

Identification and Mapping of AFLP Markers Linked to a Leaf Rust Resistance Gene in Coffee – A Step towards Marker Assisted Selection in Coffee

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SUMMARY

Coffee leaf rust caused by the obligate parasitic fungus *Hemileia vastatrix* is an economically important disease and a major limiting factor for arabica coffee (*Coffea arabica*) production. Occurrence of different physiological races of leaf rust pathogen has been the major constraint for durability of genetic resistance in cultivated strains. Interactions between coffee and rust pathogen are governed according to gene for gene hypothesis and the host resistance appears to be conditioned at least by nine major resistance factors designated as S_{H1} to S_{H9}, either singly or in combination, while the corresponding virulence have been indicated as V₁ to V₉. Molecular markers linked to S_H genes would be extremely useful in improving the selection efficiency for durable resistance.

In this direction, we have identified AFLP markers tightly linked to a rust resistance gene S_{H3}, naturally introgressed in to *Coffea arabica* from a related species *C. liberica*. F₂ progeny (101 individuals) derived from a cross between an arabica accession, Matari and an introgressed line S.288 was used for analysis. The progeny segregated into two groups for rust resistance, one manifesting resistance to physiologic race II (V₅) due to the presence of S_{H3} gene while the second group showed susceptibility due to the absence of S_{H3}. AFLP profiles generated by using the 15 primer combinations selected after initial screening showed 35 polymorphic fragments associated with alien genome introgression. Among these, 21 markers were found associated with the S_{H3} resistance gene and one marker co-segregated perfectly with the S_{H3}. Linkage analysis of the introgressed markers resulted in four linkage groups. All the markers linked to S_{H3} resistance gene were closely associated (6.3 cM) and grouped together. The present findings provide a starting point for further refinement of marker-trait associations. The potential applications of the identified markers for improving the selection efficiency in arabica coffee are discussed.