

## Abstract

This study was conducted using a dual-purpose cold tolerant sorghum E1291 to determine the effect of varying rates on nitrogen (N) and phosphorus (P) on its growth and yield at KARI, Beef Research Centre, Nakuru for two seasons. The experiment was laid out in a 5x5 factorial in a Randomized Complete Block Design (RCBD). Phosphorous ( $P_2O_5$ ) (0, 20, 30, 40 and 50 kg ha<sup>-1</sup>) was applied at sowing and N (0, 20, 30, 40 and 50 kg ha<sup>-1</sup>) applied when the seedlings were 50 cm in height. Treatment effects were determined using plant height, 1000-seed weight, Crude Protein (CP) and **grain yield**. Nitrogen and Phosphorous levels beyond 40 and 30 kg ha<sup>-1</sup>, respectively did not increase plant height, seed weight, **crude protein** and **grain yield**. Crude protein content in grain increased from 9.38 to 11.56%, while **grain yield** increased from 7 to 9 tons ha<sup>-1</sup>. The optimum sorghum **grain yield** was attained at 40 kg ha<sup>-1</sup> N and 20 kg ha<sup>-1</sup>  $P_2O_5$ , respectively. For **crude protein** the optimum was obtained at 20 N and 30 P kg ha<sup>-1</sup>, respectively. Overall, this study showed that fertilizers could enhance the production of grain sorghum (*Sorghum bicolor* (L) Moench) in the dry highlands of Kenya. However, the conventionally recommended rates of 88 kg ha<sup>-1</sup> of nitrogen (N) and 94 kg ha<sup>-1</sup> of phosphorous ( $P_2O_5$ ) proved wasteful and excessive.