

Molecular Genetic Purity Test Using SSR Markers in Pigeon Pea

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Abstract : In agriculture using quality seeds of improved varieties is very important to ensure higher productivity thereby food security and sustainability. To ensure good productivity, seeds should have characters as described by the breeder. To know whether the characters as described by the breeder are expressing in a variety such as genuineness or genetic purity, field grow out test (GOT) is done. In pigeon pea which is long durational crop, conducting a GOT may take very long time and expensive also. Since in pigeon pea flower character is a most distinguishing character from the contaminants, conducting a field grow out test require 120-130 days or till flower emergence, which may increase cost of storage and seed production. This will also delay the distribution of seed inventory to the pigeon pea growing areas. In this view during 2014-15 with financial support of Govt. of Karnataka, India, a project to develop a molecular genetic test for newly developed variety of pigeon pea cv.TS3R was commissioned at Seed Unit, UAS, Raichur. A molecular test was developed with the help SSR markers to identify pure variety from possible off types in newly released pigeon pea variety TS3R. In the investigation, 44 primer pairs were screened to identify the specific marker associated with this variety. Pigeon pea cv. TS3R could be clearly identified by using the primer CCM 293 based on the banding pattern resolved on gel electrophoresis and PCR reactions. However some of the markers like AHSSR 46, CCM 82 and CCM 57 can be used to test other popular varieties in the region like Asha, GRG-811 and Maruti respectively. Further to develop this in to a lab test, the seed sample size was standardized to 200 seeds and a grow out matrix was developed. This matrix was used to sample 12 days old leaves to extract DNA. The lab test results were validated with actual field GOT test results and found variations within the acceptable limit of 1%. This molecular method can now be employed to test the genetic purity in pigeon pea cv TS3R which reduces the time and can be a cheaper alternative method for field GOT.

Keywords : genuineness, grow-out matrix, molecular genetic purity, SSR markers

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