

## Title of the Technology:

### Macro-proliferation technique for Mushakbala Multiplication

**A. Nature of technology:** Mass Propagation Technology

#### **B. Process in Brief:**

*Valeriana jatamansi*, Jones commonly known as Mushakbala is an important temperate medicinal plant species found in western Himalayas and possesses great potential for commercial cultivation. The species can be easily grown by seeds but the vegetative propagation has scientific advantage over sexual propagation. The mature plant of Mushakbala can be utilized for vegetative multiplication by exploiting such characters of the species. Keeping the above points in mind, macro-proliferation technique has been developed for vegetative multiplication of this important medicinal plant species. This technique ensures that each propagule possesses some parts of shoot along with rhizome parts and roots at the time of separation from mature healthy plants. By the application of this technique a healthy mature plant can be multiplied 8 to 12 times successfully. In addition to multiplication >50% yield of rhizomes and roots can be recovered for marketing or various other uses. In general it is always better to go for this technique during rainy season. Besides, times of macro-proliferation (separation) from mature plant and appropriate conditions for rapid establishment of macro-proliferated propagules are very critical, those have been standardized and presented in the following table.

S. No.	Time of Macro-proliferation (Month of the year)	Conditions for rapid establishment of macro-proliferated propagules	Success Rate
1.	April to October	Placement in Poly-hose conditions for 1½ months and subsequent planting in the field	Almost 100%
2.	June to September	Placement in Sand trays for 1 ½ months and subsequent planting in field	> 95%
3.	June to August	Direct planting in field for 2 ½ to 3 years	> 90%

#### **Field Application:**

It is simple manual technique, requiring secateurs or scissors to separate macro-proliferated propagules from healthy mature mother plant. The technique should be performed either in morning/evening hours under shade conditions. The separated propagules should be planted immediately as per the facilities available to avoid desiccation or placed in moist clothes/moss. The month of application of this technique also depends upon the facilities available for subsequent establishment. The specifications of separated propagule *i.e.* shoot length >1", rhizome length >1", fine roots: 2 no. or more and leaves retained: ½ to 1 should be considered strictly for better survival and initial growth.

#### **C. Beneficiaries of technology**

##### **1. Prominent Beneficiaries/User groups**

Technique was standardized and thereafter, produced around 2.8 lakhs plants under National Medicinal Plants Board (NMPB) project. The planting material was supplied to various end users like farmers, NGO's, State Forest Department etc.

**2. Number of clients to whom technology has been transferred / sold**

Technique has been disseminated to various stakeholders such as local communities including farmers, women groups like Mahila Mandals, etc., NGOs and field functionaries of State Forest Departments. Till date it has been demonstrated to >500 people through various training programmes organized by the Institute during the last five years. Besides this, a booklet and a pamphlet in simple Hindi were published containing this technique and distributed to various stakeholders.

**3. Potential for future dissemination (As the case may be)**

The propagation technique developed will be disseminated /transferred in the North West Himalayas through training and demonstration programmes and also by developing and disseminating user friendly publicity material in vernacular language for popularizing this technique in the field at grass root level.

**D. Economic significance**

**1. Potential to address livelihood issues and generated additional income**

The species is a versatile medicinal plant and grows in mid and higher temperate Himalayas. It is important to exploit the versatility of this species by popularizing it among local communities. The underground parts of this species not only have medicinal properties but oil obtained from rhizomes is required in large quantity by perfumery and other industries. Therefore, it provides an alternative to traditional farming and also possesses potential in addressing livelihood issues and generating additional income by way of diversification.

**2. Productivity enhancement and Economic Benefits over replaced technology**

Through this technique genetic identity of stock can be maintained. The species can be propagated very well through seeds. It is well recognized fact that the productivity of vegetatively multiplied stock is more as compared to stock of seed origin, however, the comparative studies of productivity enhancement and economic benefits have not been carried out till date.

**3. Impact of Technology (As the case may be)**

By adopting this technology sustained supply of planting material of desired genetic worth can be maintained from the nursery for cultivation in the field. People can be trained for producing nursery stock of this species themselves for meeting out their requirements. Depletion of this species in its natural zone could be halted by encouraging cultivation of this species in farmer's field.

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