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Review Article

Stimulatory Allelopathy exhibited by *Ficus religiosa* L. in Favouring the Growth of *Mimosops elengi* L. and *Holoptelia integrifolia* (Roxb.) Planch

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Abstract

Allelopathy is a complex phenomenon in the natural world where plants release specialized chemicals, known as allelochemicals, that impact the growth, development, and survival of other organisms in their environment. These interactions can be positive, negative, or neutral, influencing various aspects of plant communities and ecosystems. Understanding allelopathy's diverse roles sheds light on intricate natural interactions, with potential applications in various fields. In this study, it was observed that *Ficus religiosa* was favouring the growth of *Mimosops elengi* and *Holoptelia integrifolia*. These two plants grew straight up right from the root region of Ficus religiosa.

INTRODUCTION

Allelopathy is a phenomenon in the plant kingdom where one plant species releases chemicals that affect the growth, development, and survival of other plants. These chemicals, called allelochemicals, can have a variety of effects, both positive and negative. Allelochemicals are a diverse group of compounds, including phenolic acids, terpenes, alkaloids, and Volatile Organic Compounds (VOCs). They can be released from various plant parts, such as roots, leaves, flowers, and fruits. Allelochemicals can have various effects on other plants, depending on the specific chemicals involved and the target plant species, from the inhibition of germination and to the stimulation of growth [1].

Allelopathy manifests in diverse interactions that can either positively or negatively affect neighbouring organisms. Inhibitory Allelopathy is a common strategy that involves the release of allelochemicals that suppress or harm the growth and development of other plants. It gives allelopathic plants a competitive advantage by securing vital resources like water and nutrients. Stimulatory allelopathy is less frequently observed, which involves allelochemicals that enhance or promote the growth of neighbouring plants. This cooperative interaction fosters a mutually beneficial relationship within the ecosystem [1].

Ficus religiosa, commonly known as peepal is one of the oldest trees in Indian literature [2]. It belongs to family Moraceae. It derived its botanical name from two words i.e. 'Ficus' a Latin word for 'fig' and 'Religiosa' refers to 'religion' indicating its importance in Hindu and Buddhist religions [3]. It is also found in its neighbouring countries like Bangladesh, Pakistan, Nepal, Sri- Lanka and China.

Taxonomy of *Ficus*:

- Domain: Eukaryota
- Kingdom: Plantae
- Subkingdom: Viridaeplantae
- Phylum: Tracheophyta
- Subphylum: Euphyllophytina

- Infraphylum: Radiatopses
- Class: Magnoliopsida
- Subclass: Dilleniidae
- Superorder: Urticanae
- Order: Urticales
- Family: Moraceae
- Genus: *Ficus*

Ficus religiosa (L.) grows as a huge enduring tree generally planted at the road side. Particularly, in Southeast Asia this tree is usually planted in the sanctuary zones. The normal name is Bodhi tree and is considered as a holy tree in South East Asian countries. It is usually found near the temples where it is worshipped. It is believed that under this tree Buddha achieved spiritual divine enlightenment. Flowering occurs in February, onset of fruits start in summers and ripening is complete before the onset of rainy season [3]. Fruits grow in pairs together to form a single mass. Immature fruits are green in color which changes to blackish purple after ripening [4]. All parts of this tree are rich in phytochemicals and are used in various food and medicinal preparations.

Mimusops elengi is an evergreen tree that grows upto a height of 15 meters. In Hindi this tree is known as Maulsari and it is known as Bakul in Bangla. It produces small, star shaped flowers which are fragrant. It produces orange colour berries. Fruits are edible. Its seeds are used as rosary and the plant is known to have many medicinal properties (www.flowersofindia.net).

Holoptelia integrifolia is also called as Indian elm tree or Jungle cork tree. It is called Chilbil in Hindi. It is a large deciduous tree growing upto 18meter tall. It has grey bark, covered with blisters, peeling in corky scales on old trees. Flowers are small, greenish yellow to brownish. Friut is a circular samara. The bark of Indian elm is used in rheumatism. Seed and stem bark is used to treat ring worm infections. Bark and leaves are used to treat many diseases like oedema, diabetes, leprosy, skin diseases, intestinal disorders, piles etc. (www.flowersofindia.net)

MATERIALS AND METHODS

On a survey to explore the biodiversity of Telangana, it was observed that *Ficus religiosa* is supporting the growth of some plants in its vicinity. The observations were noted and photographs of these plants were taken and they were identified based on the available data.

DISCUSSION

This study is in accordance with an earlier study in which the litter of leaves of *F. religiosa* was seen to enhance the Spike length, grain yield per pot, number of grains per pot and harvest index were maximum [5]. **In contrast, many other species of Moraceae have shown phytotoxic effects like Ficus carica [6], F. auriculata, F. semicordata [7,8]**.

FINDINGS

It was observed that *F. religiosa* was supporting the growth of *Mimosops elengi* at one site (Plate 1), and *Holoptelia integrifolia* at another site (Figure 1) observed. These two plants were found to grow straight upwards right from its region near the roots. The two plants grew well and stood tall and healthy near the vicinity of *F. religiosa*. *Mimosops elengi* grew into a large tree and was also producing flowers and fruits.

Plate 1 Stimulatory allelopathy exhibited by *Ficus religiosa* L. in supporting the growth of *Mimosops elengi* L.

Figure 1 Stimulatory allelopathy exhibited by *Ficus religiosa* L. in supporting the growth of *Holoptelia integrifolia* (Roxb) Planch.

CONCLUSIONS

This study suggests that as *Ficus religiosa* is supporting the growth of in its vicinity, right from within its main bark, this could be a stimulatory allelopathy being exhibited by *Ficus religiosa*. On the other hand, allelochemicals are the individual molecules released by plants that directly cause the allelopathic effects. On the other hand, allelochemicals are the individual molecules released by plants that directly cause the allelopathic effects. *F. religiosa* is a rich source of nutrients as well as allellochemicals which support the growth of other plants in its vicinity. Hence its application in intercropping agroforestry systems is highly recommended. Selection of this useful tree species under agroforestry systems is crucial to sustain the productivity of a crop. There is a need to perform the analysis of allellochemicals it releases and the physiology of stimulatory allelopathy exhibited by *Ficus religiosa.*

REFERENCES

1. Javier Sánchez, Biologist. The Daily ECO. 2024.
2. Singh S, Ali G, Singh R, Singh K. Standardization of bark of Ficus religiosa Linn. by developing different quality control parameters. Int J Adv Sci Technol. 2015; 2: 13-20.
3. Bhalerao SA, Sharma AS. Ethenomedicinal, phytochemical and pharmacological profile of Ficus religiosa Roxb. Int J Curr Microbiol Appl Sci. 2014; 3: 528-538.
4. Dharmender R, Permender R, Sushila R, Deepti R. Pharmacognostical standardization of Ficus religiosa fruits. Pharmacogn J. 2010; 2: 10-16.
5. Iqbal J, Rauf HA, Shah AN, Shahzad B, Bukhari MA. Allelopathic effects of rose wood, guava, eucalhyptus, sacred fig and jaman leaf litter on growth and yield OF WHEAT (Triticum aestivum L.) IN A WHEAT-BASED AGROFORESTRY SYSTEM Planta Daninha 2017; v35: e017166992.
6. Afef Ladhari, Badii Gaaliche, Armando Zarrelli, Mouldi Ghannem, Mehdi Ben Mimoun. Allelopathic potential and phenolic allelochemicals discrepancies in Ficus carica L. cultivars, South African J Botany. 2020; 130: 30-44.
7. Sourav Ranjan Satapathy, Vinod Prasad Khanduri, Bhupendra Singh, Manoj Kumar Riyal, Sandeep Kumar, Prabhat Kumar, et al. Allelopathic potential of Ficus auriculata and Ficus semicordata on growth of four traditional food crops of Garhwal Himalaya. J Agriculture Food Res. 2022; 9: 100352.
8. Sandeep, Ashwani Kumar, Dimple, Vidisha Tomer, Yogesh Gat, Vikas Kumar. Ficus religiosa: A wholesome medicinal tree. J Pharmacog Phytochem. 2018; 7: 32-37.