



Entomofauna of Kane Wildlife Sanctuary, Arunachal Pradesh, northeastern India

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Studies on the entomofauna of Arunachal Pradesh, northeastern India are referable to the works of Mitra (1976), Tandon & Khera (1978), Lahiri (1979 a,b), Basu & Sengupta (1980), Chatterjee & Saha (1981), Sengupta & Sengupta (1981), Biswas & Biswas (1985), Biswas & Chatterjee (1985), Ghosh (1985), Bhargava (1989, 1996), Pal (1985, 1992a, 1992b, 1992c, 1993) and Chakrabarty et al. (1994) in which nearly 600 species of insects belonging to Collembola, Odonata, Orthoptera, Blattaria, Coleoptera, Diptera, Hymenoptera and Hemiptera have been reported. Later, Ramakrishna & Alfred (2006) compiled all the reported species from Arunachal Pradesh

in the State Fauna series. Detailed systematic accounts were given in the state faunal series - 13 (part-II) of the Zoological Survey of India (Anonymous 2006b). It included 645 species of insects under 320 genera and 44 families in which 119 species were new records for the state. Recently, Singh et al. (2007) recorded 100 species of Coleoptera from various habitats of Arunachal Pradesh, in which 25 species under 20 genera were new to the state. As the state is one of the global biodiversity hot spots (Myer et al. 2000) and is endowed with rich flora and fauna (Das 2006), intensive studies are needed at the earliest to document all of the insects.

Kane Wildlife Sanctuary is located in the West Siang District of Arunachal Pradesh between 27°35'-27°45'N & 94°35'-94°45'E. Spread over an area of 55km², it is bounded by the Siri River on the north and northwest. Along Likabali Road (15km) on the east, Nilakh Nallah (hill stream) on the south and Bardam Modi (hill range) on the south west (Anonymous 2007). The area falls in the Eastern Himalayan bio-geographical zone with montane evergreen tropical and subtropical forest vegetation (Singh et al. 2002). The Sanctuary is unique in having a wide range of surface elevation (200-2000 m), varied temperature fluctuations (5-38 °C) at different altitudinal levels with relatively high humidity and excessive rainfall (> 3000 mm/year). The area has been declared protected as a sanctuary under the Wildlife Protection Act, 1972 for the conservation of elephants, small cats and deer along with their associated flora and fauna since 1992. However, little has been known about its flora and fauna till today. Therefore, the present study was taken up as an initiative to identify and document its faunal resources, particularly insects. The study assumes significance with reference to the conservation of entomofauna of the region.

Materials and Methods: Insect samples have been collected and preserved for study following Ghosh & Sengupta (1982). In the case of collembolans and litter thrips, the fallen leaves, soil and humus from all possible habitats were collected at random in polythene bags. The samples were subjected to the process of extraction by using modified Tullgren funnel extractors and collected specimens were preserved in 70% alcohol (Ananthkrishnan 1984). Collections were made for a period of one year (2007) with frequent trips during January to April and August to November. Collections were made within 200-1500 m altitudinal range covering nearly 15km² deep inside the eastern portion of the sanctuary on the Likabali side starting from Kane Village. Collected specimens were sorted out to species level and identified using valid key characters and by comparison with the materials available in the Insect Diversity Unit (RGU), Manipur University, ZSI and SFRI (Itanagar). Taxonomic publications including Anonymous (1999, 2003, 2006b),

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Borowiec (2001), Ghate et al. (2003), Subramanian (2005), Mitra (2006) have been referred to for the correct determination of the identities of the insects. Distributions of the identified species within Arunachal Pradesh were compiled based on Sen et al. (1988), Chakravorty et al. (1994), and Anonymous (2006 a,b).

Results and Discussion: During the one year preliminary survey, 170 species of insects under nine orders were identified and are listed along with their distributions in Table 1. This included 70 species of Coleoptera (beetles), 23 species each of Odonata (dragonflies) and Thysanoptera (thrips), 18 species of Orthoptera (grasshoppers), 13 species of Hymenoptera (bees), eight species of Collembola (springtails), seven species of Diptera (flies), five species of Hemiptera (bugs) and two species of Dictyoptera (mantis). Of these 39 species are new records for the state.

Coleopteran fauna were dominant in the present collection. Beetles being the largest among the insect orders are associated with various habitats in the forest ecosystem. The majority of them are phytophagous and scavengers inhabiting various plants, debris and animal excreta. Phytophagous beetles play an important role in checking the populations of many other insects including harmful insects such as aphids, coccids, aleurids, plantmites and other foliage feeders. Scavengers, being associated with debris and animal excreta act as detritivores, thereby helping in breaking down plant and animal remains that contribute to the recycling of nutrients and the cleaning of the environment.

The present collection reveals the occurrence of 23 species of Thysanoptera (Thrips). Among them three species viz., *Elaphrothrips spiniceps*, *Nesothrips lativentris* and *Xylaplothrips debilis* are mycophagous forms feeding on fungal mycelia. Of the phytophagous forms *Gigantothrips elegans*, *Liothrips ananthkrishnani* and *Liothrips* sp. are found to cause structural abnormalities in their respective host plants. The first one causes damage to the ficus leaf and the latter two are found to form leaf rolling galls of *Acanthus* sp. and *Pozouzia zeylanica* respectively. Again two terebrantian species, *Panchaetothrips indicus* and *Sciothrips cardamomi*, which were collected from wild herbs during the survey.

The Orthopteran collection contained 18 species belonging to six families. Among them 11 species were under the family Acrididae, two species each under Tettigoniidae, Schizodactylidae and Gryllidae, respectively. The family Pyrgomorphidae was represented by a single species *Tagasta indica*. The two species of Schizodactylidae, *Schizodactylus monstrosus* and *S. tuberculatus* were frequently encountered within sandy burrows near the hillstreams and moist foothills.

Collembolan fauna included eight species under two families, Entomobryidae and Hypogastruridae. By virtue of their association with litter and soil, these tiny apterous insects are known for their role in recycling the forest

nutrients. Dipteran and Hemiptera were represented by seven and five species respectively. In addition to the above collections, different species of butterflies, moths and a half dozen Cicadas were also collected during the study. The identities of these insects are yet to be determined.

Conclusion: Being a short term preliminary study coupled with mountainous moist habitats of the sanctuary, only limited areas could be covered during the survey. However, the above observations indicate that Kane Wildlife Sanctuary is a rich spot for entomological fauna. It also suggests that a long term survey covering maximum habitats over different seasons would be required at the earliest to explore and document the entomological wealth of the protected area.

REFERENCES

- Ananthkrishnan, T.N. (1984).** *Bioecology of Thrips*. Indira Publishing House, Michigan, USA, 233pp.
- Anonymous (1999).** *Fauna of Meghalaya*. State fauna Series 4(Part V). Zoological Survey of India, Kolkata Publication, 666pp.
- Anonymous (2003).** *Fauna of Sikkim*. State fauna Series 9 (Part III). Zoological Survey of India, Kolkata Publication, 411pp.
- Anonymous (2006a).** *Fauna of Arunachal Pradesh*. State fauna Series 13 (Part I). Zoological Survey of India Publication, 666pp.
- Anonymous (2006b).** *Fauna of Arunachal Pradesh*. State fauna Series 13 (Part II). Zoological Survey of India Publication, 518pp.
- Anonymous (2007).** *The Arunachal Pradesh Gazette* (Part I). Government of Arunachal Pradesh Publication XVIII: 57-58.
- Basu, C.R. & T. Sengupta (1980).** On a new genus and a new species of Alticinae (Coleoptera: Chrysomelidae) from Arunachal Pradesh. *Records of Zoological Survey of India* 76(1-4): 143-146.
- Bhargava, R.N. (1989).** On a collection of Odonata from west Kameng District, Arunachal Pradesh. *Indian Odonatol* 2: 45-46.
- Bhargava, R.N. (1996).** A new mole cricket of the genus *Scapteriscus* (Orthoptera: Gryllotalpidae) from Arunachal Pradesh, India. *Entomon* 21(2): 191-193.
- Biswas, D.N. & S. Biswas (1985).** Insecta: Coleoptera: Staphylinidae. On a collection of Staphylinidae (Insecta: Coleoptera) from Namdapha Wild Life Sanctuary, Tirap district, Arunachal Pradesh, India. *Records of Zoological Survey of India* 82(1-4): 139-146.
- Biswas, S. & S.K. Chatterjee (1985).** Insecta: Scarabaeidae: Coprinae. *Records of Zoological Survey of India* 82(1-4): 147-177.
- Borowiec, L. (2001).** New records of Asian and Australopapuan Cassidinae with a description of five new species of *Cassida* L. from Thailand (Coleoptera: Chrysomelidae: Cassidinae). *Genus* 12(4). Wrocław 28 XII: 493-562.
- Chakrabarty, S.P., L.K. Ghosh & R.C. Basu (1994).** On a collection of Hemiptera from Namdapha Biosphere reserve in Arunachal Pradesh. *Records of Zoological Survey of India. Occasional paper* 161: 1-38.
- Chatterjee, S.K. & G.N. Saha (1981).** On a collection of Scarabaeidae (Insecta: Coleoptera) from Arunachal Pradesh with the description of a new species. *Records of Zoological Survey of India* 78(1-4): 155-167.
- Das, A. K. (2006).** Biodiversity Conservation, pp. 160-177. In:

Table 1. List of Insects collected from Kane Wildlife Sanctuary

	Species	Common name	Distribution / new record to Arunachal Pradesh
	Order: Coleoptera		
	Family: Passalidae		
1	<i>Acerais helferi</i> Kuw.	Bess Beetle	New record
2	<i>Aulococyclus</i> sp.	Patent Leather Beetle / Bess Beetle	East Siang, Kane (W. Siang)
	Family: Chrysomelidae		
3	<i>Agrosteomela fallaciosa</i> Stal	Leaf Beetle	New record
4	<i>Agrosteomela indica</i> (Hope)	Leaf Beetle	Subansiri, Kurungkumey, Dibang Valley, Kane (West Siang)
5	<i>Aplosonyx scutellatus</i> (Baly)	Fringed-toed Lizard	Changlang, Dibang Valley, East Kameng, Kane (W. Siang)
6	<i>Aspidomorpha dorsata</i> (Fabricius)	Tortoise Beetle	New record
7	<i>Aspidomorpha indica</i> Boheman	Tortoise Beetle	Subansiri, West Kameng, Kane (W. Siang)
8	<i>Aspidomorpha sanctaerucis</i> (F)	Tortoise Beetle	East Siang, Changlang, Likabali & Kane (W. Siang)
9	<i>Aulacophora almora</i> Maulik	Leaf Beetle	Dibang Valley, Changlang, Kurungkumey, Dibang Valley, Kane (W. Siang)
10	<i>Aulacophora bicolor</i> (Weber)	Leaf Beetle	East Siang, Upper Siang, Papumpare, Changlang, Kane (W. Siang)
11	<i>Aulacophora foveicollis</i> (Lucas)	Red Pumpkin Beetle	East Kameng, Subansiri, East Siang, Kane (W. Siang)
12	<i>Aulacophora lewisii</i> Baly	Pumpkin Beetle	New Record
13	<i>Basiprinota maculipennis</i> (Boheman)	Leaf Beetle	Changlang, Dibang Valley, Papumpare, Kane (W. Siang)
14	<i>Cassida occursans</i> Spaeth	Tortoise Beetle	Changlang, Subansiri, East Siang, Likabali & Kane (W. Siang)
15	<i>Chrysomela populi</i> Linn.	Leaf Beetle	New record
16	<i>Cneorane rubicollis</i> (Hope)	Leaf Beetle	West Kameng, Subansiri, East Siang, Changlang, Kane (W. Siang)
17	<i>Cryptocephalus exsulans</i> Suffrian	Leaf Beetle	Likabali, Kane (W. Siang)
18	<i>Galerucella grisescens</i> (Joannis)	Leaf Beetle	New record
19	<i>Haplosoma unicolor</i> (Illiger)	Leaf Beetle	Papumpare, Changlang, Subansiri, Kane (W. Siang)
20	<i>Humba cyanicollis</i> (Hope)	Leaf Beetle	East Kameng, West Kameng, Dibang Valley, Likabali & Kane (W. Siang)
21	<i>Lema nigricollis</i> Jacoby	Leaf Beetle	Subansiri, Changlang, East Kameng, Kane (W. Siang)
22	<i>Meristata dohrni</i> (Baly)	Leaf Beetle	Subansiri, Changlang, Kane (W. Siang)
23	<i>Monolepta signata</i> (Olivier)	Cucumber Beetle	Subansiri, Lohit, West Kameng, Kane (W. Siang)
24	<i>Oides livia</i> (Fabricius)	Beetle	Eastkameng, West Kameng Kurungkumey, Kane (W. Siang)
25	<i>Oides maculate</i> (Olivier)	Beetle	New record
26	<i>Periclitena vigorsi</i> (Hope)	Beetle	East Kameng, Dibang Valley, Kane (W. Siang)
27	<i>Pseudadimonia variolosa</i> (Hope)	Beetle	New record
28	<i>Sphenoraia</i> (S) <i>bicolor</i> (Hope)	Beetle	New record
29	<i>Xuthea orientalis</i> Baly	Beetle	Changlang, East Kameng, Kane (W. Siang)
	Family: Scarabaeidae		
30	<i>Anomala dimidiata</i> (Hope)	White Grub	New record
31	<i>Anomala</i> sp.	White Grub	East Siang, Kane (W. Siang)
32	<i>Copris corpulentus</i> Gillet	Dung Beetle	East Siang, Upper Siang, Papumpare, Changlang, Kane (W. Siang)
33	<i>Copris indicus</i> Gillet	Dung Beetle	East Siang, Papumpare, Dibang Valley, Tawang, Along & Kane (W. Siang)
34	<i>Copris magicus</i> Harold	Dung Beetle	East Siang, Upper Siang, Kane (W. Siang)
35	<i>Copris</i> (P) <i>punctatus</i> Wiedeman	Dung Beetle	Tawang, Namdapha, Changlang, Kane (W. Siang)
36	<i>Copris siangensis</i> Biswas	Dung Beetle	Lower Subansiri, East Siang, Upper Siang, Pasighat & Kane (W. Siang)
37	<i>Onitis castaneus</i> Redtenbacher	Dung Beetle	East Siang, Kane (W. Siang)

	Species	Common name	Distribution / new record to Arunachal Pradesh
38	<i>Onitis falcatus</i> (Wulfen)	Dung Beetle	New record
39	<i>Onitis feae</i> Felsche	Dung Beetle	East Siang, Kane (W. Siang)
40	<i>Onitis subopacus</i> Arrow	Dung Beetle	East Siang, Kane (W. Siang)
41	<i>Oryctes rhinoceros</i> (L)	Rhinoceros Beetle	New record
42	<i>Rhynchophorus ferrugineus</i> (Olivier)	Red Palm Beetle	New record
	Family: Cerambycidae		
43	<i>Anoplophora</i> sp.	Long-horned Beetle	East Siang, Kane (W. Siang)
44	<i>Batocera numitor</i> (Newman)	Longicorn Beetle	New record
45	<i>Batocera parryi</i> (Hope)	Longicorn Beetle	East Siang, Kane (W. Siang)
46	<i>Hoplocerambyx spinicornis</i> Newman	Borer Beetle	New record
47	<i>Stromatium barbatum</i> (Fab.)	Kulsi Teak Borer	Along, Likabali & Kane (W. Siang)
48	<i>Stromatium</i> sp.	Forest Longicorn	East Siang, Kane (W. Siang)
49	<i>Xylotrechus quadripes</i> Chev.	Coffee White Stem Borer	East Siang, Papumpare, Kane (W. Siang)
50	<i>Xylotrechus smeii</i> (Lap. et Gory.)	Long-horned Beetle	East Siang, Papumpare, Kane (W. Siang)
	Family: Carabidae		
51	<i>Catascopus micabilis</i> Bates	Ground Beetle	East Siang, Papumpare, Dibang Valley, Tawang, Along & Kane (W. Siang)
52	<i>Ophionea indica</i> (Thunb)	Carabid Beetle	East Siang, Papumpare, Subansiri, Kane (W. Siang)
53	<i>Simous nigriceps</i> (Weid)	Ground Beetle	East Siang, Papumpare, Changlang, Kane (W. Siang)
	Family: Lucanidae		
54	<i>Calodes cuvera</i> Hope	Stag Horn Beetle	New record
55	<i>Calodes siva</i> Hope & Wetson	Stag Horn Beetle	New record
56	<i>Lucanus cantori</i> Hope	Giant Stag Beetle	New record
57	<i>Lucanus laminifer</i> Waterhouse	Giant Stag Beetle	New record
	Family: Curculionidae		
58	<i>Cyrtotrachelus longimanus</i> F	Bamboo Weevil	New record
59	<i>Cyrtotrachelus rufopectinipes</i> Chevrolat.	Snout Beetle / Stem Weevil	New record
	Family: Histeridae		
60	<i>Hypocaccus sinae</i> (Marseul)	Steel Beetle	Papumpare, East Kameng, East Siang, Kurungkume, Kane (W. Siang)
61	<i>Pachylister chinensis</i> (Quensel)	Hister Beetle	Changlang, Kurungkume, East Siang, Kane (W. Siang)
62	<i>Platylister strialis</i> (Marseul)	Steel Beetle	East Siang, Kane (W. Siang)
63	<i>Platylomalus teibodae</i> (Marseul)	Steel Beetle	East Siang, Changlang, Kane (W. Siang)
	Family: Cucujidae		
64	<i>Laemophloeus neglectus</i> Grouvelle	Paper Flate Beetle	Papumpare, Subansiri, Kane (W. Siang)
65	<i>Placonotus proximus</i> Grouvelle	Paper Flate Beetle	Papumpare, East Siang, Subansiri, Kane (W. Siang)
	Family: Staphylinidae		
66	<i>Leptochirus (S)laevis</i> Castelnau	Rove Beetle	Papumpare, Kane (W. Siang)
	Family: Meloidae		
67	<i>Mylabris cichorii</i> (Linn.)	Flower Beetle / Blister Beetle	Papumpare, East Siang, Changlang, Kane (W. Siang)
68	<i>Mylabris himalayaensis</i> Saha	Flower Beetle	Papumpare, East Siang, Along & Kane (W. Siang)

	Species	Common name	Distribution / new record to Arunachal Pradesh
	Family: Silvanidae		
69	<i>Protosilvanus lateritius</i> (Reitter)	Silvanid Beetle	East Kameng, Subansiri, Dibang Valley, Changlang, Kane (W. Siang)
70	<i>Psammoecus trimaculatus</i> Motschulsky	Silvanid Beetle	Subansiri, Dibang Valley, Changlang, Papumpare, Kane (W. Siang)
	Order: Collembola		
	Family: Entomobryidae		
71	<i>Callyntrura japonica</i> (Kinoshita)	Entomobryid /Spring Tail	Subansiri, West Kameng, Kane (W. Siang)
72	<i>Dicranocentroides fasciculatus</i> Imms	Spring Tail	Papumpare, West Kameng, Kane (W. Siang)
73	<i>Dicranocentroides salmoni</i> Mitra	Spring Tail	Papumpare, Likabali And Kane (W. Siang)
74	<i>Homodia cingula</i> Börner	Spring Tail	Subansiri, Kane (W. Siang)
75	<i>Lepidosira unguerrata</i> Salmon	Spring Tail	Subansiri, Tawang, Kane (W. Siang)
76	<i>Lobella kraepelini</i> Yosii	Spring Tail	West Kameng, Kane (W. Siang)
77	<i>Salina indica</i> (Imms)	Spring Tail	Papumpare, East Siang, Kane (W. Siang)
	Family: Hypogastruridae		
78	<i>Hypogastrura indovari</i> Salmon	Gun Powder Mite	Papumpare, Tawang, Basar & Kane (W.Siang)
	Order: Dictyoptera		
	Family: Blaberidae		
79	<i>Cryptocera</i> sp.	Wood Roaches	East Siang, Kane (W. Siang)
	Family: Mantidae		
80	<i>Mantis</i> sp.	Preying Mantis	East Siang, Kane (W. Siang)
	Order: Diptera		
	Family: Sargophagidae		
81	<i>Bercaea cruentata</i> (Meigen)	Flesh Fly	East&West Kameng, Lower & Upper Subansiri, Kane (W. Siang)
	Family: Calliphoridae		
82	<i>Calliphora</i> (<i>Calliphora</i>) <i>vicina</i> Robineau Desvoidy	Blue Bottle/ Blow Fly	West Kameng, Kane (W. Siang)
83	<i>Cryomya megacephala</i> (Fabricius)	Oriental Latrine Fly	East & West Kameng, Kane (W. Siang)
	Family: Bombyliidae		
84	<i>Ligyra oenomaus</i> (Rondani)	Bee Fly	West Kameng, Kane (W. Siang)
85	<i>Ligyra semifuscata</i> (Brunetti)	Bee Fly	East Siang, Daporizo, Kane (W. Siang)
	Family: Conopidae		
86	<i>Physocephala tenella</i> Bigot	Thick-headed Flies	Along & Kane (W. Siang)
	Family: Tabanidae		
87	<i>Tabanus fuscomaculatus</i> Ricardo	Horse Flies	East Siang, Kane (W. Siang)
	Order: Hemiptera		
	Family: Pentatomidae		
88	<i>Dalpada jugatoria</i> Lethriery	Stink Bug	Tirap, Changlang, Kane (W. Siang)
89	<i>Nezara viridula</i> (Linn.)	Green Stink Bug	New record
90	<i>Pentatomid</i> sp.	Forest Bug/ True Bug	East Siang, Kane (W. Siang)
	Family: Coreidae		
91	<i>Leptocoris acuta</i> (Thunberg)	Rice Seed Bug	Namdapha (Changlang), Kane (W.Siang)

	Species	Common name	Distribution / new record to Arunachal Pradesh
92	<i>Notobitus excellens</i> Distant	Squash Bug	Tirap, Namdapha (Changlang), Kane (W. Siang)
	Order: Hymenoptera		
	Family: Apidae		
93	<i>Apis (Megapis) dorsata</i> (Fabricius)	Rock Bee	Kameng, Subansiri, Papumpare, Kane (W. Siang)
94	<i>Apis indica</i> Fabricius	Indian Honey Bee	East and West Kameng, Papumpare, Tawang, Subansiri, Kane (W. Siang)
95	<i>Apis (Micrapis) florea</i> Fabricius.	Little Bee	Changlang, West Kameng, Kane (W. Siang)
96	<i>Bombus orientalis</i> Smith	Bumble Bee	Subansiri, West Kameng, Kane (W. Siang)
	Family: Vespidae		
97	<i>Parapolybia indica</i> (Saussure)	Paper Wasps	West Kameng, East Siang, Kane (W. Siang)
98	<i>Polistes (Nygmopolistes) tenebricosus sulcatus</i> Smith	Wasps	Changlang, Kane (W. Siang)
99	<i>Polistes (Megapolistes) olivaceus</i> (De Geer)	Yellow Wasps	Subansiri, West Kameng, Changlang, Kane (W. Siang)
100	<i>Vespa basalis</i> Smith	Black-bellied Hornet	East Kameng, West Kameng, Changlang, East Siang, Likabali & Kane (W. Siang)
101	<i>Vespa bicolor</i> Fabricius	Common Wasps	Subansiri, East Kameng, West Kameng, Likabali & Kane (W. Siang)
102	<i>Vespa mandarinia magnifica</i> Smith	Hornet	East Kameng, West Kameng, East Siang, Kane (W. Siang)
103	<i>Vespa tropica ducalis</i> Smith	Hornet	Subansiri, East Siang, Kane (W. Siang)
	Family: Anthophoridae		
104	<i>Xylocopa latipes</i> (Drury)	Black Carpenter	New record
105	<i>Xylocopa pubescens</i> (Spinola)	Carpenter Bee	New record
	Order: Odonata		
	Family: Coenagrionodae		
106	<i>Aciagrion pallidum</i> Selys	Narrow-winged Damselfly	Kameng, Dibang Valley, Kane (W. Siang)
107	<i>Agriocnemis pygmaea</i> (Rambur)	Pigmy Wisp	Kameng, Dirang, East Siang, Kane (W. Siang)
108	<i>Ceriagrion fallax cerinomelas</i> Lieftinck	Narrow-winged Damselfly	Subansiri, Kameng, Kane (W. Siang)
109	<i>Pseudagrion australasiae</i> (Selys)	Blue Damselfly	Subansiri, Kameng, East Siang, Kane (W. Siang)
	Family: Euphaeidae		
110	<i>Anisopleura lestoides</i> (Selys)	Damselfly	East Siang, Kane (W. Siang)
	Family: Platycnemididae		
111	<i>Calicnemis eximia</i> (Selys)	Scarlet Openwing	Namdapha (Changlang), Kane (W. Siang)
112	<i>Copera vittata serapica</i> (Selys)	Weak Flier/ Damselfly	East Siang, Changlang, Kane (W. Siang)
	Family: Libellulidae		
113	<i>Diplacodes trivialis</i> (Rambur)	Ground Skimmer	Changlang, West Kameng, Likabali & Kane (W. Siang)
114	<i>Neurothemis fulvia</i> (Drury)	Fulvous Forest Skimmer	Tirap, Subansiri, East Siang, Kane (W. Siang)
115	<i>Orthetrum anceps</i> (Schneider)	Marsh Hawk	East Siang, Kane (W. Siang)
116	<i>Orthetrum brunneum</i> Fouscolombe	Marsh Hawk	Subansiri, East Siang, West Siang
117	<i>Orthetrum glaucum</i> (Brauer)	Blue Marsh Hawk	Subansiri, Namdapha (Changlang), Kane (W. Siang)
118	<i>Pantala flavescens</i> (Fabricius)	Wandering Gliders	East Siang, West Siang
119	<i>Tholymis tillarga</i> (Fabricius)	Coral-tailed Cloud Wing	Likabali and Kane (W. Siang)

	Species	Common name	Distribution / new record to Arunachal Pradesh
	Family: Gomphidae		
120	<i>Ictinogomphus rapax</i> (Rambur)	Common Club Tail	East Siang, West Siang
121	<i>Onychogomphus biforceps</i> (Selys)	Club-tailed Dragonfly	East Siang, West Siang
122	<i>Onychogomphus cacharicus</i> (Fraser)	Club-tailed Dragonfly	East Siang, West Siang
123	<i>Paragomphus lineatus</i> (Selys)	Club-tailed Dragonfly	East Siang, Kane (W. Siang)
124	<i>Phaenandrogomphus aureus</i> (Laidlaw)	Club-tailed Dragonfly	Subansiri, East Siang, Kane (W. Siang)
	Family: Calopterygidae		
125	<i>Matrona basilaris basilaris</i> Selys	Broad-winged Damselfly	East Siang, Kane (W. Siang)
126	<i>Neurobasis chinensis chinensis</i> (Linn.)	Metallic Green Damselfly	Subansiri, Tirap, Kane (W. Siang)
	Family: Chlorocyphidae		
127	<i>Rhinocypha ignipennis</i> Selys	Broad-winged Damselfly	Subansiri, West Kameng, East Siang, West Siang
128	<i>Rhinocypha immaculata</i> Selys	Broad-winged Damselfly	East Sing, West Siang
	Order: Orthoptera		
	Family:Acrididae		
129	<i>Acrida exaltata</i> (Walker)	Short-horned Grasshopper	Changlang, Kurungkumey, Subansiri, Kane (W. Siang)
130	<i>Catantops annexus</i> Bolivier	Short-horned Grasshopper	Changlang, Kurungkumey, Papumpare, Subansiri, Kane (W. Siang)
131	<i>Ceracris nigricornis nigricornis</i> Walker	Short-horned Grasshopper	Subansiri, Lohit, West Siang
132	<i>Chondroacris rosea</i> (De Geer)	Short-horned Grasshopper	Subansiri, East Siang, West Siang
133	<i>Choroedocus robustus</i> (Serville)	Short-horned Grasshopper	Kameng, Tirap, Lohit, West Siang
134	<i>Gesonula punctifrons</i> (Stal)	Short-horned Grasshopper	Likabali, Kambang and Kane (W. Siang)
135	<i>Holopercna darjeelingsis</i> (Bolivar)	Short-horned Grasshopper	Subansiri, Lohit, West Siang
136	<i>Leptysmia marginicollis</i> (Serville)	Short-horned Grasshopper	New record
137	<i>Oxya hyla hyla</i> Serville	Short-horned Grasshopper	Subansiri, East Siang, West Siang
138	<i>Oxya hyla intricate</i> (Stal)	Short-horned Grasshopper	Likabali, Dalicamp and Kane (W. Siang)
139	<i>Phlaeoba antennata</i> Brunner	Short-horned Grasshopper	Subansiri, East Siang, West Siang
	Family: Tettigoniidae		
140	<i>Concocephalus</i> sp.	Meadow Katydid	East Siang, Kane (W. Siang)
141	<i>Microcentum rhombifolium</i> (Saussure)	Bush Katydid/ Angle Wing	New record
	Family: Gryllidae		
142	<i>Gryllus assimilis</i> (Fabricius)	Field Cricket	Dibang Valley, Kurungkumey, Papumpare Subansiri, Kane (W. Siang)
143	<i>Gryllus bimaculatus</i> Dee Geer	Black/Two-spotted Cricket	Dibang Valley, Kurungkumey, Papumpare Subansiri, Likabali and Kane (W. Siang)

	Species	Common name	Distribution / new record to Arunachal Pradesh
	Family: Schizodactylidae		
144	<i>Schizodactylus monstrosus</i> (Drury)	Asian Dune Cricket	Subansiri, East Siang, Kane (W. Siang)
145	<i>Schizodactylus tuberculatus</i> Ander	Asian Dune Cricket	Subansiri, East Siang, Kane (W. Siang)
	Family: Pyrgomorphidae		
146	<i>Tagasta indica</i> Bolivar	Bush Hopper	Subansiri, West Siang
	Order: Thysanoptera		
	Family: Thripidae		
147	<i>Anaphothrips sudanensis</i> Trybom	Grass Thrips	New record
148	<i>Dichromothrips nakahari</i> Mound	Orchid Thrips	New record
149	<i>Megalurothrips distalis</i> (Karny)	Bean Thrips	Namdapha (Changlang), Kane (W. Siang)
150	<i>Megalurothrips peculiaris</i> (Bagnall)	Flower Thrips	New record
151	<i>Microcephalothrips abdominalis</i> (Crawford)	Composite Thrips	Namdapha (Changlang), Kane (W. Siang)
152	<i>Monilothrips kempii</i> Moulton	Fern Thrips	New record
153	<i>Panchaethrips indicus</i> Bagnall	Turmeric Thrips	New record
154	<i>Sciothrips cardamomi</i> (Ramakrishna)	Cardamom Thrips	Namdapha (Changlang), Kane (W. Siang)
155	<i>Thrips hawaiiensis</i> (Morgan)	Cosmopolitan Thrips	New record
156	<i>Thrips himalayanus</i> (Pelikan)	Himalayan Terebrantia/ Thrips	New record
	Family: Phlaeothripidae		
157	<i>Araeothrips vama</i> Muraleedharan	Foliage Thrips	New record
158	<i>Araeothrips longisetis</i> Ananthakrishnan	Foliage Thrips	Namdapha (Changlang), Kane (W. Siang)
159	<i>Dolichothrips montanus</i> Ananthakrishnan	Thrips	New record
160	<i>Elaphrothrips spiniceps</i> Bagnall	Litter Thrips	New record
161	<i>Gigantothrips elegans</i> Zimmerman	Ficus Thrips	New record
162	<i>Haplothrips gowdeyi</i> (Franklin)	Thrips	New record
163	<i>Haplothrips tenuipennis</i> Bagnall	Thrips	New record
164	<i>Liothrips ananthakrishnani</i> Sen	Gall Thrips	Tawang, Kane (W. Siang)
165	<i>Liothrips himalayanus</i> Ananthakrishnan & Jagadish	Gall Thrips	Papum Pare, Kane (W. Siang)
166	<i>Liothrips sp.</i>	Gall Thrips	East Siang, Kane (W. Siang)
167	<i>Meiothrips menoni</i> Ananthakrishnan	Mycophagous Thrips	New record
168	<i>Nesothrips lativentris</i> (Karny)	Litter Thrips	Namdapha (Changlang), Kane (W. Siang)
169	<i>Neoheegeria montana</i> Ananthakrishnan and Jagadish	Thrips	New record
170	<i>Xylaplothrips debilis</i> Ananthakrishnan & Jagadish	Litter Thrips	Namdapha (Changlang), Kane (W. Siang)

Anonymous, *Arunachal Pradesh Human Development Report 2005*. Department of Planning, Government of Arunachal Pradesh, Publication.

Ghate, H.Y., L. Borowiec, N.S. Rane, S.P. Ranade & S. Pandit (2003). Tortoise beetles and their host plants from Pune (Maharashtra state, India) and nearby places (Coleoptera:

Chrysomelidae: Cassidinae). *Genus, Wroclaw* 14: 519-539.

Ghosh, A.K. (1985). Namdapha Biosphere Reserve-An overview. *Records of Zoological Survey of India* 82 (1-4): 1-8.

Ghosh, A.K. & T. Sengupta (1982). *Insect Collection, Preservation and Study* (Handbook). Zoological Survey of India Publication, 65pp.

- Lahiri, A.R. (1979a).** Odonata (Insecta) from different states of northeastern India. *Oriental Insects* 13(1-2): 119-132.
- Lahiri, A.R. (1979b).** New records of Odonata from Tripura and Arunachal Pradesh. *Proceeding of the Zoological Society (Calcutta)* 30(1-2): 45-49.
- Mitra, A. (2006).** Current status of the odonata of Bhutan: A checklist with four new records. *Bhu. J. RNR*. 2(1): 136-143.
- Mitra, S.K. (1976).** Some Collembola from Arunachal Pradesh (Entomobryidae). *Oriental Insects* 10: 143-149.
- Myer, N., R.A. Muttermeir, C.A. Muttermeir, A.B. Da Fonseca & J. Kent (2000).** Biodiversity hot spots for conservation priorities. *Nature* 403: 853-858.
- Pal, T.K. (1985).** A revision of Indian *Psammoecus* Latreille (Coleoptera: Silvanidae). *Miscellaneous Publication, Records of Zoological survey of India. Occasional paper* 71: 1-54.
- Pal, T.K. (1992a).** On a collection of Clavicorn beetles (Family: Erotylidae, Endomychidae and Languriidae) from Arunachal Pradesh, India. *Records of Zoological Survey of India* 90(1-4): 203-210.
- Pal, T.K. (1992b).** Inopelidae and Elacatidae (Coleoptera: Heteroptera) from Arunachal Pradesh, India. *Records of Zoological survey of India* 91(3-4): 343-351.
- Pal, T.K. (1992c).** A new inopeplid species (Coleoptera: Cucujoidae) from Patkoi Hill Range of Arunachal Pradesh. *Journal of Bombay Natural History Society* 89(2): 238-241.
- Pal, T.K. (1993).** On a collection of Passalidae and Lucanidae (Insecta: Coleoptera) from Arunachal Pradesh India. *Records of Zoological survey of India* 90 (1-4): 135-145.
- Ramakrishna & J.R.B. Alfred (2006).** Fauna of Arunachal Pradesh: an overview, pp. 1-20. In: Editor-Director. *Fauna of Arunachal Pradesh*. State fauna Series 13 (Part-I). Zoological Survey of India Publication, 666pp.
- Sen, S., N.K. Pramanik & C.K. Sengupta (1998).** Thysanoptera fauna of northeastern India. *Records of Zoological Survey of India - Occasional Paper* 100: 1-123.
- Sengupta, C.K. & T. Sengupta (1981).** Cerambycidae (Coleoptera) of Arunachal Pradesh. *Records of the Zoological Survey of India* 78(1-4): 133-154.
- Singh, T.P., S. Singh, P.S. Roy & B.S.P. Rao (2002).** Vegetation mapping and characterization in West Siang District of Arunachal Pradesh, India- a satellite remote sensing based approach. *Current Science* 83(10): 1221-1230.
- Subramanian, K.A. (2005).** *Dragonflies and Damselflies of Peninsular India - A Field Guide*. E-Book of Project Lifescape. Centre for Ecological Sciences, Indian Institute of Sciences and Indian Academy of Sciences, Bangalore, India, 118pp.
- Tandon, S.K. & S. Khera (1978).** Ecology and distribution of grasshoppers (Orthoptera: Acridoidea) in Arunachal Pradesh, India and the impact of human activities on their ecology and distribution. *Memoirs of the Entomology St. John's College* 6: 73-91.
- Singh, O.T., J. Chakravorty, S. Nabom & D. Kato (2007).** Species diversity and occurrence of edible insects with special reference to Coleopterans of Arunachal Pradesh. *Journal of Natural Conservation* 19(1): 167- 176.

