# West Virginia University
## EXTENSION SERVICE

# Hay Feeding on Meadows and Pastures to Manage Soil Fertility

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Livestock often need to be fed hay during part of the winter or in the summer during droughts. Hay, pasture and supplemental feeds contains nutrients needed by both plants and livestock. The majority of these nutrients are excreted by animals in their manure and urine. To recover and recycle these nutrients where they can be effectively used again hay feeding needs to be managed in tune with soil fertility.

Use the following management guidelines for winter feeding on meadows and pastures:
1. Soil test all meadows and pastures to determine their fertility status every 3 to 5 years.
2. Feed hay in hay meadows to return nutrients removed in harvest and build soil fertility into the optimum range.
3. Feed hay in pastures to build soil fertility into the optimum range.
4. Feed 50 feet away from fence lines, water tanks and wind breaks, 100 feet away from streams and 200 feet away from household wells and springs.
5. Do not feed more than one bale in the same spot in one feeding season.
6. Rotate feeding areas across hay fields in a 4- to 6-year cycle.
7. Feed bales in feeders during wet, muddy weather.
8. Unroll bales on dry or frozen ground.
9. Do not winter feed on wet soils that will not take the animal traffic.
10. Feed on wet ground when frozen or during summer droughts to return nutrients.
11. Spread seed and chain harrow in spring after the feeding season to revegetate the area.
12. If needed, cultipack or roll the feeding area in spring to smooth the area.

| Table 1. Number of 800-lb. hay bales fed uniformly across an acre of land and the rotation return period needed to recycle the nutrients for a 2-ton (5-bale) yield per acre. This represents first-cut yield with aftermath being grazed. If second-cut hay is taken, increase the number of bales fed per acre proportionally to total bales made per acre. | | |
|---|---|---|
| Number of bales fed per acre in the feeding year. | Bale spacing in feet. | Rotation return period in years |
| 20 | 50 x 50 | 4 |
| 25 | 45 x 45 | 5 |
| 30 | 40 x 40 | 6 |

Table 2. Fertilizer value of hay, pasture and supplemental grains (lbs. nutrient/ton 90% dry matter). Nutrients in hay and pasture is related to forage quality measured as crude protein (CP). Nutrients in grains and grain by products are less variable than hay and pasture.

| Hay & Pasture | | | | | |
|---|---|---|---|---|---|
| CP | N | $P_2O_5$ | $K_2O$ | $CaCO_3$ | $MgCO_3$ |
| 6 | 17 | 9 | 30 | 23 | 10 |
| 8 | 23 | 10 | 34 | 25 | 11 |
| 10 | 29 | 11 | 38 | 26 | 12 |
| 12 | 35 | 12 | 42 | 28 | 13 |
| 14 | 40 | 12 | 45 | 30 | 13 |
| 16 | 46 | 13 | 49 | 31 | 14 |
| 18 | 52 | 14 | 53 | 33 | 15 |
| 20 | 58 | 15 | 57 | 35 | 16 |
| Range covering 67% of observations | | ±3 | ±11 | ±11 | ±4 |
| Grains and By-product feeds | | | | | |
| Corn | 29 | 12 | 10 | 1 | 8 |
| Corn gluten feed | 69 | 44 | 32 | 4 | 27 |
| Distillers grain | 90 | 36 | 23 | 4 | 20 |
| Soybeans | 105 | 22 | 37 | 10 | 14 |
| Soybean hulls | 39 | 7 | 30 | 28 | 16 |
| Soybean meal | 147 | 30 | 50 | 18 | 20 |

Table 3. Fertilizer nutrients recycled during grazing a pasture is much greater than those removed in exported animal products.

| Recycling or removed | $P_2O_5$ | $K_2O$ |
|---|---|---|
| 6 AUM grazing (2.3 t dry matter) | 40 | 152 |
| 500 lbs. steer | 7 | 1 |
| 100 cwt milk | 23 | 17 |

The economic value of conserving nutrients in hay, pasture and supplemental feeds varies from year to year but averages about $1/day for every 1000 lbs. of livestock fed. For a 30 head cow head this is about $3700 for a 100 day feeding period. Management that keeps fertilizer nutrients where they do the most good makes economic sense.