



# INVASIVE SPECIES A HARM TO INDIA'S BIODIVERSITY

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## ABSTRACT:

Invasive species or invasive alien species (IAS) are non-indigenous species that adversely affect, economically, environmentally or ecologically, habitats where they have been introduced, either accidentally or deliberately, outside their normal past or present distribution. The ecological disruption that tends to follow such invasions often reduces the ecosystem's biodiversity and causes economic harm to people who depend on the ecosystem's biological resources. In this research paper we are going to study what are invasive species, how invasive species is a huge problem for our ecosystem, how they are effecting our native species, how they can be more harmful in coming future era.

## INTRODUCTION:

Invasive species, are also called introduced species, alien species, or exotic species, any non-native species that significantly modifies or disrupts the ecosystems it colonizes. They are known as introduced species because they are been introduced in the environment but not in a natural way. Such species may arrive in new areas through natural migrations, but they are often introduced by the activities of other species. Human activities, such as those involved in global commerce and the pet trade, are considered to be the most common ways invasive plants, animals, microbes, and other organisms are transported to new habitats. Most introduced species so not survive extended periods in new habitats, because they do not possess the evolutionary adaptations to adjust to the challenges posed by their new surroundings. Some introduced species may become invasive when they possess a built-in competitive advantage over indigenous species in invaded areas. This is not only affecting the Indian ecosystem but also affecting the biodiversity of whole world. Thus, it is a global issue. Since the dawn of life on earth, species have migrated and colonized new areas. In some cases, migrating species were unable to establish sustainable populations in new habitats and quickly died out. In other cases,

they either were incorporated into the existing structure of the ecosystem or were responsible for modifying native food chains by outcompeting native competitors or decimating native prey.

## **WHAT ARE INVASIVE SPECIES?**

Invasive alien species are animals, plants or other organisms that are introduced by humans, either intentionally or accidentally, into places outside of their natural range, negatively impacting native biodiversity, ecosystem services or human economy and well being. They can cause a great economic and environmental harm to the new area.

## **INTRODUCED SPECIES:**

Some species are brought to a new area on purpose. Often, these species are introduced as a form of pest control. Other times, introduced species are brought in as pets or decorative displays. People and businesses that import these species do not anticipate the consequences. Even scientists are not always sure how a species will adapt to a new environment. They get multiply too quickly and become invasive .

## **MOST COMMON AND HARMING INVASIVE SPECIES OF INDIA AS AN EXAMPLE:**

- **LANTANA CAMARA (A PLANT SPECIES)**

Lantana camara is a species of flowering plant within the verbena family, native to the American tropics. It is a very adaptable species, which can inhabit a wide variety of ecosystems; once it has been introduced into a habitat it spreads rapidly; between 40degree N 45degree S and more than 1,400 metres in altitude.



- It is a very common species which we can see in our nearby areas . A recent study found Lantana Camara a tropical American shrub, has invaded more than 40 percent of India’s tiger range. The Shivalik Hills, Central India, and Southern Western Ghats are the worst hit.
- With the ability to adapt to the changing climate, lantana can tolerate high temperature and moisture. The species now threatens about 300,000 sq.km of Indian forests. Scientists highlight the urgent need of habitat oriented management, biodiversity monitoring, and restoration oriented studies to safeguard forests. While India talks about the impacts of development projects on biodiversity, an exotic plant with pretty flowers has diligently carved its way to degrade its forests. This plant, Lantana Camara, is a thickest forming shrub native to tropical America. Arriving in India as an ornamental plant in the early 1800s, it has escaped from gardens and taken over entire ecosystems, now occupying 40 percent of India’s tiger range alone.
- Multiply hybrid varieties of lantana were brought to India over the 200 years of its introduction, the varieties have hybridized and formed a complex. The species is now able to climb up the canopy as a woody vine, entangle other plants by forming a dense thicket, and spread on the forest floor as a scrambling shrub.

Thus, Lantana Camara is one of the world’s ten worst invasive species and a species of High Concern for India. It competes with native plants for space and resources, and also alters the nutrient cycle in the soil. This invasion has resulted in the scarcity of native forage plants for wild herbivores. If eaten, the leaves can induce allergies on the muzzles of animals. In some cases, extensive feeding on Lantana has led to diarrhea, liver failure, and even the animal’s death.

## **INDIAN FORESTS: green cover is not always forest cover.**

Lantana has long escaped India's manicured gardens and has spread across the length and breadth of the country, invading roadsides, fallow plots, agricultural fields, and forests. A recent study published in *Global Ecology and Conservation* reports that Lantana occupies 154,000sq.km forests (more than 40 percent by area) in India's tiger range. Among forests, Shivalik Hills in the North, fragmented deciduous forests of Central India, and Southern Western Ghats are worst hit by its invasion. The study has analyzed data from one of the most extensive known systematic surveys done for evaluating the status of invasive plants at multi-landscape scale. These surveys were part of the National Tiger Estimated Project. They were conducted both inside and outside of protected areas in India by the forest guards of respective State Forest Departments and a team of wildlife biologists.

During the survey, the forests in 18 tiger states of India were divided into units of 25sq.km. Each unit was sampled to record native and invasive plants and human disturbance. In this way, 117104 plots were sampled across 200,000sq.km of forest area. Along with this information, data on factors known to facilitate the spread of invasive plants (like soil fertility, water availability, climate, fire, roads, and other human modifications) was used in a model, which was used to predict the spread of Lantana in these forests. In this study also points out, Lantana in India is growing in climatic conditions quite different from its native climate in Central America. "Nearly 60% of Lantana occurred outside its native climatic niche", mentioned Ninad Mungi, a researcher at the Wildlife Institute of India and the lead author of this study. "Lantana can tolerate warmer temperature and more moisture (in India), as compared to its native region. This can help it utilize the changing climate, where most of the native plants are failing," he added.

The modals estimate that 300,00sq.km forest area (an extra 44% of forest area) across India is threatened with Lantana invasions which means there is a high risk of biodiversity loss due to Lantana invasion in these areas.

## **A CHALLENGE FOR ECOLOGISTS AND MANAGERS:**

Protecting biodiversity and patrolling the forest against illegal activities becomes difficult with the presence of these invasive plants. Today, some forests (like Bandipur Tiger Reserve) are completely covered with Lantana bushes, raising concern or both scientists and managers.

### **WHAT LEADS TO SUCH A MONSTROUS SPREAD OF THIS INVASIVE PLANT?**

Lantana is mainly dispread by fruit-eating birds, monkeys, bears, etc., but it also has a capability to grow from its root-stock, and nodes. When Geetha Ramaswami and her colleagues studied the diepersal of lantana in Rajaji National Park, they observed that a lot of fruit-eating birds are attracted to lantana. Bulbuls in particular. "They rapidly disperse lantana seeds from source plants to managed areas. These areas are often not very far from fruiting sources plants (of lantana) and they fall well within the median dispersal range of bulbuls.

In every Tiger Reserve, a few hectares of land is cleared of lantana each year, but the area requires intensive surveillance. Since lantana seeds are already present in soil and they are also dispersed by many birds from surrounding areas, lantana regrows rapidly. To tackle this, a follow-up removal of lantana seedlings is necessary for a minimum of two years. It is a mammoth task and results have not yielding much.

## FUTURE PREDICTIONS & IMPACTS:

- **Lantana Camara is dangerous because it increases human and wildlife conflicts. In future this** will lead force to the disappearance of native species which will lead in migration of wild pigs, etc.
- It is impossible to make their population zero and also their growth cannot be controlled because usually it will come back from the crown with the upper portions burned back by winter, so cutting back the dead foliage before new growth begins is beneficial. This is also leading to the human deaths: fatal poisoning has been reported in children ingesting green Lantana berries. Two of the primary hepatotoxic and allelopathic secondary metabolites are pentacyclic triterpenoids, lantadene A and lantadene B. All the parts of the plant are poisonous if eaten and can cause vomiting, diarrhea, etc.
- India's climate is a favourable climate for lantana. They can grow rapidly in an extreme quantity. Due to their favourite and suitable climate they won't die in a particular season or climate change they continuously grow and can cause danger to our environment.

## CONCLUSION:

This research shows that forests degraded due to human influence and those occurring in warm and humid regions are most affected. Madhya Pradesh, which has the highest reported forest cover in India, was found to have a substantial part of its forests invaded. Likewise, Bandipur Tiger Reserve, which was shown to be 'greening' by another study, was found to be substantially invaded by lantana. Thus, Invasive species are capable of causing extinctions of native plants and animals, reducing biodiversity, competing with native organisms for limited resources, and altering habitats. This can result in huge economic impacts and fundamental disruptions of coastal and Great Lakes ecosystems. Herbicides are among the most effective and resources efficient tools to treat invasive species. The invasive species should be removed because without their natural predators, invasive species can spread aggressively, edging out native species, devastating ecosystems, and costing a lot of money.

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