

# Sea wormwood (*Artemisia maritima*) variety

## Him Devsugandh (CSIR-IHBT-AM-02)

### Introduction:

Sea wormwood (*Artemisia maritima*) is a strongly aromatic, herbaceous perennial plant. The plant produces many leaves on short branches, and flowering stems are of 20 - 50cm in length. It belongs to Asteraceae family and is widespread throughout the Northern hemisphere. The leaves are pinnatifid and highly pubescent. Small oblong flower heads, with three to six tubular florets, are produced in August and September in form of racemes. *Artemisia maritima* is found naturally in the western Himalayas between altitudes range of 2500 m – 3500 m. It can be grown in degraded poor dry soil (pH range 6.0 to 7.6) under temperate conditions but requires adequate sunlight for growth. The plants are drought tolerant.

### Uses

Sea wormwood is used mainly as a tonic to the digestive system, in treating intermittent fevers and as a vermifuge. The leaves and flowering shoots are anthelmintic, antiseptic, antispasmodic, carminative, cholagogue, emmenagogue, febrifuge, stimulant, stomachic, tonic and vermifuge. The young floral heads contain vermicide 'santonin' and growing shoots repel insects and mice, while an infusion of sea wormwood discourages slugs and insects.



### Him Devsugandh' (CSIR-IHBT-AM-02)

The variety 'Him Devsugandh' (CSIR-IHBT-AM-02) of *Artemisia maritima* has been developed by CSIR-Institute of Himalayan Bioresource Technology, Palampur through half-sib progeny selection approach. The variety has biomass yield of 2.80 - 3.40 tonnes/ha and essential oil content ranging from 0.22 - 0.23% and was selected from breeding lines developed from germplasm collections through half-sib family selection. The variety was evaluated in multi-location trials and found to be vigorous in growth with good adaptability.



सीएसआईआर-हिमालय जैवसंपदा प्रौद्योगिकी संस्थान  
पालमपुर हिमाचल प्रदेश - 176 061 भारत  
CSIR-Institute of Himalayan Bioresource Technology  
Palampur Himachal Pradesh - 176 061 INDIA



## Breeding methodology

Sea wormwood (*Artemisia maritima*) is an aromatic herb, widespread in its distribution in the Western Himalayas in altitudinal range of 2500 to 3500 m. Pollen dispersal in sea wormwood is brought about by wind suggesting cross pollinated breeding behaviour. Accordingly for varietal development, selective breeding of Sea wormwood was done using half-sib progeny selection approach. Eight potential selections of *Artemisia maritima* identified on the basis of biomass yield were evaluated in multi-location trials with population mean as check in a Randomized Block Design (RBD) with three replications at four different locations in Himachal Pradesh. CSIR-IHBT-AM-02 has biomass yield of 2.80 - 3.40 tonnes/ha and essential oil content of 0.22 - 0.23%.

## Agrotechnology

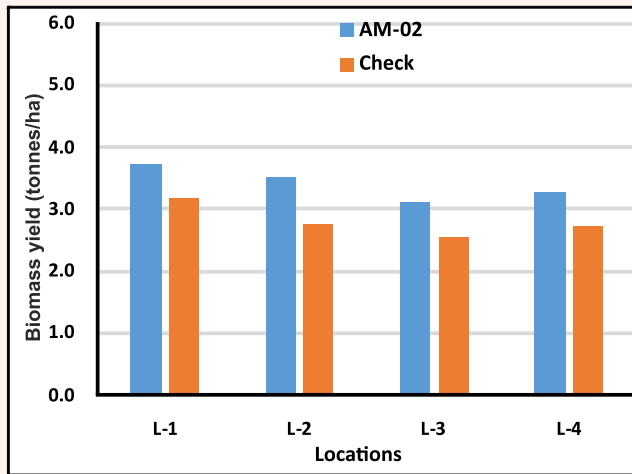
The crop is most suitable for the production of essential oil in the high hills of Western Himalayas. The crop is perennial and flowers during July- August. Cultivation of sea wormwood (*Artemisia maritima*) is done by sowing of seeds in nurseries and transplanting in fields. The essential oil is present in the aerial biomass, therefore, the crop is harvested in the month of September when the plants acquire maximum biomass. The plants become dormant during the onset of winter season when temperature falls below 5 °C. However, the stems remain viable and re-sprout during spring season after melting of the snow.

## Propagation

Sea wormwood (*Artemisia maritima*) is a perennial crop and can be raised by seed sowing in the nurseries followed by transplanting. Seeds of *Artemisia maritima* are very light and small in size, therefore, should be sown at soil surface and evenly distributed and covered with thin layer of soil mixture. Seed germination starts after about 3-4 weeks of sowing. In case of transplantation, spacing of 40 x 45 cm is maintained for proper growth of the plants.



Field view of CSIR-IHBT-AM-02



Field performance of AM-02 in comparison to check over different locations



Young seedlings of AM-02 raised in polysleeves

### Harvesting, distillation and storage

Essential oil is present in leaf and flower parts of the crop and high in the inflorescence. Therefore, as a common practice, crop is harvested above the ground level at full bloom stage. The essential oil extraction from the crop is done through steam distillation. The produce should be distilled within 2-3 hours of harvesting. Aerial biomass or essential oil should not be exposed to sunlight, moisture and high temperature at any stage of distillation as these factors deteriorate the oil quality. *Artemisia maritima* oil is pale yellow 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.

### Statement of distinction

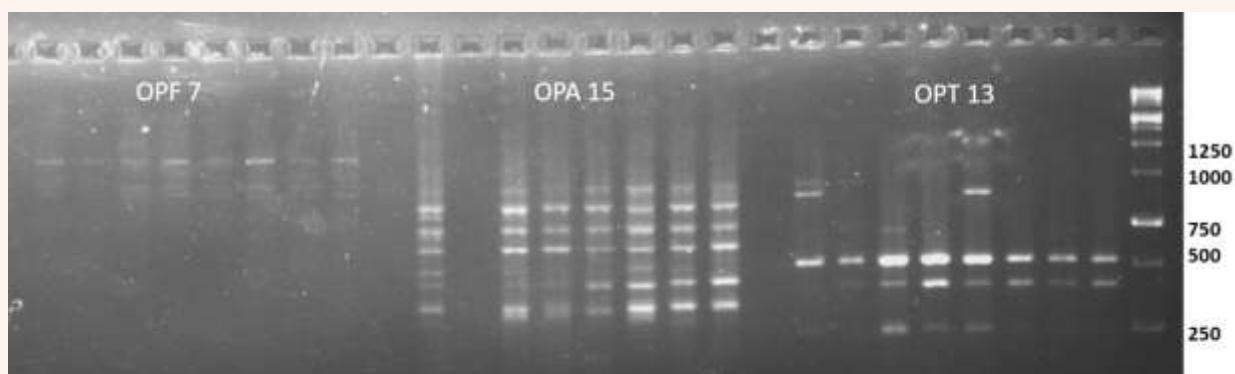
Cultivar Him Devsugandh is about 60 centimeters in height with spreading plant stature and multiple branches. It has long narrow leaves, pale green in colour with multiple clusters of flower heads.



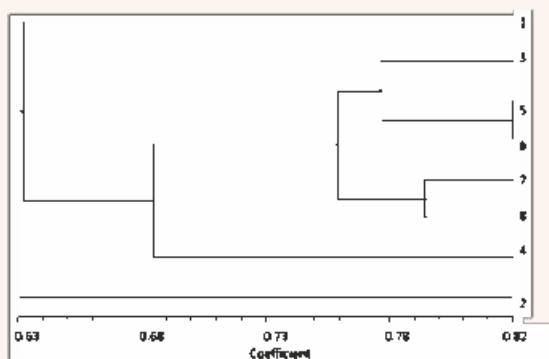
Artemisia seedlings raised in nursery

## DNA Fingerprinting of improved cultivar 'Him Devsugandh' using RAPD markers

Genetic distinctness of selection 'Him Devsugandh' (CSIR-IHBT-AM-02) was established using 12 RAPD markers. Eight selections namely, AM-01 to AM-08 of *Artemisia maritima* (sea wormwood) were used for comparison purpose. In total, 70 alleles were detected ranging from 3 to 11 with an average of 5.8 alleles per RAPD locus. Fourteen RAPD markers evincing reproducible polymorphic loci among the CSIR-IHBT-AM-02 (Him Devsugandh) and other selections were used for development of fingerprints. Based on the RAPD data, consolidated DNA fingerprints were developed with rare or unique marker loci. Cluster analysis of eight selections based on 70 polymorphic loci grouped in three major groups. Improved selection AM-02 captured significant diversity and clustered with selections AM-05 and AM-06. Pair-wise genetic similarity (GS) of AM-02 varied from a minimum of 60% (AM-04) to maximum of 68% (AM-07). In conclusion, genetic similarity data based on 70 polymorphic loci suggested that improved selection AM-02 has captured high level of genetic diversity and can be potentially used as promising parental group for future genetic improvement programme of *Artemisia maritima*.



Representative RAPD profile of *Artemisia maritima* selections using RAPD primers



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

Table represents Jaccard's similarity coefficients among the *Artemisia maritima* selections

	1	2	3	4	5	6	7	8
1	1.00							
2	0.61	1.00						
3	0.65	0.65	1.00					
4	0.63	0.60	0.67	1.00				
5	0.70	0.63	0.77	0.68	1.00			
6	0.60	0.60	0.77	0.68	0.83	1.00		
7	0.65	0.68	0.75	0.70	0.74	0.81	1.00	
8	0.54	0.61	0.72	0.67	0.77	0.74	0.79	1.00

### Developers:

Dr. Ashok Kumar  
Dr. Sanatsujat Singh

### Contributors:

Dr. Rakesh Kumar  
Dr. Ram Kumar Sharma  
Dr. Dinesh Kumar

### Contact

Dr. Sanjay Kumar  
Director,  
CSIR-Institute of Himalayan Bioresource Technology  
Post Box No.-06, Palampur-176061 (H.P.), India  
Telephone: +91 1894 230411  
Fax: +91 1894 230433  
Email: [director@ihbtres.in](mailto:director@ihbtres.in)  
Website: <http://www.ihbt.res.in>