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# ZOO'S PRINT

Communicating Science for Conservation

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Wildlife's Wonder Woman - Support The Sally Walker Conservation Fund

Zooreach and Mango Education present: Aquatic Adventures - a learning expedition to Kerala, for kids between 11 and 15 years, December 27th-28th

Zooreach and Mango Education present: WILD Detectives - Finding feathers, an online course for kids between the ages 11 and 15 years

# Highlights of the first meeting of the Association of Indian Primatologists

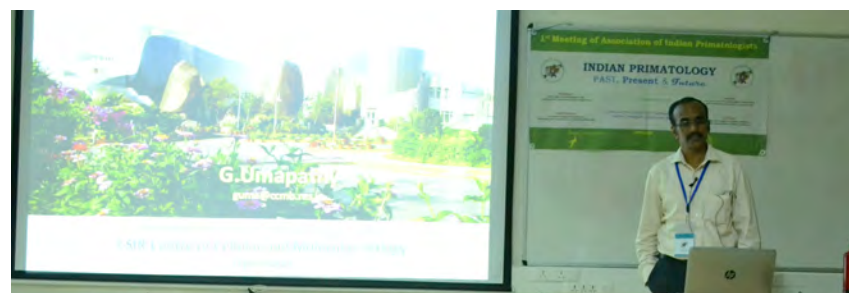
**Organisers** introduced the audience to the aims and objectives for the Association along with the origin story of the association. *Prof. Mewa Singh* from University of Mysore was thereafter invited to speak about the history of Indian Primatology and how the paradigms changed and research kept getting advanced in the country. He also gave advice on how the Association has to be managed and can be kept in motion. Thereafter the session with talks on specific themes was started.

## Ecology

The session had three 30 min talks by *Dr. Govindhaswamy Umapathy*, *Smitha Daniel* and *Dr. Krishna N. Balasubramaniam* and two 5 min speed talks by *S.R. Arun* and *M. Minsa*. *Dr. Umapathy* from The Centre for Cellular & Molecular Biology (CCMB) presented his long-term work on the fragmentation of lion-tailed macaque



**Prof. Mewa Singh** delivering a talk on the history of Indian primatology.



**Dr. G. Umapathy** presenting his long-term study on the fragmentation of lion-tailed macaque habitat.



**Smitha Daniel** familiarizing the audience with slender lorises and the challenges facing them.



**Dr. Krishna Balasubramaniam** presenting his work on the evolutionary understanding of primate sociality.

habitat in Western Ghats and use of molecular techniques to answer the challenges faced by the macaques. Smitha Daniel discussed the distribution of lorises in the Indian Sub-continent and the lack of scientific data available. She also illustrated on the anthropogenic pressures lorises are exposed to due to hunting for black magic by the local communities. The speed talk by S.R. Arjun was on one of the biodiversity hotspots in India, the Western Ghats, highlighting the presence of several primate

groups in the protected areas within Western Ghats. It was followed by M. Minsa's speed talk on the distribution of the primate species belonging to different conservation statuses in the Western Ghats. The last talk of the session by Dr. Krishna N. Balasubramaniam from the School of Veterinary medicine, University of California-Davis, focused on the evolutionary understanding of primate sociality in association with health, social structure and anthropogenic influences on primates through his range of research projects pertaining to the genus *Macaca* as a model species.



**Dr. Praveen Karanth talking on the history of the taxonomy of langurs in India and its current status.**



**Dr. Arijit Pal presenting his work on between-group encounters in Nicobar long-tailed macaque.**



**Dr. S.P. Arun presenting his lab's research work on visual cognition among bonnet macaques.**

## Evolution

The theme of the session was to present research on evolution in primates. The session comprised of 1 hour talk by *Dr. Praveen Karanth* from Centre for Ecological Sciences (CES), IISc, one 30 min talk by *Dr. S.P. Arun* from Department of Neuroscience, IISc, and two 15 talks by *Dr. Arijit Pal* from NIAS and *Kunal Arekar* from CES, IISc.

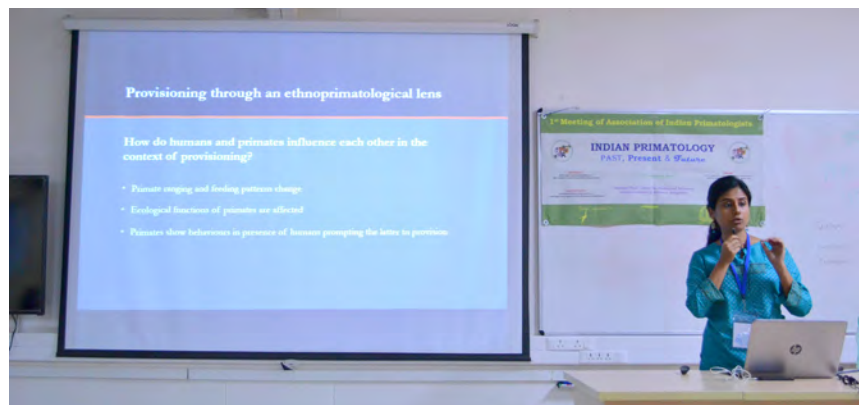
Dr. Karanth narrated the history of confusing

taxonomy in langurs of India and the approaches to resolve it. He also explained current molecular techniques and the way forward in the langur taxonomy.

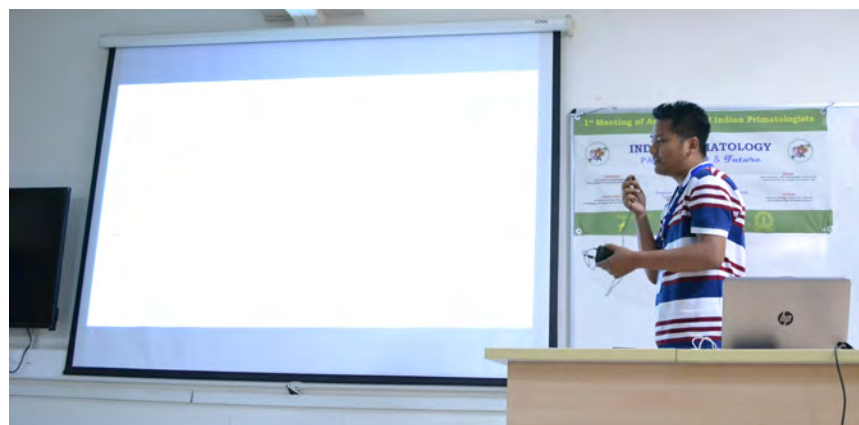
Dr. Arun presented the research work his lab is doing in understanding visual cognition among bonnet macaques using experimental setup. Dr. Pal elucidated his research on between-group encounter in Nicobar long-tailed macaque and various strategies employed by the groups when facing an encounter. Kunal talked about phylogeny and evolutionary origins of capped-golden langur lineage to check whether there was an ancient hybridization which lead to the origin.

## Behaviour

The theme was to present talks on the past, present and future research work on primate behaviour in India. The session comprised of two 30 min talks by *Dr. Malgorzata Arlet* from Adam Mickiewicz University, Poland; *Dr. Joseph Erinjery* from University of Tel Aviv, Israel; *Dr. Asmita Sengupta*, from ATREE, India, and *Taniya*



**Dr. Asmita Sengupta presenting her work on the dynamics of provisioning in macaques.**



**Bidyut Sarania presenting a speed talk on the acoustic characteristics of alarm call in Arunachal macaque.**

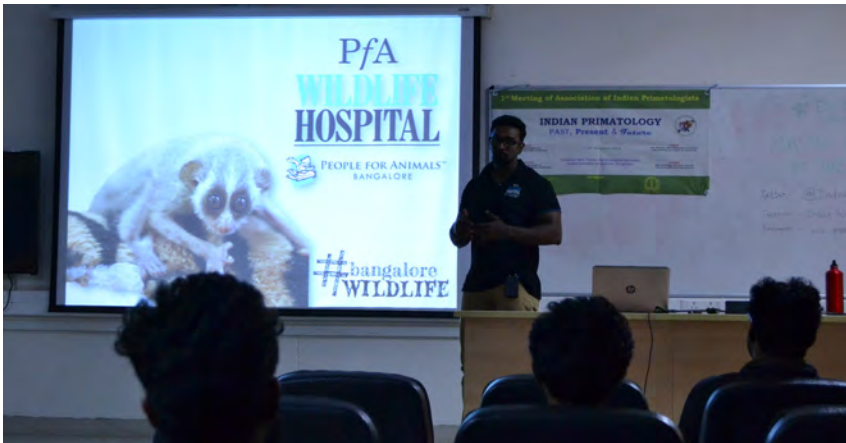
*Gill* from University of Delhi and two speed talks of 5 min each by *Bidyut Sarania* from CES, IISc and *Rahim Rashid Shaikh* from Aligarh Muslim University.

Dr. Arlet talked about the survival of infants in bonnet macaques dependent on female age, group size and anthropogenic activities at Thenmala, Kerala. Dr. Erinjery summarised the challenges faced in studying the spatial distribution of primates and solutions

available. Dr. Sengupta's talk focused on the dynamics of provisioning in the macaques using an ethnoprimateological approach. Taniya Gill presented her research on the behavioural flexibility on the rhesus macaques during human-macaque interaction in Shimla. Bidyut Sarania presented his speed talk on the acoustic characteristics of alarm call in the Arunachal macaque and Rahim Rashid Shaikh presented his work on human-



**Taniya Gill presenting her work on the behavioural flexibility of rhesus macaque during human-macaque interactions.**



**Dr. Karthik talking about the rescue, recovery, rehabilitation and release of primates carried out by People For Animals.**



**Dr. M.S. Ram talking about conservation breeding of primates in India.**



**Dr. Sanjay Molur talking about primate population trends and developments in the process of population assessment.**

influenced differences in behaviour of rhesus macaque in Aligarh, Uttar Pradesh.

## Conservation

The theme was to understand the narratives of primate conservation in India. The session was comprised of 1 hour talk by *Dr. Sanjay Molur* from Zoo Outreach Organisation (ZOO) and IUCN, talked about how the population trends of primates are ascertained by IUCN and current developments in the process of population assessment.

Two 30 mins talk were also presented in the session. First one was presented by *Dr. Karthik* from People for Animals (PFA) where he describes how PFA rescues primates, facilitates their recovery, rehabilitates them and releases them back in their natural habitat. The second talk was presented by *Dr. M.S. Ram* from CES, IISc, who addressed the scenario of conservation breeding in India with case study of lion-tailed macaque.

## Panel Discussion

A panel discussion took place on the first day.

Chaired by Mr. Partha Sarathi Mishra (PhD scholar, SACON) on behalf of AIP, the panel included Prof. Mewa Singh (University of Mysore), Dr. G. Umapathy (CCMB), Prof. Praveen Karanth (CES, IISc), Dr. Sanjay Molur (JoTT) and Mr. Mariswamy from Karnataka Forest Department. A few curated questions were initially posed to the panel and it was thrown open for discussion with participants. A variety of topics were discussed ranging from the future of Indian primatological research and human-monkey interaction to the issues surrounding funding and permissions in Indian wildlife research and the potential role of AIP in overcoming some of the challenges faced by the Indian Primatological community. Several ideas were mooted in the discussion, including the practical role AIP could play in developing a strong primatology network.

On the second day of the meeting, a discussion was held among the participants and delegates regarding the organizational structure and function of AIP. It was decided after much deliberation that the current informal setup will be followed

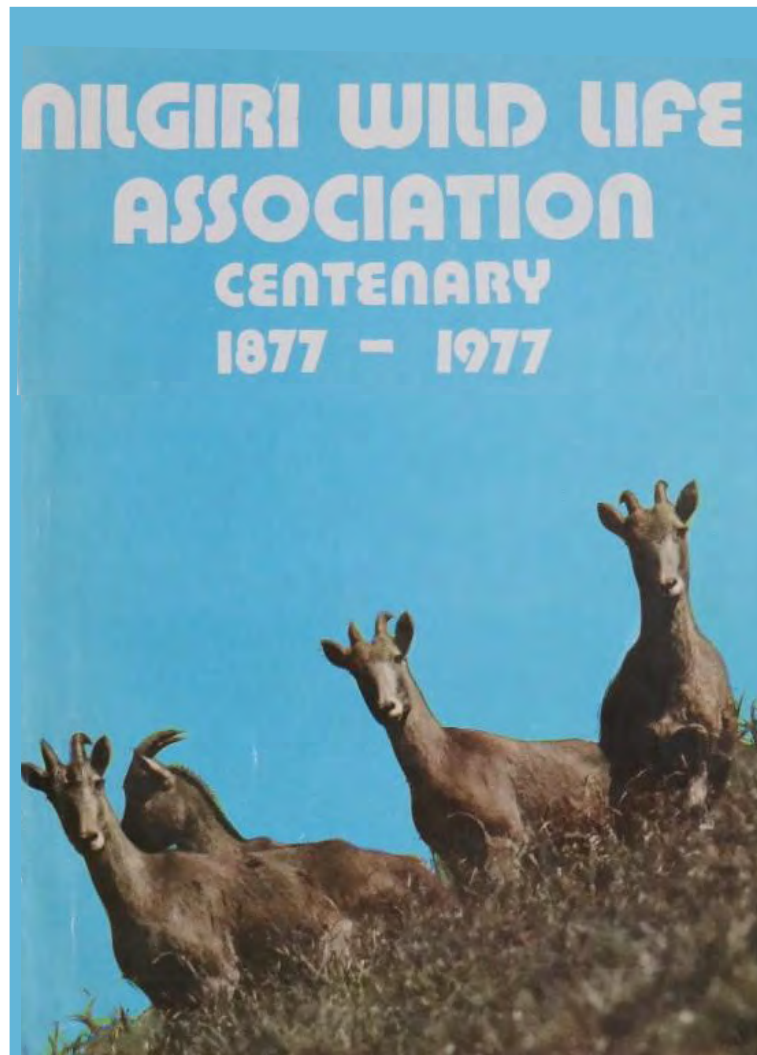
for at least two years. The second meeting is proposed to take place in February, 2021. The venue is yet to be decided, however it was decided that the meeting venue should rotate between cities as long as some faculty is ready to support it and student organizers available to conduct it. There were requests by several participants to conduct workshops while several others extended their expert support if workshops were to be conducted. The possibility of conducting a workshop arranged by AIP next year is being explored.

Regarding membership of AIP, a fee of ₹2000 for annual and ₹20000 for lifetime memberships respectively has been unanimously agreed upon. Some other functions that AIP is going to perform are: Compiling a bibliography of primate-related research and reports, listing job opening in primatological research, coordinating with forest department to provide training in primatology methods to forest personnel, publishing a curated methodology for conducting primate surveys and to encourage networking among Indian primatologists.



# Status of wildlife in the Nilgiris - E.R.C. Davidar

Published in the Nilgiri Wild Life Association Centenary publication 1877-1977 (Eds. E.R.C. Davidar and H.L. Townsend), pages 62-76.



## Preface

This article appeared in the centenary publication (1877-1977) of the Nilgiri Wildlife Association, of which E.R.C. Davidar was the Honorary Secretary at that time. The article provides important insights into the wildlife of the Nilgiris in the 1970's and earlier from the perspective of a shikari. The Nilgiris was teeming with wildlife (Fletcher 1911) when the British

colonized the hills, and unregulated hunting decimated many species, among which were the Indian Gaur (*Bos gaurus*) and Nilgiri tahr (*Nilgiritragus hylocrius*) that were abundant in the upper plateau. The tiger, elephant and other megafauna were hunted mercilessly in the lower regions of Sigur, Gudalur and Wynaad leading to drastic decline in their numbers. Legislations to protect wildlife probably came too late

as by then large extent of forests and grasslands had already been destroyed. The protection from hunting, and decline of diseases such as rinderpest and foot and mouth, and paucity of predators, could account for the resurgence of gaur populations in the upper plateau, where they share an uneasy coexistence with people. However, the Nilgiri Tahr never

recovered from its pre-British days when it probably numbered in the thousands. The elephant numbers probably plummeted during the Veerappan era beginning in the 70's and lasting until the 2000's when over 1000 elephants were presumably killed for their ivory. The Nilgai which was recorded near Mettupalayam was never seen again.

– **Priya Davidar**

### **Main Article**

On such an occasion as the Centenary of any organization, it is usual to look back to see how far it has lived upto its hopes and aspirations, take stock, and look towards its future. Since the Nilgiri Wild Life Association formed in 1877 has been intimately connected with the management of 'Game', from 1879 when the Nilgiri Game and Fish Preservation Act came into force until 1976, when the Wildlife (Preservation) Act of 1972 was enforced, it is but appropriate that the status of at least the larger forms of wildlife in the 'district' (which extends to the Bhavani river in the Coimbatore revenue district) be reviewed. It is with this object that this note was written.

### **Tiger (*Panthera tigris*)**

In his book 'Sport on the Nilgiris and in the Wynaad' (1911), F. W. F. Fletcher a planter and keen hunter in the Nilgiri-Wynaad, which is now part of the present Gudalur taluk of the Nilgiris district, recounts several successful tiger hunts between the latter part of the nineteenth century and the early part of twentieth century. According to him, netting a spearing of tigers by Panias was common in his area at that time. He

mentions – “still tigers promenade on the Devala road; and still the beat constables get skeered as of yore”. In the 'Guide to Shikar on the Nilgiris' (1924) “Big Bore” was more concerned with records than with the status of the tiger. But, the Rev. Edmund Bull mentions in a chapter in the same book – “There are plenty of tigers to be met with in the Nilgiris” and called Anaikatti “a regular tiger walk”.

The late Lt Col E. G. Phythian-Adams, who hunted in the Nilgiris between 1923 and 1957, in his notes 'Jungle Memories' published in the Journal of the Bombay Natural History Society in a series commencing in 1948 speaks of the Nilgiris, especially the plateau and Mudumalai, as a place for chance met tigers. In a note on the Association published in 1939 JBNHS he wrote – “There seems to be no decrease in their numbers either on the plateau, or in the low country, fresh animals turning up in a short time to replace those shot”. It may be noted that Sigur and Mudumalai ranges on the lower plateau (particularly the Sigur range) are generally referred to as the low country. The annual reports of the Nilgiri Wildlife Association do not, unfortunately, refer to the status of the tiger except in the

game returns, since it was not classified as “game”! Between 1912 and 1939, an average of 11 tigers were killed annually and between 1940 and 1964 (when Sigur reserve was closed to tiger shooting) the average dropped to four. (In the latter years the annual bag depended more on the tenacity of pursuit than on other considerations).

Tiger shooting was banned in the State by the Government in January 1966. The Association which had, on its own, taken various measures to prevent over shooting felt that the ban should have been preceded by adequate preparation and followed by practical and imaginative conservation measures. The sudden withdrawal of sportsmen from the scene, had an unsettling effect. The villager was left to his own devices to defend his cattle against the depredations of tigers. He, naturally resorted to the use of poison to eliminate his enemy. “Enemy” is what the tiger had become. Until then the villagers, especially those in Anaikatti, Mavinhalla and others similarly placed, had a vested interest in tigers as they made a good living taking part in beats etc. and made sure that not too many were shot. The Nilgiri tigers were extremely clever and seldom allowed themselves to get caught over “kills”. Only a few ‘game killers’ living on inaccessible slopes survived. It was the writer’s misfortune to come across the carcasses of two tigers in the Masinagudi-Sigur area, which had obviously been poisoned. No one had even bothered to remove the skins.

This writer has had a holiday cottage in Sigur, midway between Masinagudi and

Anaikatti since 1964. Thus he had the opportunity of following the fortunes of the tiger, particularly in the low country. Between 1964 and 1967 there was considerable tiger activity in the Sigur Reserve as evidenced by tracks of tigers, claw marks on trees, kills, calls and occasional sightings. Between 1968 and about two years ago (1975), tigers had vanished from the area. He also did a carnivore survey in the Mudumalai Sanctuary in 1971/72 and from this time on there has been a slow but noticeable improvement.

Had the villagers been compensated for the losses sustained in time, most of the tigers there could have been saved. The writer’s proposal to introduce a compensation scheme was accepted with much reluctance in 1969, and that too in an attenuated form covering Mudumalai Sanctuary only. After further representation, it was extended, after some years to a one km belt around the sanctuary. It was only recently that the scheme was extended throughout the state, but by then considerable damage had been done. This scheme was also not given adequate publicity, and its implementation was tardy. Except for one suspected case, there are no reports of poaching for a trophy after the ban on shooting was placed.

In the Nilgiri-Wynaad there are no tigers left, except for an occasional straggler from the Mudumalai Sanctuary where some still remain. The Masinagudi area, and the slopes get an occasional visitor, whilst Anaikatti, the home of the tiger in the

low country, has no resident population. On the plateau, in the Kundahs, (the mountains along the western edge of the plateau), tigers normally keep to the cliff line and rarely venture into the interior. The Bangitappal/Sispara areas still hold some residents. From all accounts there are a little over a dozen tigers all told, which along with those round about, are sufficient to keep the genetic pool viable.

With the loss of habitat in Kerala and in the Nilgiri-Wynaad; the western region of the Nilgiri plateau, Sigur and Mudumalai ranges have an important role to play if the tiger in this region is to be preserved.

### **Leopard (*Panthera pardus*)**

Invariably referred to as 'panther', the leopard was considered a nuisance by the early sportsman not only because of its numbers but since it interfered with the carefully laid plans to bring about the destruction of the tiger. Between 1910 and 1930 the annual average numbers of leopards killed was 23. Between 1931 and 1940 the average dropped to around 10. Between 1941 and 1966 when shooting was closed the average dropped to five. Writing in 1939 (JBNHS volume XL1, no 2) Col. Phythian-Adams states that leopards had decreased on the plateau and as a result wild pigs had increased enormously. The present writers note published in the same journal in 1968 (vol. 65, No. 2) summed up the position thus – "There are more panthers in the low country than on the plateau but they are by no means plentiful". The situation has not changed since. The Nilgiri-Wynaad which held numerous leopards in Fletcher's days now

holds very few. Black leopards also occur both on the plateau and in the low country, but are far fewer in comparison, and more or less confined to the Western and North Western parts of the district.

### **Sloth bear (*Melursus ursinus*)**

F. W. F. Fletcher (1911) writes "In my part of the country (Gudalur taluk) the sloth bear is undubitably the rarest of all game animals. By this I do not mean to imply that he is less common than, say the tiger; on the contrary on the rocky range of hills on which my estate (Rockwood) is situated, bears are fairly numerous. But, save for the short season during which the fruit of the Atti<sup>1</sup> is ripe, the bear is nocturnal in his wanderings and his day retreat is always chosen in some remote spot. Hence it is that he is so seldom seen".

IN 1939 Phythian-Adams reported "From the table (of game shot) sloth bears seem to be on the decrease but it is doubtful whether it is so as they are very nocturnal and have never been numerous".

Except for the Nilgiri-Wynaad area, there are probably as many bears in the district as there were at the start of the century; may be more. They are found mostly on the slopes, including Mettupalayam slopes and in the Mudumalai-Sigur lower plateau. During the honey season in May-June they are abroad even during the day.

### **Elephant (*Elephas maximus*)**

Fletcher writes "In the year of grace 1911, it seems scarcely credible that so late as 1873 the indiscriminate slaughter of

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<sup>1</sup>*Ficus glomerata*

elephants was not only permitted in the Madras Presidency, but was encouraged by the Government by the offer of a large reward for every elephant killed; and even after this lapse of time the elephant lover must feel a pang of regret at the thought of the wholesale butchery that was perpetrated under the aegis of this deplorable system. Here in S. E. Wynaad, the slaughter was enormous and I have heard (I believe this is strictly true) one man who was then resident here was credited with the killing of three hundred elephants mostly cows and calves”.

With reference to the position in his area at the turn of the century he states –“In regard to elephant shooting, I, at one time, occupied a unique position, for over a large area in which elephants are numerous, I had the sole right to “Kill, capture and pursue them” and had I thirsted for their blood I could easily have gratified the craving”. In this part of the country, a herd may contain any number of individuals from four to forty. Possibly much larger herds exist. Always a few are to be found in the jungles at the foot of the Northern slopes while at times their numbers rise to fifty or more”.

Phythian-Adams writes in his ‘Jungle memories’ – “Thanks to the protection afforded, elephants have increased to such an extent that they have become a serious menace to the cultivator.....The movements of elephants depend largely on climatic conditions but there are always a few to be found in the jungles at the foot of the Northern slopes while at times their number rise to fifty or more”.

It was not only the Madras Elephant Preservation Act of 1873, but the vast unspoilt jungles where the elephants could roam and breed in peace that brought about such a dramatic change, since the eighteen seventies.

In the writer’s experience of the past twenty and odd years more elephants are met with in the district today than in the fifties. Some believe that this is deceptive and attribute the apparent increase to the shrinkage of the elephant’s habitat by the denudation of forests all around, particularly in Kerala and some clear felling in the district itself; especially in the Nilgiri-Wynaad. But the large number of young seen in the herds does not altogether support this theory. Even if the population as a whole in the region has not increased, there are certainly more elephants in the district now than there were, say, fifty years ago. Elephants used to visit the plateau but rarely. Nowadays such visits are nothing unusual and there are a few permanent residents. Every year half a dozen or more people are killed in the district, but proscribed as ‘rogues’ of which one was shot. But some half a dozen or more elephants are found dead in the jungle each year, some from gunshot wounds.

### **Gaur (*Bos gaurus*)**

If FWC Fletcher’s accounts are to be believed the Nilgiri-Wynad must have been teeming with gaur at the turn of the century.

Phythian-Adams writes in his ‘Jungle Memories’ – “It was not until I settled down in the Nilgiris that I found how easy it can

be to bag one of these grand animals. They are of course no longer found on the plateau except for a very occasional wanderer, but in the low country they are so numerous that seldom a day passes without seeing them”.

Writing in 1939, he states, “.....they are now confined to the low country on the North and West where they are definitely on the increase. There was a serious outbreak of rinderpest in the Mudumalai forest in 1909 affecting both bison and sambur and the numbers of the former were so depleted that their shooting was prohibited in 1912, for five years. In 1929 there was again a small outbreak of disease in the same forest but only a few animals died and since then with the exception of a single unconfirmed case of foot and mouth disease the herds have remained healthy”.

Besides the areas mentioned by the above writers, gaur also occur in the southern and eastern slopes, on either side of Mettupalayam, though not in great numbers, and have maintained their strength over the years.

There was a serious outbreak of rinderpest in 1968, in the Mudumalai and Sigur ranges wiping out most of the gaur in the area; in terms of numbers – hundreds of animals. For the next five or six years it was a rare sight to see a gaur in the area, except on the upper slopes. In the last two years gaur have reappeared especially in Mudumalai which could be considered their home. But the danger from disease is ever present, as decrepit and diseased cattle, enroute to slaughter houses, are driven through

the area every week. Scrub cattle in the thousands, including many unhealthy ones are grazed in the low country jungles. As far as the Nilgiri-Wynaad is concerned, much of the Gaur country of Fletcher has been cut up and developed and is no longer an ideal habitat of this forest loving animal. A few herds still occur on the slopes and in the forest adjoining the Mudumalai sanctuary.

### **Nilgiri Tahr (*Nilgiritragus hylocrius*)**

“Not a great many years ago, ibex (sic) could generally be found all along the precipitous rocks forming the line of ghats skirting the hills from Rungaswamy’s peak (Kil Kotagiri) to Makoorty, Sispara and Mail-koondah. Now they are with difficulty found at some more favoured spot than others” – ‘Hawkeye’ (Gen R. Hamilton) in ‘Game’ (1876).

“In former years this animal was plentiful in certain favoured localities in these hills.....These unfortunate animals have been persistently persecuted and greatly reduced in numbers. The incessant harrying they are subjected to will certainly lead to their absolute extinction unless the game laws, since adopted and promulgated save them from this fate” Lt. Col. A. J. O. Pollock in ‘Sporting days in Southern India’ (1894).

F.W.F. Fletcher notes – “ In former days – the halcyon days of sport on the Nilgiris – “Ibex” (as the animal is commonly referred to in these parts) were found in very large herds, an assembly of even one hundred being not uncommon according to accounts of old-time sportsmen.

But owing to incessant persecution the numbers were thinned at such a rapid rate that at one time the ibex stood in imminent danger of extermination. The Nilgiri Game and Fish Preservation Act of 1879 did much to avert this calamity; the absolute prohibition of ibex shooting, which followed a few years later, did more. Under this salutary legislation there was such a steady increase in the herds, that in 1908 it was found possible to permit the shooting of one 'saddle back' (as old males with saddle marks on the back are called) under each licence issued in a season. I need hardly add, a saddle back does not fall to the lot of every sportsman. The largest herd I ever saw was at Bettmund on a glorious morning in 1890, and they numbered twenty-nine".

In a note on Game preservation published in the JBNHS in 1927 Phythian-Adams wrote "The total of the herds in the Kundhas cannot now fall much below 400". In 1939 he estimated their number at 500. But no systematic enumeration appears to have been undertaken to arrive at these figures.

In 1963 and 1975 the writer conducted, through proper census operations, and a summary of the 1975 count is given below:-

Altogether 334 animals were counted. In spite of favourable conditions, it is possible that a hundred or more tahr remained out of site, and unenumerated along the cliffs. The total tahr population was estimated at 450 compared to 292 and 400 for the 1963 census.

Some overlapping in the classification is not ruled out. No attempt was made to classify Light brown male and Adult female separately as this would have slowed down the work considerably. From the samplings it may be stated that the ratio between males and females was 1:3. The Glenmorgan herd which numbered around 30, and which enjoyed protection for many years appears to have disappeared. The tahr on the isolated cliffs of the Northern and Eastern face of the Nilgiris, which were not legally hunted also appear to have disappeared long ago.

Poaching is expected to increase with the opening up of the Silent Valley in Kerala. Banning tahr shooting is not the answer as game licence holders perform a useful function by their very presence in the area. Forest staff rarely penetrate into the interior. Every case of tahr poaching that has been detected was on the initiative of licence holders. The movements of the game

Area	Saddle-back	Dark brown male	Light brown male and adult female	Yearling ≈1-2 years	Young Upto 9 months	Total
Mukerti	2	3	22	9	9	45
Western Catchment	2	4	24	6	6	42
Nadgani/Sispara	8	15	130	23	31	207
Bangitappal	3	3	26	2	6	40
<b>Grand total</b>	<b>15</b>	<b>25</b>	<b>202</b>	<b>40</b>	<b>52</b>	<b>334</b>

licence holder, unlike those of the poacher can be watched and controlled as the entry and exit points are known. Taking all these factors into consideration a half-yearly bag limit of 2 saddle backs (which are old males, a majority of them past breeding) was suggested. This was accepted by the Association. However, since then the control has passed into the wild life department. As the Nilgiri tahr has been placed in Schedule II of the Wildlife Act, a special game licence from the Chief Wild Life Warden is required to pursue it. None has been issued in the last two years, and so no patrolling was done.

One of the worst problems that the tahr faced was the extension of wattle and eucalyptus plantations into their habitat, in spite of protests by the Association. Fortunately most of these have failed because of the high winds on the exposed slopes of the Kundhas and lack of depth of soil.

### **Sambur (*Cervus unicolor*)**

Fletcher reported on Nilgiri-Wynaad – “Living as I do in Sambur country..... any afternoon or morning I cam across a dozen sambur within a few hundred yards of my bungalow, while frequently they came into my verandah in their nightly rambles”. “During the reminder of our trip (Rockwood and Needle rock peaks) we saw several more stags with heads of about the same size (33”); but as I had redeemed my promise of sport I did not go after them”.

The slaughter of sambur on the tea and coffee plantations in the name of protecting young shade trees and nurseries was

immense as seen from various reports. Phythian-Adams in his “Jungle Memories” writes- “Though a fair number are to be found in the low country the great majority on the plateau where they have so increased in spite of the ravages of tigers, panthers and wild dogs that it has become necessary to have a few hinds shot annually”. The ban on shooting of hinds was reimposed shortly afterwards. The present low horn limit of 28” was fixed in 1932 in order to permit the shooting of old stags whose horns were going back and whose retention was undesirable. But a glance at the table shows how few mature animals are shot annually, though it must be remembered that the present bag limit is two against three previously”.

Between 1912 and 1923 over 40 stags were killed on the average annually. But then there must have been a dozen or more stags to each one shot. The average annual bag dropped to less than 20 between 1924 and 1945. Thereafter until 1975 the average bag remained at around 10. In some years as few as 3 were accounted for.

The Nilgiri-Wynaad is no longer the sambur paradise it was in Fletcher’s days. The reason for this is not far to seek – development, both authorized and unauthorized. But the area, particularly the wooded slopes, still carry a reasonable sambur population. There is no appreciable fall in the number of sambur in the low country in spite of the set back following the 1968 rinderpest epidemic which affected the sambur also.

Reporting on the status of wildlife in the Nilgiris in 1968, the present writer noted – “Alas the position of the sambur on the plateau is far from satisfactory. Except in a few pockets where there are between half a dozen to a dozen animals, the sambur is scarce. Estate labour with dogs killed quite a few. But poachers could not have accounted for all the missing sambur, for poaching never got out of hand in the Nilgiris as in other districts. How they could have disappeared even from areas where no poaching took place is a mystery. However, it is comforting to know that there are more sambur in the plateau today (1968) than there were a few years ago. But, unfortunately, as soon as there is an appreciable increase, wild dogs invade the plateau from the low country in numbers and bring down the population. In 1960 there was such an invasion that in one bay of the Pykara lake alone 14 sambur skulls and a jumble of bones were recovered. It is hoped that the new wattle plantations of the forest department on the plateau will provide more cover for the sambur and help it, to some extent, to make a come back”.

Sambur have increased on the plateau particularly in the Bangitappal/Sispara area. On the slopes also, there are more now than there were some ten to fifteen years ago.

### **Cheetal (*Axis axis*)**

Fletcher writes of Nilgiri-Wynaad – “Light open forest on the banks of streams, interspersed with glades of short grass, is the country the dappled deer love and hence they abound in the jungles at the

foot of the northern face of the Nilgiri plateau, and below the Western Ghats of Malabar where their special taste in the matter of habitat is suited to a nicety”.

“On several occasions prospecting work has taken me to a place at the foot of the hills, where the whole country is alive with spotted deer. ....I have come across herd after herd, which together must have numbered fifty at least”. (which is not a large number in Masinagudi for instance). An idea of Nilgiri-Wynaad cheetal is gained when Fletcher’s largest head measured only 32”. Big Bore in his “A guide to shikar on the Nilgiris’, calls Masinagudi the home of the spotted deer. They were said to be fairly plentiful in Mudumalai also.

Phythian-Adams reported in 1927 – “very numerous in the low country, but much persecuted by wild dogs and patta land shooters”. In his 1939 report he writes – “cheetal are confined to the low country, their favourite centre being the Mudumalai and Benne forests. In spite of the appalling ravages of wild dogs and to a lesser degree of tigers and panthers, large herds of 30 to 40 may be seen including a number of fine stags. The way in which cheetal heads have improved under careful system of preservation is shown by the following instance. Writing in 1880 a well known local sportsman and taxidermist refers to a head of 32 ½” which had recently obtained as the largest shot to date in South India. Nowadays such horns are common in the Nilgiris and heads of 34” and 35” can be obtained without difficulty, while several over 37” have been shot in recent years, the best being two of 38” bagged in 1916

and 1926”.

The average annual bag was 22 between 1912 and 1939. Between 1940 and 1959 the average dropped to 13. Between 1960 and 1974 the average shot up to 38 stags. In his 1968 report the writer stated – “This species has recorded a spectacular increase. Herds of one hundred or more are not uncommon – the concentration has moved east from Mudumalai of Phythian-Adams’ days) and large herds are found around Masinagudi and Anaikatti”. Fifty five (55) stags were accounted for in 1968, the largest number shot in any one year in the last 10 years. It was even considered that some old does should be allowed to be shot. But after the rinderpest epidemic the deer population declined and wild dogs increased. However, in the last 2 years there has been a marked improvement in their status in the low country. But in the Nilgiri-Wynaad their position is precarious. There are some herds on the Mettupalayam slopes.

### **Muntjak (*Muntiacus muntjak*)**

It is commonly known as the jungle sheep in the Nilgiris. Fletcher writes – “Both on the Nilgiris and in the Wynaad the muntjak is very common. In the Wynaad he feeds at all hours of the day at the edge of some cover in which he can retreat instanter”. Phythian-Adams in his 1927 note wrote –“are sufficiently numerous and call for no remarks”. In 1939 he reported –“are found mostly on the plateau but they occur also in the Nilgiri-Wynaad. The number allowed on the licence was reduced from 6 to 4. -----their position is satisfactory”. In 1968 the present writer reported on the

position of the barking deer thus – “is more partial to the plateau than the low country. The conditions on the plateau are so unsettled because of work on the Kundah hydro electric project and the extensive wattle plantations of the forest department that these deer venture out of the security of the sholas only late in the evenings thus making it difficult to assess their status. The bag limit has been further reduced to 2”.

Although the conditions have more or less returned to normal on the plateau, but because of extensive wattle and bluegum plantations it is difficult to sight this animal, unlike in the old days when there were more open grasslands. They are holding their own on the slopes wherever cover is available. A pure albino specimen was shot on Doddabetta in 1938.

### **Four horned antelope (*Tetracerus quadricornis*)**

Phythian Adams wrote in 1939 – “is found chiefly at the foot of the northern slopes and in the broken ground covered with light jungle along the edge of the Mysore ditch, as the great rift of the Moyar river is called. They are few in number and seldom shot”. In ‘Jungle Memories’ he states – “They are extremely wide awake little animals and it is not easy to get within sporting range, while the fact that under the rules only males may be shot makes it still more difficult to bring one to bag”.

The Association recommended the closure of the shooting of this antelope and since 1955 the ban has been effective. Some have been seen near Masinagudi

(Manradiar Avenue). There does not appear to be any improvement in the status of the animal and it continues to be scarce.

### **Blackbuck (*Antelope cervicapra*)**

Phythian-Adams wrote in 1927 – “Were closed to shooting from 1923 to 1926 and are still not numerous, but sufficiently so to allow the inclusion of one on the licence for those who care to shoot so poor a trophy”. In 1939 he reported – “For several years their shooting was closed and there seems to be little doubt that they need renewed protection, as they suffer severely at the hands of patta land shooters and from wild dogs”.

Blackbuck shooting was again closed, this time permanently from 1948. Between 1930 and 1948 the total number of bucks bagged by licence holders was 18 only. Blackbuck have completely disappeared from their old haunts in Kargudi, Moyar and Masinagudi. However on the district border, between Bhavanisagar and Thengumarada they are now plentiful.

### **Nilgai (*Boselaphus tragocamelus*)**

Phythian-Adams wrote in ‘Jungle Memories’ – “In the Nilgiris 25 years ago there was a solitary bull near Kallar at the foot of the Mettupalayam Ghat, and at my suggestion the Nilgiri Game Association afforded him and his kin full protection. But no doubt he has passed on long ago and I never heard of any other in the district”.

### **Mouse deer (*Tragulus meminna*)**

“Every year a few are shot in small game beats” wrote Phythian-Adams. Between 1958 and 1964 mouse deer shooting was

closed. Few beats were organized in the last twelve years and as a consequence very few mouse deer were killed by licence holders. Being nocturnal they are seldom seen except after a heavy shower when it is possible to see them on the margins of roads in the low country and on the northern and western slopes, at night. There does not appear to be any change in their status since the beginning of this century, except in places where forests themselves have disappeared.

### **Hyaena (*Hyaena hyaena*)**

“Except for an occasional straggler on the plateau they are confined to the dry belt at about 3000ft elevation round Anaikatti where they are common”, Phythian-Adams stated. Now they are by no means common even around Anaikatti. It is possible that their numbers came down when cattlemen poisoned tiger kills. However, their status has improved as compared to, say, five years ago as seen from their tracks.

### **Wild dogs (*Cuon alpinus*)**

Fletcher wrote of the wild dog – dhole – “crafty, untiring, cruel and relentless as fate, the wild dog is the curse of the country”. “This pest, which unfortunately is very numerous in the Wynaad..... Big bore advised “The wild dog should never be spared but shot on sight”.

In his 1927 note Phythian-Adams wrote “Up till 1923 a reward of Rs. 25.00 was paid for every wild dog killed in the area of which N. G. A. gave Rs. 15.00, Government contributing the balance. The results were satisfactory in that some 40 to

50 were destroyed annually. Unfortunately the adjoining districts did not cooperate, and skins of dogs shot outside the area were brought in, in such numbers that the N.G.A. in 1923 was forced from lack of funds to discontinue the reward. In 1926 it was decided to renew the N.G.A. reward (Rs. 10/-)". This was raised to Rs. 20/-. Bounty was paid until 1976 when the Wildlife (Protection) Act was enforced.

In 1939 Phythian-Adams wrote – "The marked variation in the number of wild dogs killed from year to year, is due partly to the reason already given but also doubtless to the periods of decrease and increase to which these animals are liable. Whether such decreases are due to disease is not known but certainly some of the wild dogs killed in 1937 were in a very mangy condition, and a number were found dead, probably from distemper in 1893-94, sometimes as many as 3 and 4 in one spot".

In 1949 in his series "Jungle Memories" he wrote – "Wild dogs are resident in the Anaikatti area and have their breeding places there. They will not as a rule be found at Mudumalai and Benne except during the dry months". Phythian-Adams was of the view that long grass is an impediment to hunting; while affording cover to the deer the sharp grass blades cut up their pads.

In 1968 the present writer reported – "This animal seldom takes up residence on the plateau. Some years they do not visit the plateau at all. They are numerous in the low country and do considerable damage

living mostly on young deer". Three years ago a pair bred near Pykara and some packs were seen in the low country have taken to preying on domestic cattle, mostly calves, regularly. There do not appear to be residents in the Nilgiri-Wynaad. Their population is subject to fluctuations, and distemper seems to be the main cause. In 1965/66 there was such an outbreak.

Following it, the bounty on the wild dog's head was withdrawn for 4 years. Dhole recovered from the set back in 2 years. To the dismay of the villagers in the low country wild dogs which have been considered vermin all along are now placed in Schedule II of the Wildlife (Protection) Act, requiring a special game licence for their pursuit which has not been issued in the past 2 years. Some control on their numbers especially during the years the dhole population is on the increase, is necessary if people are not to take the law into their own hands and devise their wholesale destruction.

### **Wild boar (*Sus scrofa*)**

In 1951 Phythian-Adams wrote in "Jungle Memories" – "On the Nilgiri plateau they do great damage to the potatoes which form the main crop of the district and at one time the Government used to pay Rs. 5/- on each pig killed".

In 1968, the present writer reporting on the status of wildlife in the District wrote – "The pig population fluctuates. For some years they go on increasing then for some unknown reason their numbers go down". They are plentiful at the time of writing.

### Small game – Jungle fowl etc.

In 1968, the writer wrote – “There are fewer jungle fowl on the plateau today chiefly because the natural sholas are either being destroyed or replaced by bluegum or wattle plantations. Some of the famous wood-pigeon sholas have vanished. So far as the winter visitors namely woodcock and snipe are concerned there has been no appreciable change. But with the exodus of the resident European sportsmen who were chiefly interested in small game and practiced beating for small game, there are fewer pursuers of game birds now. In the low country hare and jungle fowl have increased as compared to a few years ago. Peafowl have registered a larger increase”.

The pressure on small game is much less as compared to the first half of this century. Very few, if any, small game beats are organized these days. Jungle fowl are on the increase in the plateau. In the low country their population is subject to fluctuations. A few years ago when bamboo flowered extensively in the low country, there was a big increase in the number of jungle fowl. Since then there has been a drop in their population.

Area-wise the Gudalur area (‘Nilgiri-Wynaad’ is no longer used to refer to the area) has suffered the most loss. Forests have been cleared for cultivation and extension of tea and coffee plantations. In the transition from the Janmam system of land tenure obtaining there to the ryotwari tenure, there have been large scale encroachments followed by denudation of forests. Besides, except for a few privileged planters like Fletcher

and others who resided in the area, the ordinary licence holder seldom penetrated the area and it therefore remained, for all practical purposes, outside the influence of the Association and to a lesser extent the jurisdiction of the Forest Department because the bulk of the forests there were private property. Further loss of wildlife habitat may be expected when the Pandiar-Punampuzha Hydro-Electric project is taken up for execution.

On the whole the wildlife position is quite satisfactory, and could be considered very good indeed when compared to areas, which set out with a comparable stock of game as the Nilgiris one hundred years ago.

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## Observatory note on territorial fight of Common Krait *Bungarus caeruleus* from Anaikatti Hills, Kerala, India



**Image 1. Sequence of territorial fight of two Common Kraits.**

The Common Krait *Bungarus caeruleus* is a nocturnal species of venomous snake found throughout Afghanistan, Pakistan, India, Sri Lanka, Bangladesh, and Nepal (Ahsan & Rahman 2017). The diet of the species is known to comprise juveniles of own species, other snakes, lizards, frogs, and small mammals (Whitaker & Captain 2004). Cannibalism and scavenging are also known in this species (Smith 1913; Mohapatra 2011; Chowdhury 2017; Debata 2017; Mohalik et al. 2019).

On 06 November 2018, at 20.30h the author encountered two Common Kraits on the middle of the road in Anaikatti Hills, Kerala, India (11.099°N 76.730°E; elevation 621m). The two entwined individuals were of different sizes; individual A was longer and bigger than individual B. I observed the fight until 22.00h, without disturbing the snakes and maintaining enough distance. I made a video recording of 21 minutes of the observation by using a smartphone camera.



**Image 2. Stationary individual A disoriented and individual B fleeing the scene.**

Here, I present the main events of this observation. Both the individuals were locked in mouth-to-mouth combat (Image 1A–L) for most of the duration of observation. During this period, the fight was dominated by the smaller individual B. For some time, individual A showed little movement and resistance to the grip of individual B.

At one point, individual A was clearly losing the mouth grip, and was seen with its mouth wide open (Image 1G&H). The krait's limpness made us wonder whether the individual was dead, while it was just feigning death. The playing-dead act went on for some time; later, both snakes once again resorted to a mouth-to-mouth clasp. By then, both individuals were intertwined with one another in stereotypical combat behaviour (Lowe 1948) as shown in Image 1M–O).

Around 21.50h, individual B, who had dominated the entire duration of the fight, abruptly fled, leaving individual A behind on the road (Image 1P). Individual A appeared exhausted, as it lay motionless for around 10 minutes (Image 2). It then limply slithered to one side of the road, stopped, and slithered again to the other side of the road. It repeated this disoriented activity two more times.

This record forms the first-ever video documentation of territorial fight of Common Krait. Video recording of parts of the observation can be seen at the following link:

[https://youtu.be/XrFS\\_DnGV-s](https://youtu.be/XrFS_DnGV-s)

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## New distribution record of butterfly species from AJC Bose Botanical Garden, Howrah, India

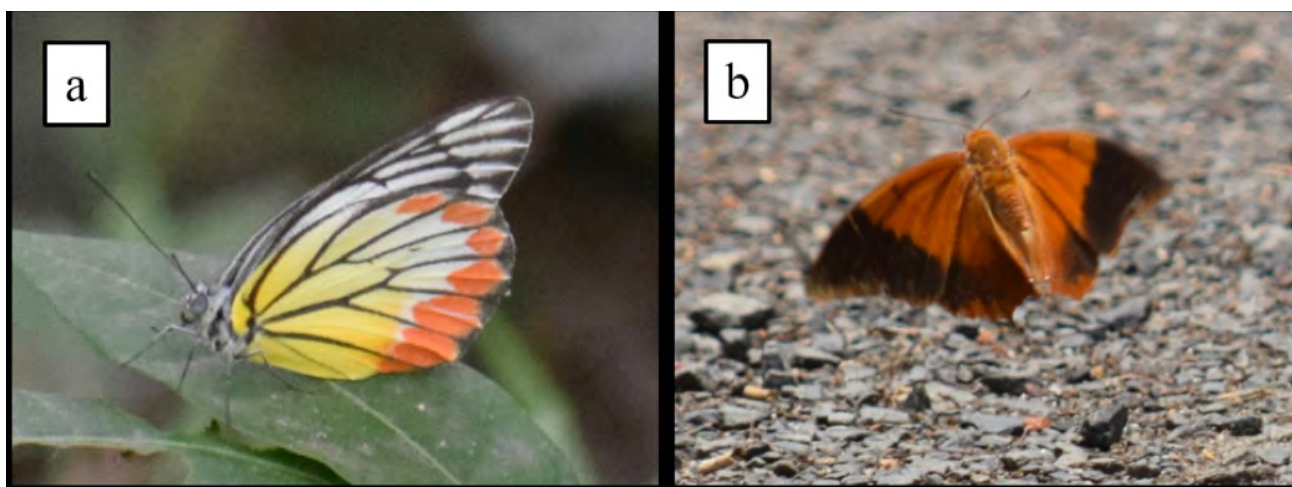


Image. a–*Delias hyparete* L., b–*Charaxes psaphon* Westwood.

This report highlights the extension of the range of the two Butterfly species, Painted Jezebel *Delias hyparete* Linnaeus, 1758 and Plain Tawny Rajah *Charaxes psaphon* Westwood, 1847 from Howrah district, West Bengal.

During the course of our periodical surveys in 2016, to study the diversity and divergence of Butterflies in and around Kolkata, India (22.572°N, 88.363°E), we observed two species of butterflies at Acharya Jagadish Chandra (AJC) Bose Botanical Garden that have not been observed in Kolkata or surrounding areas earlier.

AJC Bose Botanical Garden is a human-maintained protected region, lying by the side of the river Hugli. It exhibits a wide variety of rare plants with a total collection of over 12,000 specimens spreading over 109 hectares. The diverse flora favoured the attraction of several pollinators. In summer, the temperature ranges from 29 to 40°C, while in winter, the range is 15–28°C. The average annual rainfall is about 660mm.

The species were photo-documented (with a Nikon DSLR 5300) and identified using the right keys (Kehimkar 2016) and the distribution of the two Butterfly

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species (previous records taken from [ifoundbutterflies.org](http://foundbutterflies.org)) were geographically mapped using DIVA-GIS software version 7.5.

The species observed include the Painted Jezebel *Delias hyparete* Linnaeus, 1758 and Plain Tawny Rajah *Charaxes psaphon* Westwood, 1847 from the AJC Bose Indian Botanic Garden (22.970°N, 88.465°E). Both the species were observed within a span of three months.

### Diagnostic characters of the species:

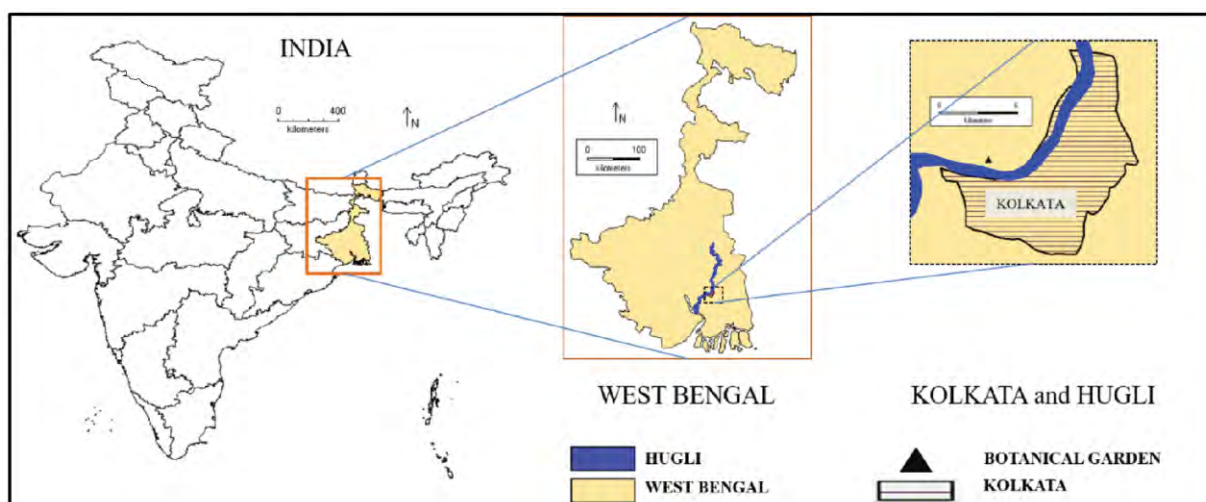
Quite identical to the Indian Jezebel *Delias eucharis* Drury, the Painted Jezebel *D. hyparete* is more lightly marked. The under-hindwing basal yellow marks does not reach the row of red marginal spots. The spots are ringed and the red marginal

row is outwardly bordered by black margins (Kehimkar 2016).

*Charaxes psaphon* has a tawny upper forewing with broad black terminal border. The upper hindwing has a black terminal border broad near the apex, tapering towards the lower tip, in a series of black-edged white spots (Kehimkar 2016).

### Previous distributional range of the

**species:** *Delias hyparete* has been reported from Andhra Pradesh, Arunachal Pradesh, Chattisgarh, north eastern Maharashtra, Orissa, Tamil Nadu, Uttarakhand, and north eastern part of West Bengal (Chandra et al. 2007; Anonymous 2018; Sondhi & Kunte 2018). Outside the country, *D. hyparete* has been recorded from many parts of Malaysia, Thailand, Nepal and Bangladesh

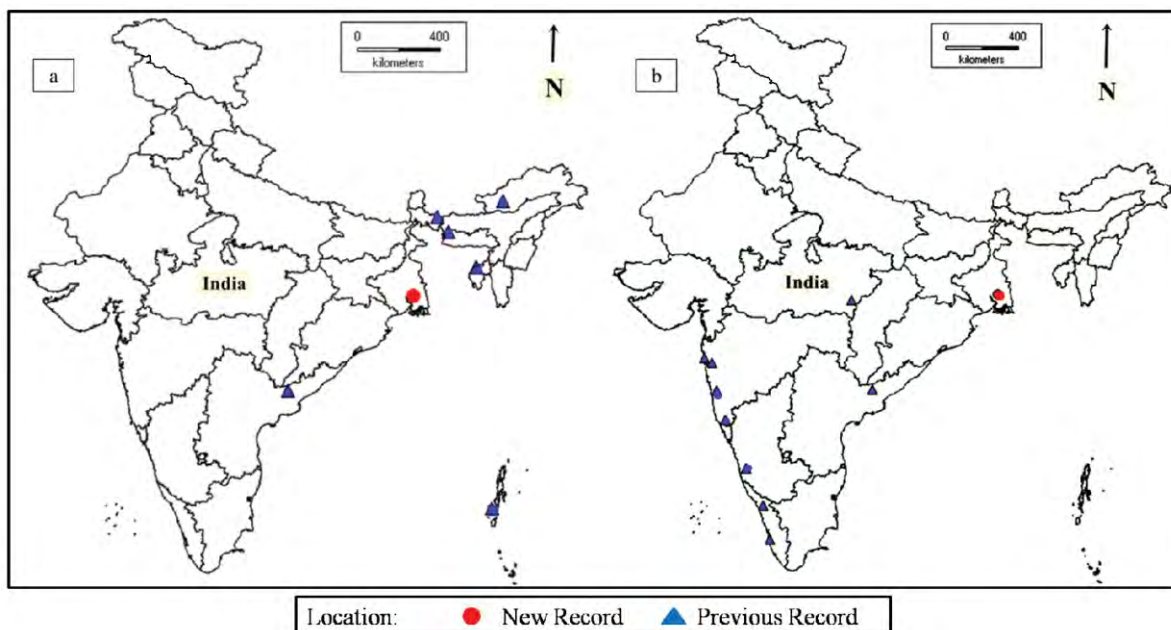


Location of AJC Bose Botanical Garden provide updated India map.

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Previous and new record distribution of a. *Delias hyparete* L. b. *Charaxes psaphon* Westwood provide updated India map.

(Khandokar et al. 2013; Khan et al. 2011; Bhusal & Khanal 2008; Hutacharern & Tubtim 1995). The nearest distribution record of *C. psaphon* is Alipurduar District, West Bengal, which is nearly 750kms away from the present record (Kunte et al. 2019).

*C. psaphon* has been recorded from SriLanka (Evans 1932; Perera & Bambaradeniya 2006; van der Poorten 2012) and the western coast of India (Tiple 2010). Reports by Khandokar et al. (2013) shows the presence of the species in many regions of Bangladesh. Due to the insufficiency of documentation from Singhbhum district of Jharkhand, a specimen of *Charaxes* sp. was uncertain whether it was *C. psaphon* or *C. bernardus* (Singh 2010). Very recently, it was reported

from Puruliya District, West Bengal, which is nearly 300km away from the present record (Kunte et al. 2019).

The previous distributional records (Anonymous 2018; Churi 2018) of both the species are well portrayed in the maps pictorially explained.

**Discussion:** Spotting such species away from its previous recorded regions hints on expansion of ecological range, especially worth noting for *C. psaphon* as Kehimkar (2016) stated that *C. psaphon* is restricted to peninsular India up to Odisha, but our report clearly hints on its extension. The assessment, occurrence, and characteristics of the fauna, provide crucial information about the environmental quality



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of a particular region of ecosystem, as they are sensitive to minute level of ecological changes. Their distribution depends upon habitat structure and availability of their food plants (Abideen et al. 2015). Changes in abundance and distribution of butterflies are linked to a wide range of factors including habitat loss and fragmentation, land use and climate changes (Thomas et al. 1998). Hence, reporting the sighting of these bioindicator species is essential.

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# Induced breeding of Iridescent Shark at the National Zoological Gardens, Sri Lanka



Adult Catfish *Pangasainodon hypophthalmus* in aquarium, National Zoological Garden, Dehiwala.

Striped Catfish or Iridescent Shark *Pangasianodon hypophthalmus* is a highly popular omnivorous fish with a high growth rate. They are schooling fish which makes a delightful display in an aquarium. This fish does not reproduce in natural or captive environments in Sri Lanka. Therefore, they have to be induced using artificial techniques in order to get offsprings. This study was conducted to explore the potential of captive breeding of Striped Catfish using artificial induce technique.

Broodstocks with an average length of 35cm were collected from the holding tanks of the National Zoological Garden (NZG), Dehiwala. Once the gravid females and males were identified, they were subjected to hormone treatment. Separate

hormonal treatments of the synthetic hormone Ovaprim was given to the males and females. Two doses of 0.5ml/kg were given to the females in an interval of six hours and the males was given one dose of 0.5ml/kg body weight at the time of the second injection given to the female. Stripping was considered as it is the best technique to fertilize the eggs and the dry method of egg fertilization was followed in trials. The fish responded positively and ovulated within 5–6 hours after the second injection. An average of 150,000 eggs were recovered from the female. Fertilization rate ranged from 85–95%. The hatching period ranged from 24 to 26 hours at a water temperature of 28–32°C. After 10 days, a black body colour appeared in the hatchlings and they started to feed rapidly on Artemia and egg yolk.

The results of the present study would help the hatchery managers in managing the induced breeding programs of *P. hypophthalmus* and other catfishes. It will help to fulfil the rising demand for Striped Catfish in ornamental culture trade.

The Iridescent Shark *Pangasianodon hypophthalmus* is a species of Shark Catfish (family Pangasiidae) native to the rivers of southeast Asia.

Iridescent Sharks originate from the large rivers Chao, Phraya and Mekong in Asia, though they have been introduced into other rivers for aquaculture. They are freshwater fish that natively live in tropical climate and prefer water with a 6.5–7.5 pH. The fins are dark grey or black. Juveniles have a black stripe along the lateral line and a second black stripe below the lateral line; they have a shiny, iridescent color that gives these fish their name. However, large adults are uniformly grey and lack the striping. Adults reach up to 130cm (4 ft) in length and can weigh up to a maximum of 44kgs (97 lb).

**Methods**

Breeding and hatching experiments were carried out in the NZG, Dehiwala. Male



**Injecting *Pangasainodon hypophthalmus* with Ovaprim.**

**Table 1. Physio-chemical parameters during the breeding experiments at NZG, Dehiwala.**

Name of the parameter	Value
Dissolve oxygen (mg/l)	4.2
Air temperature (°C)	30.5
Water temperature (°C)	29
Salinity (ppt)	0
Weather	Sunny

and female brooders were selected from the aquarium of the NZG. Physio-chemical parameters of the water were analyzed before the experiment. For inducing breeding, mature and gravid males and females were selected in the age group of 2.5(+) years. Ovaprim was administered at 0.5ml/kg to the females twice and 0.5ml/kg once to the male brooders. Injected brooders were kept in cemented breeding tanks of size (4×2×1 m) with flowing water. The fish responded positively and ovulated within 5–6 hours after the second injection.

**Result**

Physio-chemical parameters of the water during the breeding experiments have been summarized in Table 1. Results of the breeding trails on *P. hypothalamus* conducted at the NZG have been summarized in Table 2.

**Conclusion**

A single preparatory and decisive Ovaprim dose of 0.5 mL/kg body weight for females and single Ovaprim dose of 0.5 ml/kg for males succeeded in induced breeding of *Pangasianodon hypophthalmus*. It can produce viable eggs with high fertility.

**Discussion**

Catfishes have also been induced bred through similar preparations/drugs. There

**Table 2. Induced breeding experiment conducted on *P. hypothalamus* at National Zoological Garden, Dehiwala.**

	Number	Weight	Ovaprim 1st dose (ml)	Ovaprim 2nd dose (ml)	Total number of eggs stripped	Total number of fertilized eggs	Fertilization %
Female	No 1	3.20	1.6	1.6	170,000	150,000	88%
	No 2	2.80	1.4	1.4	160,000	140,000	87.5%
	No 3	2.90	1.45	1.45	130,000	100,000	76%
	No 4	3.30	1.65	1.65	140,000	90,000	64%
Male	No 1	3.00	-	1.50			
<b>Total</b>					<b>600,000</b>	<b>480,000</b>	



**Developmental stages of Induced breeding experiment conducted on *P. hypothalamus* at NZG, Dehiwala. (a) Hatchling after 36 of hatching, (b) Fingerling after 2 days, (c) fingerlings after 4 days (d) fingerlings after 15 days.**

exists report that the striped catfish has been bred successfully in Mekong Delta region of Vietnam by using high doses of human chorionic gonadotropin (HCG) (Bui et al. 2010). Since the culture of *P. hypothalamus* is profitable among the catfishes, there exists more demand of

this species for aquaculture in India and tropical regions of America for sustainable aquaculture (Rahman et al. 2006; Lakra & Singh 2010). Vietnam has already shown the record production (1.0–1.5 million tonne per annum) of this species (Nguyen 2007). Though the Striped Catfish

**Table 3. Different feed given to *P. hypothalamus* which hatched after the process.**

Date	Average length of hatchling (mm)	Feed	How many times per day
02.03.2015	5	Egg yolk	4 times
04.03.2015	7	Egg yolk, artemia	4 times
06.03.2015	10	Egg yolk, artemia	4 times
08.03.2015	15	Egg yolk, artemia	3 times
15.03.2015	20	Artemia, Grinded meat	3 times
20.03.2015	30	Artemia, Grinded meat	3 times
10.04.2015	50	Grinded meat, commercial fish feed	2 times

is widely cultured in China, Vietnam, Thailand, Taiwan, Philippines, Cambodia, Indonesia, Lao People's Democratic Republic, Bangladesh, Nepal and India (Griffith et al. 2010), this species has been declared "Endangered" in Vietnam due to overexploitation, habitat degradation, changes in flow and water quality as well as over-harvesting of eggs, fry and juveniles for aquarium trade (Vidthayanon & Hogan 2013; Anon 2014). The success achieved in induced spawning and seed (150,000) production of *P. hypothalamus* through ovaprim in the NZG, Sri Lanka will pave the way for mass seed production of this species for conservation aquaculture (True et al. 1996; Anders 1998) which will reduce the pressure on collection of fry and juveniles from the wild natural habitats (Nguyen 2009).

These animals show cannibalism in the nursery tank, which indicates that a low stocking rate of hatchlings and frequent feeding is necessary for the stages. High frequency feeding rate can lead to rapid water quality deterioration that would

lead to high mortality rates of the animals. Frequent water changes must be done for the survival of the animals.

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## Collaborative efforts to commemorate International Vulture Awareness Day

International Vulture Awareness Day (IVAD) is celebrated on the first Saturday of September all over the world. Vultures are facing serious threats and are declining not only in India but in all other range countries as well. Four species in India are listed as Critically Endangered (*Gyps indicus*, *Gyps bengalensis*, *Gyps tenuirostris* and *Sarcogyps calvus*). To commemorate the day, Indian Biodiversity Conservation Society (IBCS) started the event a couple of days before so as to involve maximum number of participants particularly the younger generation. To achieve the target, IBCS collaborated with various Government and Non-Government organizations like Department of Basic Education, Arohan Foundation-Allahabad, Manav Organization-Lalitpur, Paryavaran Jeev Seva Sansthan-

Gonda and Society for Scientific Research-Barabanki.

Various events such as poem writing, slogan writing, painting, quiz and coloring vulture sheets were organized to sensitize the participants. These events were organized in Government schools of Lalitpur, Ambedkarnagar and Jhansi in Uttar Pradesh and Niwari in Madhya Pradesh. Arohan Organization celebrated the event with the underprivileged students in Allahabad-Uttar Pradesh. Awareness material (Booklets, flyers and wall posters) all based on vultures, was distributed to the participants.

To reach out maximum number of students, IVAD was also celebrated in District Institute



**International Vulture Awareness Day celebration in Government School - Sarawan Ramnagar-Ambedkarnagar, U.P.**



**IVAD celebration in DIET-Jhansi, U.P.**

of education and Training, Jhansi. About 80 trainees in Basic Training Certificate (BTC) participated in the event. A powerpoint presentation was given on “Conservation and Management of vanishing skylords”. Based on the presentation, a quiz was organized for them. The winners were felicitated for the same. As a part of certificate course, these trainees will join various schools for teaching and will disseminate the message of vulture conservation to the students. To create awareness and spread the message about IVAD, press media and social media were also involved. The news was published in various local newspapers in local language so that maximum readers know about vultures and their importance.

**Submitted by: Sonika Kushwaha and Akhilesh Kumar, Indian Biodiversity Conservation Society, Jhansi-Uttar Pradesh.  
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## Capacity Building Workshop for Zoo-Keepers on Husbandry and Management of Reptiles in Zoos of Western & Central India

Sundarvan organised a 3-day workshop from 25th to 27th June on Capacity Building for Zookeepers on Husbandry and Management of Reptiles wherein 28 zookeepers from 15 different zoos of Rajasthan, Madhya Pradesh, Gujarat and Maharashtra have participated. This workshop was fully funded and Supported by Central Zoo Authority (CZA) and Gujarat Council on Science and Technology (GUJCOST).

The first day of the workshop commenced with the talk on introduction of Sundarvan Nature Discovery Centre describing its set up, aim, objectives and history. This was followed by inauguration of the event by Dr. R.K. Sahu, Director of Kamla Nehru Zoological Garden, Kankaria, Ahmedabad, the Chief Guest of the workshop. A session on guidelines of Central Zoo Authority of India (CZA) and role of Zoo Keepers was conducted by Dr. Naim Akhtar, Manager Sundarvan which had deliberation on types of zoos, their categories, rules and others guidelines and duties of a zoo keeper.



**Brief orientation talk on Reptiles**



**Zoo Management tips given by Park Manager**

Thereafter group activities were conducted to discuss and share their experience about snakes enclosures, manpower engaged, husbandry protocols and animal behaviour. Additionally, groups put forward the various challenges that they face in management of animals on routine basis and shared the solutions which they often adopt.

The afternoon session began with a talk on snake awareness and field exercises on handling and restraining techniques for snakes and other reptiles. There was demonstration of various equipments generally used to rescue snakes. Myths associated with snakes were discussed and the knowledge of Zoo Keepers was enlightened in bringing the real facts. The second half of the afternoon session was an interactive session on encouraging the participants to share the information on a particular species that they have worked with as an exercise of Keeper's Talk to demonstrate their ability to work as Educator in zoo for the common visitors. The objective of this session was to train



**Cleaning of enclosures by participants.**

the participants on how to address the visitors of zoo with interesting facts & information which may help in conservation and protection of that particular species. It helped them to sharpen their communication skills on imparting education and awareness.

Group activities on reptiles such as Turtles, Tortoises, Crocodiles and Lizards were carried out on 2nd day and participants shared their knowledge and experience on husbandry and management of these species. Dr. Raju Vyas shared his life long experience of Vadodara zoo where he had worked on reptiles as Animal Keeper initially and later as Zoo Inspector. He made it as an interactive talk on Husbandry and Management of reptiles in zoo. He shared his valuable experience with the participants. The second half of the day was a field exposure trip to the Kamla Nehru Zoological Garden, Kankaria, Ahmedabad. There was a session organized by Dr. R.K. Sahu in his office where he talked about role of Zoo Keepers and handling and transportation of reptiles. He emphasized the importance of the Zoo Keepers in present scenario where many of the reptiles are threatened. A visit to

new and old reptile house was organized to show existing housing of reptiles and their upkeep. Difference in old and new reptiles house was realized & experienced by the participants as it was shown perfectly. Knowledge on upkeep, housing and management was passed to the participants through live demonstration and interactive discussion. Dr. Sharva Shah, Veterinary officer of Zoo explained about the practices done under veterinary care for reptiles and what are the common symptoms of diseases of reptiles.

The last day was to impart hands on training & experiences of managing reptile cages and enclosures at Sundarvan and concluded with a certificate distribution. Since the motto of this workshop was 'Learning and Sharing,' it was given an opportunity for the participants to interact with each other and share their experiences. In fact, it had happened and participant really had a good experience of learning and sharing on reptiles husbandry and management.



**Group Photo of the participants**

**Submitted by: Deep Shah, Education Officer and Naim Akhtar, Park Manager, Sundarvan.**

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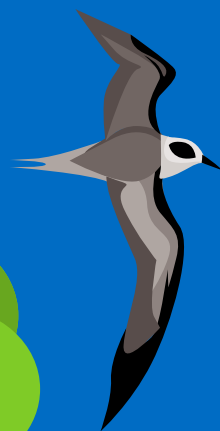
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**Type** — Articles of semi-scientific or technical nature. News, notes, announcements of interest to conservation community and personal opinion pieces.

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