NATURAL DISTRIBUTION AND ECOLOGICAL STATUS OF NON-HUMAN PRIMATES IN ARUNACHAL PRADESH

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Introduction

Arunachal Pradesh "The land of the rising sun" is blessed with rich forest resources having multitudinal bio-types of flora and fauna - coexisting in this vast territory (Roy, 1987). It is situated between the latitudes of 26° 28' N and 29° 31' N Longitude of 91° 30' E and 97° 30'E. Physio-geographically this State is having Units of Eastern Himalayan. It is the largest State in the North-Eastern part of our country having an area of 83,578 km^2, located mainly in hilly and mountainous terrain (Thapliyal, 1991). This magnificent land is bounded in the North by McMohan line, in the South by the States of Assam and Nagaland, in the east by China and Myanmer (Burma) and in the West by Bhutan. The State is sparsely populated having a total population of 8,58,392 (1991 census) consisting mainly of tribal population having more than 100 tribes.

From an elevation 100 m in the foothills region, the area passes through a series of hills and ranges of mountains and rises upto the height of about 6,000 m.

The annual rainfall varies from 100 mm to 6000 mm spread over 8-9 months. This well distributed precipitation with high humidity rising upto 90% is conducive to the luxurious growth of the forests in the foot-hills. This is the only State in the North-Eastern India which contains the Himalayas, Shiwalik and Patkoi hill ranges (Thapliyal, 1991).

There are tropical semi-evergreen, tropical evergreen, sub-tropical broad leaved, sub-tropical pine, temperate broad leaved, temperate confier and alpine forests (Haridasan *et al.*, 1990).

These varying agro-climatic and altitudinal conditions from tropical to alpine climate offer congenial condition for growing wide range of flora thereby giving good shelter, fodder etc. to varieties of wildlife.

Zoogeographically, the wildlife of Arunachal Pradesh can be categorised under palaeartic Indo-Chinese and Indo-Malayan elements of which Non-human primates are of special interest for a variety of reasons like fur, food for tribal and other related ethnobiological reasons.

The present paper deals with the studies on the distribution and ecological status of Non-human primates of Arunachal Pradesh during the survey on Tribal custome and culture with relation to ethnobiological and ecological aspects. The authors, individually have been studying the problems for the past few years.

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Observation

Out of 6 genera having 16 species (Khajuria, 1980, mentioned 17 species as he included the Barbe's monkey, *Presbytis berbei* which is uncertain) within India, 5 genera and 11 species are found in North Eastern India of which 4 genera and 7 species (and one likely i.e. *Rhinopithecus roxellanae)* are found in this State.

The biodiversity of these primates is also of great interest. The *Hylobates hoolock* are confined to tropical semi-evergreen, wet-evergreen and moist deciduous forests of Tirap and Changlang Districts extending to the semi-evergreen and moist deciduous forests of Lohit and Dibang Valley Districts upto the river Dibang. The *Macaca namestrina* (which is common in Nagaland) and the *Macaca arctoides* are also reported in the same forest types of Tirap and Changlang districts. Other primates - *Macaca mulatta, Macaca assamensis* and *Presbytis pileatus* are found in tropical semi-evergreen, moist deciduous, sub-tropical, temperate forests of all districts and wet-evergreen forests of Tirap and Changlang Districts but the *Presbytis pileatus* are more common in dense evergreen and deciduous hills forests with more streams and gentle slope but this langur is not found in the strip of country between the rivers Dibang and Siang. Though, the *Nycticebus coucang* is rare, it is randomly found through out the State but more common in the dense tropical rain forests.

Review of Literature

It was Von Zimmermann (1780) who first worked on Non-human Primates in North East India, (North Kamrup, Assam) including Arunachal Pradesh while identifying the *Macaca mulatta* however, referring to it as *Cercopithecus mulatta.* It was followed by many authors like Lacepede (1800, 1831) who studies slow Loris in Eastern India (Assam, Nagaland); Geoffray (1831) on *Macaca arctoides* in Eastern India (Assam); Harlon (1834) on *Simia hoolock (Hylobates hoolock);* Mc Clelland (1839-1840) on *Macaca assamensis* in Eastern India (Assam, Mishmi and Naga hills; Hodgson (1840) in Sikkim; Hinton and Wroughton (1840) in Assam and Nagahills; Blyth (1843) who reported *Prebytis pileatus pileatus* from Meghalaya and Nagaland; Blandford (1888-91); Wroughton (1914-1916) who studied the Langurs of Assam (Northern Assam-Seajulia, Dafla Hills and North Lakhimpur) and reported the *Presbytis pileatus brahma* and *P.p. durga* from Naga Hills and Tripura; Hinton (1923) who reported *P. p. tenebricus* from Assam north of the Brahmaputra river; Honton and Linsay (1926) who studied the Primates of Assam and Mishmi Hills; Pocock (1931) who reported *Macaca namestrina blythii* from Naga hills; Mc Cann (1933) on Hollock gibbon in Garo Hills and Naga hills; Roonwal (1949, 1950) in Manipur State and Assam; Gee (1952) who reported the probable occurrence of the Snub-nosed Monkey (*Rhinopithecus roxellanae*) in Northern Assam Manipur; Gee (1955) reported a new species of Langur from Assam; and Khajuria (1956 b) who named this new species as *Presbytis geei.* However, Pemberton (1938) reported the sighting of this new species by one Mr. Griffith who saw white monkey near Tongbo in Central Bhutan which is the earliest available published work and this was confirmed by Saha (1980) that these monkeys were really Golden Langur.

Some of the important workers are Achard (1961), Acharjyo and Mishra (1973);

Table 1

*Distribution of Indian Non-Human Primates in North East India and Arunachal Pradesh**

English common names	Zoological names	Distribution in N.E. Region of India	Distribution in Arunachal Pradesh	Remarks
1	2	3	4	5
(A) Lorisidae :				
1. Slender Loris	*Loris tardigradus* (Linnaeus, 1758)	None	None	
2. Slow Loris	*Nycticebus coucang* (Boddaert, 1785)	Assam, Arunachal Pradesh, Nagaland, Tripura, Meghalaya and Sikkim	Throughout the State	
(B) Cercopithecidae :				
3. Stump-tailed Macaque	*Macaca arctoides* (I. Geoggroy, 1831)	Arunachal Pradesh, Assam, Nagaland and Meghalaya	Tirap, Changlang and Lohit Districts	
4. Assamese Macaque	*Macaca assamensis* (Mc Clelland, 1840)	Throughout the N.E. Region	Throughout the State	Doubtful in Towang Distt
5. Long-tailed Macaque	*Macaca fascicularis* (Raffles, 1821)	None	None	
6. Rhesus Macaque	*Macaca mulatta* (Zimmermann, 1780)	Throughout the N.E. Region	Throughout the State	
7. Pig-tailed Macaque	*Macaca nemestrina* (Linnaeus, 1766)	Nagaland and Arunachal Pradesh	Tirap, Changlang and Lohit District	
8. Bonnet Macaque	*Macaca radiata* (E. Geoffroy, 1812)	None	None	
9. Lion-tailed Macaque	*Macaca silenus* (Linnaeus, 1758)	None	None	

(Contd...)

1	2	3	4	5
(C) Colobidae :				
10. Hanuman langur	*Presbytis entellus* (Defresne, 1797)	Tripura and Sikkim	None	
11. Golden langur	*Presbytis geei* (Khajuria, 1955)	Assam (North-Western Assam in the strip of country between the rivers Sankosh and Manas and South Central Bhutan upto 1,600 m	None	
12. Nilgiri langur	*Presbytis johni* (Fisher, 1829)	None	None	
13. Phayre's leaf Monkey	*Presbytis phayrei* (Blyth, 1847)	Tripura and Assam	None	
14. Capped langur	*Presbytis pileatus* (Blyth, 1843)	Throughout the N.E. Region	Throughout the State except the strip of country between the rivers Dibang and Siang	
15. Snub-nosed Monkey	*Rhinopithecus roxellanae* (Milne-Edwards, 1870)	Manipur, Northern Assam and probably Nagaland and Arunachal Pradesh	Probably Tirap and Changlang Districts	
(D) Hylobatidae				
16. Hoolock gibbon	*Hylobates hoolock* (Harlan, 1834)	Arunachal Pradesh, Assam, Tripura, Mizoram, Manipur, Meghalaya and Nagaland	Tirap, Changlang, Lohit and Dibang Valley Districts	

*Barbe's leaf monkey - *Presbytis barbei*, Blyth, is being excluded as its status is uncertain.

Alfred and Sati (1989); Biswas (1967), who clarified Khajuria as author of *P. geei;* Biswas and Tiwari (1970); Chatterjee and Chandiramani (1986); Chatterjee (1989); Choudhury (1989); BNHS (1953 a); Ellerman and Morrison-Scott (1951); Gee (1961); Ghosh and Biswas (1976); Groves (1979 a); Higging (1933-34); Julka (1974-75); Khajuria (1962, 1966, 1975, 1977, 1978, 1980, 1981, 1989); Kurup (1965, 1968, 1974, 1980, 1982); Mohnot (1980); Mukherjee (1974, 1978, 1980); Mukherjee and Saha (1974, 1978); Nair (1981); Person (1941); Roonwal (1948, 1949, 1950); Roonwal and Mohnot (1977); Roonwal and Nath (1949); Tilson (1979); Warye (1927-28, 1968); Bertrand (1969) and Agrawal (1974).

Though many authors have worked on the Primates in North Eastern India, there are few authors - Mc Clelland (1839-40); Wroughton (1914-1916); Honton and Linsay (1926); Person (1941); Julka (1974-75); Mohnot (1980); Nair (1981); Chatterjee (1986); Chatterjee and Chandiramani (1986); Mehta (1987); Chaudhury (1989); and Thapliyal (1991); who worked on the Primates in Arunachal Pradesh. Even many fragmentary notes in Magazines, News papers etc. are also available. These informations however, are not much informative for the purpose and are scattered here and there. Thus a comprehensive account is lacking.

Brief Review of Ecological Informations

The present authors attempt to study the Primates of Arunachal Pradesh in this paper and present the ecological status in the Wild and captivity below:

1. Nycticebus coucang

Habitat : Usually found in dense tropical rain forests, resting in hole in trees, crevices, bushes during the day time.

Food : Insects, fruits, tender leaves and shoots. In captivity it also feeds on breads, grains etc.

Reproduction : No well-defined breeding season. Usually a single young is born after a gestation period of 193 days (Manley, 1966a). Young weaned after 9-10 months after which it is fully grown.

Enemies : Not known.

Notes : When Sleep, curled like a ball hiding its head and eyes in lapse. Savage when disturbed growling like a cat and bites when approached (The observation made in captivity).

2. Macaca arctoides

Habitat : Tropical wet evergreen and moist deciduous forests, mostly terrestrial.

Food : Fruit, leaves, grass, leaves, roots, tender stem preferably the pith, insects, spider, flower parts, seed etc. In captivity it also feeds on sweets, milk, bread, gram, rice etc.

Enemies : Leopard and Python.

Notes : Likes swinging in swinging rope. When seated in a corner it bends forward and then raises the body kicking the head. When human adult female approached a long captive male monkey it holds scrotum and penis jerking with hand and tried to approach her and sometimes masturbates.

3. Macaca assamensis

Habitat : Predominantly terrestrial in

heavy forests and sometimes in Bamboo of Himalayas upto the altitude of about 2,500 m.

Food : Fruits, grass leaves, tender leaves and stem preferably the pith, insects, spider, crops, flower parts, etc. In captivity it also feed on rice, bread, gram, milk, sweets.

Enemies : Leopard, Python and Tiger.

Notes : The Lepchas and most of tribal people of Arunachal Pradesh hunt for food and medicinal uses. The Adi (Abor) tribe of Arunachal Pradesh eat the flesh during the epidemic diseases. The palm or fingers or skull are hung above the main door of house by Adi tribes.

4. **Macaca mulatta**

Habitat : Highly adaptable and wide distributed in present form of tropic to temperate zone, in mountain, human settlements, predominantly terrestrial.

Food : As *Macaca assamensis.*

Enemies : Tiger and Leopard.

Notes : As *Macaca assamensis,* it has wide variety of habitats, including villages, town, farms, forests, mountain etc. However its visit to town or villages is negligible.

5. **Macaca nemestrina**

Habitat : Terrestrial and arboreal, tropical rain forests.

Reproduction : Usually single young after about 170 days of gestation period.

Notes : It is rarely reported from Changlang and Tirap Districts of Arunachal Pradesh. Stock decreasing rapidly and most severely threatened. According to Khajuria (1980), gives out a short note like "Kang".

6. **Presbytis pileatus**

Habitat : Tropical semi-evergreen, wet-evergreen, deciduous forests and sometimes sub-tropical hills with many streams and is almost entirely arboreal. It is distributed throughout North Eastern Indian, Bangladesh (Chittagong hills) and Northern Burma.

Food : Leaves, buds, fruits and floral parts.

Reproduction : Usually a single young at birth in winter season.

Notes : In dry season it descend to the ground to drink water in streams but in rainy season does not descend at all. In the evening the groups aggregate in a site preferably near streams or river and sloping hills where the other side is open.

7. **Rhinopithecus roxellanea**

Notes : It is a Chinese species which strays into the higher altitudes in Manipur and North Eastern Assam and probably in Nagaland and Arunachal Pradesh adjoining to China border. The Indian records have, however, been questioned by some workers on ground of having been possibly confused with the golden langur, *Presbytis geei* which has a similar appearance (Roonwal, 1989).

8. **Hylobates hoolock**

Habitat : Dense tropical semi-evergreen, wet-evergreen and moist deciduous forests.

Food : Leaves, insects, grubs, flowers, fruits preferably *Ficus* species, terminal buds.

Reproduction : Mating was noted in the month of May to August and young born in the month of December to March.

Enemies : Tiger, Leopard and Python.

Notes : It is the ape only found in India and is the State animal of Arunachal Pradesh. Has distinctive build of ape, tailless with much longer upper limbs. Very expert in acrobatics, swinging branch to branch. In the early dusk it begins to howl. One starts, the rest follow the call ceasing in the late dusk. In the evening they again start to call. Occasional calls during day time also heard in Namdapha National Park and nearby Roing Township (Dibang Valley District).

Discussion

Biodiversity and distribution : Owing to the varying agro-climatic and altitudinal conditions there is a great diversity of forest vegetation resulting in the abundance of food plants which influences faunastic diversification in this State. This diversity is best represented by the non-human primates in India (Mohnot, 1980) of which the primates of Arunachal Pradesh are a glittering example.

The biodiversity of these primates is of great interest. In Arunachal Pradesh, the *Hylobates hoolock* are confined to tropical semi-evergreen, wet-evergreen and moist deciduous forests of Tirap and Changlang Districts extending to the semi-evergreen and moist deciduous forest of Lohit and Dibang Valley District upto the river Dibang. Dr. J. M. Julka of ZSI reported the presence of this gibbon in Subansiri District in his report of the Subansiri Expedition in 1974-75. But the present authors found no evidence of its presence in this area. Persons (1941 a, b) also noticed its absence in the North Bank of Lohit-Brahmputra river system and this ape is only found in the South Bank of the system. The *Macaca nemestrina* and *Macaca arctoides* inhabits the tropical wet moist and semi-evergreen forests of Tirap and Changlang Districts extending upto the South Bank of river Lohit of Lohit District in the same forest type. It is interesting to note that the *Macaca arctoides* and *Macaca nemestrina* are found in the region where political unrest and active hostilities have prevailed for decades. The *Nycticebus caucang* is more restricted in the dense tropical rain forests. The *Presbytis pileatus* lives in dense evergreen forests and deciduous forest with many streams in all districts except the strip of country between the rivers Dibang and Siang.

The *Macaca mulatta* occurs from low-lying land to the foot of the Himalayas at elevation upto 3,000 m. Within its wide range of distribution it exhibits considerable adaptability. It has wide variety of habitats, including villages, town, farms, forests, mountains etc. However its visit to towns or villages is negligible as the area has abundance of food plants round the year. The habitats of *Macaca assamensis* are almost same as that of *Macaca mulatta*. Amongs them the *Macaca mulatta* is the most common primate followed by *Macaca assamensis* and *Presbytis pileatus*. Though, *Nycticebus caucang* is rare, it is randomly found throughout the State.

There are few reports (Julka, 1974-75; Nair, 1981: Chattarjee and Chandiramani, 1986; Mehta, 1987; Chatterjee, 1989) which

list the occurrance of common langur (*Presbytis entellus*), in the State which is actually not found even in the region (Choudhury, 1989) except in Tripura and Sikkim. (Kaveri, Personal Communication, 1992). The *Rhinopithecus roxellanae,* a Chinese species also have been reported in North East Region (Manipur and Northern Assam) by Roonwal and Mohnot (1977) and Roonwal (1989) which strays into the higher altitudes in Eastern India (Manipur and Northern Assam). So there is a probability of occurrance of this species in Tirap and Changlang Districts of Arunachal Pradesh as the area falls in the same mountain ranges with same type of forests and physiography. According to Roonwal (1989) the Indian records of this species have, however been questioned by some workers on ground of having been possibly confused with the Golden Langur (*Presbytis geei*) which has a similar appearance. But there is no question of confusion, as the former species having larger limbs, much shorter tail, darker coloured back and lighter coloured under parts while the later species having slimmer limbs, much longer and bushy tail, lighter back and darker under parts with whorled fore head. The *Presbytis geei* is only restricted in the strip of country between the rivers Sankosh and Manas and South Central Bhutan in the northern limits and Raimona forests range of Goalpara District of Assam in the Southern Limits (Khajuria, 1989)

Threatening factors: Arunachal Pradesh is a State of hilly terrain and overlapping mountain ranges with perrenial and torrential streams and rivers covered with mostly tropical and sub-tropical moist evergreen vergin forests where the people are still practising primitive methods of cultivation and hunting. For the past 15-20 years the tremendous development has been flourishing in this State. Such human activities and interferences has been disturbing the virginity and balanced ecology of its forests due to which the Indian bison, the black panther, the musk deer etc. are on the verge of extinction in this State. The effects of such activities on non-human primates can be discussed as follows:

(a) *Jhuming cultivation* : The jhuming patterns of tribes to tribes vary. Among the Mishmi, Adi (Ador) etc. the whole villagers collectively select the jhuming site for the year and move to another site of next cycle. The abandoned fallow land is left undisturbed for 10-15 years and cultivated again when next cycle comes. The burning of slashed debris is so careful so that the fire do not catch the nearby live forests. Among some other tribes the site is selected family-wise on their own wish with or without specific cycle and with less careful burning. Hence the sites are randomised and scattered. The former pattern is more scientific and has less disturbances to the environment hence wildlife movement is specific and less disturbed and whereas latter pattern is otherwise.

(b) *Hunting* : The tribal people of Arunachal Pradesh are more concentrated in hunting of rodents, deer, pigs, wild oxen, bears and birds. Primates are hunted occasionally for medicinal use during the epidemic, sometimes killed when they raid the crops. It is not hunted for supplement of food or meat. Hence the hunting does not pose serious threat to the primate population.

(c) *Developmental activities* : Construction of dams, roads, urbanization etc. cause deforestation in large scale. Such development in hilly and mountain areas is more destructive causing more erosion and

deforestation. Establishment of forest based industry which is the main source of the State revenue is the main cause of deforestation but causing limited extent. However such effects are not profound at higher elevation. So disturbances on ecological niche of Wildlife is less. Moreover due to the activities of Arunachal Forest Department, the local people are getting more awareness towards the importance of ecology and environment and tree planting.

(d) *Others* : The stump-tailed Macaque and pig-tailed Macaque are considered to be seriously threatened and unfortunately it is at home in a region where political unrest and active hostilities have prevailed for decades. They seems to have migrated from the neighbouring State/Countries (probably Nagaland and Burma) to Tirap and Changlang Districts of Arunachal Pradesh where few activities of hostilities or warfare are reported recently.

Flash flood causing erosion is more prevalent in the State. It also poses threat to some extent.

Conclusion

Owing to the great diversity of forest vegetation there is a great diversity of non-human primates in Arunachal Pradesh which is of great interest. As the State is covered with mostly tropical and sub-tropical moist evergreen forests with perrenial and torrential streams and rivers it serves for best ecological niche for primates ensuring their survival.

The *Macaca mulatta* is the most common primate with considerable adaptation to most of the ecological conditions followed by *Macaca assamensis* and *Presbytis pileatus*. The *Presbytis pileatus* is found all over the State except the strip of country between the rivers Dibang and Siang. It seems that this primate might have migrated from the neighbouring States and countries (Burma, Nagaland, Assam, Bhutan) and could not cross the rivers Siang and Dibang to colonise the area. The *Hylobates hoolock* also seems to be migrated from Assam and most probably from Burma as it is found only in the South Bank of Lohit-Brahmaputra system upto the river Dibang as its Southern limit. The *Nycticebus caucang* is though rare it is randomly found throughout the State. The *Macaca nemestrina* is the rarest species followed by the *Macaca arctoides* in the State. It is peculiar to note that the both species are restricted to home range where political unrest and warfare have prevailed for the decades. As few reports are found on *Rhinopithecus roxellanae* which strays into the higher altitudes in Manipur and Assam including Sylhet in Bangladesh, there is probability of occurrance in Tirap and Changlang Districts of Arunachal Pradesh and Nagaland. The *Presbytis entellus* is not actually found in the State even in North East Region of India except the few reports in Tripura and Sikkim.

As the monkey hunting is not much significant the hunting activities do not posses threat to its population as this activity can be considered as one of normal ways of biotic-abiotic interaction. In the Jhuming cultivation and forest produce extraction though the deforestation is not much profound these are the most threatening factor in the State. The more scientific jhuming is less threatening than the unscietific jhuming as in the former much precautions are applied.

However, as the population is increasing day by day this small threat may turn

into big threat, the people's awareness and active participation in the conservation of wildlife is strongly needed. As our State is the one of the rich in tropical and sub-tropical moist evergreen forests which provides a best ecological niche for the primates it gives glittering example for Roonwal and Mohnot's (1977) remarks "Primates are confined today to the tropical and sub-tropical regions of both the old and the New World, roughly between 40° North Latitude and 40° South Latitude".

Further detailed exploration studies would be rewarding by helping to understand the distribution and ecology of non-human primate.

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SUMMARY

The paper deals with the natural distribution and ecological status of non-human primates in Arunachal Pradesh. The biodiversity, distribution and threatening factors have been highlighted. 4 genera and 7 species (and one likely i.e. *Rhinopithecus roxellanae*, **Milne-Edwards) are reported. The primates are not much threatend in Arunachal Pradesh except the stump-tailed and the pig-tailed Macaques. Further detailed investigation is urgently needed which will contribute more information to the Indian Primatology.**

अरुणाचल प्रदेश के मानवेतर नरवानरगण प्राणियों का प्राकृतिक वितरण और पारिस्थिकीय दशा

आशाम बोरंग व जी० एस० थपलियाल

सारांश

इस अभिपत्र में अरुणाचल प्रदेश के मानवेतर नरवानरगण प्राणियों का प्राकृतिक वितरण और पारिस्थिकीय दशा बताई गई है। जैव विविधता, वितरण और खतरा बनने वाले कारकों पर विशेष प्रकाश डाला गया है। चार प्रजातियाँ और 7 जातियाँ (तथा एक संभावित अर्थात् *राइनोपिथेकस रौक्सेलेनी* मिलने - एडवर्डस) की जानकारी दी गई है। ठूंठ-पुच्छ और शूकर-पुच्छ कपियों को छोड़ अन्य नरवानरगण प्राणियों को अरुणाचल प्रदेश में विलुप्ति का अधिक खतरा नहीं है। इस दिशा में और अधिक अन्वेषण जल्दी कराना आवश्यक है जिससे भारत के नरवानरगण विज्ञान को और अधिक जानकारी प्राप्त होगी।

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