

# Timely Viticulture

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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.

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## Nitrogen Fertilization in the Vineyard

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The annual goal in the established vineyard is to have the vines fill their allotted trellis space, top out just above the top wire at veraison, and produce a crop that is in balance with the vegetative vigor.

- For many grapevines (especially *vinifera* varieties), excessive nitrogen may lead to excessive vigor and unbalanced vines. This ultimately leads to poor fruit quality due to shaded fruit and delayed ripening.
- Overall, excess vigor is a problem with grapevines, so a conservative approach is typically taken with N fertilization.
- On heavy soils adding too much N during the growing season may result in the vine actively growing late into the fall with poorly hardened wood that has increased sensitivity to winter damage.
- Nitrogen is a very dynamic element in the soil and plant. Many of the N compounds are very soluble and are easily taken up by the plant and leached from the soil.
- Nitrogen is a major component in proteins and growth regulators (cytokinin and auxins) in plants, and therefore is utilized in large quantities. Nitrogen requirements are best determined by growth and performance. The grower needs to determine rates of N for each variety for each block of the vineyard.
- Soil tests for nitrogen have not proven useful in determining plant needs, so leaf analysis is the best tool for determining fertilizer needs in bearing vineyards.
- When planning a nutrient management program, leaf analysis, soil series, and vineyard vigor observations including shoot growth rates, leaf color, productivity, and pruning weights should all be taken into account.
- For *vinifera*, N needs and applications should be based on tissue testing in conjunction with observation on vigor and productivity.
  - Typically grafted *vinifera* vines are very vigorous and **do not** require annual N applications, except maybe on high sand content soils.
- Premium and Grafted Hybrids will typically respond similarly to *vinifera* varieties and may require little or no fertilizer.
  - *Vinifera and premium hybrids are managed for moderate yield and maximum fruit and wine quality. Thus N supply is in the lower end of spectrum.*
- Self-rooted Hybrids and American varieties require regular annual applications to maintain vigor and balance productivity.

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Pre-Bloom

- Nitrogen is supplied naturally in the soil primarily through the breakdown of organic matter. Every 1% of organic content in the soil supplies 5 to 20 lbs. of N/acre/year, depending on soil series, temperature, etc.
- As a guideline, the annual N requirement for *vinifera* and premium hybrids ranges between 0- 30 lbs./acre.
- For premium hybrids, annual N requirement ranges between 0- 50 lbs./acre.
- Self rooted hybrids and Americans may require 20-60 lbs./acres annually.

## N content of fertilizers:

- Ammonium nitrate (32% N): acidic soil reaction (1 lbs. N = 1.8 lbs CaCO<sub>3</sub> ; It takes 1.8 lbs of lime to neutralize the acidic reaction of 1 lbs. of ammonium nitrate fertilizer). May be difficult to obtain due to explosive nature
- Urea (46% N): economical N source, acidic soil reaction (1 lbs. N = 1.8 lbs CaCO<sub>3</sub>); subject to ammonia volatilization if not incorporated
- Calcium Nitrate (15% N): more expensive, basic soil reaction; excellent source for fruit.

The early spring growth of the vine is primarily fueled by reserve N stored in the trunks and other permanent wood and this typically runs out around bloom.

Most N (75%) is stored in the roots of dormant vines.

- Most N uptake by the vine occurs at 2 periods: 2-3 weeks prior to bloom and 2- 6 weeks after bloom. Vines take up only 10% of N applied at bud break, but double the rate of N uptake near bloom. Thus, it is not recommended to apply N at bud break.
- It is therefore recommended to make the first N application around full bloom, in late may or early June.
- A second application, if necessary can be made no later than mid-July if the growth of the vines has slowed or stopped by that point or the leaves look light or chlorotic.
- Vineyards on sandy soils typically require more N during the growing season, and depending on the soil organic matter content, it is best to split the application.
- Fertigation, if possible, is the desired and most efficient mode of application as it concentrates the N in the root zone.
- Dry fertilizer is typically banded under the row to feed the grapevines and not the turf middles.

## Resources:

Dr. Terry Bates Cornell University; Dr. Tony Wolf, Virginia tech; Dr. Tim Martinson, Cornell University; Dr. Imed Dami, OARDC

Visit <http://extension.umd.edu/smallfruit/grapes> for more information on viticulture and small fruit.

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