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Insect faunal diversity of chintamani kar bird sanctuary and other protected areas of West Bengal

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Abstract
Chintamani Kar Bird Sanctuary or Kayal-er Bagan is the only Protected Areas of West Bengal, within the city limit of Kolkata and is significant for its local floral and faunal diversity. Present communication is the first scientific study on the insect fauna of Chintamani Kar Bird Sanctuary (CKBS) and reports 215 species under 175 genera belonging to 55 families of 15 orders. Lepidoptera shares 117 species, followed by Odonata (39 species), Diptera (15 species), Hymenoptera (13 species), Coleoptera (11 species), Hemiptera (10 species), Blattodea (2 species). Beside this, Dermaptera, Ephemeroptera, Isoptera, Mantodea, Orthoptera, Phasmida, Psocoptera and Thysanura (one species each) are also enriched the insect diversity of this sanctuary. This communication also provides the present scenario of the insect faunal diversity in other protected areas of West Bengal and scope of further research.

Keywords: insect diversity, chintamani kar bird sanctuary (CKBS), protected areas, West Bengal

Introduction

Insects are the most diverse group on earth, consisting over half of the delineated living organisms, but knowledge on their diversity and distribution remains comparatively poor when compared to other groups [1].

Like other parts of the globe, the documentation of the vertebrates or higher group of animals of any protected areas in India were studied more elaborately than the insect group. In West Bengal, the picture is almost the same except some stray documentation from a few protected areas. Among them, much work was done at the Buxa Tiger Reserve. The major contributors are Raychaudhuri (1996) [2], Raychaudhuri & Saha (2000 & 2014) [3-4], Saha & Raychaudhuri (1998a & b, 2000) [5-7], Nandy *et al.* (2004) [8] and Sarkar *et al.* (2010, 2014, 2015a, b, 2016a, b & c, 2017) [9-16]. All these works are focused on the order Coleoptera. Apart from these, Raychaudhuri and Saha (2014) [4] have done a voluminous work on insects (573 species) and Ghosh and Das (2016) [17] on aquatic beetles of Buxa Tiger Reserve (Table-1).

Table 1: Studied insect orders from different protected areas of West Bengal

1.	**Gorumara National Park**	**Jalpaiguri**	**Lepidoptera**
2.	Jaldapara National Park	Jalpaiguri	Hymenoptera
3.	Neora Valley National Park	Darjeeling	Lepidoptera
4.	Bethuadahari Wildlife Sanctuary	Nadia	Hymenopetra
5.	Bibhuti Bhusan Wildlife Sanctuary	North 24 Paraganas	Collembola, Odonata, Hemiptera, Coleoptera, Diptera, Lepidoptera, Hymenoptera
6.	Buxa Tiger Reserve	Jalpaiguri	Coeloptera, Dermaptera, Diptera, Hemiptera, Hymenoptera,Isoptera, Lepidoptera, Neuroptera, Odonata, Orthoptera, Blattodea
7.	Sundarban Biosphere Reserve	North &South 24-Paraganas	Lepidoptera, Diptera, Hymenoptera, Collembola, Coeloptera, Orthoptera, Dermaptera, Isoptera, Mantodea, Neuroptera, Thysanoptera, Blattodea, Pthiraptera
8.	Chintamani Kar Bird Sanctuary	South 24-Paraganas	Lepidoptera, Odonata, Diptera, Hymenoptera, Coleoptera, Hemiptera, Blattodea, Dermaptera, Ephemeroptera, Isoptera, Mantodea, Orthoptera, Phasmida, Psocoptera and Thysanura

Scoliid wasps of Jaldapara Wildlife Sanctuary (Currently National Park) and butterflies of Gorumara National Park were documented by Bhattacharjee *et al.* (2010) [18] and Das *et al.* (2012) [19] respectively. One voluminous work on the

butterflies of Gorumara National Park was also published by Ghatak and Basu Roy (2013) [20]. Roy *et al.* (2012) [21] studied the butterfly diversity and abundance with reference to the habitat heterogeneity in and around Neora Valley National Park. Shah *et al*. (2017) [22] studied the moth diversity of Neora Valley National Park. All these works were concentrated only in the protected areas of Northern West Bengal (Table-1).

Insect fauna was rather poorly studied in Southern Bengal in comparison to protected areas of Northern Bengal. Among them, documentation of ant fauna of Bethuadahari Wildlife Sanctuary was done by Basu *et al.* (2013) [23]. The work done by Mitra & Parui (2012) [24] and Mitra *et al.* (2011, 2015) [25-26], Ghosh *et al.* (2011) [27], Mandal (2011) [28] and Mandal *et al*. (2011) [29] have documented the diversity of insect fauna of Bibhutibhushan Wildlife Sanctuary covering various orders (Table-1).

Literature surveys revealed that, among the protected areas of Southern West Bengal, the maximum studies on insects were made from Indian Sundarban. The major contributors are, Chatterjee (1907) [30], Choudhury (1986) [31], Ray & Choudhury (1986) [32], Poddar & Choudhury (1986) [33], Roy & Choudhury (1991) [34], Majumder & Parui (2001) [35], Mitra *et al.* (2003) [36], Rajavel *et al.* (2005) [37], Mitra & Mitra (2009) [38], Sharma (2012) [39], Mitra (2013, 2014) [40-41], Kumar *et al*. (2014) [42], Ghosh & Mitra (2014) [43], Mitra *et al.* (2014) [44], Hassan & Biswas (2014) [45], Ghosh *et al.* (2015a & b) [46-47], Mitra *et al.* (2015a, b & c) [48-50], Sar *et al.* (2015, 2016) [51-52], Biswas *et al.* (2016) [53], Mitra *et al.* (2016a, b, c, d, e & f) [54-59], Roy *et al.* (2016 a & b) [60-61], Biswas *et al.* (2017a, b, & c) [62-64], Ghosh *et al.* (2017) [65], Khushwaha *et al.* (2017) [66], Mukherjee *et al.* (2017) [67], Roy *et al.* (2017) [68]. Recently, Mitra (2017) [69] published an updated list of 753 species of insects from Sundarban Biosphere Reserve (Table-1).

Since the establishment of Chintamoni Kar Bird Sanctuary (CKBS), nothing has been published or documented on the insect faunal diversity except, three publications on butterflies by Chowdhury & Chowdhury (2006a & b) [70-71] and Chowdhury (2010) [72]. Recently the study of odonates were done from CKBS and got published by Dawn (2014) [73].

Keeping these in view, an attempt has been made to prepare an inventory of the insect diversity of this small protected area as a baseline data for future study on conservational aspects. This present communication reports 215 species belonging to 175 genera of 55 families under the 15 orders. Of them, 93 species of 73 genera under 5 families of butterflies were reported by Chowdhury & Chowdhury (2006a & b) [70-71], Chowdhury (2010) [72] and 39 species under 28 genera belonging to 4 families of odonates were reported by Dawn (2014) [73]. Hence, 83 species under 74 genera of 46 families are new addition of insect species (marked with #) from this protected area of southern Bengal (Table- 2).

Table 2: List of species reported from CKBS

Sl. No.	Order	Family	Species
I. Blattodea : Family:1, Genus:2, Species:2			
1.		Blattidae	#*Blatta orientalis* Linnaeus, 1758
2.		Blattidae	#*Periplaneta americana* (Linnaeus, 1758)
II. Coleoptera: Family:7, Genus :10, Species:11			
3.		Carabidae	#*Carabus* sp.
4.		Cerambycidae	#*Batocera rufomaculata* (De Geer, 1775)
5.		Chrysomelidae	#*Aspidimorpha (Aspidimorpha) miliaris* (Fabricius, 1775)
6.		Chrysomelidae	#*Aulacophora foveicollis* Lucas, 1849
7.		Chrysomelidae	#*Monolepta signata* (Olivier, 1808)
8.		Curculionidae	#*Neochetina eichhorniae* Warner, 1970
9.		Dytiscidae	#*Dytiscus* sp.
10.		Dytiscidae	#*Laccophilus anticatus anticatus* Sharp, 1890
11.		Dytiscidae	#*Laccophilus flexuosus* Aubé, 1838
12.		Hydrophilidae	#*Amphiops pedestris* (Sharp, 1890)
13.		Noteridae	#*Canthydrus laetabilis* (Walker, 1858)
III. Dermaptera: Family:1, Genus:1, Species:1			
14.		Labiduridae	#*Labidura* sp.
IV. Diptera: Family:9, Genus :14, Species:15			
15.		Bombyllidae	#*Villa panisca* (Rossi, 1790)
16.		Calliphoridae	#*Chrysomya megacephala* (Fabricius, 1794)
17.		Culicidae	#*Aedes (Stegomyia) aegypti* (Linnaeus, 1762)
18.		Culicidae	#*Anopheles stephensi* Liston, 1901
19.		Muscidae	#*Musca (Musca) domestica* Linnaeus, 1758
20.		Pipunculidae	#*Pipunculus* sp.
21.		Sarcophagidae	#*Sarcophaga (Sarcophaga) lineatocollis* Macquart, 1843
22.		Syrphidae	#*Dideopsis aegrota* (Fabricius, 1805)
23.		Syrphidae	#*Episyrphus (Episyrphus) balteatus* (De Geer, 1776)
24.		Syrphidae	#*Eristalinus (Eristalinus) arvorum* (Fabricius, 1787)
25.		Syrphidae	#*Eristalinus (Eristalinus) polychromata* (Brunetti, 1923)
26.		Syrphidae	#*Volucella* sp.
27.		Tabanidae	#*Tabanus striatus* Fabricius, 1787

28.		Tipulidae	#*Pselliophora laeta* (Fabricius, 1794)
29.		Tipulidae	#*Tipula fumifinis* Walker, 1860
V. Ephemeroptera : Family: 1, Genus:1, Species:1			
30.		Caenidae	#*Caenis* sp.
VI.Hemiptera: Family:10, Genus :10, Species:10			
31.		Cercopidae	#*Cosmoscarta* sp.
32.		Cicadidae	#*Platypleura* sp.
33.		Eurybrachyidae	#*Eurybrachys tomentosa* (Fabricius, 1775)
34.		Flatidae	#*Neodaksha* sp.
35.		Gerridae	#*Gerris* sp.
36.		Leptocoridae	#*Leptocorisa* sp.
37.		Nepidae	#*Ranatra* sp.
38.		Notonectidae	#*Natonecta* sp.
39.		Pentatomidae	#*Palomena* sp.
40.		Reduviidae	#*Sycanus versicolor* Dohrn, 1859
VII. Hymenoptera:Family:3, Genus :13, Species:13			
41.		Apidae	#*Apis* (*Megapis*) *dorsata dorsata* Fabricius, 1793
42.		Formicidae	#*Anoplolepis gracilipes* F. Smith, 1857
43.		Formicidae	#*Camponotus compressus* (Fabricius, 1787)
44.		Formicidae	#*Diacamma* sp.
45.		Formicidae	#*Leptogenys* sp.
46.		Formicidae	#*Myrmicaria brunnea* Saunders, 1842
47.		Formicidae	#*Oecophylla smaragdina* Fabricius, 1775
48.		Formicidae	#*Pachycondyla rufipes* (Jerdon, 1851)
49.		Formicidae	#*Solenopsis geminata* (Fabricius, 1804)
50.		Formicidae	#*Tetraponera rufonigra* (Jerdon, 1851)
51.		Vespidae	#*Polistes hebraeus* Fabricius, 1787
52.		Vespidae	#*Vespa orientalis* Linnaeus, 1771
53.		Vespidae	#*Xylocopa* sp.
VIII.Isoptera: Family:1, Genus:1, Species:1			
54.		Termitidae	#*Odontotermes* sp.
IX.Lepidoptera:Family:13, Genus :90, Species:117			
55.		Crambidae	#*Maruca vitrata* Fabricius, 1787
56.		Crambidae	#*Omiodes indicata* (Fabricius, 1775)
57.		Erebidae	#*Amata passalis* (Fabricius, 1781)
58.		Erebidae	#*Asota caricae* Fabricius, 1775
59.		Erebidae	#*Lacera alope* Cramer, 1780
60.		Erebidae	#*Utetheisa pulchella* (Linnaeus, 1758)
61.		Geometridae	#*Semiothisa fasciata* (Stoll, 1780)
62.		Limacodidae	#*Miresa* sp.
63.		Noctuidae	#*Erebus ephesperis* (Hübner, 1827)
64.		Sphingidae	#*Cephonodes hylas* (Linnaeus, [1771])
65.		Sphingidae	#*Daphnis nerii* Linnaeus, 1758
66.		Uraniidae	#*Micronia aculeata* Guenée, 1857
67.		Hesperiidae	*Ampittia dioscorides* Fabricius, 1793
68.		Hesperiidae	*Badamia exclamationis* Fabricius, 1775
69.		Hesperiidae	*Baoris farri* Moore, 1878
70.		Hesperiidae	*Borbo bevani* Moore, 1878
71.		Hesperiidae	*Borbo cinnara* Wallace, 1866
72.		Hesperiidae	*Coladenia indrani* Moore, 1865
73.		Hesperiidae	*Erionota thrax* Linnaeus, 1767
74.		Hesperiidae	*Gangara thyrsis* Fabricius, 1775
75.		Hesperiidae	*Halpe porus* Mabille, 1876
76.		Hesperiidae	*Hasora chromus* Cramer, 1780
77.		Hesperiidae	*Hyarotis adrastus* Stoll, 1782
78.		Hesperiidae	*Iambrix salsala* Moore, 1865
79.		Hesperiidae	*Matapa aria* Moore, 1865
80.		Hesperiidae	*Oriens gola* Moore, 1877
81.		Hesperiidae	*Oriens goloides* Moore, 1881
82.		Hesperiidae	*Parnara guttatus* Bremer & Grey, 1852
83.		Hesperiidae	*Pelopidas mathias* Fabricius, 1798
84.		Hesperiidae	*Spialia galba* Fabricius, 1793
85.		Hesperiidae	*Suastus gremius* Fabricius, 1798

86.		Hesperiidae	*Tagiades japetus* Stoll, 1781
87.		Hesperiidae	*Taractrocera ceramas* Hewitson, 1868
88.		Hesperiidae	*Telicota bambusae* Moore, 1878
89.		Hesperiidae	[#]*Thoressa* sp.
90.		Hesperiidae	*Udaspes folus* Cramer, 1775
91.		Lycaenidae	*Acytolepis puspa* Horsfield, 1828
92.		Lycaenidae	*Anthene emolus* Godart, 1823
93.		Lycaenidae	*Anthene lycaenina* Felder, 1868
94.		Lycaenidae	*Castalius rosimon* Fabricius, 1775
95.		Lycaenidae	*Catochrysops strabo* Fabricius, 1793
96.		Lycaenidae	*Chilades lajus* Stoll, 1780
97.		Lycaenidae	[#]*Creon cleobis* Godart, 1824
98.		Lycaenidae	*Curetis thetis* Drury, 1773
99.		Lycaenidae	*Rachana jalindra* Horsfield, 1829
100.		Lycaenidae	*Euchrysops cnejus* Fabricius, 1798
101.		Lycaenidae	[#]*Jamides bochus* Stoll, 1782
102.		Lycaenidae	*Jamides celeno* Cramer, 1775
103.		Lycaenidae	*Leptotes plinius* Fabricius, 1793
104.		Lycaenidae	*Loxura atymnus* Stoll, 1780
105.		Lycaenidae	*Chilades pandava* Horsfield, 1829
106.		Lycaenidae	*Mahathala ameria* Hewitson, 1862
107.		Lycaenidae	*Megisba malaya* Horsfield, 1828
108.		Lycaenidae	*Neopithecops zalmora* Butler, 1870
109.		Lycaenidae	*Prosotas nora* Felder, 1860
110.		Lycaenidae	*Pseudozizeeria maha* Kollar, 1844
111.		Lycaenidae	*Rapala manea* Hewitson, 1863
112.		Lycaenidae	*Rathinda amor* Fabricius, 1775
113.		Lycaenidae	[#]*Spalgis epeus* Westwood, 1851
114.		Lycaenidae	*Spindasis vulcanus* Fabricius, 1775
115.		Lycaenidae	*Talicada nyseus* Guerin-Meneville, 1843
116.		Lycaenidae	[#]*Tarucus callinara* Butler, 1886
117.		Lycaenidae	*Tarucus nara* Kollar, 1848
118.		Lycaenidae	*Zizeeria karsandra* Moore, 1865
119.		Lycaenidae	*Zizula hylax* Fabricius, 1775
120.		Nymphalidae	*Acraea terpsicore* Linnaeus, 1758
121.		Nymphalidae	*Ariadne ariadne* Linnaeus, 1763
122.		Nymphalidae	*Ariadne merione* Cramer, 1777
123.		Nymphalidae	*Danaus chrysippus* Linnaeus, 1758
124.		Nymphalidae	*Danaus genutia* Cramer, 1779
125.		Nymphalidae	*Elymnias hypermnestra* Linnaeus, 1763
126.		Nymphalidae	*Euploea core* Cramer, 1780
127.		Nymphalidae	*Euploea klugii* Moore, 1857
128.		Nymphalidae	*Euthalia aconthea* Cramer, 1777
129.		Nymphalidae	*Hypolimnas bolina* Linnaeus, 1758
130.		Nymphalidae	*Hypolimnas misippus* Linnaeus, 1764
131.		Nymphalidae	*Junonia almana* Linnaeus, 1758
132.		Nymphalidae	*Junonia atlites* Linnaeus, 1763
133.		Nymphalidae	*Junonia iphita* Cramer, 1779
134.		Nymphalidae	*Junonia lemonias* Linnaeus, 1758
135.		Nymphalidae	*Lethe europa* Fabricius, 1775
136.		Nymphalidae	*Melanitis leda* Linnaeus, 1758
137.		Nymphalidae	*Moduza procris* Cramer, 1777
138.		Nymphalidae	*Mycalesis mineus* Linnaeus, 1758
139.		Nymphalidae	*Mycalesis perseus* Fabricius, 1775
140.		Nymphalidae	*Neptis hylas* Linnaeus, 1758
141.		Nymphalidae	*Neptis jumbah* Moore, 1857
142.		Nymphalidae	[#]*Phaedyma columella* Cramer, 1780
143.		Nymphalidae	*Phalanta phalantha* Drury, 1773
144.		Nymphalidae	*Tirumala limniace* Cramer, 1775
145.		Nymphalidae	*Ypthima asterope* Klug, 1832
146.		Nymphalidae	*Ypthima baldus* Fabricius, 1775
147.		Nymphalidae	*Ypthima huebneri* Kirby, 1871
148.		Papilionidae	*Graphium agamemnon* Linnaeus, 1758

149.		Papilionidae	*Graphium doson* Felder & Felder, 1864
150.		Papilionidae	*Pachliopta aristolochiae* Fabricius, 1775
151.		Papilionidae	*Papilio clytia* Linnaeus, 1758
152.		Papilionidae	#*Papilio crino* Fabricius, 1793
153.		Papilionidae	*Papilio demoleus* Linnaeus, 1758
154.		Papilionidae	#*Papilio palinurus* Fabricius, 1787
155.		Papilionidae	*Papilio polymnestor* Cramer, 1775
156.		Papilionidae	*Papilio polytes* Linnaeus, 1758
157.		Pieridae	#*Appias albina* Boisduval, 1836
158.		Pieridae	*Appias libythea* Fabricius, 1775
159.		Pieridae	#*Appias olferna* Swinhoe, 1890
160.		Pieridae	*Belenois aurota* Fabricius, 1793
161.		Pieridae	*Catopsilia pomona* Fabricius, 1775
162.		Pieridae	*Catopsilia pyranthe* Linnaeus, 1758
163.		Pieridae	*Cepora nerissa* Fabricius, 1775
164.		Pieridae	*Delias eucharis* Drury, 1773
165.		Pieridae	*Eurema blanda* Boisduval, 1836
166.		Pieridae	*Eurema hecabe* Linnaeus, 1758
167.		Pieridae	#*Ixias pyrene* Linnaeus, 1764
168.		Pieridae	*Leptosia nina* Fabricius, 1793
169.		Pieridae	*Pareronia hippia* Fabricius, 1787
170.		Riodinidae	#*Abisara bifasciata* Moore, 1877
171.		Riodinidae	*Abisara echerius* Stoll, 1790
X. Mantodea: Family:1, Genus:1, Species:1			
172.		Mantidae	#*Mantis religiosa* (Linné, 1758)
XI. Odonata: Family:4, Genus :28, Species:39			
173.		Aeshnidae	*Anax guttatus* Burmeister, 1839
174.		Aeshnidae	*Anax* sp.
175.		Aeshnidae	*Gynacantha dravida* Lieftinck,1960
176.		Coenagrionidae	*Agriocnemis pygmaea* Rambur, 1842
177.		Coenagrionidae	*Agriocnemis* sp.
178.		Coenagrionidae	*Ceriagrion cerinorubellum* Brauer, 1865
179.		Coenagrionidae	*Ceriagrion coromandelianum* Fabricius, 1798
180.		Coenagrionidae	*Ischnura aurora* (Brauer, 1865)
181.		Coenagrionidae	*Ischnura senegalensis* Rambur, 1842
182.		Coenagrionidae	*Onychargia atrocyana* Selys, 1865
183.		Coenagrionidae	*Pseudagrion decorum* Rambur, 1842
184.		Coenagrionidae	*Pseudagrion rubriceps* Selys, 1876
185.		Gomphidae	*Ictinogomphus rapax* Rambur, 1842
186.		Libellulidae	*Acisoma panorpoides* Rambur, 1842
187.		Libellulidae	*Aethriamanta brevipennis* Rambur, 1842
188.		Libellulidae	*Brachydiplax chalybea* Brauer, 1868
189.		Libellulidae	*Brachydiplax farinosa* Kruger, 1902
190.		Libellulidae	*Brachydiplax sobrina* Rambur, 1842
191.		Libellulidae	*Brachythemis contaminata* Fabricius,1793
192.		Libellulidae	*Bradinopyga geminata* Rambur, 1842
193.		Libellulidae	*Crocothemis servilia* Drury, 1770
194.		Libellulidae	*Diplacodes nebulosa* (Fabricius, 1793)
195.		Libellulidae	*Diplacodes trivialis* Rambur,1842
196.		Libellulidae	*Lathrecista asiatica* Fabricius, 1798
197.		Libellulidae	*Macrodiplax cora* Brauer,1867
198.		Libellulidae	*Neurothemis fulvia* Drury, 1773
199.		Libellulidae	*Neurothemis tullia* (Drury, 1773)
200.		Libellulidae	*Orthetrum pruinosum* (Burmeister, 1839)
201.		Libellulidae	*Orthetrum sabina* Drury, 1770
202.		Libellulidae	*Pantala flavescens* Fabricius, 1798
203.		Libellulidae	*Potamarcha congener* Rambur, 1842
204.		Libellulidae	*Rhodothemis rufa* Rambur,1842
205.		Libellulidae	*Rhyothemis variegata* Linnaeus, 1763
206.		Libellulidae	*Tholymis tillarga* Fabricius, 1798
207.		Libellulidae	*Tramea basilaris* Palisot de Beauvois, 1805
208.		Libellulidae	*Tramea limbata* Desjardins,1832
209.		Libellulidae	*Trithemis pallidinervis* (Kirby, 1889)

210.		Libellulidae	*Urothemis signata* Rambur, 1842
211.		Libellulidae	*Zyxomma petiolatum* Rambur, 1842
XII. Orthoptera : Family:1, Genus:1, Species:1			
212.		Tetrigidae	#*Gessonula* sp.
XIII. Phasmida: Family:1, Genus:1, Species:1			
213.		Diapheromeridae	#*Carausius* sp.
XIV.Psocoptera: Family:1, Genus:1, Species:1			
214.		Psocidae	#*Tbyrsopsocus* sp.
XV.Thysanura:Family:1, Genus:1, Species:1			
215.		Lepismatidae	#*Lepisma saccharina* Linnaeus, 1758

Materials and Methods

Study area

Based on the socio-environmental situation and richness of biodiversity, certain areas of the West Bengal state have already been earmarked for conservation and these areas have been brought under the Protected Area Network of the country. The Protected Area Network of West Bengal is comprising of 6 National Parks and 15 Wildlife Sanctuaries, 2 Tiger Reserves and 1 Biosphere Reserve (Table- 3).

Table 3: List of Protected Areas in West Bengal

National Parks				
Sl. No.	**Name**	**Area (km^2)**	**Established on**	**District**
1.	Buxa	117.10	1992	Jalpaiguri
2.	Gorumara	79.45	1992	Jalpaiguri
3.	Jaldapara	216.51	2014	Jalpaiguri
4.	Neora Valley	159.89	1986	Darjeeling
5.	Singalila	78.60	1986	Darjeeling
6.	Sundarban	1330.10	1984	North & South 24-Paraganas
Wildlife Sanctuaries				
1.	Ballavpur	2.02	1977	Birbhum
2.	Bethuadahari	0.67	1980	Nadia
3.	Bibhuti Bhusan	0.64	1980	North 24 Paraganas
4.	Buxa	267.92	1986	Jalpaiguri
5.	Chapramari	9.6	1976	Jalpaiguri
6.	Chintamani Kar Bird Sanctuary	0.07	1982	South 24-Paraganas
7.	Haliday Island	5.95	1976	South 24-Paraganas
8.	Jorepokhri Salamander	0.04	1985	Darjeeling
9.	Lothian Island	38	1976	South 24-Paraganas
10.	Mahananda	158.04	1976	Darjeeling
11.	Raiganj	1.3	1985	North 24-Paraganas
12.	Ramnabagan	0.14	1981	Burdwan
13.	Sajnakhali	362.4	1976	South 24-Paraganas
14.	Senchal	38.88	1976	Darjeeling
15.	West Sundarban	556.45	2013	South 24-Paraganas
Tiger Reserve				
1.	Buxa	757.9038	1983	Jalpaiguri
2.	Sundarban	2584.89	1973	South 24-Paraganas
Biosphere Reserve				
1.	Sundarban	9630	1989	North &South 24-Paraganas

***Source*:** Envis Centre on Wildlife & Protected Areas
Hosted by Wildlife Institute of India, Dehradun (Updated- July 5, 2017)
Sponsored by Ministry of Environment, Forests & Climate Change, Govt of India
http://wiienvis.nic.in/Databas e/WestBengal_7842.aspx

Among them, Chintamani Kar Bird Sanctuary (0.1km^2), situated at Rajpur Road in the vicinity of Kolkata metropolis and lying in between Latitude 22°25'44.4"N and Longitude 88°24'06.7"E (Fig- 1).The area was notified as Narendrapur Wildlife sanctuary vide G. O No.3019-FOR dated 8th September 2004. Later it was renamed as Chintamani Kar Bird Sanctuary vide G.O No.4300-FOR/FR/O/L/6C-3/04 dated 21.10.2005, as a sign of honour to the renowned artist Chintamani Kar who lives adjoining to the sanctuary and died on the same year.

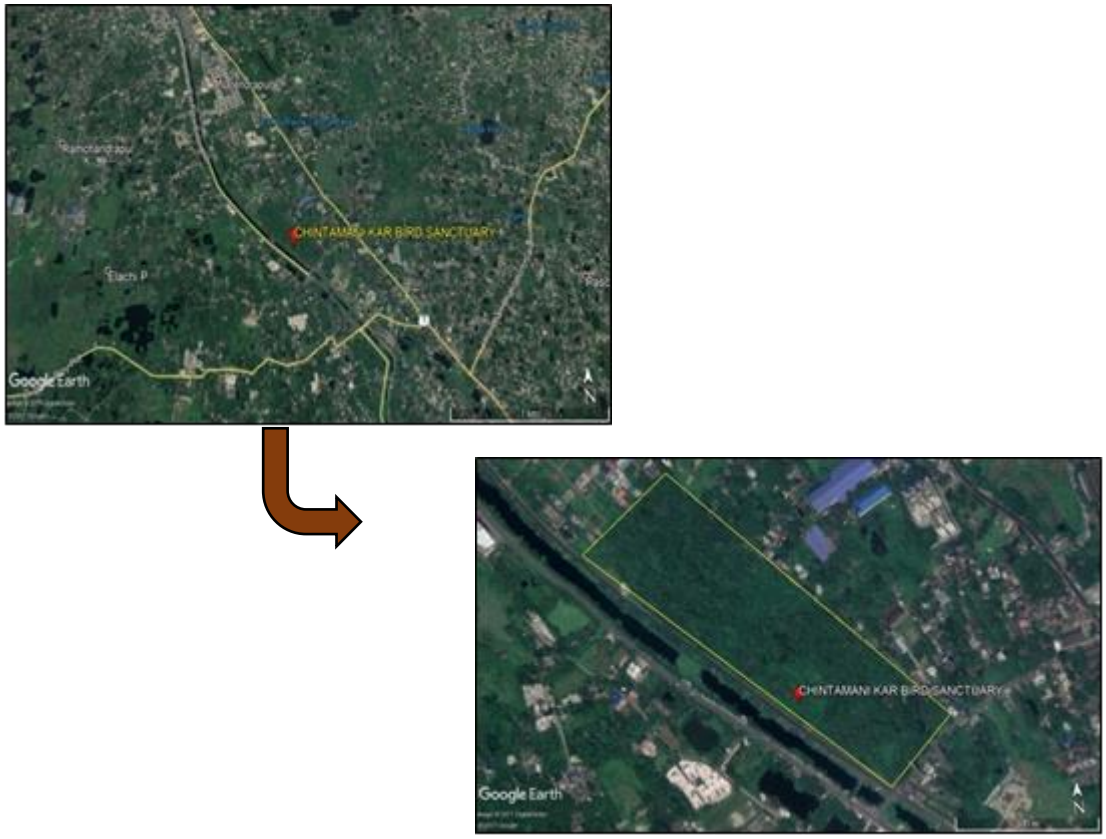

Fig 1: Map of Study area

Vegetation

Insect is an important component of forest biodiversity, which is closely related with the overall floral diversity of an area. CKBS was an orchard owned by the Kayal family before being converted into the wildlife sanctuary. The sanctuary is dominated by Mango trees (*Mangifera indica*) along with Rose Apple (*Syzygium jambos*), Aash Phol (*Dimocarpus longan*) and other fruit trees. The whole area is having a very dense under growth, and the canal beside it having a good density of aquatic flora, many species of climbers and parasitic plants are also present in the sanctuary.

Study Period and Methodology

The study was initiated during May 2013 and continued consecutively for the next four years (2014, 2015, 2016 & 2017) by different teams of Nature Mates-Nature Club and Academy of Biodiversity Conservation. Methodology was followed after the hand book on collection, preservation and identification published by The Director, Zoological Survey of India, Kolkata (Jonathan & Kulkarni, 1986) [74].

Results

The present communication reports 215 species belonging to 175 genera pertaining to 55 families under 15 insect orders of which 83 species (marked with #) belonging to 74 genera under 46 families have been reported for the first time from CKBS (Table-2). Among the 15 orders, the most diversified group is Lepidoptera (117 species), followed by the orders, Odonata (39 species), Diptera (15 species), Hymenoptera (13 species), Coleoptera (11 species), Hemiptera (10 species), Blattodea (2 species) and Dermaptera, Ephemeroptera, Isoptera, Mantodea, Orthoptera, Phasmida, Psocoptera, Thysanura (with 1 species each) (Table-2).

Among Lepidoptera, the family Lycaenidae shares maximum number of species (26 genera, 29 species), followed by Nymphalidae (17 genera, 28 species), Hesperiidae (22 genera, 24 species), Pieridae (9 genera, 13 species), Papilionidae (3 genera, 9 species), Erebidae (4 genera, 4 species), Crambidae (2 genera, 2 species), Sphingidae (2 genera, 2 species), Riodinidae (1 genus, 2 species), Geometridae (1 genus, 1 species), Limacodidae (1 genus, 1 species), Noctuidae (1 genus, 1 species), Uraniidae (1 genus, 1 species) (Table-2).

Odonata is the next diversified order after Lepidoptera. It consists of 39 species belonging to 28 genera under 4 families. Among them, the family Libellulidae is found more diversified (20 genera, 26 species) followed by Coenagrionidae (5 genera, 9 species), Aeshnidae (2 genera, 3 species) and Gomphidae (1 genus, 1 species) (Table-2).

Next comes, order Diptera, in which the family Syrphidae consists of maximum number of species (4 genera, 5 species) followed by Culicidae (2 genera, 2 species) and Tipulidae (2 genera, 2 species) and the rest of the families Bombylidae, Calliphoridae, Muscidae, Pipunculidae, Sarcophagidae and Tabanidae are equally diversified (each with 1 species under 1 genus) (Table-2).

In order Hymenoptera, the dominant family is Formicidae (Ants) (9 genera, 9 species) followed by the rest of two families Vespidae (3 genera, 3 species) and Apidae (1 genus, 1 species) (Table-2).

Order Coleoptera is diversified with 7 families in which

family Chrysomelidae and Dytiscidae have more number of species (3 species each) than the families Carabidae, Cerambycidae, Curculionidae, Hydrophilidae and Noteridae (1 species each (Table-2).

Order Hemiptera consists of 10 families, namely, Eurybrachyidae, Cicadidae, Gerridae, Flatidae, Leptocoridae, Nepidae, Notonectidae, Pentatomidae, Reduviidae, Cercopidae are equally diversified containing one species each under 1 genus (Table-2).

The order Blattodea consists of only one family Blattidae which bears two species belonging to two genera. Other orders like Dermaptera, Ephemeroptera, Isoptera, Mantodea, Orthoptera, Phasmida, Psocoptera and Thysanura each bear one species under one genus (Table-2).

Discussion

Unfortunately, insects are overlooked when inventorisation of protected areas are concerned or when tropical forest management issues are discussed because there are a very few insect taxonomist working, globally, who can potentially help in identification of this enormously diverse group. Though this is not the only cause which resist to prepare the baseline data of a protected area or any forest ecosystem. Understanding the importance of this very important faunal group is a very recent trend in wildlife research. Today, change in land-use pattern has not only resulted in a dramatic decrease in total forest cover, but also has adverse effects on insect species composition and richness. Therefore, it is an urgent need to prepare a baseline data of the insect diversity in a protected area or any other forest ecosystem.

This communication briefly summarises that, among 24 Protected Area Network present in West Bengal, maximum number of groups (13 order) were studied from Sundarban Biosphere Reserve (Mitra, 2017) which can be treated as baseline data of this fragile protected areas of India (Table-1). Apart from this, Buxa Tiger Reserve (11 order) and Bhibhuti Bhusan Wildlife Sanctuary (07 order) were also well studied and documented protected areas of West Bengal (Table-1). But a large number of protected areas were not studied till today. These are Singalila National Park, Ballavpur, Chapramari, Haliday Island, Jorepokhri, Lothian Island, Mahananda, Raiganj, Ramnabagan, Sajnakhali, Senchal and newly formed West Sundarban Wildlife Sanctuary (Table-3).

CKBS, situated within the city limit of Kolkata, is playing a very important role in harboring a significant amount of biodiversity as a whole. It has become a refuge for the urban biodiversity of its surroundings as a dramatic change of land use pattern is happening in a rapid pace. In this changing scenario, the importance of this small but diverse wildlife sanctuary will increase every day, hence its wellbeing is of utmost importance. This documentation, hence, is of significant importance, as the baseline data for this important protected area.

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