Grapes

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Grapevine Morphology

1. Bud or node. Out of this bud a leaf or a flower-bearing cluster will develop.
2. Inferior. The flowers of the grapevine. The cluster is a specialized axil that will have one to five berries. The ovaries of the grape are perfect and isopetalous; that is, they consist of five free petals and fertile parts. Fleshy fruit and seed are usually produced at this stage of the berry.
3. Fruit or cluster. These structures develop on the wood of the vine and will occasionally bear small flowers. In a vine, water is most concentrated during the growing season.
4. Twigs. These are the growing parts of the plant. Twining. Tendril. They are the parts where the clusters and leaves grow. After the harvest, they become woody and harder.
5. Leaf. The foliage of the plant, which is a part of the shoot. It has the ability to photosynthesize and bear the vine's fruiting clusters.
6. Vine. Also called aerial wood or the vine's major axis. It is balanced by the root system.
7. Stem. Also called (vein), it is a branch of the vine and consists of two main parts: the lower part, which holds the leaves and stems, and the upper part, which holds the berries.
8. Flowers. These structures are produced by the flowers. They provide the plant with reproductive potential and are responsible for pollination.
9. Branches. These structures develop on the wood of the vine and will occasionally bear small flowers. In a vine, water is most concentrated during the growing season.
10. Twigs. These are the growing parts of the plant. Twining. Tendril. They are the parts where the clusters and leaves grow. After the harvest, they become woody and harder.
11. Leaves. The foliage of the plant, which is a part of the shoot. It has the ability to photosynthesize and bear the vine's fruiting clusters.
12. Vines. Also called aerial wood or the vine's major axis. It is balanced by the root system.
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15. Branches. These structures develop on the wood of the vine and will occasionally bear small flowers. In a vine, water is most concentrated during the growing season.
16. Twigs. These are the growing parts of the plant. Twining. Tendril. They are the parts where the clusters and leaves grow. After the harvest, they become woody and harder.
Fortunately, the grape bud is a compound structure with 3 or more potential growing points from which a new cane will develop.

3 Buds in 1
Healthy Bud

Primary Bud Loss
Primary & Secondary Bud Loss

Dead Bud
Pre-flowering showing cluster, leaf, and leaf shoot
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Flowering

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.

Vineyard Layout
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Typical Row and Vine Placement

Diagram 23. Vineyard Floor Management Program
- 10 to 12 feet between rows
- 4-foot wide strip under vines free of vegetation
- 6 to 8-foot wide sod strip between rows
Weed Control

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

Absolutely NO 2,4D products.
Herbicide Injury

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

**Disease**

- Disease problems vary across the state.
- Western Nebraska is more arid thus less disease pressure.
- Eastern Nebraska has no options other than spraying.
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. As use of this product is sequenced 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.
**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.

**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 ascomycetes 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 blisters that crack. Short 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**
Trellising

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

Components of a Standard Trellis System

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

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Line Posts

- 3-4” treated posts
- Native wood posts
- Metal T-posts
- Metal specialized vineyard posts.
- Other
Hi-Tensile Wire and Accessories

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Most Common Nebraska Trellis Styles

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

Vertical Shoot Positioning (VSP)

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2005/06/24

4/5/2011
Geneva Double Curtain

Irrigation

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

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

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.
Pests

- Birds
- Deer
- Small mammals
- Others
Small Mammals
Harvest

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

Picking
Pruning

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