Agronomic biofortification improves the grain zinc and iron concentration of Ethiopian finger millet varieties: suitable approach to fight hidden hunger

Teklu D.[1], Gashu D[1], Joy E. [2], Beilay L.[3], Wilson L.[3],Lark M. [3], Amede T. [4], Broadley M.[3]

[1]Addis Ababa University centre for food science & nutrition [2]London school of hygiene & tropical medicine [3]University of Nottingham [4]Agricultural green revolution for Africa

Introduction

There is an important gap in the current knowledge base on what is the impact of agronomic biofortification, varietal & environmental effect on grain mineral

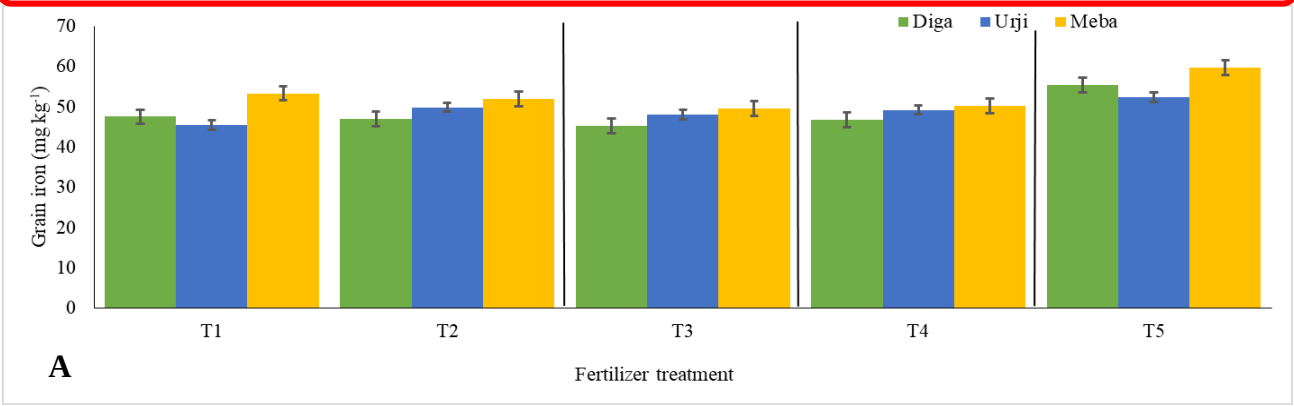
Objective

To exploring varietal, environment & treatment effects of Zn & Fe agronomic biofortification on grain Zn & Fe concentration

Methods

- **Design**
  - RCBD = 3 genotypes * 5 fertilizer levels * 2 locations * 2 slope
  - Fixed effects: slope position, fertilizer and genotypes
  - Random effects: season, block within farm, farm within location
- **Laboratory**
  - Finger millet samples analysed for grain Zn and Fe concentration

Findings and interpretations



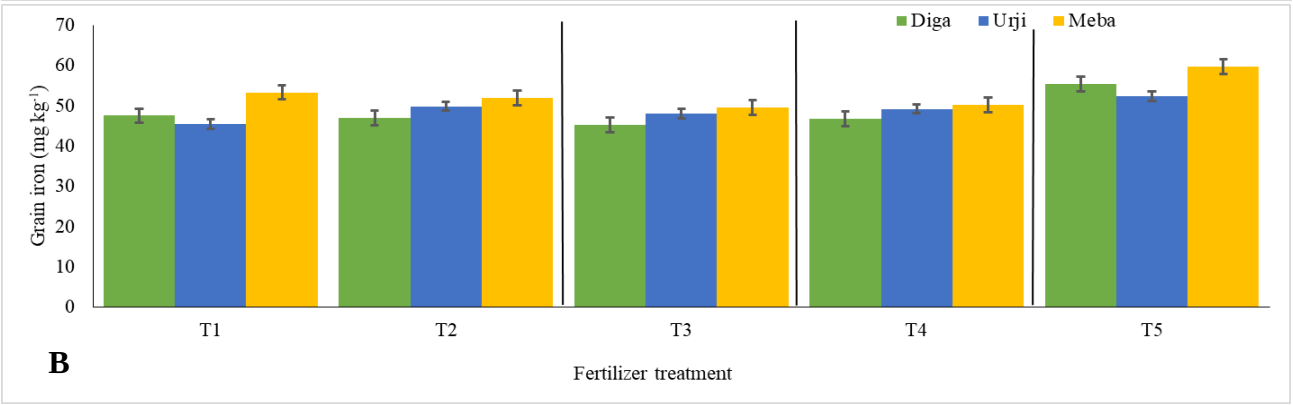


Figure 1. Grain iron (**A**) and zinc (**B**) concentration of finger millet as affected by genotype and zinc and iron fertilization.
T1: 25 kg $ZnSO_4 7H_2O$, 20 kg $FeSO_4 7H_2O$, 131 kg NPS, 60 kg K, 54 kg urea ha^{-1}; T2: 25 kg $ZnSO_4 7H_2O$, 131 kg NPS, 60 kg K, 54 kg urea ha^{-1}; T3: 131 kg NPS, 60 kg K, 54 kg urea ha^{-1}; T4: 30% of T3; T5: 20 kg $FeSO_4 7H_2O$, 131 kg NPS, 60 kg K, 54 kg urea ha^{-1}.

- Grain Zn ↑ 20% due to T1 & 18.9% due to T2 → significant effect of genotype & T2 @ P<0.001, T1 @ P<0.05
- Grain Fe ↑ 21.4% due to T1 &17.8% due to T5 → significant effect of T1 @ P<0.001, T5 & genotype @ P<0.01

➢ Location but not slope was a source of variation for both grain Zn and Fe concentration

Conclusions

➢ The soil application of Zn (T2) and Fe (T5) could be a finest agronomic biofortification strategy to enhance grain Zn & Fe and can offer an immediate & effective

➢ The strategy may also improve micronutrient intake of humans which in turn helps to combat MNDs