

A Summary of Fire and Forage Research on Shinnery Oak Rangelands

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THE GENERAL OBJECTIVE of our fire research on shinnery oak rangelands is to determine if fire can be used to increase ranch profits on a sustained basis.

Specifically, the objectives are to determine effects of backfires and leadfires on forage production, on growth of shinnery oak, and on species composition under variable environmental conditions before, during, and after the burn; to determine effects of annual burning versus burning about every third year or as needed; to determine effects of date of burning from late March to early May; to determine the value of burning to correct spot grazing with its two evils—overuse and underuse; to determine the effects of burning on soil moisture, soil nutrients, soil erosion, insect and rodent populations, quail, prairie chicken, turkey, deer, and other wildlife; to determine the value of controlled burning to reduce hazards of wild-fires by reducing fuel; and lastly, to determine cow-calf and steer production as affected by burning.

Our burning studies were first started in 1960 and are being continued. With a limited research budget, we have been able to study only a few of these objectives each year. The studies are being conducted in northwestern Oklahoma on the Davison Ranch 10 miles southwest of Arnett.

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Annual precipitation averages 22 inches, but varies from 10 to 40 inches. The climate is continental, and wind velocities and water evaporation are high. Average date of last frost in the spring is about April 15, and the average first fall frost occurs about November 1. Soils are Nobscott, Brownfield, and Miles loamy sands and sandy loams, and Tivoli dune sand. The pH varies from 5 to 6.5, duff is present, and the soil has characteristics of a forest as well as a prairie soil. Vegetation is a mixture of little bluestem, sand bluestem, switchgrass, side-oats grama, sand dropseed, sand paspalum, and about 10 minor species which annually produces about 500 pounds of dry matter per acre under a dense overstory of shinnery oak (*Quercus havardi*). The shinnery rangelands are primarily used for the production of beef calves, mostly Herefords.

Generalized preliminary results are: (1) Controlled burning in April on these brush-grass ranges has neither increased nor decreased forage production in years of below-average or average rainfall (burning in April during one year of high summer rainfall increased subsequent forage production 45 percent); (2) burning in early April appears to produce slightly more forage than burning in late April; (3) burning increases the density of shinnery stems about 15 percent; (4) burning maintains shinnery oak as a low-growing shrub and prevents formation of acorns the year of the burn (there is little difference between a backfire and a leadfire on either forage production or growth of shinnery oak); (5) burning greatly increases availability and palatability of range forage (during wet summers, forage on burned ranges is dark green in color, whereas it is chlorotic on unburned shinnery ranges); (6) shinnery ranges can be effectively burned when soil and litter moisture is high without burning more than 50 to 75 percent of the combustible fuel; (7) regrowth of shinnery oak following burning in April is susceptible to herbicidal treatment in June if growing conditions remain optimum; (8) forage production of little bluestem is usually reduced by April burning, whereas production of sand bluestem and switchgrass is usually increased; (9) cattle avidly graze the forage on the latest spring burn even if dates vary as little as a week apart; (10) cattle appear to make higher gains on properly burned ranges; (11) spot burning of ungrazed grassy areas in a pasture where dis-

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tribution of livestock use of forage has been poor appears to be an excellent method to equalize grazing distribution; and lastly, forage production on shinnery ranges the year following off-season wild-fires has been equal to production on unburned areas during two different years, and although more data are needed before a positive statement can be made, *shinnery ranges appear to be extremely fire hardy*.

In summary, the use of fire as a tool to increase ranch profits on shinnery ranges appears promising. Experience, skill, and judgment are required to set and control the fires. Wise management of the forage resource is required the year before and during the year of the burn. The judicious combined use of fire and herbicides on shinnery ranges is indicated to be highly desirable to maintain high quality and quantity of forage production on a sustained basis.