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Genetic characterization of an elite coffee germplasm assessed by gSSR and EST-SSR markers

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ABSTRACT. Coffee is one of the main agrifood commodities traded worldwide. In 2009, coffee accounted for 6.1% of the value of Brazilian agricultural production, generating a revenue of US$6 billion. Despite the importance of coffee production in Brazil, it is supported by a narrow genetic base, with few accessions. Molecular differentiation and diversity of a coffee breeding program were assessed with gSSR and EST-SSR markers. The study comprised 24 coffee accessions according to their genetic origin: arabica accessions (six traditional genotypes of *C. arabica*), resistant arabica (six leaf rust-resistant *C. arabica* genotypes with introgression of Híbrido de Timor), robusta (five *C. canephora* genotypes), Híbrido de Timor (three *C. arabica* x *C. canephora*), triploids (three *C. arabica* x *C. racemosa*), and racemosa (one *C. racemosa*). Allele and polymorphism analysis, AMOVA, the Student *t*-test, Jaccard's dissimilarity coefficient, cluster analysis,

correlation of genetic distances, and discriminant analysis, were performed. EST-SSR markers gave 25 exclusive alleles per genetic group, while gSSR showed 47, which will be useful for differentiating accessions and for fingerprinting varieties. The gSSR markers detected a higher percentage of polymorphism among (35% higher on average) and within (42.9% higher on average) the genetic groups, compared to EST-SSR markers. The highest percentage of polymorphism within the genetic groups was found with gSSR markers for robusta (89.2%) and for resistant arabica (39.5%). It was possible to differentiate all genotypes including the arabica-related accessions. Nevertheless, combined use of gSSR and EST-SSR markers is recommended for coffee molecular characterization, because EST-SSRs can provide complementary information.

Key words: Microsatellite marker; *Coffea*; Discriminant analysis; Genetic diversity

