

Indian valerian (*Valeriana jatamansi*) variety

Him Surbhit (CSIR-IHBT-VJ-05)

Introduction:

Indian valerian (*Valeriana jatamansi* Jones = *Valeriana wallichii* de Candolle) belonging to family Valerianaceae, is an important medicinal and aromatic plant of temperate Himalayan region. The rhizomes and roots of the plant yield high value essential oil for which it is collected from the wild since cultivation of this plant is not yet in practice. Indian valerian (English) is also popularly known as Mushkbala (Kashmiri/ Hindi), Sugandhbala or Tagar (Sanskrit), grows wild in the temperate Western Himalayan region between 1000 m and 3500 m altitude. Natural populations of the species are found mostly as undercover on moist slopes along the streams. The reported annual demand of *Valeriana jatamansi* from the North-Western Himalayas is up to 500 tonnes which is collected from the wild in form of uncharacterized raw produce. Over-exploitation of rhizomes for its medicinal and aromatic value has resulted in rapid depletion of natural resources and it is now considered as endangered in the Himalayas. In spite of its utility as a medicinal and aromatic plant, commercial cultivation is not being done on account of lack of characterized planting material and suitable varieties.



'Him Surbhit' (CSIR-IHBT-VJ-05)

The variety 'Him Surbhit' (CSIR-IHBT-VJ-05) of *Valeriana jatamansi* has been developed by CSIR-Institute of Himalayan Bioresource Technology, Palampur through progeny selection approach. The variety has root biomass yield of 3.40 - 4.50 tonnes/ha and essential oil content of 0.29 - 0.31% after two years of growth and was selected from breeding lines developed from germplasm collections through progeny selection. The variety was evaluated in multi-location trials and found to be vigorous in growth with good adaptability in mid and high hill regions.

Uses

The roots and rhizomes of Indian valerian contain sedative properties due to presence of iridoid compounds like valepotriates which are used for the treatment of leprosy and lewy body dementia. The species is also a source of high quality essential oil which is used in the perfumery.



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Breeding methodology

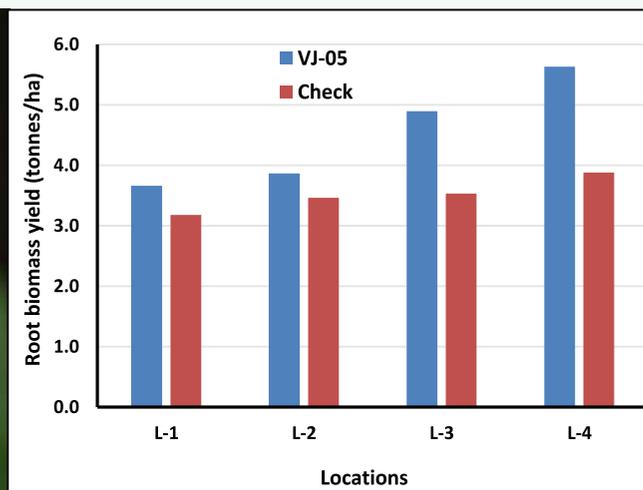
Indian valerian (*Valeriana jatamansi*) is an aromatic herb, commercially used for its essential oil present in roots of the plant collected from wild. The floral biology of *Valeriana jatamansi* is often cross pollinated. Selective breeding of *Valeriana jatamansi* was done using progeny selection approach. Ten selections including check (Himbala) were evaluated in multi-location trials for root biomass and essential oil content at four locations in mid and high hill regions of western Himalayas for two years. Experiments were laid out in Randomized Block Design (RBD) with three replications. CSIR-IHBT-VJ-05 has a root biomass yield of 3.40 - 4.50 tonnes/ha and essential oil content ranging from 0.29 - 0.31% after two years of growth period.



Controlled pollination (selfing) in *Valeriana jatamansi*



Flowers of CSIR-IHBT-VJ-05



Field performance of VJ-05 in comparison to check over different locations

Propagation of *Valeriana jatamansi*

Valeriana jatamansi is propagated by seeds which are sown during March- April. Sowing is done in raised beds under partial shade conditions (75% shade). The seeds are very small in size, therefore seeds are sown on surface of the nursery beds and covered with thin layer of soil mixture. Light irrigation is done to keep the beds moist during germination. Seedlings at 2-3 leaf stage are transplanted in polysleeves to avoid over crowding. Seedlings are ready for transplanting after 3-4 months.



Field performance of VJ-05 in comparison to check over different locations



Seedlings of CSIR-IHBT-VJ-05 in nursery ready for transplanting in the field



Field view of CSIR-IHBT-VJ-05



Roots of CSIR-IHBT-VJ-05 and control



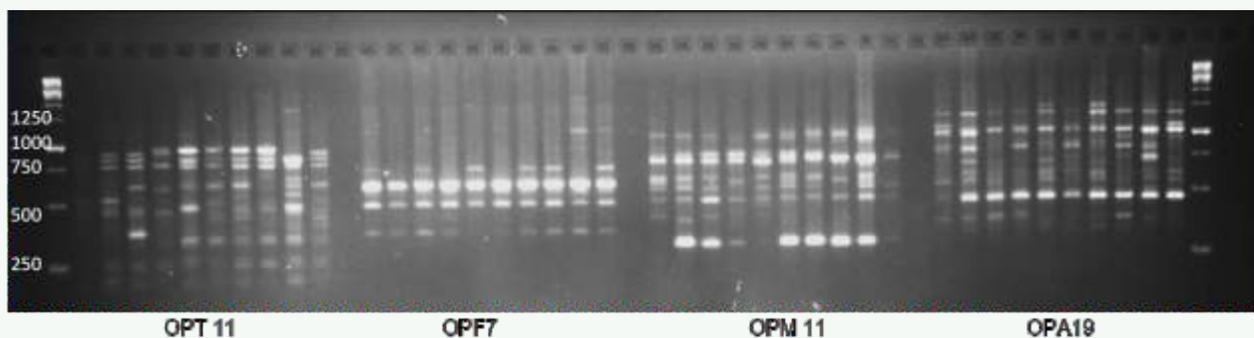
Leaf of CSIR-IHBT-VJ-05

Statement of distinction

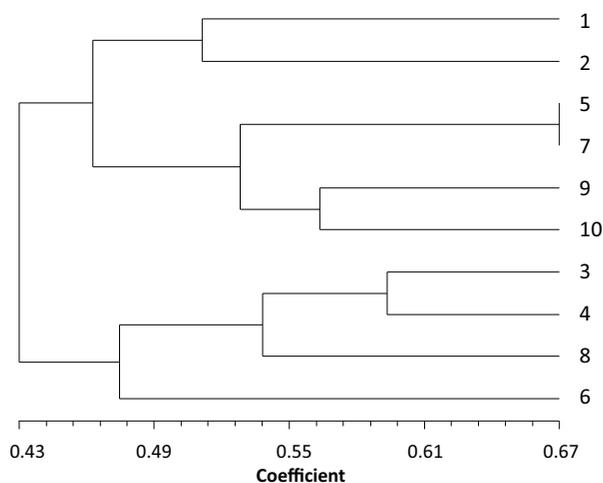
Variety 'Him Surbhit' is about 45 cm in height with compact plant stature and multiple branches which are in the form of rosette. It has large leaves, dark green in colour with multiple clusters of inflorescence.

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

Genetic distinctness of selection 'Him Surbhit' (CSIR-IHBT-VJ-05) was established using 13 RAPD markers. Ten selections namely, VJ-01 to VJ-09 and VJ-10 as check variety (Himbala) of *Valeriana jatamansi* (Indian valerian) were studied for diversity. In total, 99 alleles were detected ranging from 4 to 11 with an average of 7.6 alleles per RAPD locus. Thirteen RAPD markers evincing reproducible polymorphic loci among the CSIR-IHBT-VJ-05 (Him Surbhit) 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 ten selections based on 99 polymorphic loci grouped in four major groups. Improved selection VJ-05 captured significant diversity and clustered with selection VJ-07. Pair-wise genetic similarity (GS) of VJ-05 varied from a minimum of 40% (VJ-03) to maximum of 67% (VJ-07). In conclusion, genetic similarity data based on 99 polymorphic loci suggested that improved selection VJ-05 has captured high level of genetic diversity and can be potentially used as promising parental group for future genetic improvement programme of *Valeriana jatamansi*.



Representative RAPD profile of *Valeriana jatamansi* selections using four RAPD primers



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

Table represents Jaccard's similarity coefficients among the *Valeriana jatamansi* selections

	1	2	3	4	5	6	7	8	9	10
1	1									
2	0.51	1								
3	0.43	0.56	1							
4	0.29	0.48	0.59	1						
5	0.41	0.47	0.40	0.49	1					
6	0.33	0.45	0.43	0.47	0.46	1				
7	0.45	0.51	0.44	0.42	0.67	0.47	1			
8	0.37	0.47	0.55	0.53	0.45	0.53	0.52	1		
9	0.47	0.46	0.39	0.37	0.54	0.39	0.50	0.40	1	
10	0.43	0.49	0.40	0.40	0.53	0.43	0.54	0.50	0.56	1

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