Scholars Academic Journal of Biosciences (SAJB) **ISSN 2321-6883 (Online)**
Sch. Acad. J. Biosci., 2016; 4(12): 1132-1135 **ISSN 2347-9515 (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com **DOI :** 10.36347/sajb.2016.v04i12.013

Review Article

Ecological Heist: Invasive Plants and Their Toll on the Western Ghats' Economy

Saju Abraham[1*], Xavier Kurian P[2]
1Assistant Professor, Department of Botany, Newman College, Thodupuzha, Idukki, Kerala
2Assistant Professor, Post Graduate Department of Economics, Newman College Thodupuzha, Kerala, India

***Corresponding author**
Saju Abraham
Email: drsajuabraham@gmail.com

Abstract: The floral and faunal populations of an ecosystem must be balanced in order to preserve its ecological equilibrium. Non-native plant species that spread and disrupt a new habitat by endangering the native biodiversity and causing financial loss are invasive alien plant species. Invasive plant species provide an increasing threat to the Western Ghats, which are acknowledged as one of the most important hotspots for biodiversity in the world. The ecological effects of plant invasions in this sensitive landscape are innumerable with a myriad of impacts like the disruption of ecological interactions, such as pollination networks and seed dispersal systems that maintain forest regeneration; the displacement of endemic flora through competitive exclusion, which primarily affects rare species and medicinal plants and the alteration of soil microbiomes and nutrient cycling processes that maintain the distinctive forest mosaics found in the Ghats. In addition, these invasives inflict heavy economic toll across the Ghats region. Thus, the paper argues that the "silent takeover" by invasive plants represents a stealthy but significant threat in economic side too that demands urgent integration into conservation planning for the Western Ghats World Heritage Site. Without strategic intervention, the Western Ghats risks gradual homogenization of its legendary biodiversity and livelihood with cascading consequences for ecological services.
Keywords: Invasive Alien Species, Western Ghats, Ecological Transformation, Biodiversity Conservation

INTRODUCTION

A subtle but persistent invasion is engulfing the Western Ghats World Heritage Site, one of the eight "hottest hotspots" of biodiversity. The endemic biodiversity, ecological balance and local livelihoods of the ecologically vulnerable region are being threatened by invasive alien species, which are non-native creatures that are intentionally or inadvertently brought into ecosystems where they outcompete native flora and fauna (Rao and Sagar, 2012). Due to its high endemism and growing anthropogenic pressures, the Western Ghats, which are home to about 4000 angiosperms, 330 butterflies, 289 fishes, 135 amphibians, 156 reptiles, 508 birds and 120 mammals (Ramachandra *et al.,* 2012). Biological invasions are a widespread and expanding environmental concern that are frequently disregarded in conservation discussions that are dominated by deforestation and climate change. Invasion has disastrous effects, reducing the ecosystem's carrying capacity and affecting the sustainability of native communities by changing their composition, structure and functions (Richardson *et al.,* 2000). In a forest ecosystem, invasive plant species displace native species by inhibiting the growth of native saplings and outcompeting native species' seeds to germinate (Gioria and Osborne, 2014). Some tactics for this include the invasive plants' thick growth and increased capacity to absorb resources, which shade the saplings of native species. Invasive plant species reduce crop production and forage quality in agricultural environments by outcompeting crops for soil and water resources. When aquatic invasive plant species choke water bodies, they endanger the survival of native aquatic plants and animals and have a negative impact on irrigation systems and public water supplies. The dynamics and composition of soil are impacted by the invasion of alien plant species. Actually, pollution, harvesting, and disease put native biodiversity at more risk than alien invading species. Thus, the paper is an attempt to explore the "silent takeover" of the Western Ghats by invasive plants and its crippling economic impacts which represents a stealthy but significant threat, in that demands urgent integration into conservation planning for the Western Ghats World Heritage Site.

Historical introductions and accidental spread

The introduction of invasive plants in the Western Ghats can be traced back to colonial-era plantations, horticultural experiments and later, misguided afforestation programs. However, globalization, urbanization and climate change have accelerated their spread, allowing these species to exploit disturbed habitats and outcompete native organisms. Unlike sudden environmental disasters, biological invasions unfold gradually, making them less

visible but equally destructive. For instance, *Lantana camara*, originally introduced as an ornamental plant in the 19th century, now dominates vast stretches of forest undergrowth, suppressing native vegetation and reducing forage availability for herbivores. Over time, such species escaped cultivation and spread aggressively (Chatterjee, 2015). Post-independence, misguided afforestation programs further accelerated invasions. Fast-growing exotic trees like *Acacia mearnsii* and *Eucalyptus globulus* were planted widely, disrupting native vegetation. Globalization and increased trade in recent decades have introduced new invaders, such as the water hyacinth *Eichhornia crassipes* and the giant African snail *Achatina fulica* (Sarma *et al.,* 2015). The ecological consequences extend beyond species displacement, invasive plants alter fire regimes, water availability and nutrient cycles, with cascading effects on entire ecosystems (Pyšek *et al.,* 2012). Climate change further complicates the issue, as shifting temperature and rainfall patterns expand the range of certain invasives while weakening the resilience of native species (Runyon *et al.,* 2012). Invasive species enter the Western Ghats through multiple pathways:

- **Horticulture and agriculture**: Ornamental plants (e.g., *Mikania micrantha*) and commercial crops (e.g., *Opuntia cactus*) escaping cultivation.
- **Aquaculture and fisheries**: Non-native fish like African catfish and tilapia introduced for farming, now threatening endemic aquatic life.
- **Transport and tourism**: Seeds and insects hitchhiking on vehicles, trekking gear and construction materials.
- **Climate change**: Rising temperatures and altered rainfall patterns enabling tropical invaders to spread into higher elevations.

Disrupting the biodiversity hotspot

The Western Ghats, recognized as one of the world's most critical biodiversity hotspots, is facing an insidious threat from invasive plant species that are systematically dismantling its delicate ecological balance. The mountain range is witnessing a silent ecological invasion as aggressive alien plants reshape its landscapes (CEPF, 2007). The invasion is so pervasive that in some areas, non-native species now dominate the understory, forming impenetrable monocultures where once diverse ecosystems thrived. *Lantana camara*, perhaps the most notorious invader, has colonized vast stretches of forest floor, its dense thickets preventing sunlight from reaching native seedlings and effectively halting forest regeneration (Venkataraman, 2015). Similarly, the fast-growing *Mikania micrantha* vine smothers trees and shrubs, while *Parthenium hysterophorus* creates toxic zones where few other plants can survive (Kannan *et al.,* 2013; Patil and Janarthanam, 2013). These botanical invaders are not merely occupying space - they are fundamentally altering the ecological rules that have governed these forests for millennia.

The impacts cascade through entire ecosystems, disrupting intricate relationships that have evolved over millions of years. Native pollinators, specialized to interact with specific local plants, find themselves deprived of their food sources as invasive species take over. Herbivores that once fed on native vegetation either starve or are forced to migrate as their preferred plants disappear. The soil itself undergoes transformation, with some invaders like *Prosopis juliflora* increasing salinity to levels intolerable for most indigenous species. Walter (2011) investigated the overall impact of prosopis on local rural livelihoods in the drylands of South India and confirmed that farmers and agriculturalists suffer economic losses in areas where prosopis has invaded crop fields and competes with other plants for water and nutrients. Even the hydrological cycle is affected, as water-hungry invasives like Eucalyptus drain wetlands and alter stream flows. The consequences for endemic wildlife are particularly severe as they are losing crucial habitat to these green invaders. Several studies warn that the Western Ghats may be approaching an ecological tipping point, where the combined pressure of multiple invasive species could trigger irreversible changes to the entire ecosystem dynamics and function (Kohli *et al.,* 2009; Galbraith-Kent and Handel 2008; Bhatt *et al.,* 2012).

The combination of invaders and other environmental problems is what makes the crisis so alarming. While pressuring native vegetation, climate change is making circumstances more conducive for many invading species. Habitats are broken up by deforestation, which leaves gaps where invasive species usually establish their initial presence. Ironically, by utilizing exotic plants that grow quickly and eventually become invasive, some well-meaning forestry initiatives have unintentionally made the issue worse. The silent takeover of the Western Ghats by invasive plants represents one of the most significant yet underappreciated conservation challenges today, demanding urgent attention before unique evolutionary lineages are lost forever and these ancient ecosystems are irreversibly transformed.

Socio-economic consequences

The relentless spread of invasive plants across the Western Ghats has unleashed a cascade of socio-economic consequences that threaten the livelihoods of millions while straining government resources. These green invaders, often dismissed as mere ecological concerns, have become formidable economic adversaries, silently draining household incomes and public coffers alike. Farmers bear the brunt of this crisis, watching helplessly as their crop yields diminish year after year. *Parthenium hysterophorus*, locally known as congress grass, reduces agricultural productivity by up to 40% in infested areas (Sushilkumar, 2014), while *Lantana camara* invades

grazing lands, poisoning livestock that inadvertently consume its toxic leaves (Sharma *et al.,* 1981). The economic toll extends beyond immediate losses - households spend significant portions of their income on herbicides and manual weeding, with smallholder farmers particularly vulnerable to these added expenses.

The ripple effects penetrate deep into rural economies, where invasive species have disrupted traditional occupations and forced painful adaptations. Forest-dependent communities find their gathering grounds overrun by useless invaders, with medicinal plants and edible forest produce becoming increasingly scarce. The tendrils of *Mikania micrantha* have strangled trees and damages it. Even the tourism sector, a growing economic pillar in the region, faces threats as scenic landscapes transform into monotonous stands of alien vegetation. In addition, the governments are spending more recurring costs in state budgets, to manage the botanical invaders. The health sector bears additional burdens as allergens from invasive plants like Parthenium trigger respiratory problems, increasing medical expenditures for both families and public health systems. Perhaps most insidiously, the invasion has sparked social conflicts, with disputes over water access and grazing rights intensifying as resources diminish. The cumulative impact amounts to an undeclared economic emergency, one that demands recognition as both an environmental and developmental crisis. Without urgent intervention, these socio-economic costs will continue to mount, eroding hard-won development gains and pushing vulnerable communities deeper into poverty.

CONCLUSION

The Western Ghats stand at an ecological crossroads, where the silent but relentless advance of invasive alien plants threaten to rewrite the very fabric of the landscape. What began as isolated introductions of ornamental species and agricultural experiments has snowballed into a full-scale biological invasion, with devastating consequences for one of the planet's most biodiverse regions. The transformation is both profound and paradoxical - while appearing green and lush to the untrained eye, these invaded landscapes are becoming ecological deserts, their apparent vitality masking a dramatic loss of native biodiversity and ecosystem function. The crisis extends far beyond conservation circles, touching every aspect of life in the region, from farmer's fields to urban water supplies, from tourism revenues to public health budgets. Yet perhaps the greatest danger lies in the insidious nature of this threat - unlike dramatic environmental disasters that command immediate attention, plant invasions unfold gradually, their impacts accumulating quietly until they become irreversible. Moreover, endemic species that survived millennia of natural changes now face threats from these aggressive newcomers. The ecological damage radiates outward, disrupting water cycles, altering soil chemistry and dismantling intricate relationships between plants, animals and microorganisms that have evolved over millions of years. The Western Ghats have weathered geological upheavals and climatic shifts over millennia, but the current biological invasion represents a uniquely human-driven crisis that demands an equally human solution. The choices made today will determine whether future generations inherit a living landscape teeming with endemic life, or merely the illusion of greenery dominated by a handful of aggressive alien species. The time for action is now, before the silent takeover becomes complete.

REFERENCES

- Bhatt, J.R., Singh, J.S., Singh, S.P., Tripathi, R.S. and Kohli, R.K. 2012. *Invasive alien plants: an ecological appraisal for the Indian subcontinent.* Wallingford, UK: CABI.
- CEPF. 2007. *Ecosystem Profile: Western Ghats & Sri Lanka Biodiversity Hotspot Western Ghats Region*. Retrieved from https://d29l0tur8ol1gj.cloudfront.net/sites/ default/files/western-ghats-ecosystem-profile-english.pdf.
- Chatterjee, R. 2015. Impact of *Lantana camara* in the Indian society. *International Journal of Environment*. 4(2):348-354.
- Galbraith-Kent, S.L. and Handel, S.N. 2008. Invasive Acer platanoides inhibits native sapling growth in forest understorey communities. *Journal of Ecology.* 96(2):293-302.
- Gioria, M. and Osborne, B.A. 2014. Resource competition in plant invasions: emerging patterns and research needs. *Front. Plant Sci*.5. https://doi.org/10.3389/ fpls.2014.00501.
- Kannan, R., Shackleton, C.M. and UmaShaanker, R. 2013. Playing with the forest: invasive alien plants, policy and protected areas in India. *Current Science.* 104(9):1159-1160.
- Kohli, R.K., Jose, S., Singh, H. and Batish, D.R. 2009. *Invasive plants and forest ecosystems.* Boca Raton, FL: CRC Press
- Patil, B.B. and Janarthanam, M.K. 2013. Distribution of some obnoxious weeds in north-western Ghats of India. *Indian Journal of Weed Science*. 45(4):267-272.
- Pyšek, P., Jarošík, V., Hulme, P.E., Pergl, J., Hejda, M., Schaffner, U. and Vilà, M. 2012. A global assessment of invasive plant impacts on resident species, communities and ecosystems: the interaction of impact measures, invading species' traits and environment. *Glob Chang Biol*. 18(5):1725-1737.
- Ramachandra, T.V., Dudani, S., Chandran, S.M.D. and Joshi, N.V. 2012. Exploring biodiversity and ecology of central Western Ghats. Sahyadri Conservation Series 13. ENVIS Technical Report: 39. Western Ghats Task Force, Government of Karnataka Karnataka Biodiversity Board, Government of Karnataka, The Ministry of Science

and Technology, Government of India, The Ministry of Environment and Forests, Government of India.

- Rao, R. and Sagar, K. 2012. Invasive alien weeds of the Western Ghats: taxonomy and distribution. In: Bhatt, J. R., Singh, J. S., Singh, S.P., Tripathi, R.S. and Kohli, R.K. (Eds.). Invasive alien plants: an ecological appraisal for the Indian subcontinent. ISBN 978-1-84593-907-6. 139-161.
- Richardson, D.M., Pysek, P., Rejmánek, M., Barbour, M.G., Panetta, F.D. and West, C.J. 2000. Naturalization and invasion of alien plants: Concepts and definitions. *Diversity and Distribution.* 6:93-107.
- Runyon, J.B., Butler, J.L., Friggens, M.M., Meyer, S.E. and Sing, S.E. 2012. Invasive species and climate change. In: Finch, D.M. (Ed.). *Climate change in grasslands, shrublands, and deserts of the interior American West: a review and needs assessment*. Gen. Tech. Rep. RMRS-GTR-285. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 97-115.
- Sarma, R.R., Munsi, M. and Ananthram, A.N. 2015. Effect of Climate Change on Invasion Risk of Giant African Snail (Achatina fulica Férussac, 1821: Achatinidae) in India. *PLoS One.* 10(11):e0143724.
- Sharma, O., Makkar, H., Dawra, R. and Negi, S. 1981. A Review of the Toxicity of Lantana camara (Linn) in Animals. *Clinical toxicology*. 18:1077-1094.
- Sushilkumar. 2014. Spread, menace and management of Parthenium. *Indian Journal of Weed Science.* 46(3):205-219.
- Venkataraman, R. 2015. *Report on the Lantana Management and restoration of scrub forest ecosystem at Lokkere Reserve Forest, Bandipura, Karnataka*. CEPF-ATREE Western Ghats Small Grants Program.
- Walter, K. 2011. *Prosopis, an Alien among the Sacred Trees of South India*. Faculty of Agriculture and Forestry of the University of Helsinki.