Renovating Pastures with Warm-Season Grasses

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Warm-season grasses have multi-purposes and they provide viable economic and ecological alternatives on marginal lands. They can be used for grazing, wildlife habitat and for biomass energy feedstock. This article looks at how warm-season grasses can be used to renovate overgrazed pastures in eastern South Dakota.

Eastern South Dakota pastures that have been historically overgrazed are dominated by introduced cool-season grasses such as Kentucky bluegrass, quackgrass and smooth bromegrass and have fewer native grass species such as green needlegrass, slender wheatgrass, sideoats grama and big bluestem. In addition, weedy forbs such as Canada thistle and goldenrod species are quite pervasive. These pastures usually produce less than 3000 lb/acre of annual forage. Response to nitrogen and phosphorus fertilizer application is very limited and is usually not economical due to the genetic makeup of the predominant species.

Figure 1. *October 2003 sheep grazing in the background. Note the killed strip of grass using glyphosate in the foreground.*

Pasture renovation by interseeding could prove to be an efficient way to introduce desirable species, provided that the competition from the existing sod could be reduced to enhance establishment. Native warm-season grasses are desirable since they provide good quality and high quantity mid- to late-summer forage for livestock when cool-season pastures are low in quality and quantity. In addition, native tallgrasses provide excellent pheasant habitat which is very important to the economy of South Dakota.

The success of interseeding warm-season grasses with a no-till grass drill into existing cool-season pasture using chemical or prescribed grazing sod suppression techniques was tested at the South Dakota State University Sheep Unit in Brookings, SD. Glyphosate was applied in early October following recommended rates for killing cool-season pasture for the chemical treatment. Sheep were used to apply a heavy fall (October) and spring (early May) grazing sod suppression treatment (Fig. 1).

Sheep were kept on pasture until residual height of approximately 1" was achieved during each grazing period. The following spring (March), 5 lb/acre each of big bluestem, swithchgrass and indiangrass were seeded using a no-till drill into the treated areas. No grazing occurred during the establishment year. Broadleaf weeds were treated with a one-time application of picloram at the recommended rate in the glyphosate treated areas. No weed control was needed in the prescribed grazed areas. The year following establishment, biomass estimates were made in late-July.

Chemical treatment was very effective in suppressing sod for warm-season grass establishment. Desirable stands were established in the chemical treated areas compared to the prescribed grazed treated areas (Fig. 2)

Figure 2. *August 2004, stands of interseeded big bluestem, switchgrass and indiangrass into chemical and prescribed grazed treated sod at Brookings, SD. The prescribed grazed areas of the pasture were still dominated by smooth bromegrass and quackgrass.*

Biomass one year following establishment was greatly enhanced by interseeding warm-season grasses into suppressed sod using chemical versus prescribed grazing (Table 1). In fact, the standing crop biomass was almost three times as much in the chemical treated areas.

Some success was noticed in warm-season grass establishment in the prescribed grazed areas of the pasture where Kentucky bluegrass dominated compared to areas that were dominated by smooth bromegrass or quackgrass (Fig. 3). However, when samples were taken from the entire pasture, the effect of prescribed grazing was not satisfactory in establishment of warm-season grasses and their subsequent yield (Table 1).

A cost-benefit analysis shows that this practice would achieve a high internal rate of return. The cost of seed, drilling and herbicide was estimated at roughly $100/acre. An additional charge of no-use at $30/acre for renting additional pasture during the establishmentyear would be necessary. Total fixed costs would be approximately $130/acre. Net additional income could be calculated on the basis of increased carrying capacity. So, assuming a 25% harvest efficiency for grazing, the renovated pasture could support an additional 2.7 AUM/acre at $20/AUM this would equal an additional $54/acre net income. If the stand lasted for 20 years, the internal rate of return would equal approximately 40%.

Chemical Treated Sod	Biomass (lb/acre)
Warm-season grasses	5,950
Cool-season grasses	4,070
Weeds	390
Total	10,400
Prescribed Grazing Treated Sod	**Biomass (lb/acre)**
Warm-season grasses	20
Cool-season grasses	3,530
Weeds	<5
Total	3,550

Table 1. *Standing crop biomass estimates one year after establishment of warm-season grasses interseeded into existing cool-season pasture suppressed with chemical or prescribed grazing at Brookings, SD in 2005.*

The use of chemicals to suppress sod is a very efficient way to incorporate warm-season grasses into existing cool-season pasture. If the pasture is dominated by Kentucky bluegrass, the use of prescribed grazing could be sufficient to establish warm-season grasses. However, it will take several years for plants to become high yielding as illustrated by Figure 4.

Stand maintenance can be done with timely grazing to reduce the competitiveness of the existing cool-season grass component. Stubble heights of at least 6" on warm-season grasses are recommended following grazing periods to maintain plant vigor.

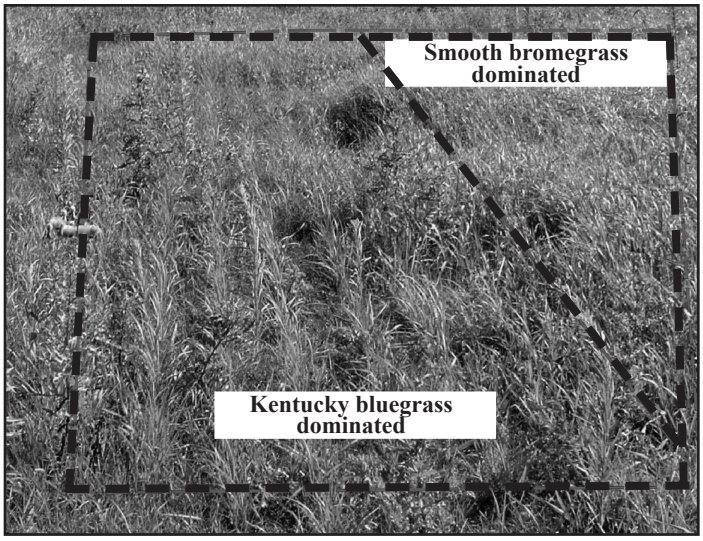

Figure 3. *August 2004, stands of interseeded big bluestem, switchgrass and indiangrass into prescribed grazed treated sod at Brookings, SD. Note the rows of warm-season grass seedlings where the pasture was dominated by Kentucky bluegrass versus the area that was dominated by smooth bromegrass.*

Figure 4. *September 2005, protected plots showing full season growth of interseeded warm-season grasses one year after establishment at Brookings, SD. Chemical treated area is in the background and prescribed grazed treated area is in the foreground. Note the smaller plant size in the protected plots that was dominated by Kentucky bluegrass where prescribed grazing was used.*