

Hay Yield, Protein,
and Digestibility of Grasses
and Legumes

Twenty-eight entries of legumes and forty entries of grasses were harvested a second year from 5 by 25-foot plots replicated four times. Ammonium sulfate at 60 pounds N per acre was applied to the grass plots in April and after first and second cuttings. The plots were cut on June 9, July 20, August 25, and October 13 with a 3-foot Carter flail harvester. Record high temperatures and an unusually long growing season resulted in four cuttings in an area where three are normally optimum. Irrigation was supplied by sprinkler at the rate of 2 inches in 24 hours each week.

The top yielding legumes were WL 220 alfalfa, Florex red clover, Apollo, Cimarron, NAPB 53 alfalfa, Redland II, and Kenland red clover (Table 5). The WL 220 alfalfa yielded 8.5 tons of dry matter or 9.4 tons of hay at 10 percent moisture. Several entries did not persist past the first year and no yield was obtained. These included subterranean clover, common and hairy vetch, strawberry clover, and big trefoil. Hairy vetch and sub clover produced very well in the first year but were not allowed to reseed. Both would do well if managed as annuals.

The top yielding grasses were Bonita, NAPB 0051, Meritra, Terhoy, NAPB 150 ryegrasses, RP6 pasture mix, Alta tall fescue, Napier orchardgrass, Deborah smooth brome, and Reubens Canada bluegrass (Table 6). Bonita ryegrass yielded 4.4 tons of dry matter or 4.9 tons of hay at 10 percent moisture. The lowest yields were observed for Potomac and S143 orchardgrass, Artal and Grinalda ryegrass, tall wheatgrass, Timfor

Table 5. The 1981 yield of legumes at the Klamath Experiment Station, Klamath Falls, Oregon

Variety	Specie	Cutting				Total	Rank
		1st	2nd	3rd	4th		
		lbs DM/A					
Kenland	Red clover	5,025	4,206	3,230	2,845	15,306	7
Florex		5,674	4,540	3,575	2,762	16,551	2
Redland II		5,665	4,061	3,180	2,771	15,677	6
Mt. Baker	Sub clover	-0-	-0-	-0-	-0-	-0-	0
NK 256	White clover	3,178	2,648	2,886	2,290	11,002	17
Ladino		3,556	3,667	3,707	3,125	14,055	12
Medium	Red clover	4,184	4,458	3,325	2,298	14,265	11
Common	Alsike clover	3,895	2,351	2,132	-0-	8,378	22
Hungrapoly	Red clover	4,977	4,500	2,826	2,340	14,643	9
ESKI	Sainfoin	6,070	2,961	2,354	1,412	12,797	14
VIVA		4,427	3,736	3,152	2,360	13,675	13
Remont		5,431	4,120	3,130	1,928	14,609	10
Common	Common vetch	-0-	-0-	-0-	-0-	-0-	0
Common	Hairy vetch	2,555	-0-	-0-	-0-	2,555	24
Palastine	Strawberry clover	-0-	-0-	-0-	-0-	-0-	0
Common	Big trefoil	-0-	-0-	-0-	-0-	-0-	0
Empire	Birdsfoot trefoil	4,451	3,704	3,137	-0-	11,292	16
Dawn		3,905	4,033	2,787	-0-	10,725	18
Granger		3,257	3,953	3,320	-0-	10,430	19
V-10		3,242	3,032	2,876	-0-	9,150	21
Lutana	Cicer milkvetch	3,038	2,084	2,769	-0-	7,891	23
Teton-Travois	Alfalfa	4,491	4,076	3,553	3,087	15,207	8
WL 220		5,037	3,922	3,733	4,270	16,962	1
NAPB 53		4,759	4,299	3,657	3,016	15,371	5
Apollo		4,391	4,247	3,315	4,153	16,106	3
Trefoil & Orchardgrass		4,000	2,986	2,209	-0-	9,195	20
Common Coated	Red clover	4,179	4,037	2,825	1,638	12,679	15
Cimarron	Alfalfa	4,319	4,634	4,095	3,032	16,080	4
	SD					1,168.7	
	LSD (.05)					1,652.7	
	% CV					9.2	

Table 6. The 1981 yield of grasses at the Klamath Experiment Station, Klamath Falls, Oregon

Variety	Specie	Cutting			Total	Rank
		1st	2nd	3rd		
		lbs		DM/A		
Potomac	Orchardgrass	2,756	1,635	1,013	5,404	40
S 143		3,154	1,681	1,442	6,277	36
Comet		3,489	1,907	1,413	6,809	24
Napier		4,027	1,990	1,548	7,565	8
Hawk		3,426	1,883	1,248	6,557	28
NAPB 7501		3,528	1,734	1,177	6,439	29
Ina		3,258	2,040	1,422	6,720	27
Sterling		3,662	2,177	1,466	7,305	14
Baylor	Smooth brome	4,433	1,355	1,718	7,506	9
Deborah		3,466	1,572	1,730	6,768	25
Manchar		3,847	1,326	1,251	6,424	30
Lincoln		4,064	951	1,965	6,980	19
Rise	Red Canarygrass	3,991	2,288	1,164	7,443	12
Vantage		3,331	2,276	1,312	6,919	20
NK Common		3,466	2,098	1,522	7,086	18
NK Tetraploid	Ryegrass	3,690	2,049	1,409	7,148	17
NAPB 150		3,966	2,473	1,483	7,922	5
Artal		2,985	1,190	1,234	5,409	39
Grinalda		3,538	1,163	1,103	5,804	38
Fawn	Tall fescue	3,685	1,962	1,621	7,268	15
Alta		3,948	2,191	1,518	7,657	7
Timfor	Timothy	3,435	1,548	1,298	6,281	35
Climax		3,700	1,718	1,404	6,822	23
Toro		3,753	1,308	1,247	6,308	33
Common	Meadow foxtail	3,016	1,956	1,319	6,291	34
Garrison		3,686	1,280	1,376	6,342	31
Beaumont	Meadow fescue	3,944	1,507	1,290	6,741	26
NK Common	Kentucky bluegrass	1,897	1,114	1,280	4,291	41
Troy		3,713	1,538	1,621	6,872	22
Reubens	Canada bluegrass	4,151	1,609	1,732	7,492	10
Common	Tall wheatgrass	2,940	1,506	1,811	6,257	37
Alkar		3,822	1,436	1,948	7,206	16
Klamath	Quackgrass	3,698	1,222	1,410	6,330	32
Greenleaf	Pubescent wheatgrass	4,226	1,399	1,669	7,324	13
Oahe	Intermediate wheatgrass	4,831	1,201	1,417	7,449	11
RP 3	Pasture mix	3,208	2,142	1,560	6,910	21
RP 6		3,623	2,155	1,943	7,721	6
NAPB 0051	Ryegrass	2,711	3,992	1,984	8,617	2
Meritra		3,823	2,613	1,703	8,139	3
Terhoy		4,037	1,643	2,443	8,123	4
Tetraploid						
Bonita		4,561	2,254	1,999	8,814	1
	SD				1,498.6	
	LSD (.05)				2,098.2	
	% CV				21.6	

and Toro timothy, Common and Garrison meadow foxtail, and quackgrass. In general, no grass specie was superior in yeild. Each specie contained varieties which produced well and others with low yields.

The white blossom clovers, white clover, ladino, and alsike clover had protein contents in excess of 20 percent (Table 7). Dawn and V-10 trefoil, Lutana cicer milkvetch, NAPB 53, and Cimarron alfalfas had protein contents near 20 percent. Ladino and white clover were 75 percent digestible. The remainder of the clovers were near 70 percent digestible. Eski, Viva, and Remont sainfoin were low in both protein and digestible dry matter content. This was the result of a very stemmy growth habit. Apollo and Cimarron alfalfa were surprisingly low in digestibility at 61 percent *in vitro* dry matter digestibility.

The protein and digestibility of RP6 pasture mix were high at 14.6 and 63.9 percent, respectively (Table 8). The high yield and quality of RP6 indicate that cattle gains could be excellent on this pasture mix. The protein and digestibility were low for Fawn and Alta tall fescue. The digestibility values of near 50 percent for tall fescue may be the result of alkaloids in the grass. Timothy demonstrated adequate protein and high digestibility content as it did in 1980.

Table 7. Crude protein and *in vitro* digestibility of second cutting legumes from the Klamath Experiment Station, 1981

Variety	Specie	C P	IVDMD
			% DM
Kenland	Red clover	16.6	70.9
Florex		18.4	69.4
Redland II		18.2	70.7
Mt. Barker	Sub clover	-0-	-0-
NK 256	White clover	23.4	75.7
Ladino		20.7	75.1
Medium	Red clover	19.2	69.6
Common	Alsike clover	21.0	69.9
Hungrapoly	Red clover	18.3	71.2
ESKI	Sainfoin	17.7	64.5
VIVA		14.3	63.0
Remont		13.8	64.7
Common	Common vetch	-0-	-0-
Common	Hairy vetch	-0-	-0-
Palastine	Strawberry clover	-0-	-0-
Common	Big trefoil	-0-	-0-
Empire	Birdsfoot trefoil	17.1	66.0
Dawn		19.9	67.9
Granger		18.6	66.9
V-10		20.7	65.8
Lutana	Cicer milkvetch	19.5	69.7
Teton-Travois	Alfalfa	17.1	65.2
WL 220		16.0	65.2
NAPB 53		19.6	65.5
Apollo		17.7	61.4
Granger/Potomac	Trefoil/Orchardgrass	15.3	65.7
Common Coated	Red clover	18.7	70.7
Cimarron	Alfalfa	19.3	61.4
	SD	1.5	3.0
	LSD(.05)	2.2	4.3
	% CV	8.4	4.5

Table 8. Crude protein and *in vitro* digestibility of second cutting grasses from the Klamath Experiment Station, 1981

Variety	Specie	C P	IVDMD	
		% DM		
Potomac	Orchardgrass	11.8	58.5	
S 143		12.6	58.7	
Comet		11.7	57.7	
Napier		11.6	58.4	
Hawk		12.0	58.7	
NAPB 7501		12.0	59.6	
INA		10.9	62.6	
Sterling		10.9	58.8	
Baylor		Smooth brome	15.1	57.8
Deborah			13.8	56.0
Manchar	13.9		57.2	
Lincoln	14.6		59.0	
Rise	Reed canarygrass		12.4	57.0
Vantage		12.5	55.2	
NK Common		12.1	54.3	
NK Tetraploid	Ryegrass	11.7	59.8	
NAPB 150		9.2	54.1	
Artal		12.8	57.3	
Grinalda		13.6	58.4	
Fawn	Tall fescue	11.1	48.9	
ALTA		11.7	50.9	
Timfor	Timothy	12.4	65.2	
Climax		12.3	63.6	
Toro		12.3	61.5	
Common	Meadow foxtail	12.0	55.8	
Garrison		12.8	62.5	
Beaumont	Meadow fescue	12.1	61.2	
NK Common	Kentucky bluegrass	14.2	57.3	
Troy		13.5	53.1	
Reubens	Canada bluegrass	12.3	58.7	
Common	Tall wheatgrass	13.3	57.1	
Alkar		11.4	58.4	
Klamath	Quackgrass	14.7	54.0	
Greenleaf	Pubescent wheatgrass	10.9	57.5	
Oahe	Intermediate wheatgrass	13.4	58.9	
RP 3	Pasture mix	12.5	60.4	
RP 6		14.6	63.9	
NAPB 0051	Ryegrass	9.1	54.1	
Meritra		10.0	51.2	
Terhoy tetraploid perennial		15.2	58.9	
Bonita		13.5	52.4	
	SD	1.1	3.8	
	LSD (.05)	1.5	5.3	
	%CV	8.8	6.5	