NORTH DAKOTA– Consider Proso Millet for a High-Quality, Warm-Season Feed

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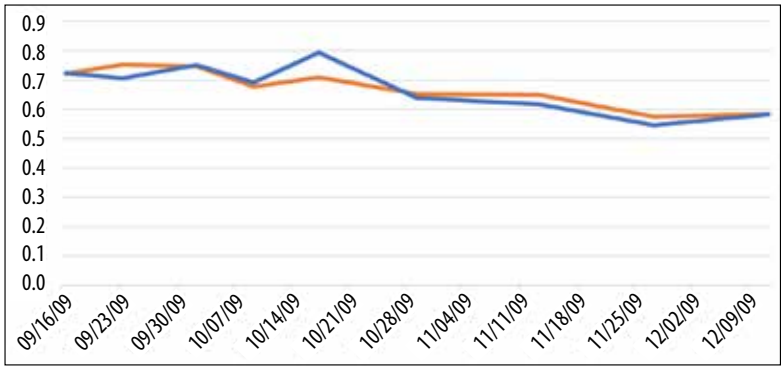
Proso millet is a fast-growing, high-quality, summer annual grass often underutilized on cow-calf operations. It can be a great forage source when the growing season is shortened or to replace a failed crop where bare ground needs cover. It is a high-quality feed for grazing, greenchop, hay, or silage and has one of the lowest water requirements of all cereals (average annual rainfall of 200-450 mm is sufficient if 35-40% falls during the growing period). Most soils are suitable except coarse sand. It is high in protein and energy and low in fiber and lignin. CP ranges from 9-11% in unfertilized soils to 14-15% under N-fertilized conditions. It is also high in Ca, Fe, and quality amino acid balance, but S-containing amino acid concentration is low. Forage is readily consumed by livestock when used at vegetative stages.

Millet was found to be highly *in vitro* degradable in our study (simulating grazing) which showed DM degradability was maintained >60% for most of the grazing season (Figure 1). Late-season degradability declines, but beyond when most grazing cattle are pulled off fields for weather conditions. If cattle were to graze stockpiled millet, degradability and TDN would still be sufficient to meet maintenance needs. NDF averaged 55% for samples taken from 2 fields in this study. ADF averaged 38%. TDN was calculated to be 56%.

Figure 1. *In vitro* degradability of DM of Proso millet harvested from two different fields, 2009, USDA-ARS Mandan, ND station. Stems and leaves were sampled every week after forage achieved grazable height of 20". Quality (degradability) was well-maintained throughout the season, indicating possible good grazing utilization.



Millet should be more utilized for grazing on cow-calf operations, especially considering its nutritional value. Nutrient content provided by well-managed Proso millet is more than sufficient for a brood cow during the later part of her annual production cycle, which coincides with a time when most farmers need late summer or early fall forage options (Table 1). When compared to oat hay (most common alternative), it has more capacity to quickly increase body condition in thin cows.

Table 1. Percent TDN requirements by month for a 1,200-lb brood cow producing 20 lbs peak milk. Well-managed Proso millet should be ~55% TDN and 12% CP. The highlighted figures represent months when Proso millet would meet the cow's required level of TDN. 12% CP would exceed the cow's requirement throughout the production cycle.

Months since calving	1	2	3	4	5	6	7	8	9	10	11	12
% TDN required	55.3	56.0	53.7	52.9	52.1	51.5	44.9	45.8	47.1	49.3	52.3	56.2
% CP required	8.43	8.79	8.13	7.73	7.33	7.00	5.99	6.18	6.50	7.00	7.73	8.78

Source: Basic Nutrient Requirements of Beef Cows.

From a land-use perspective, it is an excellent option following cool-season annual forages (e.g., spring wheat, oat). This is where it has excellent use properties for northern regions. It is adapted to warm-weather conditions, with soil temperatures >64˚F and air temperatures >85˚F. Rotation of crops including Proso millet on fields specific for annual forage production increases annual production per acre. It can produce good forage yields in the Northern Plains; 2.5 tons/ac on average for dryland and 3.3 tons/ac for irrigated in ND research centers. When planted shortly after cool-season forages have been harvested or grazed, it will stop growing before the earliest recommended cool-season forage planting.

Well-fertilized Proso millet cut before seedheads produce makes better-quality hay. Quality decreases quickly after seedheads develop, which is common for most warm-season grasses. First cutting is ~60-65 days after planting and subsequent cuts should occur every 30-35 days, though this is generally applicable to southern regions only. In northern states the season often gets too cold for regrowth.

Its thick stems require longer curing. To speed stem drying, a hay conditioner is recommended to crush stems. A high seeding rate can reduce stem thickness, favoring shorter drying times. Semi-dwarf hybrids are recommended for hay production. Also of concern are awns that form in mature stands. Avoid this by cutting in a vegetative state, or rotationally graze frequently to keep stands vegetative.

The least expensive way to use it in northern climates is to graze during vegetative stage. Nutrients are sufficient for mature animals or those with low nutrient requirements unless there is no other feed available to meet

maintenance needs. However, in temperate climate fall/winter conditions, increased nutrient concentration can be well-utilized in all cattle classes for maintenance and gain. It can be used for continuous or rotational grazing, but rotational is most efficient.

For best management practice, animals can be turned into pasture when it is 20-25" and removed when stubble is 6-8". Good nutritive value can be maintained with frequent but light grazing. Continuous stocking can be successful, but it must be well-managed or it can result in overgrazing or underutilization areas. The Proso millet feed value, as well as its flexible inclusion in crop rotations for a warm-season cover, favor it for use in northern climates. As an alternative forage source, it shouldn't be overlooked.

References:
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