

## Forage Fiber Digestibility Dynamics in the Northern Mixed Grass Prairie Following Spring Wildfire



## Abstract

Forage quality plays an important role in determining grazing distribution in both natural and livestock production systems. Fire is a known modifier of forage quality, however, the dynamics of forage quality following fire have not been well characterized. Our objective was to quantify the magnitude and longevity of fire effects on forage digestibility in order to determine when the greatest benefit might be gained from post-fire grazing. Following the Pautre wildfire of April 2013, exclosures were erected at three paired, burned and nonburned sites along the fire perimeter. Samples were collected in June, August and November 2013 and June and August 2014 and analyzed for acid detergent fiber (ADF), neutral detergent fiber (NDF), in vitro dry matter disappearance (IVDMD) and average fermentation rate. Fire decreased ADF and NDF and increased IVDMD and AFR during June and/or August of the 2013 growing season with effects diminishing by November. No fire effects were apparent in 2014, with only June to August seasonal differences in forage digestibility apparent. This suggests that the dynamics of forage digestibility following fire are largely driven by season, peak increases in forage digestibility occur soon within the first growing season following fire and any increases are short-lived.

## Introduction

- Fire is a know modifier of forage quality.
- Increases digestibility and crude protein, decreases anti-quality factors, improves foraging conditions.
- Increases in forage quality can improve animal performance and can be used to manipulate grazing distribution.
- Thus, fire has the potential to improve animal performance and grazing distribution.
- However, it is unclear when peak improvements in forage quality following fire occur and how long any enhancements last.
- Burned areas should be the most attractive and beneficial to grazers when forage quality is increased the most relative to nonburned areas.
- When does forage quality peak following fire and how long do the effects last? Potential to inform producers when and for how long burned areas will impact grazing distribution and how to best take advantage of the increased forage quality to improve animal performance.

Pautre Fir

Hypotheses:

- Fire will increase forage fiber digestibility
- 2. Forage fiber digestibility will decrease with advancing season and time since fire

## Methods

- 3 paired burned and nonburned locations along
- a north-south gradient of the fire perimeter.
- Sampled in June, August and November 2013 and June and August 2014.
- 1 L grab samples from mowed clippings.
- Lyophilized and ground to 2 mm.
- Acid detergent fiber and neutral detergent fiber determined via the ANKOM<sup>©</sup> methods.
- In vitro dry matter disappearance determined via a 48 hour incubation in rumen liquor using a modified Tiller and Terry (1963) method.
- Average fermentation rate determined by measuring methane gas production over a 96 hour period of incubation in rumen liquor using the methods of Menke et al. (1979).



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