



Soil Nutrient Analysis for Grass Hay and Pastures

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Values to consider testing for:

Major Nutrients- N,P,K

Micro Nutrients- Fe, S, Ca, Mg, Mn, Zn, Cu, B

Organic Matter

Soil pH

Salts/CEC

Fertilizer need is based on species composition and many other factors

Libegs Law of the minimum! (N often most limiting in grasses)

“Law of the Minimum,” which states that if one of the essential plant nutrients is deficient, plant growth will be poor even when all other essential nutrients are abundant.”

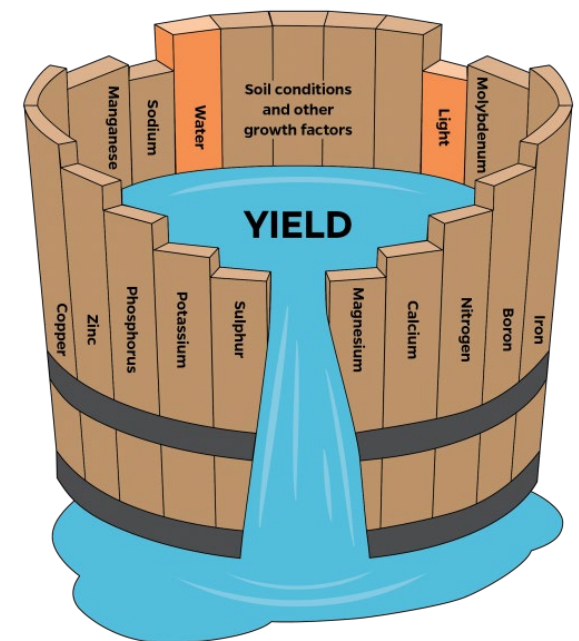


Image courtesy of Accrosa.com

Soil Sample Values from Sierra Valley

Number	Name for chart	1:1 Soil pH	Organic Matter LOI%	Nitrate-N ppm N	lbs N/A	Olsen P ppm P	Potassium ppm K	Sulfate-S ppm S	Calcium ppm Ca	Magnesium ppm Mg	Sodium ppm Na	Boron ppm B	CEC/Sum of Cations me/100g
	WETUNSEEDED	6.3	5.8	0.3	1	8.4	130	9.6	2522	770	51	0.22	22.4
	WETSEEDED	6.3	4.7	1.6	6	8.7	157	9.1	2151	643	39	0.27	19.5
	DRYSEEDED	7.6	3	0.8	3	8.2	107	7.2	2335	705	139	0.14	18.4
	DRYUNSEEDED	6.9	4.2	0.3	1	8.5	174	6.7	2295	684	55	0.22	17.9
1	Ave pasture hayed	5.5	8.4	9.4	34	9.1	72	18.3	1877	165	60	0.21	20
2	Ave pasture hayed	6.2	8.7	2.1	8	10	82	29.3	2669	325	111	0.29	22.9
3	Wet pasture grazed	6.3	6.8	6.2	22	10.2	89	8	1394	195	33	0.15	14.2
3	Sweet vernal grass	6.3	6.8	6.2	22	10.2	89	8	1394	195	33	0.15	14.2
4	Wet pasture grazed	6.2	14.8	6.4	23	9.5	140	11.2	2506	404	59	0.23	21.9
5	Ave pasture grazed	6.3	5.7	0.7	2	7.8	88	9	1564	247	50	0.27	13.5
6	Ave pasture hayed*	6.4	9.8	9	32	8.3	57	34.5	2611	305	220	0.22	20.2
7	Wet pasture grazed	7.2	7.8	3.2	12	10.8	79	8.3	3489	657	162	0.1	23.8
8	Dry pasture	6.7	8.2	1.4	5	7.2	75	9.9	2205	432	217	0.63	15.8
9	Wet pasture grazed	8	7.5	3.5	13	8	126	152.4	5955	1192	2196	20.12	49.6
11	Ave pasture hayed	8.4	5	6.2	22	9.6	145	12.2	2253	593	382	0.68	18.2
12	Wet pasture grazed	7.5	4.6	17.9	65	16.2	330	16.1	1778	701	158	0.7	16.3
13	Pivot grazed	8	2.6	14.5	52	15.7	559	8.7	2388	606	310	0.81	19.8

** These pastures are extremely low! Fertilization would give a substantial boost to forage productivity.

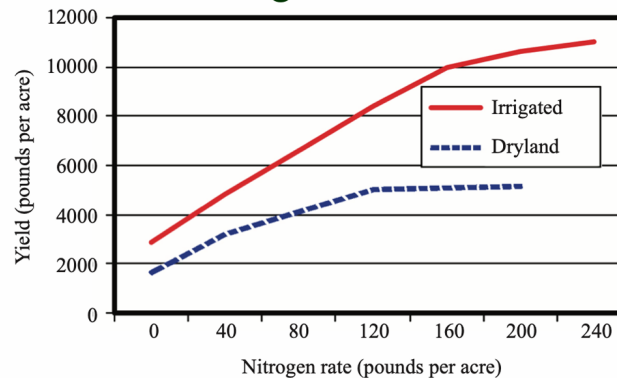
Critical Values for Selected Metrics

Tables and figures adapted from Rob Wilson [UCCE IREC-2020 Presentation](#) (Sides 202-242)

And the [Nebraska Fertilizing Grass Pastures and Hayland Publication](#)

Less than 10ppm Nitrate very little excess nitrogen- (10ppm=50lb's Nitrate)

Cool-season grass response to nitrogen fertilizer



Nitrogen Recommendation for Grass/Legume Mixtures

Stand Composition	Yield or Stocking Potential of the Site			
	4 tons/ac	5 tons/ac	6 tons/ac	7-8+tons/ac
	1,400 lb's of grazing animals/acre	1,750 lb's of grazing animals/acre	2,100 lb's of grazing animals/acre	2,450 lb's of grazing animals/acre
	lb N/acre			
100% grass	100	120	180	240
80% grass, 20% legume	80	100	150	200
60% grass, 40% legume	60	80	120	160
40% grass, 60% legume	20	40	60	80
60%+ legume	0	0	0	0

Olsen P levels at or above 10 ppm should not typically require phosphorus fertilization for grasses.

Phosphorus Recommendation for Dryland and Irrigated Pastures					
Relative Index Value	Soil test Value				
	Bray or Mehlich (2,3)	Olsen	Dryland	Irrig. Cool Season grasses	Legume Mix Irrig.
	ppm		lb P ₂ O ₅ /acre		
Very Low	0 to 5	0 to 3	40	60	90
Low	6 to 15	4 to 10	20	40	60
Medium	16 to 25	10 to 17	10	20	30
High	25+	17+	0	0	0

Potassium is rarely deficient for grass production in the Intermountain region

Potassium Recommendation for Irrigated pastures			
Soil test value	Relative Index Value	K ₂ O to apply	
		Grass	Grass legume
ppm		pounds per acre	
4 to 40	Very Low	90	120
41 to 75	Low	60	80
75 to 124	Medium	30	40
125 to 150	High	0	0
150+	Very High	0	0

Sulfur

- Soil testing is not very accurate for sulfur- but values above 5-10ppm often do not see a yield response in grasses.
- Sulfur can lower soil pH over time, so be careful with Ammonium Sulfate.
 - Micronutrients- deficiency often determined by tissue test.