Grapes

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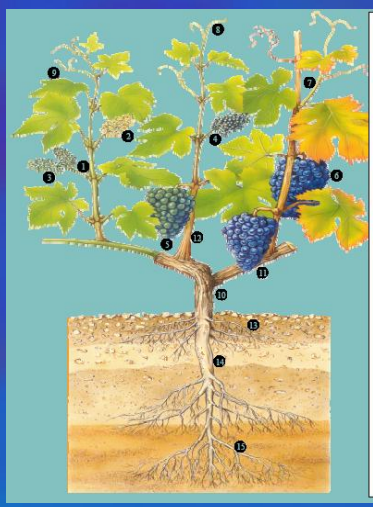
Grapevine Morphology



1 Bud or node: Out of this either a leaf or a fruit-bearing shoot will develop.
2 Inflorescence: The flowers of the grapevine. The cluster is a specialized shoot that will later bear the berries. The flowers of the grapevine are perfect or hermaphroditic; that is, they contain both male and female parts: functional stamens and an ovary within a pistil.
3 Fruit set: The first stage in the development of the berries after flowering.
4 Green grapes: Still full of chlorophyll, these tiny balls are an in-between stage in the development of the fruit.
5 Véraison or coloring: This is the transition from green to color in the fruit. It usually takes place in July, after a certain level of sugar has accumulated within the fruit; véraison is the onset of ripening.
6 Ripe grapes: The final stage in the ripening process of the fruit.
7 Water shoots or lateral shoots: These unwanted shoots develop on the wood of the vine and will occasionally bear small fruit. Such grapes remain puny and may not be harvested. As a rule, water shoots are pruned out during the summer.
8 Tendrils: These are the climbing organs of the grapevine. Tendrils coil around and grasp anything they touch. After the harvest, they become woody and harden.
9 Leaf: The breathing organ of the grapevine, which also serves to nourish it. Its shape, the size of the lobes, and the dentations change with each cultivar.
10 Trunk or vine: Also called old wood, is the vine's major stem. It is balanced by the root system.
11 Arm: Also called two-year-old wood, this is where the fruit-bearing shoots develop.
12 Shoot: Also called one-year-old wood, the shoot carries the nodes from which the leaves and clusters of grapes will grow. When shoots harden, they are called canes.
13 Shallow roots: This root system, close to the soil surface, catches surface precipitation. It is destroyed when the vineyard is plowed, but it quickly grows back.
14 Subterranean roots: These anchor the vine securely in the soil.
15 Principal roots: The vine uses these long roots to obtain water and nutrients. They store large amounts of carbohydrates before the plant's winter rest.

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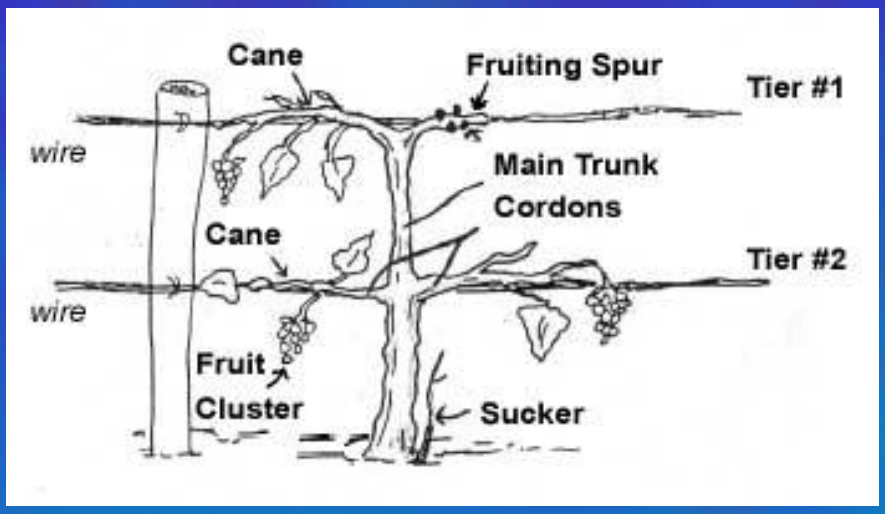

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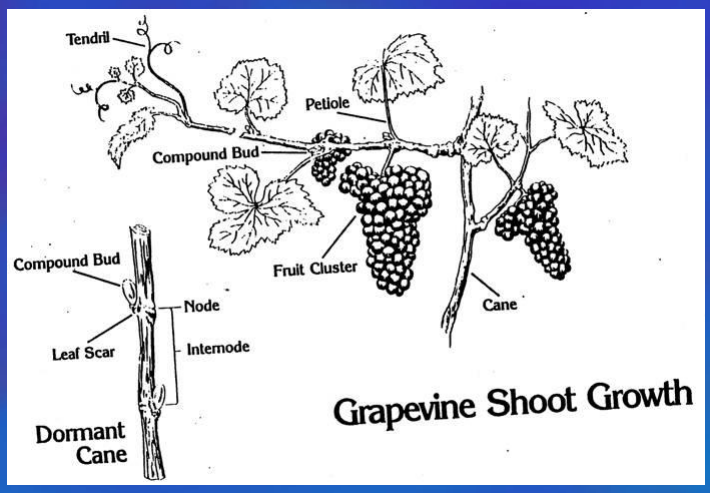

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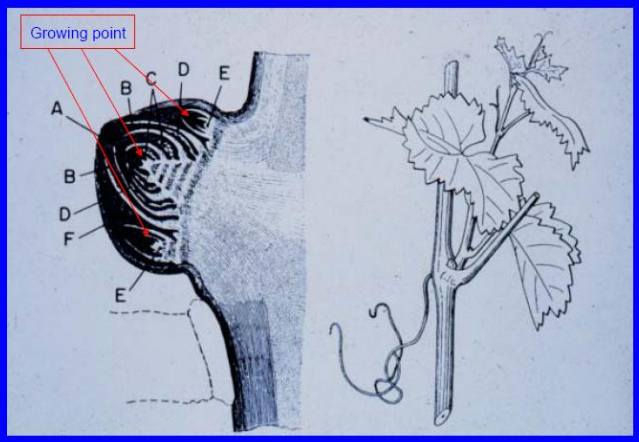
Fortunately, the grape bud is a compound structure with 3 or more potential growing points from which a new cane will develop.



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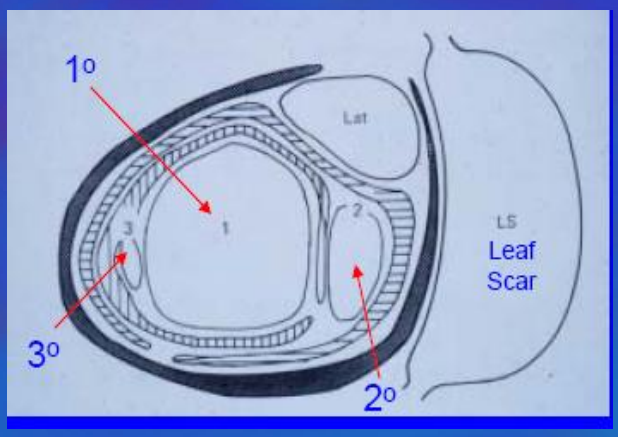
3 Buds in 1



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Healthy Bud

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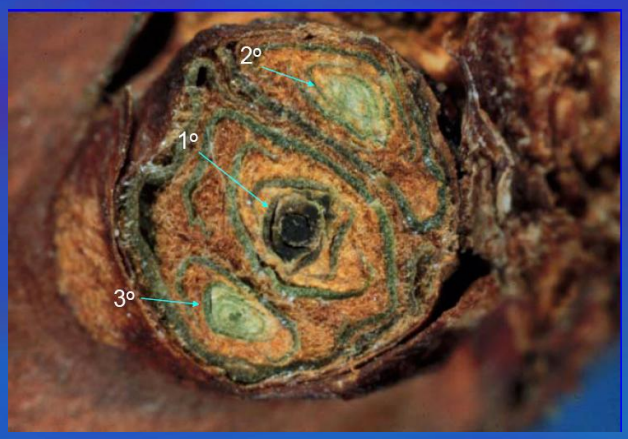
Primary Bud Loss



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Primary & Secondary Bud Loss

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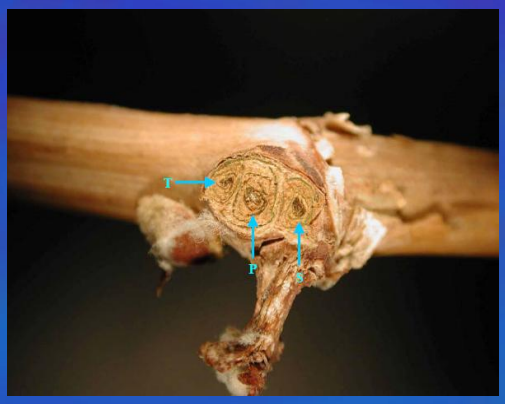
Dead Bud



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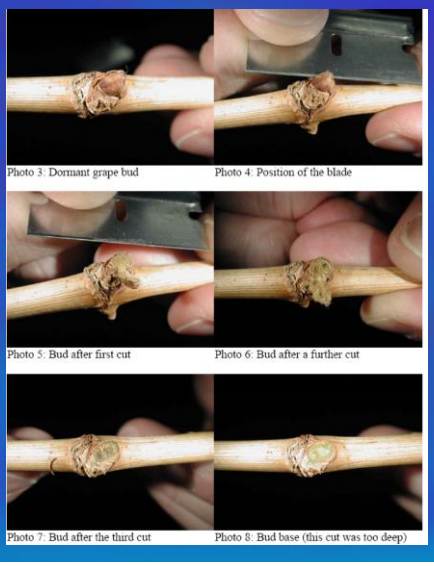
Photo 3: Dormant grape bud
Photo 4: Position of the blade
Photo 5: Bud after first cut
Photo 6: Bud after a further cut
Photo 7: Bud after the third cut
Photo 8: Bud base (this cut was too deep)

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Pre-flowering showing cluster, leaf, and leaf shoot

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Flowering

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Vineyard Layout

Attention to detail is the key once again. What is done during the layout phase to the vineyard is part of the vineyard for years to come.

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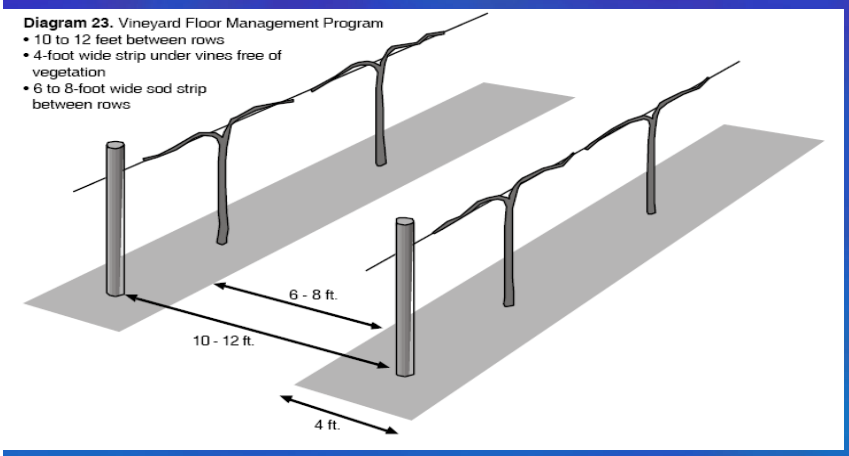
Typical Row and Vine Placement



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Weed Control

- Pre-emergent
  - -Surflan
  - -Princep
- Post emergent
  - -Round-up
  - -Rely

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Absolutely NO 2,4D products.

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Herbicide Injury

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Pre-Emergent Considerations

- Know your weeds
- Age restrictions
- Bearing or non-bearing
- Dormant applications only

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Post Emergent Considerations

- Know your weeds.
- Contact vs. translocation
- Grass vs. Broadleaf

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Disease

- Disease problems vary across the state.
- Western Nebraska is more arid thus less disease pressure.
- Eastern Nebraska has no options other than spraying.

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Most Common Disease Problems

- Powdery Mildew
- Downy Mildew
- Black Rot
- Phomopsis cane and leaf spot
- Botrytis bunch rot

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Powdery Mildew

- Powdery mildew, (*Uncinula necator)*, can infect all green tissue of the grapevine. Cluster infection at or shortly after bloom can lead to a reduction in set or cause berry damage leading to cracked, damaged fruit at harvest. Infection of the foliage can cause a reduction in vine growth, fruit yield and quality and a reduction in winter hardiness. In eastern U.S. growing regions, the fungus overwinters as cleistothecia on bark, but in California, powdery mildew overwinters as hyphal strands on dormant buds where infection takes place very shortly after budbreak. In Texas, the best evidence is that the fungus overwinters as cleistothecia. Sulfur is an integral part of the powdery mildew control program, but under some environmental conditions can become problematic. Sulfur is ineffective when ambient air temperatures are below 50 'F and can be phytotoxic to grapevine foliage when temperatures exceed 95'F. Sulfur residue on fruit can also interfere with fermentation, so use of this product is suggested in late spring and for post-harvest applications. There are several systemic fungicides that can be used during the growing season to prevent fruit yield and quality losses as well as protecting foliage.

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Downy Mildew

- Downy mildew is common in cool, humid environments but seldom occurs in hot, dry areas. Disease is first observed as a pale yellow area on the upper surface of the leaf. The underside of the leaf is marked by a downy appearance. As the disease advances the infected tissue dies and turns brown. Young stems become thickened and are often covered with the white fruiting structures.

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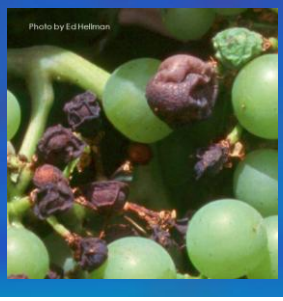
Black Rot

- Black rot of grape is an important fungal disease of American origin that was probably spread to the Old World through the importation of phylloxera resistant rootstock. Primary infection usually arises from infected fruit from the previous season and all green tissue of the grapevine is susceptible to infection. Brown circular lesions appear on infected leaves and within a few days, black fruiting bodies are formed within the lesions. These leaf lesions then become the primary source of infection to developing fruit clusters. An infected berry first appears light brown, soon the entire berry turns dark brown, and black pycnidia develop on its surface. Infected berries shrivel, turn hard and black and are called mummies. The black rot organism overwinters in mummified fruit on the vine and on the ground. Spring rains trigger the release of airborne ascospores from mummies and subsequent infection of susceptible tissue takes place if temperature and duration of leaf wetness are conducive.
- Pycnidia form within lesions and produce pycnidiospores that are spread by rainfall. Leaf lesions are capable of producing spores and causing secondary infection approximately five to seven days after they first appear. Control of black rot is based on properly timed applications of fungicides.



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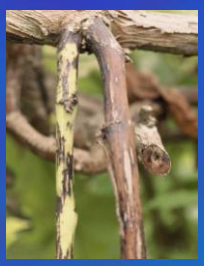
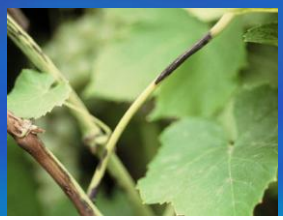
Phomopsis Cane and Leaf Spot

- Canes
- Elongated black lesions develop along the basal part of shoots and lesions often split the green tissue. Numerous lesions give the surface a blackened, scabby appearance. When infections on shoots are numerous, they often run together and form dark blotches that crack. Shoot infections cause symptoms on the canes that are readily observed in the winter. In the dormant season, infected canes may appear bleached, and numerous black fruiting bodies (pycnidia) may develop along the cane's basal region.
- Leaves
- Leaf lesions often are numerous with brown or black-brown coloration and become covered with black, pimple-like fruiting bodies. These infections usually do not become visible until late summer. Severely infected leaves are misshapen with a crinkled appearance, yellow, and fall from the vine prematurely. Small leaf spots also can occur early in leaf development which can severely crinkle or misshape the leaf. Lesions can also develop on leaf petioles.





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Main Insect Pests

- Grasshopper
- Grape Flea Beetle
- Climbing Cutworm
- Tomato Hornworm
- Grape Phylloxera

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Trellising

- Considerations—
  - -Growth habit of the plant.
  - -Available space.
  - -Mechanization in the future.

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Components of a Standard Trellis System

- End post assembly
- Line posts
- Wire
  - -Support wires---12.5 gauge hi-tensile
  - -Catch wires---

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End Post Assembly

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Line Posts

- 3-4” treated posts
- Native wood posts
- Metal T-posts
- Metal specialized vineyard posts.
- Other

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Hi-Tensile Wire and Accessories

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Most Common Nebraska Trellis Styles

- High Cordon
- Vertical Shoot Positioning (VSP)
- Double Geneva Curtain

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High Cordon

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Vertical Shoot Positioning VSP

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Geneva Double Curtain

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Irrigation

- Is irrigation needed?
- Year 1 is essential.
- Year 2 is advisable.
- Beyond year 2 -----

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Year One

- Irrigation is absolutely essential the first year after harvest.
  - -Water System
  - -Nurse Tank

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Fertilizer

- It is important that soil analysis early in the preparation stage of the vineyard takes place and the corrections are made at that point.
- As mentioned earlier a small amount of "booster" fertilizer may be used at planting.
- After initial corrections are made rely on petiole sampling to determine fertilization needs.

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Pests

- Birds
- Deer
- Small mammals
- Others

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Small Mammals

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Harvest

- When do you harvest?—
  - When the winery tells you to.
  - When the Brix tell you to.
  - When the TA tells you to.

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Picking

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Pruning

- Prune when plants are fully dormant
- Try to prune as late into the year as possible as pruning delays bud break

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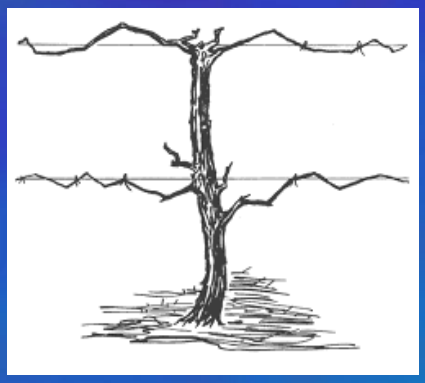

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What Do You Prune?

- 80%- 90% of the grape canopy is removed
  - 200-300 buds on a mature vine capable of producing fruit

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