

Preserving Paradise: A Journey through Ecological Wonders

Zoo Outreach Organisation has been conducting the four-month Ram Hattikudur Advanced Training in Conservation (RHATC) since 2021 annually. The course provides immersive training for 10 fellows to become future leaders in the field of conservation. The RHATC 2023–24 batch is focusing on the theme of grassland ecosystem to study the principles of conservation biology. The RHATC program also teaches through practical and experiential learning by conducting many field visits to unique landscapes with diverse conservation case studies. One such significant field visit was the journey to the Western Ghats and learning with experts at Liana Trust in Hunsur, Mysuru District, Rainforest Retreat and Magnolia Mist in Kodagu District of Karnataka. Here, amidst the scenic landscapes, we the RHATC fellows delve into the intricacies of the grassland ecosystem, gaining insights into its diverse biodiversity. The Western Ghats, renowned for its ecological significance, provides a rich learning ground. Through hands-on experiences, we developed a comprehensive understanding of the interconnected web of life within the grassland habitat and nurtured a deep appreciation for the delicate balance of nature.

1. The Liana Trust: a refuge for abandoned exotics

1.1 Introduction

The Liana Trust was the first educational spot for us to explore. Situated in Hunsur, Karnataka, “Gerry Martin Project ” was started by Gerry Martin and renamed as “The Liana Trust” in June

2020. The team at The Liana Trust primarily focuses on human-snake negative interaction and their mitigation, additionally working on ecological studies of Russell’s Viper *Daboia russelii* using radio telemetry, a technique used for better comprehension of the species. The radio telemetry data provides information on the location of Russell’s Vipers, their movement and keeps a track of their home range. It helps to warn the local people to avoid snake bites and spread awareness on conserving these species in the region. It also sheds light on post capture translocation stresses in snakes. Russell’s Viper are studied due to their extensive presence in the agriculture lands and urban ecosystem of Hunsur region.

The scientific insight on all the above mentioned information was obtained from the resource person and his team. It was necessary to understand how conservation holds significance in restoring the balance in ecosystems. The



RHATC fellows interacting with Gerry Martin.
 © B. Ravichandran.

following details will talk about understanding pet trade, how the radio telemetry technique is a useful tool, and anti-venom production.

1.2 Pet Trade- A never-ending loop

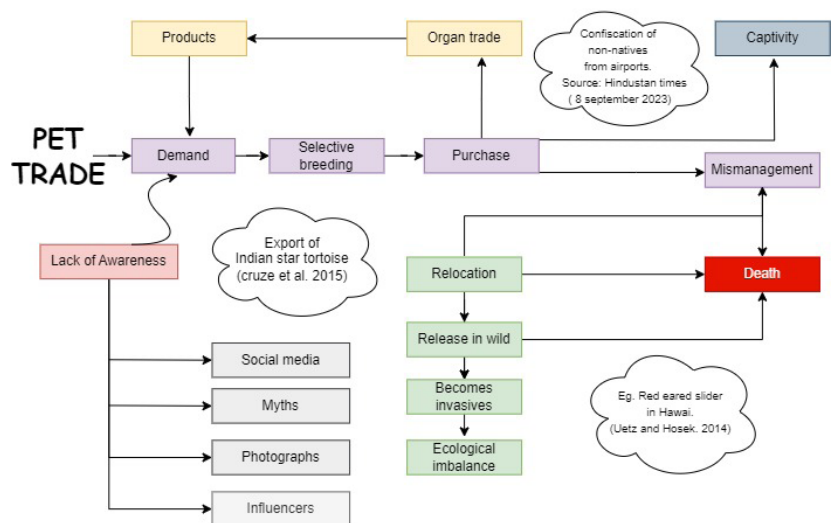
The pet trade is an inevitable chain reaction that has been going on extensively for the last few decades. The chain is fed by an increased societal demand to consider exotics as objects to show off via social media posts or photography. This increased demand for rare species has compelled the breeders to selectively breed them and induce recessive traits in the population. These species are frequently auctioned or sold off at very high prices, for example around 653 individuals of Indian Star Tortoise were reported for sale in Bangkok and Thailand in the past 10 years (Cruze et al. 2015). There is a possibility that the trafficked animals might also enter the black market to satisfy the increased demand for organs. There have also been lots of myths and superstitions associated with use of animals for medicine, as food sources, etc which is often the result of lack of awareness and education.

There have been reports of the confiscation of 55 Ball Pythons, 17 King Cobras, and six dead Capuchin Monkeys from Bengaluru International Airport (Hindustan Times News 2023). All of this demand and supply is also fuelling the entire cascade. Apart from that, the exotic species who manage to survive the tormenting journey away from their natural habitats are greatly mishandled by people. The abandoned pets either end up in captivity in zoos or pet cafes, for example a pet Red-tailed Boa Constrictor from

Florida was adopted by the Emerald Coast Zoo (nwfdailynews 2018). In most cases, the unwanted pets end up being relocated or released into the wild, where they mostly die because of unfamiliar environments or in the worst case scenario end up establishing a breeding population and becoming invasive. An excellent example would be the population of Red-eared Sliders *Trachemys scripta elegans* which is native to the central United States of America and has been reported to have established non-native populations in Brazil (Martins et al. 2014). An invasive population always ends up replacing the native species and creates an ecological imbalance. Although there are not a lot of



An interactive session for and about snakes.
 © B. Ravichandran.



A condensed flow chart showing the current pet trade culture.
 © Amrin Ansari and Praveen Rozario.

reports indicating the import of exotic species as pets in India, we found a variety of abandoned reptiles belonging to Africa, South America, Brazil, Yemen, Indonesia, the Philippines, and the Caribbean Islands which were being rescued from across the country and given a refuge in the Liana Trust.

1.3 Radio telemetry

Radiotelemetry is used to track the animal's movement, location, body condition (i.e., temperature of the body and heart beat) and its environment (i.e., atmospheric pressure and temperature) of animals through radio waves for research (Fuller & Fuller 2012). The Liana Trust has set up a module for mitigating human-snake negative interaction by introducing microchips for medically important snakes to check their movements. Russell's Viper *Daboia russelii*, being one among the medically important snakes, is found very close to agricultural patches due to the presence of rats. People working on farms or in agricultural lands are more prone to snake bites, mostly getting bitten on the arms and legs during the process of weed cutting and harvesting (Williams 2021). People tend to protect themselves from snake bites and the first thing that occurs to their mind is to kill the snake to survive. Gerry Martin and his team are catching snakes which are medically important and surgically inserting microchips for tracking their home range. This scientific method also gives information if the snake is near or in human settlements, as it can be an effective way to warn people to be aware of snakes. What was previously considered 'rescue' is considered one of the strategies to mitigate human-snake negative interactions in the region, including catching them and translocating them far away

from the location where they were caught. But according to Williams (2021), microchipping translocated snakes showed that the snakes were stressed, starvation, showed abrupt pattern of movement in the region and eventual decline in health condition sometimes leading to death (Williams 2021). Gerry Martin also mentioned this during his session that translocation of the captured snakes released far from their home range causes prolonged death.

These are some main actions that are currently helping to overcome human-snake conflict, but along with this education and outreach for the local people has been more effective in mitigating the human-snake negative interactions in the region of Hunsur. Providing gum boots and other necessary materials for avoiding snake bites among people working in agricultural sectors also contributes in making it successful. The Liana trust is thriving to create this module to spread it across all the districts of Karnataka, as well as to cover many other states of India gradually for humans and snakes to co-exist.

1.4 Anti-venom production

In India, snake bites cause around 46,000 deaths annually (Mohapatra et al. 2011) mostly impacting those belonging to lower economic backgrounds (Harrison et al. 2009). There are a lot of myths, superstitions, and malpractices associated with these misjudged creatures. India has been using a polyvalent antivenom produced against the "Big Four" namely the Spectacled Cobra *Naja naja*, the Common Krait *Bungarus caeruleus*, Russell's Viper, and the Saw-scaled Viper *Echis carinatus* for all the venomous snake bites (Laxme et al. 2019). Reports suggest that



Happy faces at The Liana Trust. © B. Ravichandran.

the antivenom produced from the Big four is not effective in neutralizing the venom of other species predominant in the country (Warrell et al. 2013). There can be a possibility of regional variation of venom composition or low potency of the polyvalent antivenom (Whitaker & Martin 2015), hence implying an immediate requirement for production of species-specific antivenom.

Currently, Gerry and his team are trying to synthesize specific anti-venoms by venom extraction of the captive vipers within the Trust rather than depending on a single polyvalent antivenom for all the snake bites. They are also trying to make a difference in the marginalized society by providing crude venom free-of-cost to pharmaceutical companies in order to reduce the cost of anti-venom.

2. Agroforestry at Rainforest Retreat

2.1 Rainforest Retreat and Mojo Plantation

From Liana Trust, we visited another wonderful place in Coorg. A unique initiative that blends ecotourism, sustainable agriculture, and environmental education is Rainforest Retreat situated amid the tropical montane rainforests of the Western Ghats of Kodagu (Coorg) District

in southern Karnataka. The Mojo Plantation Spice Farm, a project of Rainforest Retreat is a certified organic farm close to Galibeedu village, situated in an area with abundant rainfall. The rainfall in this region with an elevation of 1,100 m is between 3,500 and 5,000 mm (200 inches) each year, with the most of it falling between June and September.

Sujatha and Anurag Goel were working professionals in Delhi who quit their jobs and were passionate about farming. They came to Coorg, bought some land, and wanted to do farming in a much more meaningful way where they could produce crops without using any sort of pesticide, or synthetic fertilizers, not causing any disturbance to the ecosystem. Initially, they faced a lot of challenges and one of them was the problem of cardamom borer which used to feed on the stem of cardamom and destroyed the crop. To avoid the infestation they experimented with the extraction of phytochemicals and oil extracts from Indian Beech *Pongamia pinnata* (Raghav et al. 2019), *Annona* species (Isman & Seffrin 2014), Wild Tobacco *Lobelia nicotianifolia* and *Lantana camara*



The lovely cottages at Mojo plantation. © V.B. Pannaga.



Fellows building bridges in Mojo plantation.
 © B. Ravichandran.

(Melanie et al. 2020) and sprayed it on the stem of cardamom and it worked well and reduced the infestation. Also, leaving forest patches intact in their plantations created a microhabitat for numerous birds, insects, and frogs that feed on these insects reducing the chances of infestation. Monoculture cultivation has always been susceptible to diseases, poor diversity makes the crops vulnerable to bacteria and fungi. Having the forest patches intact reduces the chance of disease and infection among the crops. So nature by itself took care of insects and diseases thereby creating a sort of ecological balance providing more stability (Thomas & Kevan 1993).

They also refused to use any sort of synthetic fertilizers on their farm instead they produced their manure by composting. They used cow dung, litter, organic waste, and slurry from the biogas plant to create compost. All these things were piled up and covered so the microbes degraded the complex organic matter into simpler units. They used this as an organic manure for their plantation. By doing so the fertility of the soil was maintained without causing any impacts.

Rainforest Retreat offers a unique blend of education and adventure. We, RHATC fellows, had an immersive practical exposure to the ways of sustainable agriculture through hands-on activities on the farm. We built the bridges using bamboo and other wooden logs and also enjoyed bio-composting. The compost was later applied to the coffee plants in their plantation.

This wonderful place opens up opportunities to explore exciting trails and engage in educational activities that promote ecological awareness leading to a deeper understanding of sustainable agricultural practices. The retreat also includes visits to sacred groves and picturesque grasslands along riverbanks, enhancing the connection between nature and participants. This holistic approach fosters an appreciation for biodiversity and ecological balance.

2.2 Ridge Walk

On 11 November 2023, we went for a 12 km ridge walk which was full of excitement and finding interesting species of plants and insects all along the way. It was also about learning how monocultures, anthropogenic activities and invasive species are causing the ecological



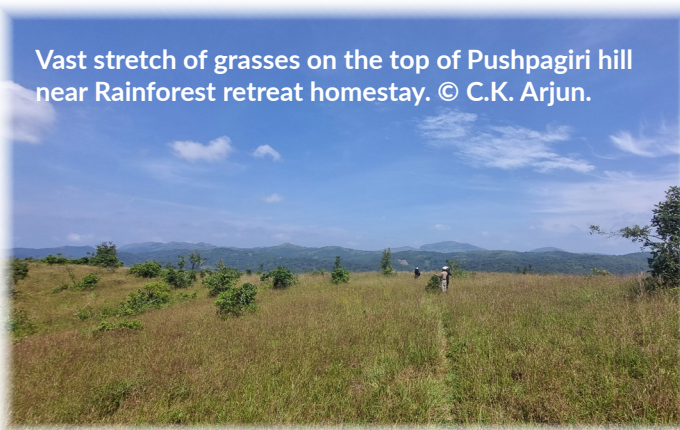
Sujatha Goel explaining about organic farming with the usage of compost and biopesticide.
 © B. Ravichandran.



Beautiful Lantern flower *Ceropogia* sp.
© Praveen Rozario.



Malabar
Giant Squirrel
peacefully
feeding on
fruit of Fish
tail palm.
© Praveen
Rozario.



Vast stretch of grasses on the top of Pushpagiri hill
near Rainforest retreat homestay. © C.K. Arjun.



Mesmerizing green mat outside the sacred grove
temple. © C.K. Arjun.



Image depicting the
beautiful Kalur river and
the patches of grasses at
the river bank.
© V.B. Pannaga.

imbalance in that area. That was evident from the remains of the 2018 landslides we observed at a few places. Dr. Sanjay Molur, course director, RHATC explained the reasons for such landslides and how the disturbed vegetation causes the soil to loosen up after heavy and continuous rainfall. Some of the landslide areas have started having new vegetation but the risk of invasive species dominating the place is very high! On the way, we saw the beautiful plant of *Ceropegia* sp. We also observed some species of *Sida*, *Ziziphus*, *Cinnamomum*, *Solanum*, *Caryota urens*. After reaching the top, we witnessed the mesmerizing view of the shola landscape all around! On our way back home, Ravi who works at Rainforest Retreat, gave us the fruits of the Balloon Vine *Cardiospermum halicacabum* to eat. It was one of the sweet memories we carried back.

2.3 Bhadrakali Sacred Grove

We visited the Bhadrakali sacred grove marshland which is 400+ years old. We were welcomed by a beautiful Malabar Giant Squirrel *Ratufa indica centralis* feeding on *Caryota* fruits. We also came across the mud puddling butterflies and the footprints of elephants and gaur making their presence evident. There was a beautiful fern along the edge of the stream and the thin layer of spores on the underside of the fern was dazzling in golden color in the sunlight, hence the name Golden Fern. There were many ephemeral plants like *Eriocaulon* sp. as well as some individuals of *Impatiens balsamina* too.

2.4 Kalur River

On the last day at Rainforest Retreat we visited Kalur River which is an unique ecosystem comprising water bodies and grasslands at the river bank. We learnt about the importance

of wetlands and grasses and their ecological role. Shallow water, deep pools, riffles, and the grassland along the banks of the stream are unique and different from each other in terms of species diversity and their roles in the ecosystem.

The species that live in each of these micro-habitats are very specific and adapted to the environment. Any disturbance to their habitat could cause imbalance and loss of stability. For example, a species of fish (A) lives in shallow water species (B) lives in deep water, and species (C) in riffle, if a check dam is constructed then the water level will increase and the riffle is transformed into stagnant water where both the species which were living in shallow water and riffle will be eliminated and the species which was living in deep water would increase in its numbers causing an imbalance (Schmutz & Sendzimir 2018). Grasslands on the river banks are crucial landscapes and play an important role in preventing soil erosion as their roots are fibrous and penetrate deep into the soil so they bind the soil tightly.

This was our experience at Rainforest Retreat. It is a nature lover's heaven, surrounded by beautiful hills and densely forested valleys. This area has some of the best trekking and birdwatching spots in southern India. Since its establishment in 2000, the Rainforest Retreat has drawn a diverse range of guests who are all connected by a love and respect for nature, including scientists, researchers, artists, farmers, students, and the elderly.

3. Magnolia Mist

3.1 Magnolia Tree

The gigantic Champa Tree *Magnolia champaca* tree “born and brought up” at the Magnolia mist is approximately 2,000–2,500 years old. The seeds of the tree are red in color and the fragrance of the flowers exceeds more than a kilometer. It is one of the 10 oldest trees in southern Asia. This is the only standing tree that harbors 23 different varieties of orchids and is home for various species like Nilgiri Marten *Martes gwatkinsii*, Rat Snake *Ptyas mucosa*, Spectacled Cobra *Naja naja*, Malabar Grey Hornbill *Ocyrceros griseus*, Lesser Racket-tailed Drongo *Dicrurus remifer*, White-cheeked Barbet *Psilopogon viridis*, Orange Minivet *Pericrocotus flammeus*.

3.2 Magnolia mist

Magnolia mist that is named after the majestic and magnificent *Magnolia champaca*, is a 25-acre plantation situated in Kodagu District of Karnataka, owned and managed by Abhishek Jain and his family. Abhishek Jain previously worked as naturalist in TATA groups of hotels.



2000 years old Magnolia tree in Magnolia mist, home for various different species. © C.K. Arjun.

His passion towards conservation and leaving a healthy planet behind for the future generation motivated him to resign as a naturalist in the TATA group and become involved in organic farming. Abhishek grows and cultivates native and exotic species in his land organically and simultaneously leaves a large portion for the ecosystems to evolve naturally to support the biodiversity in the region.

Initially a large area was cultivated with rice to generate revenue, however, he is gradually reducing the land under cultivation and aiming for subsistence. Different local varieties are grown in alternate seasons, and currently local variety ‘Khata’ that has the capacity to stay submerged in water for 15–20 days, was sown in the month of June and will be harvested by December. According to Abhishek, the natural



Abhishek Jain explaining about orchid, grown in his garden. © Sanjay Molur.

fertilizer - balls of *Gliricidia* leaves mixed with cow urine and remains of coffee husk is the best method to get rid of rodents, insects and meanwhile increasing the yields from the small area of cultivated land.

The way towards the dining area of Magnolia Mist is a distinctive beauty – it is lined by different orchids, a mini Orchidarium and fest for our eyes! At Abhishek’s orchidarium there are more than 100 species of native and rare orchids, all of which have been collected during the last five years. Vanilla is one of the luxurious growing orchids in Magnolia Mist, a moist evergreen root climber where each flower is pollinated manually. It is harvested in three batches considering the climatic factors.

Coorg is famous for its coffee and so is Magnolia Mist for its organic variety of coffee and processing coffee beans with the right amount of heat, time and blends. Over time, Abhishek has gained enough experience in this arena and revealed to us the secrets of high caffeinated coffee produced when beans are lightly roasted.

3.3 Ecology and Agriculture

Ecology and agriculture go hand-in-hand here. Following are unique examples and learnings during the field walk. Magnolia mist hosts unique biodiversity among all the plantations present in Kodagu District.

Indian Gaur *Bos gaurus* visits the open grasslands and rice fields of Magnolia Mist. The presence of species in the open field is a threat to this species as the local people hunt Indian Gaur. To ensure that the gaurs are provided with a safe foraging space that is well hidden from the

locals, the tea plants in Magnolia Mist are being uprooted and plans are in progress to plant native grasses.

Several birds nest on trees around the rice fields and cutting the nested trees will affect the natural ecosystem. So they started cultivating a part of the land with fragrant rice for bird species to feed on during the cultivation season. Hence Abhishek had planned his rice fields and the area around in such a way that nature does its job to maintain the checks and balances. The dead Silver Oak is not cut to provide habitat for tree-hole nesting species like owls that also feed on rats. Fruiting trees are grown around for birds to feed upon, allowing the ecosystem to flourish while benefiting from the same.

Abhishek explained to us the beautiful phenomenon of the Mahseer fish *Hypselobarbus wayanadensis*, a native species that breeds in the flooded rice fields of Magnolia Mist during the rainy season. This phenomenon indicates that rainfall will be surely received in the upcoming days. These species are conserved in its own natural ecology at Magnolia. In fact, Abhishek and his team guard the fishes from being hunted and leave a particular area of paddyfield unused for the fishes to thrive.

3.4 Mycelium and Dancing Frog

Abhishek and his friends had come up with a remarkable idea to conserve the Western Ghats. A private limited company named Mycelium Ecology was started with rules drafted in such a way that the founders themselves can’t change the land use policy. Mycelium’s first project called the Dancing Frog Habitat focuses on buying private lands near the reserve forests in

Coorg for the purpose of conservation. Mycelium Ecology works like a company rather than a NGO or a Trust. Mycelium ecology now holds 52% of The Dancing Frog Habitat and the remaining 48% is given to its shareholders. The interesting part is that the shareholders do not get any rights to own any part of the land, instead they receive a share of the Dancing Frog Habitat ensuring people have no rights to change the use of the land.

The idea to start Dancing frog and Mycelium Ecology comes from the strong motive and passion to leave behind a reservoir of clean air, water and pristine nature to the upcoming generations, many of whom have not lived, witnessed and understood nature at all.

The owners of private land around the reserve forests had initially planned to convert them into resorts and coffee plantations. This would have contributed to the short-sighted economic development of the place but adversely impacted the biodiversity and led to extinction of many endemic species. However, the efforts taken by Abhishek to convince a few landowners ensured that the land was left as it had been with least human intervention. Hence Mycelium Ecology started acquiring private lands under the name of Dancing Frog Habitat to preserve more of what is left and at the same time restore the sacred groves of Kodagu.

4. Conclusion

The first field visit to Western Ghats was a plethora of experiences, knowledge, learnings, takeaways for all of us. From learning about ecosystems especially the Sholas in the classroom to trekking and witnessing the

mesmerizing beautiful grasslands and also the invasiveness of invasive species, we learnt our lessons. The grave impact of anthropogenic activities was evident in these landscapes in the form of landslides, invasive plant species taking over the natural habitat, linear intrusions in the form of roads, electrical towers and poles, excessive use of pesticides by many farmers in the region, electric fences, construction activities, and resort expansions. Our journey has been an exclusive experience through diverse landscapes, each presenting unique challenges and valuable lessons serving as a fundamental principles which are forever relevant and shaping us to become better leaders in conservation!

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