

EFFECT OF NITROGEN RATE AND TIMING ON FORAGE SORGHUM BIOMASS YIELD AND QUALITY

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ABSTRACT

Forage Sorghum (*Sorghum drummondii*) is a summer annual sorghum-Sudan grass hybrid that is a high yielding and high-quality source of feed for livestock. Forage sorghum can produce multiple biomass harvests in a single growing season, and is harvested in a silage or dry hay form. Because of the high yield of forage sorghum, this crop is a valuable choice for producers in Oklahoma and surrounding regions with heavily dominated livestock production. For such a high yielding crop nitrogen fertilizer application is extremely important. However, due to the increasing price of nitrogen, the need to understand how nitrogen timing can affect production is essential. Applications of nitrogen fertilizer can benefit forage sorghum yield, however the need to understand how N application rate and timing affect forage quality is a key attribute to observe when taking protein and digestible feed values into consideration. Along with beneficial qualities, knowledge of nitrogen's potential effect on nitrate levels in forage sorghum commonly experienced during periods of drought and excess heat conditions would be beneficial to producers. Therefore, this project evaluated N application in forage sorghum production and quality. The effect of nitrogen rate and timing on forage sorghum biomass yield and quality study was conducted in north central Oklahoma. This study consists of five sites years of data conducted during the 2021, 2022, and 2023 growing seasons. Both dryland and irrigated field conditions are observed, and two harvests per site each year. The treatment structure of this study is designed with seven total nitrogen rates, with a zero-nitrogen check. Three treatments are a split application with four pre-plant only applications. Pre-plant nitrogen rates are 56 kg/ha⁻¹ 112 kg/ha⁻¹ 168 kg/ha⁻¹ and 224 kg/ha⁻¹. A split application of 56 kg/ha⁻¹ 84 kg/ha⁻¹ and 112 kg/ha⁻¹ was applied after the first biomass collection to equal the highest 3 pre-plant treatments. The nitrogen source is urea ammonium nitrate (UAN) applied use SJ3 streamer nozzles. This research study showed value in application methods of nitrogen on forage sorghum production and quality. Results suggest nitrogen positively correlated with biomass production. However, nitrogen applications did not have a significant effect on forage quality. Overall this study has provided a beneficial source of information to those involved.