

SOME OBSERVATIONS ON BUTTERFLIES OF PAKKE TIGER RESERVE, ARUNACHAL PRADESH

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ABSTRACT

Butterfly diversity was documented first time in and around Pakke Tiger Reserve, Arunachal Pradesh, during autumn. 65 species with in 43 genera representing 14 sub families within 5 families were recorded during the present study. Jaccard's similarity index showed greater dissimilarity of butterfly fauna between forest edge and forest habitats and also within families at two sites. This may be due to the difference in vegetation composition and disturbances at two sites. Out of the 65 recorded butterflies 12 species enjoys a legal protection by Indian Wildlife Protection Act and CITES.

Key words : Species diversity, Abundance, Jaccard's Similarity Index, IWPA, CITES

Introduction

The thinly populated North-East Indian state of Arunachal Pradesh is a land of great biological as well as socio-cultural diversity. This largest state in north east forms main part of the eastern Himalayas and falls under the bio geographic zone 2D (Rodgers and Panwar, 1998). Arunachal Pradesh has been identified as one of the "Biodiversity hotspots" areas in the world (Myers, 1988). The state has one biosphere reserve, two national parks and eleven wildlife sanctuaries constituting 11.68% of the geographical area of 83,743 km² (ISFR, 2009).

In western Arunachal Pradesh, Kameng Protected Area Complex (KPAC) is an area of 3500 km² consisting of Pakke Tiger Reserve, Nameri Tiger Reserve, Sessa Orchid Wildlife Sanctuary and Eaglenest Wildlife Sanctuary. The whole area ranges from 100 to 3300 m in altitude. Studies on the diversity of fauna and flora in the eastern Himalayas have always been under ignorance due to the poor accessibility and connectivity to the mainland. There has no study been done on the butterflies in the reserve.

Study area

Pakke tiger reserve is located in the East Kameng district of Arunachal Pradesh comprising an area of 862 km² bounded by Kameng river in the west. The area lies between 22°55'0" N and 93°5'0" E to 27°15'0" N and 22°35'0" E. According to Champion and Seth's (2005) classification forest types in the reserve are: Assam Valley Tropical Semi Evergreen Forest, Sub Himalayan Light Alluvial Semi Evergreen Forest, Eastern Hollock Forest, Upper Assam Valley Tropical Evergreen Forest, Tropical Riverine Forest and Secondary Moist Bamboo Tract.

Climate of the Pakke Tiger Reserve is subtropical with cold weather from November to March. The temperature ranges from 12°C to 36°C. Biotic interference in Pakke Tiger Reserve is almost absent apart from the negligible poaching reports. A few habitations, Nyishi tribe, Adivasis (tribe from West Bengal) and Nepalis, with low to medium economy can be seen along the forest edge. They depend on the forests for non-timber forest products.

Methodology

Opportunistic sampling in varied habitats was done from 10 September 2010 to 25 October 2010. The present study was carried out simultaneously during a major project in the area. There was no laid transect nor methods designed for the same. The butterfly species were photographed and recorded with the help of 'The Book of Indian Butterflies' (Kehimkar, 2008) and 'Butterflies of the Indian Region' (Wynter-Blyth, 1957). The monitored sites were forest edge and forest habitat (inside forest). Jaccard's Coefficient or Index of biotic

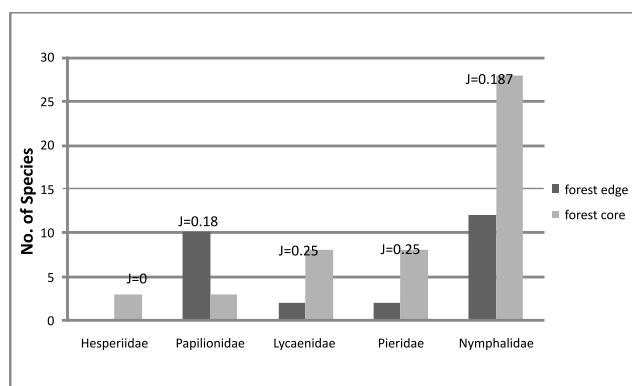


Fig. 1 : Diversity of Butterflies in different sites in Pakke Tiger Reserve.

Rich butterfly diversity of Pakke Tiger Reserve may become a criterion to suggest Butterfly Tourism in the area.

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Plate 1 : *Leea* spp. has been observed as a food source for a good number of Butterflies and other insects

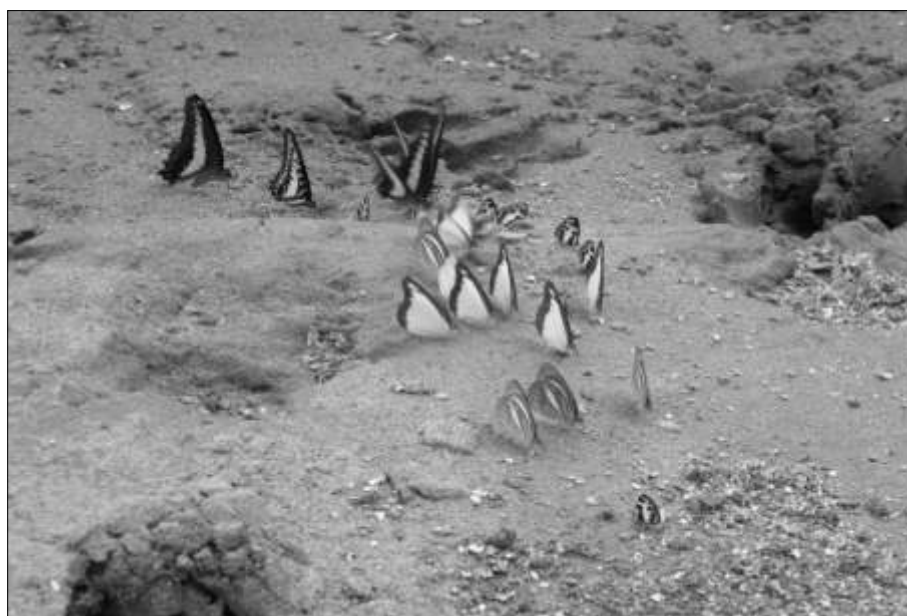


Plate 2 : Large number of Butterflies were recorded while mud puddling in congregations

similarity (Jaccard, 1992) was calculated to see the degree of similarity between the two sites (Singh, 2008) besides similarity within families in the two sites.

$$C_j = j / (a + b - j)$$

where, j = number of common species to both the sites

a = number of species at site A

b = number of species at site B

Results and Discussion

About 65 species with in 45 genera representing with 14 sub families within 5 families were recorded during the present study. A number of 51 species were recorded in the forest habitat while 26 were noted in the forest edge (Fig. 1). Jaccard's Similarity Index between two sites was calculated and the result was surprising, as it was 0.194. So, the similarity between the

Table1 : Butterflies recorded in Pakke Tiger Reserve

S.No.	Scientific Name	Common Name	Sites monitored		Status of protection
			Forest edge	Forest core area	
Family- HesperIIDae					
1.	<i>Bibasis oedipodea</i>	Branded orange awlet		*	-
2.	<i>Tagiades gana</i>	Suffused snow flat		*	-
3.	<i>Tagiades litigiosa</i>	Water snow flat		*	-
4.	<i>Bibasis sena</i>	Orange-tail awl		*	-
Family-Papilionidae					
5.	<i>Lamproptera curius</i>	White dragon tail	*		-
6.	<i>Graphium sarpedon</i>	Common bluebottle	*		-
7.	<i>Graphium doson</i>	Common jay	*		-
8.	<i>Graphium agamemnon</i>	Tailed jay	*		-
9.	<i>Graphium antiphates</i>	Five bar sword tail	*	*	-
10.	<i>Papilio helenus</i>	Red Helen	*		-
11.	<i>Papilio nephelus</i>	Yellow Helen	*		-
12.	<i>Papilio elephenor</i>	Yellow crested spangle	*		Schedule I (IWPA)
13.	<i>Papilio polyctor</i>	Common peacock	*	*	-
14.	<i>Papilio memnon</i>	Great mormon		*	-
15.	<i>Troides helena</i>	Common birdwing	*		Appendix. II (CITES)
Family-pieridae					
16.	<i>Eurema hecabe</i>	Common grass yellow	*	*	-
17.	<i>Gandaca harina</i>	Tree yellow		*	-
18.	<i>Hebomoia glaucippe</i>	Great orange tip	*	*	-
19.	<i>Pareronia avatar</i>	Pale wanderer		*	-
20.	<i>Appias lycinda</i>	Chocolate albatross		*	Schedule II (IWPA)
21.	<i>Cepora nadina</i>	Lesser gull		*	Schedule II (IWPA)
22.	<i>Delias pasithoe</i>	Red base jezebel		*	-
23.	<i>Delias descombesi</i>	Red spot jezebel		*	-
Family- Lycaenidae					
24.	<i>Ticherra acte</i>	Blue imperial		*	-
25.	<i>Hypolycaena erylus</i>	Common tit		*	-
26.	<i>Zeltus amasa</i>	Fluffy tit		*	-
27.	<i>Sinthus nasaka</i>	Narrow spark		*	-
28.	<i>Anthene lycaenina</i>	Pointed ciliate blue		*	-
29.	<i>Caleta elna</i>	Elbowed pierrot	*	*	-
30.	<i>Prosotas aluta coelestis</i>	Banded line blue		*	-
31.	<i>Zemeros flegyas</i>	Punchinello	*	*	-
Family- Nymphalidae					
32.	<i>Tirumala septentrionis</i>	Dark blue tiger		*	-
33.	<i>Danaus genutia</i>	Striped tiger		*	-
34.	<i>Euploea mulciber</i>	Striped blue crow	*	*	Schedule IV (IWPA)
35.	<i>Euploea midamus</i>	Blue-spotted crow	*		Schedule I (IWPA)
36.	<i>Euploea radamanthus</i>	Magpie crow	*		-
37.	<i>Polyura athamas</i>	Common nawab	*	*	-
38.	<i>Polyura eudamypus</i>	Great nawab		*	-
39.	<i>Charaxes bernardus</i>	Tawny rajah		*	-
40.	<i>Charaxes marmax</i>	Yellow rajah		*	Schedule II (IWPA)
41.	<i>Childrena childreni</i>	Large silverstripe	*		-
42.	<i>Vindula erota</i>	Cruiser	*		-
43.	<i>Cirrochroa aoris</i>	Large yeoman	*	*	-
44.	<i>Cupha erymanthis</i>	Rustic		*	-
45.	<i>Vagrans egista</i>	Vagrant		*	-

S.No.	Scientific Name	Common Name	Sites monitored		Status of protection
			Forest edge	Forest core area	
46.	<i>Moduza procris</i>	Commander	*		-
47.	<i>Athyma kanwa</i>	Dot- dash sergeant		*	-
48.	<i>Athyma ranga</i>	Blackvein sergeant		*	-
49.	<i>Athyma zeroa</i>	Small staff sergeant		*	-
50.	<i>Athyma nefte</i>	Colour sergeant		*	-
51.	<i>Neptis miah</i>	Small yellow sailor		*	-
52.	<i>Euthalia aconthea</i>	Common Baron		*	Schedule II (IWPA)
53.	<i>Euthalia monina</i>	Powdered baron		*	-
54.	<i>Euthalia phemius</i>	White edged blue baron		*	-
55.	<i>Euthalia lubentina</i>	Gaudy baron		*	Schedule IV (IWPA)
56.	<i>Tanaecia lepidea</i>	Grey count	*	*	-
57.	<i>Tanaecia julii</i>	Common earl		*	-
58.	<i>cyrestis thyodamas</i>	Common map	*	*	-
59.	<i>Dichorhagia nesimachus</i>	Constable	*		-
60.	<i>Rhinopalpa polynice</i>	Wizard		*	-
61.	<i>Junonia iphita</i>	Chocolate pansy	*	*	-
62.	<i>Kallima inachus</i>	Orange oakleaf		*	-
63.	<i>Doleschallia bisaltide</i>	Autumn leaf		*	Schedule I (IWPA)
64.	<i>Hypolimnas misippus</i>	Danaid eggfly		*	Schedule I (IWPA)
65.	<i>Lexias pardalis</i>	Archduke		*	Schedule II (IWPA)

*Species recorded; IWPA- Indian Wildlife Protection Act(Agarwal,2000); CITES-Convention on International Trade on Endangered species of Flora and Fauna

two sites, forest edge and forest core area is low, in other words, greater dissimilarity of butterfly fauna between the two sites, ie., greater beta diversity, suggesting that the forest edge and forest habitat (inside forest) are dissimilar habitats. The reason behind the dissimilarity between the two sites could be the vegetation composition and disturbances. The fauna within families also showed greater dissimilarity between the two sites.

The butterfly population also represents eleven species which are protected by Indian Wildlife Protection Act, 1972 (Table-1) and also one (*Troides Helena*) by CITES. *Leea* spp. were recorded as the major nectar source of butterflies in the core area during this season while, mud puddling was frequently observed along the forest edges and river beds in Kameng.

Acknowledgements

The authors are thankful to Mr. Tana Tapi, DFO, Pakke Tiger Reserve and his staff for giving support throughout the study and also wish to thank Wildlife Trust of India for providing financial support and encouragement to conduct the study. We thank Dr.Arun Pratap Singh for reviewing paper and Mr.Krushnamegh Kunte for helping us with some species identification.

पाक्की टाइगर रिजर्व, अरुणाचल प्रदेश की तितलियों पर कुछ प्रेक्षण

जिस सेबस्टीयन व अरिन्दम के. पचोनी

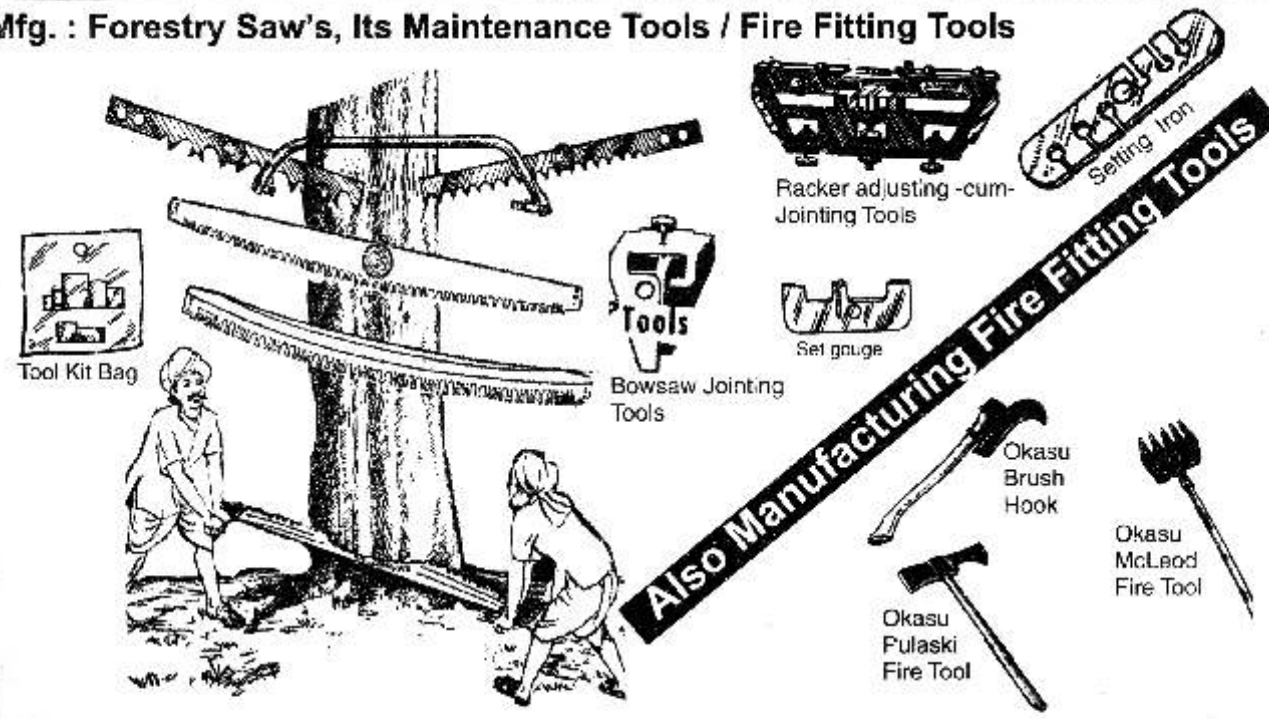
सारांश

इस अध्ययन में पाक्की टाइगर रिजर्व, अरुणाचल प्रदेश में और इसके चारों ओर शरद मौसम के दौरान पहली बार तितली विविधता प्रलेखित की गई। वर्तमान अध्ययन के दौरान 5 कुलों के बीच 14 उप कुलों का प्रतिनिधित्व करने वाले 43 वंश के बीच 65 प्रजातियों को अभिलिखित किया गया। जैकार्ड की समानता तालिका ने वन किनारों और वन आवासों के बीच और दो स्थलों में कुलों के बीच भी तितली प्राणिजात की अत्यधिक असमानता दर्शायी। यह वनस्पति संयोजन में विभिन्नता और दो स्थलों में विक्षोभों के कारण हो सकता है। 65 अभिलिखित तितलियों में से 12 प्रजातियों को भारतीय वन्यप्राणि संरक्षण अधिनियम और सी आई टी ई एस द्वारा वैधानिक सुरक्षा प्राप्त है।

References

- Agrawal, K.C. (2000). *Wildlife of India: Conservation and Management*, Nidhi Publishers. pp 140-156.
- Champion, H.G. and Seth, S.K. (2005). *A Revised Survey of the Forest Types of India*. (Reprinted), Natraj Publishers. p 404.
- India State of Forest Report (2009). Forest Survey of India. pp 58-61
- Jaccard, P. (1992). The distribution of the flora of alpine zone. *New Phytologist*, 11:37-50.
- Kehimkaar, I. (2008). *The book of Indian Butterflies*, Bombay natural history society. Pp 497
- Myers, N. (1988). Threatened biotas: "Hotspots" in tropical forests. *The Environmentalist*, 8:187-208.
- Rodgers, W.A. and Panwar, H.S., (1998). *Planning a wildlife protected area network in India*, Vol. I, Wildlife Institute of India, Dehradun.
- Singh, A.P. (2008). Butterflies of Renuka Wildlife Sanctuary, Sirmaur District, Himachal Pradesh. *Indian Forester*, 134 (10). 1326-1338
- Wynter-Blyth, M.A. (1957). *Butterflies of the Indian Region*, Bombay Natural History Society, Bombay. Pp 523

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