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Analysis of Diversity among and Heterogeneity within Tomato Cultivars from Eritrea

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Abstract

Tomato production has a long tradition among farmers in Eritrea. Yet, the average yield of tomato in Eritrea has remained low, 15 Mg ha^{-1}, compared with 19 Mg ha^{-1} on average in Africa, 23 Mg ha^{-1} on average in Asia and 27 Mg ha^{-1} on average world wide. One of the main constraints for tomato production is the poor performance of the cultivars. This study aims at analysing diversity among and heterogeneity within tomato cultivars from Eritrea and compares these data with other African and Italian cultivars.

Simple Sequence Repeat (SSR) markers were used for the genetic analysis. Genetic similarities among the cultivars were calculated and a cluster analysis performed using NTSYS. Furthermore, individual plants of cultivars were genotyped to evaluate heterogeneity within the cultivars.

A high degree of diversity was observed in the Eritrean cultivars. Thirteen out of the 15 SSRs were polymorphic, with 2-5 alleles per marker. The average number of alleles per SSR locus was between 1.0 and 1.4.

The dendrogram showed two major groups of cultivars, distinguishing the San Marzano and Marglob types. It also showed the genetic relationships between the old Italian cultivars and the Eritrean cultivars in both types.

Analysis of the within-cultivar variation showed that the Eritrean tomato cultivars were less uniform than the other cultivars. This most likely results from mixing up of genotypes.

Farmers value 'new material' as a source of influx. A survey among farmers showed that some of them purposely mix seeds to get prolonged harvest, for yield stability and stress tolerance contributing much to the genetic diversity in their originally selected 'Secret seed'.

Keywords: Diversity, Eritrea, heterogeneity, SSR, tomato

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