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Research article

Genetic diversity assessment of *Grewia tenax* (Forssk.) Fiori. germplasm for fodder and other economic traits in hot-arid Kachchh region of India

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Abstract

Grewia tenax (Forssk.) Fiori. belongs to the family Tiliaceae, an underutilized shrub in arid and semi-arid regions. The maximum distribution of *G. tenax* population was recorded in Nakhtarana (38%), Bhuj (32%), and Mandvi (15%). Morpho-physiological trait variation of germplasm *viz*., plant height ranged from 70 to 162.4 cm, canopy spread from 79.7 to 175.8 cm^2, leaf area from 3.1 to 8. 3 cm^2, relative water content from 33.3 to 72.4% and canopy temperature depression was ranged from 0.6 to 7.0ºC. The fodder traits such as above-ground biomass (AGB) varied from 0.4 to 2.9 kg/plant, with a lot of variation in crude protein (2.2- 15.2%), NDF (37.2-64.2%), and ADF (12.0- 47.6%) contents. The fruit traits *viz*., fruit length ranged from 4.9 to 6.7 mm, fruit diameter 4.1 to 5.9 mm, pulp 24.0 to 46.0%, TSS 6.5 to 11.4°B, and pH 3.2 to 4.8. Based on the overall assessment, genotypes GT-2, GT-3, GT-14, and GT-15 were found the most promising. A high coefficient of variation was recorded for nitrogen (72.5%), AGB/plant (60.4%), crude protein (57.2%), and canopy temperature depression (47.9%). Cluster analysis assembled the genotypes into two major clusters with two sub-clusters each, affirming the presence of a high amount of genetic variability between the tested genotypes. The principal component analysis revealed that first 10 Eigen PC explained 85.95% of the total variation. Biplot between PC1 and PC2 demonstrated that genotypes GT-15, GT-1, GT-3, GT-11, GT-13, GT-29, GT-32, GT-33 and GT-36 were much distinct from each other.

Keywords: Distribution, Fodder, Genetic diversity, Germplasm, *Grewia tenax*