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Shasta/Tehama Cattlemen's Association

Winter Animal Health Meeting

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Interpreting Tissue and Soil Analytical Data for Irrigated Pasture

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Soil sampling

- Keep this based on pasture and maybe range
  - This presentation is not valid for…
    - Orchard crops
    - Corn
    - Small grains
    - Etc.

Why

- Better measurement tools are developed for other crops
  - Example…Orchard crops use leaf analysis
- Pasture guidelines are based on many years of fertilizer research
- This research correlates measured pasture responses with soil test results

Keep it simple

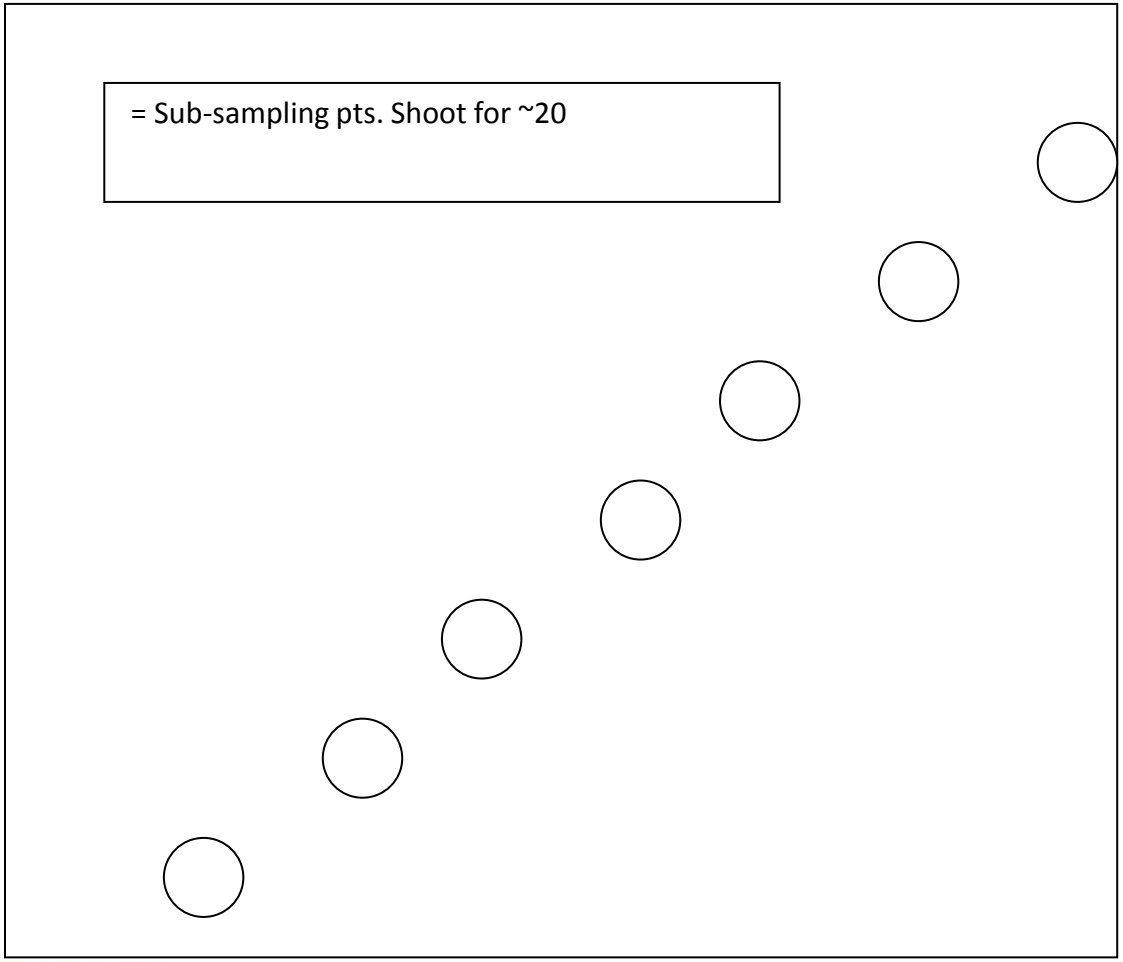
- Pastures aren't that complicated
  - Measure the major nutrients N-P-K-S
    - Nitrogen
    - Phosphorus
    - Potassium
    - Sulfur
  - Plus…
    - pH

Generally…

- Soil samples are good for P, K and pH
- Tissue samples are best for N and S

Soil test first - <6”

- One bag per per sample
- Combine the sub samples
- 1-sample per representative area



Phosphorus

- Soil test
- Major nutrient for clover growth
  - Usually limiting in some way
  - Not mobile
    - Don’t sample too deep
    - Availability influenced by soil chemical properties and reactions
      - pH dependent
  - Results can last 3+ years!

Phosphorus

- Phosphorus is expensive!
- It adds very little to established plants
- Excessive does not equal more production
- **Moral is….this nutrient pays for the soil test**

pH affects which test to look at

SOIL ANALYSIS REPORT

Phosphorus		Potassium	Magnesium	Calcium	Sodium	pH
P1 (Weak Bray) **** * ppm	$NaHCO_3$-P (Olsen Method) **** * ppm	K ***** * ppm	Mg *** * ppm	Ca *** * ppm	Na *** * ppm	Soil pH
2VL	9VL	80L	333H	1819M	15VL	6.3
2VL	33M	67L	480VH	1736M	16VL	6.3
4VL	12**	91M	271H	1082L	15VL	6.1

Phosphorus critical levels

Nutrient	If soil test is . . .*	Suggested fertilizer rate
Phosphorus (HCO3 extractable)	< 5 ppm 5–10 ppm 10–20 ppm > 20 ppm	100 lb P2O5/acre 50 lb P2O5/acre 25 lb P2O5/acre none
Potassium (ammonium acetate extractable)	< 40 ppm 40–60 ppm > 60 ppm	200 lb K2O/acre 100 lb K2O/acre 0–50 lb K2O/acre
Zinc (DTPA extractable)	< 0.5 ppm (soil pH < 7.0) < 0.5 ppm (soil pH > 7.0)	5 lb Zn as ZnSO4/acre 10 lb Zn as ZnSO4/acre

If you use the bray test multiply the results by 0.6 to evaluate the correction in the chart above

Potassium

- Generally not deficient on the western side
  - But…can be on the east side of the valley
  - But…can also be following sorghums
    - Corn
    - Sudan
- Pasture requirements are very low compared to other crops

Potassium critical levels

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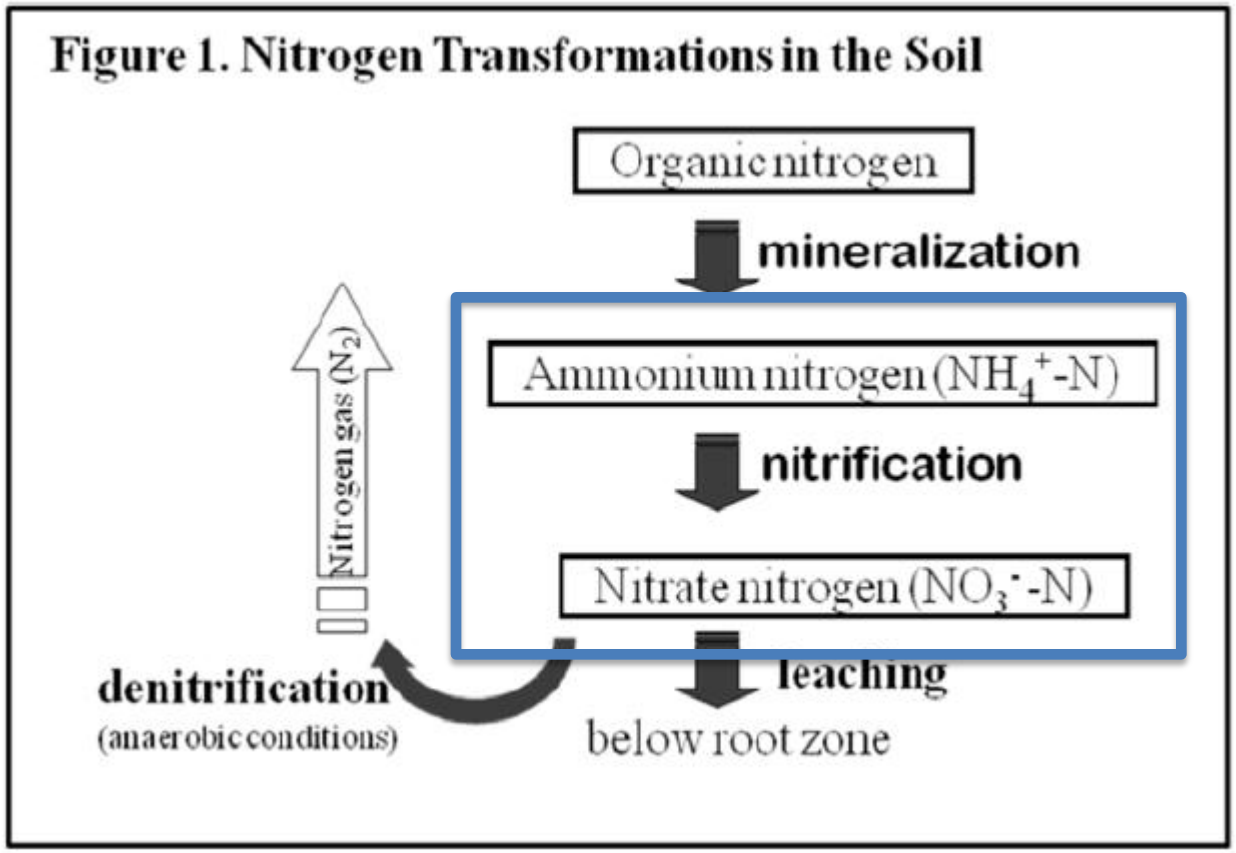
* Source: Soil and Plant Tissue Testing in California (UC ANR Bulletin 1879).

The clover theory

- Is the clover inoculated and fixing nitrogen?
- Pasture study 2012
  - 50 lbs/acre of N with 21-0-0
  - Watered in after fertilization
  - No response

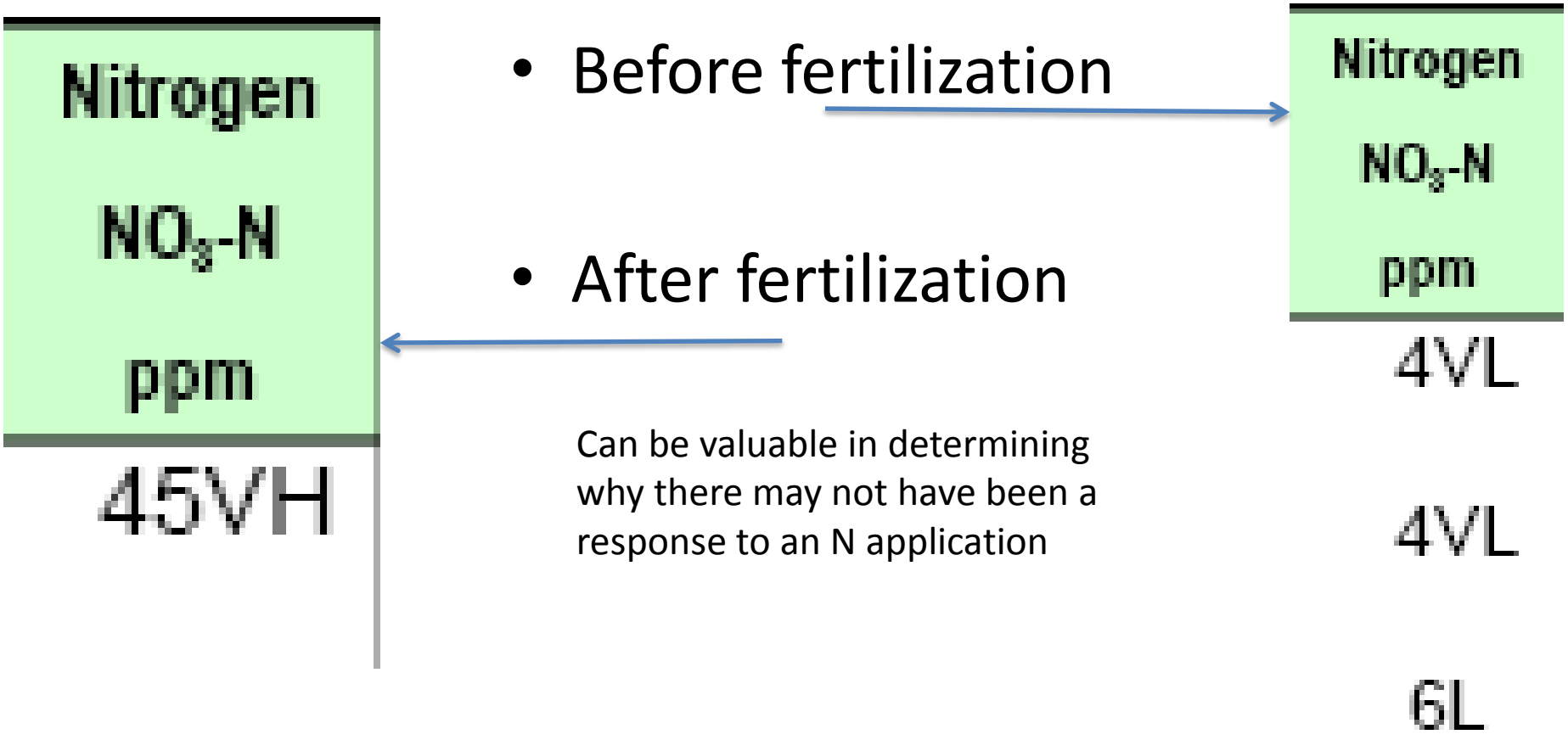
    Why?????
  - 40% clover cover and had nodules

Why plant test for nitrogen?



Source: Carol Frate – Agronomy Farm Advisor

Why would we soil test N?



Can be valuable in determining why there may not have been a response to an N application

Nitrogen plant test

Plant and growth stage	Part of plant	Nutrient	Nutrient range*		
			Deficient	Critical	Adequate
Grasses (tall fescue, orchardgrass, and others)	top 4–6 leaves, no stems	N %	< 2.0	2.0 – 2.8	> 2.8
		P %	< 0.18	0.18 – 0.24	> 0.24
		K %	< 1.5	1.5 – 2.5	> 2.5†
		S %	< 0.10	0.10 – 0.15	> 0.15‡

Our nonresponsive pasture sampled at 3.22

Sulfur plant test

- Sulfur is necessary in low amounts
- We are frequently low
  - More than is usually documented
- It is often easily corrected because a common nitrogen fertilizer is 21-0-0-24
- Sulfur is mobile
- Soil test doesn't account for outside sources

Sulfur plant test

Plant and growth stage	Part of plant	Nutrient	Nutrient range*		
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		K %	< 1.5	1.5 – 2.5	> 2.5†
		S %	< 0.10	0.10 – 0.15	> 0.15‡

Conclusion

- If your only going to do one test
  - Make it the soil test
- Check for nodules on the clover
  - If none reseed with inoculated clover
- Soil tests cost ~$12…cheaper than fertilizer
- Don’t believe the results?
  - Check them in a small area