VIRTUAL VITICULTURE ACADEMY

Know Where You Nutrients Come From

Assessment of past fertilizer applications and understanding how nutrients are introduced to each vineyard block is an important part of developing your season fertilization strategy. Follow the steps below to gain insight on how much of each nutrient was applied in your vineyard as a liquid or solid fertilizer, including nitrogen that may have been added with your irrigation water.

Step 1:
Record pounds per acre (also referred to as units per acre) of actual nutrients added in the previous year (or 2 years) and note any fertilizer applied in the current calendar year prior to tissue sampling. Use the following example equation to determine the units per acre applied via solid or liquid fertilizers. Also, take note of any foliar applied nutrients using the same equations below.

Example for Solid Fertilizer:

Ammonium sulfate [(NH4)2SO4] fertilizer contains 21% N or 0.21N/lb of fertilizer. If 100 lbs of ammonium sulfate are applied per acre, the total N application is 21 kbs/acre.

$$\frac{100 \text{ lbs } (NH_4)_2SO_4}{\text{ac}} \times \frac{0.21 \text{ lbs N}}{1.0 \text{ lb } (NH_4)_2SO_4} = \frac{21 \text{ lbs N}}{\text{ac}}$$

Example for Liquid Fertilizer:

Ammonium nitrate liquid fertilizer (AN 20) has a density of 10.76 Lbs/gal, and 21% nitrogen.

$$\frac{10.76 \text{ lbs}}{\text{gal of fertilizer}} \times \frac{0.21 \text{ lbs N}}{\text{lb of fertilizer}} \times \frac{5 \text{ gal applied fertilizer}}{\text{ac}} = \frac{11.3 \text{ lbs N}}{\text{ac}}$$

Step 2:
Test your irrigation water each year to determine if there are nutrients being introduced your vineyard block each time you water. The most commonly added nutrient with water is nitrogen (nitrate NO3 form). However, it is also important to understand if boron or salts are in ranges that could be toxic to vines. Use the below equations to determine nitrogen inputs from irrigation in both NO3 and NO3-N, the forms commonly reported on lab tests.

Example for lab report of ppm NO3:

Report from lab shows 45ppm NO3 and a total of 0.89 acre feet (ac-ft) of irrigation water was applied.

Step 1: Convert ppm NO3 to lbs N/acre foot of irrigation water applied.

45 ppm NO3 x 0.62 = 27.9 lbs N/ac-ft

Step 2: Multiply lbs N/ac-ft by total irrigation water applied per acre.

$$\frac{27.9 \text{ lbs N}}{\text{ac-ft}} \times \frac{0.89 \text{ ac-ft irrigation water}}{\text{ac}} = \frac{24.8 \text{ lbs N}}{\text{ac}}$$

Example for lab report of ppm NO3-N:

Report from lab shows 45ppm NO3-N and a total of 0.89 acre feet (ac-ft) of irrigation water was applied.

Step 1: Convert ppm NO3-N to lbs N/acre foot of irrigation water applied.

45 ppm NO3 x 2.74 = 123.3 lbs N/ac-ft

Step 2: Multiply lbs N/ac-ft by total irrigation water applied per acre.

$$\frac{123.3 \text{ lbs N}}{\text{ac-ft}} \times \frac{0.89 \text{ ac-ft irrigation water ac}}{\text{ac}} = \frac{109.7 \text{ lbs}}{\text{ac}}$$

Step 3:
Estimate the nitrogen input from soil organic matter (determined by soil test) and compost additions (if you applied any). It is estimated that for every 1.0% of soil organic matter there will be approximately 20 pounds of nitrogen available over the course of the season. Use the equation below to estimate available nitrogen over the season from compost application.

Example for Tons/Acre Compost Applied

Wet (as is) compost with 1.7% N content, applied at a rate of 5 tons per acre.

Step 1: Convert %N content to lbs N per ton of compost.

$$\frac{1.7 \text{ lbs N}}{100 \text{ lbs}} \times \frac{2000 \text{ lbs}}{\text{ton of compost}} = \frac{34 \text{ lbs N}}{\text{ton of compost}}$$

Step 2: Convert lbs N per ton of compost to lbs available N per ton of compost.

$$\frac{34 \text{ lbs N}}{\text{ton of compost}} \times \frac{0.30 \text{ lbs available}}{1 \text{ lb total N}} = \frac{10.2 \text{ lbs}}{\text{ton of compost}}$$

Step 3: Multiply lbs of available N per ton by total tons applied per acre.

$$\frac{10.2 \text{ lbs available N}}{\text{ton of compost}} \times \frac{5 \text{ tons compost}}{\text{ac}} = \frac{51 \text{ lbs N}}{\text{ac}}$$

Summary:
To properly estimate the amount of fertilizer added to each vineyard block, it is important to know how fertilizer is getting into the system. We can precisely measure the amount of fertilizer added from commercial products, however we must also estimate of the amount of nutrients applied with irrigation water, compost additions, and from the nitrogen cycle (organic matter) in the soil. By doing so, we can create a more complete budget of nutrient availability to vines and a better understanding of shifts in nutrient levels in tissue tests.

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