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### Conservation of ret medicinal plants W.S.R to *Tinospora Malabarica* (Lam.) Hook.F. & Thoms

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#### Abstract

India is rich in medicinal plant diversity. Some of them are recognized and classified as RET medicinal plants. RET medicinal plants are Rare, Endangered and Threatened forests species growing and multiplied naturally in restricted areas. The RET medicinal plants which have been identified by IUCN are to be conserved by both In-situ & Ex-situ methods. These plants species play important role as folk remedies against many diseases. *Tinospora malabarica* (Lam.) Hook.f. & Thoms which is mainly found in South India also called as *Tinospora sinensis* is found to be threatened with Vulnerable status at Karnataka, Lower risk near threatened in Kerala and not evaluated status in Tamilnadu. It is a climber and mainly found as wild variety and commonly used in the treatment of Fever, Joint pain etc. In Ayurvedic Classics it is referred to *Kandobhava Guduchi* and used as *Jwaraghna*, *Vishagna* etc. Due to its wide use in folklore practice, it is moving towards extinction in the near future. Hence, Good collection and cultivation practices and techniques for in-situ and ex-situ conservation is need of the hour.

**Keywords:** *Tinospora malabarica*, *Kandobhava Guduchi*, RET plants, Folklore practice, Conservation

#### Introduction

India is floristically rich and is recognized as one of the 12 mega biodiversity centers of the world, ranking 10<sup>th</sup> among plant resources rich nations of the world and 4 among countries of Asia. Out of 900 major medicinal plants available in India, about 10% is highly threatened due to various reasons. In India, the unsustainable collection of medicinal plants from the wild for commercial purpose and habitat destruction due to urbanization stand high among the human induced causes of depletion of medicinal plant population [1].

Conservation is the process of management of biosphere in order to obtain the greatest benefits for the present generation and maintaining the potential for future. Over exploitation of natural reservoirs has led to the extinction of various plant species, while some others have become endangered. In order to meet the growing demand of herbal drugs, it is important to conserve genetic diversity by adopting conservation strategies.

The RET – Rare, Endangered and Threatened plant species can be defined as species with narrow geographical distribution ranges, highly specific habitat requirements or species restricted to only small populations. RET medicinal plants which have been identified by IUCN are to be conserved. IUCN recognizes the following categories extinct, extinct in the world, critically endangered, endangered, vulnerable, near threat, least concern, data deficient and not evaluated. Critically endangered, endangered and vulnerable together form the threatened category [2].

*Tinospora malabarica* have been mentioned among Red listed medicinal plants and it is categorized under vulnerable threat status.

The Present study was undertaken to review the conservation strategies for *Tinospora malabarica* [3].

#### Review on *tinospora Malabarica*

**Botanical Name:** *Tinospora malabarica* (Lam.) Hook.f. & Thoms

**Synonyms:** *Tinospora sinensis* (Lour.) Merr, *Tinospora tomemtosia*

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**Family:** Menispermaceae

**Sanskrit name:** *Kandodbhava guduchi*

**Morphological Description:** [4]

A large deciduous climber with rambling or dextrose stems, bearing aerial roots from branches, found almost throughout India, ascending to an altitude of c.1000 m. Bark papery, warty, pale brown or yellowish or grey; leaves orbicular-cordate; flowers dioecious, green, greenish yellow or yellowish green with a rather disagreeable smell, in slender, drooping, axillary racemes; drupes 1-3, ellipsoid, scarlet or orange coloured. It is a large deciduous extensively spreading climber with several elongate twinning branches to 1.5cm in diameter that are clothed when especially young with somewhat stiff scattered whitish hairs the older portions occasionally fairly smooth bearing fairly long petioled, broadly ovate, cordate, acuminate membranous leaves that are much larger than those of *Tinospora cordifolia* being 10-20cms or more long and 8-15cms or proportionately broad, seven nerved at base pubescent above whitish beneath and clusters of green pedicelled flowers on axillary racemes 7-15 cm long followed by smooth ovoid reddish or crimson drupes. Fruits are found in January.

**Leaves:** Simple, alternate, exstipulate, long petioled the petioles up to 15cm long roundish, pulvinate both at base and apex with the basal one longer and twisted partially or half way around blade broadly ovate or ovate cordate 10-20cm long and 8-15cm membranous, pubescent above and whitish tomentose and with the reticulum prominent beneath (the leaves of *Tinospora cordifolia* are quite glabrous).

**Flowers:** Unisexual on slender pedicels the staminate an pistillate on separate plants greenish yellow on racemes 7-15cm long that usually arise from the axils of fallen leaves on older portion of stems and branches, the staminate flowers usually occurs in clusters while the pistillate are mostly solitary. Sepals and petals similar in both staminate and pistillate flowers. Sepals 6 free in 2 series of 3 each, the outer three being small, ovate to oblong and obtuse and the inner larger, oblong to nearly roundish or suborbicular, concave membranous and about 3 mm long petals – 6 free, smaller than the sepals, obovate, cuneate or clawed at the base rounded at the apex and membranous but unlike those *Tinospora cordifolia* not embracing the stamens.

**Fruits:** An aggregate of one to three usually two, ovoid smooth drupeless on thick stalks with sub terminal style, the fruits turn reddish or crimson when ripe, the endocarp is marked externally with many sharp pointed tubercles.

**Distribution:** The species is endemic to India and is common throughout tropical and subtropical zones at an altitude of 600m. Globally distributed over parts of India, Sri Lanka, Pakistan, Nepal, Bangladesh, Myanmar, China, Thailand, Vietnam and Cambodia. Nationally among different parts of Arunachal Pradesh, Assam, Bihar, Orissa Maharashtra, Karnataka, Andhra Pradesh and Kerala [5].

**Medicinal Uses:** [6]

According to Ayurvedic Nighantus *Tinospora malabarica* is mainly indicated in Jwara (Fever), Visha (Poisonous conditions), Vali palita (Wrinkles and Premature graying of

hair) etc.

The plant is used almost in the same way as *T.cordifolia*. it is reported to be used for fumigation in piles and ulcerated wounds, and for preparation of medicated baths for liver complaints. Boiled roots are given in fever. Fresh leaves and stems are used in Chronic Rheumatism. Stem is said to taste sweetish.

**Threat assessment and Conservation action**

*Tinospora malabarica* was assigned the threat status as 'Vulnerable' regionally over Karnataka, Kerala, Tamilnadu and 'Data deficient' globally. The Species again evaluated State wise and threat status was assigned as 'Vulnerable' for Karnataka, 'Near threatened' for Kerala and 'Not evaluated' for Tamilnadu [7].

**Methods of conservation of *tinospora malabarica*** [8]

**1) Climate And Soil**

- The plant grows in subtropical and tropical climate.
- Light medium sandy loam soil rich in organic matter, and with adequate drainage, is suitable for its cultivation.
- It does not tolerate high rainfall or waterlogged conditions.

**2) Mode of propagation**

- Stem cuttings are the best planting material for raising commercial crop.
- The cuttings can be obtained from mother plants in June–July.
- The plant can also be raised using seeds. Seeds take almost more than double the time to mature and yield the same quantity of drug.

**3) Agro Technique: Nursery technique**

**Raising propagules**

1. The stem cuttings are sown directly in the field.
2. Cuttings are obtained from older stems with nodes.
3. Cuttings should be sown within 24 hours of their removal from the mother plant. Meanwhile, they should be half-dipped in water vertically.

**Propagule rate and pretreatment**

- About 2500 cuttings are required for plantation in 1 hectare of land.
- No specific treatment is required before sowing

**4) Planting In The Field Land preparation and fertilizer application**

- The land is ploughed, harrowed, and made weed-free.
- A basal dose of FYM (farmyard manure) @ 10 tonnes per hectare and half dose of nitrogen (75 kg) are applied at the time of land preparation.

**Transplanting and optimum spacing**

- The stem cuttings with nodes are sown directly in the field.
- An optimum spacing of 3 m × 3 m is recommended for better yield.
- The plant requires support to grow, which can be provided by raising wooden stakes or trellis.
- Already growing shrubs or trees can also support the plant.

### Intercropping system

- Being a large twiner, it needs a host to twine and covers the host in a very short period.
- If the stem cuttings with aerial roots are thrown over trees, they start growing and strike roots in the ground.

### Interculture and maintenance practices

- Follow-up dose of 10 tonnes of FYM with 75 kg nitrogen (20% nitrogen content) is recommended.
- About two to three weedings and hoeings are required for good growth of twiner.
- The inter-row spaces between plants should be kept weed-free by frequent weeding and hoeing, as the plants may get suppressed by weeds, especially during early stages of growth.

### Irrigation practices

- The crop is grown under rain-fed conditions.
- However, occasional irrigation during extremes of cold and hot weather may help the crop survive adverse conditions.

### Disease and pest control

- No serious insect pest infestation or disease has been reported in this crop.

### *Tinospora Malabarica*- fruits and flowers

#### 5) Harvest Management Crop maturity and harvesting

- The stem is harvested during autumn when it develops to a diameter of more than 2.5 cm. Basal part is left for further growth.

### Post-harvest management

The stem should be cut into small pieces and dried in shade. It can be stored in gunny bags, and kept in cool and airy storage god owns. Stem bark peels off even by touch, thus stem should be cut very cautiously as peeled stem decays very soon.

### Yield

The plant yields about 1500 kg of fresh woody stem, reduced to 300 kg of dry weight per hectare in about two years.

### Discussion

Conservation of genetic resources of medicinal plants is the most important task for present day intellectuals because gradual loss of biodiversity of medicinal plants has been seriously affecting the potency and therapeutic efficacy of herbal medicine. This can be achieved only by domestication and cultivation of rare and endangered species and species in high demand, so as to alleviate the pressure on natural resources and prevent such species from entering red data book. Medicinal plants are globally valuable sources of new drugs. Up to 80% of people in developing countries are totally dependent on herbal drugs for primary healthcare, and over 25% of prescribed medicines in developing countries are derived from wild plant species. A highly conservative estimate states that the current loss of plant species is between 100 and 1000 times higher than the expected natural extinction rate and that earth is losing at least one potential major drug every 2 years<sup>[9]</sup>. The degradation and destruction of habitats is a major cause of the loss of medicinal plant resources<sup>[10]</sup>. Several plants in use today are substitutes for genuine ones. Such substitution is necessitated by the

unavailability or dire shortage of the genuine medicinal herbs. Finding acceptable substitutes is, in fact, a practical solution for dearth of medicinal plants faced by manufacturers. Such substitutes are to be selected only after analytical and clinical studies, but today many plants are used without such studies.

*Tinospora malabarica* (Lam.) Hook.f.& Thoms) which is one of the varieties of *Tinospora* species. In India *Tinospora* consists of 4 species and many times *Tinospora cordifolia* is adulterated and substituted with other species in raw drug market. Conservation strategies and agro techniques as described above are necessary in order to protect plant from extinction. Proper documentation and conservation of indigenous knowledge requires to be done. Appropriate training of local communities regarding conservation and sustainable use of flora needs to be given by which anthropogenic impacts like deforestation and overgrazing can be reduced. These species should be grown in botanical gardens.

Thus in the present study, as a part of conservation strategy proper identification of *Tinospora malabarica* based on morpho anatomical features has been done from the natural habitats of Kerala. The drug has been collected and cultivated in a small scale according to the agro techniques mentioned.

### Conclusion

Medicinal plants occupy a vital sector of health care system in India and represent a major national resource. *Tinospora malabarica* above mentioned are used by various tribals and local people to cure different ailments. Hence, there is an immense need for conservation of diversity of medicinal plant wealth for the present and fore coming generations, by adapting the suitable strategy with most appropriate method of conservation. The methods of micro propagation and agrotechnique of *Tinospora malabarica* play an important role for conservation of this threatened but economically and medicinally important plant. In-situ is the best option for conservation of natural resources whereas ex-situ is also good option which would help to save the endangered status of the medicinal plants.

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