
HCLFoundation
saytrees
Reclaiming Nature
A journey of habitat restoration at Govindapura

HCL**Foundation**

HCLFoundation delivers the corporate social responsibility agenda of HCLTech in India. It contributes to national and international development goals by investing in long-term sustainable programmes and special initiatives with thematic focus on education, nurturing grassroots sports, health and sanitation, skill development and livelihood, environment and disaster risk reduction, and response management. To ensure equitable development, child protective strategies, inclusion and gender transformative approaches are at the core of all the programmes. Till date, the HCLFoundation has positively impacted over 7.5 million lives.

Harit

Harit by HCLFoundation a distinct flagship programme for Environment Action; with the vision 'to conserve, restore and enhance indigenous environmental systems and respond to climate change in a sustainable manner through community engagement'. Throughout the process, Harit ensures at building scalable and replicable models that are economically viable, socially acceptable, environmentally sustainable, holistic and inclusive.

Responding to the threat of climate change, environmental degradation, and biodiversity loss, Harit is working urgently to conserve, restore, and enhance indigenous environmental systems. With full participation and stewardship of local communities, Harit develops and designs sustainable measures for climate action.

To learn more visit www.hclfoundation.org

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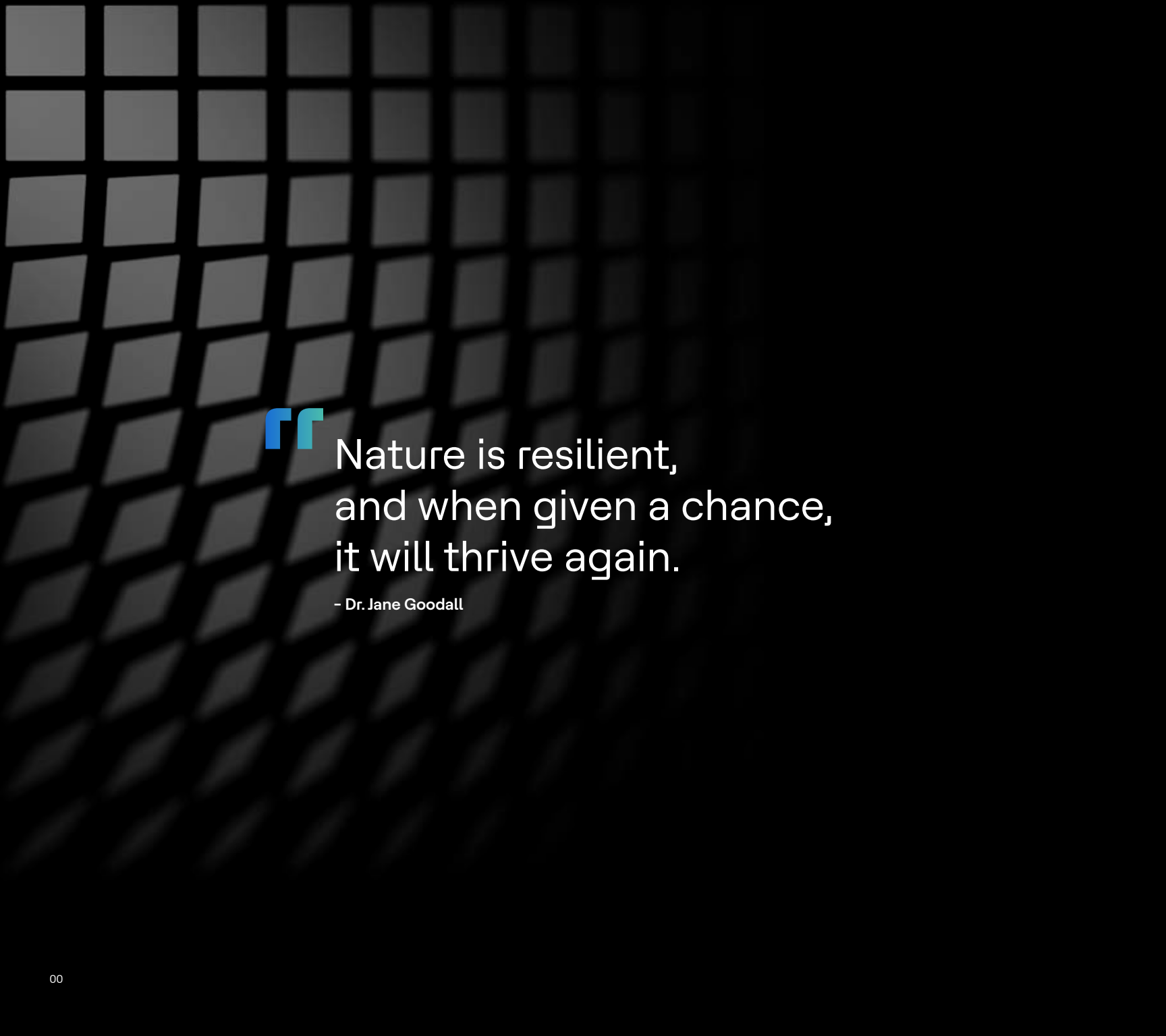

Nature is resilient,
and when given a chance,
it will thrive again.
– Dr. Jane Goodall

Prelude

In the heart of Karnataka, nestled near bustling Bengaluru, the Govindpura Reserve Forest once thrived as a lush sanctuary of biodiversity. Over time, this haven fell under siege, dominated by the relentless spread of Lantana camara—a vibrant yet invasive shrub that strangled native flora, disrupted nutrient cycles, and threatened the delicate balance of life. The stakes were clear: ecological collapse loomed unless decisive action was taken.

With a vision for ecological restoration, the HCLFoundation, under its Harit initiative, embarked on an ambitious journey to reclaim Govindpura. This transformative effort combined scientific precision with community stewardship, uprooting the invasive lantana and reviving the forest with native species. The story of Govindpura is one of resilience—a testament to the synergy between humanity and nature in the face of adversity.

Today, Govindpura stands renewed, a vibrant ecosystem teeming with biodiversity, where birdsong echoes through restored canopies, and butterflies dance among thriving native blooms. This is not just the tale of a forest reborn; it is a blueprint for sustainable restoration—a call to action for preserving the intricate web of life that sustains us all.

India's forests, teeming with life and biodiversity, face a silent yet aggressive adversary:

Lantana camara

Lantana camara is a thicket-forming shrub native to the tropical regions of Central and South America.

Scientific name: *Lantana camara L.*

Synonyms: Camara vulgaris, Lantana scabrida

Common names: Sleeper weed, lantana, wild sage

Taxonomic position:
Division: Magnoliophyta
Class: Magnoliopsida
Order: Lamiales
Family: Verbenaceae


Graphic illustration

Introduced in the early 1800s by the British as an ornamental plant in the Botanical Gardens, Calcutta, **this invasive species has transformed into a relentless ecological disruptor.**

4th worst invasive species in top 10 list by IUCN!

This vibrant shrub, with its deceptively colorful flowers, strangles native flora, disrupts nutrient cycles, and deprives wildlife of essential forage. Its dense thickets block sunlight and create barriers that hinder both plant regrowth and animal movement.

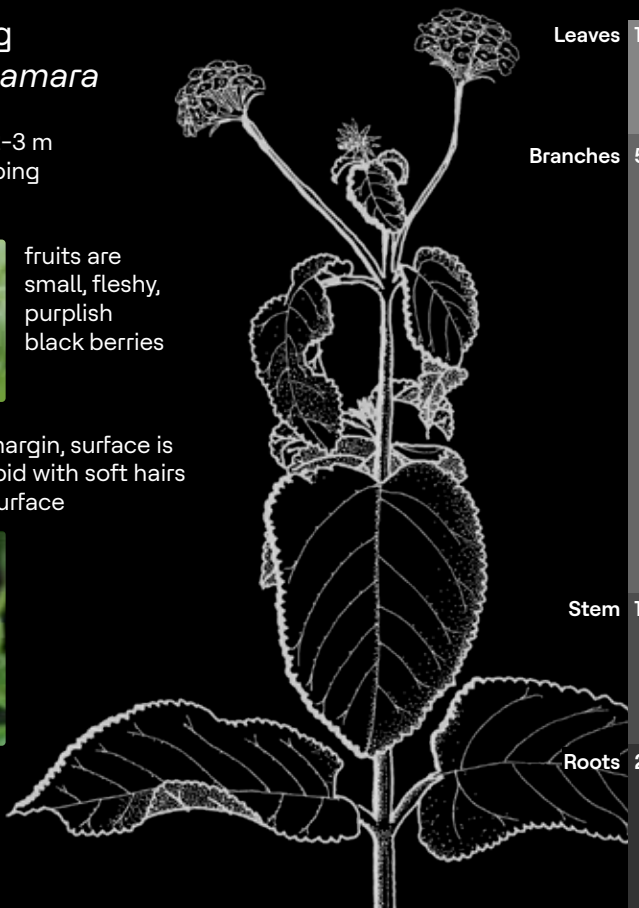
The unchecked spread of lantana threatens not only forest health but also the livelihoods of communities dependent on these ecosystems.

Identifying *Lantana camara*

thorny shrub 2–3 m in height climbing or hanging

fruits are small, fleshy, purplish black berries

toothed leaf margin, surface is rough and hispid with soft hairs on the lower surface



Lantana blossoms
A kaleidoscope of colors

Lantana invasion
A spectrum of ecological impacts

Impact on ecosystems
Severely affects native terrestrial ecosystems *(Swarbrick 1986; IUCN 2001).*

Ecological impact
Adversely affects tree communities in tropical dry deciduous forests *(Sharma and Raghubanshi 2006).*

Habitat dominance
Dominates disturbed areas, streams, open forests, and riparian vegetation *(Richardson et al. 2004; Ramaswami and Sukumar 2014; Raghubanshi and Tripathi 2009; Meek et al. 2010; Dobhal et al. 2011).*

Economic and social impact
Reduces livestock forage by 50%, diminishes natural resources, and obstructs movements *(Shackleton et al. 2017).*

Habitat range
Occupies varied habitats and soil types, disperses through birds, human activities, and forest fires *(Sharma et al. 2005; Hariharan 2017; Lin 2007; Hiremath and Sundaram 2005).*

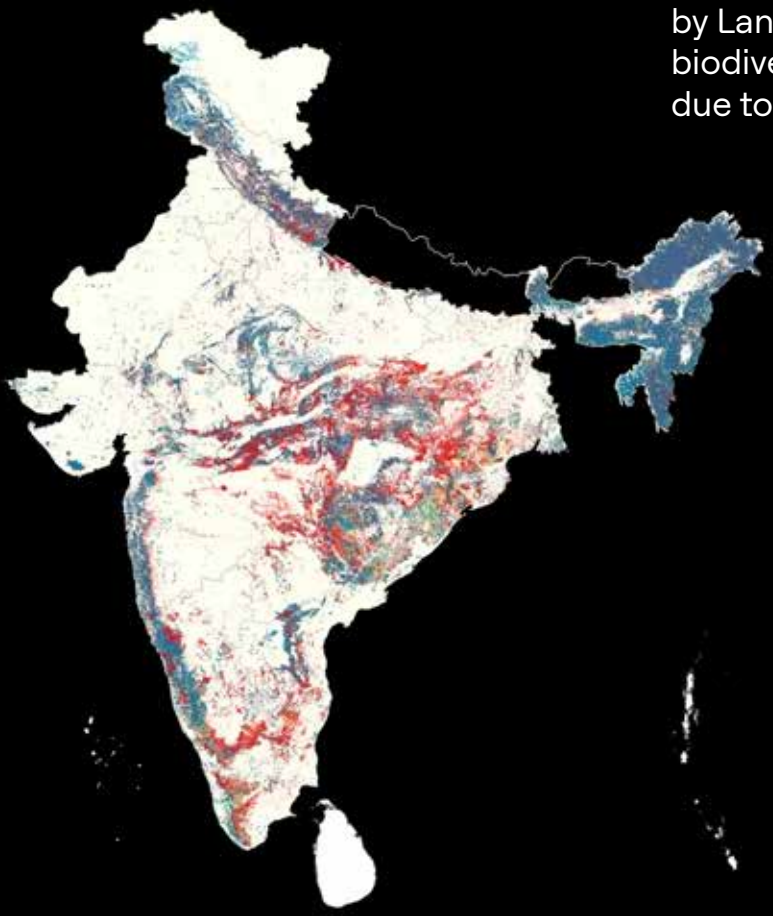
Fire stimulation
Stimulates forest fires *(Raghubanshi et al. 2005).*

Invasion potential
High regeneration and perennial reproduction enable rapid invasion *(Daizy et al. 2004).*

Allelopathy
Allelochemicals reduce plant richness *(Day et al. 2003).*

> Today, Lantana stands as a relentless invader, transforming once-thriving jungles into battlegrounds and casting a shadow over the lives of those who depend on these ecosystems.

Mapping the spread
The Lantana Camara proliferation



~44%

of India's forest area is overrun by Lantana, making the risk of biodiversity loss alarmingly high due to its invasive spread.

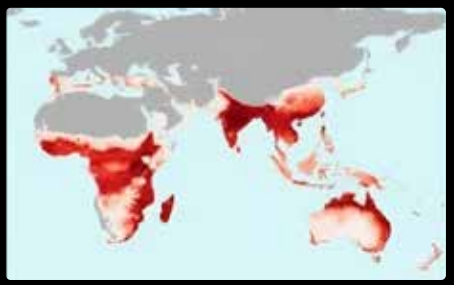
Total forest in India: **750,905 km²**

Total sampled forest: **254,880 km²**

Total sampled forest where Lantana was found: **140,966 km²**

Total forest likely invaded by Lantana: **574,186 km²**

Climate suitable for invasion of Lantana Camara



Invasion of Lantana Camara

Low — High

Source: Wildlife Institute of India, Dehradun

Ecological and human consequences of Lantana invasion

The aggressive invasion of Lantana camara is rapidly unraveling the ecological fabric of India's tropical and subtropical forests. This tenacious invasive species doesn't discriminate; it infiltrates both disturbed and undisturbed habitats, forming dense, impenetrable thickets that choke out native vegetation and fundamentally alter forest structure. The consequences are cascading and dire: native herbivores like sambar and chital are deprived of food and shelter, disrupting the delicate balance of the food chain. This scarcity of prey directly threatens apex predators such as tigers and leopards, leading to nutritional stress, displacement, and an alarming increase in human-wildlife conflict as these majestic animals are forced to seek alternative food sources closer to human habitation.

The insidious spread of Lantana is transforming tiger reserves, including the Sundarbans and the Western Ghats, into biological deserts. These once-vibrant ecosystems are being replaced by Lantana monocultures, resulting in a devastating loss of biodiversity and ecological resilience. The scale of this invasion is staggering, a clear indicator of the profound ecological disruption wrought by this invasive plant.

But the impact of Lantana extends beyond ecological damage; it strikes at the heart of human communities, particularly those marginalized populations who depend on forest resources for their daily survival. Access to essential resources like firewood, grazing lands, and medicinal plants is severely restricted, forcing people to venture deeper into the forest and increasing the risk of dangerous encounters with wildlife. Traditional agroforestry and grazing practices, cornerstones of sustainable livelihoods, are disrupted, and the decline in wildlife diversity and visibility deals a blow to ecotourism, further destabilizing local economies. The unchecked proliferation of Lantana, therefore, not only jeopardizes the delicate balance between human needs and wildlife conservation but also threatens to undermine the very foundation of local communities and economies.

Graphic illustration

On December 7, 2021, a Memorandum of Understanding (MoU) was signed between the Karnataka Forest Department and HCLFoundation, the CSR arm of HCLTech, to enhance habitat improvement and restore ecosystem services.

The signing ceremony was graced by Shri. Sanjay Mohan, IFS, Principal Chief Conservator of Forests – Head of Forest Force, Karnataka Forest Department.

HCLFoundation's transformative action

To combat this ecological crisis, Harit by HCLFoundation initiated a significant Habitat Restoration Project in Govindapura Reserve Forest, Karnataka. The initiative targeted the eradication of lantana through sustainable, research-driven methods.

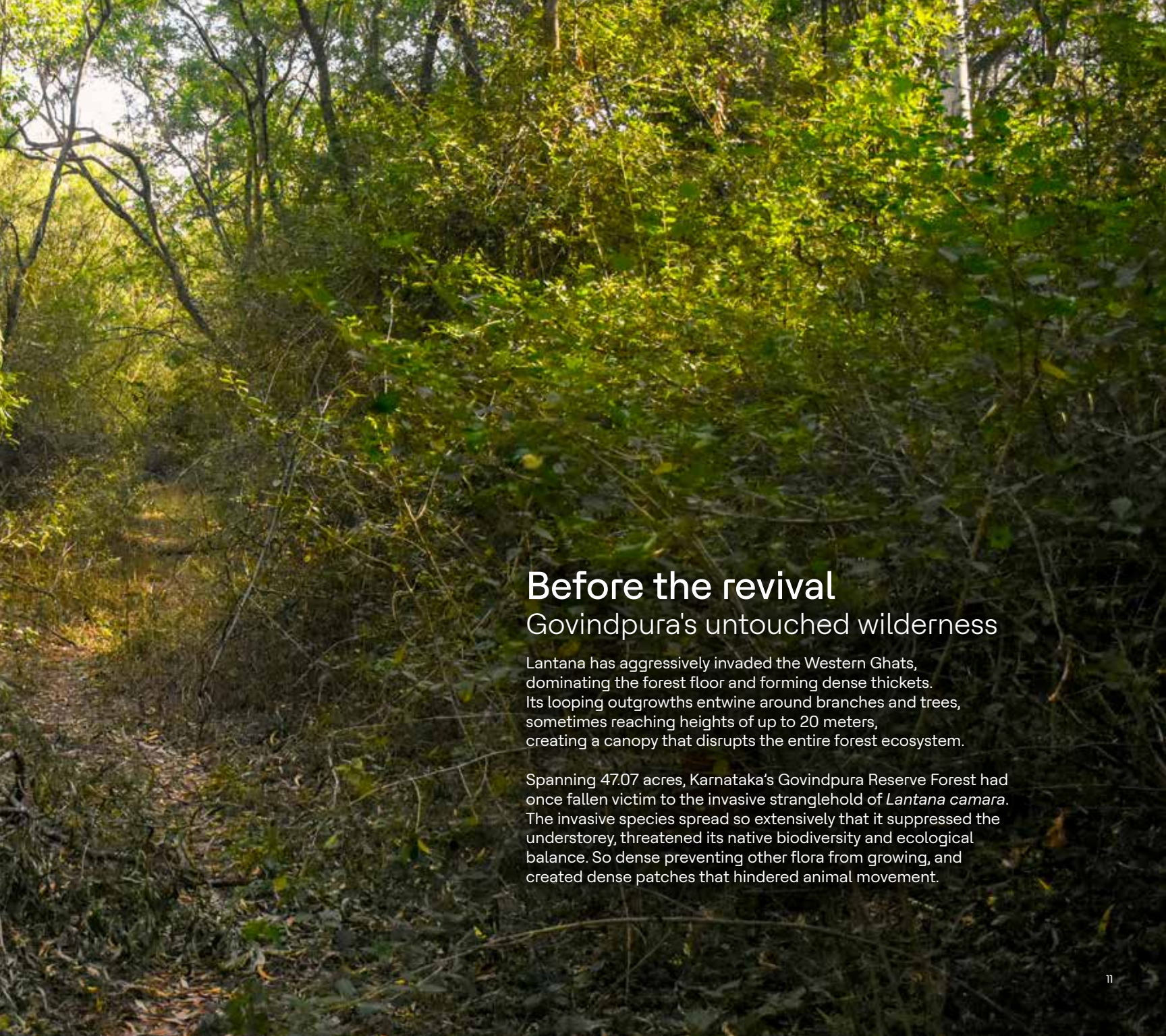
Uprooting the plant at its roots, rather than surface-level removal, was prioritized to prevent regrowth. The cleared areas were then rejuvenated with native grass species, fostering a return to a balanced and thriving ecosystem.

Building on science and community

Drawing insights from global and local studies, Harit by HCLFoundation emphasizes ecosystem restoration that is both resilient and inclusive.

By involving local communities in the management process, the initiative not only restores biodiversity but also strengthens socio-economic ties to conservation.

The implementation project at Govindapura Reserve Forest serves as a model for addressing invasive species across India, linking evidence-based strategies with on-ground action.



Before the revival

Govindpura's untouched wilderness

Lantana has aggressively invaded the Western Ghats, dominating the forest floor and forming dense thickets. Its looping outgrowths entwine around branches and trees, sometimes reaching heights of up to 20 meters, creating a canopy that disrupts the entire forest ecosystem.

Spanning 47.07 acres, Karnataka's Govindpura Reserve Forest had once fallen victim to the invasive stranglehold of *Lantana camara*. The invasive species spread so extensively that it suppressed the understorey, threatened its native biodiversity and ecological balance. So dense preventing other flora from growing, and created dense patches that hindered animal movement.

> The mission was clear:
> to restore the forest's ecological integrity by removing Lantana and encouraging native vegetation.

Armed with determination and informed techniques, HCLFoundation, in partnership with SayTrees, embarked on this ambitious journey.

The project's main objective was toremove *Lantana camara* from the site with minimal disturbance to the existing ecosystem.

About Govindapura Reserve Forest

Nestled northwest of bustling Bengaluru, Govindpura Forest Reserve stands as a testament to nature's resilience when nurtured with care.

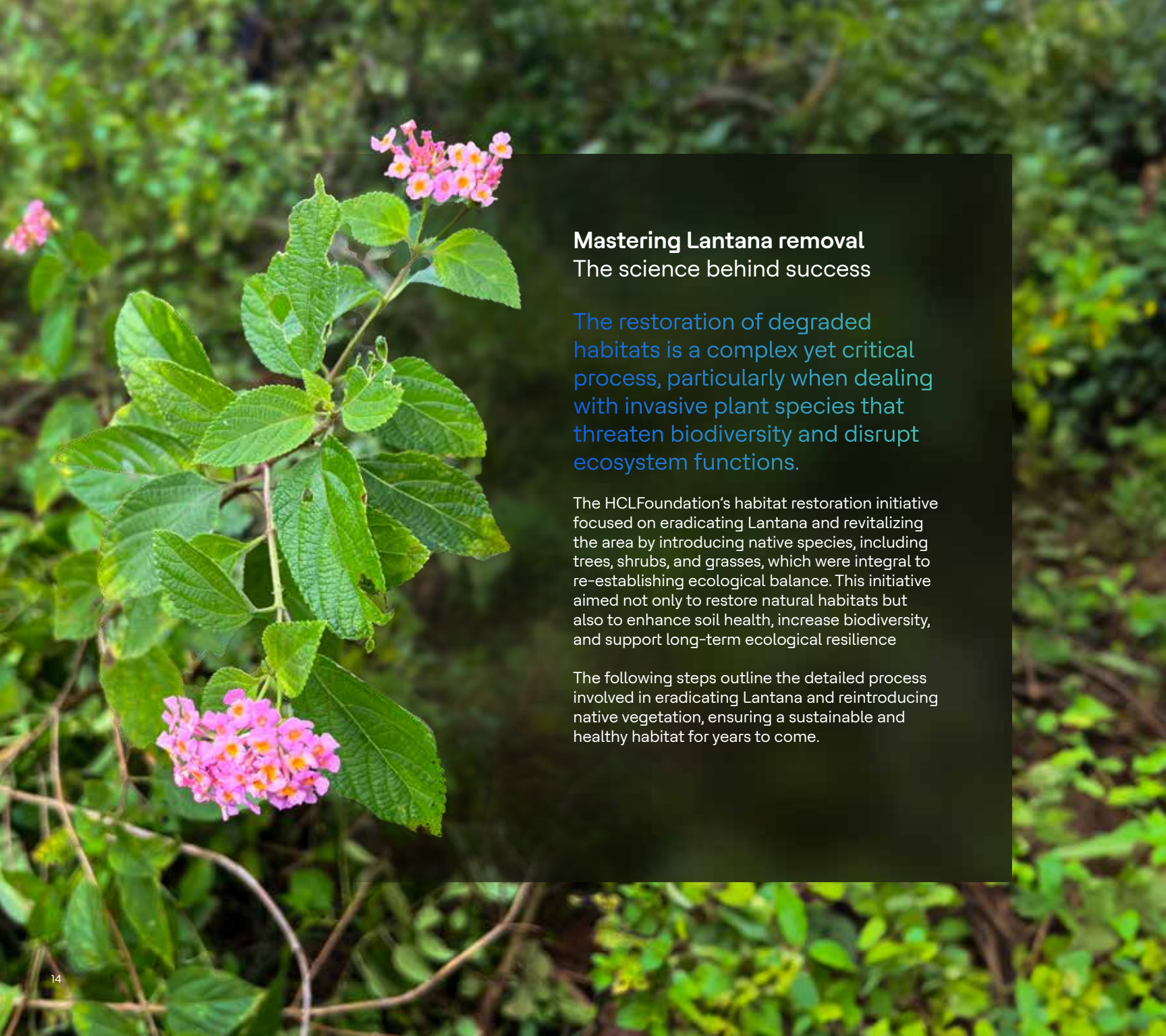
Most of the area is closely planted with Eucalyptus trees. The undergrowth mostly consists of dense impenetrable clumps of Lantana. A few other exotic species of trees other than Eucalpytus are also planted in smaller areas. These include Senna siamea, Acacia auriculiformis and Leucaena leucocephala.

Eucalyptus are not known to colonize areas but the other three species, especially Leucaena leucocephala are invasive and can colonise an area quickly. There is a patch of native scrub that is completely devoid of planted trees which should be preserved. This patch consists of a large number of Dodonaea viscosa shrubs interspersed with some Acacia leucophloea, Flacourtia indica and other native species.

The area serves as a refuge for several plants that are not found in the highly cultivated lands/urban area outside such as Balanites roxburghii, Diospyros melanoxylon, Flacourtia indica, Santalum album, Secamone emetica, etc.

Most of the species serve as important sources of fruits, nectar, shelter, etc for wildlife. There are a few wild edible fruit species like Diospyros melanoxylon, Flacourtia indica and Ziziphus oenoplia. Some medicinal plant species also occur inside the site such as Plectranthus caninus and Hybanthus enneaspermus.

Oriental Garden Lizard
(Calotes versicolor)



Mastering Lantana removal
The science behind success

The restoration of degraded habitats is a complex yet critical process, particularly when dealing with invasive plant species that threaten biodiversity and disrupt ecosystem functions.

The HCLFoundation's habitat restoration initiative focused on eradicating Lantana and revitalizing the area by introducing native species, including trees, shrubs, and grasses, which were integral to re-establishing ecological balance. This initiative aimed not only to restore natural habitats but also to enhance soil health, increase biodiversity, and support long-term ecological resilience

The following steps outline the detailed process involved in eradicating Lantana and reintroducing native vegetation, ensuring a sustainable and healthy habitat for years to come.

1 Complete uprooting and removal

2 Minimize soil disturbance

3 Biomass removal and proper disposal

4 Seeding of native vegetation

5 Habitat restoration

Complete uprooting and removal

This involved systematically removing all Lantana plants, ensuring the entire root system was uprooted. This step was critical to prevent re-sprouting and reduce the seed bank in the soil, eliminating the possibility of regrowth.

Successful eradication required precision in targeting both mature plants and juvenile seedlings.

Minimize soil disturbance

Efforts were made to minimize soil disturbance during removal to prevent the germination of other invasive species or native weeds. A mini excavator with a specialized uprooting attachment was used to selectively pull out each plant without digging.

In areas where the excavator could not reach without damaging trees, a manual approach was used to cut below the root stock, minimizing regeneration and soil disturbance.

Biomass removal and proper disposal

Removed plants resulted in a large biomass, posing a fire threat and reducing space for natural regeneration. The biomass, including stems, roots, and leaves, were removed to prevent seed spread. Proper disposal methods were ensured to avoid re-infestation.

A tractor-run pulverizer was used to shred and remove *Lantana camara* biomass from the site. The pulverization process also facilitated quicker decomposition, allowing for better site preparation for native species replanting.

This step was crucial to complete the eradication process and keep the ecosystem free from future threats.

Seeding of native vegetation

Following the clearance of Lantana, native grasses, shrubs, and trees were introduced to restore the natural ecosystem. This step was essential to create a competitive environment for native species and prevent re-invasion by Lantana.

The selection of appropriate species ensured that ecological functions—such as pollination, soil stabilization, and water retention—were effectively restored.

Habitat restoration is a multifaceted process that extended beyond the initial eradication of *Lantana camara*, focusing on the long-term recovery of the ecosystem.

After completely removing the invasive species, the restoration process involved continuous monitoring, maintenance, and establishing a resilient native ecosystem.

The initial phases of restoration were intensive, requiring a one-time removal of invasive plants, followed by 3 to 5 years of active weeding to manage new saplings and emerging invasive species. This extended weeding phase was crucial to prevent the re-emergence of Lantana and other non-native plants, ensuring native vegetation had sufficient time to establish and thrive.

Regular monitoring and intervention were key to identifying and removing any new invasions early, preventing long-term ecological disruption.

Sustainability in the restoration process was achieved through

Integrated Weeding and Maintenance
Continued weeding was carried out using both mechanical and manual methods to keep the site clear of emerging saplings and invasive species. This was critical to ensuring native species could grow without competition from invaders, ultimately leading to self-sustaining native plant populations.

Native Species Growth Monitoring
The health and growth of the newly introduced native vegetation were regularly monitored to track progress and make adjustments where necessary. This involved ensuring that the right mix of species was flourishing and that the habitat was evolving toward a stable, biodiverse ecosystem.

Soil and Ecosystem Health Monitoring
Regular soil and ecological assessments ensured that soil health and habitat conditions remained conducive to native species growth. This included monitoring for erosion, soil fertility, and moisture levels, and taking corrective actions when necessary to promote healthy soil and vegetation recovery.

Volunteering and Community Engagement
Involving residents in the restoration process through training and capacity building ensured long-term success. By promoting stewardship and creating local awareness, the project fostered a sense of ownership, leading to sustained habitat protection beyond the project's duration.

Bicolor Ant Mimick Jumping Spider
(Myrmarachne sp.)

The restoration of the Govindapura Reserve Forest is a shining example of HCLFoundation's unwavering commitment to environmental stewardship and sustainable development.

Spearheaded by HCLFoundation in partnership with SayTrees, this transformative project has successfully reversed biodiversity loss and restored ecosystem functionality in a degraded landscape. Through targeted efforts, such as the eradication of *Lantana camara* and the reintroduction of native vegetation, this initiative has created a resilient and thriving ecosystem that supports wildlife and local communities alike.

HCLFoundation provided the vision, resources, and strategic oversight for the project, ensuring alignment with national biodiversity and climate resilience goals. SayTrees, as the implementation partner, translated this vision into impactful on-ground action. Their expertise in sustainable practices, community mobilization, and innovative restoration techniques was instrumental in achieving the project's goals.

From April 2022
to November 2024

40,000+ kgs
of Lantana removed

1,600+
man hours involved

47.07 acres
of area covered under
habitat restoration

Under the stewardship of HCLFoundation, Govindapura has become a beacon of hope, demonstrating that degraded landscapes can be revived with strategic planning and collaborative efforts.

By aligning with India's biodiversity conservation goals, the initiative showcases a scalable and replicable model for restoration across the country. This project exemplifies the potential of partnerships between corporates and NGOs to create meaningful environmental and social impacts. Because...

> When humanity joins hands with nature, miracles become possible.

Laternfly
(Fulgorid planthoppers)

Rediscovering biodiversity at Govindapura

The restoration of Govindapura Reserve Forest marks a significant milestone in reviving ecological balance and fostering biodiversity.

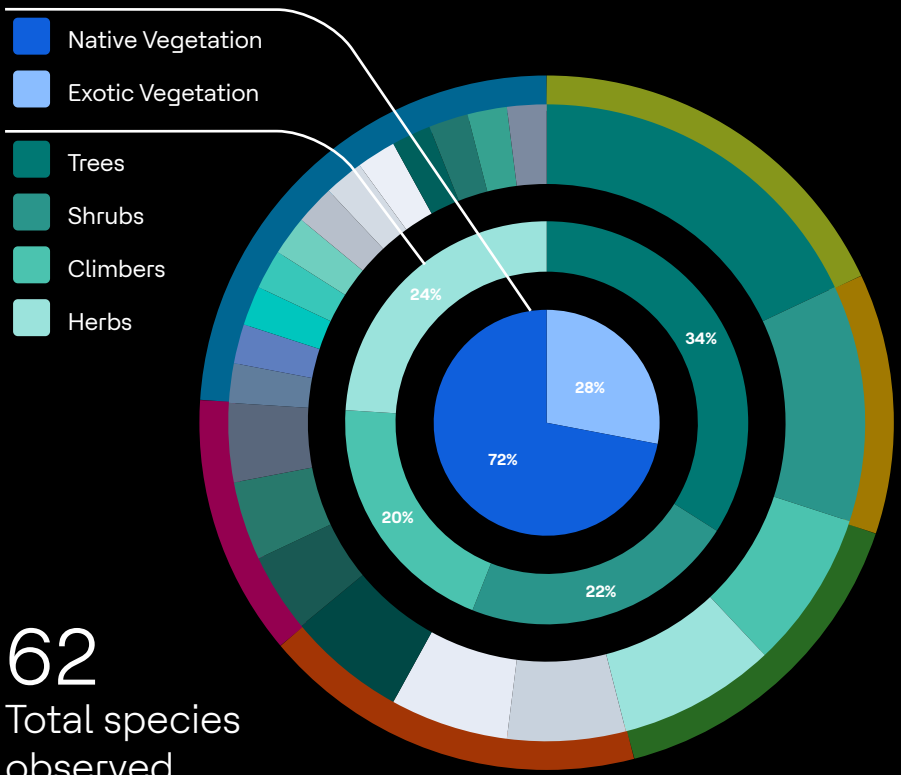
Currently, the forest boasts an impressive diversity of 50 plant species, including trees, shrubs, climbers, and herbs. This remarkable variety is expected to grow even further during the rainy season, unveiling more of nature's hidden wonders. Among these species, 13 are exotic, including Eucalyptus and the previously dominant *Lantana camara*.

While their presence remains significant, ongoing restoration efforts led by HCLFoundation are steadily tipping the balance in favor of native flora, paving the way for a more balanced and harmonious ecosystem.

The forest is home to over 50 species of birds, 70 species of butterflies, and a rich array of plant life. It's alive with a symphony of sounds—from the calls of ground-dwelling birds like the Indian Peafowl to the vibrant flight of butterflies such as the Lime Swallowtail.

The resurgence of biodiversity at Govindapura stands as a powerful testament to the effectiveness of habitat restoration, demonstrating how targeted interventions can rekindle nature's inherent resilience and beauty.

Vegetation diversity overview



62
Total species observed

Including 11 invasive species that significantly impact the local ecosystems. These species, primarily from families such as Acanthaceae, Solanaceae, and Fabaceae, are altering native plant communities, competing for resources, and disrupting ecological balance. Their presence threatens the regeneration of native species, hindering the overall health and biodiversity of the habitat. Examples include Puncture Vine, Brazilian Nightshade, and Common Lantana.

Species distribution

18%
Asteraceae

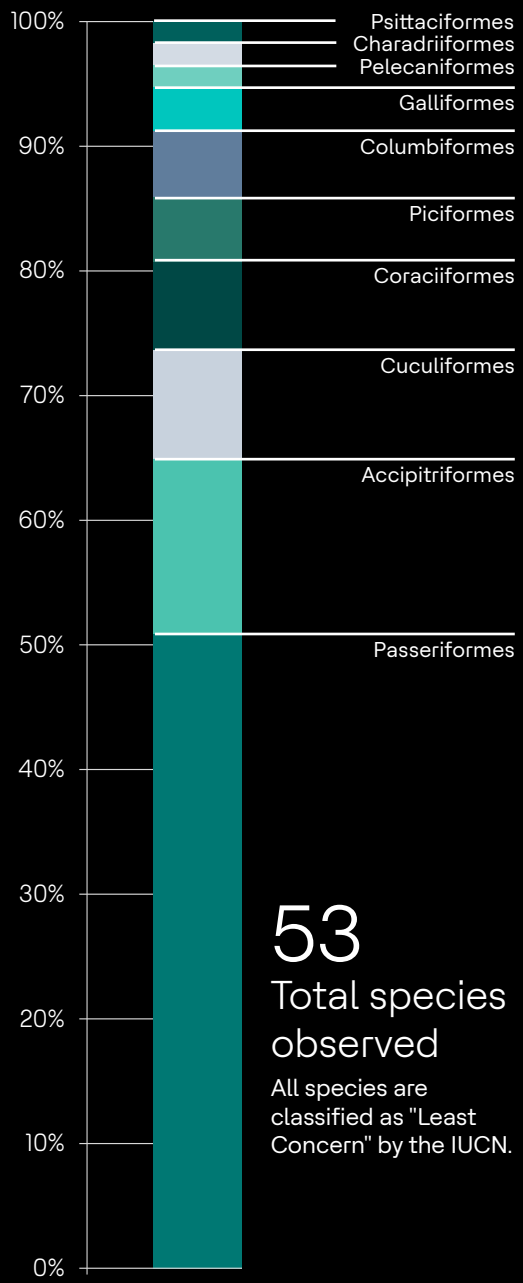
12%
Fabaceae

8%
each of Acanthaceae and Apocynaceae

6%
each of Solanaceae, Sapindaceae, and Bignoniaceae

4%
each of Rutaceae, Phyllanthaceae, and Rhamnaceae

2%
each of Zygophyllaceae, Commelinaceae, Myrtaceae, Oxalidaceae Punicaceae, Lamiaceae Asparagaceae, Santalaceae, Crassulaceae, Poaceae, and Malvaceae



53

Total species observed

All species are classified as "Least Concern" by the IUCN.

Avian Diversity Overview

The bird community of Govindapura Reserve Forest reflects the overall health and ecological complexity of the habitat. This diversity is significant for habitat restoration efforts, as birds play vital roles in pollination, seed dispersal, pest control, and maintaining ecological balance.

Galliformes, represented by ground-dwelling species such as the Indian Peafowl and Grey Francolin, are essential for maintaining soil health and contributing to ground-level biodiversity. Their presence indicates a balanced ecosystem with suitable undergrowth and habitat conditions.

Cuculiformes, with brood parasites like the Asian Koel and Common Hawk-Cuckoo, highlight the complexity of ecological interactions. These species play a role in shaping the reproductive strategies of other birds, reflecting a stable and diverse avian community.

Accipitriformes, represented by raptors such as the Shikra and Brahminy Kite, are apex predators that regulate populations of smaller vertebrates and invertebrates, ensuring a healthy food web. Their presence signals that the forest has a sufficient prey base, indicating an effective restoration of ecological functions.

Piciformes, including woodpeckers like the White-cheeked Barbet and Lesser Golden-backed Woodpecker, are vital for controlling insect populations and contributing to habitat formation by creating cavities used by other species.

Pelecaniformes (Little Egret) and Charadriiformes, represented by a single species, show the forest's suitability as a wetland or riparian habitat, vital for maintaining water-based ecosystems and fostering a diverse range of species dependent on aquatic resources.

Coraciiformes, such as the White-throated Kingfisher and Asian Green Bee-Eater, are critical for maintaining insect populations and contribute to the balance of the forest's food web. Their presence reflects a thriving environment with adequate prey.

Passeriformes, with 29 species, represent the largest bird group. These small to medium-sized birds, like the Ashy Prinia and Common Myna, are highly adaptable and are indicators of ecosystem health. Their abundance in the forest highlights successful habitat restoration that supports a wide range of ecological niches.

Psittaciformes, represented by the Rose-ringed Parakeet, signifies the forest's capacity to support colorful and complex avian species, further reflecting ecological richness.

The diverse bird community at Govindapura is a key indicator of the restoration's success. The presence of various species across multiple ecological roles demonstrates the forest's recovery and its growing capacity to support biodiversity. The variety of birds not only enhances the aesthetic and ecological value of the forest but also contributes to the regeneration of plant species and the overall resilience of the ecosystem, reinforcing the critical link between habitat restoration and biodiversity conservation.

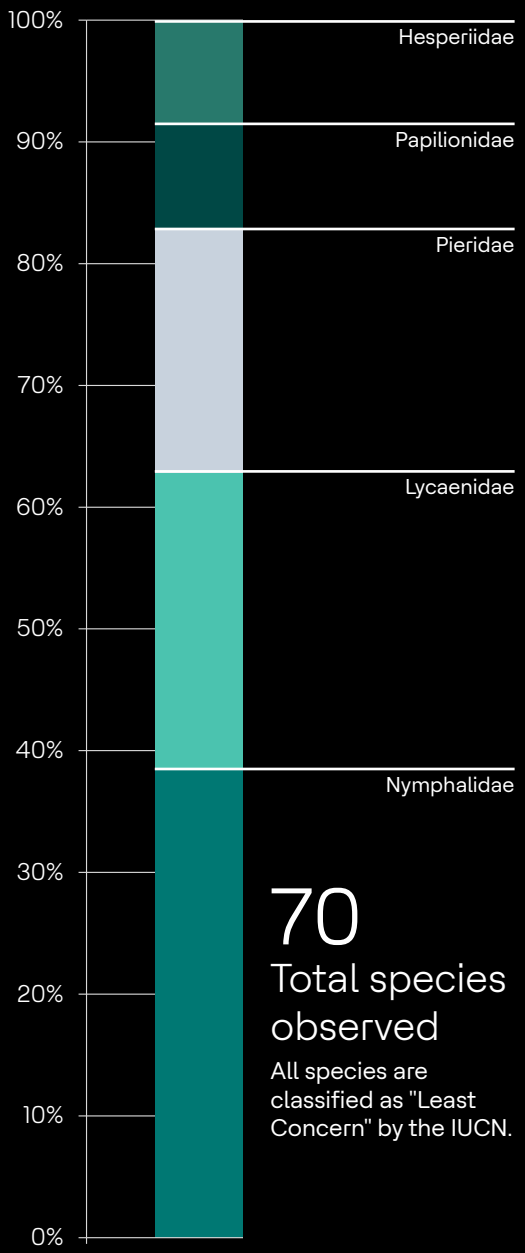
Red-wattled Lapwing
(Vanellus indicus)

Odonata species overview

The Odonata community at Govindapura comprises 18 species, categorized into two families: Coenagrionidae, with four species, and the dominant Libellulidae, which represents 14 species. This community's significant presence highlights the crucial role of Odonata as bioindicators of freshwater ecosystem health, as they are highly sensitive to changes in water quality and habitat conditions.

All 18 species are classified under "Conservation Concern," emphasizing the necessity for continuous monitoring to safeguard their populations. The absence of endemism within the community suggests a more general reliance on the broader habitat conditions, rather than specific localized adaptations. However, the prominence of the Libellulidae family underscores the potential for their role in indicating the success of habitat restoration efforts.

Orange Bluet
(Enallagma signatum)



Butterfly species overview

The butterfly community at Govindapura comprises 70 species spread across five distinct families, each playing a crucial role in the health and dynamism of the ecosystem.

Nymphalidae (27 species): The largest butterfly family, featuring intricate species like the Danaid Eggfly, is integral to the regeneration of local flora. Their larval stages often feed on specific host plants, contributing to the selective spread of native vegetation.

Lycaenidae (17 species): Known for their vibrant coloration, such as the Lesser Grass Blue, these small butterflies are essential pollinators, contributing to the reproduction of flowering plants, which is vital for maintaining plant biodiversity.

Pieridae (14 species): Typically characterized by their white or yellow hues, such as the Common Grass Yellow, members of this family are often important indicators of ecosystem health, as their presence reflects the quality and variety of available habitats.

Papilionidae (6 species): Including the striking Lime Swallowtail, these larger butterflies are vital in pollination processes, particularly in the restoration of floral diversity in degraded habitats.

Hesperiidae (6 species): Robust skippers like the Indian Dart and Grass Demon play a significant role in maintaining ecological balance by fostering plant reproduction through cross-pollination, especially in areas of high floral diversity.

The diversity of butterfly species at Govindapura highlights the success of ongoing restoration efforts and the ecological significance of these insects as indicators of habitat health. Sensitive to environmental changes, butterflies demonstrate the success of reintroducing native plants and restoring ecological functions.

Spiny Ant
(Polyrachis sp.)

Ant species overview

The ant community includes eight species within the Formicidae family. Unlike other species groups, the conservation status of these ants has not been evaluated by the IUCN. No species are endemic, suggesting a broad distribution.

Spider species overview

The spider community at Govindapura consists of 28 species spread across 8 different families within the single order Araneae. Spiders play a critical role in the ecosystem, serving as both predators and prey within the food web. Their presence and diversity offer valuable insights into the health of the restored habitat, highlighting the balance between predators and prey in an ecosystem on its path to recovery.

> Govindapura Reserve Forest is a true celebration of nature's resilience and diversity.

Flower Crab Spider
(Thomisus sp.)


Govindpura
Unveiled

Indian White-Eye
(Zosterops palpebrosus)
flits joyfully among Cipadessa baccifera, feasting on its juicy fruits. Their lively chirps and vibrant movements create a delightful scene, enchanting nature lovers.

Red-whiskered Bulbul
(Pycnonotus jocosus)
distinguished by its striking red cheek patches and black crest, is native to South Asia. This highly social bird is often seen in pairs or small flocks and has a particular fondness for fruit.

Coppersmith Barbet
(Psilopogon haemacephalus)
is known for its distinctive "tuk...tuk...tuk" call, vibrant plumage, tree-trunk nesting skills, and diverse diet of fruits and insects. These birds are skilled at carving out nests in tree trunks using their beaks, a feat not commonly found among all bird species.

White-cheeked Barbet
(Psilopogon viridis)
endemic to India, seamlessly blends with lush foliage. Its vibrant colors provide effective camouflage, enhancing its ability to thrive in its natural habitat.

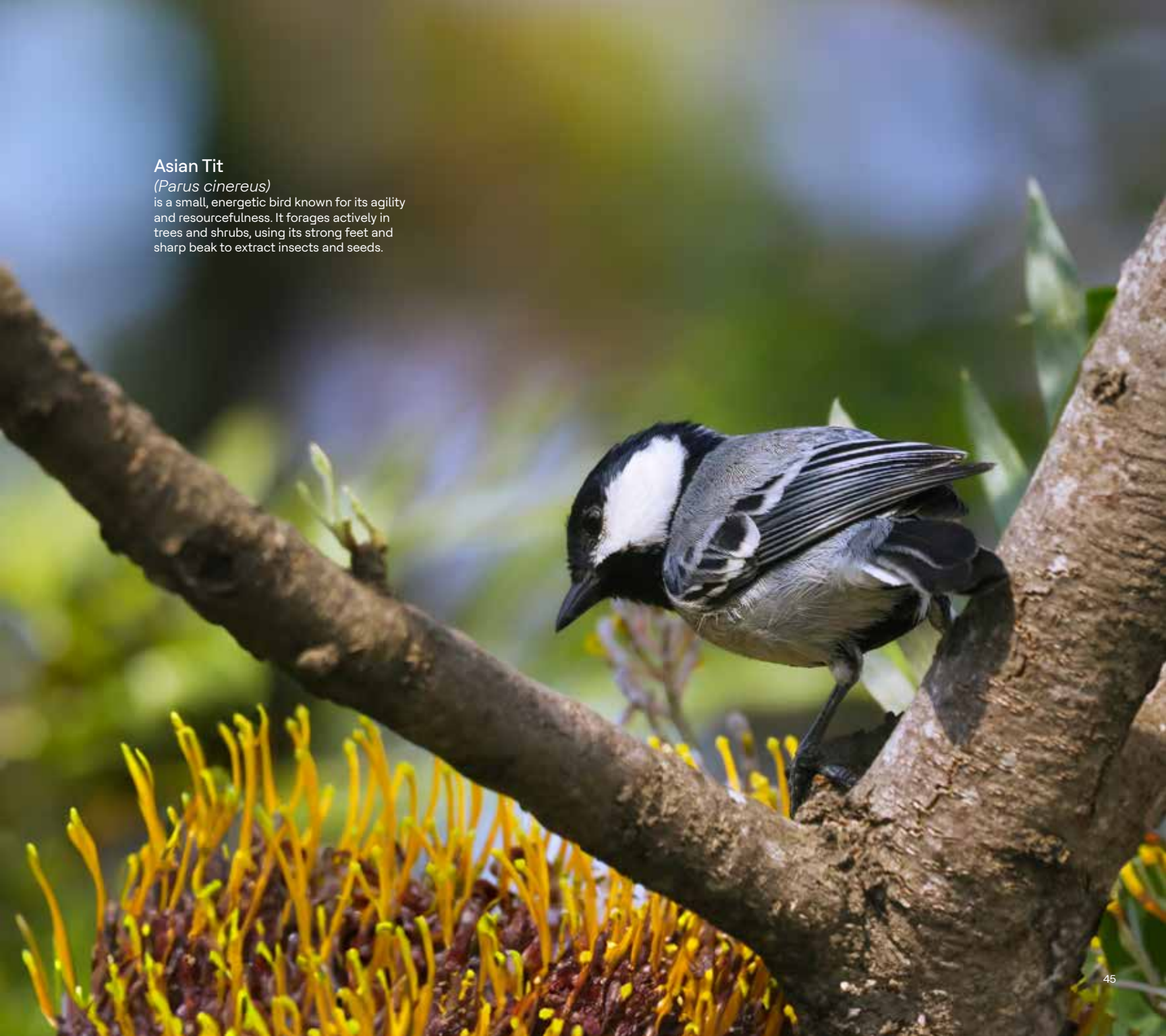
Booted Warbler
(Iduna caligata)
embarks on thrilling long-distance migrations from Central Asia to South Asia every year. Its remarkable journey showcases the resilience and adaptability of this small yet determined bird.

Plain Prinia
(Prinia inornata)
snugly roosts in bushes, hidden and safe from predators. Using its anisodactyl feet with strong toes and locking tendons, it grips vertical sticks securely. This adaptation aids in foraging, mobility, and predator avoidance in its habitat.

Asian Green Bee-Eater

(Merops orientalis)

engages in sand baths to clean its feathers, remove parasites, and regulate body temperature. It rolls in the sand, often in sunlit, open areas. This agile bird hunts by perching and scanning for flying insects, swiftly capturing prey mid-flight and returning to its perch to subdue and consume the insect.



Asian Tit

(Parus cinereus)

is a small, energetic bird known for its agility and resourcefulness. It forages actively in trees and shrubs, using its strong feet and sharp beak to extract insects and seeds.

Common Hawk-Cuckoo
(Hierococcyx varius)
perches near bamboo thickets to hunt insects. Its sharp calls echo through the forest as it blends with the bamboo, using the dense foliage for camouflage and safety.

Purple Sunbird
(Cinnyris asiaticus)
with their vibrant plumage and melodious calls, hover or perch to sip nectar, playing a crucial role in pollination across diverse habitats. Nectar-feeding birds are vital pollinators, ensuring the reproduction of flowering plants and supporting ecosystem biodiversity.

Scaly-breasted Munia

(Lonchura punctulata)
is known for its distinct and melodious vocalizations. It produces a variety of soft, high-pitched calls, often heard in the early morning or evening. These calls, including whistles, chirps, and trills, help maintain group cohesion and attract mates during the breeding season.

Indian Robin
(Copsychus fulicatus)
fiercely defends its territory with vibrant displays and melodious songs, warding off rivals with flair. Its striking behavior and vocal prowess make it a standout in its habitat.

Jungle Prinias

(Prinia sylvatica)

actively forage, hopping through dense vegetation to catch insects. They pounce on prey from leaves or the ground and sometimes fly short distances to catch flying insects. Their agility and speed make them efficient hunters.

Common Tailorbird
(Orthotomus sutorius)
showcases incredible nest-building skills, "sewing" leaves together with spider silk, plant fibers, or thread-like materials. It pierces leaf edges with its beak, creating a secure, well-hidden pouch that provides excellent camouflage and protection for its eggs and chicks.

Jungle Myna

(Acridotheres fuscus)

thrives in forests, urban areas, and agricultural landscapes across South and Southeast Asia. Known for its intelligence and bold behavior, it feeds on fruits, insects, and food scraps. Eye color varies regionally, this regional variation adds to the bird's unique charm and adaptability.

Ashy Prinia

(Prinia socialis)

is known for its tail-flicking behavior and melodious calls. Despite its small size, it boldly forages in open areas. During breeding, males perform aerial displays to attract mates, and both sexes build dome-shaped nests hidden in dense vegetation.

Greater Coucal
(Centropus sinensis)
hunts insects amidst Guduchi vines, a thrilling pursuit. Its stealthy movements and keen senses make it an effective predator, navigating the dense foliage with ease to catch its prey.

Spotted Owlet
(Athene brama)
is a small, nocturnal bird known for its spotted plumage and piercing yellow eyes. It hunts insects and small prey with precision, often seen perched in tree hollows or on branches, vigilantly observing its surroundings.

Yellow-billed Babbler
(Argya affinis)
is a noisy, social bird endemic to southern India and Sri Lanka. Thriving in flocks, it engages in endless chatter and lively antics, making it a vibrant presence in its habitat.

Indian Silverbill
(Euodice malabarica)
feeds on grass seeds, grains, and small insects, often foraging in flocks. It uses abandoned Baya Weaver nests for shelter during non-breeding seasons, saving energy and providing safety from predators and harsh weather.

Golden-winged Warbler

(Vermivora chrysoptera)

is a striking bird known for its vibrant yellow wing patches. Males sing melodious tunes to attract mates, while females focus on nest-building and caring for the young.

Oriental Magpie-Robin

(Copsychus saularis)

female is quieter than the male, focusing on nest-building and care. She incubates eggs and feeds chicks, using subtle calls to communicate, especially when alerting males to threats.

Eastern Cattle Egret
(Ardea coromanda)
feeds on insects and parasites around cattle, reducing pests and enhancing cattle health. Their presence also alerts cattle to potential predators.

The Dual-Eye Advantage of Insect Vision

Insects possess not only complex compound eyes but also simple eyes known as ocelli. These small, single-lens eyes, situated between the compound eyes, play a crucial role in detecting light intensity and aiding navigation.

When combined with their multifaceted compound eyes, insects achieve remarkable visual capabilities, enhancing their precision and environmental awareness. This unique visual system significantly contributes to their exceptional survival skills.

Dragonfly Vision Mastery in the Skies

Dragonflies possess extraordinary compound eyes, each containing up to 30,000 lenses, providing nearly 360-degree vision. With a high lens density at the front for sharp focus and more spaced-out lenses at the sides, they can detect movement from all angles.

This exceptional vision makes them elite aerial hunters, navigating the skies with precision.

Greater Crimson Glider

(Urothemis signata)

dazzles with its fiery red wings and graceful flight. This medium-sized dragonfly, found across many Asian countries, has distinctive red eyes and a blood-red abdomen with black markings.

Yellow-tailed Ashy Skimmer

(Potamarcha congener)

is a dragonfly species where females are more commonly seen than males. While males typically stay near water, females can be found in various locations away from water, often perching on wires, clotheslines, or fences.

Blue Ground Skimmer
(Diplacodes trivialis)
zips through the air with stunning blue wings, hunting near water with precision. This agile dragonfly is a master of aerial maneuvers, often seen darting around ponds and streams.

Common Picture Wing
(Rhyothemis variegata)
or Variegated Flutterer, is a medium-sized dragonfly with colorful wings tinted pale yellow and marked with black spots.

Small Carpenter Bees

(Ceratina)

are tiny pollinators that drill into wood to create nests. They are gentle, efficiently pollinating flowers with agility, and their nesting behavior helps aerate wood, contributing to forest ecosystem health.

Carpenter Bees

(Ceratina)

are essential for ecosystems, ensuring plant reproduction and biodiversity. Their presence supports other wildlife that depends on these plants for food and shelter. Despite their small size, their efficient pollination activities make them vital for thriving ecosystems.

Nomad Bees

(Nomada furva)

a parasitic bee, lays eggs in other bees' nests, feeding on the host's pollen and eggs. Living a solitary life, they secure themselves with plant material while sleeping for stability, protection, and camouflage, ensuring safety from predators.

Red Dwarf Honey Bee

(Apis florea)

may be small, but it is remarkably powerful. These bees construct intricate open-air hives and thrive in tropical forests, showcasing their impressive adaptability and industrious nature.

Common Bluetail
(Ischnura senegalensis)
a member of Odonata, showcases remarkable hunting prowess. With lightning-fast flight, it snatches prey midair with incredible precision and skill, exemplifying the agility.

Unveiling the World of Damselflies

Damselflies are flying insects belonging to the suborder Zygoptera in the order Odonata. Similar to dragonflies, they are typically smaller with slimmer bodies. Most species fold their wings along the body when at rest, unlike dragonflies, which hold their wings flat and away from their bodies.

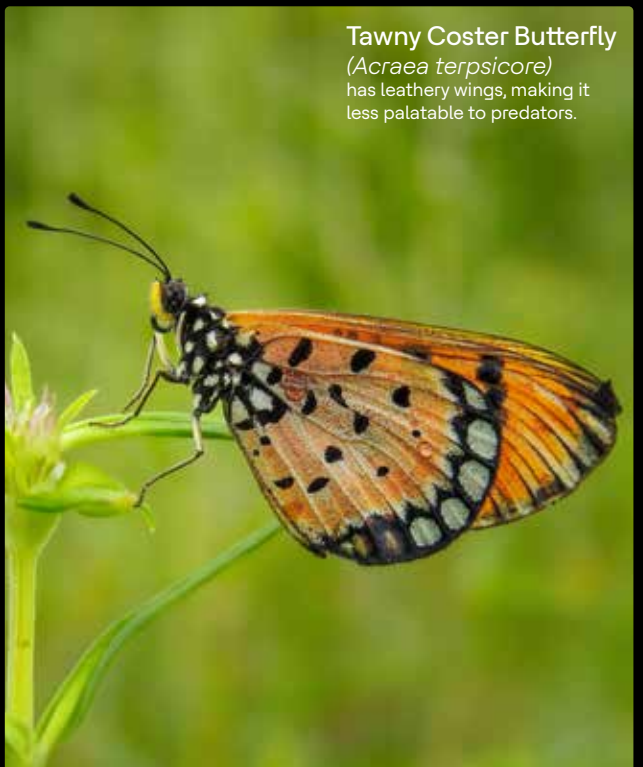
Damselflies are capable of zooming sideways and backwards to capture prey. Their wings are thin and transparent, while their long bodies provide balance during flight. Unlike dragonflies, which are inactive in cold temperatures, damselflies continue to hunt in cooler conditions.

Both damselflies and dragonflies play essential roles in nature: they are key components of the aquatic food chain and serve as natural predators of mosquitoes and other pests.

Common Rose Butterfly
(Pachliopta aristolochiae)
is toxic to predators due to aristolochic acids from its host plants, deterring birds and enhancing its survival.

Oriental Psyche Butterfly
(Leptosia nina)
mimics a falling leaf with its weak, erratic flight to evade predators.

Common Grass Yellow Butterfly
(Eurema hecabe)
changes color with the seasons, displaying darker morphs in summer and lighter morphs post-monsoon.



Tawny Coster Butterfly
(Acraea terpsicore)
has leathery wings, making it less palatable to predators.

Plain Tiger Butterfly

(Danaus chrysippus)
elegantly flutters around milkweed, feeding on nectar while deterring predators with its vibrant, toxic wings.

It is believed to be one of the first butterflies depicted in art, with a 3,500-year-old ancient Egyptian fresco in Luxor featuring its illustration.

Common Cerulean Butterfly
(Jamides celeno)
seasonal polyphenism i.e. changing its appearance between wet and dry seasons for better camouflage.

Oriental Apefly Butterfly

(Spalgis epius)

its caterpillars are predators of scale insects like mealybugs, unlike many other butterflies that feed on plants.

Zebra Blue Butterfly

(Leptotes plinius)

engages in "mud-puddling" to absorb essential minerals and nutrients.

Dark Grass Blue Butterfly

(Zizeeria karsandra)

camouflages with dry grass or soil to evade predators.

Pale Grass Blue Butterfly

(Pseudozizeeria maha)

thrives in diverse habitats, from urban areas to forest clearings.

Footman Moth

(Cyana peregrina)

larvae feed on lichens, which is unusual among moths. This diet allows them to thrive in forest habitats where lichens are abundant.

Handmaiden Moth

(Amata cyssea)

mimics wasps with its bright colors and slender body to deter predators.

Vine Hawk-moth
(Hippotion celerio)
larvae feed on lichens, which is unusual among moths. This diet allows them to thrive in forest habitats where lichens are abundant.

Oriental Garden Lizard
(Calotes versicolor)
can change its color to blend into its surroundings, a trait that helps it avoid predators and regulate its body temperature.

Dakhan Common Castor
(Ariadne merione)
Its larvae feed almost exclusively on the castor plant (Ricinus communis). This specialized diet is quite unique among butterflies.

Indian Common Sailor Butterfly
(Neptis hylas varmona)
has a stiff gliding flight with short, shallow wingbeats. This unique flight pattern makes it easily distinguishable from other butterflies in its habitat.

Blister Beetle

(Hycleus biundulatus)
secrete a toxic compound called cantharidin, which can cause blistering on human skin. This chemical defense mechanism helps protect them from predators.

Spittlebugs

(Infraorder cicadomorpha)
are known for their unique ability to produce a frothy mass that resembles spit, which they use to hide and protect themselves from predators.

Weevil Beetle

(Sternuchopsis fabricii)
distinguished by its elongated snout, which it uses to bore into plant material for feeding and laying eggs.

Red Cotton Stainer

(Dysdercus Cingulatus)
notable for its ability to transmit cotton-staining fungi while feeding on cotton bolls.

Brown Marmorated Stink Bug
(Halyomorpga halys)
is known for its strong, unpleasant odor released when threatened, which serves as a defense mechanism.

Grass Lynx Spider
(Genus Oxyopes)
are easily recognizable by their hexagonal eye arrangement with six larger eyes on top of their head and two smaller eyes in front.

White-eyebrowed Jumping Spider
(Evarcha albaria)
are easily recognizable by their hexagonal eye arrangement with six larger eyes on top of their head and two smaller eyes in front.

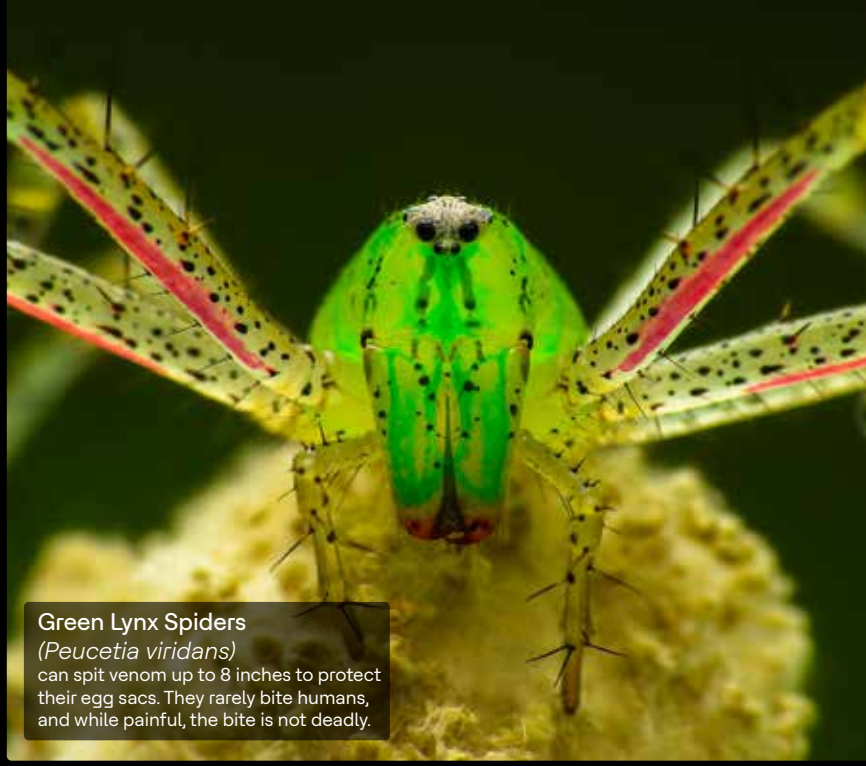
White Lynx Spider
(Oxyopes shweta)
are active hunters, most often sighted outdoors, and during the month of May.

Jumping Spider
(Tenkana spp)
are known for their highly visual hunting methods and agile jumping movements.

Rough Twig Spider
(Poltys illepidus)
is a master of camouflage, mimicking the appearance of a broken twig to avoid predators.

Monkey Orb Weaver Spider
(Neoscona punctigera)
hunts insects from it web at night, and remain folded in a safe place during day.

Hump Back Araneid Spider
(Eriovixia excelsa)
is a master of concealment, mimicking dead foliage to evade predators.



Green Lynx Spiders
(Peucetia viridans)
can spit venom up to 8 inches to protect their egg sacs. They rarely bite humans, and while painful, the bite is not deadly.

Laglaise's Garden Spider
(Eriovixia laglaizei)
rests on the upper surface of leaves, mimicking a dead object to avoid predators.

Garden Cross Spider
(Argiope pulchella)
builds webs with a zig-zag stabilimentum to attract prey and provide support. Even dragonflies can fall prey to its deadly web.

Masked Crab Spider
(Thomisus labefactus)
can change color to match its floral perch, aiding in predation and camouflage. Both males and females have horn-like protrusions on either side of their eyes, which is quite distinctive.

They use their excellent camouflage to blend into their surroundings, waiting patiently for unsuspecting prey to come close. When a moth flies by, the crab spider strikes with lightning-fast precision, capturing it mid-flight.

Mesh Weaver Spider
(Schizocephala bicornis)
constructs irregular, mesh-like webs on the upper surfaces of leaves rather than in hidden or sheltered areas. This unique behavior enhances its ability to catch prey in open spaces.

Tree Hopper
(Leptocentrus taurus)
has an enlarged and ornate pronotum that resembles thorns, aiding in camouflage. This adaptation helps it blend seamlessly with its surroundings to avoid predators.

Brown Droptail Ant
(Myrmicaria brunnea)
is notable for its distinctive down-curved abdomen and spines on the thorax, which help it navigate and defend its territory.

Asian Weaver Ant
(Oecophylla smaragdina)
are remarkable for their nest-building skills. They create nests by weaving leaves together using silk produced by their larvae.

Red Weaver Ant-mimicking Spiders
(Myrmaplata plataleoides)
have elongated chelicerae, up to half their body length, used for both feeding and combat with other males.

Greater Banded Hornet
(Vespa tropica)
raids the nests of other wasps to capture larvae for its young. This predatory behavior helps control the populations of other insects in its ecosystem.

Indian Flower Mantis *(Creobroter gemmatus)* adopts a striking threat posture, revealing eye-like spots on its wings to deter predators. This behavior serves as both a defense mechanism and a fascinating example of insect mimicry.

Giant Grass Mantis *(Danuria thunbergi)* excels at camouflaging itself among grass and foliage, making it nearly invisible to both predators and prey. This ability allows it to ambush prey and avoid detection effectively.

Community in action...

> What we do makes a difference, and we have to decide what kind of difference we want to make.
>
> **– Dr. Jane Goodall**

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