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Grazing Management for Warm-Season Grasses in Eastern South Dakota

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Native warm-season grasses like big bluestem, little bluestem, indiangrass, switchgrass, tall dropseed, and prairie dropseed are high-yielding, high-quality forages that have potential as a source of perennial summer forage.

In eastern South Dakota, warm-season grasses produce 70 to 80% of their annual yield after June 1. On the other hand, cool-season grasses such as smooth bromegrass and Kentucky bluegrass produce more than 75% of their annual yield before June 1 and often are nearly dormant and unproductive during the heat of the summer. Warm-season grasses can provide grazable forage during the summer after cool-season pastures have been utilized and have gone dormant (Figure 1).

Warm-season grasses are well adapted to most soils in eastern South Dakota, making them an attractive alternative on less productive sites or marginal cropland. Warm-season grasses can be successfully utilized in simple mixtures or monocultures. However, they respond to grazing differently than cool-season grasses and therefore must be managed differently. Improper management of warm-season grasses can result in poor livestock performance, declining yields, and damage to stands.

Native warm-season grasses evolved under brief periods of high-intensity grazing so they are not well suited to lengthy periods of continuous stocking or close, frequent grazing. Proper grazing management will optimize both yield and quality of warm-season grasses while maintaining a vigorous stand.

Grazing management

Managing the production of stem material is the key to proper grazing management of warm-season grasses. As they mature, stems of warm-season grasses become unpalatable to livestock, have low crude protein content and digestibility, and reduce intake.

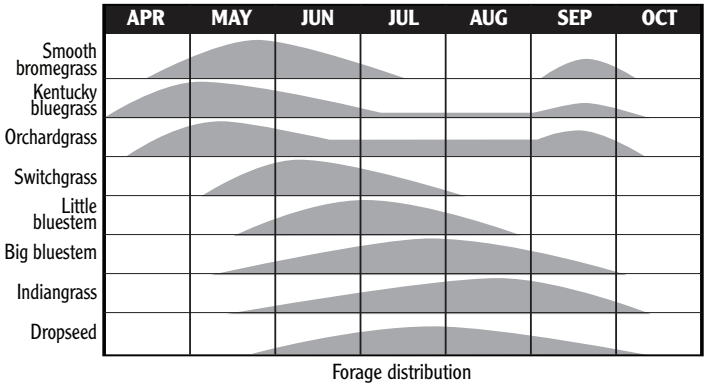

Fig 1. Forage distribution of cool-season and warm-season grasses through the growing season (adapted from Waller et al. 1985).

Stem production and plant maturity occur at different times during the growing season for different warm-season grasses. Therefore, one of the key management objectives when grazing warm-season grasses is to minimize stem production of these grasses and maintain leafy, vegetative growth. Specific windows of opportunity exist to successfully manage stem production.

Early season

Warm-season grasses typically undergo a period of very rapid growth, beginning about June 1, that continues through mid-July. At this time, the rate of forage accumulation can exceed the rate of livestock consumption at recommended stocking rates.

When forage yield of warm-season grasses accumulates faster than livestock can consume it, forage utilization generally is poor and the potential for good quality regrowth for use later in the grazing season is severely limited (Fig 2).

Switchgrass presents a unique challenge to managers because it matures earlier in the growing season than most warm-season

grasses. Before switchgrass produces a seedstalk, forage quality is high and palatability is good. After seedheads emerge, nutrient levels decline rapidly and forage becomes unpalatable to grazing livestock (Fig 3). The biggest challenge in stands containing switchgrass is reducing selective grazing by livestock so the switchgrass will be better utilized and more palatable grasses (big bluestem and indiangrass) will not be overgrazed later in the grazing season.

Grazing warm-season grass pastures early in the growing season can help successfully manage the rapid-growth phase. Your objective will be to minimize stem development. Turning livestock out on warm-season pastures when growth is about 12 to 14 inches tall (generally late May) will allow livestock to consume forage at the same rate that it grows. Length of early season grazing depends on stocking rate and grazing system, but stocking at the recommended rate for 2 to 3 weeks or, in more intensive systems until about 6 to 8 inches of stubble remain, should be adequate to minimize stem production (Fig 4).

Generally, stocking warm-season grasses too heavily early in the season and moving animals to other pastures sooner than planned is better than stocking too lightly and having considerable stem development by mid- to late June.

Following early season grazing periods on warm-season grasses, rest periods should be at least 25 to 35 days, depending on environmental conditions.

Midsummer

After at least 12 to 18 inches of regrowth (late July or early August), warm-season grass pastures can be grazed again. Although early season grazing will help manage stem production of warm-season grasses, by midsummer some stem material of early maturing plants (switchgrass) may be produced.

Livestock will generally avoid grasses with excessive stem material so minimum stubble heights in midsummer should be monitored for later maturing plants like big bluestem and indiangrass to ensure that these plants are not being overgrazed.

Length of grazing periods in midsummer will be dependent on moisture, the grazing system, and stocking rate, but stubble heights should be maintained at a minimum of 8 to 10 inches regardless of length of grazing period. A much higher stubble must be maintained with warm-season grasses than is typical of cool-season pasture management.

Following midsummer grazing cycles on warm-season grass pastures, rest periods should be 45 days or more, heading into late summer and early fall.

Fig 2. Poor utilization of warm-season grass following turn-out after stem development in late July (photo: Eric Mousel).

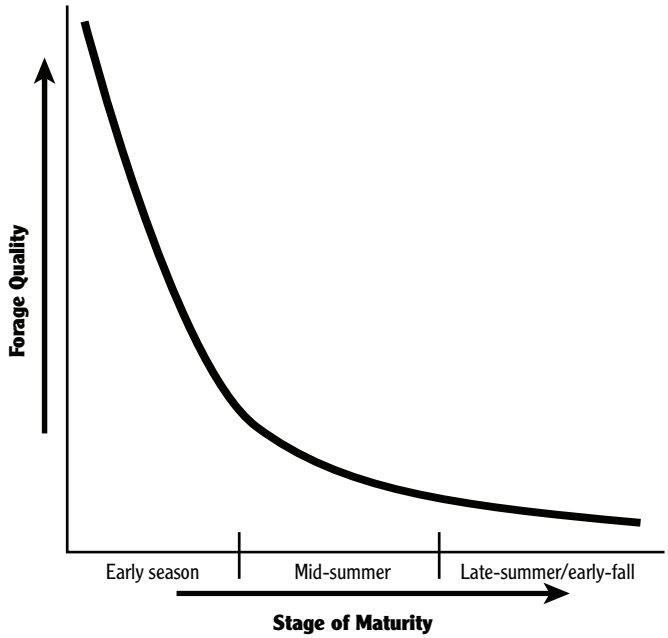

Fig 3. Relationship between stage of warm-season grass plant maturity and forage quality. As stage of plant maturity increases, forage quality decreases (adapted from Undersander et al. 2002).

Fig 4. Uniform grazing of pastures early in the season minimizes stem development of warm-season grasses. This increases utilization and improves forage quality of the regrowth later in the summer (Photo: Eric Mousel).

Late summer and early fall

Late summer and early fall management is critical for warm-season grass pastures. Warm-season grasses are very susceptible to degradation from improper late summer or early fall grazing.

Day length, not moisture, is generally the limiting factor for regrowth at this time. As days begin to noticeably shorten (mid-August) with the onset of fall, regrowth potential of warm-season grasses diminishes rapidly, regardless of moisture availability. Warm-season grass pastures that are not allowed adequate rest from earlier grazing periods or are heavily stocked in late summer or early fall will experience reduced winter survivability and yield potential and increased weed encroachment the following spring.

With proper management, warm-season grass pastures can be successfully grazed at this time, so long as the pastures have had at least 45 days of recovery since the previous grazing period. This does require watchfulness on your part, however, so that energy reserves, stored by perennial grass plants in rhizomes and stem bases and required for winter survival and initiation of the next year's spring growth, are not depleted. When a plant begins growth in the spring, there is no leaf material present to manufacture energy metabolites for growth. Therefore, energy for early spring growth must be provided from stored reserves. Once some leaf material is present, photosynthesis can occur and energy metabolites can be manufactured by the plant. If low amounts of energy have been stored before first frost, spring yields will be limited.

Grazing should be concluded by September 15 or when a minimum stubble height of 8 inches is reached (whichever comes first) to allow warm-season grasses to store energy reserves and regenerate their root systems before first frost.

Winter

Top growth of warm-season grasses killed by freezing temperatures can be grazed with little effect on plant survival. However, a minimum stubble height of 4 to 6 inches should be maintained to catch snow, insulate plant roots, and protect the soil surface from runoff during spring snowmelt.

Forage quality is generally very low for warm-season grasses grazed during the winter, and nutrient content usually is below minimum requirements for crude protein, energy, phosphorus, and vitamin A. Feed supplements will be required to maintain cow body condition or calf gains on winter pastures.

Grazing systems for warm-season grass pastures

Season-long continuous stocking

Season-long continuous stocking has limited utility as a grazing system for warm-season grasses. This system has a low capital investment cost, a lower stocking density (number of animals per unit area) than other grazing systems, and requires the least management input because livestock remain on the same pasture throughout the grazing season (Fig 5). However, early in the season, forage yield accumulation greatly exceeds rate of intake by livestock. Since livestock are very selective grazers, selecting the highest quality plants and plant parts, some plants are grazed heavily to the exclusion of others.

Continuous stocking generally creates a patchwork of grazed and ungrazed areas within the pasture. Livestock will repeatedly graze the highest quality plants in the stand. Although animal performance can be high initially, continuous stocking results in heavy grazing pressure on the most palatable plants and avoidance of undesirable plants. Over time, desirable plants will be reduced and the overall stand will be weakened, allowing invasion by undesirable species.

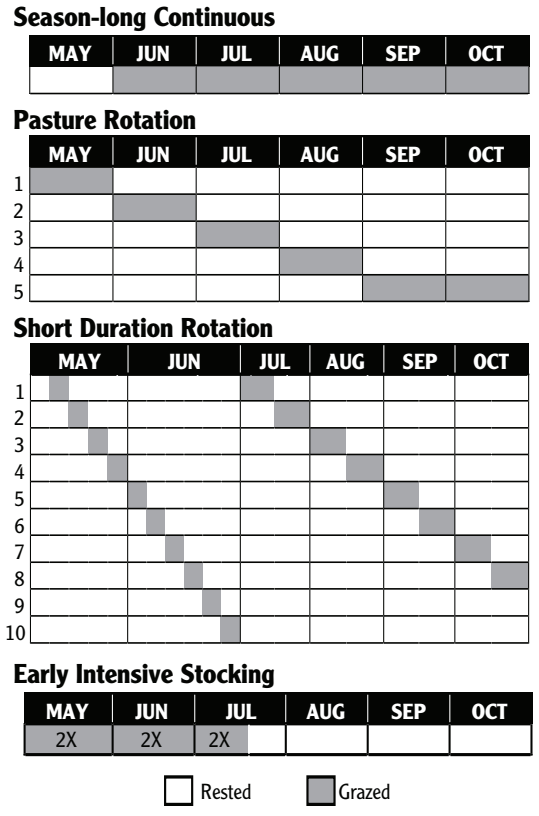

Fig 5. Examples of seasonal distribution of grazing for a season-long continuous system, a 5-pasture rotation, a short duration rotation, and an early intensive stocking system (adapted from Reece et al. 2001).

Rotational grazing

Rotational grazing systems are generally a better match for warm-season grass pastures than continuous season-long stocking systems. Rotational systems allow managers to use sequential periods of grazing and rest to improve forage utilization and provide recovery periods for the pasture (Fig 5). Rotational systems require at least two paddocks, but a pasture divided into three or four paddocks is common. Rotational systems help match livestock intake to forage accumulation rate during the rapid growth phase of warm-season grasses.

Although initial capital investment costs and commitments to management are greater than for season-long continuous systems, these costs are quickly recaptured through lower grass stand maintenance costs (reseeding, herbicides) and increased production (per acre) through slightly higher stocking rates.

Short-duration rotational grazing

Short-duration grazing, a form of rotational grazing, allows the manager much more flexibility in managing stem production of warm-season grasses. In a short-duration system, generally > 8 paddocks are used (Fig 5). Increasing the number of paddocks in a rotational system increases the grazing pressure (not necessarily stocking rate) on each paddock, resulting in more uniform grazing, higher quality regrowth, and more flexibility in managing stem development.

Because grazing pressure on each paddock in a short-duration system is increased compared to a standard rotation, animal movements are more frequent, allowing the manager to better match livestock intake rate with forage accumulation rate. Initial animal movements through paddocks may be as frequent as every 1 to 5 days early in the season, depending on the number of paddocks available. As the season progresses, rotations may slow to 1 to 2 weeks, to allow adequate rest intervals for each paddock.

Intensive early stocking

Intensive early stocking systems were designed specifically for forage species that produce a tremendous amount of growth in the early- to mid-growing season. Warm-season grasses certainly fit into this category.

Intensive early stocking systems double the recommended stocking rate but animals are only allowed to graze during the first half of the growing season (May through mid-July) (Fig 5). This type of system allows livestock to take advantage of the high production and high quality of warm-season grasses early in the season and to provide deferment in the last half of the growing season for root maintenance and to restore energy reserves before dormancy.

Some limitations to intensive early stocking apply to the integration of this system into the overall forage balance program of an operation. Because livestock are on pasture only in the first half of the growing season, alternative forages must be available after mid-July. Intensive early stocking may work well as part of a complementary grazing system with stockpiled cool-season grasses or summer annual forages. However, availability of these forages in mid- to late-summer often are limiting, making this system better suited to stocker calves than cow/calf operations.

For more information on grazing management and grazing systems for warm-season grasses, contact your local SDSU Extension educator.

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