

Fingerprinting of Indian Coffee Selections and Development of Reference DNA Polymorphism Panels for Creating Molecular IDs for Variety Identification

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SUMMARY

There are two main cultivated species of coffee namely, tetraploid *C. arabica* and diploid *C. canephora* (also called robusta coffee). A number of breeding programs were initiated in India at Central Coffee Research Institute, Chikamagalur, with main thrust being building resistance coupled with productivity without affecting quality in arabica and improvement of bean quality and yield in robusta. Such efforts spread over many decades resulted in the development of 16 superior selections of coffee (14 arabica and 2 robusta selections). The present study was undertaken to fingerprint these station-bred selections using high-resolution DNA marker approaches for their individualization and to ascertain their genetic base. DNA typing was performed using fluorescence-AFLPs, RAPDs and a large number of in-house developed coffee-specific microsatellite markers. The data revealed very limited variability in arabica genotypes, which could be visualized for their discrimination only by employing a very large number of DNA markers. The fingerprinting data were analyzed to create reference 'DNA polymorphism panels' (Microsatellite, AFLP, RAPD-based) which can readily be used for: a) generating 'Molecular IDs' needed for genotype individualization/registration/IPR protection; b) selecting genetically diverse genotypes and suitable/efficient marker approaches for breeding programs; and c) other genetic studies. In our opinion, this study involving DNA fingerprinting of Indian coffee selections, in perspective strongly suggests the need for creation of molecular data banks (enumerating DNA marker efficiencies and DNA polymorphism status) for globally available elite coffee germplasm for use as reference resources. Availability of such resources would increase the practical utility and efficiency of the DNA typing approaches that are exorbitantly costly but are highly desired in coffee genetic improvement programs, especially on arabica coffee that inherently suffers with low genetic base.