Testing Alfalfa for Nutrient Management

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Palo Verde Valley is a wonderful alfalfa country

Where alfalfa does its best

Alfalfa reaches the highest state of perfection in Palo Verde Valley. The unusual soil and climatic conditions cause this valuable forage plant to yield prolific crops. Ten to twelve tons to the acre is the average yield here. Inasmuch as alfalfa is the basis of the dairying industry in the Southwest, dairymen and stock raisers have found this valley a veritable paradise for their operations. It is a fact that cattle, hogs, horses and sheep breed faster and are raised at less expense here than in any other part of the state.
Agronomic Laboratory

Plant Analysis
Soil Analysis
Feed Analysis
Consulting for Nutrient Mgmt
Programs
Alfalfa Production in Desert SW USA

• Nutrient Management is about P and K
• In-season Applications
  – P, water run liquid fertilizer
  – K, broadcast muriate of potash
PRACTICAL INTERPRETATIONS OF SOIL INFORMATION
TO MAINTAIN HIGH ALFALFA YIELDS

Aron A. Quist and Garn T. Stanworth ¹

ABSTRACT

Soil analysis has proven to be a reliable indicator of nutrient status for most crops. Phosphorus is
the primary fertilizer nutrient applied to alfalfa. Proper calibration of the Olsen Bicarbonate Method
phosphorus² test is essential to maintaining sufficient phosphorus levels in alfalfa for high
production. The purpose of this paper is to describe a program to maintain adequate phosphate
without over-fertilizing or sacrificing yield potential.

Key Words: Alfalfa, Fertility, Olsen P Soil Test, Management.
Soil P Testing Program

• FEEDBACK SYSTEM
• SAMPLE 1-4 TIMES PER YEAR
• PREDICATE FERTILIZER RECOMMENDATIONS UPON ANALYSIS
Alfalfa production per cutting to achieve 10 ton/acre annual yield in Palo Verde Valley
Stanworth Database Review

• 20 years and 326,000 samples analyzed
• Samples were collected by SCC primarily
• 86,618 soil P samples from Established Alfalfa
• 47,464 Soil K samples from Established Alfalfa
• Excluded preplant soil samples
• Each record contained soil texture information
  – Each field contained soil texture records (SP)
ANALYTICS

• REVIEW DATA TO IMPROVE NUTRIENT MANAGEMENT STRATEGIES

• REVIEWING EFFICIENCY, EFFICACY OF PROGRAM

• MONEYBALL OF NUTRIENT MANAGEMENT – PAYDIRT OF AGRONOMY
P soil test levels
Soil texture effect

clay
loam
sand

Critical Zone
Above
At
Below
P soil test levels
Season effect

Critical Zone
- Above
- At
- Below

Season:
- Fall
- Winter
- Spring

Percentage:
- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%
P soil test levels
Sand soils

Critical Zone
- Above
- At
- Below

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<tr>
<th></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<td>Percentage</td>
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Seasons:
- Fall
- Winter
- Spring
P soil test levels
Loam soils

- Fall
- Winter
- Spring

Critical Zone
- Above
- At
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P soil test levels
Clay soils

Critical Zone

Above
At
Below
Alfalfa production per cutting to achieve 10 ton/acre annual yield in Palo Verde Valley
P soil test levels
Trend over time (5 yr running avg.)
Soil K Testing Program

• Soil samples taken the same time as P soil samples
• K is slightly mobile in the soil, so samples depth is increased
• Potassium is prone to “Luxury Consumption”, so rates are limited to 200 lbs K20/ac per application maximum
K soil test levels

Soil texture effect

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Critical Zone:
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K soil test levels
Season effect

Critical Zone
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K soil test levels
Sand soils

- Critical Zone:
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K soil test levels
Loam soils

Critical Zone
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Fall
Winter
Spring
K soil test levels
Clay soils

Critical Zone
Above
At
Below
K soil test levels
Trend over time (5 yr running avg.)
Database Lessons

• Analytics telling us we are doing a reasonable job of maintaining P and K levels
• Soil texture has a strong influence on levels
• Nutrient needs are seasonal driven by yields
• We may consider increasing sufficiency levels in the late spring sampling to even out the percentages of samples below the critical Values
• Recent practices of application of compost are increasing soil potassium levels