Optimizing Nutrients for Fertility & Moisture Utilization for Vineyards

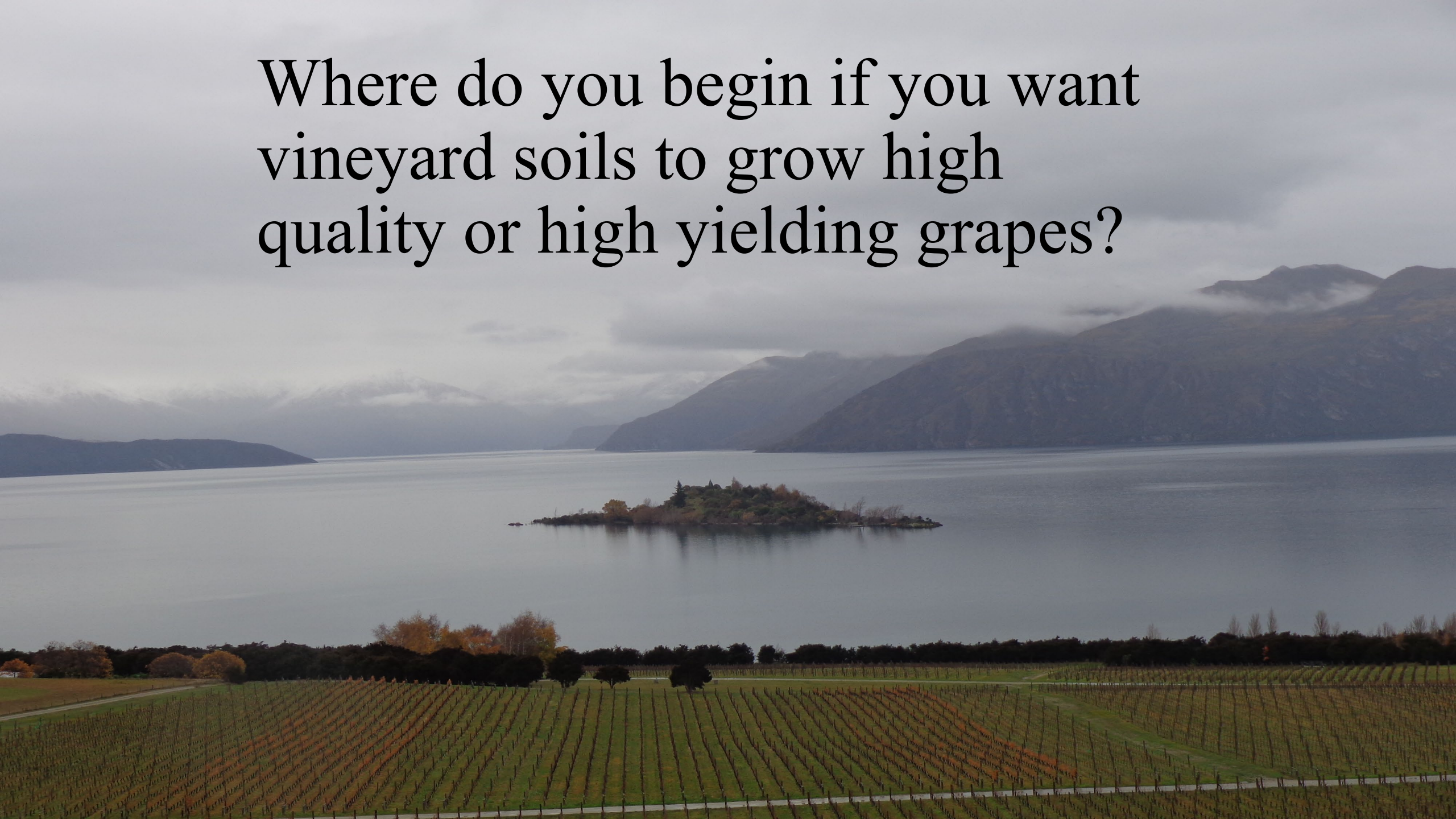
Dirt to Glass Conference

Traverse City, Michigan

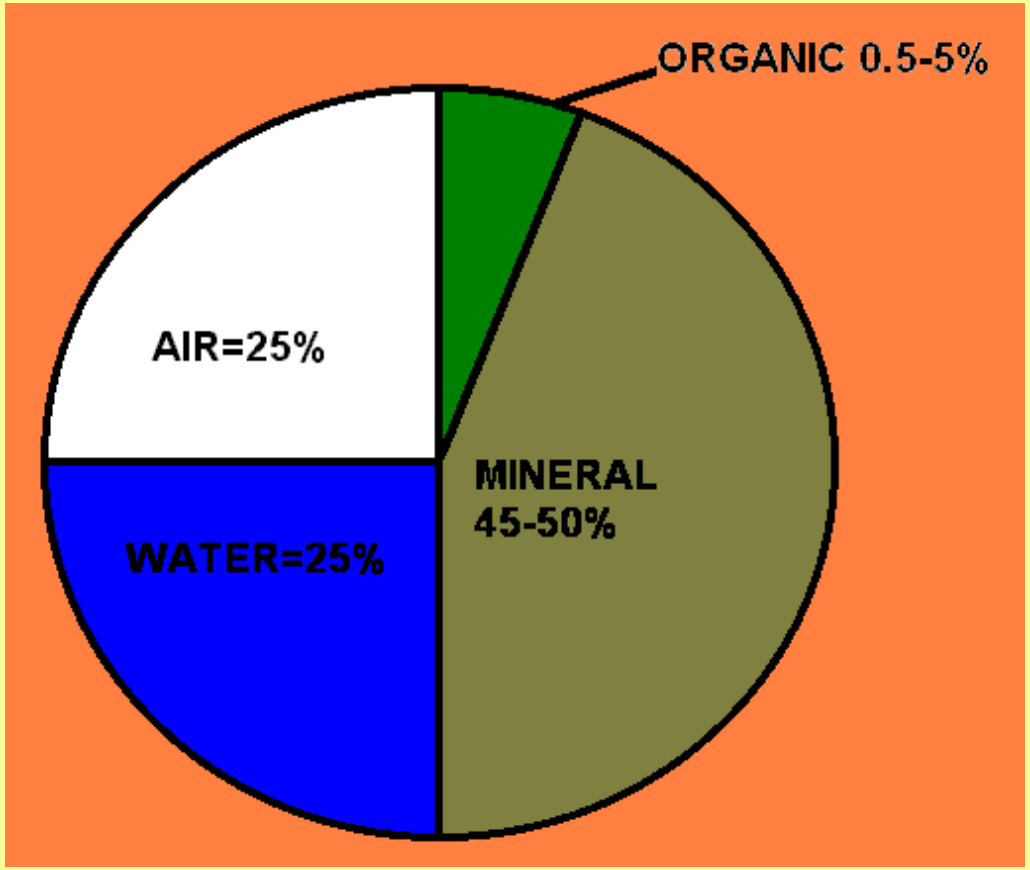
August 23, 2023

Kinsey Agricultural Services, Inc.:

- Our soil tests use only one set of specific methods (not just any test) for the analysis to correct soil fertility and consequent growth, yield, or quality problems as each applies to grapes and any ancillary crops. (Cover crops, olives, herbs, etc.)
- For soil sampling larger areas, we use aerial photos, yield data, or EC zones available from established GPS technology, to correctly measure needs and properly apply only needed fertilizer & lime in each area. We do not sell these products.)
- Teach introductory and advanced training programs for growers, consultants and fertilizer companies - including testing and fertility programs just for growing grapes.
- On-site consultations pertaining to use of soil testing for increasing fertility and/or crop quality.


Where do you begin if you want vineyard soils to grow high quality or high yielding grapes?

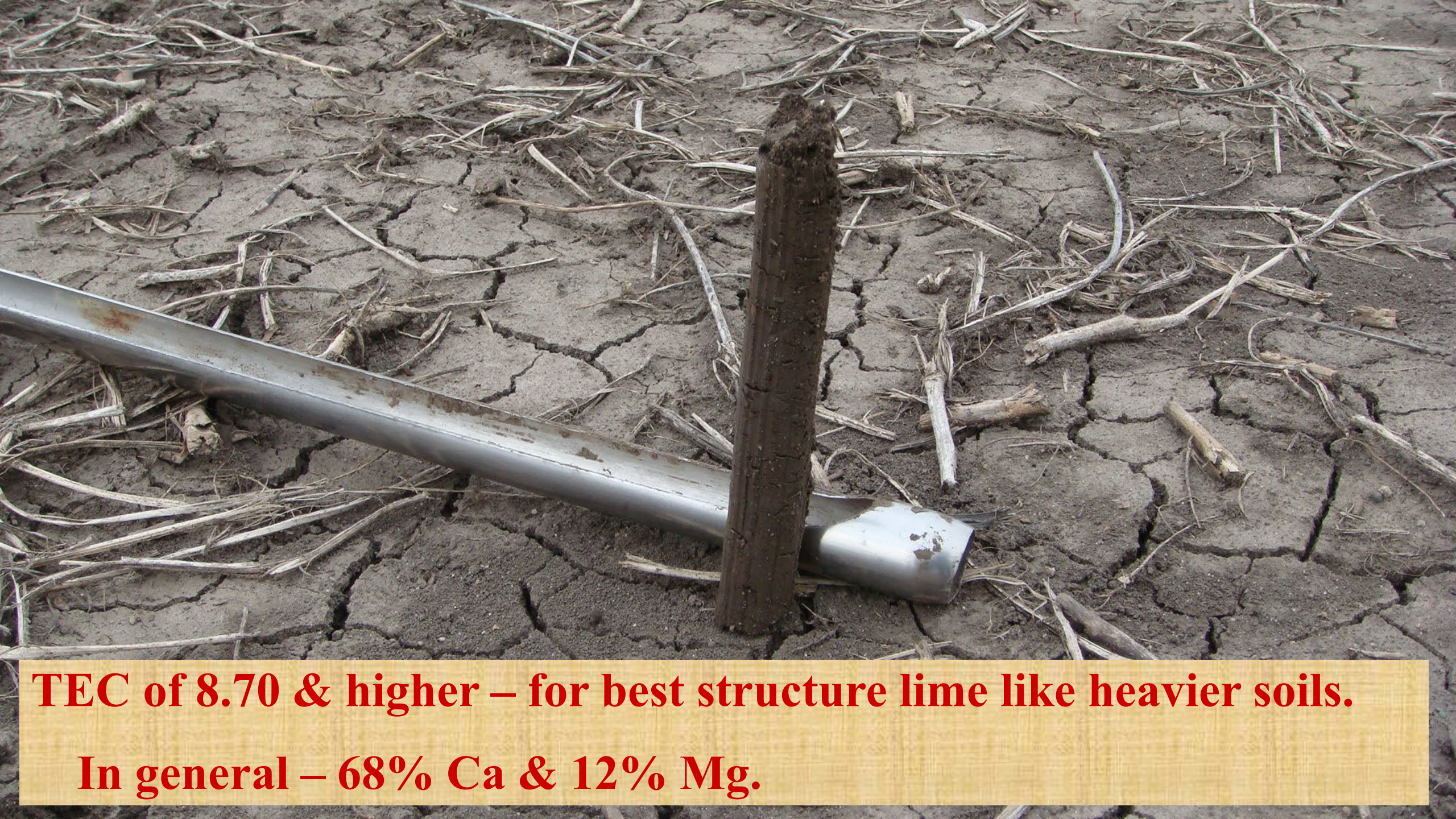
THE IDEAL SOIL STRUCTURE for GRAPES?!?



Relationship Between Soil Texture, Soil Structure, and Water Holding Capacity

- Sandy soils (*coarse texture*) have large pore spaces, thus allowing water to drain freely.

- Clay soils (*fine texture*) have small pore spaces and hold water tightly.



TEC of 8.70 & higher – for best structure lime like heavier soils.

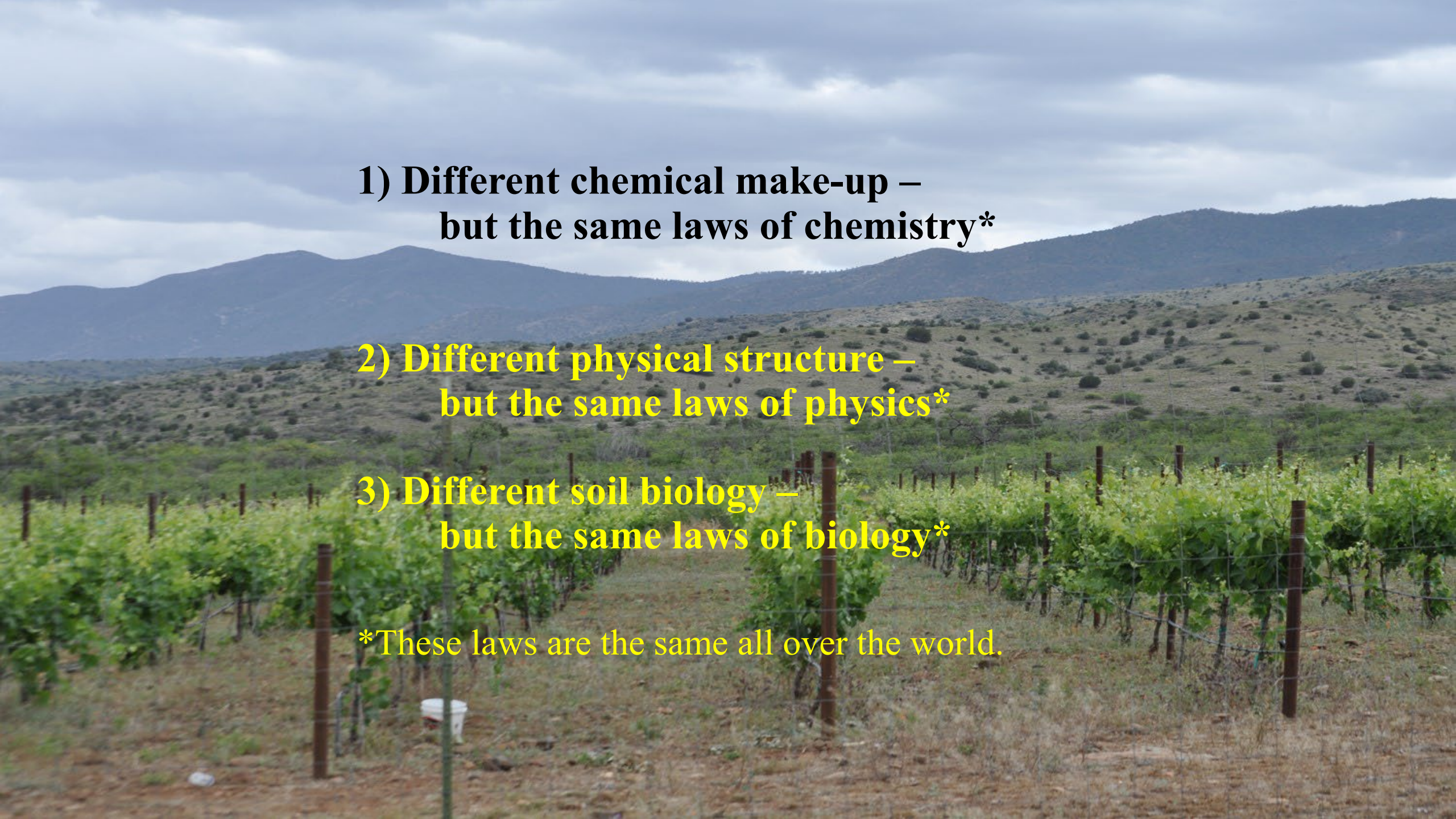
In general – 68% Ca & 12% Mg.

TEC – 8.69 or less – lime as a sand (in general - 60% Ca and 20% Mg).

(in particular – a minimum of 250 lbs. per acre of Mg - so long as it totals between 12% to 20% of the soils total base saturation.

(Never drop below 200 lbs./acre of Mg even when that exceeds 20%.)

It may work in Missouri, but our soils are different!



1) Different chemical make-up –
but the same laws of chemistry*

2) Different physical structure –
but the same laws of physics*

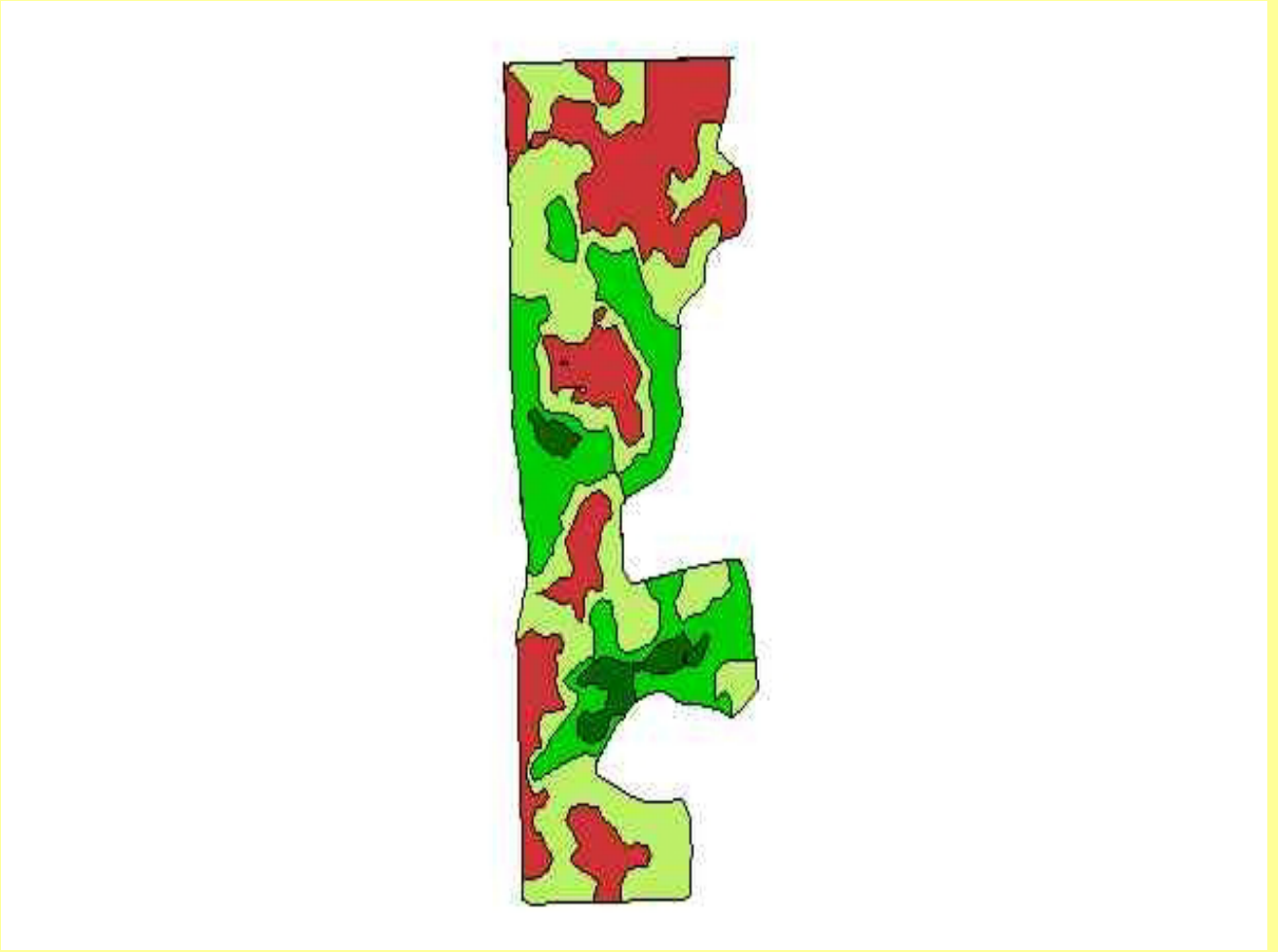
3) Different soil biology –
but the same laws of biology*

*These laws are the same all over the world.

Find and use the things that all soils have in common.

Basic science does not change, it is the same anywhere in the world!

New vineyard – four different soils.

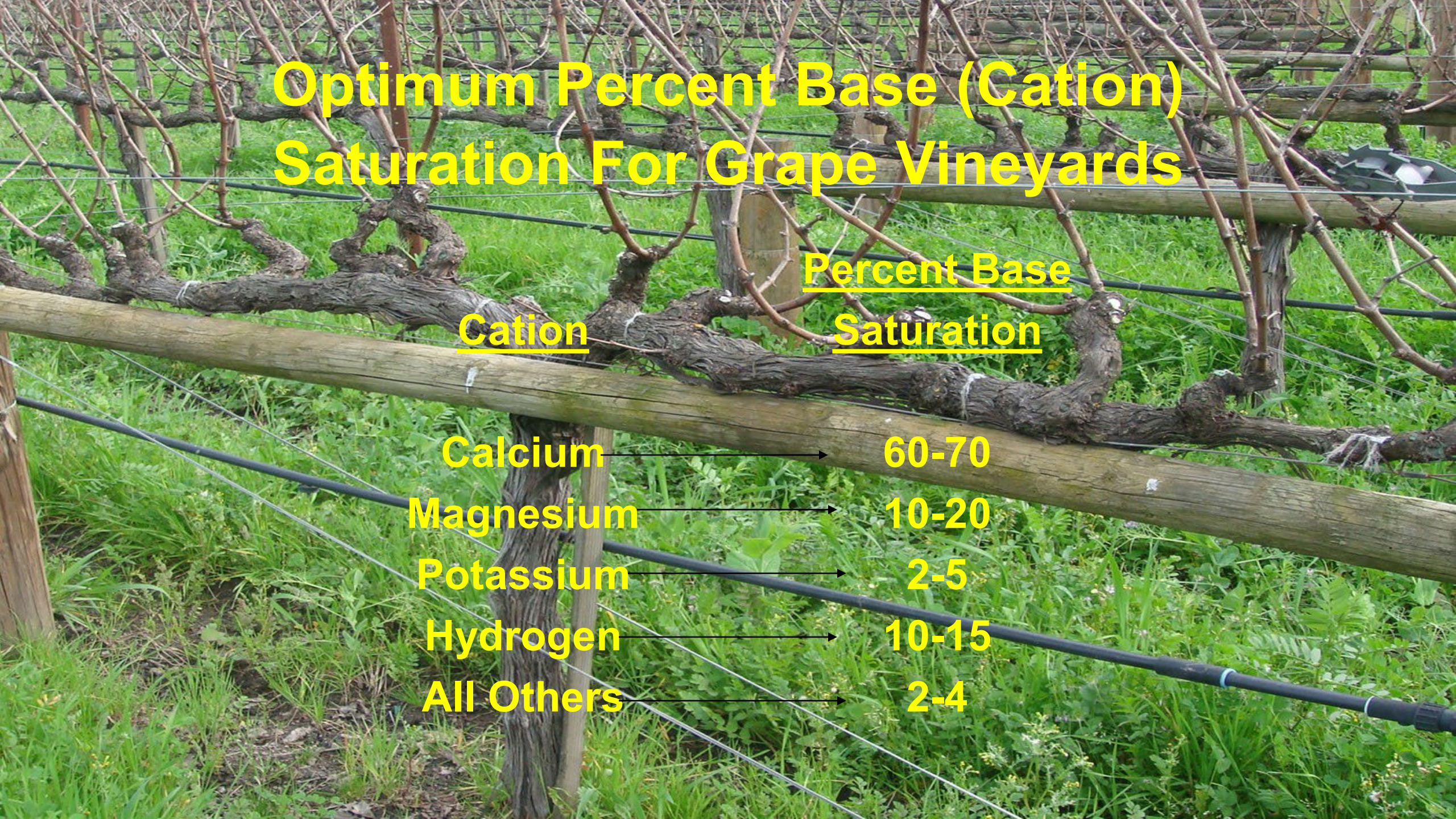


How many different soils do you have that grow grapes?

No matter how many or how different the soils on your land may be – the laws of science will work for them all.

Anywhere in the world the laws of science are the same. Gravity still works the same. Chemistry, physics and biology still work the same way.

What we need is a system that works with these laws of science to identify and provide what is required for soils to do their best.



Optimum Percent Base (Cation) Saturation For Grape Vineyards

Cation	Percent Base Saturation
Calcium	60-70
Magnesium	10-20
Potassium	2-5
Hydrogen	10-15
All Others	2-4

This program provides the basics required for correcting each different vineyard soil in order to achieve the most needed soil fertility levels, without which the vines or the grapes will not achieve their top potential.

Does this actually represent the ideal soil make-up for growing grapes?

Two examples:

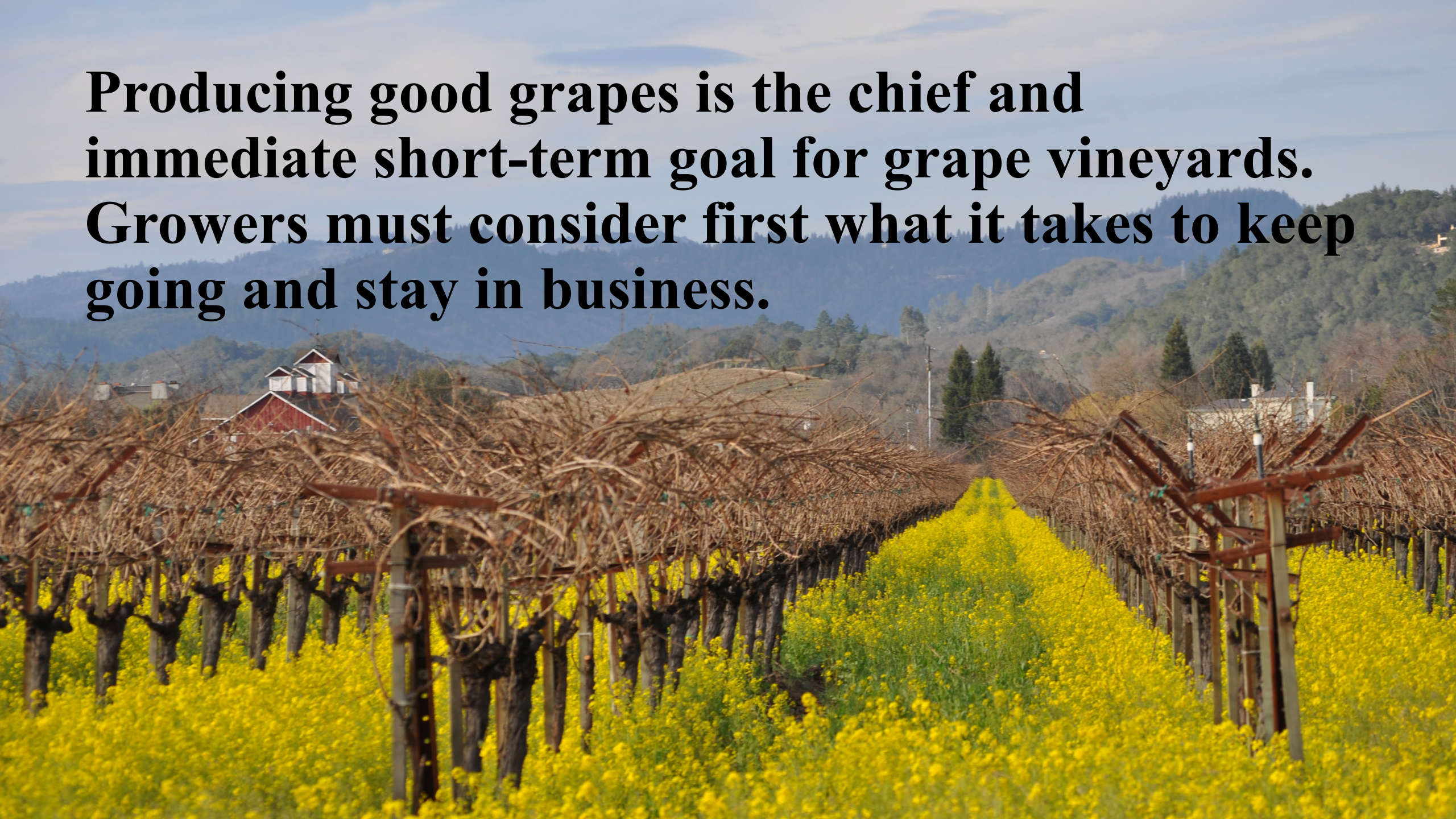
California – Give us your worst vineyard soil.

France – Testing some of the very best vineyard soils.

TEST YOUR SOIL TEST! Best vs. Good vs. Poor Soils.

Once a vineyard soil meets these parameters, then the other points about to be discussed will work most effectively.

They can still help, but until we eliminate any other more limiting factors, they will not necessarily provide the fully expected response.



Producing good grapes is the chief and immediate short-term goal for grape vineyards. Growers must consider first what it takes to keep going and stay in business.

For Crop Growth N-P-K-S deficiencies first.

then

Sufficient calcium and/or magnesium from the proper materials

(calcite, dolomite, SPM, etc.).

then

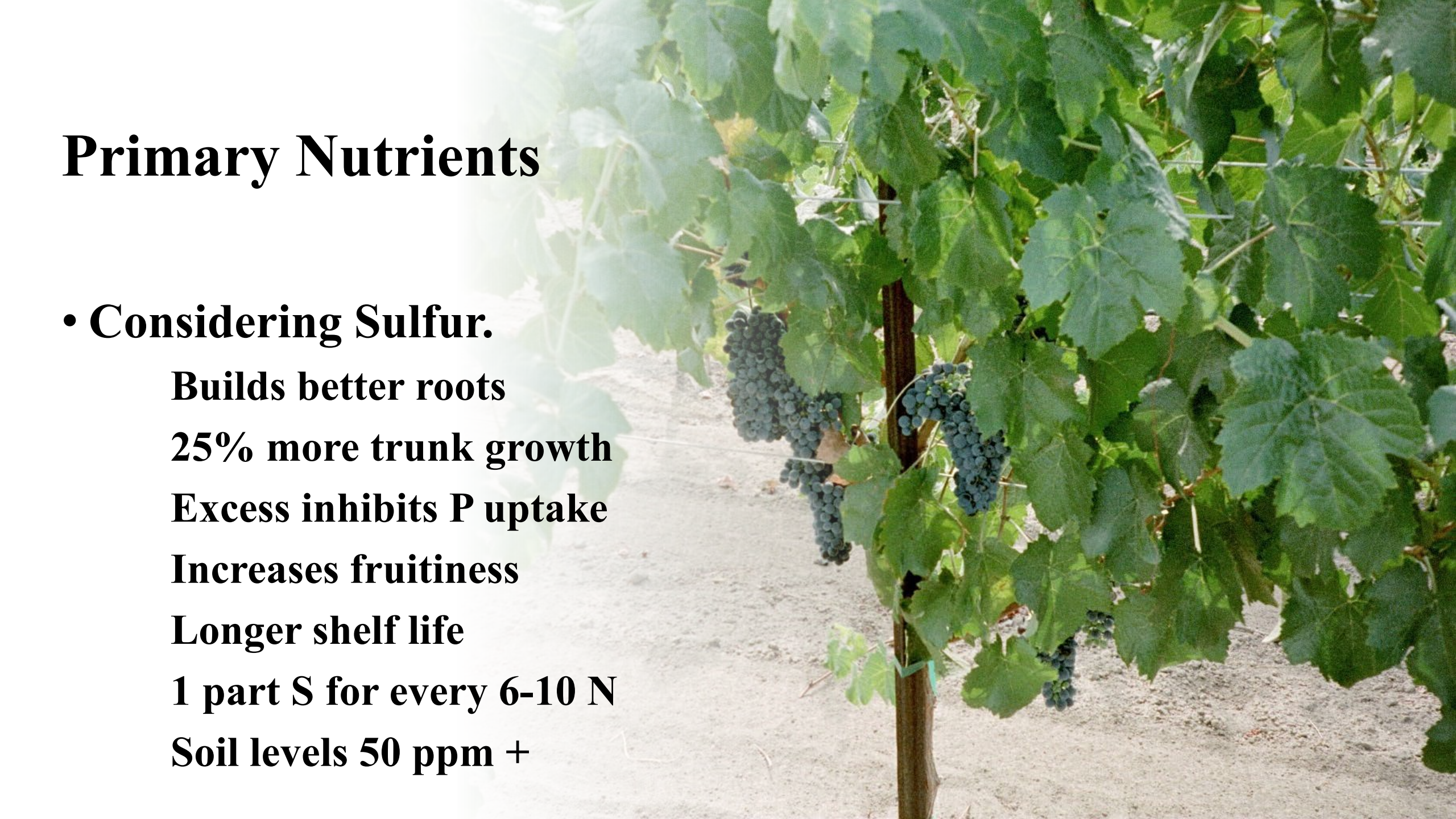
Add needed micronutrients.

You cannot manage what you cannot measure

Soil Tests should measure available plant nutrients.

If the plant nutrient tests as available, but the crop is not taking it up – then could something else be causing the problem?

Primary Nutrients



- **Considering Sulfur.**
  - **Builds better roots**
  - **25% more trunk growth**
  - **Excess inhibits P uptake**
  - **Increases fruitiness**
  - **Longer shelf life**
  - **1 part S for every 6-10 N**
  - **Soil levels 50 ppm +**

Phosphorous availability:

First, how accurate is the test? Will it measure P_2O_5 increases pound for pound when soft rock P is applied?

To build P in the soil – the pH of the P material matters!

Low calcium – P uptake suffers if less than 60% Ca.

Too much magnesium in a clay soil affects P metabolism in the grapes. (Foliar Epsom salts every 4 wks or longer.)

Potassium for Grapes

- Adequate potassium builds strong wood.
- When soil structure is correct, 7 – 7.5% potassium is best.
- Makes larger grapes.
- Increases water uptake from same amount of water.

  Must also have adequate zinc to be most efficient.
- Along with adequate sodium increases red skin color.

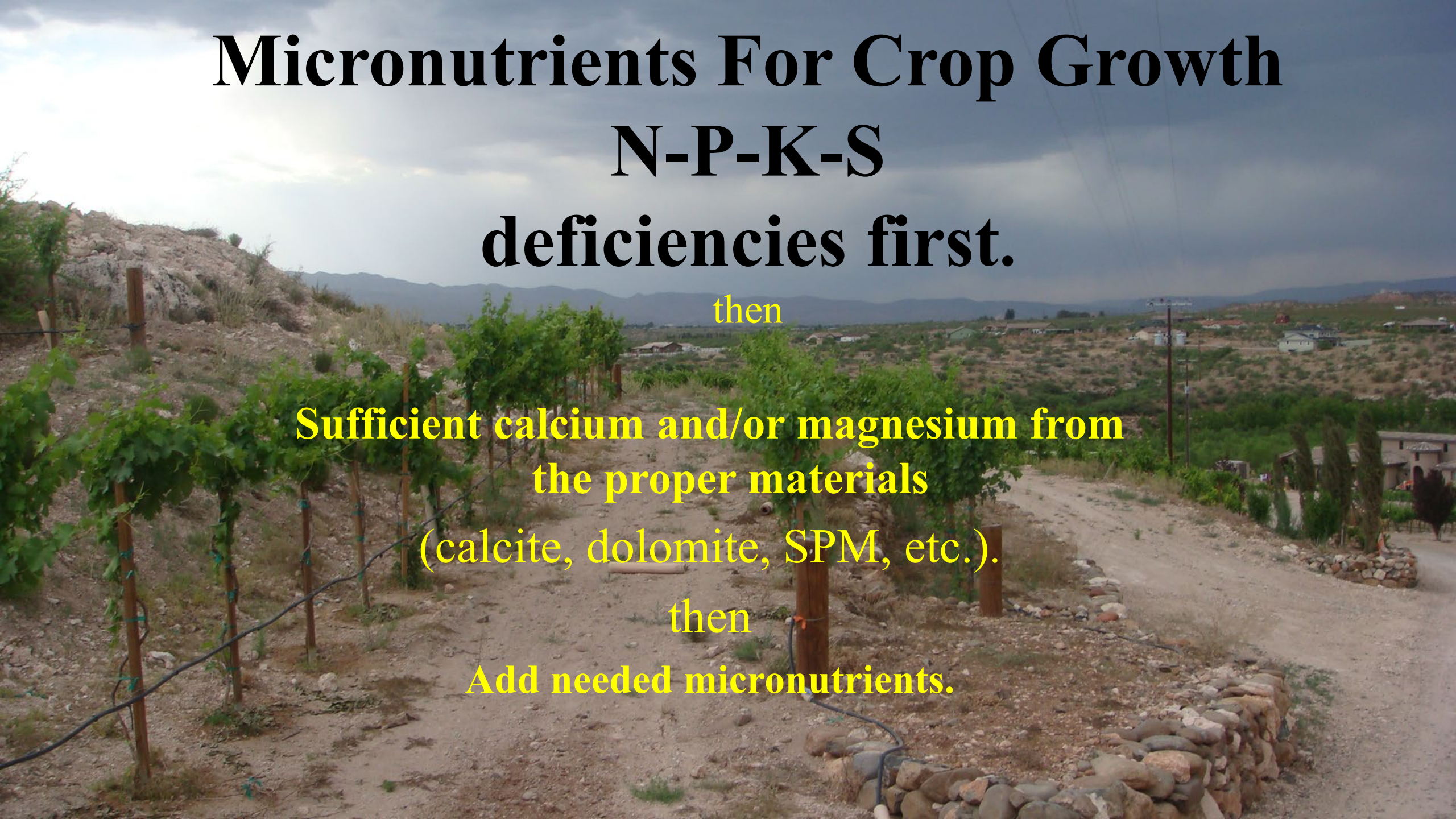
The Value of Compost Use

- Compost makes a great soil amendment for grapes.
- Moderate amounts or less are generally not a problem.
- But using too much compost can cause problems.

Table grapes in Mexico

Problems from excessive Potassium:

- over 7.5% of TEC – ties up Boron (requires more Nitrogen and produces smaller grapes).
- If over 10% of TEC, whether alone or combined with sodium - ties up Manganese – reduces fruit set.



Micronutrients For Crop Growth

N-P-K-S deficiencies first.

then

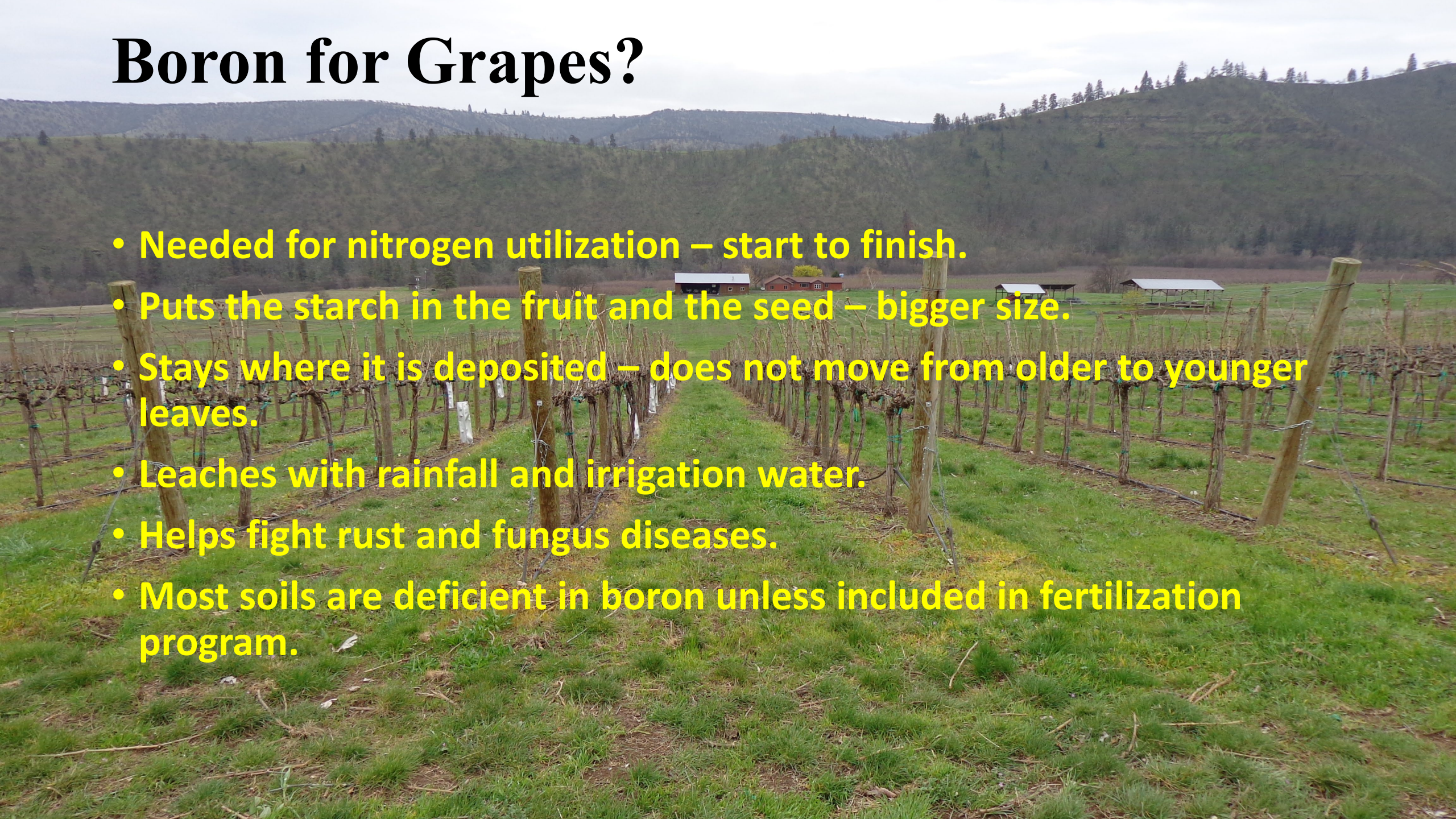
Sufficient calcium and/or magnesium from the proper materials

(calcite, dolomite, SPM, etc.).

then

Add needed micronutrients.

Boron for Grapes?



- Needed for nitrogen utilization – start to finish.
- Puts the starch in the fruit and the seed – bigger size.
- Stays where it is deposited – does not move from older to younger leaves.
- Leaches with rainfall and irrigation water.
- Helps fight rust and fungus diseases.
- Most soils are deficient in boron unless included in fertilization program.

Manganese Needed for Grapes

- Grow off faster.
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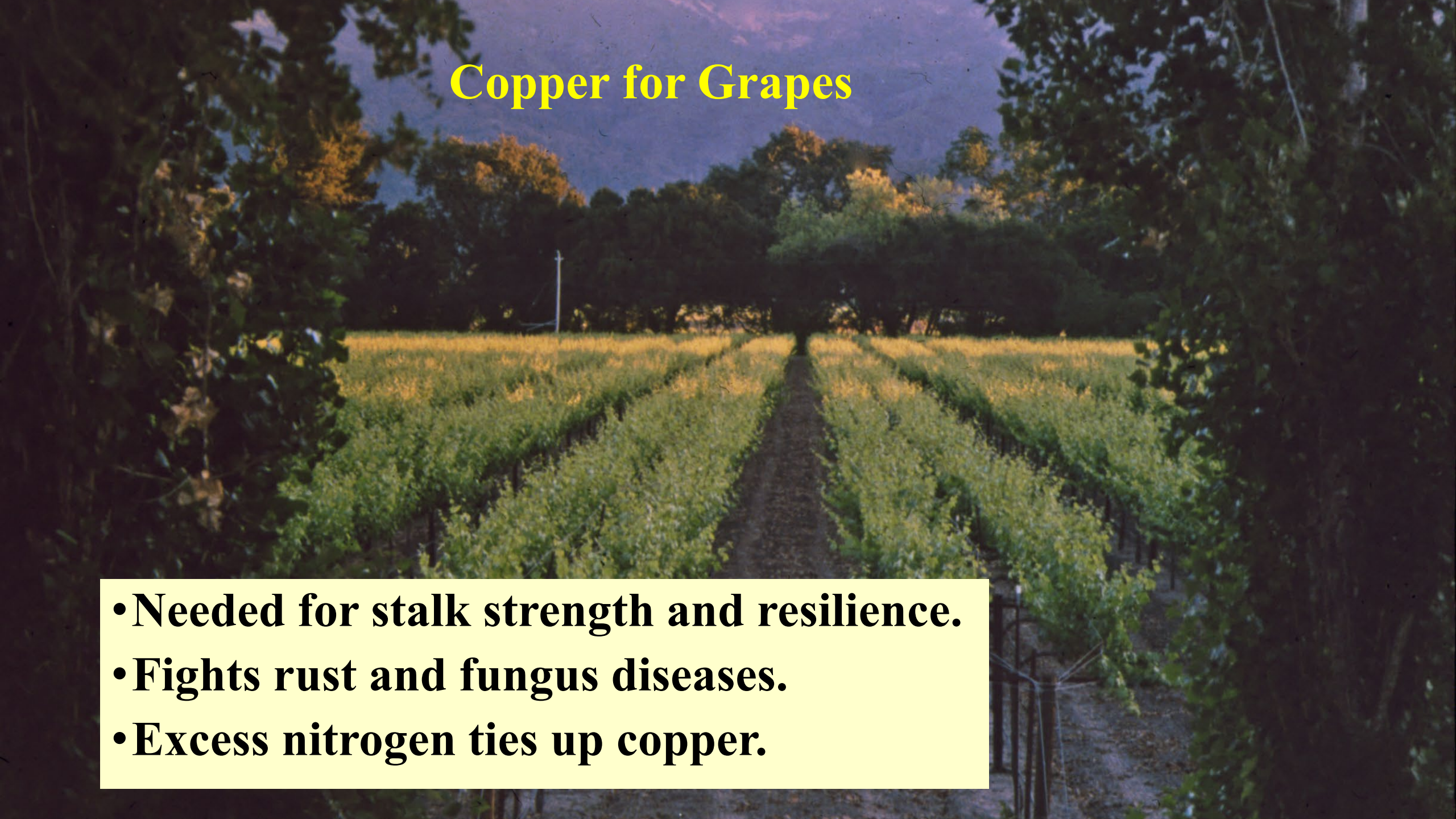
With adequate potassium, increases wood strength.

Needed to set blooms and hold fruit on the vine.

Plants grow off faster.

Copper for Grapes



- Needed for stalk strength and resilience.
- Fights rust and fungus diseases.
- Excess nitrogen ties up copper.

Leaf or Tissue Testing vs. Soil Testing

- European example:
  - Dryland vineyards – no irrigation.
  - Very low yields.
  - Potassium and copper.

Grapes need zinc.

- Necessary with adequate potassium and calcium for moisture absorption.
- Match with phosphate availability levels in each vineyard soil.
- Use sulfate form, not oxysulfate, to build levels in the soil.
- Builds the level over 24 months in vineyard soils.
- Once desired level is achieved – top off needed about once every 5 to 7 years.


The best possible yields and quality
can only be achieved on soils with the proper structure already in place.


Calcium & Magnesium
Primary Nutrients for Soil Structure
Secondary Nutrients for the crop

Ca & Mg-Primary for soil life!

THE END