

# Petiole Testing 2008

Results and recommendations for  
North Dakota vineyards

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# Participating Vineyards

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- Absaraka
- Bear Creek Winery
- Carrington Experiment Station
- Dakota Breeze Vineyard
- Double D Vineyards
- Haymarsh Valley Vineyards
- Long Shadow Vineyards
- Kindred Spirits
- Prairiewood Winery
- Red Trail Vineyard
- Souris Valley Vineyard
- Twisted Sisters Vineyard
- Williston Experiment Station

# Petiole Samples Collected

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- 27 samples in all
- 13 samples GRASS between rows
- 14 samples TILLED between rows
- Samples were segregated by variety

# Frequency of Deficiency (% of samples)

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Nutrient	Grassed	Tilled
Nitrogen	85	7 (1 sample)
Phosphorous	0	29
Potassium	0	7 (1 sample)
Calcium	46	50
Magnesium	62	7 (1 sample)
Zinc	23	43

# Frequency of Deficiency, Cont.

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Nutrient	Grassed	Tilled
Manganese	31	43
Iron	77	71
Copper	15	29
Sulfur	54	71
Sodium	N/A	N/A
Boron	0	0

# Above Desired Range (% of times)

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Nutrient	Grassed	Tilled
Nitrogen	0	21
Phosphorous	8(1 sample)	0
Potassium	100	93
Manganese	8(1 sample)	0
Sodium	8(1 sample)	0

# Most Common Deficiencies (in order)

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- Nitrogen if GRASSED (84% of samples)
- Iron (74% of all samples)
- Sulfur (63% of all samples)
- Magnesium if GRASSED (62%)
- Calcium (48% of all samples)
- Manganese (37%)
- Magnesium & Zinc (33%)
- Phosphorous if TILLED (29%)

# Most Common Excesses

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- Potassium (96% of all samples)
- Nitrogen if TILLED (21% of TILLED samples)

# Conclusions

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- Nitrogen is growth-limiting if grassed
- Nitrogen can be excessive if tilled
- Phosphorous can be low if N is good
- Potassium is almost always HIGH
- Hi K is likely cause of low Ca & Mg
- Sulfur was low on majority of samples
- Low Fe may be due to high pH

## GK's notes from the MGGA 2008 CCC:

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Grapes need about 50# of Nitrogen each year. Each percent Organic Matter can provide 15 to 20# N (in theory. For reality in North Dakota, look at the actual tissue test results).

Potassium and Magnesium ( and Calcium) are absorbed together. An excess of one means a deficiency of the other and vice versa.

Pomace is very high in Potassium and applying it to the vineyard can cause an excess of K.

One ton of grapes removes 2# Nitrogen, 0.6# Phosphorous, 4.9# Potassium, 1.0# Calcium and 0.2# Magnesium.

Mancozeb fungicide contains Zinc and Manganese.

Bordeaux mixture contains Sulfur and Copper.

Calcium becomes LESS available as the soil gets warmer.

# Recommendations (1/3)

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- Acknowledge that grass loves nitrogen
- Realize that planting grass results in a HUGE reduction in nitrogen availability
- Don't let grass encroach on vines
- Use compost, manure or mulch to slowly supply other nutrients in addition to nitrogen

# Recommendations (2/3)

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- Apply 30 to 50 lbs/A Nitrogen initially if grassed and do follow-up petiole tests
- Apply foliar Iron fertilizer if needed
- Do petiole tests during growing season
- Consider planting white clover instead of grass
- If tilled, and growth is excessive, plant grass (or clover mix)

# Recommendations (3/3)

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- Do not fertilize with POTASSIUM unless a petiole or soil test calls for it
- Do not fertilize with BORON unless a petiole test calls for it
- Do not treat low and high vigor varieties the same
- Expect changes in other nutrient levels after growth increases following nitrogen application



Low Nitrogen plants. Note leaf color and size and canopy density

# Mike White's Hierarchy for Healthy Plant Growth (in order)

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- 1-7 Temperature, Sunshine, CO<sub>2</sub>, O<sub>2</sub>, Water, Soil Tilth, pH
- 8 \*\*\*NITROGEN\*\*\*
- 9 Phosphorous
- 10 Potassium
- 11 Sulfur
- 12-14 Calcium, Magnesium, other micronutrients
- Therefore.....

**“Shoot the slow  
rabbits first”**

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(Manage your nitrogen)