What Impacts Forage Quality?

Tom Getts: UCCE Weed Ecology and Cropping Systems Advisor - Lassen, Modoc, Sierra, and Plumas Counties - tjgetts@ucanr.edu
Rob Wilson: UCCE Intermountain Research Station Director and Farm Advisor- rgwilson@ucanr.edu
Tracy Schohr: UCCE Livestock and Natural Resources Advisor for Butte, Plumas and Sierra Counties - tkschohr@ucanr.edu
DJ Eastburn, Specialist - Department of Plant Sciences, UC Davis - djeastburn@ucdavis.edu

Species

Legumes- Less fiber, higher protein/nitrogen content (more leaf- not N limited).

Grasses- Lower protein, more fiber(often N limited).

Temperature- Higher temps = more rapid growth=increased fiber.

Growth stage- Inverse relationship: more mature growth stage = poor quality.

-Trade off yield vs quality in hay.

-Pasture often can maximize forage quality as new growth is fed on.

Time of day- Higher sugars in afternoon.

Fertilization- Needed for yields, and for quality.

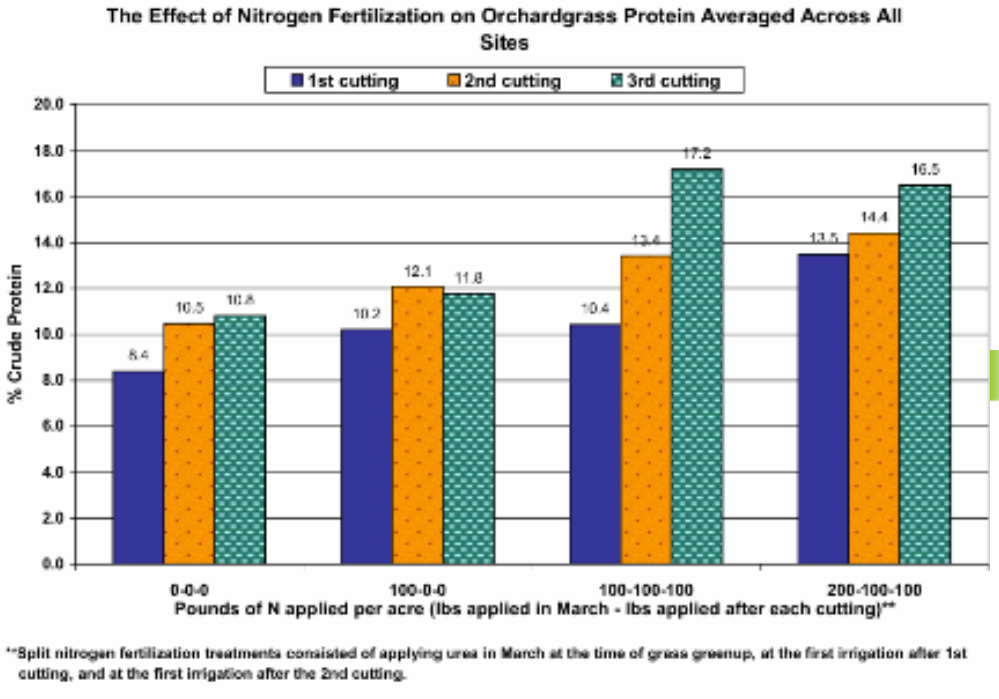
Ex: Additional N not only can boost yields but can boost crude protein values in grasses.

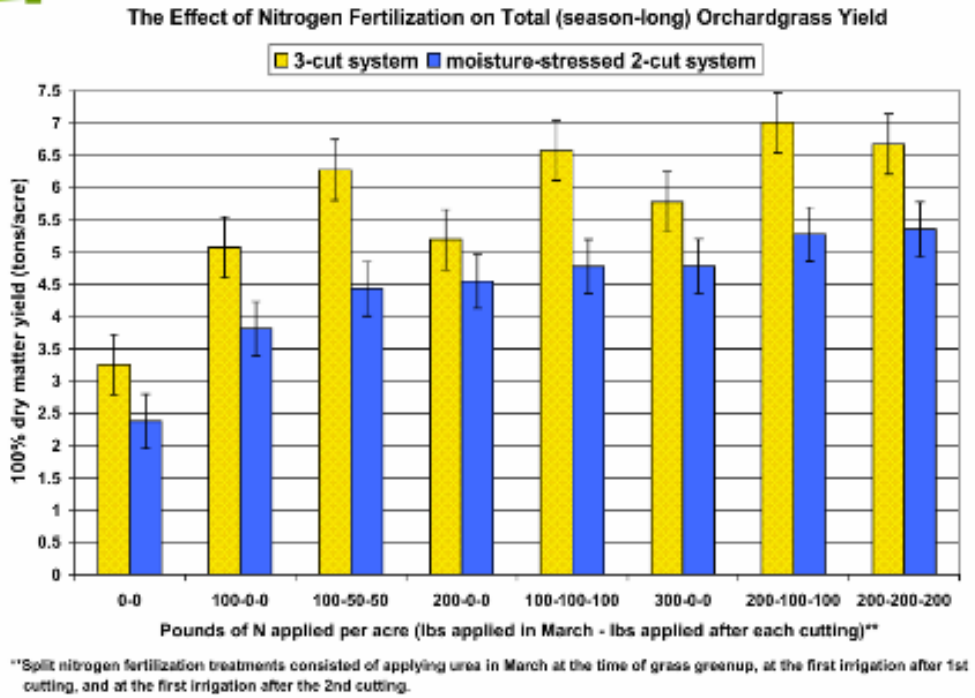
Quality Measures:

ADF- Digestibility measure (lignin cellulose etc. not digestible) Higher value= more fiber=lower quality feed. Impacts animal intake.

TDN- Total Digestible Nutrients- estimate of digestible energy. Used along with protein to determine rations.

Crude Protein- Total amount of N. CP is 6.25 times the N content of the forage, as non-protein N is converted to usable protein by ruminant microbes.





Fertilization Research in Orchard grass hay: Graphs sourced from fertilization presentation by Rob Wilson IREC Director.

(Slides 203-242)

Forage Test Results from Sierra Valley					
Number	Site name	% Crude Protein	ADF	TDN	Fat
Seeding trial	WET UNSEEDED	7.1	32.1	64	2.8
Seeding trial	WET SEEDED	7.7	36.6	61	2.2
Seeding trial	DRY SEEDED	8.4	40.5	59	2.6
Seeding trial	DRY UNSEEDED	9.1	40.1	60	3
1	Avg pasture hayed	8.1	44.6	57	2.3
2	Avg pasture hayed	8.2	43.2	54	2
3	Wet pasture grazed	7.5	43.9	55	1.7
3	Sweet vernal grass	4.1	42.1	61	1
4	Wet pasture grazed	7.1	42.4	58	1.8
5	Avg pasture grazed	7.6	39.4	59	1.9
6	Ave pasture hayed*	4.6	48.1	51	1.3
7	Wet pasture grazed	11	40.6	55	1.6
8	Dry pasture	7.3	39.2	57	2.2
9	Wet pasture grazed	7.8	40.2	60	2.6
10	Ave pasture hayed	8.8	42.8	59	2
11	Ave pasture hayed	8.6	43.4	56	1.9
12	Wet pasture grazed *(high clover)*	19.7	33.5	61	2.8
13	Pivot grazed	8.4	40.2	57	2.4

*Hay guidelines from USDA Hay Quality Designation Guidelines
https://www.ams.usda.gov/sites/default/files/media/HayQualityGuidelines.pdf

Alfalfa Guidelines (domestic livestock use and not more than 10% grass)

Quality	ADF	NDF	RFV	TDN-100%	TDN-90%	CP
Supreme	<27	<34	>185	>62	>55.9	>22
Premium	27-29	34-36	170-185	60.5-62	54.5-55.9	20-22
Good	29-32	36-40	150-170	58-60	52.5-54.5	18-20
Fair	32-35	40-44	130-150	56-58	50.5-52.5	16-18
Utility	>35	>44	<130	<56	<50.5	<16

Grass Hay Guidelines

Quality	Crude Protein Percent
Premium	Over 13
Good	9-13
Fair	5-9
Utility	Under 5