Section 16 of 22 (16j – Irrigation Water, Soil and Plant Tissue Analysis Guide – Alfalfa Example)

Producer: Carlsbad **Crop:** Alfalfa **Yield:** 6 t/ac **Field #:** **Ac.:** **Soil Texture:** loam **Irr. Water (ac-in/ac):** 34 **Crop Rotation:** alfalfa

Nitrogen (N), Phosphorus (P), Potassium (K), Sulfur (S), Calcium (Ca), Magnesium (Mg), Zinc (Zn), Iron (Fe), Manganese (Mn), Copper (Cu), Sodium (Na), Chloride (Cl)

Water Analysis Date: 3/24/09 well

Nutrient	NO_3-N	P	K	SO_4-S	Ca	Mg	Zn	Fe	Mn	Cu	Na	Cl
mg/l = ppm	2	not	3.8	not	451	173	not	not	not	not	190	Not
Total Lbs/ac 1/	16	analyzed	30	analyzed	3527	1350	analyzed	analyzed	analyzed	analyzed	1487	analyzed

mg/l x 0.23 = lbs. of Nutrient/ac.-in. of H_2O; 1/ lbs Nut x in. H_2O applied = Total lbs Nut/ac

Bicarbonate (HCO_3): 260 mg/l ; Boron (B): n/a mg/l ; pH: 6.9
Carbonate (CO_3): n/a ; Hydrogen Sulfide (H_2S):n/a mg/l

Sodium Adsorption Ratio (SAR): 1.9
Soluble Salts (ECiw-mmhos/cm): 3.3

TDS (mg/l) = ECiw (mmhos/cm) x 640, for ECiw between 0.1 and 5.0 mmhos/cm

TDS (mg/l) = ECiw (mmhos/cm) x 800, for EC > 5.0 mmhos/cm

Example: 0.34 mmhos/cm x 640 = 218 mg/l (TDS)
218 mg/l x 2.72 = 593 lbs. of soluble salts/ac.-ft. of water applied

Soil Analysis Date: 3/24/09 Soil Depth: 0-12"

Nutrient	NO_3-N	P	K 3/	SO_4-S	Ca 3/	Mg 3/	Zn	Fe	Mn	Cu	Na 3/	Cl
ppm	3.45	8.7	43	Not	535	136	0.42	4	2.1	0.53	476	Not
Classification 2/	Very Low	Low	Moderate	analyzed	High	Very High	Low	Moderate	Moderate	Moderate	n/a	analyzed
Lbs./ac.	14	35	172		2140	544	2	16	8	2.1	1904	

A Very Low or Low Classification indicates a High Probability for obtaining a fertilizer response.

A Moderate Classification indicates a fertilizer response May or May Not occur.

A High or Very High Classification indicates a fertilizer response is Not likely to occur.

ppm x 4.0 = lbs. of nutrient/ac.-ft. (i.e., based on soil weighing 4 million lbs. per acre-foot). Or ppm x 2.0 = lbs. of nutrient per acre 6" depth.

Free Lime ($CaCO_3$): ____; pH: 7.5
Organic Matter (%): 1.3

Sodium Adsorption Ratio (SAR): 4.8
Soluble Salts (ECe – mmhos/cm): 4.7

3/ CEC - Typical proportions of major adsorbed cations: Ca = 65%, Mg = 20%, K = 10% & Na = 5% (Table 8.1, Nature & Properties of Soils 11th Edition)

Fertilizer Inputs: (Recommendations)

Nutrient	N	P_2O_5	K_2O	S	Ca	Mg	Zn	Fe	Mn	Cu	Na	Cl
Lbs./ac.		120	160				15	2.5				

lbs. of P_2O_5 x 0.44 = _____lbs. P (Phosphorus)
lbs. of K_2O x 0.83 = _____lbs. of K (Potassium)

lbs. of S ÷ 0.33 = _____lbs. of SO_4 (Sulfate)

Split Apply Nutrient applications to meet plant needs & improve efficiency. Refer to fertilizer recommendations for guidance.

Plant Tissue Analysis Date: 6-23-08

Nutrient	Total N	Total P	K	Total S	Ca	Mg	Zn	Fe	Mn	Cu	Na	Cl
ppm or %	4.03%	0.33%	3.52%	0.3%	1.67%	0.24%	18 ppm	151 ppm	51 ppm	9 ppm	0.138	n/a
Sufficiency Range Low (L) to High (H)	4.5-7.0	0.25-1.5	2.5-7.0	0.3-1.0	1.0-5.0	0.3-2.0	20-150	50-1000	30-250	10-50	Excessive > %	Excessive > %

Nutrient levels at or below the Low Sufficiency Range indicate a High Probability of a fertilizer response.

A fertilizer response May or May Not be obtained when the nutrient levels are Within the Sufficiency Range.

Nutrient levels at or above the High Sufficiency Range indicate a Low Probability of a fertilizer response.

Note: NO_3-N; PO_4-P & SO_4-S are in ppm for Petiole Samples.

For some crops, Boron (B= _____ppm) and Molybdenum (Mo= _____ ppm) may need to be analyzed. (Boron = __30-100_ppm Sufficiency Range; Molybdenum = _____ppm Sufficiency Range)

In suspected Saline or Sodic areas, Sodium & Chloride should be analyzed.

Harvested Nutrients @9.2% H_2O

Nutrient	N	P	K
%	3.0	.34	3.5
Total lb/ac 4/	328	37	38

4/ Crop (lbs./ac) x % dry matter = lb. Crop (dry weight)/ac
Crop (lb/ac dry wt.) x % Nutrient = lbs. Nutrient removed/ac
Note: For NPK % averages & % Moisture Content, refer to NRCS Nutrient Uptake Tool: http://npk.nrcs.usda.gov/

2/ Classification NRCS Nutrient Management Jobsheet (590): click on Tables & Crop Tabs

Rating for ppm	N	P	K	Ca	Mg	Zn	Fe	Mn	Cu
Very Low	.01-4	.01-7	.01-9	.01-99	.01-14	.01-.09	.01-0.9	.01-.09	.01-.09
Low	5-9	8-14	10-29	100-199	15-29	0.1-0.4	1-2.4	0.1-0.9	0.1-0.2
Moderate	10-29	15-22	30-59	200-399	30-59	0.5-0.9	2.5-4.4	1-2.4	0.3-0.9
High	30-49	23-30	60-79	400-799	60-99	1-9	4.5-9	2.5-9	1-9
Very High	> 49	> 30	> 79	> 799	> 99	> 9	> 9	> 9	> 9

Note: Evaluate above data with Soil Quality (e.g., aggregate stability), IWM, IPM and Tillage Operations records for best understanding of results. rudy.garcia.2009

Agronomy Tech Note 76 (http://www.nm.nrcs.usda.gov/technical/handbooks/iwm/nmiwm.html)