

AGASTHYA

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dimensions

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SPECIAL FOCUS:

Biodiversity outside protected areas



'Notes from the editor'

Conserving biodiversity outside protected areas

For long have I been hearing that the 'Protected Area' method of conserving wildlife has alienated people from wildlife and may be detrimental to conservation interests. Some of my experiences in the field also seemed to validate this theory. Younger people whom I met seemed to know less about the forest that was in their backyard. Kids even thought that there were gorillas and lions in KMTR. In contrast, the older people would know where and when exactly different species would be found in KMTR. It seemed true that people were indeed being forcefully separated from forest which could have negative long term implication. But would the conservation scenario be any different if the state had adopted a different conservation paradigm as often contested by intellects? A deeper thought from the experiences from outside the protection of the Tiger Reserve suggest a different scenario. Why are snakes, even non-poisonous ones, killed at sight? Why does a market for pond terrapins exist? Why are wetlands threatened by careless use regime and are being literally used as waste-yards, despite provisioning various useful services? These questions come to the mind when one thinks about the state of the fauna and flora without protection. But still there are some bright spots as many of the articles of the current issue focusing on the biodiversity values outside KMTR shows. Species such as the fan throated lizard and ecosystems such as 'Theri' are covered in this issue along with a few articles from interns. That there still exists considerable amount of biodiversity outside the forests are but an indicator of the resilience of human dominated natural ecosystems. But if the threats and pressures maintain their increasing trajectory, as is the prevailing trend, it is quite plausible that the resilience of the system would break, putting the very survival of such bounties of nature at stake.

- Allwin Jesudasan

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Cover page image: Bats inside a temple Credit: Seshadri K S

Flip of cover page image: Comb Duck Credit: Allwin Jesudasan

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

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The changing dimensions of wetlands in Tamiraparani river basin

The one ecosystem that maintains substantial biodiversity outside the 'forest' or the 'Protected Area' is wetlands. In the Tamiraparani basin which straddles the districts of Tirunelveli and Thoothukudi of Tamil Nadu, many such wetlands have been conserved by the local peoples primarily, perhaps, due to their utilitarian values. Apart from using it for irrigating agricultural land, wetlands has many other uses – lotus from the wetland is used in religious ceremonies, fish is harvested by contractors and local traders, firewood and timber is also harvested, certain varieties of grass and sedges are collected for mat weaving, silt is collected for agriculture and the wetlands are used as pasture lands once they dry up. For long, the way wetlands were used did not often conflict with the biodiversity that they harboured and hence the birds and wetland plants have co-existed with human use. This may not be such a happy story for long as wetlands now face different kinds of threats primarily from developmental pressures such as land conversion. For example, the new bus stand in Tirunelveli stands on what was once part of a wetland and currently, what remains of the wetland is the confluence of sewage from the city. In Ayan Singampatti village, the wetland



Mathivanan M

has been encroached with paddy fields and the one in Pappankulam plays host to the garbage from the granite quarry. The frequent dynamites that go off in such quarries make sure that Diwali is celebrated all year keeping the birds away. Pattarkulam, a wetland in Kallidaikurichi is strewn with

unavoidable as they were planted by the forest department to be auctioned and harvested. Regardless of the threats, there have been instances when wetlands have triumphed despite odds. In Pudur, a cardboard factory was letting out its effluents into the wetland causing a stench and change in colour. After stiff resistance from local villagers the factory has now stopped polluting the wetland. But such examples are rare. A wide range of stakeholders need to take concerted efforts to conserve wetlands. Since the control of many of these wetlands lies with the Public Works Department, the department needs to have a strong action plan to maintain and manage these wetlands. In some villages, funds from the Mahatma Gandhi National Rural Employment Guarantee

Debris from quarrying dumped in the wetland
chicken waste and garbage. In most wetlands in Tirunelveli district, lotus collectors are now using fertilizers like urea to increase the harvest. Hunting parties frequent Perungulam lake targeting pelicans. Some species, like the pond terrapin, even have a well-knit market for it to be traded. Even mongooses in dry wetlands are not spared as they are hunted either for their meat or for their fur. Trees that stand in wetlands face harvesting, which is

program are being used to clear wetlands of weeds. Such opportunities should be explored to help in planting saplings and maintaining trees in and around the wetlands. Effective replication of such well-intentioned efforts at a larger scale could help conserve and secure the future of wetlands which could be beneficial for both biodiversity and human well-being.

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Temple gardens – a refuge for biodiversity

The plains abutting the hills of Agasthyamalai are dotted with hundreds of temples both big and small which are laid out among the fields and human settlements. Last summer, my interest in the fields of ecology and nature conservation, brought me to this landscape, from my native temperate country of France. Setting the Agasthyamalai Community-Based Conservation centre as my base, I started assessing biodiversity of temple gardens or 'Nandavanam'. My excitement was double fold as this was an opportunity to learn to assess biodiversity and also an exposure to the wonderful temple architecture of south India and its culture.

Temple gardens can serve as repositories for local biodiversity in a matrix of human settlements and fields. However, our preliminary survey of the temple gardens revealed that native plants are slowly giving way to the fancy horticultural varieties. What was earlier open soil are being laid with concrete that reduces the area for plants.

I worked on four taxa, birds, butterflies, small



Lise Nuninger

A Typical Nandavanam

mammals and plants that are associated with the temple gardens. I visited 61 temples in all, accompanied by Saravanan - my essential companion for plant identification, Mathivanan who carried out a social survey with the temple authorities and Marie-Noelle who was working on bats in the ancient temples. The work in these temples was about collecting data, but for me it was more than that. It was about observing wildlife from the sub-tropics for the first time in a practical way: learning how to watch and recognize the birds and butterflies, learning to be attentive to every little thing that surrounds you. After having visited all the 61 temples, I had quite a massive dataset to carry out preliminary statistical analysis. I noticed some correlations between flora and fauna which I hope will be helpful for ATREE to design a management plan for temple gardens with a purpose to increase their biodiversity.

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Temple bats - denizens of the dark

While Lise studied animals and plants during the day, I was after the nocturnal visitors to the temples -bats. Thus my work essentially started in the evenings and spilled over the night. In this first part of our action oriented project, the population survey was entrusted to me while the socio-economic study was handled by Mathivanan who is more comfortable in the local language. What really triggered this project was the fact that the bats in these temples have been decimated due to temple renovation and the idea was to assess their population.

We recorded 5 species of bats and their populations in the 61 temples and made a map of their occurrence in the temple.

From a preliminary analysis we could find a few key factors that determine the presence of a good bat population. Quiet and dark corners, less crowded parts of temples, carved or finely cracked ceilings seemed to influence bat populations.

From a researcher's point of view, the joy of sharing this fresh knowledge with local



Bat emerging out of the temple

community both young and old who were curious about our work was quite exciting. The response of people to the bats were very variable, some were indifferent as they occupied parts of the temple which were not used by the devotees, while others even noticed the decimation of bat population after temple renovation. With further probing

they have even said that bats have moved to some other temple in the same locality. I was overall surprised that despite the noise and the stench of faeces, pilgrims and priests often did not mind the presence of the bats in the temples.

As any naïve European who has been suddenly exposed to a new world where everything is so different, I too, inevitably tended to become an anthropologist. I couldn't help but be amazed by wealth that was unveiled to me in India, beauty of its temples and biodiversity that it protects is a cultural and economic asset. The rich nature of unique animals, giant bats hanging on the trees like huge fruits or flying in the sky like huge European birds of prey, showed me that cohabitation is possible with animals which are generally considered unwelcome. I hope that in the coming years the religious practices will be continued along with the continued existence of the bats, flying freely in and around these temples.

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Oasis in Theri landscape

Tinnevely (old name for Tirunelveli district) covered major natural habitats ranging from coastal vegetation to high altitude grasslands representing all the five ecological landscapes of Sangam period. Stuart, a British Collector aptly called Tinnevely the epitome of Madras presidency. Diversity of elements to be endowed by the southern districts of Tamil Nadu should be attributed to Agasthyamalai mountains and the rivers that originate in these mountains. The River Tamirabarani is the aorta of southern Tamil Nadu, otherwise a largely semi-arid landscape supporting Acacia and Palmyrah palm trees and open grasslands. Through the network of canals and ponds, the river irrigates the arid plains where paddy and banana are extensively cultivated. At the tail end of the Tamirabarani, an oasis called 'Sunai' needs a special mention as it is an emerald stud at the edge of the desert with red sand, called 'Theri' locally. It is a small pond with unique fresh water swamp vegetation and rarely goes without water even during summer.

The name for the tank 'Sunai', meaning spring in Tamil, is apt one as the nearby large lake dries off during summer whereas the Sunai does not. All year round, the pond has water with

trees such as Samuthira paalai, Punnai, Naaval, Thazhai, Koarai Pullu, reeds and various species of water plants which are either submerged or floating. *Barringtonia racemosa* (Lecythidaceae) will be able to grow only in the well drained loamy soil with standing water. Locally it is called as Kadambamaram. The festoon of crimson colored flowers hanging from the branches in the background of green leaves is spectacular to see. The seeds fall in the water, float and get drifted to the shore where it germinates on the slush. The whole pond brims with diverse plant and animal life. This kind of freshwater swamp vegetation is very unique to the Coromandel coast of southern India. Few such remnant fresh water swamps

are found along the East Coast Road and few could be seen between Marakkanam through Pondicherry till Chidhambaram. These fresh water swamp vegetation are part of the vast agricultural lands and they are cleared for paddy cultivation. In Sunai, we noticed encroachments in the form of cultivation of coconuts, banana etc. Developing infrastructure facilities around the temple could also be a threat to the existence of the Sunai and its vegetation.

The Sunai not only supports biodiversity but also a rich cultural heritage through the Aiyandar temple. The deity Aiyandar is worshipped by the clan of people living in close by villages and by those who migrated

to other parts of southern Tamil Nadu. There are heaps of stuccos in the base of a tree indicating the offers in appreciation of deity's blessings which range from children, cattle etc. Aiyandar, is revered as the savior of the villagers and their property from the marauders. Today the Sunai and the temple are the insignia of the past landscape intact with its vegetation, people and the culture.



Barringtonia swamp

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Non-vegetarian plants of wetlands

Mention wetlands and one starts fantasizing flocks of feathered friends thereby setting up an irrepensible urge to pick a bird guide and binoculars. But wetlands are also a repositories of very interesting plants, which can be viewed without binoculars. Here, in this note I particularly focus on the insectivorous plants that capture insects to draw nutrients from them for their healthy growth. These plants mainly obtain nitrogen compounds from the insects and their presence indicates low nitrogen levels in the environment and hence they can serve as indicator species. Usually they are seen in fresh water tanks, marshy-ponds and swamps and have a worldwide distribution. In the Agasthyamalai landscape most common insectivorous plants are sundew plants (*Drosera*) and bladderworts (*Utricularia*) each of which has more than six species occurring here. They use their modified leaves to capture insects with their glandular hairs or use bladder traps etc. These special



Drosera indica

structures help trap insects and secrete digestive enzyme and some organic acids that helps in the break down complex

molecule of nitrogen to a simple form that can be easily absorbed by the plants. Sundew plants are represented by *D. burmanni* and *D. indica* which are very common in edges of wetlands or water logged areas. The bladderwort plant genus called *Utricularia* is a common genus comprising more than 200 species globally and is represented by atleast six species in the wetlands. Some of these species are submerged and free floating, while others are fixed by fine roots. In general, free floating *Utricularia* species have bladder like traps in the water. The whole plant has several traps, which are used for capturing insects in the water. Although plants are submerged their inflorescence are above the water with attractive yellow/blue/purple flowers which are short lived and last for a day. So the next time readers think of wetland, I hope that diversity of plant life also crosses their mind.

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The joy of bird watching in a rural landscape

In the gradient of a common man's natural progression to a serious birder, whose access to Protected Areas (PA) is restricted, birds around one's courtyard, paddy field or the nearby pond/lake plays a crucial role in honing one's bird-watching skills during those formative years. And I am no exception. But the interesting part, at least in my case, is that even after I have had access to several PAs in the last few years, the

fascination with those that exists beyond them, is still strong. While working in KMTR for the last 5 years I also got ample opportunities to watch birds that existed beyond the reserve, mostly through the annual 'water fowl census' that ACCC organises every winter. It was during these surveys that I could master my field identification skills of the waders. And the wetlands that the great river Tamiraparani supported in the landscape are literally 'treasure troves' of bird diversity, particularly the aquatic ones. During the survey, we encountered about 60 species of wetland birds including a few species like black bittern, pied avocet which are not very common in the area. Many are winter migrants for whom these wetlands are critical source of food and shelter. However, most wetlands are

threatened today, as the article by Allwin and Mathivanan in this issue highlights. Birds, even those occurring beyond the PA, should be conserved and protected, mainly from the threats of local poaching, which, if goes unchecked for a long time, can pose serious survival challenge for them. Many people, even those who live in close vicinity with these birds and have come to know about their intrinsic values such as being natural pest controllers and natural fertilizing agents, still seek them out and persecute them by bursting crackers, shooting with catapult, setting snares and traps and by stealing eggs. Thus it wouldn't be entirely wrong to suggest that if protected areas allegedly alienate people, even the people outside such areas appear to alienate themselves from the rich diversity of life in and around them, for reasons beyond the comprehension of a passionate birder like me.

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Spot - billed pelican

Clay models for owls

A few of us had hit upon the requirement of observing the habits of owls in paddy fields, since farmers in this area have traditionally tried to 'invite' them to their fields by erecting a country made pole, to rid them of rats which can destroy crops. The widely used camera-trap, a motion or heat sensitive camera that can obtain pictures of creatures from a short range was found to be a very expensive option because even a small set of cameras would cost an exorbitant sum of money to be extensively planted in widely grown paddy.

Moreover, owls are active during the night when conventional methods of observation are not possible. Hence we borrowed an idea from kids who use modelling clay to create forms and shapes.

A sheath or lump of clay was fixed onto slender poles, or on locally made owl perches and fence posts to be planted in and around paddy fields. In spite of a fairly simple design to learn about their unknown habits during the dark night, it was almost a couple of weeks

since we realized how effective these poles would be. For almost two full days no bird approached it, not even the ones that are active in broad daylight, until a small blue kingfisher finally did. An amusing set of observation came in on an early morning when eight of us teamed up in a large bungalow which had windows looking out in every direction into large spaces of the garden, fields, and forests, with a clay-pole at an obtrusive distance from the window. After a few hours of observations there was just



Clay on poles and fence posts; scaly marks and deeply pierced marks from claws are noticed

one instance of a curious babbler, which flew in to peck at the red clay-topped knob, and flew back immediately. In the dark night, we simply did not know what was happening unless the clay pads showed markings of claws and feet. However, in a fence post near the fields, on the very next day of installation, we had come across rough scaly marks on the clay pad. It simply did not resemble the deep claw marks that were earlier seen on bird-perched clay knobs. On closer examination of those markings, we realized

that they may have been coming from the rough scaly pads the owls possess under their feet to grip their prey, and, led us into planting them more extensively in a paddy field for further observations.

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Tree planters of a different kind

Ficus (Banyan) or fig trees are ecologically and culturally important trees in any landscape. They are sacred and always associated with some deity or the other. This makes it a common tree in human dominated landscapes and people have planted and protected several species of ficus for generations. The fruits of ficus, called figs are eaten by a variety of birds and mammals. The unique character of figs is its asynchrony in fruiting that allows a few trees to be in fruit all through the year. This means figs are a reliable resource and many species can depend on it for survival. It's so attractive that one of our interns Mr. Trevor who did a study on fig trees near Singampatti village found that some species of frugivorous birds and bats will visit large fig trees even when there is high human disturbance around them, say in a busy temple or in a busy city. Another interesting thing that the study showed was tree seedling



White Cheeked Barbet

density is significantly higher under these sacred trees compared to in the open area which implies that birds and mammals bring lots of seeds of other tree species and deposit under the fig tree allowing regeneration of a diversity of trees in the landscape. This way the animals are the real tree planters and what they need is some protection, for both the dispensers and the seedlings they disperse. Some of the oldest fig trees are

found in temples or along road sides. In both these places these trees are under threat; temples grow to accommodate more people and roads to accommodate more cars, so the big fig tree is either pruned or simply cut. Many of the roads in the Tirunelveli districts were once lined with large fig trees but these have been cut to widen the roads. Would all figs meet the same fate? On a recent visit to the district and indulging in my favourite pass time of looking out of the train or bus window and dreaming of the landscape, I noticed that all the small shrines of Sodalaimadan and others had ficus trees and most of them were young may be 5-6 years old. This gave me hope that the future generation will not only see ficus trees but also the birds and bats that visit them to eat the fruits and continue to be natures gifted tree planters.

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Tales from wilderness

'A cicada rain' and 'a cicada pain'

Many of us have heard about the famous cicada emergence in temperate region after leading a subterranean life for 17 years. Their emergence in colossal numbers must be a fantastic sight so much that there exists a load of limericks and poems around the cicadas. Also, we can help ourselves with the numerous recordings of their songs from 'youtube' if we wanted. You walk the trails of KMTR pre-monsoon you will be exposed to the cicada chorus which can reach a crescendo every 10 to 15 minutes. But this is an annual feature, so I always wondered what kind of cycles our fellows have here. Recently, they have been recorded to have an earlier emergence and also advance their first song due to global climate change. Our encounters with cicadas in KMTR were of a different kind. Rani Krishnan, who was doing her field work in KMTR for her doctoral thesis, one day rushed to the site where Ganesh and I were doing the phenology of our plots

and announced that *Ormosia tranvancorica*, the elegant endemic tree, was spraying fine droplets of water exactly at noon when the sun was above it. Seeing her staunch confidence, we convinced her that it is something worthy of publication maybe in prime journals like Nature or Science but she can start with a note to BNHS. Ganesh, of course had wry expression, and I quickly glanced up at the spraying trees. Back to base, there was Rani, taking out the rickety typewriter to write the note. We could hold it no longer and quickly revealed that it was indeed the cicadas that were squirting the fine rain and making a racket while they were courting and mating. Rani's face fell after reaching the crescendo of excitement. Actually it is amazing to see cicadas completely drench the tree gaps with their squirting.

Cicadas crossed our path again. We were trying to figure out who was the seed predator

of *Myristica dactyloides* from the ground which had been a long drawn effort. Ganesh had set many of us to discern it in the field. We were in different corners of the forest keeping a watch on 5 to 10 *Myristica* fruits. All were glued to our target yet when we shone our torch to the spot, the seeds would disappear with just husks behind. We could not hear the scrambling whoever this ghost was which took away the seeds right under our noses because it was pre-monsoon and the cicadas were singing even late into the dusk. After many days of the cicada orchestra, we dimly lit the area with hurricanes lamps and sat on low platforms with the background music of course. Lo and behold we saw this cute little Spiny mouse descend from canopy and neatly lift the fruit and de-husk the fruits to carry the seeds! But cicadas continue to fascinate us and we hope to study their vocalization soon.

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Ecology of *Sitana ponticeriana*

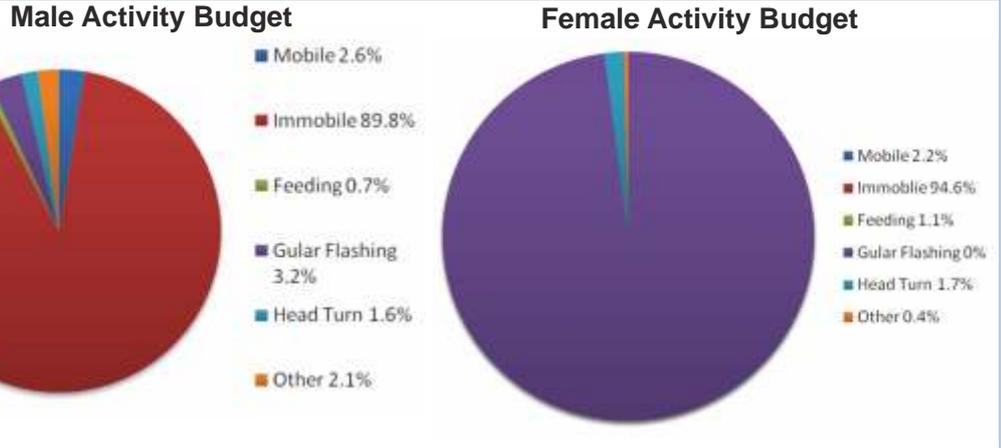
I started my study on the fan-throated lizard (*Sitana ponticeriana*) with a goal to generate base line information on the species, with a particular focus on its home range, utilization of habitat, dependence of plant species within the habitat and time activity budgets additionally focusing set on the variation between the sexes.

I conducted the study between the months August and October at the scrublands around the Agasthyamalai Community-Based Conservation Centre in Manimutharu. Being the mating season the males and females could be easily distinguished due to the display of colored dewlap of the male as seen in the picture.

With the help of Chian and many others (unsuspectingly roped into aiding me), we managed to create a net and captured 21 individuals from three different sites around the station. This was not an easy task as the



Radio tagged male displaying on branch off ground



Sitanas can be quite fast and their habitat makes it easy for them to escape the clutches of our net! All 21 individuals were measured and weighed. Furthermore 12 (6 male and 6 female) were attached with a radio tag and tracked between 14- 25 days.

Results showed females were on average 4 cm from snout to vent, tail length 10 cm and weighed 3.42 gm, whilst the males proved to be larger at 5.22 cm from snout to vent, 12.1 cm in tail length and weighing 5.4 gm on average. Although home ranges for both sexes were small, the males proved to have a much larger home range than the females. The preferred habitat was in the vicinity of low thorny shrubs mainly *Catunare gumpionsa* and *Dalbergia coromandelina* but also amongst *Dodonae aviscosa* in which they used the leaf litter for cover.

were made for monitoring behavior. A total of 240 scans of 5 mins were taken throughout the day at different time intervals. A set of behaviors: mobile, immobile, feeding, gular flashing (for males), head turning and "other" were selected. Although both sexes proved to spend the majority of the day immobile, the males showed to have more activity due to their displaying action results for both sexes can be seen in pie chart.

This current study took place prior to the monsoon. In the future it could be interesting to see of behaviour and home ranges change after the breeding season and rains as well as to monitor the behaviours of the juveniles.

Alongside this activity budgets

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Event Report

Rural Agricultural Work Experience (RAWE) programme at ACCC

A 15 day training programme was conducted for students from Tamil Nadu Agriculture University (TNAU), Killikulam, at the ATREE-Agasthyamalai Community-based

Conservation Centre (ACCC). The training programme is part of the University's RAWE project. The students were trained in several topics like chemical free agriculture,

ecosystem services provided by bats, frogs and owls in agricultural fields. The students were also trained in lizard monitoring by using radio collar device.

World wildlife week

ACCC conducted drawing competition among school students to mark the 'world wildlife week'. About 100 students from Government High School, Padmaneri participated in this event. In addition the students also took out a procession to highlight environmental issues. Since 2011-2012 has been declared international year of bats, the focus for both the painting

competition as well as the procession was bat conservation. Mr. Sekar, Deputy Director of Kalakad Mundanthurai Tiger Reserve (KMTR) also took part in the event and distributed the prizes to the winners of drawing competition. The prizes were sponsored by Zoo Outreach, a Coimbatore based conservation organization. After the ceremony the students participated in the

procession whereby all of them wore bat badges and masks and chanted conservation friendly slogans. After the procession the students were greeted by the School Head Master Mr. Arumugam Pillai. The village Padmaneri has a roost of flying foxes.

Snippets:

- Vagaikulam, which usually attracts birds by end of October did not have any birds till mid December. The nesting and roosting trees were not under water as the water was not released this year from the dam. **Ganesh, T.**
- On tracking, we found that the Vagaikulam birds have shifted their roost to areas close to Mukudal. **Ganesh, T.**
- The mottled wood owl was making breeding calls in early December. **Ganesh, T.**
- A sand boa was seen at the field station at Manimuthar. **Ganesh, T.**
- Large tanks known for waterfowls are completely dry in Thoothukudi district. **Mathibalan**

News, Talks and Presentations:

- The first meeting of the local advisory committee on tourism was held on 4th December at Mundanthurai.
- Students from MSPV community college visited the ACCC on 6th October 2012.
- M. Mathivanan spoke about biodiversity conservation at the NSS camp conducted by Tilak Vidyalaya Hr. Sec. School, Kallidaikurichi on 24th October 2012.
- M. Mathivanan gave a lecture on Application of Science and Technology in Rural Areas (ASTRA) programme, conducted by Sri Paramakalyani College, Alwarkurichi on 8th July 2012.
- Navy Cadets from INS Kattabomman visited ACCC on 4th November 2012 as part of ACCC's outreach program.

Upcoming events:

- The annual waterfowl census will be conducted from January 18th- 20th, 2013 in Tirunelveli and Thoothukudi districts. Interested volunteers can contact M. Mathivanan at mathi@atree.org



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