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Novel mutations in FAD2B gene identified from new high oleic mutants in groundnut (Arachis hypogaea L.)

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G roundnut is an important oilseed crop in India wherein majority of the produce is crushed for edible oil. Narrow genetic base of groundnut has impeded its genetic improvement in yield and oil quality. In order to induce genetic variation and diversify the source of high oleate trait in groundnut, GPBD 4 (inter-specific derivative), a popular cultivar with inherent resistance to major foliar disease (late leaf spot and rust) was subjected to mutagenesis (EMS and gamma rays). A significant variation in fatty acid profile of mutant progenies was observed in M4 generation. Two stable high oleic (>70%) mutant lines viz., GM6-1 and GM4-3 were isolated and utilized for characterization of *FAD 2B* gene that control oleic and linoleic acid content in seeds. Cloning and sequencing of *FAD 2B* gene from parent GPBD 4, GM6-1 and GM4-3 revealed two novel mutations (1085A \rightarrow G and 1111G \rightarrow A) in GM 6-1 and single transition 1111G \rightarrow A in GM 4-3. A CAPS (bF19/R1, Mob II enzyme) marker and two SNP (bF19/GM6-1-GM4-3 and bF19/GM6-1) markers that could differentiate the two mutants were developed and tested. These makers were also validated in other high and low oleic genotypes. Some of the RILs derived from TMV 2 × GM 6-1 that were high in oleic acid with resistance to LLS and rust were tested using IPAHM103 and GM2301 markers linked to a common genomic region governing rust and LLS resistance. Thus, these new high oleic mutant lines with resistance to major foliar diseases could help to broaden the genetic base as valuable genetic resources in future groundnut breeding programs.

Biography

H L Nadaf has completed his PhD from University of Agricultural Sciences, Dharwad and Post-doctoral research from Texas A & M University, College Station, Texas, USA. He is the Principal Scientist (Plant Breeding) and Head of AICRP on Groundnut, UAS, Dharwad. He has published more than 75 papers in reputed journals.

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