Sarpagandha

*Rauvolfia serpentine* Benth

**Family: Apocynaceae**

An erect, green perennial under shrub, 15-45 cm. (rarely 90cm) high; tap root tuberous, soft, sometimes irregularly nodular; bark pale brown, corky with irregular longitudinal fissures; leaves in whorl of three, large, 7.5-17.5cm × 4.3-6.8 cm., elliptic-lanceolate or obavate, acute or acuminate, dark green above and pale green below; flowers white or pinkish, in many-flowered cyme; fruit a drupe, slightly connate, obliquely ovoid, purplish black; pyrenes slightly rugose.

**Vernacular Names:**

Sanskrit – Sarpagandha, chandrika

Urdu – Asrel

Hindi – Chandrabhaga, chota-chand

Kannada – Sarpagandhi, shivanabhi bali

Mar – Harkaya, harki

Telugu – Paatalagani, paataala garuda

Tamil – Shivan amelpodi

**Distribution:**

*R. serpentina* widely distributed in the sub Himalayan tract from Punjab eastwards to Nepal, Bhutan and Sikkim, in Assam, in the lower hills of Gangetic plains, eastern and Western Ghats, in some parts of central India and in the Andamans. Beyond India, the plant is distributed in East Pakistan, Ceylon, Burma, Malaya, Thailand and Java. It is found usually in moist deciduous forests at altitudes ranging from 1200m. It is seldom found in evergreen forests except at their very edges and is absent on open country.

**Threat status:**

**Agro-climatic requirements:**

*R. serpentina* can grow under a wide range of climatic conditions. It flourishes in a hot humid condition with a range of temperature from 10-38\(^{\circ}\) and can be grown both in the open and in partial shade; it cannot stand the full open sun. In its natural habitat the plant thrives under the
shade of forest trees or at the very edge of the forests where three of the four sides are protected against too intense an illumination. It prefers a tropical or sub tropical belt having the benefit of monsoon rains (250 cm-500 cm rainfall annually), preferably the south-west. The plant grows in a wide variety of soils from sandy alluvial loam to red lateritic loam or stiff dark loam. The soil should be acidic with pH about 4.0-7.0.

**Varieties:**

S.R-1 (Jawaharlal Nehru agriculture university, Indore, M.P.)

**Cultivation:**

*R. serpentina* can be propagated by seeds, root cuttings, root stumps and stem cuttings.

Seed propagation is done by direct sowing of seeds in the field has not been found successful and hence seedlings are raised in the nursery and transplanted in the field. The germination percentage of seeds is very poor and variable (25-50%) and is often as low as 10 percent. This is attributed partly to the adverse influence of the stony endocarp.

For propagation root cuttings, large tap roots with a few filliform lateral secondary rootlets are used. Cuttings 2.5-5.0 cm long are planted horizontally about 5 cm. near 50% of the root cutting sprouts in about a month.

Propagation by root stumps using about 5 cm of root and a portion of stem above the collar. This method met with about 90-95 percent success or sometime even 100 percent.

Stem cuttings taken from woody twigs have also been tried for propagation. Hard wood cuttings have been found better than softwood cuttings; cuttings, 15.0-23.0 cm long having three internodes are most suitable.

**Manure and fertilizers:**

Farmyard manure or compost at the rate of 30-37 cartloads per hectare is applied. 30 kg N in 3 divided dose and 60 kg P₂O₅ and 30 kg K₂O per hectare applied during transplantation.

**Intercultural and pruning:**

During rainy season no need to irrigate the plantation, in summer and winter monthly once irrigation is required. Weeding and hoeing is done once before monsoon starts, second in the month of December and twice in rainy season.

**Plantation protection:**

*R. serpentina* is susceptible to various diseases like leaf spot, mosaic, leaf blotch, leaf blight and bud rot. Spraying Dithane M-45 or Dithane Z-78 and 0.3% Blitox fungicide controls infection.

A very few pests have been recorded. A pyralid caterpillar causes appreciable damage to the leaves. By spraying Rogar (0.2%) pesticide controls infestation.
Harvesting and yield:

Roots of exploitable size are generally collected 2-3 years after planting. When plants have shed their leaves, are far richer in the total alkaloid content.

Roots dug up, freed from the adhering soil and during the process care should be taken not to damage the bark of the root. Such collected roots are thoroughly air dried and packed usually in gunny bags.

Though the R. serpentina can be propagated by various methods, optimum yield of roots (including thick, thin and fibrous) is obtained when propagation done by seeds. The yield of fresh root per plant varies from 0.1 kg to 4.0 kg (air dry basis). Plants raised from seeds work out about 1175 kg per hectare as compared with 175 kg in case plants raised from stem cutting and 345 kg obtained from root cuttings. Two year old plantation yield 2,200 kg of air dried roots per hectare and 3,300 kg from a 3-year old plantation.

Cost of Cultivation: Approximate cost of cultivation comes around Rs. 62,000/- per hectare.

Inputs:

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Materials</th>
<th>Per acre</th>
<th>Per hectare</th>
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<tbody>
<tr>
<td>1</td>
<td>Seeds (kg)</td>
<td>4</td>
<td>10</td>
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<tr>
<td>2</td>
<td>Farm Yard Manure (t)</td>
<td>4</td>
<td>10</td>
</tr>
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<td>3</td>
<td>Fertilizer (kg)</td>
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<tr>
<td></td>
<td>N</td>
<td>24</td>
<td>60</td>
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<td></td>
<td>P₂O₅</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>K₂O</td>
<td>12</td>
<td>30</td>
</tr>
</tbody>
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Parts used: Roots

Medicinal Uses:

In recent years, sarpagandha and its preparations have become important therapeutic agents, both anti hypertensive and as sedatives. Rauvolfia has been employed for the relief of various central nervous system disorders, both psychic and motor, including anxiety states, excitement, maniacal behavior associated with psychosis, schizophrenia, insanity, insomnia and epilepsy. Extracts of roots are valued in the treatment of intestinal disorders, particularly diarrhea and dysentery and also as anthelmintic. Mixed with other plant extracts, they have been used in the treatment of cholera, colic and fever. The root believed to be stimulating uterine contraction and promote expulsion of foetus. The root is used as a remedy for poisonous snake bites and sting of insects. In colic one part of the root with two parts of the root of Holarrhena antidysentrica and three parts of Jatropha curcas is given in milk. In fever the root with andrographis paniculata, ginger and black salt is used. The reflexes and sensation of pain are not affected by ordinary doses of the drug; if, however, the dose is large it produces deep sleep, the reflexes and sensation
of pain are diminished and death may result from asphyxia due to paralysis of the respiratory centre. The juice of leaves has been used as a remedy for opacity of the cornea.