

Development of Highland Quality Protein Maize (QPM) Varieties with Drought Tolerant Abilities

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Introduction

Maize (*Zea mays* L.) is among the four priority food security crops in Uganda as defined in Uganda's Vision 2040. Climate change vagaries are the major reasons for the noticeable decline in maize yield to 2 t/ha in the highland areas of Uganda, yet a potential of 9-10 t/ha exists. Breeding for a drought tolerant, nutritionally rich and disease resistant maize varieties is a more cost-effective approach to the maize producing communities in Uganda and neighbouring countries. Therefore, the major objective of this study was to develop high yielding, drought tolerant and disease resistant quality protein maize (QPM) varieties for the highland areas of Uganda.

Materials and Methods

We obtained 59 drought tolerant/QPM inbred lines from CIMMYT in 2018. Following several generations of crossing, evaluation and selection, 10 hybrids were obtained. The hybrids were tested in a rain-out shelter (Fig. 1), on-farm, and also subjected to a nutrient and high performance liquid chromatography (HPLC) test.

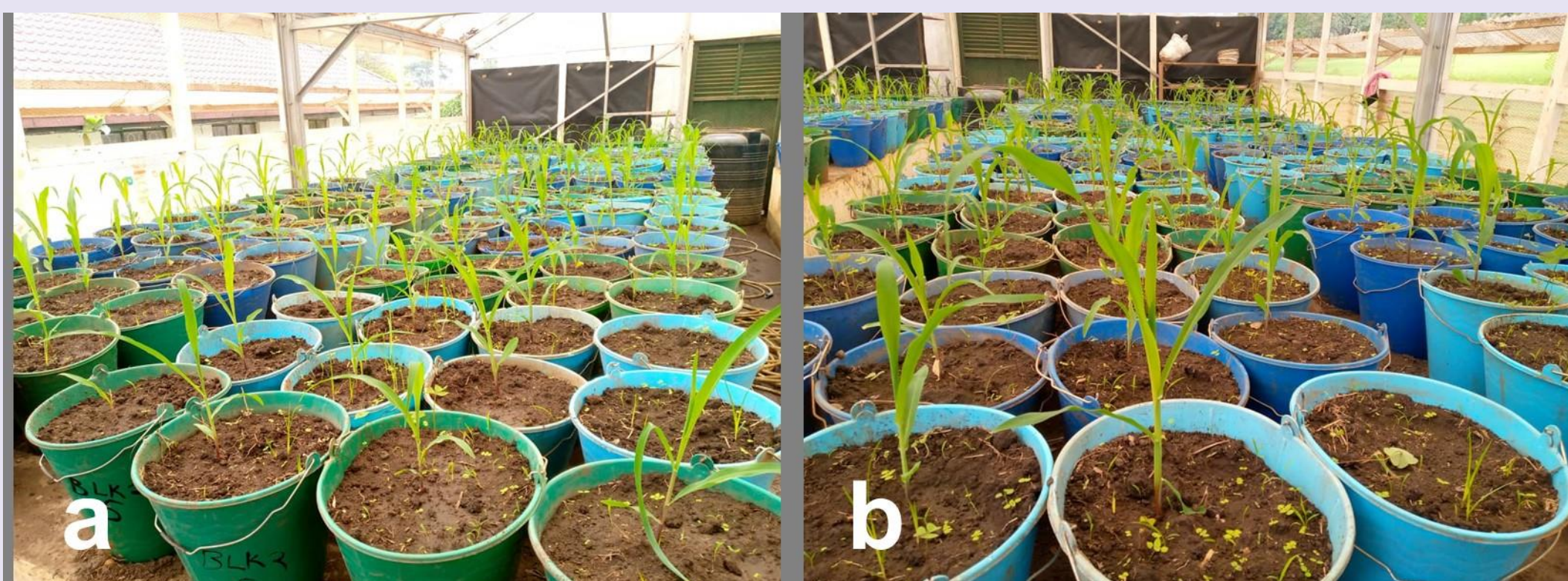


Fig. 1: Maize under water stressed (a) and well-watered (b) conditions

Results

Hybrids Q150114, Q150138 and Q160121 had high QPM (except Q150114), drought tolerance, resistance to key diseases and higher grain yield both under drought and well-watered conditions (4.6 – 9.2 t ha⁻¹) (Fig. 2).

Conclusion

The three hybrids can be released for cultivation in the drought prone and nutritionally deficient highland areas of Uganda and the neighbouring countries.



Yld (normal): 8 t ha⁻¹,
Yld (drought): 5 t ha⁻¹
Non-QPM

Normal: 7.0 t ha⁻¹,
Drought: 4.6 t ha⁻¹
QPM

Normal: 7.0 t ha⁻¹,
Drought: 5.5 t ha⁻¹
QPM

H614 (Standard check)

Yld (normal): 9.3 t ha⁻¹,
Yld (drought): 4.2 t ha⁻¹
Non-QPM



Fig. 2: Description of best performing highland maize hybrids in comparison to the check

Policy statement

Release and promotion of these hybrids will: i) lower the cost of maize production in the highland areas of Uganda, thereby contributing to sustainable development goal (SDG) 1 of fighting poverty; ii) improve nutrition, thereby contributing to SDG 2 of ending hunger, achieving food security and improved nutrition, and; iii) developing stress resilient maize varieties is a huge contribution to SDG 13 of combating climate change and its impacts.

Acknowledgement

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