

AGASTHYA

Volume 6 Issue 2

**Untold
story**

Following the
nectar

**Elusive
fruit eaters**

Wait-a-While
or I will

**Winged
beauties**

Studying the
unseen

Fern Ball

**Northern
star**

Event Report

**SPECIAL FOCUS:
Plant - Animal Interactions**



'Notes from the editor'

Conserving in pairs

Organisms interact with other organisms in different ways. Sometimes they compete, predate, get preyed upon, or even act as parasites. Some interactions between species can also be beneficial to either of them. Several species exerts selective pressure on the other, so they evolve together. The biodiversity that is commonly talked about is not number of species but also encompasses such interactions in nature. Given my formal training in engineering and economics I cannot help but see various analogies in those of the socio-economic order. Various ethnicity and groups combine to form nations, orders and unions to avoid being conquered which maybe an equivalent of intra and inter-specific interactions to avoid being predated. Also, resource driven conflicts has improved human civilization, akin to niche-based competition aiding evolution and natural selection. Any change in one component has serious implications for the other. In the natural world one can see many species that have co-evolved. A reduction in seed dispersers like bats can influence the survival of *Elaeocarpus tuberculatus* in the long run. Thus, survival of one species is heavily dependent on another. Studies on such plant animal interaction are important not just to push the boundaries of knowledge but also to aid in conservation. For example, the understanding of interactions have driven a policy shift whereby foci of conservation shifted from species to ecosystems viz. PA and recent declaration of the entire Western Ghats across five states as a Heritage Site. Such policy level decisions not just aid in the conservation of one, but many species.

Many ecologists have studied plant-animal interactions in KMTR. This issue's special focus is on such observations in KMTR. Apart from the casual observations during field visits and a research article, there is an interesting article from a Ph.D. student's experience in the forest. A report on the annual festival inside KMTR marks the gradual shifting of roles and responsibilities to local stakeholders which began last year. The voluntary reduction in polythene bags brought inside the forest maybe a sign that ATREE's efforts in the landscape are paying off.

- Allwin Jesudasan

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Cover page image: Quid pro quo Credit: Rajkamal Goswami

Flip of cover page image: Seeds of *Elaeocarpus tuberculatus* on the forest floor Credit: Kalyan Varma

Back cover: Biologically and culturally rich and diverse landscape of the Agasthyamalai Credit: R Ganesan

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Untold story of white bracts of *Mussaenda frondosa* -The Sequel

Way back in 1990, inspired by Dan Janzen's tales of plant-animal interactions, Ganesh and I picked any system which appeared curious and started working on it in KMTR. One such was *Mussaenda frondosa* a straggler found along forest edges. It had striking orange tubular flowers and a white bract (a modified or specialized leaf especially one associated with a reproductive structure) to go along with it. Of course the question was why white bracts? What followed were tireless efforts of manipulative experiments of removing bracts and comparing with control plants. Yes! the bracts did play an important role in attracting the pollinators, 'the long tongued butterflies' like the birdwings. Back at the base, we very eagerly analyzed our data but after our literature review, we found out, to utter disappointment, that the bract story had just been published in *Biotropica*. We shelved the idea of publishing and the data now sits in our archives. Strangely enough, after two years and a decade, when I asked the students of 'Plant-Animal Interactions Course' to review that paper, I realized that there was an unfinished story. In the earlier paper, the researchers did not connect the white bracts to higher conspicuousness in crepuscular light, which we realized during one of the



R Ganeshan

Mussaenda frondosa - Pollination in progress

night safari rides. The *Mussaenda* looked adorned with the bracts and appeared like a tree with Christmas balls in twilight. Then we unraveled the story with further experiments and recorded that the plant had one set of flowers which opened in the morning while another set bloomed exclusively in the evening. The pollination system appeared to maximize fertilization using a suite of long tongued visitors comprising *Papilio* butterflies and solitary bees during the day and the hummingbird hawkmoths during

dusk and dawn. I wound up the plant-animal interaction class by highlighting how critical it is to publish when data is hot, or it would lie deep down in the cold storage. The course left me inspired to take up the old data and use it as a sequel to the previous *Biotropica* paper. Will there be one more story to complete a trilogy? Well, maybe. But that's for another course!

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Following the nectar

In the evergreen forests of KMTR and in most parts of Western Ghats, a little emerald jewel flits tweeting between flowers on a typical warm sunny day looking for nectar. This is the crimson-backed sunbird (*Leptocoma minima*), aptly known as the small sunbird, as it is one the smallest birds known from India. The species is restricted to the evergreen forest and surrounding areas between 800-1300 m and seasonally occurs in different habitats. In the high elevations it feeds on nectar from the flowers of *Loranthus* and *Palaquium* during late May and June. Once the monsoon sets in the evergreen forests, the birds move to the lower moist deciduous forests along the eastern slopes where rain is just a drizzle invoking many species to flower. But the most spectacular movement is in January when the blue and red flowers of *Helectres isora* is common along the eastern slopes stretching from the scrub forest at 80m to the moist deciduous forest at 600m elevation. The small sunbirds come all the way to the scrub forest during this time competing with the other two species of sunbirds for nectar. It's because the wet evergreen forests are nectarless

and cold, allowing only the hardy *Cullenia* and occasionally the *Syzygiums* to flower; thus making the sunbirds move to the fairly productive foothills where the lush vegetation, very similar to the evergreens after the NE rains, and plenty of *Helectres* in flower keeps them busy for two months. Once the flowering gets over, which also happens gradually up slope, the small sunbirds move back up the hill to feed on *Ormosia* and *Palaquium* flowers later in the dry season.

These small birds make this annual migration across the hills to track nectar which is usually scant in the rugged mountains of KMTR and is spatially and temporally spread. In the process they have to compete with their congeneric at the lower elevation and the spider-hunters in the higher elevations apart from other nectar feeders like the Oriental white eye (*Zosterops palpebrosus*). Such movements are seen elsewhere in the Western Ghats wherever there is this continuum of resources available across the habitats on a temporally overlapping scale. If such corridors of resources become disjointed or fragmented, the birds then have to take the risk to cross inhospitable barriers which can affect their population. It's not just sunbirds; many bees, frugivores and even elephants track resources across the rugged terrain which calls for maintaining an un-fragmented landscape for frugivores, nectarivores and others even within protected areas.



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Crimson-backed sunbird feeding on *Helectres isora*

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Elusive fruit eaters and sacred trees

Frugivores and their role in structuring the forests have been the focus of my studies. One of the most fascinating frugivore mammals in the forests of the Agasthyamalai range is the brown palm civet (*Paradoxurus jerdoni*), a night rider endemic to the Western Ghats. This fruit eating mammals' diet can outclass any royal gourmet. Examining about 1000 scats of this civet, I recorded nearly 60 plant species in its diet. But what intrigued me most was the dominance of fruits from the trees belonging to the *Elaeocarpaceae* family, also a source of the *Rudraksh* beads, highly consecrated by the followers of Hinduism. Three species of this family were quite common in these forests—*Elaeocarpus munronii*, *E. serratus*, and *E. tuberculatus*. Fruiting season of these three species occur during the months of April to September when copious amount of fruits can be seen on



Night rider of the forest – Brown palm civet

the forest floor. As the popular Indian saying goes, not all fingers are alike, these sacred trees' interactions too were varied with animals in different ways. While I would frequently find a lot of seeds and pulp of *E. serratus* in the scats of brown palm civets and sloth bears (*Melursus ursinus*), seeds of *E. munronii*, probably more of a bird-dispersed

species, and *E. tuberculatus*, dispersed by bats, were lesser in comparison. Another study in the same site has shown that pollinators of this group also differed. *E. munronii* flowers were pollinated by social bees, *E. serratus* by flies, and *E. tuberculatus* by moths and beetles. However, the story does not end there. Another bunch of night robbers are also known to predate on the seeds of these elaeocarp species. Prominent are the wood rats (*Rattus sp*), the Malabar spiny dormouse (*Platacanthomys lasiurus*), and flying squirrels (*Petaurista sp*) who are known to eat the seeds gnawing through their hard shells and extracting the kernels. The elaeocarps are meshed up with diverse set of animals in complex fashion which needs to be elucidated with further detailed studies.

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Wait-a-While or I will make you do so

"I am really worried....we are lost"

"Don't worry, we will find our way... probably..."

"Who is that, CHIYAAAAN? YEAAAAAH, we are saved....." and then it stuck.

Eventually, the person who was so elated had to *WAIT-A-WHILE*, before she could savour the presence of the saviour (our field assistant, Chiyen). This was just a glimpse of one of the several incidents that occurred while trekking through the forest of KMTR.

KMTR, a vast expanse of tropical rainforest at the southernmost tip of mainland India, nurtures a wide variety of endemic biodiversity. While roaming through this pristine forest one frequently encounters a notorious spiny vine, Wait-a-While (*Calamus sp*). During our trek, it was impossible to romp through, as it ripped our clothes and often got tucked into the flesh sturdily. Thus we were bound to learn the art of removing it, in the

true sense, by waiting for a while.

Calamus sp. also known as "Lawyer cane" or "Hairy Mary" is a climber belonging to the palm family (*Areaceae*), found commonly in the Tropical rainforests. It bears spines on leaves, stalk and also on the long whip-like flagella. The curved hooks get badly stuck on people's clothing or bare skin, giving it the name.



Pricking your thoughts

A little probing on why such hideous structures exist opens up the interesting field of battle between plants and animals. The spinescence of the plant may be a constitutive mechanical defence to ward off herbivores. This is an outcome of the evolutionary arms race continuing for eons between the prey (plants) and their predators (herbivores). Though it seems to be an impenetrable barrier, herbivores often come

up with unique strategies to evade the spines and enjoy the juicy parts. The recurved hooks of the vine might also help the plant to climb higher up in the rainforest in search of light. So, next time when one gets stuck into the spiny palm, while untangling one should think of themselves as a collateral damage of this on-going 'war of the worlds'.

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Winged beauties of KMTR's evergreen forests

The two weeks of field work on plant-animal interactions in early May this year in the Kalakad Mundanthurai Tiger Reserve (KMTR), was my first 'work' experience in a primary wet evergreen forest, first sightings of Nilgiri langurs, lion-tailed macaques and a brown palm civet. However, it was the high number of fluttering butterflies, most of them lifers, which fascinated me the most.

The idea of how important butterflies are in

the functioning of ecosystems as pollination agents and their intricate relationship with their larval host plants had struck me while taking the plant-animal interactions course as an elective during our Ph.D. coursework. Ever since, I have begun to look at butterflies with a new light and have started observing their host plants and flight patterns which are indicative of their ecology and habits. I observed several butterflies from the forest habitats of the Western Ghats. Some of these

included the Nilgiri tiger (*Parantica nilgiriensis*), the red-disc bushbrown (*Mycalopsis oculus*), the orange oakleaf (*Kallima inachus*), and spot puffin (*Appias lalage*). The one that I found to be the most magnificent of all was the Malabar tree-nymph (*Idea malabarica*), a large white butterfly with black dots and streaks that sailed high in the forest understory and canopy along the edges of the wet evergreen forests. The Nilgiri tiger turned out to be more



Dancing july of the plum kind

common in its habitat i.e. closed canopy wet evergreen forests,

I observed with great interest that all these butterflies had different habits and feeding strategies and was fascinated to see the great diversity at which they occurred in the forest canopy. Some, like the red-disc bushbrown and white-bar bushbrown, belonging to the large butterfly family called Nymphalidae, seemed to be exclusively forest floor butterflies which maintained territory in tiny sunlit patches on the forest floor. On the other hand, the Malabar tree-nymph, a nymphalid, preferred to glide high in the canopy in small gaps in the forest, appearing as a distinct black lined pattern on a white background. In between these two

was the red helen of the swallowtail family *Papilionidae*, weaving rapidly at mid-level height in the forest understory. I found the plum july (*Abisara echerius*) of the family *Riodinidae*, highly endearing for its habit of turning around constantly in short jerky movements after alighting on short herbs and shrubs in the forest floor, something that gave me the impression of it dancing about in the trees! These butterflies, their varied feeding habits and their interactions with plants, vital in ensuring plant pollination and herbivory are something that will remain etched in my memory for a long time.

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Studying the unseen world

Just the thought was enough to take me out of the packed schedule of course work and tons of reading material. We were going on a field trip to learn plant-animal interactions at Kalakad-Mundanthurai Tiger Reserve. After all, going to the fields and to actually experience the world around is a different kind of education in itself. We had been listening about the place and the various plant-animal interactions for a long time throughout the theory classes. The interactions which had stuck in mind were related to the mammals eating and pollinating *Cullenia* flowers, the spiny-dormouse feeding on *Myristica* fruits, and the syndrome of white colored scented flowers blooming in evening which attracted moths. We wanted to see all of these!

Now, after completing the course, I realized that we never did see all of these directly. We saw the forest floor spread with fruits eaten by the dormouse, we saw the white flowers but

without the moths, and we saw *Cullenia*, without flowers. We did a study of herbivory which involved beetles and a tree. We could not see the beetle but we spent couple of weeks looking at perforated leaves. We saw a plant which offers brooding sites for small beetles; it was amazing to see tiny insects crawl out of their chambers.

I realized a few things more. First, although my mind was set to see a mammal interacting with plants, the tiny world of insects was as grand. Looking at the perforated leaves of a tree might sound boring but it is not so once you start unraveling the patterns. Secondly, the seasons play important role in the interactions and it takes effort to be at the site at the right season and at the right time. Most importantly, it is the mystery within these interactions which urges the researcher to know more about it. These interaction are often subtle, we don't even understand that our crops are pollinated by bees, or the scent



Ovee Thorat

Herbivory of Macaranga

or color of the flowers is not just for us to enjoy but for the variety of pollinators which visit them, nor do we see the small dormouse which steals the fruits and yet the trees grow numerous and tall. We don't need to see these mysteries to appreciate them, but just a glimpse is enough to stir an indolent mind and body into action.

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Fern Ball at the Fern House

One late afternoon, hungry and weary, Johnson and I clambered down a tall *Cullenia* tree after enumerating epiphytic orchids. After a quick lunch our hunt for the next tree led us to cross the *Palaquium* stream which cuts across the 'Green Trail' leading to a forest bungalow called the 'Fern House'. As the name suggests, it is surrounded by various ferns including the tree fern. There, on the low bushes, a clump of ferns caught my attention whose fronds were rolled like a clenched fist. It took my mind to an observation made by noted Kannada author, Poornachandra Tejaswi, based on his encounter with such rolled up leaves on a hot summer afternoon in Charmadi Ghats, Hassan, Karnataka. Intrigued, he took it to his entomologist friend, who opened the roll to find eggs inside which later hatched into

giraffe weevil *Trachelophorus* sp. so called due to the disproportionately long head. However, they had to wait two long years to finally see the actual rolling process; the adult achieved it by first cutting off the midrib which made the leaf wilt. Then they laid eggs in the tip and rolling it quickly, lets it drop to the leaf litter for the eggs to hatch.

Our neatly rolled fern frond was held together by some form of adhesive and as we opened one of them, we saw that the leaflets were folded inwards into a neat ball with the top most leaflet holding it all together. Inside the ball we saw a translucent spotted grub, probably of some beetle, about an inch or two long along with lots of tiny black pellets. On sensing danger the grub coiled up but once we finished shooting, it settled down and

began to munch the leaves. For every inch of leaf munched, it defecated a pellet thus literally eating the ball inside out. We left the open ball on a fern hoping that the disturbed grub would survive.

After about three years, Shyamal, an entomologist and a friend, told me that it was in fact, a moth caterpillar. He informed that the eggs hatch on leaflets and the caterpillar rolls the leaves to pupate as a cocoon which would later metamorphose into a moth.

Reminiscing about the incident, I am in awe at the numerous ways the actors interact in the eternal drama of life.

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The 'Northern star' of the forest

Those who had a chance to walk deep inside the wet evergreen forest of KMTR during February to April, could have easily walked past the inflorescence of *Balanophora fungosa* albeit some shutterbug mistook it as a fungus. Other than the flowers, it has no green visible part to qualify it as a plant. The actual plant is simply the underground tuberous structure attached to the roots of a tree or a shrub nearby. Once in a year the tuber burst into several inflorescences that protrudes above the soil and stands like the 'north star' in the dark forest floor laden heavily with litter. This inflorescence appears as sparkles because of their fiery red or yellowish orange color.

It was during my maiden trip to Kakachi when I and my colleagues first stumbled upon a *Balanophora*. Dr. Bawa and I, the two trained botanists of the group, slipped into the world of taxonomy and quickly realized the attrition of group size. Enamored by the curious morphology of *Balanophora*, Dr. Bawa quickly put me on my assignment to study its reproductive biology.

The first month of the next two years I spent time in locating the populations which were clumped but scattered far away from each other in a radius of 5 kms. By late January through February, when flowering started, I



Balanophora fungosa

got busy in recording anthesis, i.e. the time and process of unfolding of blossoms, nectar secretion and its quantity, and its animal visitors. After recording the male/ female ratio of the plant at population level, I started documenting day and night visitations of the pollinators and predators by either crouching or sitting in the cold and wet forest floor. My constant companions during those cold, dark and anxious nights were Kannan, the assistant, and my fears that were borne out of expecting the odd visit by a giant tusker, a gaur or for that matter, a tiger. Today when I see my younger colleagues employing camera with intervalometer to record seed predation and other nocturnal habits and activities in the forest, I can't help but get nostalgic about those 'dog nights' on the forest floor.

Interestingly, the male plant had lot of pollen and female inflorescence secreted copious amounts of nectar which flowed down and collected in the bracts. Male flowers opened during the wee hours of the morning. During our day time observations, we recorded hollow nesting bees (*Apis cerana*) mostly on the male flowers, as they robbed the pollen from male plants, while seldom visiting the females. The nectar, opaque and musty, appeared as dew in the early morning but turned into big globules by midday, and rolled down by evening, to be collected in the bract. We also recorded fruit flies (*Drosophila* sp.) on dehisced anthers as well on the female inflorescence. Compared to the bees, the fruit flies seemed sedentary and inactive as we observed them sitting on for hours at one location while in few cases they sat almost through the night on one same location in the inflorescence. Later when we found that the heroic pollinators were none other than these tiny *Drosophila*, we were not surprised since they visited both the male as well as the female flowers. I still grope in the dark about the fact that *Balanophora* invests such spectacular inflorescence but only to attract a few fruit flies to pollinate the flowers.

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Tales from wilderness

A Renegade Anthropologist in the Podhigai Hills

A social science researcher in a forest is essentially working with people rather than looking at plants and animals. Thus, personal conduct, especially with young women, becomes important if the researcher is male. All this while during fieldwork I had kept in mind Gandhi's advice to R.K. Narayan's protagonist in *Waiting for the Mahatma*. This was to the effect that in order to keep the senses in control one should lower one's eyes to the ground at the sight of an attractive woman. This was always a source of personal dejection. But this visit, I hoped, would be different. Since I was supposed to be observing plant-animal interactions instead of asking pesky questions of people, I felt I could be bolder.

Soon, however, I realised that ecology fieldwork is a lonesome exercise. For the first couple of days, the only women I saw were my female course-mates and course instructor. On the third day, I desperately hoped to espy some demure belle bathing in one of the forest streams. Determined to look

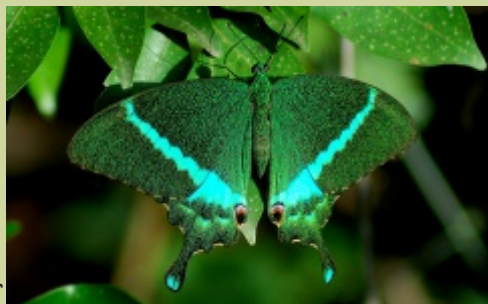
my gentlemanly best, I braved a cold water bath, vigorously oiled my hair, and put on a bright shirt. My course instructor berated me for the resulting delay and threatened to abandon me altogether. Having braved her wrath and my smelly team-mates' petulant

prevaricating between *Pon azhagi* (Southern Birdwing) and *Mayil azhagi* (Common Banded Peacock), I eventually pledged my loyalty to the grand-sounding *Naattu neela kannaaadi azhagi* (Common blue bottle).

By this time, however, KMTR had me smitten. The thick forests and limpid waters sat as easily with the regimen of the tea plantations as with the mythological distinction of the Podhigai hills - the cradle of the Tamil language and the legendary Tamirabarani river. Academically, the trip was an occasion for valuable disciplinary integration. I began to recognise a different dimension of human interactions with the natural world, one that I had hitherto remained oblivious of. I can see the transition occurring in my thought-process, and hope it will reflect in the work that I intend to do in the future.

I do hope to go back to KMTR again. For plant-animal interactions and more. After all, hope springs eternal in the human breast!

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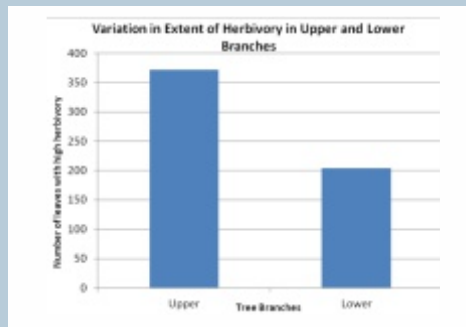
Mayil azhagi - Damsel of the forest

looks, I felt like a martyr for a grand cause. Tragically though, despite craning my neck 360-degrees all day along the forest trail, the only thing I attracted was leeches in the dozens. In the end, I rested content with the picturesque butterflies in the KMTR field-guide, many of whose local names ended in *azhagi* (= beautiful woman). After

Herbivory on *Macaranga peltata*

The aim of our visit to the Kalakad – Mundanthurai Tiger Reserve from the 4th to the 11th of May, 2012 was to study plant-animal interactions as part of the elective course at ATREE. Following preliminary reconnaissance and brainstorming, we decided to select one particular interaction - the extent of herbivory on leaves of *Macaranga peltata*, to conduct field observations. The varying availability of sunlight, nutrients, plant density and species diversity, known to influence resource availability in primary and secondary forest. We set out to test a few hypotheses which were based on the 'resource concentration' and the 'theory of plant apparency'. The resource concentration hypothesis states that the incidence of herbivory is proportional to the availability of the resource (plants). According to the theory of plant apparency, the discovery of a plant by herbivores is dependent upon the microclimatic conditions such as sunlight, location of leaves on a plant and the location of the plant itself in a patch. The theory assumes that plants that are prone to discovery tend to invest more in quantitative defenses such as reduced digestibility. The two theories are not mutually exclusive, and each one is a corollary of the other.

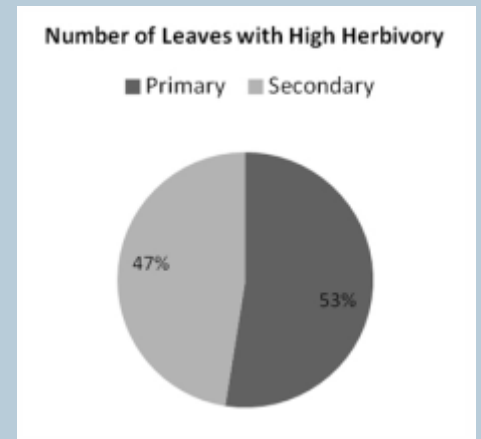
We hypothesized that the extent of herbivory would be higher in secondary growth forests where *M. peltata* was found in higher density compared to primary growth forests. Furthermore, we also sought to investigate if



older trees reported greater herbivory compared to younger ones. At the same time, we sought to understand if the leaves in the upper branches which are exposed to sunlight are more prone to herbivory compared to leaves in the shaded lower branches irrespective of occurrence in primary or secondary forests.

Over the week we established a total of 30 square plots measuring 10 x 10 sq m, 15 each in primary and secondary evergreen forests. Within each plot, we measured the height and diameter of the *M. peltata* trees. The ratio of non-predated leaves to predated leaves was considered as a measure of herbivory.

Secondary forests carried a higher average number of *M. peltata* individuals per plot. Primary forest plots had fewer *M. peltata* trees but the overall tree density was higher than in secondary forests. The *M. peltata* trees in primary forest plots also displayed a higher mean height as well as girth than those in secondary forest plots.



The findings showed that the incidence of herbivory was marginally higher overall in the primary forests than in secondary forests. This finding was not in accordance with our initial hypothesis. Second, we found that although younger trees suffered herbivory to a greater extent relative to older ones the relationship was not a strong one. Third, regardless of the forest type, herbivores in general preferred the upper branches of trees irrespective of their occurrence in primary or secondary forests. Thus, the findings of this study do not support the resource concentration hypothesis. However, they appear to provide evidence to the theory of plant apparency with respect to *M. peltata* trees.

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Event Report

Handing over Sorimuthian Temple clean festival campaign to denizens

Regular readers of Agasthya may know that since the last two years, ATREE has been training local stakeholders to take over the campaign for a cleaner Adi Amavasai festival. As part of the exit plan we provided hands-on experience to local college students in carrying out impact assessments by taking them in the team lead by ATREE researchers. 'Swasam', a local NGO concerned about education for poor and other social issues has taken primary responsibility of mobilizing volunteers from local schools and colleges to assist in frisking the baggage of visitors for plastics, liquor and other banned materials. 'Viveka Sakthi', an NGO from Alankulam specializing in folk arts, spread the message and awareness about responsible tourism among villagers through performing arts.

It was heartening to observe that the effort that we spent to build capacity among the

local stakeholders over the years has started to yield results. The campaign, led by Swasam and KMTR Tiger Foundation this year, ran smooth. It was heartening to see that polythene usage, the main concern that made us to initiate the campaign in the past, had reduced in comparison to the previous years. Owing to our incessant advocacy with

the District Administration over the issue of open defecation and its associated health hazards, a large number of toilets were set up last year which seemed to be working this year too. However, we cannot claim that it might have addressed the main issue i.e. health and sanitation hazards since the visitors and the pilgrims didn't seem to be using them as we had expected. However there has been some observed reduction in the scale of open air defecation. With the local stakeholders assuming control and leadership of campaign, a future challenge which awaits us is the one where we set our goal to create a paradigm shift in the overall individual attitudes of the visitors towards environmental issues and cleanliness, which once achieved, would then not require constant unpleasant tasks of policing, preaching and frisking.



Local Stakeholders

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Snippets:

- There was a massive fruiting of *Palaquium ellipticum*, the bat dispersed species in the evergreen forest inside KMTR in June-July after many years. But evidence of bats coming in large numbers as in 1994 was poor. **Ganesh, T.**
- A tiger scat was encountered on 25.7.12 whereby a large claw (probably of a leopard) was seen within. Since the hairs were black so we speculate that the prey might have been a black leopard. **Seshadri, K.S. and Tamilazagan.**
- The rains have been poor in the Agasthyamalai region. Upper Kodayar dam which should be half full by now has very low water and water for irrigation from most of the dams has been stopped. **Ganesh, T.**
- A Malabar spiny dormouse was sighted that fell to ground from about 10 feet at 11 pm at Wooden Bridge on 24.7.12. **Seshadri K.S. and Tamilazagan.**
- A flock of 3 white bellied tree pies, as part of a mixed hunting party was sighted near Wooden Bridge on 26.7.12. **Seshadri K.S.**
- A spot bellied eagle owl was heard and later sighted in Mundanthurai on 18.7.12. The same species was sighted near Servalar during 'Adi-Amavasai' festival in 2010. A brown fish owl was seen near the tea factory at Nalmukh. **Seshadri, K.S. and Ganesh, T.**
- The "bats in temples" survey has started and we have recorded 6 bat species in about 10 temples. **Seshadri, K.S. and Mathivanan, M.**

Interns

- Marie-Noëlle, a student from Groupe ESA, France, is interning with Dr. T. Ganesh till September to assess bat population in temples of Tirunelveli.
- Lise Nuninger, a student from Groupe ESA, France, is interning with Dr. Soubadra Devy till September to study the biodiversity in temple gardens in Tirunelveli.

Talks and Presentations

- Mathivanan, M was invited as a resource person for Application of Science and Technology in Rural Areas (ASTRA) program which was held at Tilakvidyalaya Hr., Sec., School, Kallidaikurichi on 8th July 2012 organized by Sri Paramakalyani College, Alwarkurichi. Students of 11th and 12th standard participated in the program and Mathivanan gave a presentation titled "Biodiversity in Kalakad Mundanthurai Tiger Reserve (KMTR)".
- Mathivanan, M gave a talk about impacts of temple tourism in KMTR at Jayaraj Annapackiam Nadar College, Nallur on 11th July 2012. The program was organized by Tamil Nadu Forest Department (TNFD).
- Mathivanan, M gave a talk about resources of Agasthyamalai region at Papanasam on 21st July 2012. The program was organized by Ulaga Thamizh Maruthuva Kazhagam where 500 SHG members participated.

Upcoming events

- Students from Tamil Nadu Agricultural University (TNAU), Killikulam, are scheduled to visit ACCC to participate in Rural Agricultural Work Experience (RAWE) program from 11th August to 25th August 2012.

Publications

- A Krishnagopal, K S Seshadri, M B Prashanth and T Ganesh (2012) The Agasthyamalai landscape: Land of mountains, wetlands and biodiversity. Sanctuary Asia (in press).
- K S Seshadri, K V Gururaja and N A Aravind (2012) A new species of Raorchestes (Amphibia: Anura: Rhacophoridae) from mid-elevation evergreen forests of the southern Western Ghats, India. Zootaxa (in press).



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