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Sheep Pastures - A Godsend or a Drag

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Too few sheep producers properly manage sheep on pasture. Many merely stand back and let them "fill up" on parasites. Why do so few of us truly understand how to manage the pasture forage so as to optimize production. Producers must understand how to sustain stand viability over a period of years, to minimize weed invasion, to vary production up or down according to need, or how to extend the grazing period (Early On--Late Off). If you think you can do all of those things in a single field, with a single forage species and with no input of tilth and forage management or no added soil nutrient from time to time, you can also win a $100 million lottery. The crux of pasturing sheep is to reduce production cost, not necessarily to magnify individual sheep performance. I know of no pasture program that will equal the performance of sheep fed corn and protein in drylot.

If pasturing is intended to reduce production costs, then it must have these hallmarks:

1. Involve land that can't be used for any other purpose (steep, easily eroded rocky or sandy soil that can't be tilled or sustain a crop through the growing season). Land with trees or a meandering stream running through it. If the land has no alternative use, it should bear little production costs.

2. Pasturing system must involve more than a single area or a single forage species. Both area and forage species are equally important. Constant grazing will kill most legumes so rotation must be part of your management. Brome or orchardgrass may be ideal in May but is worthless in August for weaned lambs.

3. Producer attitude about pasturing sheep must include the belief that nutrient needs for dry ewes vs lactating ewes vs weaned lambs is as different as night and day. A pasture adequate for dry ewes may well result in weight loss of weaned lambs and pasture adequate for lactating ewes is a waste of resources when used for dry ewes. Grazing ewes and lambs together may be counterproductive. Tillable land devoted to sheep pasture must be managed to net as much as if it were planted to wheat or corn.

4. Internal parasites are a part of any pasture system that involves forage plants over 1 year old and grazed by one or more sheep/acre. If you chose to neglect the constant problem of internal parasites, no pasture program can be a success.

Dry Ewe Pasture System

1. No. of ewes x no. days of grazing = ewe grazing days. Ewe grazing days per acre for dry ewes should be your number one concern. Fifty ewes per acre x 30 days = 1500 ewe days per acre (E.D.) and calls for quite different management from 15 ewes per acre x 100 days = 1500 E.D. The first scheme

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about forces the producer to use supplementary pasture. The second scheme invariably results in feed waste in May-June and consumption of forage low in nutrients and digestibility in late June to September. Neither scheme by itself is ideal. Admittedly, dry ewes that gain little during the summer or are harboring heavy parasite loads do not seem to have their subsequent production affected adversely. (NOT TRUE OF THIN EWE LAMBS THAT HAVE LAMBED AT 12 TO 14 MONTHS.)

If the above is factual, then the supplementary forage should favor DM production per acre rather than high palatability and high nutrient content of the forage. Sudan grass seeded June 1 makes a good dry ewe forage crop, whereas it is quite mediocre for lactating ewes and especially poor for weaned lambs. Turnips or rape are crops that can be used fairly well for either ewes or lambs. Seed is inexpensive, rape is ready to graze by mid-June (if planted in April-May) and it provides excellent fall pasture.

Lactating Ewe Pasture System

Pasture provided for lactating ewes must maintain milk yield plus a nutrient "package" that will support adequate lamb gains. To accomplish both of these ends usually results in overfeeding the ewe and normally provides the lamb nutrients so diluted with fiber and water that they simply can't consume enough daily to realize .6 to .8 lb gain per day. To compound this problem, parasites take a heavy toll on lamb average daily gain (ADG). More forage per acre correlates to more parasites per square foot.

Obviously, the number of lactating ewes and their lambs grazed per acre x no. of days is usually a virtue and normally positively affects total pounds of lamb produced per acre (but not always). It may, as often as not, have an adverse effect on the performance (ADG, condition score, etc.) of the individual lamb and thus affect mortality, total gain per acre and selling price per pound. We have produced 800 to 900-lb lamb weight gains per acre. Yet the individual lambs gained <.2 lb per day. The major culprit to the poor lamb performance is due not entirely to lack of nutrient intake or competition from the ewe but PARASITES.

Eight- to 10-week old weaned grazing lambs gain slower than weaned 8-week old grazing lambs and very much slower than 8-week old weaned lambs full-fed grain in drylot. Our experience has been that it is easier to control internal parasites in weaned grazing lambs than in unweaned grazing lambs. To that should be added the fact that the ewe consumes two to four times more high quality forage per day than the lambs consume. Furthermore, it is the ewe that is continually "seeding" the pasture with parasites. Thus, grazing 12 to 14 dry ewes per acre in one pasture and 15 to 18 weaned lambs per acre in another pasture usually results in more lamb weight gain than grazing four ewes and six lambs together per acre.

Our experience with internal parasite control has been to deworm the ewe prior to lambing and deworm the lambs prior to going on clean pastures. Thus, parasite buildup on the pasture due to contamination by the very small number of parasites the lambs are harboring does not become a problem until about mid-August when the lambs are near market weight. If control is not exerted at that time, the pasture will be contaminated the following year. This is especially true if lambs are grazed in early summer the second year on land that was grazed in late fall the first year.

Forage Species and Renovation

Any sheep pasture on tillable land that hasn't been renovated and reseeded with better adoptive varieties within the last 8 to 10 years is really operating at about 1/2 speed. Yes, 50 pounds of nitrogen per acre on sod will boost production considerably. But is your sod antiquated? Is it 1935 bluegrass, brome, timothy, quack, etc., all of which are very sensitive to dry weather and heat or is your sod 1980-90's varieties that have been improved yield wise as much as wheat, barley and oats have been in the last 50 years? Some legumes are 100% superior to the old commercial varieties. A strain of reed canary grass (MN-76 or Palaton) is five times better as sheep pasture forage than many commercial varieties offered. A good sheep producer wouldn't use a ram of 1940-1950 vintage, yet many are still relying on 1950 vintage forage varieties.

Complete pasture renovation will not only clean a pasture of parasites but increase forage yield 40 to 50%. However, it is a costly procedure. A new legume, kura clover, that spreads via underground rhizomes will persist for 15 years, get thicker each year and may be an agronomic breakthrough. If we can develop a scheme that will result in a reasonable stand via sod-seeding, it would truly be a winner. Kura has been superior to birdsfoot trefoil (BFT), red clover, alsike and alfalfa in our tests. However, BFT produces the greatest ADG but lacks persistence and carrying capacity.

I believe the greatest potential use of pastures is for the dry ewe and the April-born lamb. A $60 annual pasture cost per acre and 12 dry ewes per acre translates to $5 per ewe cost for 15 days or $0.33 per ewe day. The low cost and the long grazing period make a good pasture program your most effective cost reducing opportunity. Are you making the most of it? The days when you could buy an acre of land for less money than the cost of improving the land you already have are long over.

Bluegrass or quack pastures will produce only feeder lambs and then of light weight. If you want to produce lambs economically on pasture, your attitude as to what constitutes a productive pasture will have to change 180°. The following tables illustrate some of our results with various forage species, pasture management and sheep management systems.

TABLE 1. ANNUAL FORAGES FOR LAMBS

Items	Oats-rape	Peas	Corn	Oats-peas	Sudangrass
Lambs/acre	16	24	30	26	26
Grazing period, days	79	29	33	30	50
ADG[a], lb	.38	.32	.40	.39	.32
Lamb grazing days/acre	1231	696	1008	766	1265
Lamb gain/acre, lb	467.8	222.7	403.2	298.7	404.8

	Oats-rape	Peas to corn	Oats-peas to sudangrass
Lambs/acre	15.5	13.5	13.0
Grazing period, days	79	62	79
Lamb grazing days/acre	1231	852	1015
ADG, lb	.38	.36	.36
Lamb gain/acre, lb	313	286	291

[a] ADG = average daily gain.

TABLE 2. CARRYING CAPACITY AND LAMB PERFORMANCE ON FOUR ANNUAL FORAGE SPECIES OR COMBINATIONS USED FOR SECOND CROP PASTURE FOLLOWING FIRST CROP BARLEY SILAGE DURING TWO YEARS

	Annual forage species or combination			
Year	Sudangrass-annual ryegrass	Soybean	Forage rape	Tyfon-turnip
	Animal days/acre			
1	713 (97%)[ab]	344 (47%)[c]	622 (84%)[a]	736 (100%)[a]
2	1,064 (96%)[a]	679 (61%)[b]	885 (80%)[ab]	1,106 (100%)[a]
	Average daily lamb gain (lb)			
1	.286 (63%)[b]	.451 (100%)[a]	.282 (62%)[b]	.273 (60%)[b]
2	.282 (71%)[ab]	.396 (100%)[a]	.176 (44%)[b]	.180 (46%)[b]
	Lamb product/acre (lb)			
1	204 (100%)[a]	155 (76%)[a]	176 (86%)[a]	201 (60%)[a]
2	299 (100%)[a]	269 (90%)[ab]	156 (52%)[b]	200 (60%)[ab]
	In vitro digestible DM[d], %			
	60.4	74.8	80.7	82.7
	Crude protein, %			
	16.0	24.3	25.4	24.2
	NDF[e] (cell walls), %			
	56.6	33.6	20.8	20.8
	ADF[f] (%)			
	37.5	28.7	22.2	22.6

[a,b,c] $P<.05$. Values in horizontal rows bearing dissimilar superscripts are significantly different from one another.

[d] DM = dry matter.

[e] NDF = neutral detergent fiber.

[f] ADF = acid detergent fiber.

TABLE 3. LAMB PRODUCTION AS AFFECTED BY FORAGE SPECIES IN A DOUBLE CROPPING SYSTEM (1982-1984)

	Forage treatments			
	Soybeans	Cowpeas	Sudangrass	Kochia
Days of grazing	36	36	36	36
No. lambs	28	27	40	44
Initial weight, lb	64.7	65.1	62.7	62.7
Avg lamb grazing days/acre	489[b]	485[b]	900[a]	838[a]
Avg daily gain, lb	.405[a]	.482[a]	.328[b]	.343[b]
Lamb produced/acre, lb	198.0[c]	233.8[bc]	295.2[a]	287.4[ab]

[a,b,c] $P<.05$. Values in horizontal rows bearing dissimilar superscripts are significantly different from one another.

TABLE 4. INFLUENCE OF ALKALOID CONTENT ON LAMBS GRAZING REED CANARYGRASS

Alkaloid type or forage variety	Alkaloid content, % DM[a]	ADG[b], lb	Incidence of diarrhea, %	% DM remaining 7 days postweaning
Gramine				
High	.24	.092	17	38
Low	.08	.244*	3	15
Typtamine-carboline				
High	.24	.123	51	34
Low	.08	.249*	18	22
Rise	.30	.147	19	
Vantage	.26	.176	3	
MN-76	.10	.255*	2	

[a] DM = dry matter.
[b] ADG = average daily gain.
* $P<.05$.

TABLE 5. EFFECT OF MEFLUIDIDE TREATMENT ON REED CANARYGRASS AND BROMEGRASS ON LAMB PERFORMANCE

Year and measurement	Reed canarygrass		Smooth bromegrass	
	All control	Half control/ half mefluidide	All control	Half control/ half mefluidide
1982 (81 days)				
Animal days/acre	2368 (121%)[a]	2039 (104%)[b]	1961 (100%)[b]	1931 (98%)[b]
ADG, lb	.288 (116%)[bc]	.339 (136%)[a]	.249 (100%)[c]	.308 (124%)[ab]
Lamb product/acre	682 (140%)[a]	691 (142%)[a]	487 (100%)b	595 (122%)ab
1983 (100 days)				
ADG, lb	.319 (123%)	.299 (115%)	.260 (100%)	.284 (109%)
	Forage quality in 1982 (81-day mean), % dry wt			
IVDDM[d]	74.0	73.2	75.3	75.0
Crude protein[d]	23.7	24.0	22.7	22.0
NDF[d]	53.6	51.4	54.0	51.4

[a,b,c] Means within rows followed by different letters are different (P<.10 LSD).

[d] During the second grazing period (6/7-6/28), mefluidide-treated pastures had significantly greater IVDDM (in vitro digestible dry matter) and CP (crude protein) and less NDF (neutral detergent fiber). However, this was offset by lower quality for these pastures during the fourth grazing period (7/19-8/6) due to compensatory growth.

TABLE 6. COMPOSITION OF ALFALFA COMPONENTS

Property	Leaves	Leaves and stems	Stems
Crude protein, %	21	17	13
Cell wall, %	47	56	64
Acid detergent fiber, %	36	45	52
Hemicellulose, %	11	11	12
Cellulose, %	24	30	34
	Digestibility, %		
Energy	57[c]	53[c]	45[d]
Crude protein	74[c]	71[c]	62[d]
	Intake		
DM[a], g/metabolic body size	75[c]	60[cd]	51[d]
Avg retention time, hr	29[c]	30[c]	38[d]
Max excretion rate, %/hr	2.7[c]	2.5[c]	2.0[c]
DE[b] requirements, Mcal/day	2.8	2.8	2.7
DE intake, Mcal/day	4.4	3.3	2.3

[a] DM = dry matter.
[b] DE = digestible nutrients.
[c,d,e] $P<.01$.

TABLE 7. EFFECT OF FORAGE SPECIES ON COMPOSITION AND LAMB PERFORMANCE

Item	Individual grasses mixed with alfalfa	Birdsfoot trefoil	Birdsfoot trefoil stockpiled
Lamb days/acre	1629	1509	1499
%	102	94	94
ADG[a], lb	.242[e]	.295[d]	.299[d]
%	100	122	124
Lamb gain/acre, lb	370[e]	435[d]	429[d]
%	100	118	117
In vitro dig. DM[b], %	71.3[e]	73.3[d]	72.9d
NDF[c] (cell walls), %	46.1[e]	45.0[e]	46.3[e]
Crude protein, %	18.5[d]	18.7[d]	19.1[d]
Legume content in stand, %	49[e]	62[d]	59[d]

[a] ADG = average daily gain.
[b] DM = dry matter.
[c] NDF = neutral detergent fiber.
[d,e,f] $P<.05$.

TABLE 8. EFFECT OF LEGUME SPECIES ON THE PERFORMANCE OF GRAZING LAMBS

	Alfalfa	Red clover	Birdsfoot trefoil	Cicer milkvetch
		1985		
No. lambs	36	36	30	33
Days grazed	86	86	86	58
Initial wt, lb	47.7	47.1	46.4	46.4
ADG[a], lb, entire period	.464	.462	.447	.550
ADG, 58 days, lb	.535	.541	.532	.506
% of alfalfa, %	100	101	100	95
		1986		
No. lambs	33	33	31	33
Days grazed	100	100	100	100
Initial wt, lb	55.7	55.4	54.3	55.4
ADG, lb	.407[b]	.305[c]	.385[bc]	.431[b]
% of alfalfa, %	100	86	95	106
Lamb grazing days/acre	1717	1801	1720	1740
Lamb gain/acre, lb	700	630	662	750

[a] ADG = average daily gain.
[b,c] $P<.05$.

TABLE 9. KURA CLOVER, BIRDSFOOT TREFOIL OR A COMBINATION OF THE TWO AS PASTURES FOR LAMBS

Items	Treatments		
	Kura clover	Birdsfoot trefoil (BFT)	Kura-BFT mixture
No. lambs	45	45	54
Days grazed	97	97	97
Initial wt, lb	51.6	52.9	53.1
ADG[a], lb	.465	.428	.425
Gain as % of BFT, %	109	100	99
Lamb grazing days/acre	1533	1356	1631
Lamb gains/acre, lb	713	580	693

[a] ADG = average daily gain.

TABLE 10. EFFECT OF WEANING AND GRAIN FEEDING OF PASTURED LAMBS

Item	Weaned			Not weaned		
	Grain	No grain	Avg	Grain	No grain	Avg
No. lambs	51	45		36	34	
Lamb grazing days	92	92		92	92	
Ewe grazing days	--	--		993	964	
ADG[a], lb	.42[b]	.26[c]	.33	.48[b]	.33[c]	.40
Lamb gains/acre, lb	1164	442	803	696	421	558
Grain/lamb daily, lb	1.39	--		1.14	--	

[a] ADG = average daily gain.
[b,c] $P<.05$.

TABLE 11. EFFECT OF FORAGE SPECIES AND GRAIN FEEDING ON LAMB PERFORMANCE

Items	Alfalfa-brome	Alfalfa	Alfalfa-brome + grain	Alfalfa + grain
		% dry weight		
2nd year				
Alfalfa in stand, %	52	94	46	98
In vitro digestible DM[a]	73.9	73.8	72.8	73.1
Cell wall constituents	45.5	39.4	45.2	38.5
Crude protein	22.4	24.5	22.9	24.0
ADG[b], lb	.22[c]	.26[c]	.48[d]	.48[d]
3rd year				
Alfalfa in stand, %	42	85	22	90
In vitro digestible DM	70.2	72.1	67.0	72.6
Cell wall constituents	51.6	38.2	53.9	37.1
Crude protein	18.7	23.2	17.7	23.1
ADG, lb	.24[e]	.35[d]	.57[c]	.57[c]

a DM = dry matter.
b ADG = average daily gain.
c,d,e $P<.05$.

TABLE 12. EFFECT OF GRAZING MANAGEMENT OF NONLACTATING EWES

Items	Oats-rape	
	Continuous grazing	Restricted grazing
No. ewes	14	29
Initial wt, lb	152	149
Wt change, lb	4.9	-8.6
Ewe grazing days/acre	689	1467
Increase in grazing days, %	--	113
Ewe production		
Fleece wt, lb	9.2	9.2
No. barren ewes	1	2
Lambing rate, %	161	158
Lamb birth wt, lb	10.8	11.1