Progress in Maize Germplasm Development for the Highlands of East and Central Africa

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1. Introduction

- Maize is a major crop in eastern and central Africa (ECA) region
- It's potentially cultivated in all major agro-ecological zones in the region up to the altitude of 2400 m.a.s.l.
- Maize production in the highland areas of the region is characterized by low yields due to unimproved varieties
- ECAMAW 5-year research plan gave attention to the improvement of the yield potential of local maize varieties, particularly for the highlands
- Then CIMMYT-led regional project funded by the BMZ, Germany was started in 1998
- Six countries in the region (Ethiopia, Kenya, Tanzania, Uganda, Rwanda and Burundi) directly participated in the project.
- A regional nursery was established at Ambo Ethiopia
- About 1200 local germplasm accessions were collected in the six countries in 1998
- 4000 CIMMYT germplasm were introduced
- A project aimed at developing and releasing improved normal and quality protein maize varieties was launched to undertake research by CIMMYT from (2003 – 2008) and ASARECA (2005 - 2007 and 2010/11) through collaboration

2. Development of Germplasm

2.1. Non-QPM Germplasms

- Since the establishment of the Highland Maize Improvement Project, a number of inbred lines of different heterotic groups have been developed
- 341 F5 generation lines are available for further breeding activities
- 139 F9 generations of 3 hetertic groups are available for use in variety development in the region
- 5 varieties have been released in member countries
- 4 potential varieties are ready for release in member countries

2.2. QPM Germplasm

- Although maize is an important stable food for many people, its protein is deficient in two essential amino acids (lysine and tryptophan)
- Since 2003 a number of highland maize inbred lines converted to QPM (NARS, CIMMYT and ASARECA) which are used in development of QPM hybrids and synthetics.
- Advanced 538 inbred lines were formed through the process of conversion
- Analysis done by CIMMYT Mexico showed that 30 converted inbred lines had good levels of lysine and tryptophan
- Member countries (Ethiopia) converted popular non-QPM hybrid varieties into QPM
- 4 potential QPM varieties are ready for release in member countries

Table 1:Maize Germplasm Developed and Available for use in the highlands of ECA

No	Germplasm	Germplasm type	Quantity (No.)
1	Ecuador Lines	Non-QPM	53
2	Kitale Lines	Non-QPM	34
3	Pool9A Lines	Non-QPM	22
4	Ungrouped Lines	Non-QPM	24
5	Synthetics	Non-QPM	3
6	Converted Lines	QPM	30
11	Synthetics Under conversion	QPM	3

Table2: Maize Varieties Released in the ECA Highland Region

Variety	Grain yield (t/ha)	Plant height (cm)	Maturity (days)	Adaptation (m.a.s.l.)	Country
AMB02SYN1(Hora)	6.5	220	170-175	1800-2400	Ethiopia & Rwanda
AMH800 (Arganne)	7.5	222	175-178	1800-2500	Ethiopia
AMH850 (Wenchi)	10.0	228	180-185	1800-2600	Ethiopia
AMH851 (Jibat)	10.0	228	178-182	1800-2600	Ethiopia
AMH760Q (Webi)	10.0	245	180 - 185	1600 - 2200	Ethiopia

Conclusion : several non-QPM and QPM germplasm are now available for use by different NARS for the development of normal and nutritionally enhanced varieties in the ECA region.

Acknowledgements: CIMMYT is acknowledged for providing the germplasm technical and financial support . The NARS (EIAR, KARI, ISABU, NARO, RAB and TARI) for the implementation of the project by providing technical and financial support.

Farmers and stakeholders Visiting demonstration plots of AMH851 in Ethiopia, 2010

Farmers evaluating 3 way cross hybrids at Kitale Kenya 2010

A farmer appreciates improved hybrid maize variety in Ethiopia

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