SUMMARY ARTICLE
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QUALITY PROTEIN MAIZE (QPM) VARIETIES

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Tandzi, L. N., Mutengwa, C. S., Ngonkeu, E. L. M., Woïn, N., and Vernon, G. (2017). "Breeding for Quality Protein Maize (QPM) Varieties: A Review" *Agronomy* 7 (4): 80. https://doi.org/10.3390/agronomy7040080

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Maize (*Zea mays*) has a huge contribution in diets as it is an easily accessible source of protein for lactating mothers, refugees and children who suffer from protein deficiency. Quality Protein in Maize (QPM) is of importance as these QPM varieties are superior to non-QPM for both animals as well as humans. Research for QPM varieties have led to breeding programs for the development of varieties with improved nutrition profiles. In this paper authors explain modern achievements in molecular and classical breeding for the QPM varieties development. These achievements have been attained under non stressed and stressed environments. Already, various QPM varieties have been released in many parts of the world. In 1997, in Brazil a double crossed hybrid was released, Zhongdan 9407 a QPM hybrid was released in China, Shakti-1 was released in 1998 and Vivek QPM-9 that was a hybrid of QPM line was released in 2008 in India. In South Africa, 4 OPVs (QS-King,

Nelson's Choice QPM, Qsobo and Obatampa SR) and sixteen QPM hybrids (7 yellow and 9 white) have been released and grown by farmers. They also mentioned problems faced by farmers during production and adoption of QPM varieties along with suggestions to solve these problems. For cultivation of QPM varieties under stress conditions (e.g., low nitrogen soil, drought condition, resistance to ear rot, leaf blight, striga and grey leaf spot) and normal condition, many conventional breeding methods are beginning to be used. Distance isolation of 200-400m is required for the development of QPM. To control the synthesis level of protein, 3 loci have been involved and have correlation with lysine. Many molecular techniques, Simple sequence repeat markers (SSR), SDS-PAGE, SNP markers, SNP based genetic distance, Proteomics analysis, ISSR primers, variety diagnostic markers and inter-simple sequence repeat (ISSR) and random amplified polymorphic DNA (RAPD) markers are used. These genes are located on chromosomes 7, 4 and 2. Speed and efficiency of development of QPM varieties can be improved by using molecular techniques. In developing countries, the expensiveness of these molecular techniques limit their use. More research is required for development of varieties for cultivation under stress conditions like combined drought and heat stress, low soil pH and solely heat resistance. Post- harvest losses in QPM also require considerations for improvement. Cooperation between farmers, maize breeders, relevant stakeholder and agricultural extension workers are the main causes for adoption of QPM varieties along with the isolation requirements of QPM variety production. So as QPM has a high nutrition profile, there is a need to make efforts to increase the rate of adoption of QPM genotypes around the world. It is especially required in developing areas where farmers grow maize mainly for their consumption and collect seeds for next year sowing. This can be achieved by enhancing the collaboration between farmers and breeders/researchers and by PPB (participatory plant breeding) that will increase the attention level of famers for the availability, existence and also nutrition value as well as conditions that are required for the production of QPM varieties with an improved nutrition profile.

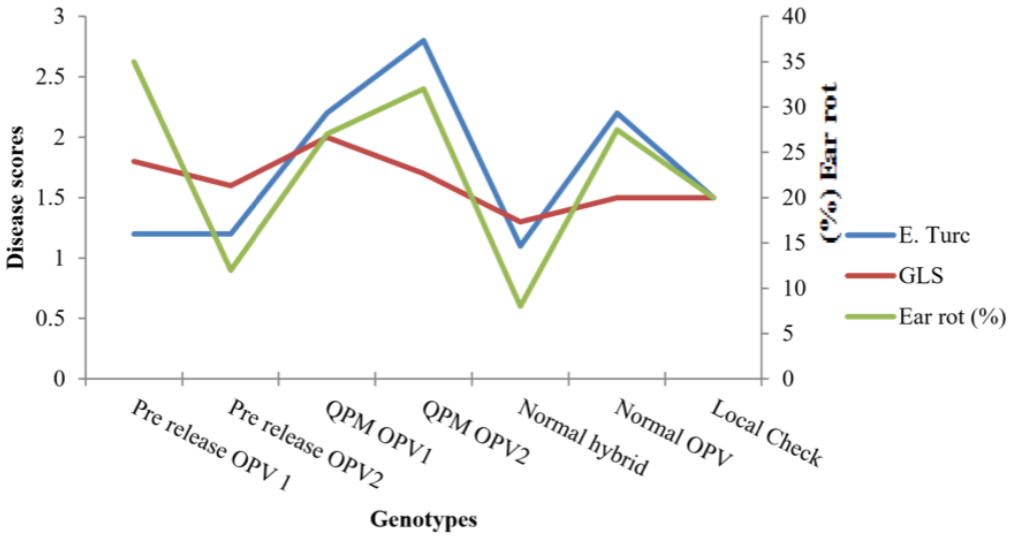

Figure 1: Disease reaction (GLS, Turcicum leaf blight and ear rot) of two QPM OPVs, two prerelease QPM hybrids, two normal OPVS and one normal hybrid.