



**Timely Viticulture**

- Dormant  
 - Pre-Bloom  
 - Bloom  
 - Post Bloom  
 - Mid Season  
 - Pre-Harvest  
 - Harvest  
 - Post Harvest  
 - Dormant

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"Timely Vit" is designed to give those in the Maryland grape industry a timely reminder on procedures or topics they should be considering in the vineyard.

## Drought Stress, Vine Performance, and Grape Quality

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Although it is generally accepted that grape and ultimate wine fruit quality is better in relatively "dry" seasons, it is clear that water STRESS or excessive drought is NOT desirable for balances of yields and wine quality. Excessive water is not desirable but adequate water to keep the plant systems active and productive is mandatory!

Effects of "excessive" drought stress:

- Vine growth is inhibited – may seem desirable, but if old leaves are diseased or damaged there will be no replenishment of new leaf surface for photosynthesis.
  - The desired leaf-to-fruit ratio is about 12-15 leaves per cluster.
  - Growth processes like shoot growth and early berry growth are very sensitive to water stress.
  - Early drought stress will not allow the development of the proper ratio and the vine will not have the capacity to properly ripen fruit.
- Reduced photosynthesis - optimum wine quality does not come from stunted vines with non-functional leaves.
  - Leaf photosynthetic function is less sensitive than growth, however, postveraison stress (now) may slow down the photosynthetic function and suppress ripening.
- Fruit ripening may be delayed or suppressed, potentially decreasing quality and increasing risk of disease and bird predation.
  - Brix may appear to increase, but may be the result of dehydration, not actual increase in sugar.
  - Post veraison berry growth is quite resistant to water stress.
  - Small berries typically are associated with high quality, but if the small size is due to excessive stress, the grapes may not produce high quality wines.
  - Varietal character (secondary products) develops in the last few weeks before ripening, so late stress also affects flavor development.
  - Wines made with grapes from drought stressed vines have typically been characterized by having dull or little fruit, less complexity, and relatively short life.
  - Untypical or Atypical aging (UTA or ATA) has been associated with grapes that have been produced in seasons of drought stress, either directly or through drought induced nitrogen deficiency.

The desirable scenario of drought stress for optimal grape wine quality:

- Adequate water early in the season to have good, but not overly-vigorous, canopy and cluster develop-

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ment through bloom.

- Mild stress should gradually develop after bloom so that good fruit set can occur, but the growth of the berries and shoots are slowed somewhat.
- After fruit set, the canopy should be filling the trellis, and at this time the stress should increase so that the shoots slow growth markedly, the berries stop growth at a somewhat reduced size, and yet the leaves are still fully functional.
- Mid-season to harvest, the vines should be maintained at the intermediate stress to reduce vegetative growth, but keep the leaves healthy through harvest.
- There should be minimal basal leaf yellowing before harvest if the canopy is kept properly open.
- Stress does not get too severe at any point. Look for signs of leaf wilting and tendril drying.
- Irrigate if vines become too stressed during ripening, especially just after veraison.
- Canopy management should be meticulous.
- Careful cluster thinning to balance the crop is critical – do not try to maintain a large crop on drought stressed vines.

For newly planted and young newly bearing vines:

- A very conservative approach should be taken with young vines just beginning their bearing cycle (2-5 years old).
  - Crop should be thinned or even dropped completely under severe drought conditions as it may affect the winter sensitivity (cold damage) and long term survivability of the vines.
  - Irrigate if necessary to avoid severe stress.
- For newly planted vines, drought stress needs to be avoided – irrigation and weed management are necessary – to maintain good establishment.
  - Poor winter survival is a much greater risk in newly planted vines that have been exposed to severe drought stress.
- Pay special attention to new “replants” in existing vineyards as these are sometimes forgotten at this point.

High wine quality appears to require adequate, but not excessive, water supply early in the season to support the crop. Moderate stress later will help limit further vegetative growth, but allows healthy leaves to fully ripen the fruit. Severe stress should be avoided.

References:

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