



Tile Drainage in Vineyards

Should I or Shouldn't I ?

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General Principles

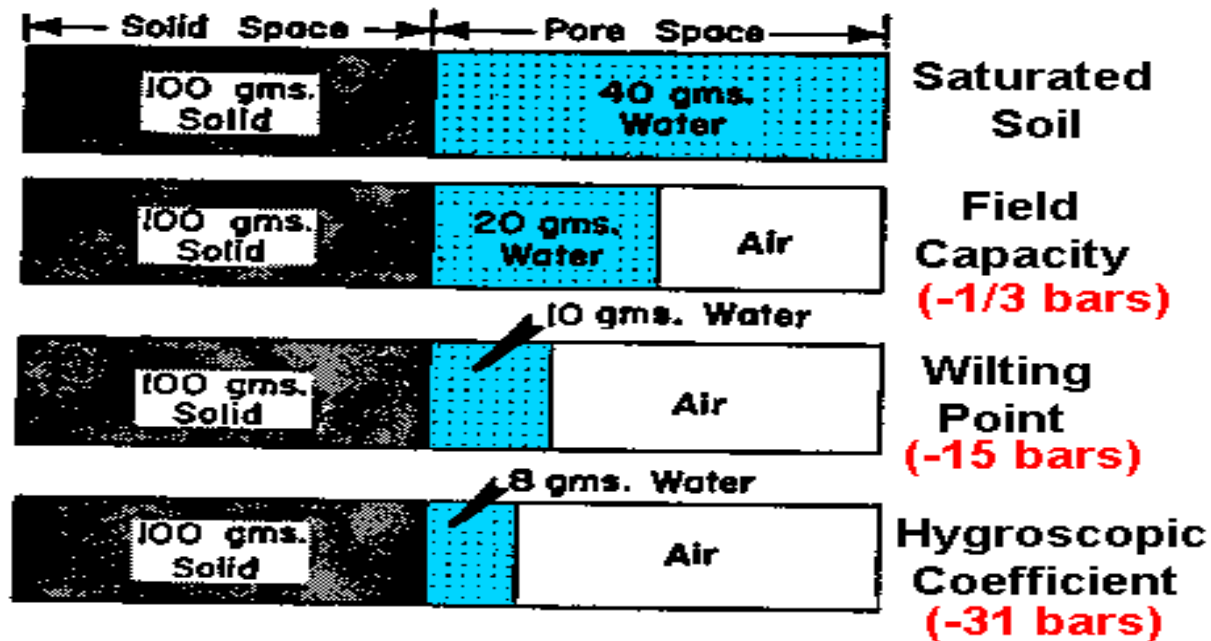
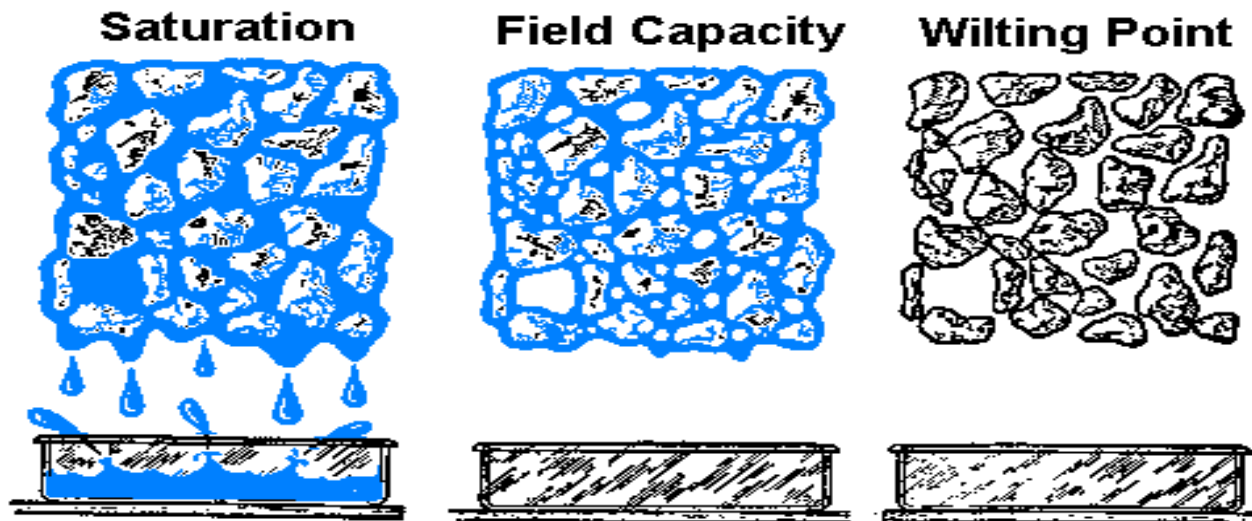
- **Aims**
 - Control water table and vineyard wetness
 - Optimize conditions for vine growth
- **ALSO**
 - Restoration of soil aeration and removal of water beyond field capacity to ensure necessary soil air content

Other Reasons

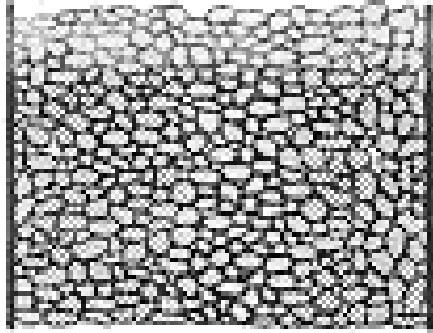
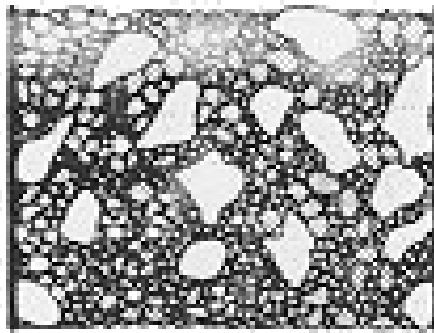
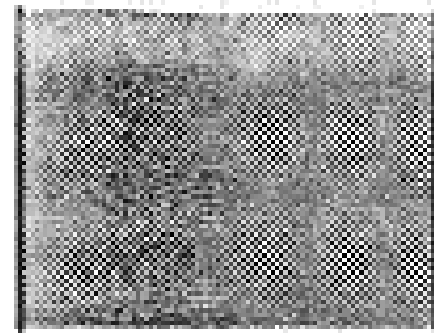
- **Higher soil temperatures**
 - evaporation takes heat away
- **Improved drought resistance**
 - roots go deeper for future drought
- **Better soil structure**
 - dry soil has more wet/dry cycles
- **Increased bearing strength**
 - tiles could be difference (wet yrs)

Drainage Classes

- **Rapidly Drained**
 - Water moves very quickly through the profile
- **Well drained**
 - Readily but not rapidly drained by gravity
- **Moderately Well drained**
 - Higher clay content, may become compacted, may have high water table issues
- **Imperfectly drained**
 - Tendency to have periods where soil is wet/sticky
 - Topographically challenged

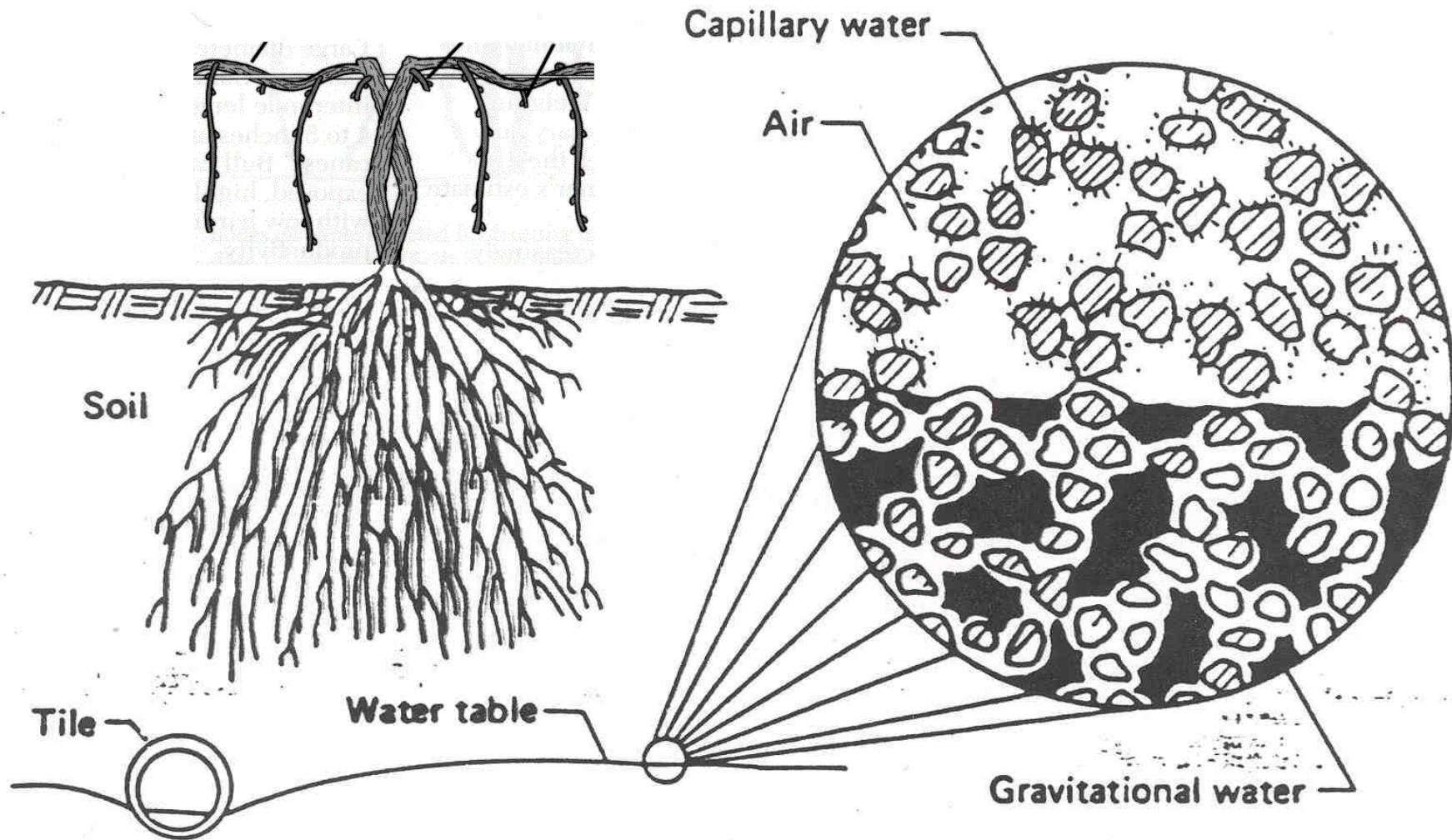


Soil Water Movement

Soil Texture & Associated Permeability		
Sand	Sandy Loam	Clay
		
Fast	Moderate	Very Slow

Soil Water Movement

- Drainage occurs when natural capillary water capacity has been reached and gravitational movement of water can occur

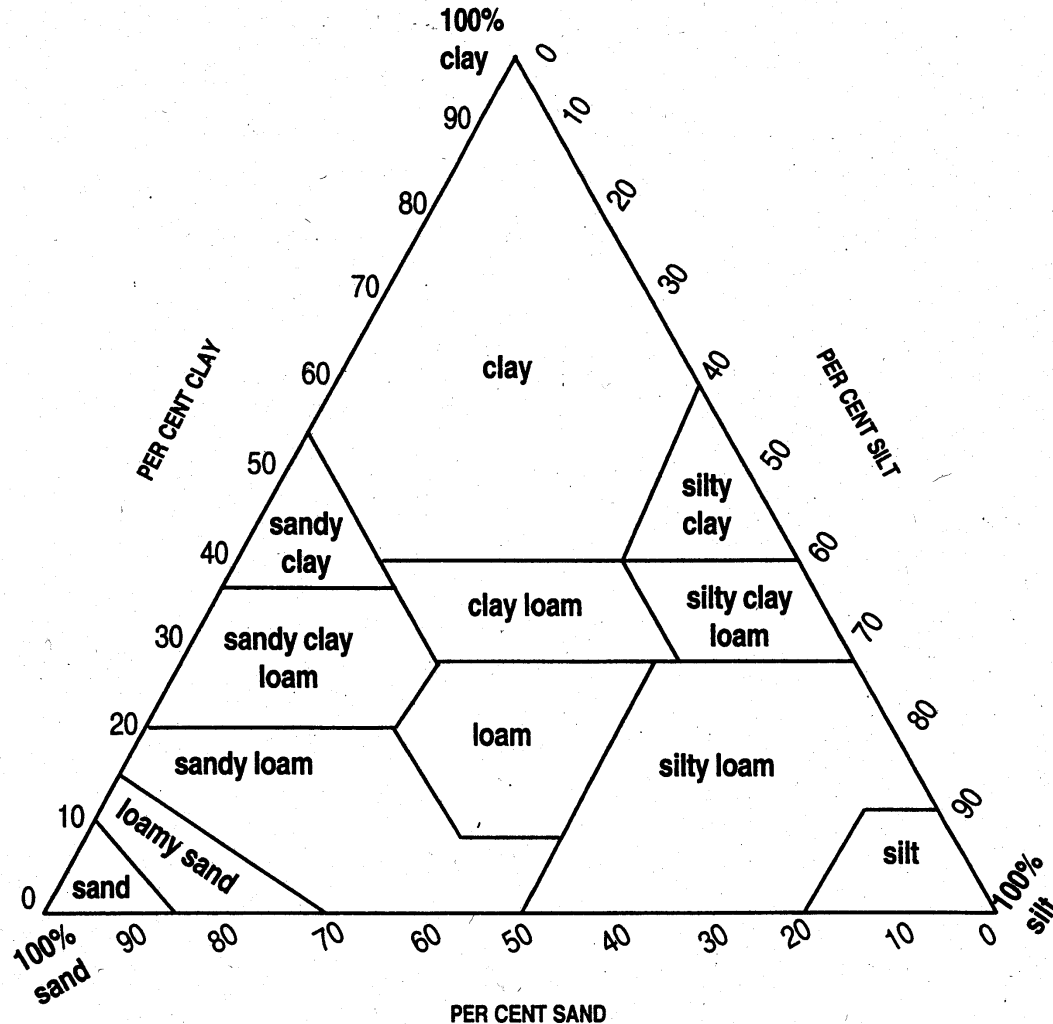


Why Use Tile Drainage?

- **Know your soil**
 - What is the physical composition?
 - What lies beneath it?
 - What is the natural drainage capability?

Know Your Soil

SOIL TEXTURE TRIANGLE



Know Your Soil

	Canning	Morristown	Wolfville	Hantsport
sand	70	45	40	43
silt	20	40	40	40
clay	10	15	20	17
class	Loamy sand	Sandy loam to loam	Loam to sandy clay loam	Loam to sandy clay loam
origin	glaciofluvial	Glacial till	Glacial till	Glacial till
drainage	rapid	Well drained	Moderately well drained	Imperfectly drained

Know Your Soil

Have you ever really
looked at it?



Why Use Tile Drainage?

- **Know your water table**
 - How variable is it?
 - Where is it normally during the growing season?

Why Use Tile Drainage?

- **Signs that soil water may be an issue**
 - Variable vine growth in specific areas
 - Standing water at any time of the season?
 - Inability to access the vineyard during critical growth periods due poor soil conditions
 - Chronic wet spots
 - Winter injury problem in chronic wet spots?
 - Yearly observation of Fe or Mn deficiency?

Know Your Vineyard

Uneven
vine size?



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Know Your Vineyard

Wet spots?



Know Your Vineyard

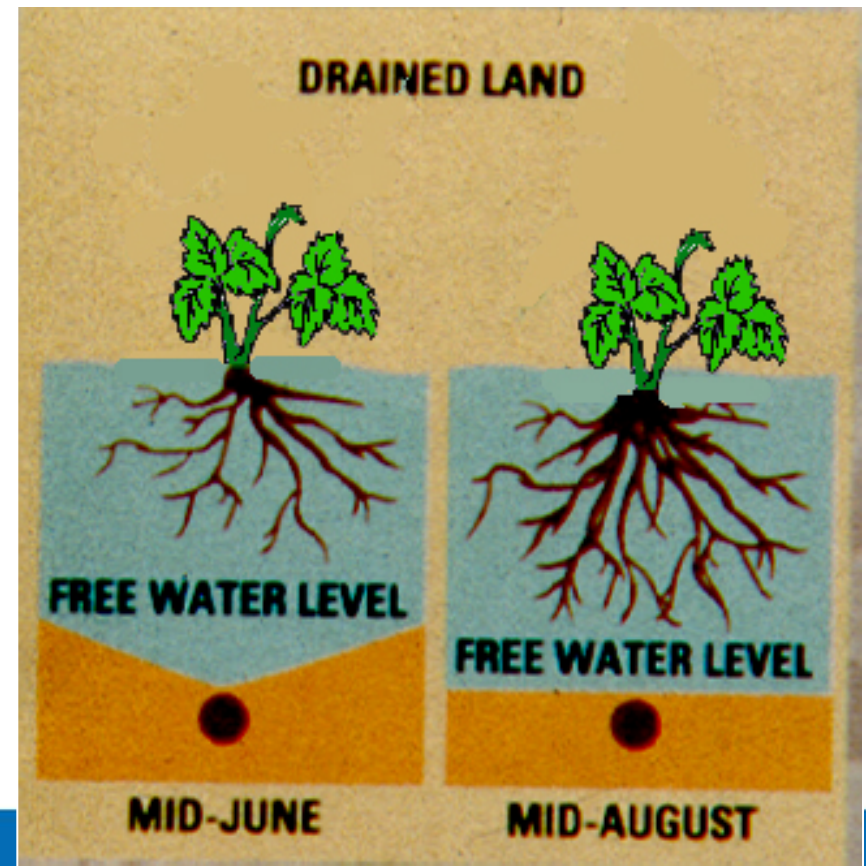
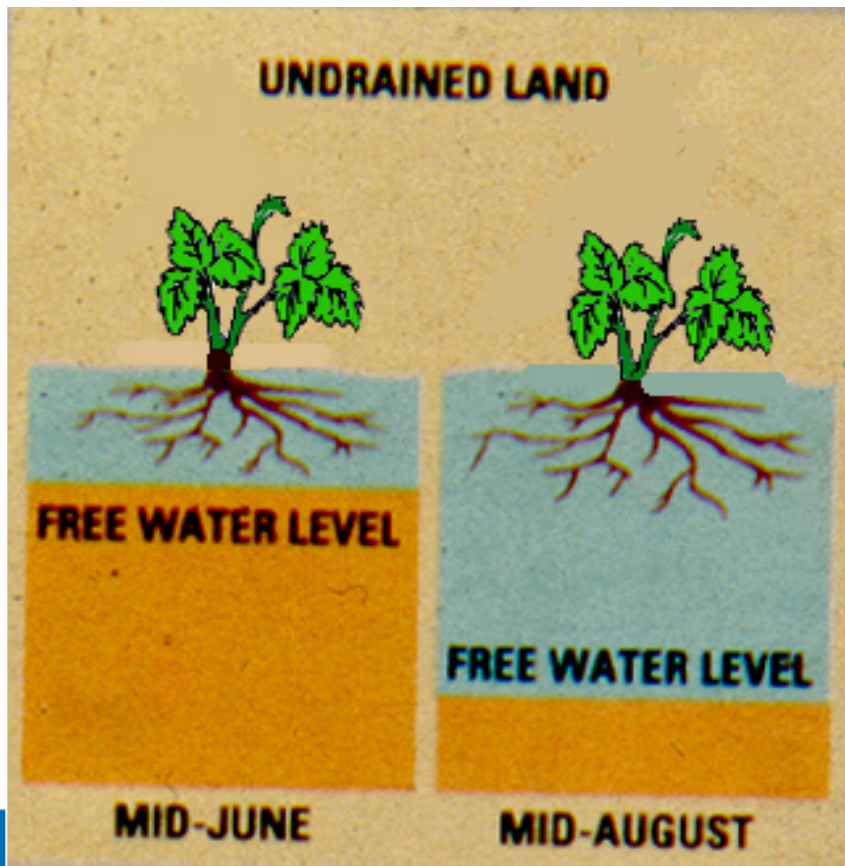
Underground
water?

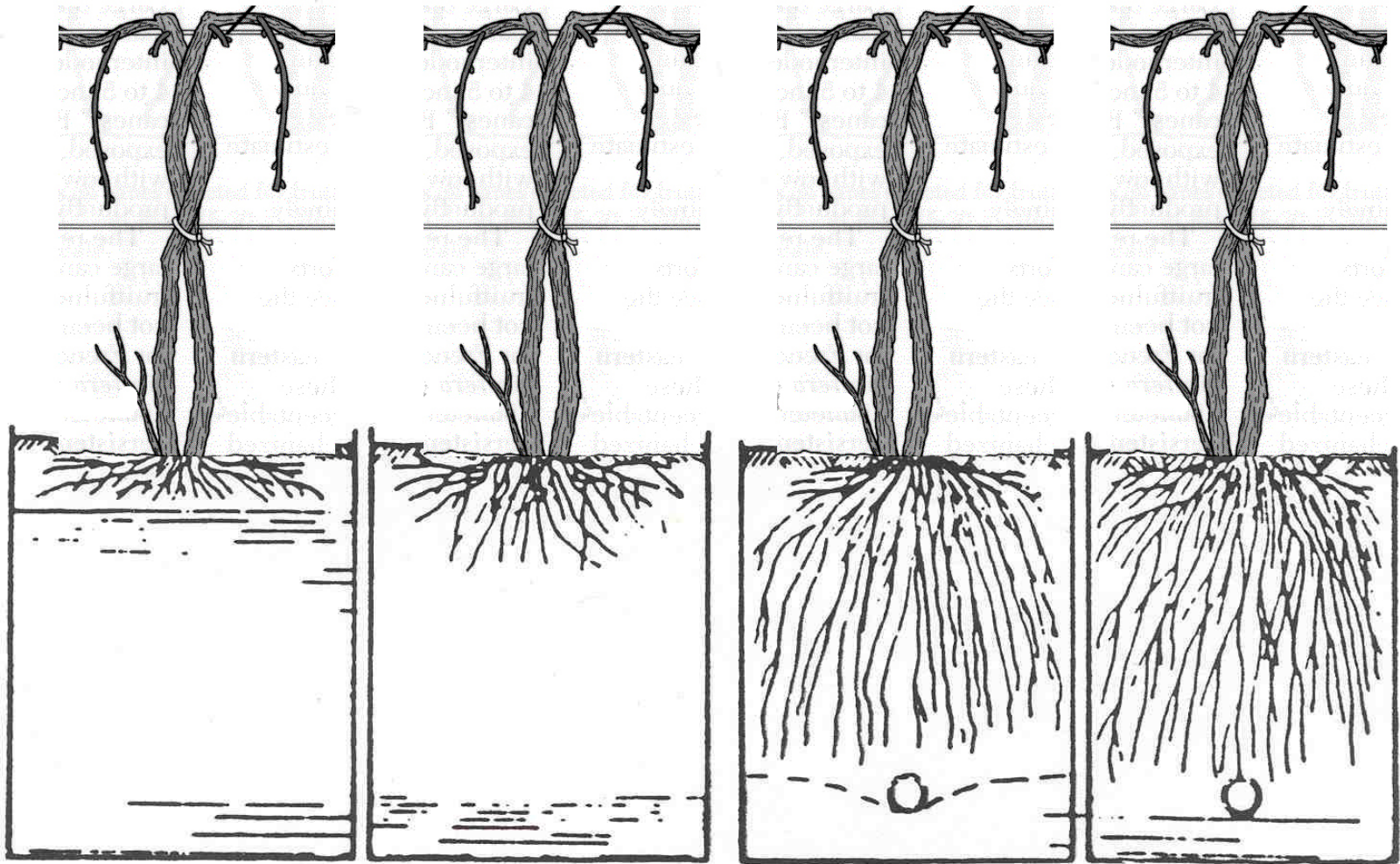




Effect of tile drainage on rooting patterns

Shallow roots in early season due to low oxygen and high water table, resulting in small root volume and drought stress when water table drops in mid summer





Spring

Summer

Spring

Summer

Undrained Land

Drained Land

Drainage Installation

- Preparing tile layout



Drainage Installation

- **Planning**
 - Plan entire area even if only a section to done
 - Main and outlet capacity for entire area
 - Identify wet spots and causes
 - Tile depth depends on soil type - most are at 60 to 80 cm (24 to 30 inches) to allow for subsoiling to deal with hardpans and compaction

TILING PATTERNS

Random

Following the lowest contour



Herringbone



Gridiron

Interception

Cross tiles intercepting run-off at the base of a hill or springs uphill from cultivated field



Tile Installation

Pre vineyard establishment



Drainage Installation

Machinery available



Drainage Installation



Drainage Installation

Laser guided





How well do these things really work?



Not Just Yield to Consider

Questions ????



Takeaways

Know Your Vineyard

- soil type, natural drainage patterns, look for clues

Dig some pits (more than one!!!)

- How deep is your growing profile
- Look for hardpans

Plan ahead if possible

- land contour work?

Ask for references of installers