

3rd International Conference on Agriculture & Horticulture

October 27-29, 2014 Hyderabad International Convention Centre, India

Genetic improvement of horsegram through mutation breeding

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Horsegram [*Microtyloma uniflorum* (Lam.) Verdc.] is an important drought resistant dual purpose crop grown as a contingency crop. Being a leguminous crop it also enhances soil fertility by fixing atmospheric nitrogen hence it is used as a green manure and cover crop. Horse gram is a nutritious forage crop for cattle as well as nutritious grain with high protein content which can provide nutritional security for small and marginal farmers in dry areas. It also has medicinal properties for treatment of kidney diseases and urinary problems. The efforts were made to improve the horse gram both as grain and forage crop at CRIDA, Hyderabad. Two genotypes namely K-42 and Hyderabad Local were used as parental lines and variability was induced through physical mutagen, γ -ray irradiation of seeds of parental lines. Surviving viable mutants with improved plant type were selected and advanced in subsequent generations. A number of stable lines were developed by selections being carried out from M1 to M6 generations. Promising lines were entered in to the Initial Varietal Trial (IVT) of All-India Multi-location trials of the National Network Research Project on Arid Legumes and promoted to Advanced Varietal Trial I and Advanced Varietal Trial II (AVT) for identification of superior lines and release as a variety. Based on multi-location evaluation under AICRP on Arid Legumes in different years of evaluation, three superior mutants CRIDA-18R, CRHG-4 and CRHG-19 were identified and subsequently released as variety by Central Variety Release Committee (CVRC) for South India. CRIDA-18R, mutant derivative of K-42, recorded 20.94% higher yield over the best check and the yield ranged from 750-1150 Kg/ha. Seeds are brown in colour, non shattering and tolerant to Yellow Mosaic Virus, Powdery Mildew and Mites. The variety recorded 40% increased yield over local varieties in farmer's fields. The variety was released and notified for S. India in 2009. CRHG-4, mutant derivative of Hyderabad Local, yielded on an average 785 kg/ha (33.1% higher over the best check), while yield ranged from 700-1100 Kg/ha in different locations. It is tolerant to powdery mildew, yellow mosaic virus, anthracnose and mites. The variety recorded 34% increased yield over local varieties in farmer's fields and is black seeded and non-shattering type. It was released and notified for South India in 2010. CRGH-19, mutant derivative of K-42, is brown seeded and tolerant to pod shattering. The genotype recorded a mean grain yield of 760-1300 kg/ha gave 20.22% higher grain yield over the best check in multi-location trials. It is tolerant to Powdery Mildew, Anthracnose and Whiteflies. It has superior quality parameters with 28.3% crude protein content. The variety recorded 65% increased yield over local varieties in farmer's fields. It was released very recently in 2014. CRHG-6 and CRHG-8 has been registered by Plant Germplasm Registration Committee (PGRC) of ICAR on July, 2011 with registration number INGR 11017 and INGR 11018 respectively.

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