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Pasture Management to Improve Dry Matter Intake

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Agricultural producers are constantly looking for ways to maximize returns while reducing input costs. On dairy operations, a move from confinement feeding to pasture grazing offers the potential to reduce costs associated with harvest and storage of feed. In such a transition, producers sometimes report a decline in milk production and growth of livestock—both of which can strongly correlate to dry matter intake. Fortunately, dry matter intake is something that can be influenced by management practices. In this publication, we discuss the pasture management practices to improve dry matter intake.

Why is Dry Matter Intake Important to Livestock Production?

Dry matter intake is a measure of how much feed an animal consumes, minus moisture content, and is a major factor affecting ruminant performance. High dry matter intake allows the animal to get a large amount of nutrients in a short period of time, which can sustain high milk production and/or growth. Pasture is a cost-effective alternative to confined feeding, but dry matter intake and energy are often limiting factors in lactating and growing animals.

Fat and grain concentrates can be used to supplement energy in animals fed on pasture, but excessive amounts will change the pH in the rumen, resulting in less efficient fiber digestion and reduced grazing. Supplementation also increases feeding and labor costs. Rather than supplementation, a more cost-effective method to increase animal performance on pasture is to increase dry matter intake of pasture grasses and legumes.

Challenges of Grazing

Various challenges exist in maximizing livestock production on pasture. An animal on pasture may expend more energy in search of feed and water than a similar animal in confinement feeding. This causes more energy to be directed toward maintenance than growth or lactation. Another challenge is that quality and quantity of forage on a pasture is often variable. Cool season grass pastures will produce large amounts of forage in the spring, much less in the summer, and intermediate amounts in the fall. Similarly, forage quality also shows large fluctuations throughout the year and is influenced by plant growth stage. When pastures have high nutritive value, animals readily consume the forage and intake will

increase. Similarly, as forage nutritive value declines, intake will generally decrease.

How to Maximize Intake on Pasture

Pasture Species

Pasture grasses and legumes often vary in palatability and animal preference. Decisions surrounding forage species and variety selection plays an important role in the production potential of animals that will graze on that pasture. Highly palatable grasses and legumes will tend to increase intake, while species that are less palatable or nutritious will limit intake. Plant grasses that are well adapted to the region are known to be preferred by livestock.

Orchard grass and meadow brome are two well-adapted grasses to Utah that have excellent intake (Table 1). Both are palatable with good regrowth after grazing and cutting. Perennial ryegrass and tall fescue are two other grasses tested in Utah but generally have lower intake than orchard grass and meadow brome. Tall fescue is a high-producing, grazing-tolerant grass, but it loses palatability quickly as it matures. Maintaining young, lush growth in tall fescue pastures can help to improve intake, especially in dairy animals. Perennial ryegrass produces forage very high in nutritive value, but it is generally lower yielding than other grasses and may need reseeding every few years.

Table 1.
Adapted Grasses for Improved Intake on Pasture (Most to Least)

Grass	Characteristics
Orchard Grass	Mid maturity Rapid recovery after grazing Winter damage in extreme cold without snow cover
Meadow Brome	Early maturing Good recovery after grazing Lax vegetative growth form, better for mixtures
Perennial Ryegrass	Excellent nutritive value Late maturing Short-lived, low growing
Garrison Creeping Foxtail	Well-suited for flooded or water-logged soils Aggressive rhizomes lead to long-lived stands Good recovery after grazing
Tall Fescue	Very resilient Good summer growth Low palatability, especially when mature

Similarly, a number of legumes, with their own unique attributes and qualities, are well adapted to Utah (Table 2). Alfalfa is the most widely grown legume in Utah due to its adaptation to multiple environments and uses. A limitation of alfalfa is that it can cause bloat in ruminants. Forage quality also declines more rapidly with maturity in alfalfa than most other forage legumes. Birdsfoot trefoil is a non-bloating, tannin-containing legume that persists well in the Intermountain West. Season-long yields of birdsfoot trefoil are usually less than alfalfa, but it can have higher production than alfalfa in the heat of the summer. Cicer milkvetch is a less known forage legume that is difficult to establish. Once established, it can produce yields similar to or better than alfalfa, and with a rhizomatous, spreading root system, it persists well in pastures and can be grazed for long periods.

Table 2.
Adapted Legumes for Improved Intake on Pasture

Legume	Characteristics	Intake	
		Pre-bloom	Post-bloom
Birdsfoot Trefoil	Contains tannins to increase animal efficiency and reduce parasite loads Non-bloating Withstands flooding Must be rested in fall before killing frost (typically one month)	Very Good	Good
Alfalfa	Highly productive Quick regrowth Causes bloat	Very Good	Fair
Kura Clover	Very persistent following establishment (poor seedling vigor) Withstands flooding and water-logged soils Causes bloat	good	Good
Red Clover	Generally has lower lignin than alfalfa Establishes rapidly Lower risk of bloat than alfalfa Short-lived: must be reseeded every one to two years	Good	Good
Cicer Milkvetch	Long-lived Well-suited for limited irrigation conditions (drought tolerant) Non-bloating Slow to establish-seed must be scarified to germinate	Good	Good

Forage Height and Production

Intake is maximized when the pasture provides enough high quality forage for livestock needs and when the forage is tall enough for them to consume substantial amounts of feed with each bite. For these reasons, forage height and production is an important variable to consider on a pasture. In a USU grazing study in northern Utah, tall, palatable grasses generally had greater intake than shorter grasses (Rose, 2019). As a general rule of thumb, maintaining pastures at a moderate height (10–15 inches) and vegetative growth stage will help to maximize dry matter intake (see Figure 1). Since different grass species mature at different heights, some variation on target height may be required. For example, perennial ryegrass is shorter than the other grasses in Table 1, so a 7–10 inch height might be more reasonable for this particular species.

Growth Stage

Growth stage has a large effect on nutritional characteristics of forage and intake. When pastures are young, leaf mass makes up most of the forage, and livestock are able to consume high quality feed in every bite. As pasture plants mature and produce seeds, fibrous stems start to replace leaves, reducing the forage's nutritive value. As fiber increases and sugars decrease, digestibility and intake decline (see Figure 2).

Stocking rates will need to be adjusted during the growing season. Sometimes, especially in the spring, forage production can greatly exceed livestock availability, so excessive growth may need to be swathed and baled to maintain leafy, vegetative growth in the pasture. Stocking rates are typically highest in the spring. Summer stocking rates are usually the lowest, but can be increased in the fall as pasture production increases with the cool weather.

Figure 1. *Ruminant intake on vegetative pastures that are 10–15 inches tall will generally be greater than very short or very tall stands that have reached reproductive growth stages.*

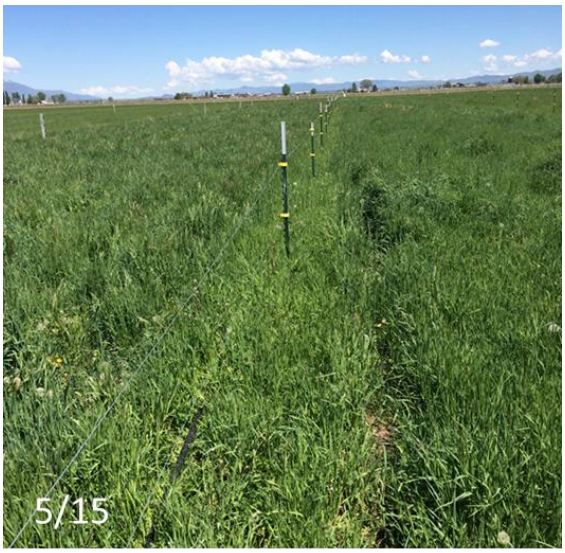

Figure 2. Cool season grasses such as meadow brome, shown above in May (left) and June (right), grow very rapidly and produce seed heads in the spring. Once seed heads emerge, quality declines rapidly. Adjust stocking rates or remove excess forage to maintain good nutritive value.

Legume Content

Legumes generally have less fiber (NDF and ADF) and more crude protein than grasses, which helps to improve intake and digestibility. Legumes in the pasture can also help to reduce or eliminate the need for applied nitrogen and maintain more consistent production during the hot summer months. Displayed in Table 3, USU research has shown that dairy heifer dry matter intake in grass-legume mixtures was equal to or greater than grass-only pastures, while yielding more forage with less fertilizer (Rose, 2019).

If a pasture contains alfalfa or other legumes known to cause bloat, limit legumes to no more than 50% of the plants in the pasture, by weight. Use rotational grazing to maintain desirable levels of legumes in the forage, since they are often preferred by cattle and can be grazed out of the pasture.

Table 3.
Intake and Yield, on a Dry Matter Basis, of Grass Monocultures and Grass-Birdsfoot Trefoil Mixtures in a Heifer Grazing Study in Lewiston, Utah from 2016–2018

Pasture Type	Intake	Yield
	Pounds/Acre	
Grass-Legume	936	3396
Grass Only	789	2651

Conclusion

As an alternative to confinement feeding, pasture grazing provides an effective strategy to maintain animal production while reducing costs. Dry matter intake is critical to achieving high livestock performance on pasture. Animals are known to readily accept plant pasture grasses and legumes. Maintain grasses around 10–15 inches in height to maximize forage that cows can consume in each bite. Keep pastures in a vegetative growth stage to maintain excellent nutritive value. Plant legumes to decrease fiber, increase crude protein, and decrease fertilizer costs. Following these practices will go a long way toward helping livestock producers increase dry matter intake and consequent profitability on pasture.

Reference

Rose, M.F. (2019). *Herbage characteristics affecting intake by dairy heifers grazing grass-monoculture and grass-birdsfoot trefoil pastures.* Utah State University Graduate Thesis. 7655. https://digitalcommons.usu.edu/etd/7655