This article was presented on June 26, 1996
at the Purdue Hay Day.

CUT FEED EXPENSES BY UTILIZING CORN RESIDUES, STOCKPILED PASTURE AND COVER CROPS[1]

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The Facts Making hay is equipment and labor intensive. Grazing, when possible and without subsequent loss of animal performance, is a less expensive alternative than feeding hay. Many popular articles have been written about "year-round grazing"; the reality, however, is that ways can be implemented to extend the grazing system, but 365-days of grazing is not a practical reality in Indiana due to environmental conditions, pasture quality and the nutritional needs of the livestock.

Why Extending the Grazing Season Should be Considered The reasons this concept should be part of a forage-livestock program are:

- less labor associated with making hay, hauling manure, and feeding
- less wear and tear on buildings and equipment
- less respiratory illness
- more exercise for livestock
- better utilization of land resource

Research Objectives Objectives of the research are to explore alternative ways to stretch the grazing season for ruminant livestock, to evaluate livestock performance on different grazing systems as compared to being fed hay in drylot, and to document the amount of hay fed on each system.

Initial Goal Our initial intentions were to graze forage turnips, soft red winter wheat or annual ryegrass in the autumn when planted no-till following corn silage harvest. This goal ended up not being very realistic because not enough forage dry matter accumulated between time of planting and the end of dry matter accumulation in the autumn to warrant grazing. "Mother Nature" was most responsible for the low amount of forage available because of wet weather delays in harvesting silage and, therefore, planting in1993, and dry weather impact upon timely emergence of the forages in 1994 and 1995. Dry matter yields measured in late December 1993 were only 491, 698 and 659 lbs. of dry matter per acre for turnips, annual ryegrass and winter wheat, respectively. I would suggest that yields less than 1000 lbs. of dry

matter per acre are not economically worth grazing.

Approaches Initial experiences in late summer and early autumn noted above suggested a different approach was needed to extend the grazing season. We opted to 1) extend autumn grazing by utilizing corn residues or stockpiled cool-season grass pasture and Individuals involved to date with data reported include 2) to extend spring grazing by grazing winter wheat or annual ryegrass in the spring prior to turnout to traditionally used perennial grass-legume pasture. Our initial work was done exclusively with mature non-lactating ewes. These experiments has application to the beef cattle industry, too; another project has been initiated with beef cattle as the test species.

Sheep Project

Stockpiled pasture This project was conducted at the Sheep Production Unit at the Animal Sciences Research Center, Montmorenci, IN. Fifty pounds of nitrogen was applied per acre in late August 1994 and 1995 to each of two replications. Grasses in the pasture include orchardgrass, tall fescue and Kentucky bluegrass with the predominant species being orchardgrass. Per the definition of "stockpile", no grazing was allowed on this acreage between fertilization and initiation of the project in the late autumn. Seven mature ewes were stocked per acre. No hay was fed unless snow cover was greater than 4 inches. Water and mineral were provided in each paddock. Shelter consisted of a windbreak with no cover in 1994 and with cover in 1995.

Corn Residues Stocking rate was the same as in the stockpiled pasture. Orchardgrass-alfalfa hay supplemented the residues. Amount fed was 0.85 lb. of hay/ewe/day. Forage analyses indicated that the hay had 17.8 % crude protein, 35.1 % Acid Detergent Fiber, 52.9 % Neutral Detergent Fiber and a Relative Feed Value of 108. Extra hay was only fed when snow cover was greater than 4 inches. Cover, water and mineral was available in each paddock. The corn residue and stockpiled pastured ewes performance was compared to ewes fed 3.9 lbs. of the same quality hay noted above. Quantity of hay fed was based on National Research Council recommendations for ewes of the weight and production cycle utilized in the project.

Wheat and Annual Ryegrass Two years of data, 1995 and 1996, has been collected from the winter-annual cover crops, although data will be collected the spring of 1996, too. These crops were planted singly in each of two one-acre replicates. 'Clark' soft red winter wheat and 'Marshall' annual ryegrass were sown as soon as possible after corn silage harvest with a no-till drill at a seeding rate of two bushels and 35 lbs. per acre, respectively.

Mature ewes that had recently weaned their lambs were used for this trial. Replication one and two were stocked with 10 and 17 ewes per acre, respectively. The difference in stocking rate was due to more forage production on replicate two and corresponded to a more productive soil type. Fifteen ewes per acre were

stocked in each replication of wheat in 1996. Annual ryegrass did not survive the winter of 1995-1996.

We adopted the philosophy of using the cover crops to trap residual nitrogen from the previous year's corn silage crop, so no nitrogen fertilizer was applied in the late winter. No hay was fed to the ewes. Their performance was compared to ewes in drylot receiving 3.6 lbs. and 3.9 lbs. of hay per day in 1995 and 1996, respectively.

Results of the Sheep Project

Data collected indicate that there is a significant hay cost savings to the producer when utilizing stockpiled grass pasture or corn residues (Table 1). Ewes were able to graze corn residues for 28 days in both years and stockpiled pasture for 28 days in 1994. Dry weather in the late summer reduced the amount of stockpiled grass available in 1995 and only 21 days of grazing occurred. Ewes were able to graze the wheat and ryegrass for 14 days (April 18 - May 2) in 1995; this is significant as traditional turnout to perennial grass-legume pastures is around May 1, thus the use of the winter-annual crops complemented the perennial pasture. Due to weather conditions that limited wheat growth, ewes were able to graze wheat for seven days (May 1 - May 8) in 1996.

Weight loss and body condition score change was a concern with the 1994 ewes on corn residues, although lambing data indicated no concern as compared to other treatments (Table 1). This problem partially was caused by a later grazing start in 1994 (early December) as compared to 1995 and could also have been reduced by feeding more hay or a higher quality hay. Individuals wanting to use corn residues for ruminant livestock are encouraged to begin use of residues as soon as possible following grain harvest so losses in quality associated with weathering can be reduced.

Lambing data collected (Table 2) indicates nothing unordinary as lamb number per ewe is excellent and lamb weights very acceptable.

Ewes performed similarly on the winter wheat or annual ryegrass pasture (Table 3). Cost of establishing these crops, seed and drilling cost, will be approximately $28. Our first year's data suggest that hay savings benefit is worth more than $21 per acre. There is more risk assumed when using these crops for pasture as compared to stockpiled pasture or corn residues because of timeliness of seeding, winter's impact on the crop and soil compaction caused by spring grazing.

Table 1. Results from sheep project investigating hay savings and ewe performance data associated with use of stockpiled pasture, corn residues and hay fed in drylot.

Treatment	Hay Fed, lbs.	Hay Savings/ Ewe, $[a]	Change of Ewe Wt., lbs.	Body Condition Score Change[b]

1994				
Stockpile	3.9	3.16	-2	-0.12
Corn residues	26.9	2.47	-9	-.057
Drylot	109.2	-	18	0.11
1995				
Stockpile	0	2.46	13	0.09
Corn residues	23.8	2.57	8	-0.18
Drylot	109.2	-	-2	-0.13

[a] Hay Valued at $60 / ton ($0.03/lb.)

[b] Scale 1-5

Table 2. Lambing results from ewes grazing stockpiled grass or corn residues, or fed hay in drylot in late autumn 1994.

Treatment	Live Lambs/ Ewe Lambing		Lamb Weight at Birth, lbs.	
	1994	**1995**	**1994**	**1995**
Stockpile	2.1	2.0	10.0	12.1
Corn residues	2.3	2.4	11.9	10.2
Drylot	2.3	2.2	11.7	11.4

Table 3. Results from 1995 sheep project investigating hay savings and ewe performance data associated with use of winter wheat or annual ryegrass pasture and hay fed in drylot.

Treatment	Hay Fed, lbs.	Hay savings/ Ewe, $[a]	Change of Ewe Wt., lbs.	Body Condition Score Changes[b]
1995				
Wheat	-	1.51	2	0.04
Ryegrass	-	1.51	1	0.02
Drylot	50.4	-	3	0
1996				
Wheat	-	0.82	4	0
Ryegrass	27.3	-	5	0

[a] Hay Valued at $60 / ton ($0.03/lb.)

[b] Scale 1-5

Beef Project

Positive results from the sheep project have been expanded to a project utilizing mature crossbred cows as the experimental animal. This project is being conducted at the Scholer Animal Sciences Farm, Warren County, and the Feldun-Purdue Agricultural Center, Lawrence County. The project will be done again in 1996. Autumn treatments include stockpiled pasture, corn residues and drylot. Annual ryegrass was no-till seeded following harvest of drilled soybeans at Feldun and corn silage at Scholer. The ryegrass was to be grazed at each site in mid April, however, poor growth during winter did not permit grazing.

Results from the autumn part of the project are encouraging (Table 1). Stockpiled grass receiving 60 lbs. of nitrogen in late August and corn residues provided 42 and 50 days of grazing at Feldun and at Scholer respectively. Hay savings per cow during the grazing period ranged from $16.88 to $30.31 (Table 4). Cows grazing stockpiled grass and corn residues did not have reduced animal performance as compared to drylot cows.

Calving collected in spring 1996 indicate no significant difference in birth weight and calving ease in cows that grazed stockpiled grass and corn residues compared to drylot cows (Table 5).

Table 4. Results from beef cattle project investigating hay savings and cow performance data associated with use of stockpiled pasture, corn residues and hay fed in drylot.

Treatment	Hay Fed[a], lbs. of Dry Matter	Hay savings/ Cow, $[b]	Change of Cow Wt., lbs.	Body Condition Score Changes[c]
Feldun				
Stockpile	79	21.67	80	0.59
Corn residues	292	16.88	66	0.27
Drylot	1042	-	11	0.04
Scholer				
Stockpile	341	30.31	52	0.16
Corn residues	413	28.69	14	0.20
Drylot	1688	-	60	-0.08

[a] Hay Fed from 11/8 to 12/20 at Feldun and 11/8 to 12/28 at Scholer

[b] Hay valued at $45 / ton Dry Matter ($0.0225 / lb.)

[c] Scale 1-9

Table 5. 1996 calving results from cows grazing stockpiled grass and corn residues, or fed hay in drylot in late autumn 1995.

Treatment	Weight at Birth, lbs.		Calving Ease. % No Assistance	
Stockpile	85.9	90.8	100%	100%
Corn residues	90.3	88.3	100%	96%
Drylot	89.6	87.0	100%	100%

[1] Funds to conduct this research were provided in part by the IN Sheep and Wool Market Development Council and the Purdue University School of Agriculture.