

Managing Dairy Grazing for the Most Efficient Yields

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Pasture and grazing management has changed from an art to a science that dairy managers can learn and apply. The study of pastures, how they grow and how the dairy cow uses them provides the scientific knowledge needed to manage pastures in a manner once called an art.

When farmers understand how pasture growth interacts with cattle grazing, they can plan efficient systems to manage dairy grazing for their dairies.

Improving your management of pasture and grazing will help you hold costs to a minimum by efficiently producing and using high-quality forage. Concentrates in the ration are most cost-efficient when abundant, high-quality pasture is available.

To understand a system of managing pasture and grazing, you'll need a good understanding of the following processes:

1. How plants grow most efficiently;
2. How cows use pasture and how to control their feeding behavior;
3. How plant growth interacts with your cows' use of the pasture;
4. How to establish and maintain a high-producing dairy pasture; and
5. How to develop a balanced fertilizer program to meet plant needs, including plant nutrient requirements.

Pasture dry matter (lb/A)
and pasture height (inches)

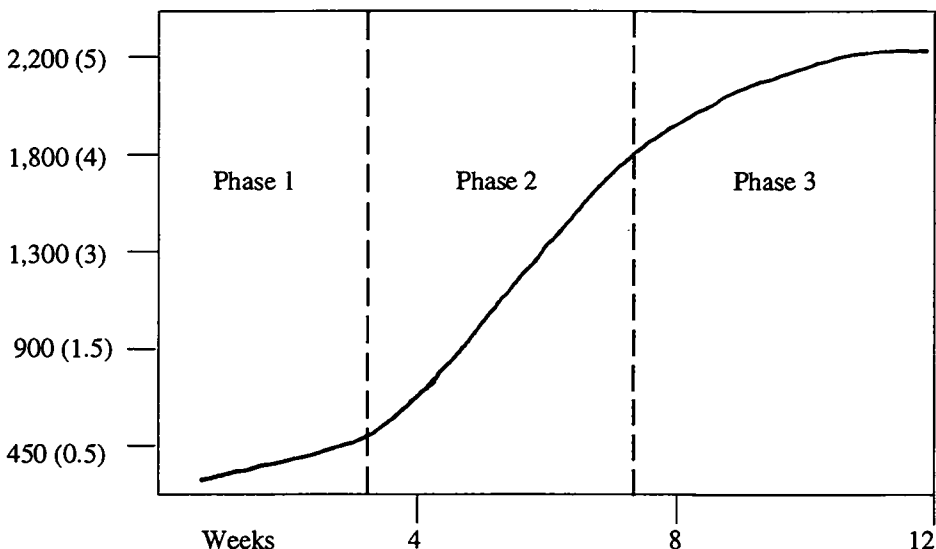


Figure 1.—Rate of pasture regrowth after grazing. (Adapted from *Controlled Grazing Systems: Introduction*, Figure 1. 1983. Wellington, New Zealand: Ministry of Agriculture and Fisheries, FPP 681.)

How plants grow most efficiently

Clover and grass pastures grow most efficiently if you hold them at a 2- to 6-inch height.

Figure 1, based on New Zealand research, shows how pastures in phase 1 (1 inch high, 450 lb dry matter per acre) grow very slowly because they lack leaf area for photosynthesis.

In phase 2 (1.5 to 5 inches, 900 to 2,200 lb dry matter per acre), the plants make the most rapid and efficient growth; their leaf area is great enough to use all the sunlight falling on the area.

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Pasture growth slows in phase 3 (8 to 12 inches high) as lower leaves become shaded and die.

Allowing dry matter per acre to exceed 3,500 lb before grazing, or grazing below 900 lb of dry matter per acre, will seriously reduce the pasture regrowth and, thus, the efficiency of pasture production. This pattern of growth will be influenced by soil temperature, soil moisture, and day length.

How cows use pasture

High-producing cows early in lactation can't consume enough forage to meet their nutritional needs. Therefore, all the feed they consume must be of highest quality if you're going to maintain production.

Dairy cows prefer grazing grasses rather than legumes and will graze those species that are most palatable. For example, they'll graze ryegrass before tall fescue. Their pasture intake is directly affected by the amount of feed that you allocate in the pasture.

You allocate feed when you control the height of the pasture presented to the animals, the size of the grazing area they're given, and the percentage of the pasture allowance they're forced to use.

Cattle on pasture will graze a maximum of 8 to 10 hours a day and spend an additional 3 to 4 hours ruminating the feed they've gathered while grazing.

A cow's pasture intake is controlled by her biting rate. The ease with which the cow can tear off and consume the pasture plants, and the quality or maturity of the pasture, greatly influence biting rate. In addition, feed intake is reduced if you don't control the cow's tendency to walk considerable distances while grazing.

Research studies show a cow will take about 36,000 bites per day consuming a maximum of about 24 lb of dry matter if



Matching forage growth to animal needs will pay a real bonus.

conditions are ideal. Under less than ideal conditions, the amount of pasture dry matter consumed will be considerably less.

Pasture allowances for high-producing, lactating dairy cattle need to be generous if they're to consume the 20-plus pounds of pasture dry matter they need daily. High milk production from pasture requires low use at any one grazing, which means consumption of 50% or less of the pasture allocation or available forage.

In "residual dry matter" grazing management, you control feed intake and animal production by adjusting the amount of forage dry matter (DM) that remains when you move the livestock to the next pasture. If you maintain forage quality, the height of the pasture determines how much feed the animal can consume and how much milk she can produce.

For pasture forage to support the first 35 to 40 lb of milk per day, graze pastures to a residual dry matter level of not less than 1,400 lb of DM per acre. This would require strip grazing—moving cows daily or twice daily to graze from 2,400 to 2,800 lb of DM per acre down to 1,500 to 1,600 lb.

Cows should use less than 50% of the forage offered on a daily basis. When dairy cattle are forced to use a larger amount, forage intake is limited, even though it may be of high quality.

Table 1 shows a sample feed budget for pasture systems, based on southwest Oregon growing conditions.

Table 1.—Sample pasture budget, based on growing conditions in southwest Oregon

Total forage in pasture	2,400 lb DM/A
Subtract uneaten pasture	-1,700 lb DM/A
Feed available	700 lb DM/A
Daily feed allowance for 100 cows @ 28 lb/day	2,800 lb DM/A
Pasture needed for 1 day = $\frac{2,800 \text{ lb/A}}{700 \text{ lb/A}} =$	4 acres
Days before regrazing this area (daily growth @ 60 lb DM/A/day)	12 days
Area required for 12-day rotation	48 acres

Plant growth and cattle use

Intensive grazing improves the quality of regrowth in pastures, but it reduces the rate of regrowth and, thus, reduces yield from the pastures. This will depress feed consumption and lower production.

Pastures allowed to grow over 3,000 lb of dry matter per acre become coarse and of lower quality even though total production is high. If you offer this feed to high-producing dairy cows, production will suffer.

The ideal situation is to keep pastures growing in phase 2 by grazing them from 2,400 to 2,800 lb of dry matter growth per acre down to 1,500 to 1,600 lb (see Figure 1). You can use dry cows or mowing equipment to clip the pastures and remove the remaining coarse growth.

Establish and maintain high-producing pastures

Pasture renovation is usually done to control weeds or low-producing pasture species. Growing an annual crop such as oats will provide a general cleanup of the pasture before reseeding.

When you reseed a pasture, it's very important to prepare a fine, firm seedbed; use a roller after cultivation and seeding. Broadcast seeds evenly over the ground. Don't drill them in wide rows—this leaves large areas open for weed establishment.

If you prefer drilling your pasture, drill lighter rates in two directions to fill open areas. A seeding rate of 28 lb of perennial ryegrass per acre provides one seed per square inch if you broadcast evenly, but drilling seed in rows would leave 6 to 8 inches between rows with no plants.

Table 2.—Pasture seeding recommendations for southwest Oregon (lb seed/A)

	Mixture	
	No. 1	No. 2
Well-drained land		
Perennial ryegrass		25
Orchardgrass	20	
Annual ryegrass	4-6 ^a	4-6 ^a
White clover	2-3	2-3
Total	26-29	31-34

^a Seed annual ryegrass only if you can graze or harvest it before it shades the perennial grasses and legumes.

High-producing varieties of perennial ryegrass or orchardgrass combined with white or red clover can produce over 12,000 lb of dry matter annually. Newer varieties of white clover and perennial ryegrass, developed in New Zealand, are well adapted to western Oregon.

The white clover varieties Pitua and Kopu are replacing the older Huia variety.

Ellett and Nui perennial ryegrass seedings have shown excellent vigor, a strong tendency to remain vegetative, competitiveness with weeds, and high yields. Pennmead and Potomac are the preferred orchardgrass varieties.

Avoid pasture mixes (see Table 2) that include more than one perennial grass; the differences in palatability cause dairy cattle to graze selectively.

Developing a balanced fertilizer

Plan a well-balanced fertilizer program to meet the needs of your newly seeded pasture.

Nitrogen (N) is the most limiting nutrient for pasture production. Because legumes not only fix nitrogen but also produce high-quality forage, clovers are included in pasture mixes. White clover has the ability to fix 125 lb of nitrogen from the atmosphere when soil temperatures are above 52°F.

Soil temperatures below 52°F greatly reduce the soil bacteria's ability to fix nitrogen or to break down the organic matter that provides nitrogen for pasture growth. Grass plants will produce 8 to 25 lb of dry matter per acre per day at soil temperatures between 41°F and 50°F if adequate nitrogen is available as ammonia or nitrate in the soil.

Because of lower soil temperatures early and late in the pasture season,

using nitrogen fertilizer will supplement the nitrogen produced by soil organisms:

- Nitrogen applied 6 weeks before turning cows on pasture in the spring can increase spring pasture production sharply.
- Nitrogen applied in August, with adequate soil moisture, will correct late summer pasture shortages.

The nitrogen fixed by clover isn't directly available to grass plants. To become available, the increased growth by clover plants caused by nitrogen fixation must first be broken down by animal digestion or decomposed in the soil.

Monitor the grass in the pasture stand for symptoms of nitrogen deficiency (slow growth, yellowish color). New seedlings or pastures cut for greenchop, silage, or hay may require nitrogen, either as animal manure or commercial fertilizer, to keep the grass component of the pasture healthy.

In addition, potassium requirements are about 20% higher for harvested pastures over those grazed.

Maintain the levels of phosphorus, potassium, soil pH, calcium, magnesium, and sulfur on any pasture, based on periodic soil tests.

Summary

1. You can increase production of early spring and late summer clover-grass pasture by applying nitrogen fertilizer.
2. High-producing forage varieties have the ability to use high levels of soil N, and newer clover varieties can compete with grasses and continue to fix nitrogen.
3. High milk production from pasture requires low use at any one grazing. Have cows graze less than 50% of the forage offered in a pasture daily.
4. Allowing pasture growth to exceed 3,500 lb DM/A before grazing, or grazing below 900 lb DM/A, will seriously reduce pasture productivity.
5. To maintain adequate intake, don't graze pastures to less than 1,400 to 1,800 lb DM/A.
6. Leaving more than 1,800 lb DM/A after grazing will reduce the quality of the grass for later grazing.



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