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LANTANA CAMARA: AN INVASIVE DOUBLE - EDGED PLANT SPECIES

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Introduction

Plants that have been introduced from one region to another that causes negative impacts to the biodiversity are called invasive plants. They cause economic losses and harm animal and human health. They may also be a pest or disease harborage. International trade and travel have facilitated the movement of such plants. It is said that Parthenium, also known as Santa – Maria fever few, native to America, made its way to India through import of wheat from the United States in 1956.

Several studies have shown that invasive species grow faster than the native species by occupying their habitats and suppressing their growth. They reproduce faster; propagation is faster because of the large quantity, small size and light weight of the seeds. Invasive plants tend to alter the resource availability and the structure of the ecosystem, which leads to the degradation of the biodiversity. One such invasive plant that poses serious threat in India is Lantana camara.

Lantana camara – biology, growth and reproduction

Lantana camara (common name – common lantana, red sage) is a perennial, aromatic flowering shrub that belongs to the family Verbanaceae. It is a native species of tropical America. Lantana is a genus with 150 species. It has now been established in more than 50 countries. In some places, they are cultivated for the flowers. Leaves are ovate, opposite and simple. Flowers are tubular shaped and arranged in clusters, umbel like aggregation and are available in various colors. The bright colors attract a wide range of pollinators including butterflies, insects, small birds like hummingbirds and sunbirds. Fruit is berry-like drupe, that turns purple from green on maturity.

Unripe fruits are inedible to animals and humans whereas, ripe fruits are consumed by birds and animals, who facilitate the seed dispersal. Germination of seeds is stimulated by high temperature and moisture. They can grow in diverse climatic conditions and on various soil types. They generally grow best in open and unshaded places, like grasslands, beach fronts, forest edges, etc. they are commonly found in roadsides, railways tracks and canals. They are drought resistant and moderately shade resistant.

Lantana flower

Unripe and ripe berries

Negative impacts

Lantana camara is one of the most serious invasive plant species of India. It has colonized in large areas of Himalayan forest areas. Due to its rapid growth and wide adaptability, Lantana has developed into a serious pest. Infested areas include forest lands, cultivable lands, fallow lands and pasture lands. Its strong root system helps the shrub to elongate. *Lantana camara* outcompetes native species for resources like nutrients, water and sunlight and space. This results in loss of biodiversity, loss of soil nutrients, loss of soil by erosion and hampering in forest regeneration.

A recent study published in "Global Ecology and Conservation" reports that Lantana has invaded more than 40 percent of India's tiger range. The Shivalik hills, Central India, and Southern Western Ghats are the worst hit. The species now threatens about 3,00,000 sq.km of Indian forests. Another one of the negative impacts of Lantana is its allelopathic effect. It releases certain chemicals that will hamper the growth of the native plants. However, this is not true in case of all the plants. Studies have shown that the leaf extractions have inhibitory effect on the germination and growth of chickpea, black gram, cucumber, mustard, cowpea, etc. There are studies that prove that germination of chillies, rape seed and Chinese cabbage decreased progressively when subjected to Lantana leaf extracts. Crops like soybean, wheat and corn were affected by the allelopathic effects of dried Lantana shoot residues.

The plant is usually unpalatable for animals. In case of ingestion during grazing, it causes exfoliation of skin, profuse salivation, severe jaundice and dermatitis. Green fodder scarcity is one the reasons for lantana poisoning. *L. camara* contains pentacyclic triterpenoids that cause hepatotoxicity and photosensitivity when ingested by grazing animals such as sheep, goats, cows and other cattle. The ripe fruits of some species are edible to animals, birds and humans. If unripe fruits are consumed, it leads to diarrhoea, vomiting, breathing difficulty and liver damage in humans.

Lantana in India

Lantana was introduced in India by the British in the 1800s as an ornamental hedge plant to the National Botanical Garden. Its true dangers as an invasive species were realised later in the 1920s. *L. camara* is listed in the IUCN's "List of the world's 100 worst invasive species". In India, a few species such as *L. camara*, *L. indica*, *L. veronicifoila* and *L. trifolia* have been reported. The worst affected areas are parts of Western Ghats including Coorg, Niligiris, parts of Uttar Pradesh and parts of Himalayan regions including the North Eastern states. In 1905, it invaded into North-West Himalayan region and later was found to have covered about 13.2 million hectares of pasture land and fallow land. As stated earlier, it has invaded more than 50 countries. Lantana species grow speedily after pruning.

In case of any occurrence of forest fires, the germination of seeds and growth of plants is stimulated. Their rapid growth suppresses the development of young trees; thereby restricting the growth of local species and endangers native plant and animal species. It has taken over land used for tea, sugarcane, cotton, coffee, banana, coconut, oil palms, rice, rubber, etc. It has become a serious broad leaf weed in various crops in both, dryland and wetland ecosystems. Human intervention also paves way for invasion of alien plant species. Forest clearing for construction of dams, roads, etc. has led to forest fragmentation and increased invasion, resulting in the ultimate loss of native biodiversity.

In an article published in The New Indian Express, on the 24th of February 2024, clearly explains the problems faced in the present situation. There is abundant growth of Lantana in the grasslands of Bandipur National Park, Karnataka and Mudumalai Tiger Reserve, Tamil Nadu, affecting the biodiversity. Firstly, there was lack of fodder for the herbivores. It also affects the foraging patterns of animals, birds and insects. Secondly, there was less wildlife movement reported in these areas. These grasslands are home to a wide range of animals which were all compromised by the alien species. In order to control this threat, the Tamil Nadu government has come up with a policy in 2022, Tamil Nadu Policy on Invasive Plants and Ecological Restoration (TNPIPER). Tamil Nadu is the first state in the country to come up with such a policy to eradicate invasive plant species from forest areas.

Eradication

There are various mechanical, chemical, cultural and biological methods to eradicate Lantana camara. The most common method is to uproot and destroy the plant. This will prevent further germination from the rootstock. Cutting of branches is only a temporary solution, whereas bulldozing and uprooting the plant a long-term solution. Spraying of non-selective herbicides like Glyphosate is a useful method. Another chemical method is to cut the plant to ground level and to apply sodium arsenate on the cut ends. However, this method is not advisable because of the risk of livestock poisoning. Painting 2,4 D on cut ends provides effective control.

In case of biological control, insects like lantana bug, lantana seed fly and lantana lace bug have been proven efficient. This method has been attempted only to a limited extent. There is a risk of polyphagus pests, that may tend to damage other plants/crops. The lantana lace bud, *Ophiomyia lantanae,* native to America, feeds on the flowers and fruits of *Lantana camara*. Biological control method also include control using pathogens like *Septoria* sp., *Prospodium tuberculatum, Puccinia lantanae, Ceratobasidium lantanae-camarae* and *Mycovellosiella lantanae.* Fungal pathogens have a significant role in control of Lantana.

Among the above-mentioned pathogens, *Septoria* sp. have proven to be the most effective control in the Hawaiian forests. In case of other pathogens, their interactions with the host are yet to be studied completely. Revegetation is an important part of Lantana eradication. Revegetation of improved pasture varieties will control the re-establishment of Lantana.

Uses of Lantana

Despite all the disadvantages, there are some ways in which Lantana can be used productively. The thick barks and stems are used for making furniture. Many tribal communities in the country have acquired a livelihood through this. Lantana barks are also used for making fuel briquettes which are supplied to industries. The extracts obtained from the plants is used for treating chicken pox, asthma, measles, etc. in folk medicine. The oil extracted from leaves can be used for skin irritations and used as an antiseptic for wounds. The bark of stems and roots contain alkaloids that have antipyretic and antipasmodic properties. The roots of Lantana contain oleanolic acid which has anti-inflammatory, anti-tumour and anti-oxidant properties. The extracts of the plant show cytotoxicity against cancer cells which makes this plant a potential candidate in the making of anti-cancer medicines. Acid extracts of the shoots show antibacterial activity against *Escherichia coli*. Root leachates of Lantana can be used against soil borne pathogens like *Fusarium* sp. and *Rhizoctonia solani*. It can also be used against harmful insect pests, nematodes and snails.

Lantana leaves are used to protect the grains from infestation of ants, termites and mice. Extracts of lantana can be used as a biocide against water hyacinth. The pulp obtained from the plant can be used for making papers and straw boards. The leaves and twigs are occasionally used as mulch and green manure. Lantana leaves decompose completely within 13-14 months and contains nutrients in high concentration. Another important use of the plant is that it can be used for phytoremediation and phytoextraction of heavy metals, especially mercury.

Furniture, oil and home-made botanicals prepared from Lantana camara

Conclusion

Lantana camara is an alien plant species that was brought into India from tropical America. It is an ornamental plant that attracts various pollinators like beetles, bees and butterflies. The blossoms are said to be associated with joy, positivity and good luck. However, this ornamental plant has turned into a disastrous one. This plant has invaded into forest and grazing lands, cultivable and waste lands. Due to its wide adaptability and tolerance to all soil and climate types, it has suppressed the growth of the local plants and has altered the native biodiversity of the region. Despite all the above drawbacks, there are a few advantages. The plant is being used as a medicine by the indigenous people in treating wounds, asthma, chicken pox, etc. Research scientists have stated that this plant is a prospective candidate in making anti-cancer medicines. The extracts from this plant can be used as a pesticide and herbicide. The plant, as a whole, plays an important role in phytoextraction of mercury and other heavy metals. Tribal people have made it a source of living by making fuel, paper and furniture from the plant. Truly, this plant has proven to be double edged in more ways than one.