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Yearling Cattle Grazing Pastures Burned During Summer Perform Similarly to Cattle Grazing Pastures Burned in Early Spring: Year 2 of 6

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CATTLEMEN'S DAY 2021

KANSAS STATE UNIVERSITY CATTLEMEN'S DAY

Yearling Cattle Grazing Pastures Burned During Summer Perform Similarly to Cattle Grazing Pastures Burned in Early Spring: Year 2 of 6

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Abstract

The Kansas Flint Hills represent a major segment of the stocker cattle industry in the United States. Before each grazing season, ranchers typically apply annual spring-season prescribed fire to improve stocker cattle body weight gains. At this time, no direct comparisons of stocker cattle performance are available for yearling cattle grazing native rangelands burned later in the year (i.e., August-October). In the second year of a six-year study, 18 pastures were grouped by watershed and assigned to one of three prescribed-fire treatments: early spring (April 7 ± 2.1 days), summer (August 21 ± 5.7 days), or early fall (October 2 ± 9.9 days). All fire treatments were applied prior to grazing. Yearling cattle were grazed from May to August at a targeted stocking density of 250 lb of live weight per acre. Initial body weight did not differ ($P = 0.82$) between prescribed fire treatments; however, total body weight gains and average daily gains were greater ($P = 0.01$) for calves that grazed spring- and summer-burned pastures compared with those that grazed fall-burned pastures. In addition, calves in the spring and summer prescribed-fire treatments had greater ($P = 0.04$) final body weights compared to those in the fall prescribed-fire treatment. We interpreted these data to suggest that summer prescribed fire could be used to manage sericea lespedeza (*Lespedeza cuneata*) populations without negatively affecting stocker cattle performance.

Introduction

The value of prescribed fire to improve yearling cattle performance has been well-documented in the Kansas Flint Hills. Traditionally, ranchers apply annual spring-season prescribed fire to native rangelands to improve stocker cattle performance, increase warm season grass production, and reduce woody vegetation. Although spring-season prescribed fire has been established as the standard for many Flint Hills ranchers, it does not reduce the proliferation of sericea lespedeza (*Lespedeza cuneata*). Recent research has demonstrated that sericea lespedeza populations are reduced when the timing of prescribed fire is shifted from spring to late summer or early fall. While late summer (i.e., August-September) or early fall prescribed fire (i.e., August-October) can affordably manage sericea lespedeza infestations, ranchers have concerns that cattle growth

performance will be negatively affected. At this time, no direct comparisons of stocker cattle performance are available for these prescribed fire regimes. The objective of our experiment was to document the effects of prescribed-fire timing on stocker cattle performance over a six-year period.

Experimental Procedures

Our experiment was conducted at the Kansas State University Beef Stocker Unit. The Beef Stocker Unit is located northwest of Manhattan, KS, and is comprised of approximately 1,100 acres of native tallgrass prairie. Eighteen pastures were grouped by watershed and each watershed was assigned to one of three prescribed-fire treatments (n = 6 pastures per treatment): spring (April 7 ± 2.1 days), summer (August 21 ± 5.7 days), or fall (October 2 ± 9.9 days). All prescribed fire treatments were applied prior to grazing.

Pastures were stocked with yearling cattle at a targeted stocking density of 250 lb of live weight per acre from May to August, subsequent to prescribed fire. Upon arrival, cattle were individually weighed, given an individual visual identification tag, and assigned randomly to pasture and treatment. On the day grazing began, each calf was weighed to determine initial body weight and then allocated to the respective pastures. At the completion of the grazing season, calves were gathered and individual body weights were measured to determine total body weight gains and average daily gains. Gain data from 2019 and 2020 were analyzed using a mixed model, considering the effects of year, pasture, and treatment. The year × treatment interaction was not significant; therefore, the main effects of treatment were reported.

Results and Discussion

Total body weight gains did not differ ($P = 0.43$; Table 1) between the spring and summer burn treatments; however, calves that grazed the fall-burn treatment had less ($P = 0.01$; Table 1) total body weight gain compared to calves that grazed the spring- or summer-burn treatments. Calves that grazed spring- and summer-burned pastures gained 26 and 20 lb more body weight, respectively, than calves that grazed fall-burned pastures. Similarly, no differences ($P = 0.47$; Table 1) in average daily gain were observed between spring and summer prescribed-fire treatments. Conversely, average daily gain was greater ($P = 0.01$; Table 1) for calves that grazed the spring and summer fire treatments compared with calves that grazed the fall-fire treatment. As a result, final body weight was greater ($P = 0.04$; Table 1) for calves that grazed the spring- and summer-burn treatments compared with calves that grazed the fall burn treatment. The first two years of data from our six-year experiment were interpreted to indicate that prescribed fire timing influenced stocker cattle performance. In year one, we estimated that calves could afford to gain about 80 lb less if summer or fall prescribed fire was used to manage sericea lespedeza populations, as opposed to spring-season fire followed by herbicide application. This estimate was based on a value of gain at $0.65 per lb (CattleFax 04-12-2019 vs. 08-09-2019), prescribed fire cost of $2.25 for three acres required to support a calf, and herbicide application cost of $54. In year two, the value of gain increased to $1.15 per lb (CattleFax 04-17-2020 vs. 08-14-2020) while the cost of prescribed fire and herbicide application remained roughly the same. The increase in the value of gain resulted in a breakeven performance difference of 45 lb per calf. Beef

producers are encouraged to compare these revenue changes with the costs of chemical methods for sericea lespedeza control.

Implications

We interpreted our data to suggest that beef producers could utilize summer-season prescribed fire to manage sericea lespedeza populations without sacrificing yearling growth performance. We will continue to evaluate these trends and modify our conclusions over the next five years.

Table 1. Effects of prescribed fire timing on stocker cattle performance in the Kansas Flint Hills

	Prescribed fire season			Standard error of	
Item	Spring	Summer	Fall	the mean	*P*-value
Initial body weight, lb	680	684	677	11.3	0.82
Final body weight, lb	930[a]	927[a]	900[b]	11.1	0.04
Total body weight gain, lb	249[a]	243[a]	223[b]	7.5	0.01
Average daily gain, lb/day	2.8[a]	2.7[a]	2.5[b]	0.08	0.01

[a,b]Within rows, means with unlike superscripts differ ($P \leq 0.05$).