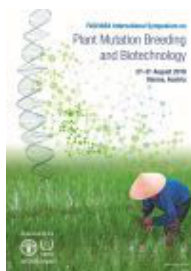


FAO/IAEA International Symposium on Plant Mutation Breeding and Biotechnology



Contribution ID: 16

Type: Oral

GENOTYPE-BY-ENVIRONMENT INTERACTION OF ELITE VARIETIES OF COWPEA DERIVED THROUGH MUTAGENESIS

Grain yield of cowpea (*Vigna unguiculata* L.) is considerably low in the northern communal areas of Namibia where the crop is predominantly cultivated. This is attributed to: i) the lack of improved and well-adapted cultivars, ii) limited water availability, as well as iii) the effects of genotype by environment (G x E) interaction on the crop productivity. The objectives of this study were to determine G x E interaction and yield stability of elite cowpea genotypes developed through mutagenesis and to identify promising genotypes and to establish the most representative field-test methods and identify the best production environments. The study was conducted in Namibia at three selected sites (Bagani, Mannheim and Omahenene) during two cropping seasons (2014/2015 and 2015/2016) in six different environments. The experiments were laid out using a randomised complete block design with three replications. Thirty-four elite genotypes and three check lines were evaluated. Data were analysed using the Additive Main Effects and Multiplicative Interaction (AMMI) and the Genotype plus Genotype by Environment (GGE) bi-plot methods. The following four promising mutant genotypes: G9 (ShL3P74), G10 (ShR3P4), G12 (ShR9P5) and G4 (ShL2P4) were identified with better grain yields of 2.83, 2.06, 1.99 and 1.95, t/ha-1, in that order. The parental lines designated as G14 (Shindimba), G26 (Nakare) and G37 (Bira) provided mean grain yields of 1.87, 1.48 and 1.30 t/ha-1, respectively. The best environments in discriminating the test genotypes were Bagani during 2014/15 and Omahenene during 2014/15. The AMMI model explained 77.49 % of the total variation in the present study. The GGE bi-plot showed that 63.57% of the total variation was explained by the first principal component (PC1), while the second principal component (PC2) explained 12% of the variation.

Country or International Organization

Namibia

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Track Classification: Mutation breeding for adaptation to climate change in seed propagated crops