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EDITORIAL BOARD

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MALABAR GIANT SQUIRREL

(*Ratufa indica*)

Photo Credit : Prasad Gaidhani

EDITORIAL

2021 continues to be the year that the covid pandemic maintains its grip on the world, even as vaccination drives shift into top gear everywhere. While the race is on to get a sizable chunk of the population vaccinated, vaccine shortages, new mutant variations and a second wave of infections continue to plague India.

Of all colours in flowers, blue is one that is seldom seen, and one to raise a question in any curious nature observer. Vasanth takes you through a short journey into the Shola grasslands to peek into the cause and nature of a few blue flowers of the Nilgiris. On the heels of blue flowers, we take you into the world of some climbing shrubs that you might encounter should you climb any of the Nilgiri hills. They all come in their range of colours and shapes of flowers and fruits. Know more about them in this edition's photo feature so you can try identifying them the next time you are out on your trail walks. Continuing the storyline with plants, this edition brings you a new research initiative in the Nilgiris that is all about citizen participation in a mapping exercise - to map alien invasive plant species in the Nilgiris. To know more about it and how you can get involved, do not give this article a miss.

Where there are plants, can insects be far behind? How does a battle between ants and a solitary bee pan out? Asish gives you a wonderful peek into the amazing lives of insects, right in his backyard – in this photo story that reveals astonishing facts and feats of these little critters. Bhavya brings you tales from the Barefoot ecologists from the diverse Sathyamangalam landscape and their keen sense of observation that is both filled with facts and fun in equal measure. Listen to Parvathi akka as she talks about her fine balance between different systems of healing and medicine for health - both from her traditional knowledge passed down from elders, as well as her exposure to modern medicine as an ASHA worker.

From traditional times into the current - we dig into the science behind pandemics, viruses, how they move from species to species - a must to understand in these covid times. Sushma takes us down history lane into the many zoonotic diseases mankind has seen and our role in their spread bringing some very important questions on our actions to light.

A temporary relaxation in the lockdown regulations saw NNHS conduct a Toda trail and an invasive mapping workshop, before resigning to the virtual world of communication under lockdown conditions once again. Webinars and online events continue to be the new modes of operation for a new normal in work.

Where does it take us from here? Will the pandemic prove to be a great teacher for mankind – of coexistence with other species and respect for habitats and ecosystems? Only time will tell. To quote Danish philosopher Soren Kierkegaard, "Life can only be understood backwards; but it must be lived forwards."

Sharada Ramadass,
NNHS Co-ordinator

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CLIMBERS FOUND IN THE NILGIRIS

By Shiny Mariam Rehel



Rubus fairholmianus

Gard. (Rosaceae)

Local name: Mullu pazham**Habitat:** Semi-evergreen forests**Distribution:** Endemic to the southwestern ghats

Description: This is a climbing shrub with its inflorescence clothed with glandular hair. There are three to five leaves, and these are densely white below. The flowers are white in colour and have an axillary corymb type of inflorescence; its fruits are bright pink in colour and are found commonly. The flowering and fruiting season is known to fall between December to May.



Rubus niveus

Thunb. (Rosaceae)

Local name: Mullu pazham**Habitat:** 459-3000mts altitude**Distribution:** India, Southeast India, China, Afghanistan

Description: This is a shrubby climber with many prickles. The leaves are simple with three to seven lobes which are ovate or triangular and deeply cordate. The flowers are white, and its fruits are a dark purple. The fruits can also be eaten.



Rubus ellipticus

Smith (Rosaceae)

Local name: Mullu pazham**Habitat:** Evergreen, semi-evergreen, and Shola forests**Distribution:** Western Ghats & Eastern Ghats of India, Sri Lanka, and Myanmar

Description: Commonly known as the Yellow Himalayan Raspberry, this plant is a climbing shrub covered with glandular hair. The plant is covered with prickles that are slender and curved downward. The leaves are pinnately 3-foliolate. The flowers are dense in the terminal and axillary racemes. The fruits are yellow.



Decalepis nervosa

(Wight. & Arn.) Venter. (Asclepiadaceae)

Local name: Paal kodi**Habitat:** Evergreen forests**Distribution:** Western ghats of India

Description: Commonly known as the nerved leaf swallow root plant, this is a climbing shrub with a purplish stem that is pubescent with a milky latex. The leaves are simple, and the flowers are pinwheel shaped and are greenish purple. The flowering cycle is between December and April.



Passiflora leschenaultii

DC. (Passifloraceae)

Local name: Vaval kodi**Habitat:** Shrub forest**Distribution:** Western Ghats, Evergreen Forests. Endemic to Peninsular India

Description: this is a slender climber with glabrous tendril. The leaves of the plant are emarginate and the flowers are white with mauve to purple in the centre. The fruits are ovoid and form bluish berries and turn yellow when ripe.



Piper schmidtii

Hook. f. (Piperaceae)

Local Name: Kattu melagu**Habitat:** Shrub forest**Distribution:** Western Ghats, Evergreen Forests, Endemic to Southern Western Ghats

Description: the plants are a climbing shrub. The leaves are alternate, and each opposed by a spike or the spike scar. The upper side is dark green and glossy while the lower side is pale to white. The flowers are cream in colour and the fruit is a berry which is red- yellow in colour. Flowering and fruiting can be seen in November to April.

BLUE COLOURED WILD FLOWERS OF THE NILGIRIS

By Godwin Vasanth Bosco

The Nilgiris gets its name from the famous Neela Kurinji (*Strobilanthes kunthiana*), which flowers en-masse, once in twelve years. However, this shrub, which flowers profusely during the 12 year cycle, actually does not have blue colour flowers. Its flowers are - 'lilac'. There are other plants part of the native grassland plant community that have blue flowers.

The Nilgiri plateau was once covered by the shola-grassland mosaic, where native grasslands covered 60-70 percent of the entire plateau's surface and the rest of the area - about 30 percent - was covered by sholas (montane forests), which occurred as patches in the grassland. It is estimated that there are some 650 species of plants - including grasses, sedges, shrubs, herbs, and bry-



(IMG: GENTIAN BLUE) Above is the blue flower of the *Gentiana pedicellata* plant. This herb dots intact grasslands of the Nilgiris, parts of the Himalayas and Bhutan. The Todas, a local indigenous peoples group, believe that this flower can sense your feelings and emotions. They say that if you carry deep sorrow and touch the flower, the petals will fold and close.



(IMG: DESMODIUM BLUE) Seen above is the blue flower of *Desmodium ferrugineum* plant. This plant, which prefers to grow in the mid elevation grasslands of the Nilgiris, is highly endangered because this vegetation type is reduced to just a few tracts of hill slopes.



(IMG: COMMELINA BLUE) Seen above is the blue flower of the *Commelina Hirusta* plant, which grows only in the wetland habitats of the Nilgiris' grasslands. This Western Ghats endemic is highly endangered, because wetlands are severely threatened.

ophytes - that make up the grassland plant community alone. Unfortunately, now, less than 10 percent of this habitat remains in its intact form. Habitat destruction and alteration has made the native grasslands of the Nilgiris, some of the most endangered vegetation types in India.

Of the hundreds of plant species that form part of the biodiverse grassland community, only a handful of them have blue coloured flowers. What is also interesting is that there are even fewer plants part of the shola forest community with blue flowers. The reason why blue coloured flowers are rare in nature, could lie in the clue that more grassland plants have blue coloured flowers than shola plants.



(IMG: EXACUM BLUE) Seen above is the blue flower of *Exacum whightianum* plant which is the rarest of all the other endemic plants, mentioned so far.

In nature, the colour blue is rarely produced by plants, because the band of blue light within the spectrum of sun's light, carries the maximum amount of energy. Contrary to what we notice, the green band of light contains the least amount of energy, which is why most plants reflect this colour. Absorbing the band with the maximum energy helps plants with all their metabolic processes. However, the few plants that are able to overcome this need, and produce flowers that reflect the blue spectrum, carry the advantage to stand out more to pollinators.

The fact that reflecting the blue bandwidth requires giving up a fair share of an energy resource, is perhaps why more grassland species are found to have

blue flowers than shola species. The Nilgiris' open grassland habitats offer copious sunlight for species such as the *Gentiana pedicillata*, *Commelina Hirusta*, *Exacum whightianum* and *Desmodium ferrugineum* to open out their bright blue flowers (all varying in slight hues from each other).

Like most of the other endemic grassland plants, these plants too are highly endangered, with species like the *E. whightiana* facing imminent local extinction due to severe habitat loss.

About the Author

Godwin Vasanth Bosco is a Restoration Ecologist and Founder of Upstream Ecology, working towards restoration in the Nilgiris Biosphere. He is the author of the book - Voice of a Sentient Highland (a book about the Nilgiris' Ecology)

Images copyright :
Godwin Vasanth Bosco



THE LONE DEFENDER

By Asish Mangalasseri



Carpenter Bee Illustration

While taking my dog for a walk around the house, I was about to realize my home is home to many others and in fact it can be a kingdom by itself. My position in it? Not the king in the eyes of some others who live here. Maybe I am the nosy parker in their life. Yes, I am talking about the tiny critters that live around us.

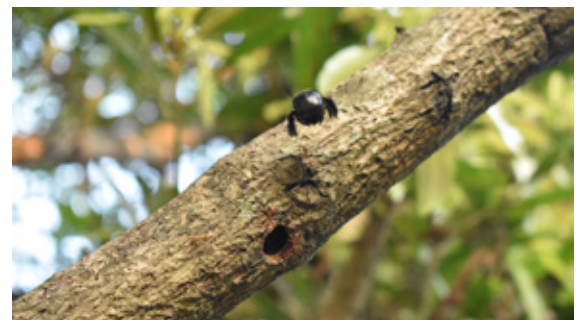
While walking the dog, I saw a beetle flying around a low branch of our mango tree. Sure, it was normal. I did not have to care about its business. But it was still flying in the same spot even after my second round around the house! And the third! Okay, that is it. It was time to find out what he/she was doing in my garden. I do not mind if the beetle is just chilling around there. But the mango tree, well, I care about mangoes. So, I went close to the branch. At first the beetle tried to attack me. But since he/she was already busy with something else, soon he/she started to mind his/her own business (That's it. Let me give it a name first. So, I do not have to use he/she/his/her. The creature will be called Remy. From the character, Remy in the Disney movie *Ratatouille*. The reason I gave that name will be explained later).

I saw Remy attacking an army of weaver ants (did you know a group of ants is collectively called an army?). I thought loudly, "Why is the weird beetle attacking these poor ants for no reason?" (By now the beetle had become weird because I realized it did not look like a beetle to me anymore. And believe me I have a bachelors in Zoology. But somehow, I forgot what group I could include that creature at that moment. It looked more like a bumble bee than a beetle.

Remy continued attacking the ants. And I could see that ants from different branches were coming to defend. "Interesting! I can watch John Snow vs Ramsey's army, live!" (Game of Thrones is a popular web series. And this sentence simply means that I can watch one man against an army fight scene).

But since I was standing behind Remy and ants were on the opposite side, I eventually ended up on Remy's side. I felt sympathetic towards Remy. Remy was going to lose for sure. Remy was alone. Tirelessly fighting!

Suddenly I noticed the small hole in the branch, and Remy had been concentrating on attacking the ants around that hole only. The hole was about 3 cm diameter and looked like a perfect circle entrance.



Boom! I found it. I realized that Remy was trying to defend its nest (possibly) (IMG: DEFENDING THE HOME). And Remy is the good guy in the battle. I felt happy to be on Remy's side (even though it was not my first choice).

Perhaps it was trying to defend its territory and the ants might have come to steal Remy's egg/ larvae/ food reserve? I looked down and saw the wood powder/dust straight down the hole. "So, the hole was bored recently. Interesting!"

Remy looked like a bumble bee. But did not have the fluffy back of a bumble bee. The back was more like a beetle; it had a chitinous cover, and a yellow colour in its abdomen too (the back of insects is called abdomen, thanks to my zoology degree). I went home and took my camera. Remy was still fighting when I returned.

I started clicking close-up photos and taking videos. I found out that Remy was picking out each ant one by one from the branch and throwing it to the ground. Remy was flying and keeping position in the air like a hummingbird and continuously striking at the ants! Most of the time Remy missed the ant. Ants were also trying to attack Remy in each strike. Some were already inside the hole. But Remy continued striking tirelessly, occasionally taking a long flight to the top branch; perhaps trying to gasp for some air and energy. Then immediately come back and stand in the air just in front of me, continuing to strike at the ants. At last Remy was able to clear the surrounding of his wood hole. It took more than half an hour for sure. I took 100s of photos and my hands became numb holding the camera up for so long! I could not imagine the stamina of that small creature who fought that long in the air. Remy went inside and removed the remaining ants from inside too. I still do not think that the ants lost the war. Maybe they realized it was not worth spending that much energy and retreated. Persistence matters!

I returned to the room satisfied and tired. I knew John Snow (Remy) would win. With the memory card out of the camera, I started surfing through the 100s of photos I took within the half an hour of my observation there. I was see-



ing the show again, now as still life and 600th of a second and more, zoomed in! And I could not believe that my eyes did not capture the truth out there. The camera was revealing more facts in freeze frames.

Remy was doing flips to fly back quickly to its position! (something like the helicopter flipping scene from the movie - A team). Remy also had a secret weapon - 'dart'! It sprayed some fluid from its bottom towards the ants at one point. I would not have noticed these if I did not take those photos. And Remy killed and kicked out the last ant in the hole with its bum!

I do not know what happened to Remy later. Remy might have abandoned that nest and moved to another one since the ants were likely to be around. Or he might continue his night watch like John snow (Game of thrones reference - John snow after all the wars, returned to 'night's watch' to protect at the boundary)

Later, searching more about Remy on the internet, I found Remy is a Carpenter bee! I was fully wrong with my beetle guess, but closer with my bumble bee guess. Carpenter bees are solitary bees. I could not find many details about the carpenter bee's secret weapon. But some articles confirmed they use darts to de-

fend their territory. They can also dive bomb upon you and chase you for a short distance if you go near their nests.

Was Remy a male or female? I read somewhere that male carpenter bees are the aggressive ones, and they are the ones who dart on the enemy. But I am not sure.

Male bumble bees are territorial and defend their nest but do not have stingers. But females have stingers but are not that aggressive. Females are the engineers; they bore the nest and males guard it. They drill the wood using their strong mandibles (jaw). Carpenter bees do not eat the wood they bore, to build their nest. Instead, they spit out the wood. Like other bees, carpenter bees also rely on pollen and nectar for food. They are good pollinators but for some plants they are 'nectar robbers', since being too big for some flowers, they slit open the flower and take the nectar without helping with the pollination. So, while they do perform ecological services, they have some destructive habits like destroying furniture too.

And why the name Remy, you ask?

Remy in the movie Ratatouille is a rat who becomes a cook. Like our bee friend who became a carpenter.

Photo Credits: Asish Mangalasseri

FIELD EXPRESSIONS OF BAREFOOT ECOLOGISTS

By Bhavya George

When the Barefoot Ecologists (BFE) walk in the forest and farms they observe many things; few are linked to the stories that are narrated by the elders and have been passed on from generations. Other observations lead to new stories of their own which are yet to be passed on. Almost all the stories are linked to the life around them. Being from indigenous community, the narratives are rich and represent their interactions with the natural resources from many generations.

As the BFEs observe their natural resources with some training on recording observations, they also relate their work with the culture, customs and ceremonies revolving around biodiversity and life itself. Here are some snippets from the BFEs of Sathyamangalam and Sigur region. Few commonalities between both the region are that they are Tiger Reserves and inhabited by indigenous communities, mainly Irulas, with others sharing space. The snippets below talk about migratory birds, frogs, that echoes stories of hill diversity and co-existence amongst humans and wildlife.

The story of Paalpakki - Vijiyarani, Chokkanahalli

Lot of stories revolve around the natural and curious phenomenon of bird migration. Vijiyarani describes one such incident she has come across in her village. Though she did not use the word migration, the description made it evident. The interesting part of her story is how this event relates to the folklore of her village. During late October to early November, during Deepavali festival, Chokkanahalli finds visitors claiming space on the trees especially near the river. White birds similar to *Naarai* in Tamil (storks) fly in a flock of 60-70 as a guest for a month or so. They do no harm to the crops or anything else but occupy many trees for resting. The story does not end here. There is a name given to this bird by the elders and it is "*Paalpakki*". *Paal* means Milk and *Pakki* means a bird. As to why they are called so, the belief is that when these birds flock to the village, the milk production of the cattle goes low. The reason being that these birds, the *Paalpakki*, take all the milk from the cattle as an offering to deity and people are okay with it.

Sathy landscape: Keystone Foundation

BAREFOOT STORIES



Sigur Farmland: BFE, Chokkanahalli



Palpakki on the coconut tree: BFE, Chokkanahalli

But when asked about the validation to understand whether actually the story relates to any change in the milk production, Vijayarani smiles and says it is a folklore told by elders in connection to these birds. She does however agree there is scope in digging deeper into the behaviour of these birds.

Froggy observation- Sathya, Bokkapuram

When you are surrounded by a forest and the river flows beside your village, there are ample chances to see diverse movements of life from the biggest elephants to smaller insects. If you are a good observer and have an eye for spotting, then the chances of sightings increase. Sathya is one such good observer and finds her interest in personalizing her subjects of observation. It is indeed very endearing to see her give names to all the trees which are part of phenology observations. She is in her early 20s and has completed class 12th which is not the usual scenario in her village still. She belongs to a generation which does not have a grip of the traditional knowledge as the generations before. Her observations are a learning process to fill gaps about what she knows and has heard from elders. One day she was observing the agricultural fields to fill in her field notes. Sighting of frogs caught her interest. The frogs she observed were in different colours and sizes. Some green, some brown. All this she noticed when

the land was ploughed to cultivate the crop. Otherwise, she had never come across these anywhere else. After that she did not see it again and her wait is now to watch for it this cropping season and find the answers to many questions she had.

Around the Hills of **Barisalamala- Valli, Thadasalatty**

Have you ever tried listing out the biodiversity in your garden? If not, you should try but it needs some prior knowledge about your place and the beings there. Imagine when a forest becomes one's backyard. For Valli, the forest around her village is her backyard and she knows everything around there. The hill Barisalamala is a place for seamar (pheonix grass) collection and it is quite amazing the way she describes the life around the hills in Irula language listing the fauna and flora. When tired of work and she took rest on a rock in that hill, she could observe a *Pacche kutruku mari* (Barbet's chick) in the tree hole. She also saw *Kaatkozhi*, *Kottalai muttai*, and *Kapate muttai* (Jungle fowl, Bulbul and nightjar eggs). The place has a diversity of flora that supports this bird life - trees one could see being *Maavu* (*Mangifera indica*), *Naaval* (*Syzigium cumini*), *Oppe* (*Canthium diocum*), *Vella naga* (*Anogeissus latifolia*), and *Kambi* (*Gardenia gummifera*). These trees flourish here with

Elephant on the Sathy Road: BFE, Galidhimbam



the phoenix grass and *Ugina* (*Ipomea staphylina*) climber. She ends her list with saying how she enjoys being in this place where the echoes go louder into the open space and she calls all the names she loves to be echoed amidst the clouds.

Dancing Elephant- Amutha, **Gaalidhimbam**

Elephants are a common sighting in the forests of Sathyamangalam including the farms which are in the midst of forest. For a wayfarer and a tourist passing through these forests the sightings of elephants are a luxury but not the same for the farmers who have to see their crops raided by them many times. The scenario is more pathetic when it comes to indigenous farmers who are small farmers and the crops are part of subsistence and sale. But there are instances where tolerance and co-existence comes into play. One among those stories is the story of Dancing elephant which Amutha told in one of the BFE meetings. It was a usual night as always when an elephant entered the farm and villagers got together to fend their crops and chase the elephant back to the forest with their simple methods of sounds. That night it was a sight of awe to all who were there to chase the elephant. When the *Tamate* (Hand based drum) was played to make sound, the elephant stopped eating the crop and started wagging its tail as if it was enjoying the sound and listened to it with keenness. Once the people stopped playing the *Tamate* it went back to its business of eating the crop. Again, when the *Tamate* was played, its dance to the tune of music resumed. It was a moment of fun and the people forgot about the crop but got interested in the elephant's behaviour. Amutha ended up saying, on that day she understood that even wild animals have ears and love music.

PARTICIPATORY MAPPING OF INVASIVE PLANTS

ALONG THE MOYAR-BHAVANI WATERSHED

Citizen science has in the past decades grown as an exciting opportunity for ecological observations bringing citizens and scientists together. Today in India there are several efforts to study birds, flowering plants, frogs, migratory species led by scientists in partnership with amateur naturalists, school children and citizens. A problem like invasive plants could well be researched using this approach.

Invasive species are well recognised world over as a significant contributor to habitat degradation and biodiversity loss. Although the problem persists in protected areas and most forest areas, farmlands too are covered with invasive

plants during the fallow periods. Removing these plants to prepare the land for farming has increased the labour costs on farms.

At the national level India is a signatory to the Convention on Biological Diversity and has set itself goals for addressing the challenges posed by invasive species. An estimated 173 species of plants (http://www.bsienvi.nic.in/Database/Invasive_Alien_species_15896.aspx) are invasive. Besides which a comprehensive list of all species declared as invasive to India is available on the website of the National Biodiversity Authority of India. (<http://nbaindia.org/uploaded/pdf/>



laslist.pdf). The problem of biological invasions is widespread and systematic documentation is lacking which would aid in prioritising which species need to be addressed to prevent further spread of the problem. The current scale of the problem warrants that we work across landscapes and with multiple stakeholders to build a thorough understanding of the problem.

Researchers at ATREE (Ashoka Trust for Research in Ecology and the Environment, Bangalore) and Keystone Foundation, Kotagiri have come together to plan



By Bhavya George

BETWEEN TWO WORLDS PARVATHI'S JOURNEY OF BEING A HEALER

Our people take tablets, go to hospital but they always need a bark, a leaf, or a root from the forest to keep up their health says the Soliga woman Parvathi narrating her journey of being a traditional healer and an ASHA (Accredited Social Health Activist) worker from Kanagere village in Sathyamangalam landscape.

For many generations women have always held an important role in the traditional medicine system as a healer, birth attendees, or veterinarians. Parvathi is one amongst those women who got to learn about the traditional medicine from her grandmother. In the beginning when her grandmother was keen to teach before she died, Parvathi was 13 years old and was disinterested. It was at the age of 24, she got interested in traditional medicine seeing its effectiveness and value in healing her people of the

community. By then her grandmother and later on her father both mentored her in acquiring the knowledge.

Indigenous communities follow different types of traditional healing practices mainly by using herbs in the form of crushed juice, decoction, powder and paste of a bark, root, stem or leaf, to treat various ailments. Though there is some amount of documentation available on the healing practices of indigenous communities, most of them lack the stories pertaining to social, cultural and environmental backgrounds.

For instance, it is a cultural and customary practice to never say aloud the name of the plant/tree but only show it. The reason behind is that if the name is said aloud the efficacy of the medicine is lost and also the knowledge transfer does not happen. Even Parvathi was taught the same way from her grandmother taking her to the places in the forest where the medicinal herbs are found and she follows the same custom while teaching it to her daughters. So, in a way it leads to the philosophy of “seeing is believing”. The system is to see it and believe, not just hear it.

The first time Parvathi tried the traditional medicine was on her own daughter to cure continuous vomiting and loosies. It was healed. With that confidence she tried giving medicines to oth-

ers and slowly she was recognized by the community as a healer. At the same time, she also enlisted as an ASHA worker and is very sincere with her work dealing with pregnancies and other women and childcare support. But when asked, between the two worlds of traditional healing and modern medicine system which she considers important, she thinks for a while and says both have their own play and role in healing the ailment. Yet the first level of treatment will always be through the traditional medicine and only when it does not work, they trust the hospital. She also adds that at these odd times of COVID when hospitals are far and many a times inaccessible, it is the traditional medicines that comes in handy for common ailments of stomach ache, headache, menstrual pains etc.

As Western science relies too strictly on written documentation, many of these orally passed traditions were/are ignored. Many times, they can be an alternative to the high cost of Western-style medicine and hospital stays by using plants that grow in their local areas.





and implement a strategy to record and analyse the invasive plants of the Nilgiris. In order to get the methodology perfected we have chosen the watershed of the Moyar and Bhavani rivers. The selected region falls in three districts of Nilgiris, Erode and Coimbatore. This pilot study could be scaled up to address larger landscapes across the subcontinent. Alongside the documentation we want to create greater public awareness about the issue posed by invasives and their impacts on ecology and livelihoods.

Our project will set out to map using Android based applications and with the help of citizen volunteers who have been trained to recognise the invasive plant species. The data collection will be through ODK forms and hosted on a web portal where people can see the patterns of the data and their contributions to the data collection process. Through the refining of this method we propose that forest department personnel also take this training and use the application to map invasive species within protected areas.

As a team we meet every week to discuss the data collection, visualisation and outreach to review progress. We have launched the ODK based form and are keen to have everyone participate. One of our major goals is to make the form easy enough for any non-technical person to use. We will never know till we have more people participate in the effort. We have been broadcasting information about the research through our Radio Kotagiri broadcasts. We also hope that more people will download the app and feel confident to use it. It's a great way to learn about the invasives in your backyard!

If you would like to know more about the initiative, participate in this citizen science effort and see how your effort supports the larger study, do visit us at miap.atree.org/ for video tutorials on how to get started!

Anita Varghese on behalf of the Invasive Mapping Crew
Ankila Hiremath, Milind Bunyan, Shiv Subramanya and
Reshnu Raj from ATREE

Anita Varghese, Shiny Miriam Rehel and Sharada
Ramadass from Keystone Foundation

Like how Parvathi says that all the medicines are found in the forest around. Forest is the source of their wellbeing through medicines, wild food for nutrition and spiritual beliefs. As change is all pervading and omnipresent, the forest around her village has also changed. The availability of a lot of medicines has decreased. While talking about this she narrated the story of a tuber named in their local language- *Matadka muchalka*. They use this tuber to heal the stomachache and while digging this tuber one has to be quiet and not talk; the belief is that, if one does talk, it buries itself deeper and the tuber will not be found. *Maatadka* means talk and *muchalka* is too close. From the past 2 years the place where it was found the population has decreased, except the one tuber plant she was continuously collecting from. There are also occasions where access to these places has become difficult after the landscape was declared a Tiger reserve.

For Parvathi's keen interest in gardening, she has tried growing many of the medicinal herbs and tubers in her kitchen garden space. Not many grow and the one which does, she has observed the efficacy of the treatment goes low compared to the same herbs collected from the forest.

To the question of sustainable harvest of these valuable medicines from the forest

in their times of population decrease, Parvathi responded that there is a system which is followed and not randomly collected. For instance, if the medicine is for a livestock, healers use their teeth and take the bark from the tree only in three bites. If it is for people, again three times but they use a small sharp stone. For leaves, tender ones are never pulled out but only mature ones are. Tubers are left behind for the next collection and it is not completely harvested.

With all these systems and knowledge in place how do younger generations view and perceive it? It is not easy being indigenous in the present century. Parvathi feels and has experienced a hesitation in younger generations to showcase and accept the system of traditional medicines openly in front of others. The reason is many of them are out of the village and some are in cities too. There the notion of being accepted makes them hesitate. Yet she has seen they don't wear certain amulets with leaves, barks, roots but keep it in their purse.

Her wish is not to let these traditional systems of medicine die and to make it useful to others rather than keep it to herself. On that path, her two daughters are slowly picking up the interest and the knowledge. Parvathi is also a Barefoot Ecologist and she happily said how her roaming in the forest boundaries to



record the observations has made her remember a lot of forgotten medicines. In a way it is continuous interaction and observation that also keeps these traditional knowledge systems alive.

It is wonderful how between the two worlds, Parvathi has connected well. She says we need hospitals as well as traditional medicine. But the need is for more conversations with communities to know what is best for them and is working and what needs to be improved. Only conversations and respect for all the remedies around can bridge the gap between the two worlds.

Picture Credits: Keystone Foundation

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Shankar, Rama et al. "Traditional healing practice and folk medicines used by Mishing community of North East India." *Journal of Ayurveda and integrative medicine* vol. 3,3 (2012): 124-9. doi:10.4103/0975-9476.100171

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TOTALLY INFECTIOUS:

A SHORT OVERVIEW OF 'CATCHY' ZOOONOTIC DISEASES

The year 2020 unfolded itself like a crazy movie- a NEW VIRUS, chaos, lockdowns, unemployment, and global blame-games. The ordeal is still upon us, with 2021 looking like the evil twin of 2020, especially in India with the mutant strain wreaking havoc in the country.

By now we all know COVID-19 is a contagious viral disease caused by the coronavirus SARS-CoV-2, which can genetically be traced to bats and pangolins. Other animals may have carried the virus without getting sick themselves (also known as reservoir species) before

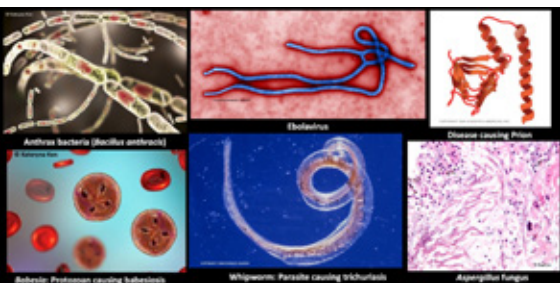


Image 1 Illustrations and Microscopic photography of Pathogens

it jumped into humans. Such an event where a disease jumps from a reservoir to a new host is called the spillover effect. Zoonotic diseases are diseases that spread from an animal to a human. Various pathogenic agents (or germs) such as bacteria, viruses, fungi, protozoans, parasites, and prions can cause infectious diseases (Image 1). Most human diseases have a zoonotic origin, but when transmitted first-hand from an animal to humans, they are called direct zoonotic. There is a plethora of zoonotic diseases of which some classic examples are Malaria, Ebola virus disease, Crimean-Congo haemorrhagic fever, toxoplasmosis, Nipah virus, leprosy, and many more. These diseases can spread either directly from handling infected animals, from bites and scratches, or indirectly

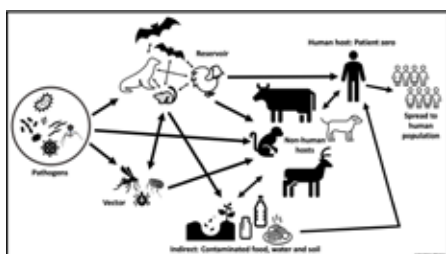


Image 2 Representation of general zoonotic disease cycle

from the areas used by animals. They can also spread from vectors (parasites carrying and spreading pathogens from a reservoir to host), contaminated food, water, or soil (Image 2).

Living amidst a pandemic, we may wonder, where do new diseases come from? How do they spread? Who spreads them, and how fast? But more importantly, to quote Joey from F.R.I.E.N.D.S, “whyyy God? Why us?”

To understand these diseases better, we need to take a short trip to the Western Ghats.

In 1957 several monkeys were mysteriously dying in Kyasanur forest in Soraba taluk in Shimoga. People living nearby were also falling sick with high fever, headaches, and haemorrhaging. The villagers noticed that only those who came in contact with the dead monkeys fell ill. They called this *mangya kayale* in Kannada which translates to monkey fever. The nature of the disease resembled mosquito-borne yellow fever, but the cases were too localized and inconsistent with that of mosquitoes' life cycle. Researchers probed further and found that forest ticks were carrying and spreading the virus. This new disease also coincided with the tick life cycle. The disease was christened Kyasanur forest disease or KFD, and the virus was called as Kyasanur forest disease virus (KFDV).

The origin of KFD is still a mystery. Some theories suggest that migratory birds from Russia may have been the reservoir. In one study, birds at Keoladeo National park (Bharatpur bird sanctuary) in Rajasthan had antibodies for KFD. Others speculate that the disease may have existed within the silent grasps of forests within reservoir species.

Fast forward to 2012 and the virus crossed state boundaries spreading to other areas in Karnataka, Kerala, Nilgiris district (Gudalur and Pandalur taluks) in Tamil Nadu, Goa and Maharashtra (Image 3).

KFD is different from air-borne COVID-19, and human-to-human transmis-

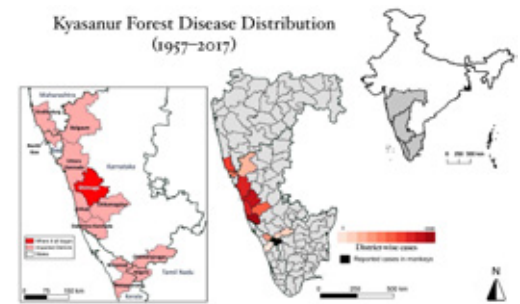


Image 3 'KFD map'

sion has not been observed. The virus needs ticks to spread the disease to hosts. But ticks have short lifespans and do not move much on their own. Livestock can carry the virus, but there is no evidence that non-primates can successfully spread the disease. How then, did the disease manage to jump borders? The simple answer is they hitchhiked. Ticks are ectoparasites (those that latch onto the skin) on many animals. Monkeys, ungulates, and even humans can carry infected ticks from place to place. Furthermore, the Western Ghats have been subjected to large-scale deforestation, land-use change, and encroachments for agriculture, plantations, and human settlements. These transgressions brought humans closer to new forest pathogens. Forest dwellers, estate workers, and migrant workers who work in plantations collect firewood and other forest products, forest department officials who patrol on foot are all at the highest risk of contracting KFD. Intensive use of motorized vehicles for the transportation of humans, livestock, and forest products speeds the spread of the disease. Other activities that bring humans closer to infected animals like poaching, hunting, and meat consumption also increases the risk. Despite its long history, we still lack a good understanding of this disease. For now, without a cure, it is a public health threat especially among rural populations living near forests. And awareness, safety measures such as protective gears, tick repellents, and proper handling of dead animals is the way to manage spread.

This reminds me of another story that also involves primates, forests, hunters, and

bushmeat. Before HIV became a global phenomenon, it started as a silent epidemic in a small part of the Democratic Republic of the Congo (DR Congo). An epidemic is a widespread outbreak of a disease that spreads rapidly among many individuals in a community at the same defined timeframe. And you guessed it, a pandemic is a kind of epidemic affecting many countries across the world at the same time. The most popular theory for the origin of the virus suggests that in the 1900s a hunter killed a chimpanzee infected with a virus called the simian immunodeficiency virus (SIV), which entered his bloodstream either through open wounds on his body or during consumption. Normally the immune system would kill off any foreign object that enters a body, but on rare occasions, the virus escapes this attack. In this case, the SIV that entered the hunter's body soon adapted to the human environment and became the first human immunodeficiency virus (HIV-1). Interestingly another strain of SIV that mutated to a different form of HIV (HIV-2) was not found in a chimpanzee, but in sooty mangabey monkeys, a West African species. Bushmeat consumption and trade, extensive use of linear transportation, increased sex trade, European colonialism, population growth, urbanization and vaccination drives using unsterilized needles fuelled the spread to large parts of Africa. The disease got traction only during the 1970s in the United States, where the virus was identified as HIV in 1983 and the disease was called acquired immunodeficiency syndrome (AIDS).

HIV has a long incubation period, and it attacks and weakens the immune system. It is a life-threatening disease that spreads via bodily fluids and patients usually succumb to secondary infections contracted due to low immunity. To this day many communities, especially



Image 4 Nasal samples from camel to test for presence of MERS



Image 5 (Left) Portrait of Alan Turing; (Right) Benedict Cumberbatch playing Turing in The Imitation Game

in the lower economic groups in both developed and developing countries, continue to face discrimination and receive poor health care services. There is still no definite cure for the disease, but antiretroviral drug treatments prolong life expectancy. Researchers are expecting a breakthrough in HIV-AIDS cure, bringing hope to millions.

Moving on from one pandemic to another, let us look into coronaviruses, a large family of commonly occurring viruses. They have been around for a very long time. We often get infected with rhinovirus, which is a coronavirus that causes the common cold. They get their name from the protein spikes on their surface giving them a crown-like appearance. If you recall the mutant COVID-19 strain, it is the mutation in these spikes that makes the variant more contagious.

Severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS) are both caused by coronavirus SARS-CoV-1 and MERS-CoV respectively. Much like COVID-19, these diseases spread from aerosols via air or droplets, also produce flu-like symptoms and respiratory distress in humans with significant mortality rates.

MERS was first detected in 2012 in Saudi Arabia, and it soon spread to 26 countries with a high death rate. Its true origin is still a puzzle, but genetic studies suggest a link to bats. Dromedary camels are significant reservoir species that spread the disease to humans (Image 4). Human-to-human transmission is rare and only occurs from close contact with patients. The SARS epidemic started in Guangdong province of China and soon spread to 29 countries within 2 years, infecting around 8000 people. Its genetic origin was traced to cave-dwelling horseshoe bats, and the virus was detected in civets, raccoon dogs, ferret badgers, and domestic cats which were found in the local market in Guangdong. Although the virus is believed to be eradicated after 2004, it may still be lurking in silence within some reservoir species, waiting for all the stars to align for its re-emer-

(Did you know that there is a connection between Alan Turing and bovine TB? Turing's friend and first love interest Christopher Morcom died of bovine TB which he had contracted after drinking infected milk. The extreme grief from this loss led Turing to dive deeper into mathematics and computer science, earning him the name 'father of theoretical computer science and artificial intelligence'.

gence into human populations. Well, hopefully not!

Besides viruses and bacteria, other pathogens like protozoan, fungi, nematodes, and prions also cause zoonotic disease. Malaria, sleeping sickness, and babesiosis are vector-borne protozoan diseases caused by *Plasmodium*, *Trypanosoma*, and *Babesia*. Amoebiasis or amoebic dysentery caused by *Entamoeba* and sarcosporidiosis by *Sarcocystis* are zoonotic food- and water-borne diseases. Fungal diseases are harder to pronounce, but some examples include dermatophytosis, sporotrichosis, and histoplasmosis which cause lung and skin infections. Ever wondered why we took doses of deworming medicines, as kids? Well, they essentially protect us from internal parasites that can cause ascariasis, hookworm disease, enterobiasis, filariasis, and others which can be vector- food-water-borne diseases. Prion diseases are caused by a type of protein called prion which is a virus-like particle. It causes a host of diseases in several mammal species. Mad cow disease is a disease in cattle that is thought to infect humans through uncooked meat causing similar neurological diseases.

Now one might wonder, can plants spread diseases to humans? A pathogen needs to evolve in a specific way to thrive in the host environment. It can only be successful in evading the immune system of a new host that is structurally and physiologically similar to the previous hosts. Plants and animals are both living organisms sharing some genetic features but largely vary functionally and structurally. This genetic relation between plants and animals can lead to spillover events, but this is extremely rare. *Pseudomonas aeruginosa* is a very common bacteria that has been around long enough to adapt to both plant and animal hosts. It causes soft rot in plants and a wide range of human conditions including urinary tract infection, dermatitis, gastrointestinal infections, have been observed. This may not yet be a cause for concern, but researchers have begun to explore the scope further.

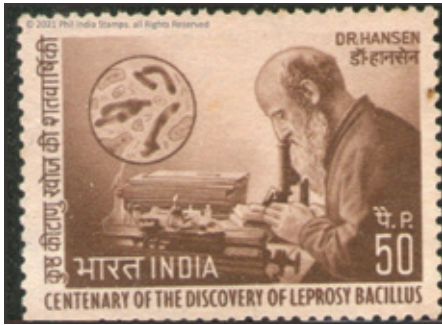


Image 6 Dr. Gerhard Hansen first identified bacterium *Mycobacterium leprae* which causes leprosy. Leprosy is not eradicated, but it is now treatable. The Indian government issued a postage stamp in 1973 to commemorate the 100th anniversary of the discovery.

Irrespective of their source, diseases are not a new phenomenon. They naturally occur in many ecosystems and have been an integral part of human history (do read *The Tangled Tree: A Radical New History of Life* by David Quammen).

However, the cost of diseases is unimaginable. Be it the black death that plagued Europe in the mid-1300s, or the late 1800s' measles outbreak in Fiji and Samoa island, they claim lives and impact economies. Diseases like HIV and Ebola have left many young children orphaned, especially in developing nations. We continue to see the impact of COVID-19 on many nations, exposing our vulnerabilities and weaknesses. To fan the flame, the rate of emergence of new, rare, or previously unknown diseases has increased since the 1970s by reckless anthropogenic actions (**Image 7**). We have opened a Pandora's box by teasing apart the intricate web of natural balance. Deforestation alone, done in the name of progress, has led us to walk into a minefield of deadly pathogens. Extinction of typical reservoir species increases spillover when the pathogens start to explore new alternatives with different behavioural and population patterns. Habitat loss further adds stress to reservoir species making them weak. In this state, they tend to shed more pathogens in the form of bodily fluids like saliva, mucous, and urine. Poaching, hunting, pet



Image 7

trade, bushmeat trade, and kleptoparasitism (stealing kills from predators for human consumption) are intimate ways of getting exposed.

Climate change events also contribute to the emergence of new infectious diseases. Cooler regions are now getting humid and warm, an ideal environment for many vectors like ticks and mosquitoes. Along with the range expansions of these species, the pathogens they carry also get an opportunity to spread diseases in new areas.

Additionally, human population growth, behavior, and lifestyle changes have increased the risk of contracting diseases. We have already seen how deadly diseases are just a plane ride away. Unsupervised use of over-the-counter antibiotics, disinfectants, and sanitizers can lead to mutations in pathogens that can make them antibiotic and drug-resistant which can be fatal to severely ill patients who have infections caused by these resistant strains.

Diseases can also get deadlier when human prejudices play out in the form of racial, gender, and economic injustices. Poverty-ridden populations often under-nourished, live in densely populated, unhygienic areas, and cannot afford medical care for even preventable and curable diseases. Poor health prevents them from earning income which results in more poverty. It is a vicious cycle!

At the risk of sounding clichéd, prevention is better than cure, any day. This is however easier said than done. We need to invest in wildlife and forest conservation policies driven by reliable research studies, and train scientists in field-based epidemiology. The development of biotechnological research capacity to safely handle, identify, and understand a pathogen, develop vaccines, etc. is vital to the process. It is of paramount importance to integrate public health policies to curb outbreaks through sound contact-tracing systems, strict quarantine systems, and hygiene awareness. It is of course important to have reliable health care systems but prioritizing this alone will not suffice. Bringing about any wide-reaching changes requires political will and sound investments; but each one of us, as individuals, have

our roles to play in its prevention also. COVID-19 has made it impossible for us to hold hands and embrace, but let's learn the lessons from it and embrace the responsibilities together to prevent another global pandemic.

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Email Id- sushma.life@gmail.com



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THE BUZZ

NNHS DIARY



2021 started with hope for many of us. While most places had shown a significant decline in the COVID19 cases there was an ease in restrictions and with the emergence of vaccines we almost thought that the pandemic would be over.

On March 28th after a long hiatus, we organised A Toda experience Trail to Kodithenmund keeping in mind Covid protocols of social distancing, wearing masks, and keeping to small groups. A group of 11 individuals took the forest trail to Kodithenmund looking out at the Shola trees, lianas, and birds on the way. It was a great way to enrich our understanding of local community practices as well as support conscious community-based tourism especially, after how much the pandemic affected the local communities.

To keep up the engagement and interests of our audience we also regularly kept up with the weekly Bird detective activity on our WhatsApp group, where a bird picture is posted with a clue and group members identify the species.

For Earth day on the 22nd of April we ran a treasure hunt for the employees of the keystone foundation in the campus and the winners were awarded. Apart from this we also celebrated with our social media audiences with a fun series of riddles and quizzes on Facebook and WhatsApp.

In March, when there was a relaxation of covid lockdown protocols, we ran a training workshop on citizen science participatory mapping of alien invasive plant species, for a project being undertaken jointly by Ashoka Trust for Research in Ecology and the Environment (ATREE) and Keystone Foundation. Interested NNHS members and others from civil society were gathered in Coimbatore on 13th March, wherein a training was conducted on how to identify invasive species, as well as document then using the ODK (Open Data Toolkit) application. On the 13th May 2021 we conducted a training for the stewards at the Keystone Foundation campus, Kotagiri. On the 24th of April 2021, a second workshop was run, this time virtually on Zoom, as the lockdown regulations were back in force.

On 20th of May in celebration of bee day we hosted a photography and art competition. The idea behind the competitions was to bring these small heroes into attention. The competition winners' talents were showcased.

Keeping up with our movie screenings, this time on the 29th of May we screened the 'life of butterflies' a film by Sammilan Shetty. The movie is possibly India's first ever comprehensive documentary on butterflies, covering the life of the most renowned insects on this planet.

The year that started off with hope went on to become calm before the storm and as with everyone else, has been limited on various fronts owing to the ensuing covid19 pandemic. As we move ahead, the path forward might seem excessively uncertain. There might be or might not be a third wave. So, let's remember to stay safe!

Habeeba Fathima

NNHS



The newsletter of the Nilgiri Natural History Society (NNHS) aims to cover the many dimensions of natural history - conservation issues, lay observation, cultural representations and traditional knowledge. The newsletter will carry communications about research in Keystone Foundation in the areas of conservation, environmental governance, culture, livelihoods and enterprise. In keeping with the pan Nilgiri Biosphere Reserve (NBR) nature of the Society, space will be allocated for reporting of events/views from elsewhere within the country and from outside the country. Additionally a section will be devoted to research summaries by students who work in the region of the NBR. Guest editors will be invited for special editions. News items gleaned from printed sources about the NBR will be featured. Separate sections will carry information on NNHS and Bee Museum activities. The species focus will feature species of special conservation status, endemic to the Western Ghats and present in the NBR.

SUBMISSION OF ARTICLE

The NNHS newsletter articles are reviewed by the Chief Editors and a member of the editorial board. Articles are invited for the following section: i. Natural History News from India (400 words); ii. Natural History News from the World (400 words); iii. Research Initiatives in the NBR - student contributions (400 words); iv. Species focus (250 words). Articles should be submitted by email to: contact@nnhs.in

Authors should provide complete information including an email address and phone numbers. Articles need to be submitted in standard word processor formats only. Rich text content and other forms are not accepted. Figures and texts need to be sent in separately with adequate labelling and numbering in context to the articles sent. Pictures in the manuscript also need to be sent in separately in TIFF, JPEG or PNG formats with resolution not less than 250 dpi

Reference style:

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Photo credit: Chandrasekar Das

Anthus nilghiriensis

Redescribed by Richard Bowdler Sharpe in 1885

The Nilgiri Pipit (*Anthus nilghiriensis*) occurs on the grassy upland slopes interspersed with bushes and trees, in southern India. It is richer brown in colour compared to the other pipits found here and the heavily streaked crown and underparts are added pointers to its identification. Endemic to the high altitude hills, its grassy habitat is under threat from conversion into tea, eucalyptus, and silver wattle plantations along with the unintentional spread of the invasive Scotch broom (*Cytisus scoparius*). It is classified as 'Vulnerable' on the IUCN owing to habitat loss.

With increased construction for tourism in the Sholas that border the Montane grasslands, their habitat continues to shrink. As a species occupying habitats at the very top of the hills, it is also potentially threatened by the effects of climate change. The pipit is sensitive to anthropogenic disturbances and could also be a potential bioindicator species for environmental changes.



Photo credit: Chandrasekar Das