



## Response of Potassium Fertilizer on Bread Wheat (*Triticum aestivum* L.) in Acidic Soil of Tsegede Highland, Northern Ethiopia

Gebremedhin Berhe

Tigray Agricultural Research Institute, Mekelle Soil Research Center, P.O. Box 1070, Mekelle - Ethiopia

### Abstract

A field experiment was carried out on acidic soils of Tsegede, Northern Ethiopia where wheat production is severely constrained by soil acidity to evaluate wheat crop response to potassium. Four potassium levels (0, 25, 50, and 75) kg ha<sup>-1</sup> in the form of potassium Sulphate (K<sub>2</sub>SO<sub>4</sub>) were applied considered as treatments along with recommended NP(46N and 20P) fertilizers and lime(5.4 t ha<sup>-1</sup> at Endamariam and 4.1 t ha<sup>-1</sup> at Endaslassie) were arranged in randomized complete block design with two replications at two farmers field. Initial soil analysis was made following standard procedures. The soil reaction (pH) is classified as strong acid and The Exchangeable aluminum and Exchangeable Acid also revealed as toxic for plant growth at both Endaslassie and Endamariam. However the total percentage of organic matter and total Nitrogen were high at both sites while very low in available phosphorus. Endamariam and Endaslassie have Medium to low exchangeable cations (Calcium and potassium), respectively while Exchangeable Magnesium was medium at both locations. The ANOVA result indicated that total biomass and grain yield of wheat showed significant ( $P \leq 0.05$ ) response to the potassium fertilizer application, and Plant height also affected by the application of potassium fertilizer at only Endamariam, However Days to 50 % Maturity, panicle length and harvest index were not significant affected by application of potassium fertilizers at both locations. The soils that received 25, 50 and 75 kg ha<sup>-1</sup> potassium gave additional grain yield increment by about 30.6, 31.0, and 41.1 % at Endamariam and 27.7, 27.6, and 36.7 % at Endaslassie over the control (treatment with only recommended lime and recommended NP) respectively, while the total biomass yield improved by 25.21, 25.66, and 35.39 % at Endamariam and 23.0, 22.8, and 31.9 % at Endaslassie respectively. However there is no significant difference among each treatments having potassium fertilizer on all yield and yield components at both locations. This significant wheat yield response to the applications of Potassium over the control implies that deficiency of K in the acidic soils of the area is a constraint that limits wheat crop production. Hence, a combined application of 25 kg ha<sup>-1</sup> Potassium fertilize along with recommended lime and N&P fertilizers are recommended to achieve sustainable wheat crop production on acidic soils of the Tsegede highlands and similar localities.

**Keywords:** Potassium; Lime; NP; Wheat; Acid Soil; Tsegede.