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Genetic diversity in anchote (*Coccinia abyssinica* (Lam.) Cogn) using microsatellite markers

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Abstract

Anchote (*Coccinia abyssinica* (Lam.) Cogn) is an endemic crop species of Ethiopian origin mainly cultivated for its nutritious tuberous roots and tender leaves. The crop plays an important role in the local diet of rural and peri-urban communities mainly in Western and South Western Ethiopia. Limited molecular marker resources hinder breeding and genetic studies for improvement, conservation and management of anchote genetic resources. In this study we aimed to (i) measure the genetic diversity of *C. abyssinica* and of its populations; and (ii) describe the genetic structure of populations across the cultivation range in Ethiopia. A total of 45 germplasm accessions collected from Western parts of Ethiopia were studied along with three cultivars of related species in Cucurbitaceae family using 24 microsatellite markers. Results showed high level of genetic diversity in the

anchote accessions. All the analysed loci were highly polymorphic and detected a total of 354 alleles among all population, with an average of 15 alleles per locus. The average genetic diversity, as quantified by the expected heterozygosity, was 0.88 ± 0.06 per locus. Nei's gene diversity index was the highest ($I = 1.93$) for populations

from East Wellega maintained *in situ* in the farmers' field and *ex situ* in Debre Zeit Agricultural Research Center (DZARC). Using discriminant analysis of principal components (DAPC), four clusters including outlier groups were detected. The DAPC analysis indicated that the most closely related populations geographically occurred in close proximity to each other. AMOVA attributed 95 % of the genetic variation to within population and only 4 % to between populations. The results provide important genetic information in *C. abyssinica* to drive improvement, management and conservation decisions efforts.

Keywords: Anchote germplasm, Ethiopia, genetic diversity, genetic structure, microsatellites