

# Propagation prospects of dye yielding plant *Rhinacanthus nasutus* (Linn.) Kurz

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## Abstract

The paper deals with cultivation prospects of an indigenous plant, *Rhinacanthus nasutus* (Linn.) Kurz, which is commonly used for extracting a dye and for various medicinal purposes. Due to over exploitation this herb is vanishing from natural habitat hence its propagation on commercial scale is recommended. An attempt is made to propagate this plant through stem cuttings; rooting of stem cuttings through application of growth regulators has been undertaken as a protocol for large scale propagation. Maximum rooting percentage (75%) was observed in apical shoot cuttings treated with 2000 ppm of IBA followed by 2000 ppm of IAA.

**Keywords:** *Rhinacanthus nasutus*, Threatened plant, Propagation, Natural dye, Medicinal uses

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## Introduction

*Rhinacanthus nasutus* (Linn.) Kurz syn. *Rhinacanthus communis* Nees (Hindi — *Palak juhi*) belonging to the family *Acanthaceae* is an indigenous plant species of South West Bengal. A shade loving perennial shrub commonly known as *Rangchita* is found wild in the road side bushes. The plant is 60-76cm in height, leaves are ovate to oblong, sparsely to densely pubescent, 4-6cm long, base rounded to cordate, apex short acuminate. Flowers are violet in colour.

The origin of the plant is both from India and China. It grows well in the red lateritic soil of Midnapore, Purulia and Bankura district of West Bengal. The areas receiving rainfall between 1000-1200mm and the temperature range between 25-28°C have been found to be

suitable for optimum growth of the plant. Too high temperature (35°C and above) does not favour plant growth. During rainy season the plant grows vigorously whereas in summer, the aerial part mostly dries up and the root portion remains intact. It is highly susceptible to water logging and water stagnation for a period of 1-2 days cause damage to the plant.

All green parts of the plant possess dye yielding brown coloured pigments and are widely used for colouring the mats in the rural areas. The species may find place in Red Data List of threatened plants because of over exploitation. Study reveals that over exploitation is caused not only due to its collection for dye extraction but also for medicinal uses of the plant. The root bark of this species contains viscous, colourless, rhinacanthin (C<sub>14</sub>H<sub>18</sub>O<sub>4</sub>), not a glucoside. In some respects it resembles

chrysophanic acid. The rural people frequently use the leaves and woody root of the plant for the treatment of ringworm and other skin infections. Therefore, for the rare occurrence in the natural habitat, the plant may be considered as endangered species and it is necessary to conserve the species both *in situ* and *ex situ* condition.

In spite of its economic importance, the dye has not yet been properly commercialized due to non availability of the raw material as well as the ignorance of the rural people. By looking into the great demand for plant material, an attempt is therefore made to propagate this plant through stem cuttings which is the most convenient method for vegetative propagation as followed by Reddy *et al*<sup>1</sup>. Rooting of stem cuttings through application of growth regulators has been undertaken as a protocol for large scale propagation of this herb following the method of Jayasankar *et al*<sup>2</sup> and Rao *et al*<sup>3</sup> with minor modifications.

## Propagation

The stem cuttings were collected from the plants grown in the wild habitat of Midnapore district, South West Bengal in rainy season during the year 2003. Two types of stem cuttings were used, viz. (a) Apical shoot cuttings (b) Mid cuttings.

Cuttings with 1-2 nodes were used in the experiment. The cuttings were first treated with 1% Bavistin solution (a broad spectrum fungicide), later the cut ends were dipped in 500, 1000, 2000, 2500 and 3000ppm of different growth regulators, viz. Indole Acetic Acid (IAA), Indole Butyric acid (IBA) and Naphthalene Acetic Acid (NAA), etc. for 5 minutes. For 0 ppm (treated as control), the cuttings were treated with distilled water for 5 minutes. Each treatment was replicated thrice and twenty five cuttings were maintained in each treatment. Treated cuttings were planted in polybags filled with sand, soil and FYM (1:1:1) and watered regularly in the morning. Periodic observations were made to notice the performance and changes in these cuttings.

It was observed that most of the leaves especially in the mid cuttings had fallen but in case of apical shoot cuttings,



Fig. 1 : Rooted apical shoot cuttings, A. Control; B. IAA 2000 ppm; C. IBA 2000 ppm



Fig. 2 : Developed plant

the leaves were turgid and intact. No callus formation was noticed in apical shoot cuttings. However, root initiation was observed at 500 ppm concentration after 21 days of treatment. In mid cuttings, callus formation was observed after 12 days and root initiation was recorded after 25 days. No rooting was observed in control both in mid cuttings and apical shoot cuttings even after 40 days.

## Results

Maximum rooting percentage (75%) was observed in apical shoot cuttings treated with 2000 ppm of IBA followed by 2000 ppm of IAA (Table 1; Fig. 1). In general IBA was found to be more effective to promote rooting as compared to the other growth regulators. More profuse and longer roots were observed in cuttings treated with IBA. NAA was less effective compared to IBA and IAA for root initiation. Similar response was noted by Thai<sup>4</sup> for root initiation in some selected timber species. Higher concentration of growth regulators suppressed the rooting percentage per cutting. The shoot cuttings having maximum number of roots were transferred to the field condition and grew successfully throughout the year (Fig. 2).

## Conclusion

The present study provides a further research scope on *in vitro* and *ex vitro* propagation of the species and to commercialize a natural dye extracted from this wild species.

## References

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**Table 1 : Rooting response of apical shoot cuttings and mid cuttings of *Rhinacanthus nasutus* (Linn.) Kurz treated with various growth regulators**

Growth regulators	Treatment (ppm)	Rooting (%)	
		Apical shoot cuttings	Mid cuttings
IAA	500	12	8
	1000	32	21
	2000	60	52
	2500	45	30
	3000	14	8
IBA	500	15	10
	1000	36	25
	2000	75	58
	2500	48	35
	3000	18	12
NAA	500	6	2
	1000	11	8
	2000	25	18
	2500	17	12
	3000	9	4
Control	0	0	0