Graze-out plus: filling forage gaps in the Southern Great Plains, USA

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Introduction Putting low-cost gain on yearling cattle with forages is a significant agricultural activity in the Southern Great Plains. The primary forage system within the area has two components: winter wheat (*Triticum aesitivum*) grazed from fall through spring (Redmon et al., 1995), and warm-season perennial grasses for summer grazing. This system has significant gaps (Fig. 1) when high-quality forage is not readily available (September-November and May-June). Introduced cool-season perennial grasses have longer growing seasons than wheat, and could help fill these gaps. This experiment tested the function of an introduced cool-season perennial grass, new to the southern Great Plains, in a stocker production system involving intensive grazing of paddocks.

Figure 1 Primary forage system used to graze yearling stocker cattle in the Southern Great Plains

Materials and methods Studies were conducted during 2003-2004 on 1.8 ha paddocks (n=3) planted to non-toxic endophyte-infected tall fescue (*Festuca arundinacea* var. 'Jessup Max-Q'). In October through mid-November (35 d), cattle (200 kg body weight (BW)) were assigned to fescue paddocks. Thereafter, they were moved to paddocks of annual winter wheat, and grazed through April. Cattle (300 kg BW) were then moved back to the fescue paddocks from late-April through May (32 d). Cattle grazed fescue paddocks at high densities (7.4 hd/ha, ~ 3 times normal densities) during the two grazing periods. Standing crop (±1 s.e.) was measured at the start of grazing periods, and livestock gains were determined at different stages of the study. Establishment and maintenance (fertilizer, weed control, application costs) costs were recorded and used to compare cost of gain of forages related to annual costs of sward management.

Results Fescue establishment costs were 2.7 times that of wheat (Table 1); 58% of this cost was seed, interest, labour, and equipment. However, when amortized over the planned stand life (7 y), establishment costs were only 48% of total annual costs, which were less than total annual costs for wheat. Fescue paddocks produced 2030(±305) kg/ha by mid-October and 3630(±870) kg/ha by mid-April. These paddocks produced 259 (in fall) and 238 (in spring) stocker-grazing days during these periods. Fescue paddocks generated 511 kg/ha of gain at times when wheat or warm-season pasture could not readily supply forage, for an additional 69 kg gain per head. Based on the historic potential market value of gain for the region (US$ 1.10/kg), an additional US$ 50/hd return above sward costs could be produced by incorporating fescue paddocks into a wheat-based system.

Table 1 Mean (±s.e.) sward costs, grazing management and livestock responses on wheat and fescue paddocks

	Wheat	Fescue
Sward Costs, US$/ha		
Establishment [1]	234 (5)	635 (7)
Annual maintenance	--	100 (5)
Total annual	234 (5)	191 (4) [2]
Grazing Management		
Grazing season, d	171 (6)	67 (2)
Stocker grazing days, d/ha	589 (32)	497 (13)
Land, ha/hd	0.77 (0.3)	0.14 (0.1)
Livestock Response, kg		
ADG [3]	1.15 (0.1)	1.03 (0.1)
Gain / ha	678 (45)	511 (13)
Gain / hd	188 (12)	69 (5)
Forage Effectiveness		
Cost of gain, US$/kg [4]	0.34 (0.06)	0.37 (0.04)

1. Costs included seed, fertilizer, labour, equipment, and interest. Fescue costs also included first year deferment.
2. Annual maintenance plus 1/7th of establishment cost.
3. Average daily gain.
4. Based on total annual costs related to swards.

Conclusion Despite high establishment costs, paddocks of non-toxic endophyte-infected tall fescue were effective at generating gains by yearling cattle, and did so during time periods when traditional forages were not available. This capacity would allow graziers in the Southern Great Plains to partially fill fall and spring forage gaps with high quality forage, and extend the grazing season. Such an extended grazing season would allow graziers to change marketing strategies for their cattle or possibly develop grass-fed beef for niche markets if wheat, cool-season perennials and warm-season forages were combined in integrated systems.

References

Redmon, L., G.W. Horn, E.G. Krenzer & D.J. Bernardo (1995). A review of livestock grazing and wheat grain yield: boom or bust? *Agronomy Journal*, 87, 137-147.