works.
- Rooting occurs best at the nodes, advantage in having several nodes per cutting.
- Disinfect cuttings with a 5% hydrogen peroxide solution before growing them to keep disease from spreading.
- Observe the vine in bearing to be sure it is healthy
- Some vine diseases can reduce crop, allowing the vine to grow more, so it looks big and vigorous when dormant, but is unfruitful.

- Vines grown from cuttings of a virus-infected vine will also have the virus.
- When taking cuttings:
 - Collected in autumn or winter when they have the highest levels of carbohydrate reserves.
 - Wood is well-ripened and healthy.
 - Normal appearance, and when cut the cell layers just beneath the bark should be green and full of sap, the wood firm and free from dark specks.
- Cuttings 30-45cm in length are collected, bundled, labeled, and stored at 5C before grafting.
- They can be heat treated by placing them at 50C for 30 minutes in order to rid them of pests like phylloxera, nematodes, and phytoplasmas.
- If cuttings are not grafted, they can be planted out straight into a nursery or into a pot in a greenhouse.
- To encourage them to grow successfully:
 - Plenty of water as the leaves grow faster than the roots.
 - Mist propagation or a propagating frame.
 - Keep them warm, 15C-25C. Best to heat from below to encourage root development.
 - Use loose, well-drained soil or potting compost that has good aeration, a high water-holding capacity, good drainage and protection from vine weevils (a beetle).

STORING CUTTINGS

- Wrap in moist paper or pack them in a damp peat in a plastic bag.
- Keep cuttings refrigerated or stored in an unheated building in a crawl space under a house.
- Avoid places where they will freeze.
- Freezing will not harm them, but will dry them out.
- Ideal temps 32-33F.
- Can be held for a year or more.
- Large quantities can be stored in sand pits to prevent water logging upside down with 6-18" of sand covered with tarps and boards.

CALLUSING

- Callus is the white tissue that forms on cut surfaces. It is from callus that roots form.
- Once roots start, they grow in cooler conditions than what is needed for callus to form.
- A cutting placed in the soil will sit until the soil is warm enough for callus to form, so it only grows a few inches the first year.
- Pre-callusing before planting will grow much more often enough to establish the truck, even more.
- A callused cutting planted in its permanent location can often grow enough to bear a cluster or two the new season.
- Nursery-grown cuttings have to grow a year to re-establish their roots, trained the second year, bearing fruit the third year.
- Before callusing, be sure cuttings haven't dried. Standing them in an inch or two of water overnight will let the refill, improving rooting.
- Several methods to callus cuttings. Rooting hormones isn't necessary. A very good product is Dig N Grow used at medium strength.
- **Method 1**
 - Wrap in moist paper or sphagnum in a black bag.
 - Put in a warm area that stays constantly at 80-85F.
 - Callusing should occur in 1-2 weeks.
 - Plant as soon as roots start to appear.
- **Method 2**
 - Plant cutting in a pot of 3:1 perlite to peat.
 - Set pots on heating mat set to 85F, in a cool area or outdoors.
 - Heated zones encourage callusing but top of the cuttings will not push buds with the cool air.
 - The idea is to get roots before buds push too much as there is an existing root system to support new growth.
 - Rooting occurs in 1-2 weeks.
- **Method 3**
 - Plant cuttings in a black pot in 3:1 perlite-peat mixture and set in sunny location to be warmed by the sun.
 - Pot no larger than 1 gallon.
 - Avoid excess watering as that will cool the soil and slow rooting.

- A slower method, taking up to a month, and buds will grow before roots are formed.
- Large quantities of cutting can be bundled in lots of 50-100 and rooted in 3:1 perlite-peat mix in benches with bottom head set at 80-85F in the root zone.
- Beds outdoors or refrigerated room to retard buds while roots develop, same in method #2.
- This reduced the likelihood of shoots that can break down during planting.

PLANTING

- Cuttings callus and root quickly so don't start callusing until the planting site is ready.
- Once cuttings have a ring of callus or roots start to appear, its time to plant them.
- Cuttings may be planted:
 - Directly in the spot you plan to grow the vine.
 - Nursery row where they grow until fall then transplant the vine when it is dormant.
 - In a pot.
- In a pot you can start cutting early in the year, then transplant them as spring advances, or grow them in the pot all summer and plant in the fall.
- If you lack the means to keep young vines watered in their permanent location, it is better to grow vines in a nursery or pot and transplant them as dormant, when they can handle more stress.
- Plant cuttings with half or more of their length in the soil to protect them from desiccation.
- In very hot, dry areas the cuttings can be covered with a mound of loose soil at first. When buds begin to grow, pull the soil mound away.
- Water an inch or more a week until the shoots grow 6" long, then start using a weekly feeding of a balanced organic fertilizer (such as fish) or a liquid chemical fertilizer (16-16-16).
- Before the shoots are 6", the roots are not long enough to benefit from fertilizers.
- With drip irrigation, fertilizer can be used in the water.
- Stop fertilizing by mid-summer and stop water afterwards to allow the vines to harden before frost.
- Apply mycorrhizal fungus to roots before planting to help the roots take up nutrients.

ON-SITE ROOTING

- Completed after all danger of frost is past and weather is consistently warm.
- Soil at the site must be tilled and clean of weeds.
- For each vine, put down a sheet of clear plastic mulch, 2'x2', a week before planting.
- After a week, prepare cuttings with Dip N Grow.
- Push cuttings through the plastic at least half way into the soil.
- 1-4 weeks cuttings should root and begin to push buds. Vines can be watered and fertilized (fish) after shoots are 6" tall.
- The clear plastic allows sunlight to the soil and traps the heat.
- The new shoots can be trained up a support stake as they grow.
- The new vine may get big enough to bear a small crop next season.
- Success varies with climate, soil, and grape variety.
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