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Research Article

# *Roylea cinerea* (D. Don) Baillon: A Traditional Curative of Diabetes, its Cultivation Prospects in Srinagar Valley of Uttarakhand

**Rakhi Rawat and DP. Vashistha**

Department of Botany & Microbiology, H N B Garhwal University (A central University) Srinagar-Garhwal-246174, Uttarakhand, India.

**ABSTRACT**

*Roylea cinerea* (D. Don) Baillon, is traditionally used for the cure of ailments such as fever, jaundice, skin disease, malaria and most prominently in diabetes. Present communication provides information on the herbal uses, phytochemical composition, and propagation behaviour of this plant. The plant is propagated both by seeds and vegetativly. The highest seed germination was observed in sandy soil, whereas the maximum vegetative propagation by stem cutting was observed in farmyard compost in spring season.

**Keywords:** Diabetes, propagation, *Roylea cinerea*, traditional cure.

## INTRODUCTION

*Roylea cinerea* (family-Lamiaceae), commonly known as Karui, is used locally to cure ailments such as fever, malaria, skin diseases and diabetes. But, none of the pharmaceutical companies are using *Roylea cinerea* as a drug component. Therefore, this herb can be a potentially new source for the cure for several diseases. The objectives of the present study were to describe medicinal uses, chemical composition and propagation behaviour of *Roylea cinerea.*

## MATERIAL AND METHODS

Propagation by stem cutting and seed germination was studied in laboratory and field condition by adopting the method of Heartrment and Kester, 2002. The vegetative propagation by stem cutting was studied in main growing season viz, spring ($15^{th}$ Ferbury-$15^{th}$ March) and rainy season ($15^{th}$ July-$15^{th}$ August). One to two year old 15-20 cm long with approximate diameter 1-2 cm, healthy shoots were selected, in such a way that each cutting has at least 4 nodes. The cuttings were planted in perforated polythene bags filled with different type of soil viz, garden soil (S1), farm yard compost soil (S2), red soil (S3), forest soil (S4) and sandy soil (S5). The soil analysis of different soil compositions used under present study was carried out at Regional Soil Testing Laboratory, Uttrakhand, India. The cuttings were kept for 90 days and periodical observation for sprouting and rooting were made. All through minimum soil moisture content was maintained. The seed germination was studied in field conditions. For seed germination in soil, seeds were sown in different soil samples contained in polythene bags. The periodical observations of seed germination were made up to 45 days keeping the ideal condition for germination.

For the habit and distribution study different places were visited to record and mark the presence of *Roylea cinerea* in Uttarakhand. The information on the medicinal uses was gathered from the people of different villages in the State. This information gathered was supplemented with data available in herbal literature.

## RESULT AND DISCUSSION

A variation in total sprouting and rooting was observed in different soil samples and seasons (Table 1). The maximum sprouting was observed in spring season in farmyard compost (70%) followed by forest soil (65 %). The lowest value sprouting was observed in red soil (26%). The sprouting is also recorded photographically (Fig.1).

**Table 1: Growth parameters sprouting of shoot cuttings after 90 days**

| Soil type | Spring season | | | | Rainy season | | | |
|---|---|---|---|---|---|---|---|---|
| | Percent of sprouted cutting | No of sprout per cutting | Maximum width of leaves (cm) | Maximum length of leaves (cm) | Percent of sprouted cutting | No of sprout per cutting | Maximum width of leaves (cm) | Maximum length of leaves (cm) |
| **S1** | 60± 10 | 7± 1 | 1.3 ± 0.1 | 2.3± 0.3 | 43.33± 11.5 | 8 ± 1 | 3.36± 0.4 | 4.6± 0.62 |
| **S2** | 70± 10 | 9± 0.5 | 2.9± 1.4 | 4.16± 0.2 | 46.66± 5.77 | 7.66± 0.57 | 3.5 ± 1.12 | 4.5 ± 0.62 |
| **S3** | 26± 5 | 5± 0.5 | 1.2± 0.2 | 2.16± 0.15 | 26.66± 11.5 | 7.66± 0.57 | 3.1± 1.24 | 3.75± 1.11 |
| **S4** | 65± 5 | 9 ± 1 | 2 ± 0.5 | 2. 9 ± 0.2 | 56.6 ± 20.8 | 9.33± 1.15 | 4.43± 0.46 | 5.33± 0.15 |
| **S5** | 60± 17 | 8.6 ± 1.1 | 1.6± 0.2 | 2.6 ± 0.5 | 43.33± 11.5 | 8.33± 1.52 | 3.76± 0.45 | 4.93± 0.64 |

The results of soil testing are presented in Table 2. The results indicate the variation in soil parameter viz. organic carbon, phosphate and potassium in different soil. Propagation results varied in different soil types. The maximum sprouting and rooting was observed in S2 and S4. These soils also have highest desirable soil properties such as organic carbon 0.780 and 0.795, potassium 271.04 and 274.40, phosphate 30.192 and 37.788, and soil Ph 7.0 and 6.5 respectively.

**Table 2: Chemical characteristics of the soil**

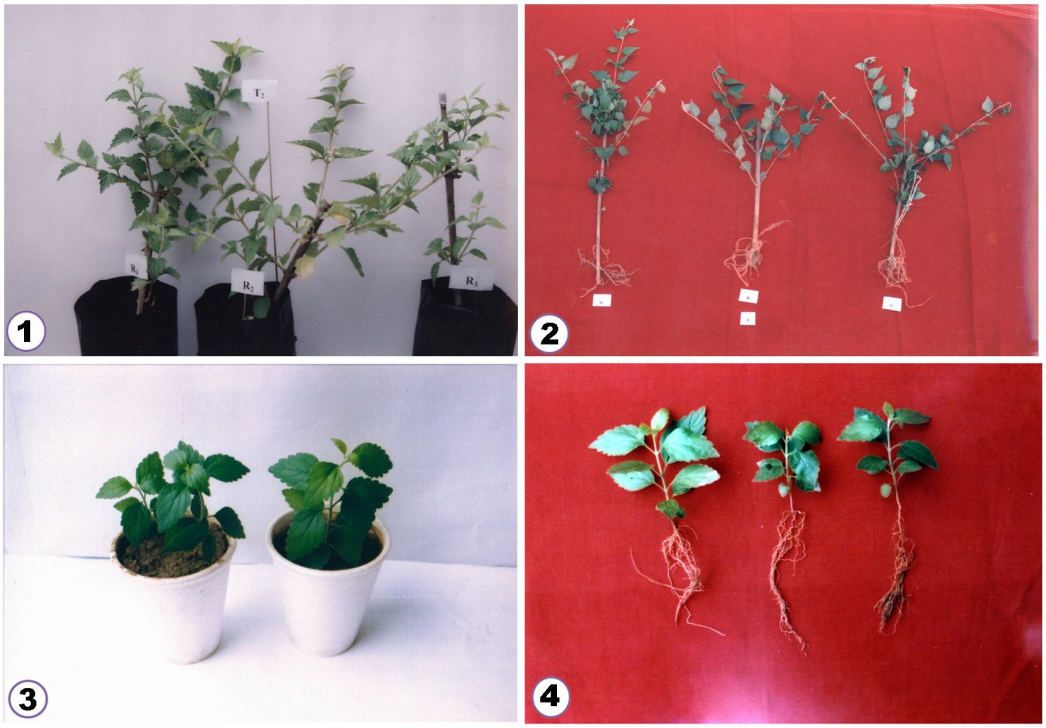
| Soil type | pH | Organic carbon | Phosphate | Potash |
|---|---|---|---|---|
| S1 | 7.1 | 0.630 | 20.720 | 224.00 |
| S2 | 7.0 | 0.780 | 30.192 | 271.04 |
| S3 | 6.5 | 0.525 | 28.712 | 215.04 |
| S4 | 6.5 | 0.795 | 37.788 | 274.40 |
| S5 | 6.9 | 0.435 | 13.616 | 215.04 |

After 90 days of planting, the stem cuttings were examined for root initiation and survival (Table 3, Fig. 2). Season wise the number of dead cutting was highest in rainy season which was almost 50% of the total cuttings. The survival of cutting was lowest in the red soil amongst all in both seasons. The rooting was highest in spring season. The maximum root growth and highest rooting was observed in the forest soil and farmyard compost.

**Table 3: Rooting response of *R. cinerea* after 90 days**

| Soil type | Spring season | | | | rainy season | | | |
|---|---|---|---|---|---|---|---|---|
| | Percent of rooted cutting after sprouting | Maximum length of root (cm) | Fresh weight (gm) | Dry weight (gm) | Percent of rooted cutting after sprouting | Maximum length of root(cm) | Fresh weight (gm) | Dry weight (gm) |
| **S1** | 10± 10 | 4.33 ± 4.5 | 0.15± 0.52 | 0.14± 0.135 | 13.3± 5.77 | 10± 4 | 0.316± 0.135 | 0.304± 0.428 |
| **S2** | 53.3± 15 | 11.33± 4.31 | 0.96± 0.57 | 0.916± 0.141 | 43± 5.77 | 20± 4.35 | 1.44± 1.141 | 1.296± 0.505 |
| **S3** | 10 ± 0 | 13.33 ± 3.7 | 0.043± 0.26 | 0.041± 0.048 | 13.3± 5.77 | 14.66± 4.5 | 0.379± 0.48 | 0.338± 0.245 |
| **S4** | 50 ± 10 | 11.66± 1.52 | 0.672± 0.54 | 0.615± 0.173 | 43.3± 5.77 | 21.66± 7.6 | 1.618± 0.173 | 1.471± 0.520 |
| **S5** | 53.3± 20 | 13.5 ± 3.5 | 0.66± 0.529 | 0.61± 0.299 | 40± 10 | 20.33± 9.8 | 0.766± 0.199 | 0.74± 0.5091 |

In present report the seed germinability also showed considerable variation in different soil medium. The sandy soil showed maximum germination (60%) followed by forest soil and garden soil, 27% and 10% respectively (Figs. 3 & 4). No seed germination was observed in red soil and farmyard compost. Sandy soil is always best for seed germination.



**Figs. 1-4: Propagation of *Roylea cinerea* .1: Sprouting and establishment of stem cutting of *Roylea cinerea* 2: Rooting in stem cutting of *Roylea cinerea,* .3: Seedling establishment of *Roylea cinerea*.4: Fully grow seedlings of *Roylea cinerea* (45 days old)**

The scrutiny of the data on phytochemical composition of *Roylea cinerea* reveales the presence of large number of medicinally important phytochemicals in different parts of the plant (Table 4). The most important compounds reported are glycosides and two diterpinoids-calyone and precalyone. The diterpinoids are commonly used as an important ingredient of several medicines against tumour, microbial infection, fever, diabetes etc. (Ranganayaki *et al* 1985; Dhobal and Joshi 1979; Ansari *et al* 1981, Dhobal *et al* 1981, Kumar *et al* 1981, Dwan *et al* 1979)

**Table 4: Phytochemicals of the plants parts**

| Organ | Phytochemicals |
|---|---|
| **Leaves** | Betulin, *β* -amyrin, *β* -sitosterol, stigmasterol, cetylalcohol, Glucose, Fructose, Arabinose, Palmitic, Stearic, Olic, Gallic, Oxalic, Tartaric, Anthraquinone glycoside, 1, 4-dihydroxy-6, 7-dimethoxy 2-methy 3-O- *β* -D-glycopyranoside, Flavonol glycoside, Quercetin 3 O- *β* -L-rhamnoside, Moronic acid, Calyone, Precalyone, and Calyenone. |
| **Stem** | Pentacosane, Octacosanol, Friedelin, *β*-amyrin, *β*-sitosterol, Betulonic acid, *β* -sitosterol- *β* -D glucoside and 5,6,7,4 -tetramethoxyflavone. |
| **Root** | 3-*β*-hydroxyolean-12-ed-28-oic acid. |

The collection of information on the medicinal use from local people and herbal literature has revealed that a large number of medicinal properties are associated with the plant. The bitter decoction of the leave is used as tonic. It is also prescribed as cure for fever, jaundice**,** skin diseases (Osmaston 1927, Gaur 1999). However, the medicinal use has remained confined to the local ethnic groups and are not economically exploited. Our scrutiny of the popular herbal drugs has revealed that in none of the branded medicine sold popularly in drug stores has this herb has as a sole or mixed component.

With such as vast possibilities, *Roylea cinerea* can be a potential herbal plant and can be recommended for the cultivation in valley regions in the middle Himalayas of Uttarakhand, as it has been established presently that the plant is able to propagate both vegetatively and by seeds in some preferred soil conditions. Further, as the plant has well recorded diterpinoids and glycosides constituent, it can find a place in various herbal prescription drugs. Further the *Roylea cinerea* can successfully grow naturally in the climatic zone of

Srinagar valley, undertaking the cultivation would be a cost effective.

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