A modified forage system for stocker production in the Southern Great Plains, USA

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Introduction Putting low-cost gain on yearling cattle with forages is an important agricultural activity in the Southern Great Plains. The primary forage system within the area incorporates two forages: winter wheat (*Triticum aestivum*) for grazing in fall through spring, and warm-season grasses in the summer (Fig. 1). These systems have significant gaps in time when high-quality forage is not available. This study tested the function of introduced cool-season perennial grasses in filling the spring gap, and their capacity as large-scale replacements for winter wheat.

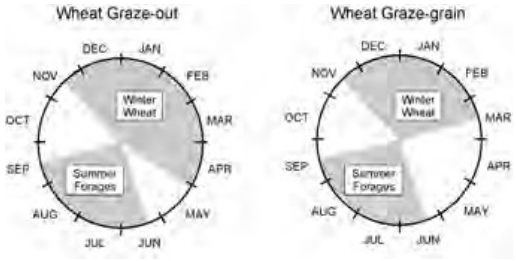

Figure 1 Traditional forage systems used to graze yearling stocker cattle in the Southern Great Plains

Materials and methods Studies were conducted during 2002-2004 on 2.0 ha paddocks (n=27) planted to wheat (n=9) or one of two introduced varieties (n=9 per variety) of wheatgrass (*Thinopyrum intermedium* and *T. ponticum*). The fall grazing period began in mid-November, with cattle (200 kg body weight (BW)) assigned to paddocks (wheat, 2.5 hd/ha; perennials, 4.1 hd/ha) and allowed to graze until perennial grasses terminated growth in early winter. All the cattle were moved to ungrazed paddocks of wheat for winter grazing (January-February), and then returned to their original perennial or wheat paddocks (plus put-and-take animals) for spring grazing. Spring period cattle (310 kg BW) were allowed to graze until May 1 (wheat, 7.1 hd/ha) or June 1 (perennials, 4.5 hd/ha). Carrying capacity was determined at the start of grazing periods and livestock weight gains were measured for each period. Establishment and maintenance (fertilizer, weed control, application costs) costs were used to compare performance of wheat and wheatgrass swards during fall and spring grazing periods.

Results Establishment costs of perennials were 2.3 times the cost of wheat (Table 1); 49% of this cost was seed, interest, labor and equipment. When amortized over the planned stand life (7 y), establishment costs were 47% of total annual costs (maintenance + establishment), which were lower than winter wheat. The perennial paddocks produced enough forage in the fall and spring to support a 23% increase in stocker grazing days. However, daily gains (ADG) were 75-81% of levels recorded for wheat Perennial paddocks generated slightly lower total gains than wheat (538 vs. 559 kg/ha) during the two grazing periods, despite longer grazing periods and increases in stocker grazing days. However, costs of gain related to total annual sward costs were 26% lower for the wheatgrasses. Based on the historic potential market value of gain for the region (US$ 1.10/kg), the perennial swards produced 43 US$/ha in additional gross (not including animal production costs) potential value above sward costs.

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

	Wheat	Perennials
Sward Costs, US$/ha		
Establishment [1]	234 (5)	549 (21)
Annual maintenance	--	89 (8)
Total annual	234 (5)	167 (4) [2]
Management and		
Fall Period		
Length, d	69 (1)	60 (8)
Stocker grazing days, d/ha	171 (30)	245 (47)
ADG, kg [3]	1.26 (0.2)	0.94 (0.2)
Gain, kg/ha	215 (19)	228 (64)
Spring Period		
Length, d	36 (5)	63 (6)
Stocker grazing days, d/ha	255 (35)	282 (23)
ADG, kg [3]	1.35 (0.1)	1.09 (0.1)
Gain, kg/ha	344 (64)	310(25)
Total Gain, kg/ha	559 (48)	538 (96)
Cost of Gain, US$/kg [4]	0.42 (0.05)	0.31 (0.06)

1. Costs included seed, fertilizer, labor, equipment, and interest. Perennials 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, wheatgrasses could be effective components of forage production systems in the Southern Great Plains. While daily gains were below those of winter wheat, their lower cost and extended spring grazing season can make such forages viable options for stocker production systems. Their value to graziers will depend on establishment and maintenance costs (both wheat and perennials), risk of stand failure, potential reductions in fixed costs, and the amount of land that must be planted to perennials to augment wheat and warm-season species in a three-forage system.