



# Forage Management

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## The Nutritional Value of Rotationally Grazed Pasture in Jefferson County

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This fact sheet is based on three years of work by four livestock producers in Jefferson County West Virginia. The county, which lies in the northern end of the Shenandoah Valley, is in the rain shadows from the Appalachian and the Blueridge mountain ranges. In the past, this has led to a reliance on row crop production and continuous grazing for feed rather than the use of rotational grazing. These long time traditions have discounted the use of pasture as a source of high quality forage. This fact sheet will discuss the potential nutritional value of three types of pasture/meadow grown in this area of West Virginia.

### Pasture Quality

A total of 64 samples were submitted to Dairy One Forage Lab for analysis. The samples were divided into three classes of pasture: Tall Grass-Alfalfa, Tall Grass-Clover and Bluegrass-Clover. Table 1 provides an overview of the quality of the three different

forage categories.

### Dairy Cattle Performance

Using the average crude protein, energy, and fiber of all samples and values representing 33 percent above and below the average, provided the opportunity to relate management of forage quality to animal production. Three different rations were formulated based on the average forage value and 33 percent above and below average. The *Cornell Dairy Pasture Ration Balancer* (1991), was used to formulate rations that would support a three year old, 1300 pound Holstein cow that is 120 days in milk, producing 3.5% fat. The assumption was made that the cow will lose no more than one Body Condition Score during a 305-day lactation. The theoretical cow had a body condition score of 2.5 using the descriptions developed at Michigan State University. The pasture is assumed to be unlimited and supplemented with orchardgrass hay and rolled shelled corn.

**Table 1: Analysis Results**

Forage	# of Samples	Days Between Grazing	Plate Height When Grazed	% Crude Protein	% TDN	NEL	NEG	ADF	NDF	% Ca	% P	Relative Feed Value
Tall Grass-Alfalfa	9	24	6.2	28	65	.68	.41	24	37.6	1.10	.43	179
Tall Grass-Clover	32	27	7.3	22	64	.66	.39	27	45.8	.79	.31	141
Bluegrass-Clover	23	36	4.3	20	64	.66	.39	29	49.8	.75	.30	126
Total\ Average	64	30	6.1	22	64	.66	.39	27	46.1	.83	.33	141
Quality Standard				Prime				Prime	#1			#1
Standard Deviation		13.5	3.5	5.0	2.8	.04	.04	4.2	7.1	.28	.07	31.6

**Table 2: Average Forage Analysis (Half of the samples are better and half the samples are poorer)**

Level of Milk Production	Pounds of Pasture (DM)	Pounds of Orchardgrass Hay	Rolled Shelled Corn (as fed)
40	25	7.5	4.0
50	25	10	4.0
60	25	11.5	5.5
70	25	13.5	6.0
80	24	11.5	13.0
90	24	13	14.0
100	24	14	16.0

**Table 3: Forage Analysis 33 percent above average (only 17% of the samples are better)**

Level of Milk Production	Pounds of Pasture (DM)	Pounds of Orchardgrass Hay	Rolled Shelled Corn (as fed)
40	30	5.5	3.0
50	29	8.0	4.0
60	29	9.0	5.5
70	29	10.0	7.5
80	28	10.0	11.5
90	27	12.0	13.0
100	27	13.0	15.0

**Table 4: Forage Analysis 33 percent below average (83% of samples better)**

Level of Milk Production	Pounds of Pasture(DM)	Pounds of Orchardgrass Hay	Rolled Shelled Corn ( as fed)
40	22	4.0	11.5
50	22	4.5	14.0
60	22	5.0	16.5
70	20	6.5	20.0
80	20	7.0	22.0
90	20	8.0	24.0
100	19	8.0	27.5

One of the concerns of dairymen is the loss of butterfat by cows on pasture. A key component contributing to this loss is the Acid Detergent Fiber (ADF) level in the ration. According to the *Nutrient Requirements of Dairy Cattle*, a level above 21% is desirable, but a level as low as 19% could be tolerated. The rations above were kept between these levels, with levels dropping as the production requirements went up.

Using the values of \$5 per ton for pasture, \$75 per ton for orchardgrass hay and \$140 per ton for rolled corn, the following observations were made.

- The average cost of the rations was:
  - Poor Quality: \$2.09 per cow per day
  - Average Quality: \$1.55 per cow per day
  - Excellent Quality: \$1.48 per cow per day
- The greatest economic incentive is to improve from the below-average pasture

to the average pasture. An average cost difference of \$.54 per day or \$164.70 per cow per 305 -day lactation.

- Improving the pasture to the above average quality forage from the average reduces the cost per cow per day by only an additional \$.07 or \$21.35 per 305-day lactation.

### **Beef Calf Performance**

Rations were formulated using the *Cornell Cattle System II Feedlot Edition (1989)*, to evaluate the rate of gain of a 550-pound steer with a supplement of shelled corn:

Table 5 demonstrates the improvement in the rate of gain when forages are of higher quality. The cost per pound of gain also decreased. Weather can affect these projections. Table 5 can be used to evaluate the use of improved pasture to wean calves and show how improved pastures can affect stocker cattle profitability.

**Table 5: Steer Rate of Gain**

Ration (%)		Rate of Gain (Cost per Pound of Gain)		
Pasture	Shelled Corn	Poor Quality Forage	Average Quality Forage	Excellent Quality Forage
100	0	1.37(.14)	1.68(.11)	1.97(.10)
90	10	1.68(.32)	1.93(.28)	2.2(.25)
80	20	1.95(.43)	2.19(.39)	2.42(.35)
70	30	2.25(.48)	2.44(.45)	2.62(.42)
60	40	2.51(.50)	2.67(.48)	2.81(.45)
50	50	2.76(.50)	2.87(.48)	2.99(.46)
Average	****	2.09(.40)	2.30(.37)	2.50(.34)

**Summary**

This three-year study demonstrated that the quality of rotationally grazed pastures found in the Northern Shenandoah Valley can support a high level of production with the addition of energy and fiber to balance the ration. The biggest challenge is to utilize the high level of protein found in these forages to its greatest advantage.

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