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Isolation of male sterile and maintainer lines from North Indian onion (*Allium cepa* L.) populations with the aid of PCR based molecular marker

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Marker Assisted Selection (MAS) using mitochondrial DNA based marker cytochrome b (*cob*) was integrated with phenotypic evaluation to isolate male sterile and maintainer lines from open pollinated onion varieties adapted to North Indian agro-climatic region. Cytotype (N/S) determination by *cob* marker followed by morphological and microscopic study of pollen discovered male sterile plants (*Smsms*) at frequencies of 0.015 in Punjab Naroya, 0.020 in Punjab Selection, and 0.006 in Punjab White. The progeny scoring of test-crosses between male sterile and N-cytoplasmic plants isolated the maintainers (*Nmsms*) at frequencies of 0.133 in Punjab Naroya, 0.231 in Punjab Selection and 0.182 in Punjab White. As a novel approach, Trait Recovery Programme was demonstrated to reduce the population size required to recover a male sterile plant by 91.08% in Punjab Naroya, 92.99% in Punjab Selection and 97.66% in Punjab White. For recovering a maintainer, 10% reduction in Punjab Naroya and 9.10% in Punjab Selection was calculated. However, no reduction was observed in Punjab White. This analysis also validated that in a randomly mating onion population, frequency of recessive *ms* allele squared is equal to the frequency of male sterile plants among S-cytotype and frequency of maintainers among N-cytotype ($f_{ms}^2 = f_{Smsms}/f_S = f_{Nmsms}/f_N$).

Biography

Geetika Malik is currently working as an Scientist and Assistant Professor in the division of vegetable science at Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, India. She is expertise in Natural Products and Horticulture.

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