

Progeny Analysis by Microsatellites in Crosses of *Coffea arabica* L.

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SUMMARY

Genetic polymorphisms are a fundamental tool for studying the rules governing inheritance as well as for tracing specific genes in breeding programmes. In the last decade it was discovered that DNA itself is a major source of polymorphism. *Coffea arabica* is expected to show polymorphic DNA sequences as any other species even if, this species could show a low level of genetic variability because of the restricted genetic base of the cultivated varieties and because of self-fertility. Nevertheless we could identify some DNA sequences which show a high degree of polymorphism, namely microsatellites.

Microsatellites, also known as simple sequence repeats (SSRs), are produced by tandem repetition of sequences from 1 to 6 bp long and constitute highly informative markers. They are inherited in a codominant Mendelian manner and they are somatically stable. The polymorphisms are the result of the variation in the number of the repeated monomers. Primers can be designed on the single sequences flanking the microsatellite and then used to amplify the locus by PCR. Simple gel electrophoresis reveals polymorphic variations in the size of the amplification product. Microsatellites have already been found to be useful as genetic markers in a number of plants such as soy bean, *Arabidopsis*, barley, rice, corn, tomato and other plants.

Here we report the analysis of two *C.arabica* crosses with some microsatellite to show their Mendelian inheritance and their use in molecular assisted breeding programmes.

In the first cross we analysed 51 microsatellite and the parents showed different alleles for 4 systems. All the progeny had the same alleles as expected by Mendelian inheritance. For instance, the analysis of the E10-3CTG microsatellite gave the following results: the mother was homozygote for the 135bp allele and the father was homozygote for the 137bp allele, all the progeny was heterozygote 135/137. This cross was performed with the aim of selecting plants resistant to nematodes and we should be able to follow the inheritance of the resistance gene/s when more polymorphisms become available.

The second cross was analysed with 30 microsatellites, two of which proved to be homozygote in the parents while all the progeny was heterozygote as reported in the table below.

Microsat.	PARENTS		F ₁ PROGENY					
	Icatuai	IAPAR-59	I-30-1-1	I-30-1-2	I-30-2-1	I-30-2-2	I-30-3-1	I-30-3-2
34-6CTG	108/108	112/112	108/112	108/112	108/112	108/112	108/112	108/112
37/6CTG	121/121	119/119	119/121	119/121	119/121	119/121	119/121	119/121

More microsatellite should be developed and their association to interesting gene should be established for a practical use in breeding programmes.