

***Lantana camara* L. (Verbenaceae): An invasive plant**

Suman Singh¹, Shweta Kukreti¹, Rakhee Dimri^{1*}, Gajender Singh² and Rajkumari Supriya Devi³

¹Department of Botany, Dr. P. D. Barthwal Govt. P. G. College, Kotdwar, Pauri Garhwal, Uttarakhand, India

²Faculty of Pharmacy, Department of Pharmacognosy, P.K. University, Shivpuri, Madhya Pradesh, India

³Biodiversity and Conservation Lab., Ambika Prasad Research Foundation, Odisha, India

*Email-id: dimri.rakhi@gmail.com; ORCID: <https://orcid.org/0000-0002-9310-7493>

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Abstract: *Lantana camara* is a highly invasive shrub native to Central and South America, now widespread across nearly 60 tropical and subtropical countries. This invasive species exhibits a wide range of morphological characteristics, including woody stems with recurved prickles, rough leaves with fine hairs, and clusters of fragrant flowers in various colors. *L. camara* thrives in diverse habitats, including open areas, forest edges, and agricultural lands, but is susceptible to frost and low temperatures. It has significant ethnobotanical importance for its medicinal properties, but its invasiveness threatens native ecosystems, altering trophic levels and outcompeting native species. An attempt has been made to review the morphology, habitat, ecology, invasiveness, association with flora and fauna and management to check the overgrowth of the plant species and threatens the native flora. Management strategies include mechanical uprooting, burning, herbicidal application, and biological control using natural enemies. Understanding the ecological and biological characteristics of *L. camara* is crucial for developing effective management strategies to mitigate its impacts on native ecosystems.

Keywords: Thickets, threat, native species, noxious, medicinal, management

Introduction

Lantana camara is a multifaceted plant species that holds significance for its various uses and impacts (Figure 1). It belongs to Verbenaceae family. On one hand, it has been valued for its medicinal properties, showcasing antimicrobial, anti-inflammatory, and antioxidant effects ((Wagh *et al.*, 2023; Jamadar *et al.*, 2025) that have been harnessed in traditional medicine. Additionally, It serves as a source of shelter and food for numerous animal species, including birds and insects, thereby playing a role in supporting local ecosystems (Swarbrick *et al.*, 1995).



Figure 1: Habit of *Lantana camara*



Figure 2: Flowers of *Lantana camara*



Figure 3: Fruits of *Lantana camara*

Its ornamental value is also noteworthy, as it is cultivated for its clusters of fragrant and visually appealing flowers, which come in a variety of colors including pink, yellow, orange, and red (Ghisalberti *et al.*, 2020). Morphologically, it is characterized by its shrub-like growth habit, reaching heights of up to 2-4 meters with a sprawling tendency. Its leaves are ovate to lanceolate in shape, with a rough texture and aromatic properties (Shah *et al.*, 2020). The plant's flowers are notable for their color variation, occurring in clusters that attract pollinators. The small, berry-like drupes that follow are an important food source for many animals, contributing to the plant's seed dispersal. These morphological traits, combined with its ecological adaptability, underpin *Lantana camara*'s invasive potential and its ability to establish itself in new environments (Seid, 2020). However, importance of *L. camara* is overshadowed by its notorious invasiveness in many parts of the world. Its ability to spread rapidly and outcompete native vegetation has led to significant ecological impacts, altering ecosystems and biodiversity. Seeds are efficiently dispersed through consumption by animals and human activities, facilitating its widespread invasion. Furthermore, it exhibits remarkable resilience, tolerating a range of environmental conditions that enable it to thrive in diverse settings.

Morphology

It is a vigorous, dense shrub which grows up to 2-4 m in height. Stems are woody, angular in cross section and often with recurved prickles. It sometimes climbs with the support of other vegetation.

Leaves are rough with fine hairs; margins serrate and emit pungent odour when crushed. Flower head contains 20-40 flowers, colour bright are attracting that varies from white, cream, yellow, orange, pink, purple to red (Figure 2). Fruit glossy green and bluish black when mature (Figure 3). Roots are strong with main taproot and mat of shallow side roots (Shah et al., 2020; Figures 1-3).

Habitat

It grows in wide and diverse habitat that are unshaded. This includes open areas near human habitation, wastelands, forest edges, agricultural lands, scrub lands, urban areas, etc. However, it is susceptible to frost and very low temperature (Nawaz et al., 2016; Negi et al., 2019).

Distribution and Origin

It is tropical in origin. It is native to Central and South America and Caribbean. It also occurs widely in the Asia-Pacific region, Australia, New Zealand Now it is dispersed to nearly 60 tropical and subtropical countries and the distribution is still expanding within many islands and countries (Ghisalberti et al., 2020).

Ethnobotany

The leaves and flowers of *L. camara* are reported to be used to treat fever, influenza, cold, rheumatism and asthma in Central and South America. The plant infusion is taken to treat bronchitis and the root extract to treat stomach ache in children in some regions of Ghana. In Asian countries, crushed leaves are used to treat wounds, rheumatism, inflammations. The leaves decoction is commonly used for skin diseases like scabies, leprosy, etc (Wagh et al., 2023; Jamadar et al., 2025).

Phytochemical constituents

It has the ability to hybridize with the nearest taxa and diverse varieties have been developed. The phytochemical constituents present are diverse and interesting including different types of terpenes i.e., monoterpenes, sesquiterpenes, triterpenes. The first toxic compounds discovered from this species are triterpenes – lantadene A and lantadene B. Other bioactive compounds including flavonoids, iridoid glycosides, furanonaphthoquinones, phenyl ethanoid glycosides, alkaloids, steroids, saponins, hydroxy anthraquinones, anthraquinone, coumarins, tannins and primary metabolites like carbohydrates, proteins and other compounds have been reported (Ghisalberti, 2000; Madke et al., 2024). Researchers and scientists have worked on the different bioactivity of the plant parts with different solvent extracts. The plant has shown effectiveness on the antibacterial, antifungal, wound healing, anti-inflammatory and antiurolithiatic activity (Madke et al., 2024).

Invasiveness

It is an invasive weed that can and have thrive in vast ecological system that are favourable and unfavourable. They have invaded the habitats of many native flora of diverse region across the globe reflecting a vast ecological tolerance. The extreme weather events such as frequent and intense

heatwaves, droughts, and storms, rising global temperatures, changes in precipitation patterns, due to climate change and anthropogenic activities are overcome by invasive species leading to the threat to native species. The ease of transport and trade have led to the establishment and spread of such invasive species (Adhikari et al., 2024). It is recognized as one among the 10 most invasive alien species of the world. Seeds are dispersed by birds and can grow from individual to becoming clumps and later as dense impenetrable thickets. It has disturbed trophic levels of many ecological system. In many disturbed ecological systems, they are found to be dominated over a large area. The roots of the plant produce allelochemical compounds like phenolic acids, alkaloids that reduce the growth of other plant species near them thereby, outcompeting the native plant species. The unpalatable nature of plant prevents them from herbivores and helps to outgrowth the other species and competing for nutrients, water, and sunlight (Seid, 2020). Due to the attractive and bright colours, they are introduced as ornamental plants by nursery men or transported through trade across the globe. Many of these become invasive that become threat to the native plant species. Rashmitha and his coworkers in 2024 revealed the impact uprooting *L. camara* infestation for natural regeneration that uprooting this invasive species increases the availability of organic and inorganic matters in the soil and hence improves the regeneration of other species. Light can affect the spreading of this invasive plant. Plants grown in full sun produced significantly more flowers than those in shaded conditions. When adapting to low light levels, plants exhibited physiological changes, including increased stomatal opening, enhanced photosynthetic activity and improved photosystem II efficiency (Tacuri et al., 2011).

Faunal and avifaunal association

Seeds are mainly dispersed through the digestive systems of fruit-eating birds and mammals, which consume the plant's fruits. In return, the plant offers shelter and sustenance to various animal species and small birds. While it provides nectar for pollinators like insects, its toxicity poses a threat to grazing animals. In different regions, various animals contribute to seed dispersal, such as Indian mynahs in Hawaii and New Caledonia, birds, rodents, and monkeys in South Africa, and cattle, sheep, goats, foxes, and jackals in India. Birds like sparrows, parrots, and crows also play a significant role in spreading lantana seeds. Furthermore, soil disturbance caused by exotic ungulates like deer, cattle, horses, and goats facilitates the spread of lantana in areas like New Caledonia (Swarbrick et al., 1995).

Management of noxious weed

Various ways of controlling the growth of *L. camara* is described here. The basic way of management is uprooting the main taproot from the soil mechanically which is a laborious method. During hot seasons, it can be burnt easily even with low intensity fires that help in controlling the thicket growth. Again, some herbicidal chemicals can be applied to the foliage and stem although the effectiveness may vary depending on the size of the plant however, this could be an expensive treatment (Seid, 2020). Biological control are best way to suppress the growth of *L. camara*. There are many species that are introduced, established and distributed in India which may be called the natural enemies. *Ophiomyia lantanae*, *Teleonemia scrupulosa*, *Lantanophaga pusillidactyla*, *Epinotia lantana*, *Hypena* sp. and *Archips* sp. *Micaceana*. Other exotic species include *Neogalea esula*, *Calcomyza lantanae*, *Salbia*

haemorrhoidalis and *Plagiohammus spinipennis* that have proven effectiveness to suppress the weed (Barik et al., 2020).

Conclusion

Lantana camara is a complex species with both valuable medicinal properties and significant ecological risks. While it offers benefits in traditional medicine, its invasive nature poses substantial threats to native ecosystems and biodiversity. Effective management strategies, including biological control and targeted removal, are essential to mitigate its impacts and preserve ecological balance. Further research and awareness are necessary to balance the benefits and risks associated with *L. camara*.

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