woody plant encroachment.[24,25,26] Growing-season fire in grasslands enables land managers to extend the traditional dormant-fire season and actively burn throughout the year with minor or no negative impact on grass survival. Pre-fire and post-fire environmental conditions influence individual plant and plant community response.[27,28] Soil moisture has been identified as the single most critical factor affecting plant recovery following fire in the southern mixed prairie.[29] Drought following fire, regardless of season, can intensify fire effects in semi-arid grasslands, but in the Kansas tallgrass prairie no reduction in productivity followed annual late-spring burning (dormant-season) even in dry years.[24,29,30] Drought can also delay recovery beyond three years in some instances.[28] Even when drought follows fire, vegetation will recover, but it may take longer than if the post-fire period is accompanied by normal or above normal rainfall.

A study conducted in Oklahoma[31] revealed the plant community was unaffected by fire season and little bluestem (*Schizachyrium scoparium*), a presumed fire-sensitive grass species, was strongly influenced by precipitation, and unaffected by season-of-fire even when followed by grazing (Figure 2). The results of the study indicate the previous year's precipitation influenced plant composition more than season of fire.

These results are supported by data from a greenhouse study that found that little bluestem seedling survival was strongly dependent on plant age, and the effect of burning followed by clipping (simulated grazing) was similar to multiple clipping events.[31] Burning also increased aboveground biomass and belowground root biomass of clipped and non-clipped plants, yet burning had less negative effect on little bluestem than clipping (Figure 3). These results strongly suggest little bluestem is highly adapted to growing-season fire.

## *Forage Quality*

Fire removes old, standing dead plant material that is coarse and low in forage quality. After a fire, plant regrowth is young, green and considerably higher in quality than dead plant material or older live plant tissue. Grazing animals attracted to this palatable, nutritious regrowth will preferentially graze recently burned areas. This attraction is one of many mechanisms that demonstrate how fire and grazing interact with each other.

While it is commonly known that burning increases forage quality, the practice is often applied in the spring when vegetation is dormant. Forage quality is increased after the fire, but declines as the season progresses. Burning during the growing season will have similar effects. This increase in forage quality can be valuable for livestock or wildlife, as it is at a time when forage quality declines. Fire may be necessary for optimum productivity of grazing animals. Burning during the growing season may also prolong the availability of high quality forage; quality of burned areas may be twice as good as unburned areas through November (Figure 4).

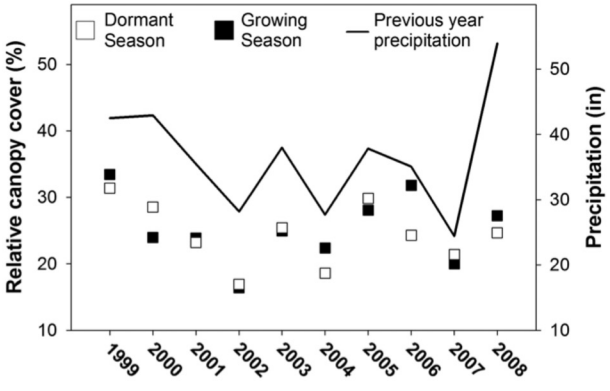


**Figure 2. Little bluestem relative canopy cover within tallgrass prairie at the Oklahoma State University Research Range, Stillwater burned in the dormant season or growing-season and annual precipitation from 1999 to 2008. The results of the study indicate that the previous year's precipitation influenced plant composition more than season of fire.[31]**

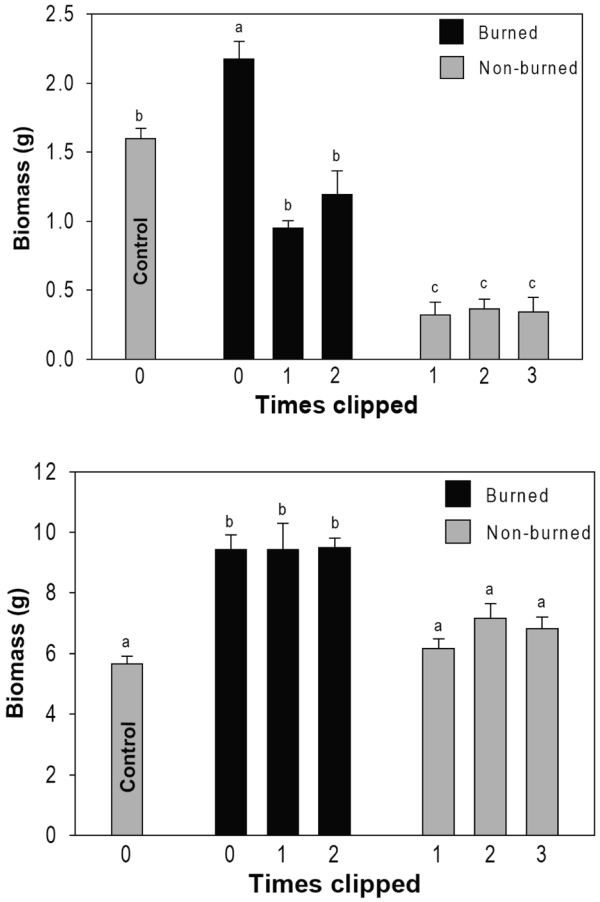


**Figure 3. Aboveground biomass (top graph) and belowground root biomass (bottom graph) harvested from little bluestem plants subjected to burning and clipping, and clipping only, at 18 weeks post germination. Burning increased aboveground biomass and belowground biomass of clipped and non-clipped plants, yet burning had less negative effect on little bluestem than clipping. These results strongly suggest little bluestem is highly adapted to growing-season fire.[31]**