

Damask rose (*Rosa damascena*) cultivar

Him Basant (CSIR-IHBT-RD-04)

Introduction:

Damask rose (*Rosa damascena*) originated in Damascus region of Asia minor and occupies one of the most important position as an aromatic plant for the extraction of essential oil. It is cultivated in Bulgaria, France, Italy, Turkey, Iran, Morocco and India for the production of attar (otto) of rose or oil of roses and is suitable for cultivation under sub-tropical and temperate conditions. It belongs to Rosaceae family and is an erect, perennial, hermaphrodite shrub possessing multiple green prickly stems up to 1–2 m in height, compound leaves with oval serrated leaflets. Flowering occurs during onset of summer season and continues for 30-35 days. The flowers are renowned for their fine fragrance, and are commercially harvested for rose oil (either "rose otto" or "rose absolute") used in perfumery and to make rose water and "rose concrete".

Uses

Essential oil of damask rose is used in manufacture of perfumes, colognes and cosmetics, while rose water, which is the by product, has extensive demand in the flavouring industry. The other products from damask rose are rose concrete, rose absolute and "gulkand". Dried petals of damask rose are also used for blending in orthodox tea.



'Him Basant' (CSIR-IHBT-RD-04)

The cultivar 'Him Basant' (CSIR-IHBT-RD-04) of *Rosa damascena* has been developed by CSIR-Institute of Himalayan Bioresource Technology, Palampur through half-sib selection approach. The cultivar has high flower yield (3.30 - 4.10 tonnes/ha) and essential oil content of 0.025 - 0.031% and was selected from clonal breeding lines developed from breeding lines through half-sib family selection. The cultivar was evaluated over four years and found to be vigorous in growth with good adaptability.



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Breeding methodology

Rosa damascena is an aromatic shrub, commercially cultivated for its essential oil present in flowers of the plant. It has cross pollinated breeding behaviour and for varietal development, selection was done in half-sib progeny lines derived from varieties 'Jwala' and 'Himroz' and clonally propagated. Four clones along with check cultivar (Jwala & Himroz) were evaluated for flower yield and essential oil content for four years in RBD with four replications. CSIR-IHBT-RD-04 has flower yield of 3.30 - 4.10 tonnes/ha and the essential oil content ranges from 0.025 - 0.031%.

Propagation

Stem cuttings of size 20 cm are collected from mature plants during pruning season in the months of October and November. The cuttings are treated with IBA @ 250 ppm solution for 30 minutes and planted in raised beds. Light irrigation is done with watering can at regular intervals to keep the soil bed moist. Rooting starts in about 3-4 weeks after planting of cuttings. It takes about three months to attain 2-3 leaf stage when the cuttings are ready for transplanting in polysleeves. The rooted plants are transplanted in the field during monsoon and winter season.



Propagation of damask rose plants through cuttings in nursery



Damask rose rooted cuttings ready for transplantation



Damask rose plantation in vegetative phase (inset: flowering stage)



Mature plant of CSIR-IHBT-RD-04



Leaves of CSIR-IHBT-RD-04



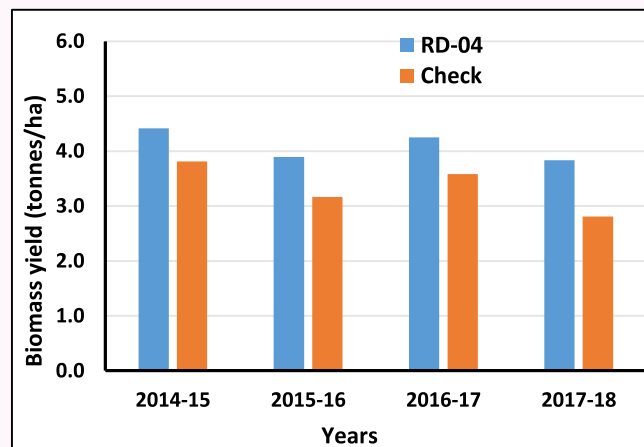
Flower buds of CSIR-IHBT-RD-04



Flower of CSIR-IHBT-RD-04

Harvesting, distillation and storage

Essential oil is present in the flowers of damask rose. The essential oil is highly volatile, therefore the flowers are plucked in the early morning to avoid the loss of essential oil content in the flowers. The plucking of flowers is done daily for higher oil recovery. The essential oil extraction from the crop is done through steam distillation. The produce should be distilled within 2-3 hours of plucking. Flowers and essential oil should not be exposed to sunlight, moisture and high temperature during distillation as these factors deteriorate the oil quality. Damask rose oil is light pale to transparent in colour and moisture should be removed immediately after distillation. The oil should be stored in stainless steel, amber colour glass container or aluminium containers filled up to the brim to avoid auto-oxidation and stored in cool and dark place. Rose water is obtained as byproduct of damask rose distillation process.



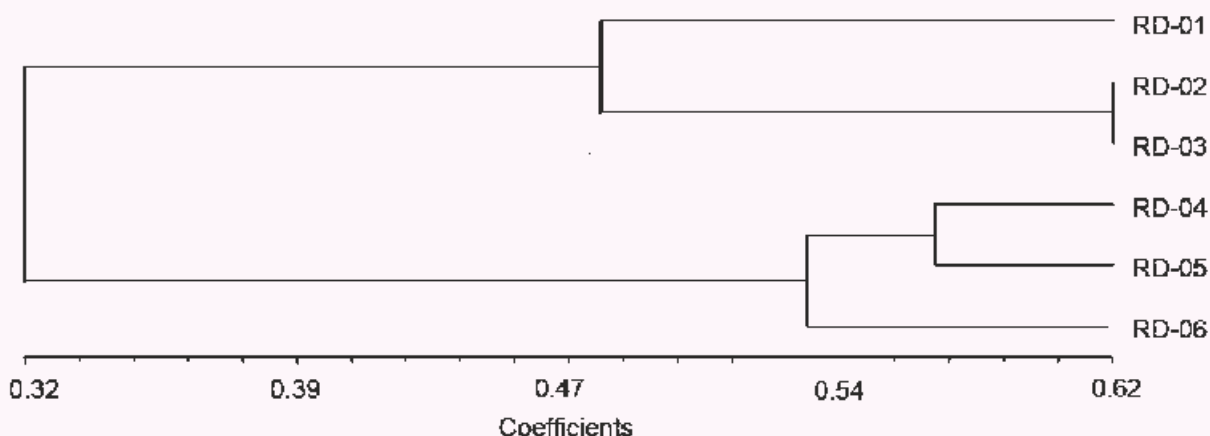
Field performance of RD-04 and check over years

Statement of distinction

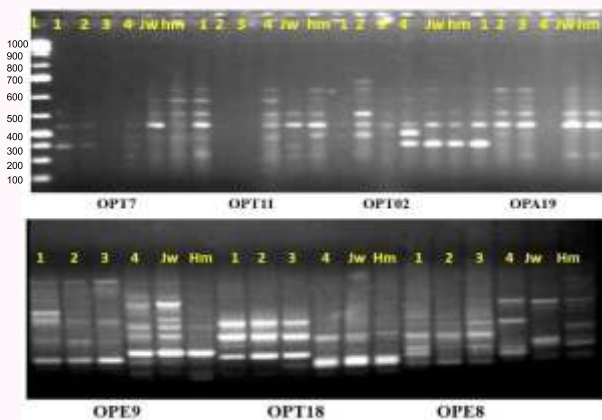
Cultivar 'Him Basant' is about two meters in height with compact plant stature and multiple stems which are erect and upright. It has large leaves, dark green in colour with large size flowers.

DNA Fingerprinting of improved cultivar 'Him Basant' using RAPD markers

Genetic distinctness of selection 'Him Basant' (CSIR-IHBT-RD-04) was established using seven RAPD markers. Six selections namely, RD-01 to RD-04 and check varieties 'Jwala' and 'Himroz') of *Rosa damascena* (damask rose) were used for comparison purpose. In total, 43 alleles were detected ranging from 4 to 8 with an average of 6.1 alleles per RAPD locus. Seven RAPD markers evincing reproducible polymorphic loci among the CSIR-IHBT-RD-04 (Him Sugandh) and other selections were used for development of fingerprints. Based on the RAPD data, consolidated DNA fingerprints were developed with unique marker loci. Cluster analysis of six selections based on 43 polymorphic loci grouped in three major groups. Improved selection RD-04 captured significant diversity and clustered with check cultivar 'Jwala'. Pair-wise genetic similarity (GS) of RD-04 varied from a minimum of 23% (RD-03) to maximum of 57% (Jwala). In conclusion, genetic similarity data based on 43 polymorphic loci suggested that improved selection RD-04 has captured high level of genetic diversity and can be potentially used as promising parental group for future genetic improvement programme of *Rosa damascena*.



Dendrogram of *Rosa damascena* selections representing genetic diversity (scale indicates Jaccard's similarity coefficient)



Representative RAPD profile of *Rosa damascena* selections using RAPD primers

Table represents Jaccard's similarity coefficients among the *Rosa damascena* selections

	1	2	3	4	5	6
1	1					
2	0.45	1				
3	0.48	0.61	1			
4	0.37	0.34	0.23	1		
5	0.29	0.34	0.34	0.57	1	
6	0.42	0.28	0.23	0.55	0.52	1

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