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Poster Communication Abstract – PH.54

CHARACTERIZATION AND EVALUATION OF HETEROTIC TRAITS IN MULTI-PARENT ADVANCE GENERATION INTERCROSS (MAGIC) MAIZE POPULATION

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The Multi-parent Advanced Generation Inter-Cross (MAGIC) maize population is a formidable tool for QTL mapping and for producing segregant hybrids to study heterosis; a fundamental aspect of maize success. The MAGIC collection was used as inbred source for recombinant intercrosses (RIX) development. RIXs are in-fact hybrid genotypes which are derived by crossing between pairs of MAGIC RILs; each RIX having known genomic contribution by its two parental RILs. The resulting RIX population offers some unique properties to facilitate the genetic analysis of complex traits, and this population, combined with the genomic resources available in maize, provides a powerful resource to study the genetic basis of agronomic traits and resistance to Fusarium Ear Rot (FER) in heterozygous genotypes, filling the gap from inbred lines to hybrids. Hence, this study was conducted on a set of 400 RIXs that was phenotyped in two consecutive years for agronomic, yield and FER resistance traits. High level of phenotypic diversity and trait distribution closed to normality indicates that the mode of inheritance of quantitative traits was continuous and should be influenced by many genes. After the GWAS analyses, 55 significant putative QTL associated to different traits were found. Several overlapping QTL were observed for highly correlated agronomic traits suggesting the possible presence of a pleiotropic effect influencing multiple linked traits at once. Heritability for FER was moderate and seven putative QTL for resistance were identified on chromosomes 5 and 8. The QTLs identified as associated to relevant agronomic, yield and disease-resistance traits may be used to harbor potential candidate genes for agronomic performance and Fusarium resistance. These findings represent the basis for future research by providing additional layers of information about heterosis and allowing a finer characterization of QTL to contribute to maize productivity and stability.