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Original language: English

GENOTYPE X ENVIRONMENT INTERACTIONS IN SUGAR BEET-EFFICIENCY OF AMMI AND OTHER BIOMETRICAL MODELS

ABSTRACT

Sugar beet (*Beta vulgaris,* L) is cultivated in India as a supplementary sugar crop. It is sown in October-November and harvested from mid-March to May when temperatures range between 38°C to 45°C. Industrial processing of sugar beet started at Sriganganagar (Rajastahan) in 1972. In multi location varietal trials it is important to identify stable as well as location specific varieties. The main objectives of the present study are to study i) G x E interaction and stability in exotic genotypes by two stability models, ii) to apply Additive Main Effects and Multiplication Interaction (AMMI) Matmodel in sugar beet, and iii) to compare the relative efficiency of these two models in sugar beet. Sixteen sugar beet genotypes, from different countries of Europe, North America, and USSR, were evaluated at 8 locations having varying climatic conditions in RBD data on root yield/plot, sucrose % juice were recorded at harvest. Significant differences among genotypes for root yield were observed. In plant breeding programmes, most biometrical models have used replicated data for stability analysis. AMMI Matmodel has previously been used in sugarcane (Srivastava et al., 1999, 2001) using replicated data. However, AMMI Matmodel is quite effective, even with un-replicated data, if the numbers of genotypes and environments are large. In the present study, the G x E was first studied by Eberhart & Russell (1966) model with replicated data. Subsequently, the mean root yield data of each location was used to study G x E from this un-replicated data by AMMI Matmodel. The Anova for the AMMI-2 model shows that G x E is twice as large as the genotype (G) main effect. IPCA-1 alone is larger than genotype main effect. The IPCA-1 scores and bi-plot suggest that the Lucknow location is unique, with IPCA-1 near zero and its main effect (41.38) rather close to the grand mean. Two main mega-environments were identified. Kawe Megapoly wins in environments 3, 4, 5, and 7 while Kawe Percopoly wins in environments 2, 6, and 8. According to the AMMI-1 model that is more accurate than the raw data. This paper discusses the stability of genotypes as assessed by these two models and the efficiency of AMMI Mat model for sugar beet and other root crops.

INTERACTIONS GÉNOTYPE-ENVIRONNEMENT EN BETTERAVES SUCRIÈRES – L'EFFICACITÉ DE AMMI ET D'AUTRES MODÈLES BIOMETRIQUES

ABRÉGÉ

Version française pas disponible.

GENOTYP-UMWELT-INTERAKTIONEN IN ZUCKERRÜBEN – EFFIZIENZ VON AMMI UND WEITEREN BIOMETRISCHEN METHODEN

KURZFASSUNG

Deutsche Version nicht verfügbar.