

## Yield and Nutrient Uptake by Sudangrass (*Sorghum Vulgare var. Sudanense*) as Influenced by Phosphorus and Zinc Application

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**Abstract.** The study was conducted at the Basrah University / Karmat Ali, Iraq during the fall season 2020, to investigate the effects of four rates of phosphorus, (P0 =0, P1=40, P2=80 and P4=120 kg P ha<sup>-1</sup>) and spraying four concentrations of zinc (Zn0-control, Zn1=25, Zn2=50, Zn=75mgL<sup>-1</sup>) on growth and forage yield of Sudangrass. The randomized complete block design (RCBD) was carried out in three replicates using a split plot experiment, zinc concentrations were put in the main plots while, rates of phosphorus in subplots. Application with P<sub>120</sub> resulted to a significantly greater stem diameter (14.61mm) number of leaves (20.00 leaf plant<sup>-1</sup>), leaf area (7420cm<sup>2</sup>), number of branches (14.967 branch plant<sup>-1</sup>) green and dry forage yield (29.25, 12.69 t ha<sup>-1</sup>). Foliar application of Zn<sub>75</sub> resulted in greater plant height (251.2cm), stem diameter (14.21mm), number of leaves (19.42 leaf plant<sup>-1</sup>), leaf area (6163cm<sup>2</sup>) and number of branches (13.450 branch plant<sup>-1</sup>). The combination of P × Zn had no significant effect on green and forage yield. Both P and Zn application had significant effect on N and P percentage of forage Sudangrass, on the other hand, no significant effect of their application on K percentage.

**Keywords.** Forage Sudangrass, Phosphorus, Zinc, Green forage, Dry forage.

### 1. Introduction

The agricultural sector has encountered a recent challenge in the form of water scarcity, which has compelled farmers to cultivate crops with low water requirements, particularly in semi-arid regions across the globe [1,2]. Thus, the forage sorghum, which has many attractive qualities, has gained popularity as a summer feed option every year [3]. Various cultivars of forage sorghum have a diverse array of environmental tolerances, including resilience to high temperatures and drought conditions. These cultivars also demonstrate a high degree of water use efficiency and exhibit rapid regrowth after grazing or cutting [4]. Therefore, due to the impacts of global warming, there is a possibility that these crops will garner greater attention as a potential source of summer forage in the coming years. One of

