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K-State Cattleman's Day: Students present research on impacts of prescribed burning

Studies compare effects on prairie ecosystem of burning in spring, summer or fall

By Pat Melgares, K-State Research and Extension news

MANHATTAN, Kan. – A trio of Kansas State University graduate students recently reported their findings regarding threats to the animals that graze the Kansas prairie – and the impact of prescribed fire on those threats.

They reported their findings [during K-State's recent Cattlemen's Day](#), which highlights cattle-related research being conducted at the university.

The students' multi-year research projects compared the effects of prescribed burning of pastures in spring, summer and fall.

Zach Duncan, who completed the doctoral degree in ruminant nutrition last December, compared the effects of burning in the three seasons on the growth performance of stocker cattle. The study zeroed in on how fire reduces the growth of sericea lespedeza, an invasive weed that has degraded more than 600,000 acres of native Kansas rangeland – most of that in the Flint Hills region.

"Flint Hills ranches traditionally apply a spring-season fire in April, then intensively graze yearling beef cattle from May to August," Duncan said. "Unfortunately, this practice has not limited the proliferation of sericea lespedeza."

Previous research at K-State led by range management specialist KC Olson determined that burning in August or September reduces the presence of sericea lespedeza, but that practice has been limited, Duncan said, "because burning pastures later in the year could have unknown major effects on the growth performance of stocker cattle during the next grazing season."

The six-year study studied the effects of fire in spring, summer and fall with nearly 2,000 yearling beef cattle grazing the land. Duncan said the results indicate shifting burning from August to October reduced yearling stocker cattle weight gains by 10-14 pounds during a 90-day grazing season.

Ranchers should weigh that finding, however, against the reduced need for herbicides against sericea lespedeza, improved wildlife habitat, and the reduced downwind impacts of smoke on air quality, Duncan said.

In another study, Andrea Salazar – a K-State doctoral candidate in entomology – found that spring- and summer-burned pastures had lower counts of ticks compared to fall-burned areas.

High tick burdens on cattle, Salazar said, results in decreased production, anemia, skin irritations, pruritus (itching) and stress.

“Furthermore, ticks serve as vectors for diverse pathogens, such as bacteria, protozoa and parasites, leading to diseases in animals and humans,” she said.

The study was conducted at K-State’s Beef Stocker Unit west of the Manhattan campus. Salazar said three tick species were found: The Lone Star tick, American dog tick, and the Gulf Coast tick. “Significantly fewer ticks were collected from fire-treated areas compared to non-burned areas during eight months of sampling,” she said.

“Among seasonally burned areas, tick counts in fall pastures were higher than summer and spring pastures,” Salazar added.

“The findings suggest that consistent annual burning of grazing areas, particularly when conducted in the spring, holds the potential to substantially diminish tick populations. This approach presents an efficient non-chemical method for tick control. The strategic timing of prescribed fires is crucial, aligning them with conditions that target specific tick species during vulnerable phases in their life cycle to optimize the impact on tick control.”

The choice of when to burn does not seem to make a difference in protecting populations of dung beetles, an important part of the pasture ecosystem. First-year entomology graduate student Herman Griese said “the difference was not significant” in a study that looked at spring, summer and fall prescribed burns.

Dung beetles feed on or store feces to provide housing and food for their young, which in turn transports nutrients to the subsoil and improves nutrient cycling, soil structure and forage growth on the prairie.

For farmers, the benefits to their land and livestock herds also are real: reduced parasite pressure, better aeration, reduced compaction, reduced runoff after rain events and decreased ammonia levels.

“Based on our study, ranchers who are worried about killing their decomposers (such as dung beetles) by burning their pastures can choose what time of year to burn based on other desired outcomes,” Griese said.

The full listing of research reports presented during the 2024 K-State Cattlemen’s Day is [available online](#).

K-State Cattleman's Day, <https://www.asi.k-state.edu/events/cattlemens-day>

Cattleman's Day Research Reports, https://www.asi.k-state.edu/extension/beef/focusareas/24_CattlemensDaySummary.pdf

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