



International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 4 Number 9 (September-2016) pp. 87-98

Journal home page: <http://www.ijcrar.com>

doi: <http://dx.doi.org/10.20546/ijcrar.2016.409.008>



Insect Faunal Diversity of the Sunderban Biosphere Reserve, West Bengal, India

Bulganin Mitra¹, Olive Biswas¹, Sankarsan Roy^{1*}, Udipta Chakraborti¹ and Balaram Panja²

¹Zoological Survey of India, M – Block, New Alipore, Kolkata, West Bengal, India

²Office of the Divisional Forest Officer, 24- Parganas (South division), Kolkata, West Bengal, India

*Corresponding author

KEYWORDS

Entomofauna,
Diversity, India,
Sunderban
Biosphere
Reserve.

A B S T R A C T

Present paper confirms the report of 591 species, under 404 genera of 100 families belonging to 13 orders of insects from the Indian parts of Sunderbans. In terms of species richness, the order Lepidoptera is the most speciose (163 species), followed by Diptera (133 species), Hyemnoptera (96 species), Coleoptera (81 species), Orthoptera (19 species), Dermaptera (8 species), Isoptera (7 species), Neuroptera (6 species), Thysanoptera (2species), Blattodea (2species) and Phthiraptera (2 species).

Introduction

Mangroves are one of the dynamic ecosystems that harbour a variety of organisms of which insects play a major role that influences the growth and survival of mangrove. The knowledge of insect faunal diversity of the Sunderban Biosphere Reserve (SBR) is at the very primary level. Probably, the first attention was drawn on the insects and Diptera in particular from Sundarbans by Chatterjee in the year 1907. Subsequently, contributors like, Sarangi (1983), Maiti and Nandy (1985), Ray and Choudhury (1985), Choudhury (1986), Ray and Choudhury (1986), Poddar and Choudhury (1986), Nandi and Misra (1987)

Mandal and Nandi (1989) Roy and Choudhury (1991), Mukherjee (1993), Ghosh & Ghosh (1994), Bal and Basu (1994), Biswas *et al.*, (1994 a, b, c), Chakraborty *et al.*, (1994), Ghosh *et al.*, (1994), Agarwal and Ghose (1995), Majumder and Parui (2001), Bhattacharyya *et al.*, (2002), Mitra *et al.*, (2003), Rajavel *et al.*, (2005) were enriched the insect fauna of this mangrove deltaic islands. Moreover, in recent times Mitra and Mitra (2009), Narendran and Kumar (2009), Sharma (2012), Kumar *et al.* (2012), Mitra (2013), Ghosh and Mitra (2014), Hassan and Biswas (2014), Mitra (2014), Mitra *et al.*, (2014),

Mitra *et al.*, (2015 a, b, c) have also been contributed several research papers on the insect faunal diversity of the SBR of West Bengal.

But all these information are published in different journals and in a scattered manner. Therefore, an attempt has been taken to generate a state of art report on the diversity of insect fauna of this unique ecosystem. Present communication has been developed from the field data generated from Sundarbans during the last four years (2012-2016) under the MOEFCC funded project by the authors and also from the information available in the existing literature on this subject. Sincere efforts have been made to provide a detailed and up to date knowledge on the insect faunal diversity of this aqua-terrestrial mangrove ecosystem of Sundarbans. Gap areas of interest in the insect faunal study have also been focused.

Study Area

Sundarban Biosphere Reserve (SBR) in West Bengal, India has been identified as the largest single block of tidal halophytic mangrove forest in the world, covering an area of 9630 sq km (in India) and lying in between 21° 32' – 22° 40' N latitude and between 88° 45' – 89° 04' E longitude. At present the SBR is bounded in the East by the International boundary of Bangladesh formed by the rivers Ichamati, Raimangal and Kalindi; Bay of Bengal in the South and river Hooghly in the West. The Northern limit cannot be clearly demarcated due to high degree of reclamation; though an imaginary Dampier-Hodges line has marked (considered in 1831) the North-Western limit of this Biosphere Reserve – an imaginary line from Kulpi (South 24-Parganas) to Basirhat (North 24-Parganas).

Results and Discussion

Present communication reports 591 species, under 404 genera of 100 families belonging to 13 orders of insects from the SBR. Of them, maximum number of species were reported from the order Lepidoptera (163 species), followed by Diptera, Hyemnoptera and Coleoptera with 133 species, 96 species and 81 species, respectively (table-1). Among 404 genera reported from this mangrove ecosystem, the trend for generic richness is almost the same and Lepidoptera (122) shares the maximum number of genera (table-1). Among the 13 orders of insects reported from this Biosphere reserve, the maximum number of families are found in the order Diptera (22), and the minimum in Thysanoptera, Blattodea and Pthiraptera (1 family each) (table-1).

Altogether, 185 species of odonates have been reported so far from West Bengal (table.1). Of them, only 27 species pertaining to 23 genera under 3 families are known from Sunderbans Among these 3 families, Libellulidae (62.96%) and Coenagrionidae (33.33%) are more diversified families and well-studied in SBR (fig.1).

The next order Thysanoptera is reported with 143 species under 79 genera of 3 subfamilies from West Bengal (Tyagi and Kumar, 2016). Of them, only two species of two genera under single family are so far reported from this deltaic mangrove (table-1).

The order Orthoptera includes common insects like grasshoppers, locusts, crickets, mole crickets and grouse locusts. In West Bengal, altogether 278 species of orthopteran insects have been reported (Shisodia *et al.*, 2010). Of them, only 19 species under 15 genera under 4 families are

reported from Sunderban Biosphere Reserve (table-1). Among the four families of orthopteran insects reported from this biosphere reserve, the family Acrididae (57.89%) and Tettigoniidae (21.05%) are well studied and having more number of species in comparison to Gryllidae and Pyrgomorphidae (10.52% each) (fig.2).

Order Blattodea is one of the oldest insect orders with a fossil history extending to more than 300 million years. In State fauna series of Zoological Survey of India, Mukherjee (1993) reported 23 species of Blattodea from West Bengal (table.1). Of them, only two species under single genera of single family are known from Sunderbans (table.1).

Maiti and Saha (1993) were the pioneering contributors on termite fauna of West Bengal and reported 55 species of termites from the state of West Bengal (table.1). Of them, only seven species belonging to five genera and three families are reported from Sunderban (table-1). The family Termitidae shares maximum number of species (43%), whereas, other two families are almost equal in share (fig.3).

The taxonomic study of the order Neuroptera from this state and Sunderbans in particular has received very little attention. So far, 79 species of 48 genera and 12 families of Lace wings are reported from West Bengal of which 6 species of 5 genera under 3 families are known from Sunderban (table-1). All the three families share almost equal number of species in SBR (fig.4).

Srivastava (1993) was the pioneer worker on Dermaptera in West Bengal and made substantial and valuable contribution on this group. Among 79 species reported from West Bengal, 8 species under 8 genera of 5 families are reported from Sunderban

Biosphere Reserve (table-1). Among the reported families of order Dermaptera in SBR, the family Labiduridae shares highest number of species (fig.5).

Altogether, 966 species of hemipterans are reported from West Bengal (table.1). Of them, only 45 species belonging to 37 genera of 14 families are so far known from SBR (table.1). Among the 14 families so far reported from SBR, the family Pentatomidae shares maximum number of species (20%) (fig. 6).

The Diptera fauna of SBR are enriched with the recent contributions by Mitra (2013) and Mitra *et al.*, (2015). Presently, 133 species under 71 genera belonging to 22 families of the order Diptera are known from Sunderbans (table-1). Of the 22 families reported from SBR, the family Muscidae and Culicidae shares maximum species with 17% each followed by other families (fig. 7).

The order Coleoptera with 81 species of 58 genera under 17 families is ranked fourth among the reported insect fauna of Sunderban Biosphere Reserve (table.1). Among them, the families like Cerambycidae, Dytiscidae and Staphylinidae shares maximum species (12%) followed by the other families (fig. 8).

As per available records, out of 430 species of hymenopteran insects from West Bengal, 96 species under 55 genera are reported from SBR (table.1). Among the 11 families of Hymenoptera, Vespidae shares maximum species with 25% followed by Eulophidae (24%) and rest. (fig. 9).

Approximately, 1020 species are reported so far from the State of West Bengal under order Lepidoptera (table.1) and 163 species of 122 genera under 15 families of

Lepidoptera are reported from the mangrove ecosystem of SBR (table-1). Among the 15 families of Lepidoptera, Lycaenidae shares maximum diversity (23%) followed by the other families (fig. 10).

Altogether, 21 species belonging to the 7 genera under 6 families of the order Phthiraptera are so far known from West Bengal (table.1). Of them, 2 species namely, *Haematopinus suis* (Linnaeus, 1758) and *Linognathus setosus* (Von Olfers, 1816) under single family of the monophyletic suborder Anoplura are reported from Sunderbans (Adhikari & Ghosh, 1998).

The mangrove create unique ecological environment that host rich assemblages of species (Kathiresan and Bingham, 2001). Insects are believed to constitute a significant portion of the fauna in many mangrove communities. But unfortunately, mangrove faunal diversity is well known for the larger animals and poorly known for

micro-organisms and insects. Study of insect biodiversity can help in determining its potential productivity and in better management of mangroves. They may be permanent residents of the mangroves or only transient visitors. But both the groups do bear inputs into the mangrove ecosystem and provides ecosystem services and other important dynamics in the ecosystem.

There are several works have been done on the insect faunal diversity of different mangroves in India. Senthil and Varadharajan (1995) carried out a study on insect diversity at Pichavaram mangrove and reported a total of 101 species of insects belonging to nine orders and 42 families. Veenakumari *et al.*, (1997) recorded 276 species of insects from the mangals of Andaman and Nicobar islands. Balakrishnan *et al.*, (2014) reported 487 species of Insects from Pichavaram mangrove. But nothing has been known on the insect diversity of SBR in a consolidated manner.

Table.1 Number of Insect species of SBR and West Bengal

	Sunderban Biosphere Reserve				West Bengal
	Order	Family	Genus	Species	Species
1	Odonata	3	23	27	185
2	Thysanoptera	1	2	2	143
3	Orthoptera	4	15	19	278
4	Blattodia	1	1	2	23
5	Isoptera	3	5	7	55
6	Neuroptera	3	5	6	79
7	Dermaptera	5	8	8	79
8	Hemiptera	14	37	45	966
9	Diptera	22	71	133	681
10	Coleoptera	17	58	81	1570
11	Hymenoptera	11	55	96	430
12	Lepidoptera	15	122	163	1020
13	Anoploplura	1	2	2	21
		100	404	591	5530

Fig.1 Species diversity of the order Odonata (Family-wise)

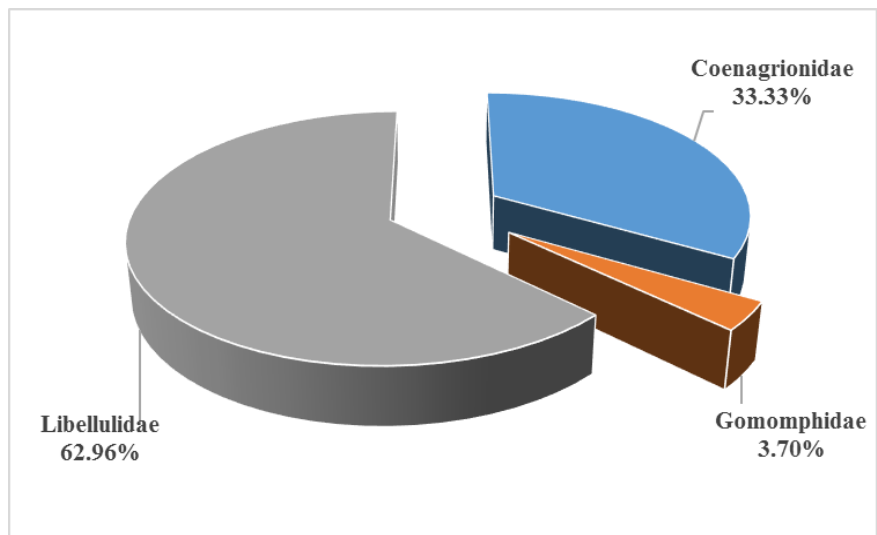


Fig.2 Species diversity of the order Orthoptera (Family wise)

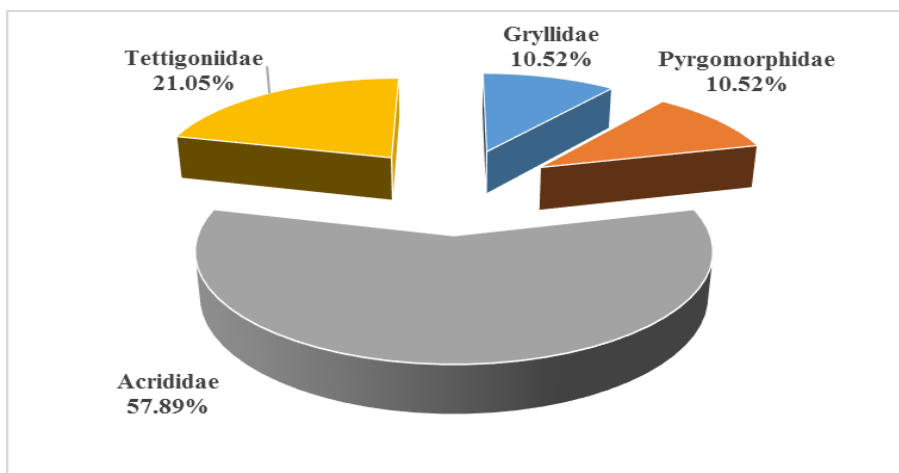


Fig.3 Species diversity of the order Isoptera (Family wise)

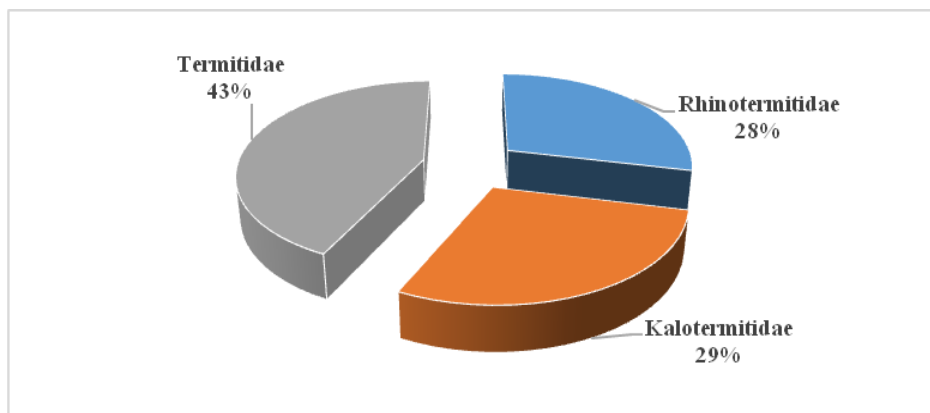


Fig.4 Species diversity of the order Neuroptera (Family wise)

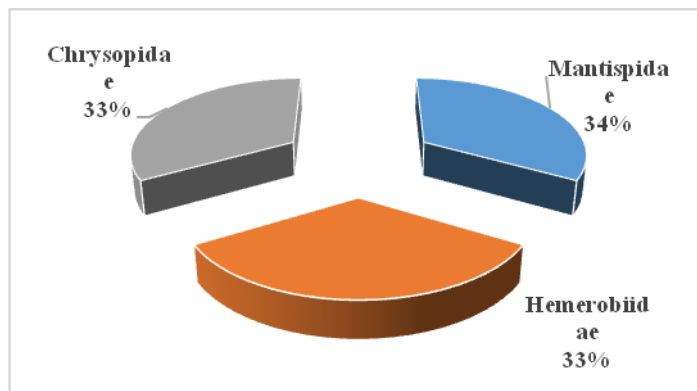


Fig 5 Species diversity of the order Dermaptera (Family wise)

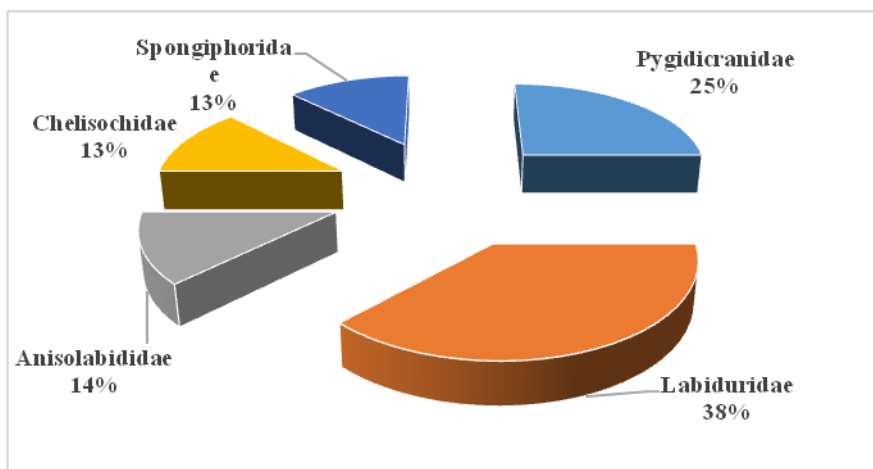


Fig.6 Species diversity of the order Hemiptera (Family wise)

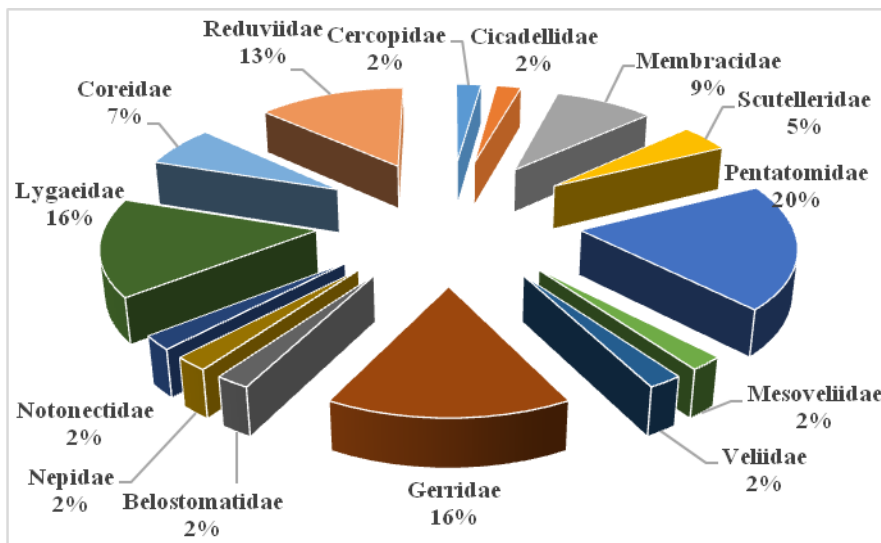


Fig.7 Species diversity of the order Diptera (Family wise)

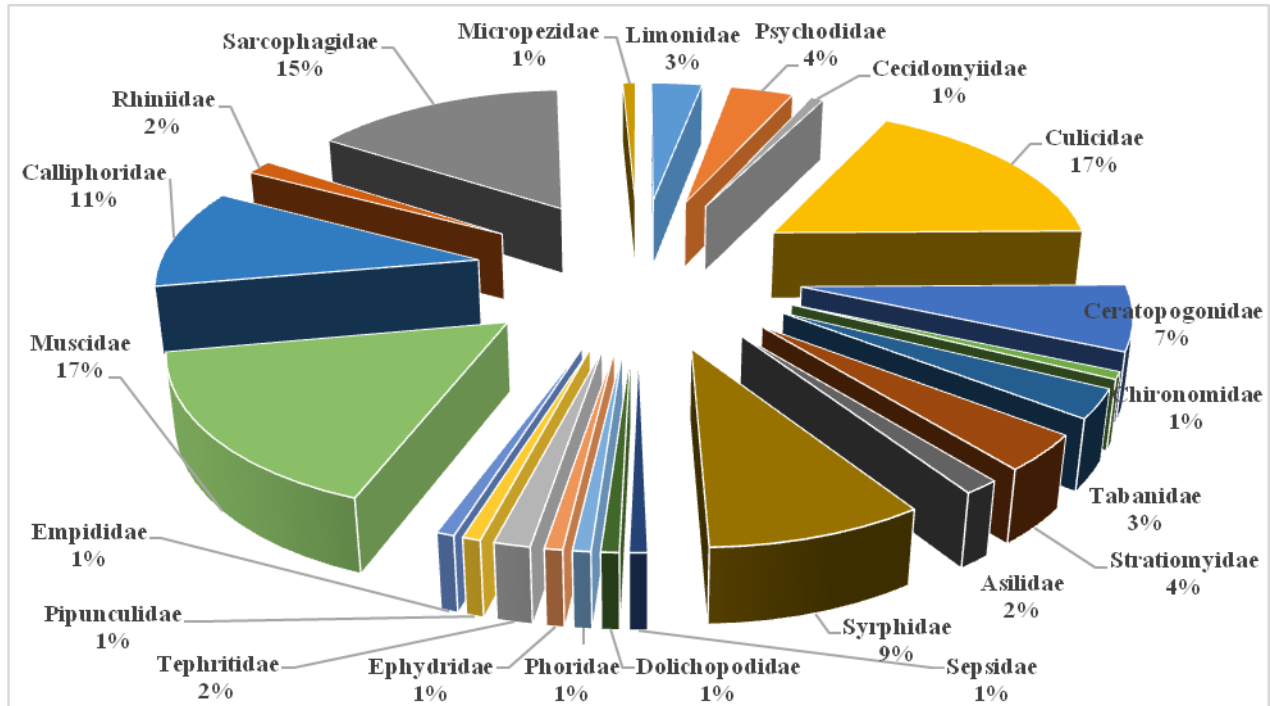


Fig.8 Species diversity of the order Coleoptera (Family wise)

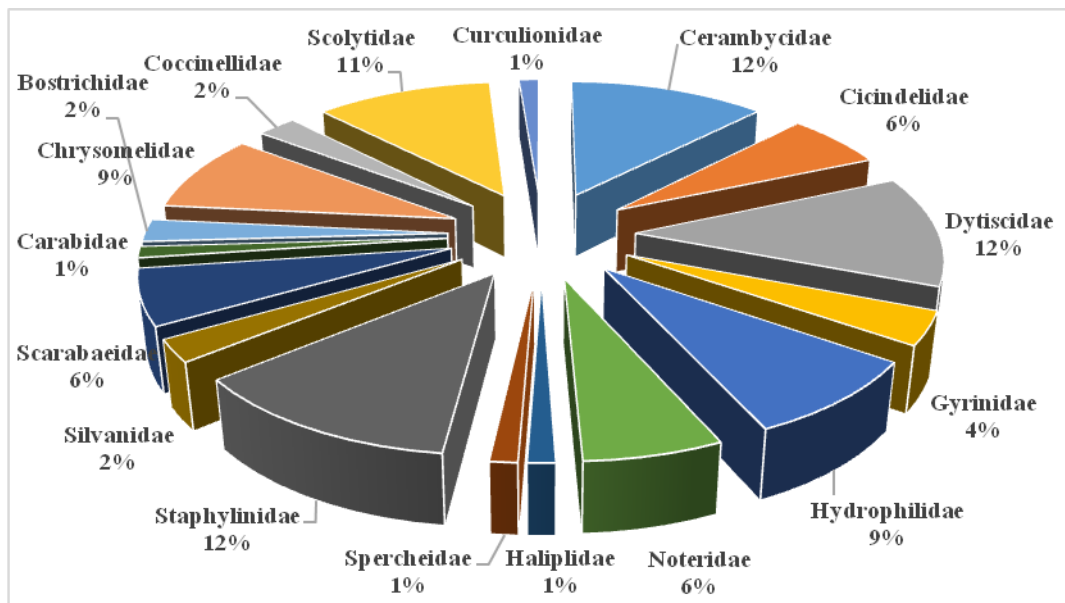


Fig.9 Species diversity of the order Hymenoptera (Family wise)

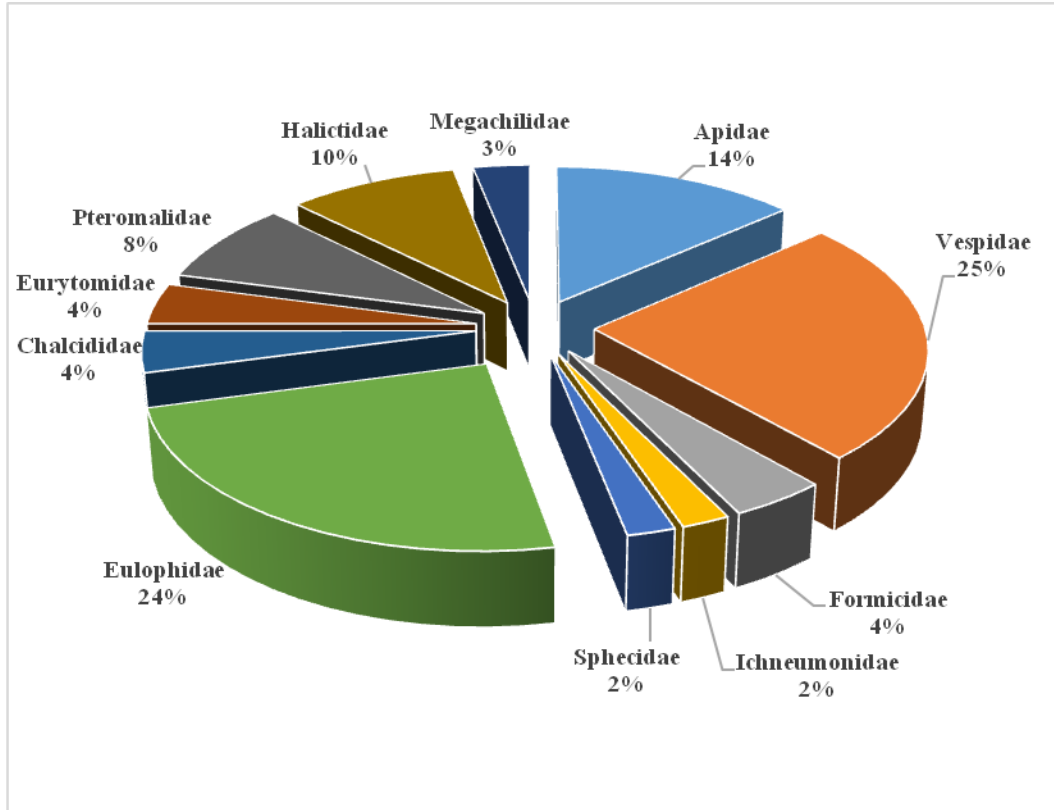


Fig.10 Species diversity of the order Lepidoptera (Family wise)

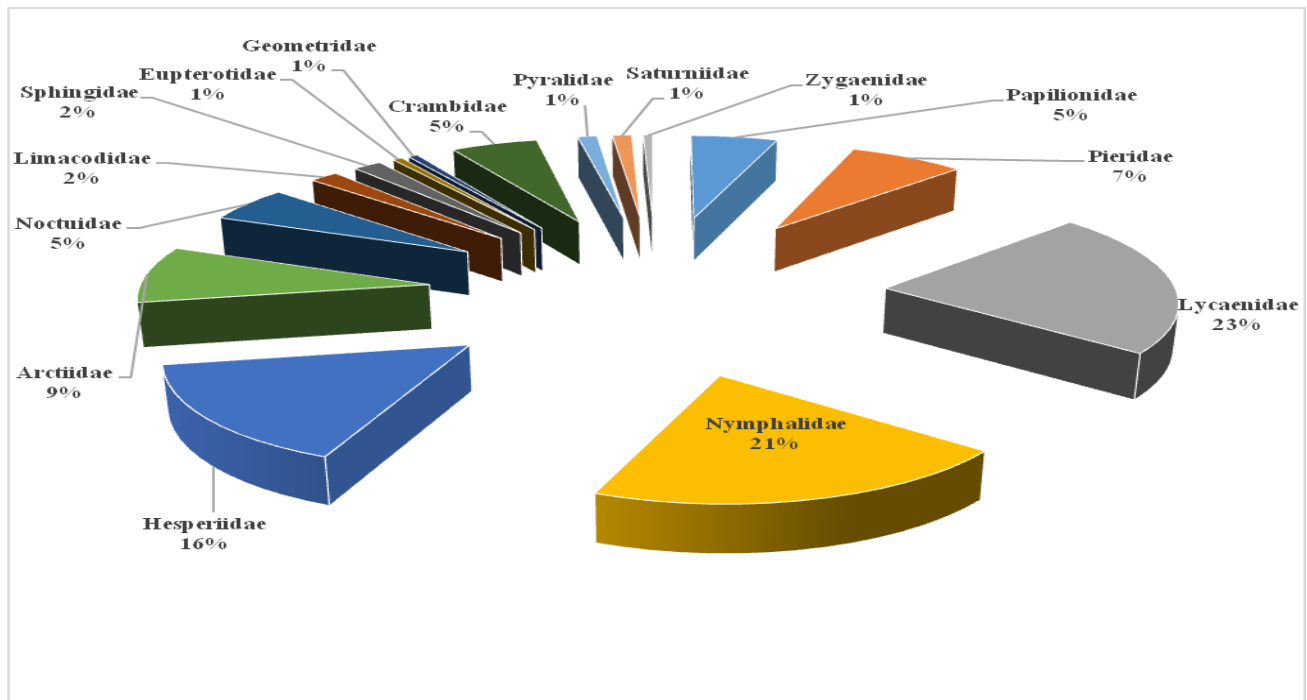
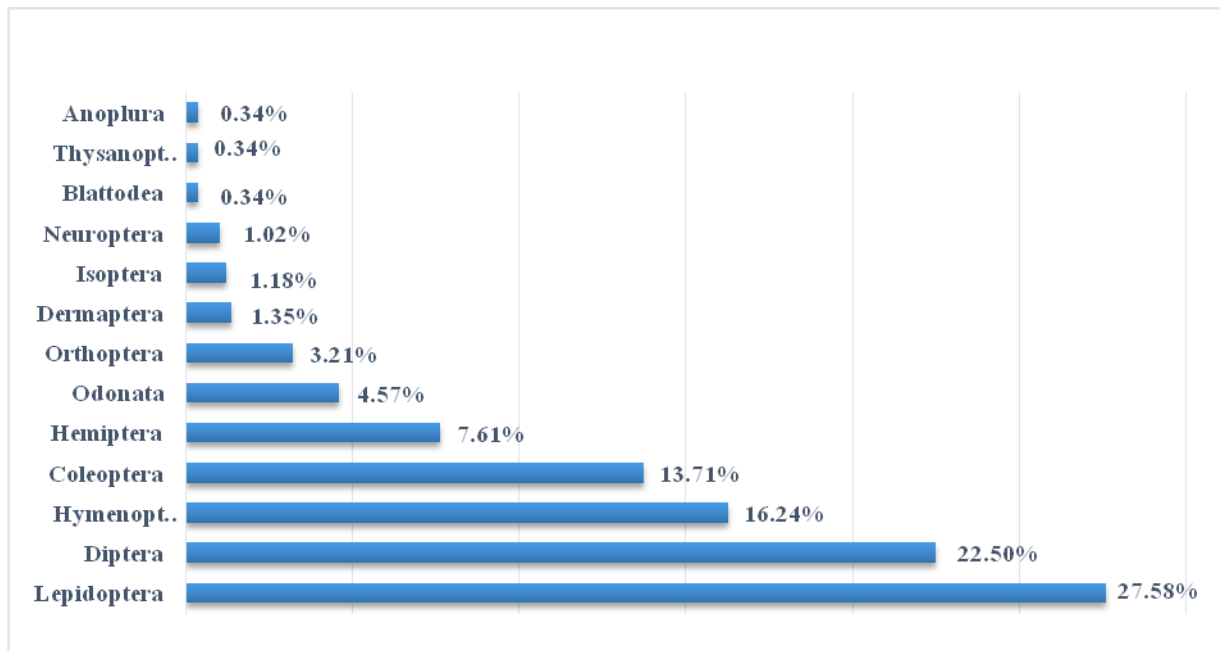


Fig.11 Species diversity of the order reported from Sunderban Biosphere Reserve (percentage wise)



Sundarban ecosystem is famous for its luxuriant mangroves and unique wild life resources. Near total inter-dependence in phyto-entomon relationship, on this extremely versatile but fragile eco-surface, has brought about co-evolution that ensured emergence of innumerable varieties and variabilities amongst the insects. In comparison to insect faunal diversity of other mangroves in India, insect faunal diversity is much more in the Indian part of Sunderbans. Though, out of 27 order of insects in India only 13 order of insects so far reported from Sunderban.

Considering the order wise analysis, order Lepidoptera shares maximum number of species (27.58%) of the total reported species from SBR (fig.11). But in comparison to butterflies very less number of moth species are reported so far. Therefore, more emphasis to be given to explore the moth fauna of this mangrove ecosystem.

The order Diptera is in the second rank and share 22.50% of species in this protected area (fig.11). Among the 85 families so far reported from India, Sunderban is having only 22 families. Moreover, most of the families are representing with very less number of species. Some important families like, Tipulidae, Chloropidae, Bibionidae, Bombyllidae, Tachinidae, Hippoboscidae, Diopsidae, Sphaeroceridae, Agromyzidae are missing till to date. More expertise surveys will help to make a complete picture of this group.

Hyemnoptera with 16.24 % species diversity is ranked 3rd in this deltaic region (fig.11). Only three families, namely, Vespidae, Eulophidae and Apidae are well studied group of this biosphere reserve. Other families of Hymenoptera and Formicidae in particular are not been studied properly where more species can be explored from this region.

The order Coleoptera with more than 100 families in India is representing with 17 families which share 13.71% of the species in Sunderban (fig.11). Therefore, more survey and study will help to give a complete picture of the beetle fauna of this unique mangrove zone.

The phytophagous group of Insects, the order Hemiptera are also not been studied properly and therefore, share only 7.61% of the species in this mangrove ecosystem (fig.11). Rest of the families also poorly represented from this area (fig.11).

Presently, considerable changes in the landscape of Sundarbans have taken place keeping pace with developmental activities of the region, particularly in reclamation programmes in agriculture, aquaculture and human habitation. Moreover, SBR is also experiencing the effects of climate change that has influenced the phenology of plants which in all possibility would affect the insects also. Survivability of this mangrove forest is largely dependent on the insects through their ecosystem services including pollination. Therefore, it is an urgent need to document the complete insect faunal diversity of this pristine ecosystem immediately and hope this first consolidated report on the insect faunal diversity of SBR will act as a baseline data for future works on the insect faunal diversity of Sunderban Biosphere Reserve.

Acknowledgement

Authors are grateful to Dr. Kailash Chandra, Director, Zoological Survey of India, Kolkata for giving necessary permissions and suggestions. Thanks are also due to Shri K. C. Gopi, Additional Director and in-charge of Entomology section (A & B), Zoological Survey of India, Kolkata for all his extended help and support.

References

- Adhikary, C.C. and Ghosh, A.K. 1999. Insecta: Anoplura. In: *Zoological Survey of India, Fauna of West Bengal, State Fauna Series*, 3(8): 427 - 442
- Agarwal, V.C. and Ghose, R.K. 1995. Fauna of Sunderban tiger reserve. Fauna of Tiger Reserve (Sunderbans, Palamau, Simlipal and Manas). *Fauna of Conservation Areas*, 8: 1-46.
- Balakrishnan, S., Srinivasan, M. and Mohanraj, J. 2014. Diversity of some insect fauna in different coastal habitats of Tamil Nadu, southeast coast of India. *J. Asia Pacific Biodiversity*, 7: 408-414.
- Bal, A. and Basu, R.C. 1994a. Insecta: Hemiptera: Mesoveliidae, Hydrometridae, Veliidae & Gerridae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 511-534.
- Bal, A. and Basu, R.C. 1994b. Insecta: Hemiptera: Belostomatidae, Nepidae, Notonectidae and Pleidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 535-558.
- Bhattacharyya, A., Datta, B., Chowdhury, A. 2002. Homopteran rice pests in Sunderbans biosphere reserve. *Insect Environ.*, 8 (4): 191-192.
- Biswas, B. and Ghosh, L.K. 1994. Insecta: Homoptera: Aleyrodidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 113-124.
- Biswas, B., Ghosh, M., Basu, R.C. 1994a. Insecta: Hemiptera: Homoptera: Cercopidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 1-27.
- Biswas, B., Basu, R.C. and Ghosh, L.K. 1994b. Insecta: Hemiptera: Homoptera: Membracidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 69-90.
- Biswas, B., Sen, G.C. and Ghosh, L.K. 1994c. Insecta: Hemiptera: Reduviidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 369-411.

- Chakraborty, S.P. and Ghosh, L.K. 1994. Insecta: Hemiptera: Lygaeidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 413-432.
- Chakraborty, S.P., Ghosh, L.K. and Basu, R.C. 1994. Insecta: Hemiptera: Pentatomoidea - I. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 469-493.
- Chatterjee, G.C. 1907. Mosquitoes of the genus *Anopheles* from Port Canning, Lower Bengal. *Rec. Indian Mus.*, 1: 81-82
- Choudhury, A. 1986. Vertical distribution of immature *Culicoides oxystoma* Kieft. (Diptera : Ceratopogonidae) in intertidal mud and sand Oats of Sunderbans Sagar Island. *The Mangroves: hoc. Nat S,mp. BioL Util Cons. Mangroves*, pp. 522-526.
- Ghosh, L.K. and Ghosh, M. 1994. Insecta: Hemiptera: Cicadellidae. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 29-68.
- Ghosh, M., Dutta, B. and Ghosh, L.K. 1994. Insecta: Hemiptera: Pentatomoidea – II. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(5): 495-509.
- Ghosh, S.K. and Mitra, B. 2014. Further records of aquatic beetles from Sunderban Biosphere Reserve, West Bengal. *Bionotes*, 16(2): 67-68.
- Hassan, M.E. and Biswas, B. 2014. Record of some Hemipteran fauna from the Sunderban Biosphere Reserve, West Bengal. *Bionotes*, 16(1): 29.
- Kathiresan, K. and Bingham, B.L. 2001. Biology of Mangroves and Mangrove Ecosystems. *Adv. Marine Biol.*, 40: 81-251.
- Kumar, J., Basu Roy, A. and Mitra, B. 2014. Butterflies and Moths of Sunderban, West Bengal, India. *ZSI ENVIS Newsletter*, 20(1&2): 11.
- Mandal, A.K. and Nandi, N.C. 1989. In: *Zoological Survey of India. Fauna of Sunderban Mangrove Ecosystem, West Bengal, India. Fauna of Conservation Areas*, 3: 116 pp.
- Maiti, P.K. and Nandy, B. 1985. Estuarine Insects. In State of Art Report: Estuarine Biology: Zoological Survey of India, Calcutta (mimeo.) 9 pp
- Maiti, P.K. and Saha N. 1993. Insecta: Isoptera. In: *Zoological Survey of India, Fauna of West Bengal, State Fauna Series*, 3(4): 1-17.
- Mitra, B., Mirdha, R. and Parui, P. 2003. Diptera from Sagar Island, South 24 Parganas, West Bengal. *Bionotes*, 5(3): 69.
- Mitra, A. and Mitra, B. 2009. Pictorial handbook on Common Dragon and Damsel Flies (Odonata: Insecta) of mangroves of Sunderbans, India. *Zool. Survey of India*, Pp. 1-56.
- Mitra, B. 2013. A Synoptic Retrospect on the Diptera fauna of Sunderban Biosphere Reserve, India. *Prommalia*, 1: 56-64.
- Mitra, B. 2014. Faunal Bibliography of Sunderban Biosphere Reserve. *ZSI Envis Newslett.*, 20(1&2): 13-20.
- Mitra, B., Shah, S.K., Chakraborti, U., Roy, S., Biswas, O., Biswas, B., Das, S.K. and Kumar, P., Girish. 2014. Additional Records of Entomofauna from Sunderban Islands, West Bengal. *Bionotes*, 16(4): 134-135.
- Mitra, B., Biswas, O., Roy, S and Chakraborti, U. 2015a. Pollinators of Mangroves in the perspective of Indian Sunderbans. *ZSI Envis Newslett.*, 21: 6-11.
- Mitra, B., Parui, P., Roy, S., Biswas, O., and Chakraborti, U. 2015b. A note on Stilt-legged Flies (Diptera: Micropezidae) with the First Record of *Mimegrallaalbimana* (Doleschall, 1856) from SunderbanBiosphere Reserve, India. *Entomol. Appl. Sci. Lett.*, 2(2): 16-19.
- Mitra, B., Chakraborti, U., Das, P. and Majumder, A. 2015c. Longhorn beetle (Cerambycidae: Coleoptera) of Sunderban, West Bengal, India. *Entomol. Appl. Sci. Lett.*, 2(2): 26-31.
- Majumder, S.C. and Parui, P. 2001. Diptera (Insecta) from Sunderban, West Bengal, *Rec. Zool. Surv. India*, 99(1-4): 171-199.
- Mukherjee, K.P. 1993. Insecta: Dictyoptera: Blattaria. *Zoological Survey of India:*

- Fauna of West Bengal, State Fauna Series*, 3(4): 461-473.
- Nandi, N.C. and Misra, A. 1987. Bibliography of the Indian Sundarbans with Special Reference to Fauna. *Records of the Zoological Survey of India, occ. Paper*, 97: 1-135.
- Narendran, T.C. and Girish Kumar, P. 2009. Taxonomic studies on a collection of Chalcidoid wasps (Hymenoptera: Chalcidoidea) from Sunderbans, West Bengal India. *Rec. Zool. Surv. India*, 109(1): 89-96.
- Narendran, T.C. and Girish Kumar, P. 2009. Three new species of Pteromalidae (Hymenoptera: Chalcidoidea) from Sunderbans, West Bengal, India. *J. Environ. Sociobiol.*, 6(2): 123-130.
- Poddar, T.K. and Choudhury, A. 1986. Vertical and horizontal movement of intertidal hydric rove beetle (*Bledius* spp.) in the sand flats of Sagar Island, Sunderbans, India. *The Mangroves: Proc. Nat. Smp. Biol. Util. Cons.*, pp. 511-515.
- Rajavel, A.R., Natarajan, R., Vaidyanathan, K., 2005. Mosquitoes of the mangrove forests of India: Part- 2 Sundarbans, West Bengal *J. Am. Mosq. Control Assoc.*, 21(2): 136-138.
- Ray, S. and Choudhury, A. 1985. Study on salinity tolerance of *Culex satiens* Wied. (Diptera: Culicidae) larvae in laboratory conditions 2nd NaL Seminar on Marine IntertidJl Ecology, Waltair, Abstract No. 83A.
- Ray, S. and Choudhury, A. 1986. Ecology of tabanid larvae and pupae (Diptera : Tabanidae) in Sunderbans Mangrove Ecosystem, Sagar Island. *The Mangroves: Proc. Nat. Symp. Biol. Util. Cons. Mangroves*, pp. 516-521.
- Roy, S. and Choudhury, A. 1991. Population ecology of benthic dipterans of the mangrove ecosystem of Sundarbans, India. *Rec. Zool. Surv. India*, 130: 1-91.
- Saranghi, N. 1983. Ecology of macrobenthos in some sewage water and brackish water impoundments of West Bengal India. Ph.D. Thesis Calcutta University, Calcutta.
- Senthil, R. Varadharajan. 1995. *Proceedings of the national symposium on recent trends in wild life research*. A.V.C. College. Mayiladuthurai 609: 30-35.
- Sharma, N. 2012. Population fluctuation of Grasshopper fauna in a field near Kakdwip, Sunderbans, West Bengal. *Rec. Zool. Surv. India*, 111(3): 27-30.
- Shishodia, M.S., Chandra, K. & Gupta, S.K. 2010. An annotated checklist of Orthoptera (Insecta) from India. *Records of the Zoological Survey of India*, 314: 1-366.
- Srivastava, G.K. 1993. Insecta: Dermaptera. In: *Zoological Survey of India, Fauna of West Bengal State Fauna Series*, 3(4): 369-459.
- Tyagi, K. and Kumar, V. 2016. Thrips (Insecta: Thysanoptera) of India- An Updated Checklist HALTERES, Volume 7: 64-98.
- Veenakumari, K., Mohanraj, P. and Bandopadhyay, A.K. 1997. Insect herbivores and their natural enemies in the mangals of the Andaman and Nicobar Islands. *J. Natural History*, 31(7): 1105-1126.

How to cite this article:

Bulganin Mitra, Olive Biswas, Sankarsan Roy, Udipta Chakraborti and Balaram Panja. 2016. Insect Faunal Diversity of the Sunderban Biosphere Reserve, West Bengal, India. *Int.J.Curr.Res.Aca.Rev.4(9): 87-98*. doi: <http://dx.doi.org/10.20546/ijcrar.2016.409.008>