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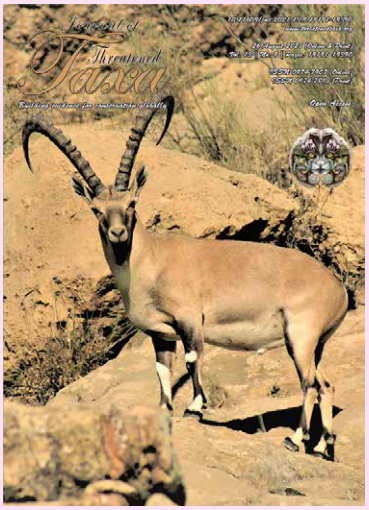

COMMUNICATION

A PRELIMINARY CHECKLIST OF MOTHS (LEPIDOPTERA: HETEROCERA) FROM GANGAJALGHATI, BANKURA, WEST BENGAL, INDIA

Ananya Nayak

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COMMUNICATION

A preliminary checklist of moths (Lepidoptera: Heterocera) from Gangajalghati, Bankura, West Bengal, India

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Abstract: The present study was conducted at Gangajalghati, a village near the forest of Bankura district from West Bengal that has a tropical wet and dry climate where moth diversity has not been explored before. The village was surveyed between January 2016 and December 2018. The present study has recorded a total of 1,328 individual moths belonging to 13 families, 31 subfamilies, 80 genera, and 90 species. Of which four species viz. *Condylorrhiza diniasalis* (Walker, 1859), *Argyrocosma inductaria* (Guenée, 1858), *Oraesia emarginata* (Fabricius, 1794) and *Eublemma roseonivea* (Walker, 1863) have been reported for the first time from West Bengal, India.

Keywords: Conservation, diversity, Erebidae, *Eublemma roseonivea,* microlepidoptera.

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INTRODUCTION

Moths constitute the vast majority of the insect order Lepidoptera and are present in all the continents except polar regions. This important component of biodiversity serves as nocturnal pollinators, herbivores of crops and wild plants, and food for numerous species of rodents, birds, and bats (Bates et al. 2014). Being dynamic, the biological diversity of a given area changes continually in response to biotic and abiotic fluctuations and other environmental pressures and therefore, close monitoring and recording of its status in time and space are necessary to assess their impacts (Green et al. 2009). Tropical regions of the world exhibit higher levels of endemism and great moth abundance and diversity in comparison to the temperate regions and need more explorations to determine their complete conservation status (New 2004; Green et al. 2009). Detecting, describing, and interpreting the results of an inventory of fauna from a specific region almost always remains a challenging task and the primary data collected in such studies can be used for the analysis by environmental agencies (Silveira et al. 2010). Documentation of species occurrence records in a data-poor but biodiversity-rich region like Bankura is important for determining the species distribution and abundance of the district which contribute significantly to the knowledge base of local biodiversity. Further, small-area inventories of relatively immobile or readily detected organisms from an unexplored region may provide both reliable presence and absence information of a species, but usually with limited spatial or temporal specificity (Jetz et al. 2019).

India harbours nearly 10,000 species of moths which is approximately 10 times higher than the number of butterfly species of the country (Smetacek 2013). The pioneering work on the moth diversity of West Bengal and India dates back nearly 100 years when extensive work was done by Hampson (1892, 1894, 1895, 1896) and Bell & Scott (1937). A total of 42 species of microlepidoptera (moths) from West Bengal was described by Meyrick (1912–1916, 1916–1923, 1923–1930, 1930–1936, 1937) and Sevastopulo (1945, 1956) reported several moth species from Calcutta. Subsequent studies by the Zoological Survey of India and others have enriched and extended the work on the moth fauna of West Bengal (Bhattacharya l997a,b; Ghosh & Chaudhury 1997a,b; Gupta 1997; Mandal & Ghosh 1997; Mandal & Maulik 1997; Sanyal et al. 2012; Biswas et al. 2017a,b). The studies by Bhattacharya (1997a,b) have reported 35 species and subspecies under 21 genera of Zygaenidae and 140 species of Pyralidae from different districts of West Bengal. The work by Ghosh & Chaudhury (1997a) has reported the presence of 52 species in 29 genera of Arctiidae in 14 districts of the state. Further work by Ghosh & Chaudhury (1997b) has described 18 species in five genera of the family Ctenuchidae from 11 districts of West Bengal and four species in a single genus of the family Hypsidae from six districts of the state. A study by Gupta (1997) recorded 20 species of Saturniidae from seven districts of the state. Mandal & Ghosh (1997) reported 47 species of Geometridae belonging to 32 genera from the state of West Bengal. A study by Mandal & Maulik (1997) has described 67 species of Sphingidae, 25 species of Lasiocampidae, 89 species of Lymantriidae, and only one species (*Ratarda marmorata*) of Ratardidae from the state. Arora (2000) studied several pyralid species of economic importance from the state. Several studies over the past decade have made a significant contribution to the moth study of West Bengal (Sanyal et al. 2012; 2017a,b; Shah et al. 2016, 2017, 2018). The work by Sanyal et al. (2012) has reported many moth species from different parts of West Bengal. Further work by Biswas et al. (2017a) has reported 94 species of moths from the Sunderban Biosphere Reserve. Shah et al. (2016) reported the occurrence of 198 species under 142 genera from the Kolkata Metropolitan Region. Further work by Shah et al. (2017) reported the occurrence of 40 species in Neora Valley National Park of West Bengal. Another work has enlisted the presence of 1,058 moth species in West Bengal (Shah et al. 2018). Recently a study by Nayak & Sasmal (2020) has reported 78 species of moths from the Midnapore town in West Bengal. In the present work, a preliminary inventory of the moth fauna of Gangajalghati village of Bankura district was performed and the findings of the study were summarized in an illustrated checklist. The study reports the occurrence of 90 species in 80 genera from the study area.

MATERIALS AND METHODS

Study area

Gangajalghati is a village under Bankura Sadar subdivision of Bankura district of West Bengal, India (Figure 1). It is located about 24 km north of Bankura town. The village is located at 23.42°N 87.12°E with very deep sandy loam to sandy clay loam soils (Das & Gupta 2019) and is surrounded by a number of landforms including an adjacent Sal forest, Damodar River (18km) on the north and north-east, Koro hill (122m, 5km) and Sali River (5km) on the south, Sali Reservoir or Gangdua

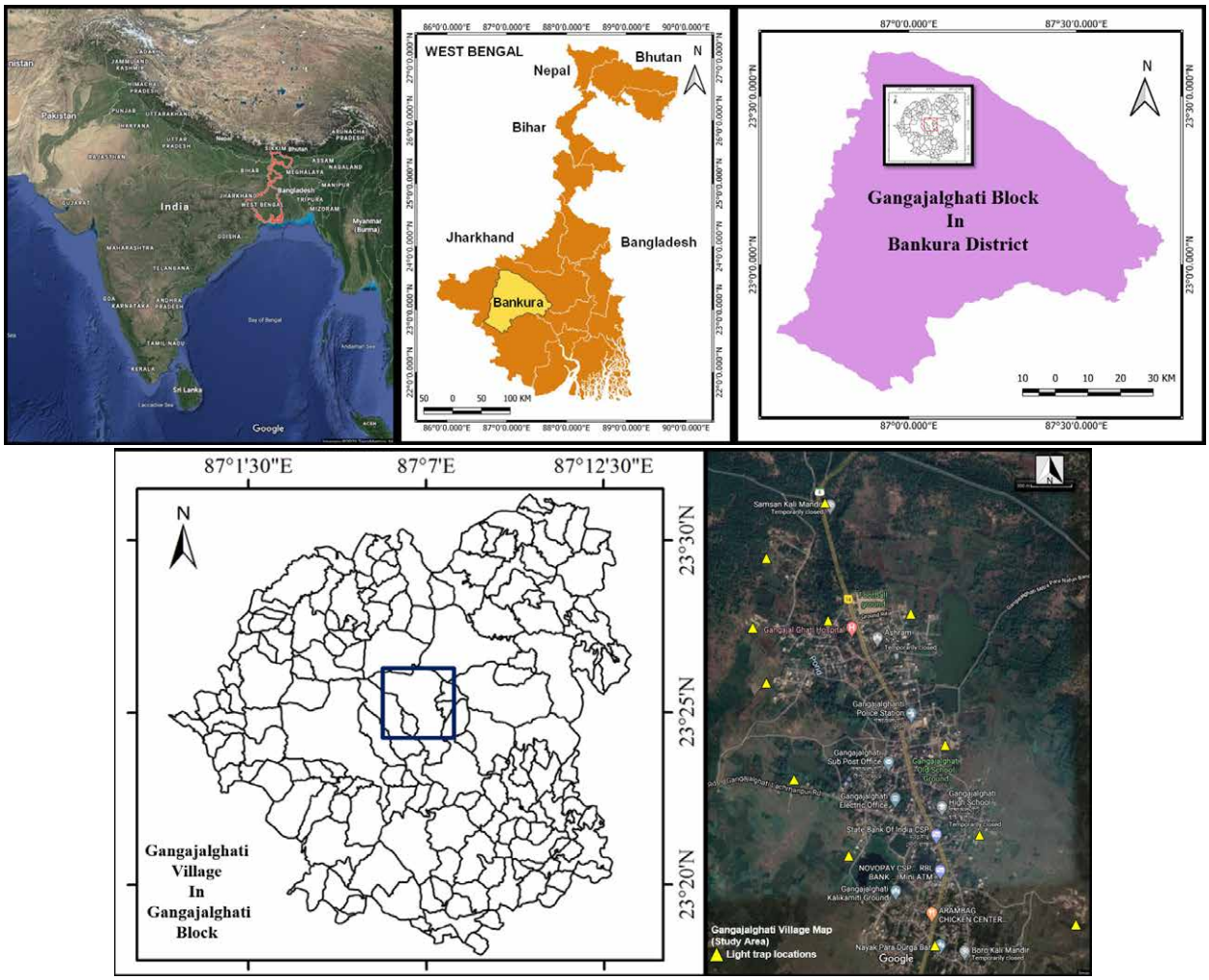

Figure 1. Geographical location of the study area: Gangajalghati village in Gangajalghati community development block (Map data: India © 2021 Google map, West Bengal from Nayak (2020) with permission from the publisher; Bankura district was generated using QGIS and modified using Gangajalghati Block map; Gangajalghati Block modified after Das (2017); Gangajalghati village map ©2020 Google Earth).

Dam (4km) on the south-west and Susunia hill (448m, 18km) on the west. Gangajalghati forest, locally also known as the jungle of Hanspahari is a small forest area located to the north of the village and ends near Mejia Thermal Power Station. *Shorea robusta* remains the most dominant species of the forest with other notable species like *Butea monosperma*, *Madhuca indica*, and *Phoenix sylvestris*. Besides forest associated zones, the study area encompasses a large number of ponds. Some other notable plants found in the village area are *Acacia auriculiformis*, *Azadirachta indica*, *Bambusa* spp., *Bombax ceiba*, *Eucalyptus tereticornis*, *Ficus benghalensis*, *Tamarindus indica*, and *Terminalia arjuna*. The common crops grown in the area are beans, Bitter Gourd, Bottle Gourd, Brinjal, Cabbage, Carrot, Cauliflower, Chillies, Cucumber, Potato, Ladies Finger, Maize, Onion, Pumpkin, Radish, Rice, Tomato, Snake Gourd, Squash, and Sugarcane and some of the common fruits are Black Plum, Common Fig, Custard Apple, Date Palm, Doub Palm, Guava, Jack Fruit, Jujube, Mango, and Papaya. The climate shows a hot summer (April–May), monsoon (June–September), and winter (November–February) with an annual rainfall between 1,200 to 1,500 mm. The maximum temperature varies 35–45°C in summer and 12–15°C in the winter season (Das & Gupta 2019). The study was conducted in different land-use types including localities near the forest area, roadside vegetations, vegetations around water bodies, grasslands, bushes of weeds, gardens, and agricultural lands (Image 91).

Moth surveys and Identification

The sampling of the moth was conducted in 22 localities for three years from 2016 to 2018. Light trapping method was employed for 15 nights during 15 months in 12 different localities (Table 1), and collected the moth data through opportunistic surveys in all 22 localities. Table 2 provides the details of sampling nights in the study area from 2016 to 2018. However, due to frequent elephant attacks in the forest area for the last two decades, recording of moths was not possible in the core area of the forest. The trap (a hanging white cloth sheet) was illuminated from 1900 h to 2200 h and the moth counts were recorded and photographed using a Canon EOS 1200D DSLR Camera with a 55–250mm lens and a Sony DSC-H400 compact camera with 63x optical zoom to support further identification. Diurnal species were recorded and photographed during daylight hours. The survey data were analysed with Microsoft Office Excel, 2010.

Moths were identified based on morphological characters with the help of available literature including Hampson (1892–1896), Bell & Scott (1937), Holloway (1985–2009), Haruta (1992–2000), Robinson et al. (1994), Arora (2000), Schintlmeister & Pinratana (2007), Kononenko & Pinratana (2013), Kirti & Singh (2015, 2016), and Kirti et al. (2019). The classification used in the checklist follows van Nieukerken et al. (2011). Besides the above mentioned literature, a number of web resources including www.jpmoths.org; moths of India (http://www.mothsofindia.org/; Sondhi et al. 2020) were used for the purpose of identification.

Table 1. Localities with their GPS coordinates with altitudes and habitat type.

	Locality or sampling site	GPS coordinate	Altitude in m	Habitat type
1	Samsan Kali Mandir	23.433639°N, 87.109743°E	138	Sal forest
2	Forest Colony	23.431835°N, 87.108471°E	130	Sal forest
3	Hospital Colony	23.429576°N, 87.107968°E	125	Human habitation
4	Hospital Colony	23.426922°N, 87.108723°E	124	Agriculture land
5	Gangajalghati Hospital	23.429183°N, 87.111650°E	125	Human habitation
6	Natun Bandh	23.430167°N, 87.114418°E	127	Agriculture land
7	Lachmanpur Road	23.423847°N, 87.109794°E	119	Agriculture land
8	Purano Bandh	23.421461°N, 87.112079°E	118	Agriculture land
9	Nayak Para Durga Bari	23.417739°N, 87.115170°E	120	Human habitation
10	Beerkanali	23.417700°N, 87.117130°E	118	Agriculture land
11	Bara Atchala	23.421589°N, 87.116336°E	123	Human habitation
12	High School Colony	23.424238°N, 87.115311°E	124	Human habitation

RESULTS

The present work has recorded a total of 1,328 individual moths belonging to 13 families, 31 subfamilies, 80 genera, and 90 species across different parts of the study area (Table 3, Images 1–90). Maximum species richness was recorded from the family Erebidae (31 species; 27 genera) followed by Crambidae (27 species; 24 genera), Sphingidae (seven species; seven genera), Geometridae (seven species; six genera), Noctuidae (five species; five genera), Notodontidae (three species; three genera), and others (Figure 2; Table 4). However, Crambidae (41.26%) was the family having highest proportion of moths recorded followed by Erebidae (33.05%), Geometridae (7%), Noctuidae (5.34%), Sphingidae (3.31%), and others. These results of the study were consistent with the previous finding that reported the dominance of these moth families from Jharkhand as well as from Gangetic plains with a tropical wet and dry climate similar to the present study area (Singh et al. 2017). However, Bombycidae, Euteliidae, Lasiocampidae, and Saturnidae were represented by single species in the study area.

Although the surveys were not undertaken uniformly throughout the year, data were recorded on the month-wise occurrence of these species. The results showed that the species richness (data not shown) and relative abundance increased significantly from May to October, peaked in October and decreased rapidly at the end of November with further declines in the early winter session (Figure 4). These results indicate that the highest numbers of moths were recorded during warm nights from June to October and it can be explained by the positive correlation between the activity of ectothermic species and ambient temperature (Jonason et al. 2014). The highest number of species (30) observed on 30 October 2016, which was the night of Kali Puja/Diwali festival. These observations are following previous studies, which showed that the number of moth individuals caught in the light trap are at their highest at periods of no moon or new moon and decrease with the fullness of the moon (Williams 1936; Yela & Holyoak 1997; Butler et al. 1999). The most abundant species were *Cnaphalocrocis medinalis* (Guenée, 1854) followed by *Diaphania indica* (Saunders, 1851), *Asota caricae* (Fabricius, 1775), *Chabula acamasalis* (Walker, 1859),

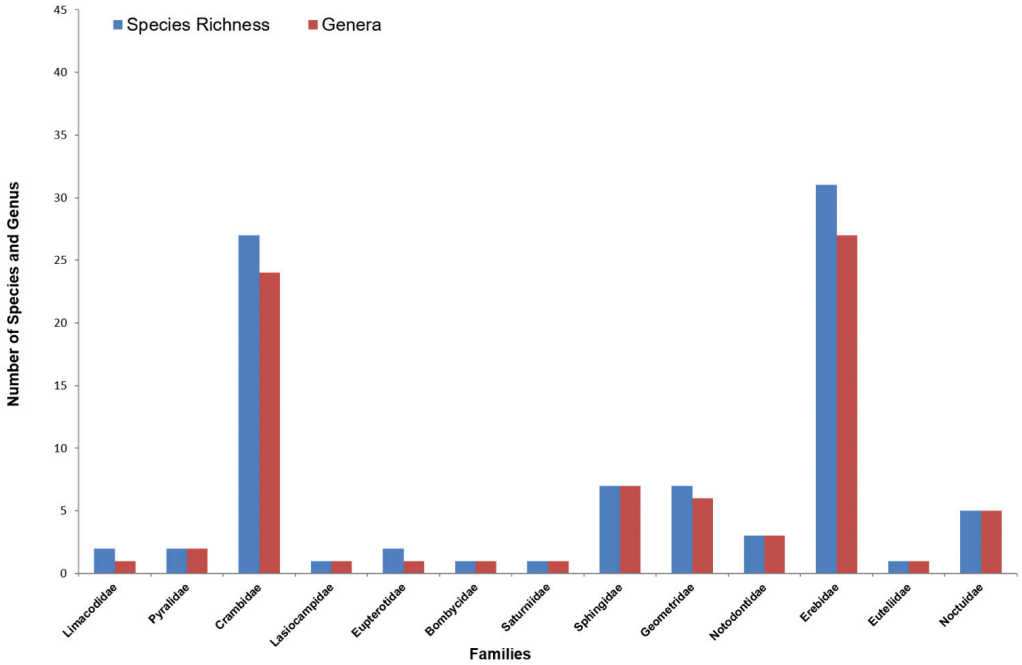

Figure 2. Family-wise moth species richness and number of genera recorded in different habitats of Gangajalghati village of Bankura.

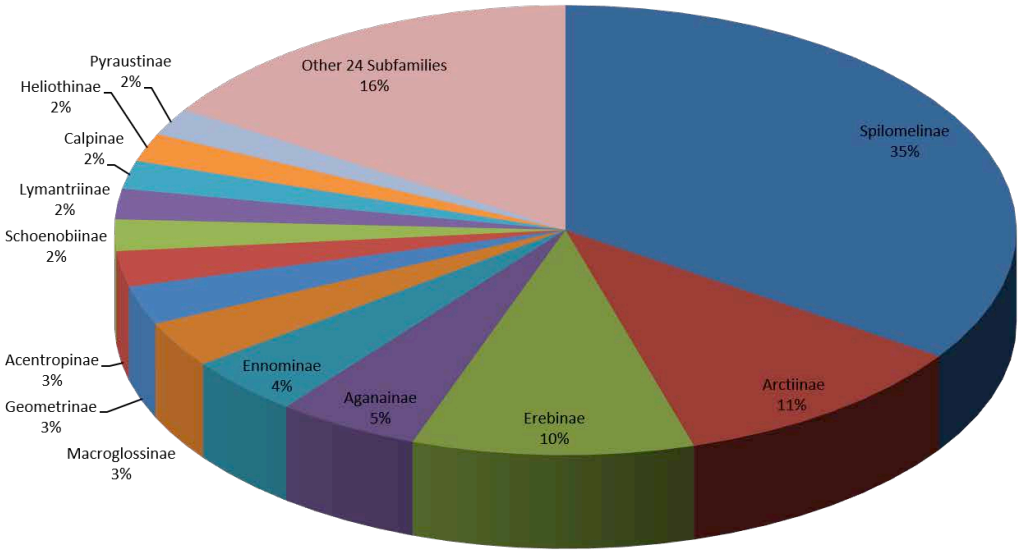

Figure 3. Sub family-wise distribution of moth population from the study area.

Glyphodes bicolour (Swainson, 1821), and *Pericallia ricini* (Fabricius, 1775). Some of the least abundant species recorded were *Agrius convolvuli* (Linnaeus, 1758), *Erebus hieroglyphica* (Drury, 1773), and *Eupterote undata* (Blanchard, 1844). A total of 18 species were documented exclusively by opportunistic occurrence records and 72 species were documented by both light trapping and opportunistic observations. The data also revealed that only three (Spilomelinae, Arctiinae, and Erebinae) out of 31 subfamilies constituted more than 50% of all moth individuals recorded, that includes a number of economic pest of crops and fruits (Figure 3). Therefore, the results of the study represent a species pool (Sphingidae, Eupterotidae, Saturniidae, Notodontidae) indicative of an assemblage of Sal dominated forest which is currently in a fragmented state and invaded by generalist or pest species group (Crambidae, Arctiinae) associated with highly altered open habitats.

Table 2. Details of sampling nights and collected individuals.

Year and month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	0	0	1	0	1	1	0	1	0	1	1	0
2017	0	0	0	1	0	0	1	0	1	1	1	0
2018	0	0	0	0	1	1	0	0	1	1	0	0
No. of individuals by light trapping	0	0	9	18	40	116	68	80	189	268	121	0
No. of individuals by opportunistic records	4	2	0	5	10	23	46	89	79	134	20	7
Total no. of individuals	4	2	9	23	50	139	114	169	268	402	141	7

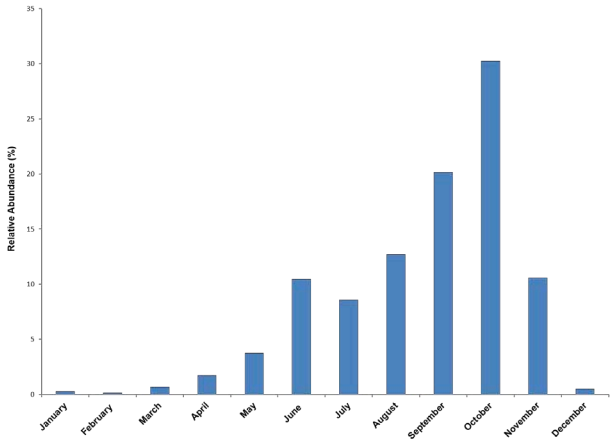

Figure 4. A species-relative abundance histogram for all 90 species observed in the present study, showing the recorded occurrences by month.

DISCUSSION

Prior to this study, only 11 moth species had been reported from the Bankura district; *Acherontia styx* (Westwood, 1847), *Asota caricae* (Fabricius, 1775), *Creatonotos gangis* (Linnaeus, 1763), *Creatonotos transiens* (Walker, 1855), *Diaphania indica* (Saunders, 1851), *Eilema vicara* (Strand, 1922), *Macroglossum gyrans* (Walker, 1856), *Scirpophaga incertulas* (Walker, 1863), *Theretra oldenlandiae* (Fabricius, 1775), *Theretra silhetensis* (Walker, 1856), and *Trabala vishnou* (Lefèbvre, 1827) (Bhattacharya 1997b; Ghosh & Chaudhury 1997a,b; Mandal & Maulik 1997). The present study reports a total of 82 species from Bankura district in West Bengal that has not been reported earlier. However, the most important finding from the study was the documentation of four species, viz., *Condylorrhiza diniasalis* (Walker, 1859), *Argyrocosma inductaria* (Guenée, 1858), *Oraesia emarginata* (Fabricius, 1794) and *Eublemma roseonivea* (Walker, 1863) (Image 63), a very rare member of the family Erebidae for the first time from West Bengal. The species was spotted on 29 October 2016 at around 07:57h. It was attracted to a Tungsten halogen lamp mounted near a pond on the eve of Diwali/Kali Puja festival. Later the species was recorded three more times in different places of Gangajalghati village but no documentation was made on those occasions. The species was previously reported from China, Borneo, Indonesia, Malaya, Philippines, and Thailand (Ades & Kendrick 2004; Kononenko & Pinratana 2013). In India, the species has been recorded from Karimganj (Assam) (Sondhi et al. 2020). Therefore, the study reports the westernmost distributional record of the species in India.

Several species including *Acherontia styx* (Westwood, 1847), *Agrius convolvuli* (Linnaeus, 1758); *Achaea janata* (Linnaeus, 1758), *Creatonotos gangis* (Linnaeus, 1763), *Spodoptera litura* (Fabricius, 1775), *Helicoverpa armigera* (Hübner, 1809), and *Maruca vitrata* (Fabricius, 1787) were found to be an economic pest of common crops and fruits of the area. The highest abundance of the Crambidae family in the study is represented by the subfamily Spilomelinae (31%) that constitutes the most species-rich subfamily of Crambidae. Their abundance can be explained by the occurrence of diverse habitats rich in grasses and several crop plants preferred by the members of Crambidae.

CONCLUSION

The present work has been carried out to elucidate a preliminary checklist of moth fauna from Gangajalghati village of Bankura which has not been explored previously. Erebidae remains the most species rich and Crambidae, the most abundant family from the village. Although preliminary, the present study will provide valuable baseline data for moth diversity of the area that has not been reported. There is an urgent need to assess the degree of deterioration of habitats for moth fauna

Table 3. Preliminary checklist of moth fauna recorded during the study.

	Family	Subfamily	Species	Author, Year	Month of observation
1	Limacodidae	Limacodinae	*Parasa lepida*	Cramer, 1799	Aug, Sep
2	Limacodidae	Limacodinae	*Parasa bicolor*	Walker, 1855	Jun
3	Pyralidae	Pyralinae	*Hypsopygia mauritialis*	Boisduval, 1833	Aug
4	Pyralidae	Pyralinae	*Tamraca torridalis*	Lederer, 1863	Sep
5	Crambidae	Acentropinae	*Parapoynx fluctuosalis*	Zeller, 1852	Apr, Oct, Nov
6	Crambidae	Acentropinae	*Parapoynx stagnalis*	Zeller, 1852	Oct, Nov
7	Crambidae	Pyraustinae	*Orphanostigma abruptalis*	Walker, 1859	Jul, Aug
8	Crambidae	Pyraustinae	*Tatobotys biannulalis*	Walker, 1866	Aug, Sep, Oct
9	Crambidae	Schoenobiinae	*Scirpophaga incertulus*	Walker,1863	Jan, Apr, Sep,Oct, Nov
10	Crambidae	Spilomelinae	*Aethaloessa calidalis*	Guenée, 1854	Jul, Aug
11	Crambidae	Spilomelinae	*Agrioglypta itysalis*	Walker,1859	Jul, Aug, Sep
12	Crambidae	Spilomelinae	*Condylorrhiza diniasalis*	Walker, 1859	Oct, Nov
13	Crambidae	Spilomelinae	*Chabula acamasalis*	Walker, 1859	Sep, Oct
14	Crambidae	Spilomelinae	*Cirrhochrista brizoalis*	Walker, 1859	Oct
15	Crambidae	Spilomelinae	*Cnaphalocrocis medinalis*	Guenée, 1854	Sep, Oct, Nov
16	Crambidae	Spilomelinae	*Conogethes punctiferalis*	Guenée, 1854	Sep
17	Crambidae	Spilomelinae	*Diaphania indica*	Saunders,1851	Jul, Sep, Oct, Nov
18	Crambidae	Spilomelinae	*Botyodes flavibasalis*	Moore, 1867	Oct
19	Crambidae	Spilomelinae	*Eurrhyparodes tricoloralis*	Zeller, 1852	Oct
20	Crambidae	Spilomelinae	*Glyphodes bicolor*	Swainson, 1821	Jun, Jul, Aug, Sep, Oct
21	Crambidae	Spilomelinae	*Glyphodes caesalis*	Walker, 1859	Sep, Oct
22	Crambidae	Spilomelinae	*Glyphodes onychinalis*	Guenée, 1854	Sep, Oct
23	Crambidae	Spilomelinae	*Haritalodes derogata*	Fabricius, 1775	Jul, Aug
24	Crambidae	Spilomelinae	*Hymenia perspectalis*	Hübner, 1796	Oct
25	Crambidae	Spilomelinae	*Maruca vitrata*	Fabricius, 1787	Sep, Oct
26	Crambidae	Spilomelinae	*Metoeca foedalis*	Guenée, 1854	Oct, Nov
27	Crambidae	Spilomelinae	*Parotis* cf. *marginata*	Hampson, 1893	Aug, Sep
28	Crambidae	Spilomelinae	*Pycnarmon cribrata*	Fabricius, 1794	Oct
29	Crambidae	Spilomelinae	*Sameodes cancellalis*	Zeller, 1852	May, Jun
30	Crambidae	Spilomelinae	*Spoladea recurvalis*	Fabricius, 1775	Oct
31	Crambidae	Spilomelinae	*Syllepte straminalis*	Guenée, 1854	Jun
32	Lasiocampidae	Lasiocampinae	*Trabala vishnou*	Lefèbvre, 1827	Aug
33	Eupterotidae	Eupteroptinae	*Eupterote bifasciata*	Kishida, 1994	Sep, Oct, Nov
34	Eupterotidae	Eupteroptinae	Eupterote undata	Blanchard, 1844	May, Jun
35	Bombycidae	Bombycinae	*Trilocha varians*	Walker, 1855	Oct, Dec
36	Saturniidae	Saturniinae	*Actias selene*	Hübner, 1806	Oct
37	Sphingidae	Macroglossinae	*Daphnis nerii*	Linnaeus, 1758	May
38	Sphingidae	Macroglossinae	*Hippotion rosetta*	Swinhoe, 1892	Aug, Sep
39	Sphingidae	Macroglossinae	*Nephele hespera*	Fabricius, 1775	May
40	Sphingidae	Macroglossinae	*Pergesa acteus*	Cramer, 1779	Jul, Aug, Sep
41	Sphingidae	Macroglossinae	*Theretra silhetensis*	Walker, 1856	Sep
42	Sphingidae	Sphinginae	*Acherontia styx*	Westwood, 1847	May, Jun
43	Sphingidae	Sphinginae	*Agrius convolvuli*	Linnaeus, 1758	Dec
44	Geometridae	Ennominae	*Hyperythra lutea*	Stoll, 1781	Sep, Oct
45	Geometridae	Ennominae	*Hypomecis cineracea*	Moore, 1888	Jun

	Family	Subfamily	Species	Author, Year	Month of observation
46	Geometridae	Ennominae	*Hypomecis transcissa*	Walker, 1860	Sep, Oct
47	Geometridae	Ennominae	*Petelia medardaria*	Herrich-Schäffer, 1856	Jul
48	Geometridae	Geometrinae	*Agathia laetata*	Fabricius, 1794	Sep, Oct, Nov
49	Geometridae	Geometrinae	*Argyrocosma inductaria*	Guenée, 1858	Aug
50	Geometridae	Sterrhinae	*Scopula emissaria*	Walker, 1861	Jan, Apr, Oct
51	Notodontidae	Biretinae	*Saliocleta longipennis*	Moore, 1881	Sep
52	Notodontidae	Phalerinae	*Antheua servula*	Drury ,1773	Nov
53	Notodontidae	Phalerinae	*Phalera raya*	Moore, 1849	Apr
54	Erebidae	Aganainae	*Asota caricae*	Fabricius, 1775	Jul, Sep, Oct, Nov
55	Erebidae	Aganainae	*Asota ficus*	Fabricius, 1775	Jul, Aug, Sep
56	Erebidae	Arctiinae	*Amata passalis*	Fabricius, 1781	Jan, Oct
57	Erebidae	Arctiinae	*Brunia antica*	Walker, 1854	Oct, Nov
58	Erebidae	Arctiinae	*Creatonotos gangis*	Linnaeus, 1763	Jun, Jul
59	Erebidae	Arctiinae	*Creatonotos transiens*	Walker, 1855	Jul, Aug
60	Erebidae	Arctiinae	*Eressa confinis*	Walker, 1854	Jun
61	Erebidae	Arctiinae	*Pericallia ricini*	Fabricius, 1775	May, Jun, Jul, Sep
62	Erebidae	Arctiinae	*Syntomoides imaon*	Cramer, 1780	Jan, Oct, Nov
63	Erebidae	Boletobiinae	*Eublemma roseonivea*	Walker, 1863	Oct, Nov
64	Erebidae	Calpinae	*Eudocima materna*	Linnaeus, 1767	Jun, Jul, Sep
65	Erebidae	Calpinae	*Oraesia emarginata*	Fabricius, 1794	Aug, Sep
66	Erebidae	Erebinae	*Achaea janata*	Linnaeus, 1758	Aug, Sep
67	Erebidae	Erebinae	*Chalciope mygdon*	Cramer, 1777	Nov
68	Erebidae	Erebinae	*Ercheia cyllaria*	Cramer, 1779	Oct, Nov
69	Erebidae	Erebinae	*Erebus ephesperis*	Hübner, 1827	Oct, Nov
70	Erebidae	Erebinae	*Erebus hieroglyphica*	Drury, 1773	Aug, Sep
71	Erebidae	Erebinae	*Fodina pallula*	Guenée, 1852	Aug, Sep
72	Erebidae	Erebinae	*Grammodes geometrica*	Fabricius, 1775	Oct, Nov
73	Erebidae	Erebinae	*Scardamia* cf. *metallaria*	Guenée, 1858	Oct, Nov
74	Erebidae	Erebinae	*Mocis frugalis*	Fabricius, 1775	Oct, Nov
75	Erebidae	Erebinae	*Pericyma cruegeri*	Butler, 1886	Aug, Sep
76	Erebidae	Erebinae	*Pericyma umbrina*	Guenée, 1852	Apr
77	Erebidae	Erebinae	*Polydesma boarmoides*	Guenée, 1852	Jun, Jul
78	Erebidae	Erebinae	*Sphingomorpha chlorea*	Cramer, 1777	Oct
79	Erebidae	Erebinae	*Spirama retorta*	Clerck, 1764	Apr, Jun, Nov
80	Erebidae	Erebinae	*Thyas coronata*	Fabricius, 1775	Aug, Sep
81	Erebidae	Lymantriinae	*Arctornis cygna*	Moore, 1879	Jul, Sep
82	Erebidae	Lymantriinae	*Lymantria marginata*	Walker, 1855	Feb, Mar
83	Erebidae	Pangraptinae	*Egnasia ephyrodalis*	Walker, 1858	Aug
84	Erebidae	Scoliopteryginae	*Anomis fulvida*	Guenée, 1852	Oct, Nov
85	Euteliidae	Euteliinae	*Paectes subapicalis*	Walker, 1858	Jun
86	Noctuidae	Bagisarinae	*Xanthodes intersepta*	Guenée, 1852	Sep
87	Noctuidae	Condicinae	*Condica illecta*	Walker, 1865	Jul, Aug
88	Noctuidae	Eustrotiinae	*Maliattha signifera*	Walker, 1858	Oct
89	Noctuidae	Heliothinae	*Helicoverpa armigera*	Hübner, 1808	May, Jun
90	Noctuidae	Noctuinae	*Spodoptera litura*	Fabricius, 1775	Sep, Oct

in the district and to raise positive public awareness for Lepidoptera conservation for future monitoring of their status. Further investigation is therefore warranted to make a detailed checklist for the better understanding of diversity of moth populations of the Gangajalghati block and Bankura district.

Table 4. Family-wise number of species recorded during the survey.

	Family	Number of species recorded
1	Limacodidae	2
2	Pyralidae	2
3	Crambidae	27
4	Lasiocampidae	1
5	Eupterotidae	2
6	Bombycidae	1
7	Saturniidae	1
8	Sphingidae	7
9	Geometridae	7
10	Notodontidae	3
11	Erebidae	31
12	Euteliidae	1
13	Noctuidae	5
	Total	**90**

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Images 1–24: 1—*Parasa lepida* | 2—*Parasa bicolor* | 3—*Hypsopygia mauritialis* | 4—*Tamraca torridalis* | 5—*Parapoynx fluctuosalis* | 6—*Parapoynx stagnalis* | 7—*Orphanostigma abruptalis* | 8—*Tatobotys biannulalis* | 9—*Scirpophaga* sp. | 10—*Aethaloessa calidalis* | 11—*Agrioglypta itysalis* | 12—*Condylorrhiza diniasalis* | 13—*Chabula acamasalis* | 14—*Cirrhochrista brizoalis* | 15—*Cnaphalocrocis medinalis* | 16—*Conogethes punctiferalis* | 17—*Diaphania indica* | 18—*Botyodes flavibasalis* | 19—*Eurrhyparodes tricoloralis* | 20—*Glyphodes bicolor* | 21—*Glyphodes caesalis* | 22—*Glyphodes onychinalis* | 23—*Haritalodes derogata* | 24—*Hymenia perspectalis*. © Ananya Nayak.

Images 25–48: 25—*Maruca vitrata* | 26—*Metoeca foedalis* | 27—*Parotis* cf. *marginata* | 28—*Pycnarmon cribrate* | 29—*Sameodes cancellalis* | 30—*Spoladea recurvalis* | 31—*Syllepte straminalis* | 32—*Trabala vishnou* | 33—*Eupterote bifasciata* | 34—*Eupterote undata* | 35—*Trilocha varians* | 36—*Actias selene* | 37—*Daphnis nerii* | 38—*Hippotion rosetta* | 39—*Nephele hespera* | 40—*Pergesa acteus* | 41—*Theretra silhetensis* | 42—*Acherontia styx* | 43—*Agrius convolvuli* | 44—*Hyperythra lutea* | 45—*Hypomecis cineracea* | 46—*Hypomecis transcissa* | 47—*Petelia medardaria* | 48—*Agathia laetata.* © Ananya Nayak.

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Images 73–90: 73—*Scardamia* cf. *metallaria* | 74—*Mocis frugalis* | 75—*Pericyma cruegeri* | 76—*Pericyma umbrina* | 77—*Polydesma boarmoides* | 78—*Sphingomorpha chlorea* | 79—*Spirama* sp. | 80—*Thyas coronata* | 81—*Arctornis cygna* | 82—*Lymantria marginata* | 83—*Egnasia ephyrodalis* | 84—*Anomis fulvida* | 85—*Paectes subapicalis* | 86—*Xanthodes intersepta* | 87—*Condica illecta* | 88—*Maliattha signifera* | 89—*Helicoverpa armigera* | 90—*Spodoptera litura*. © Ananya Nayak.

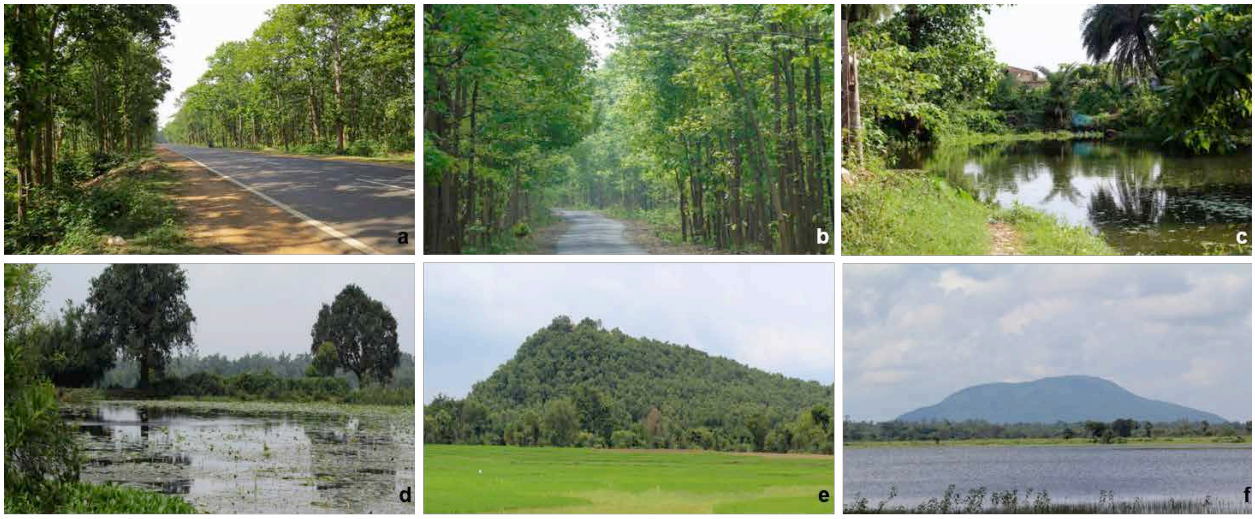

Image 91. The study area (a–d) and its surroundings (e–f): a—National Highway 14 passing through Gangajalghati Forest | b—Forest dominated area of the study site | c & d—Study sites located about two kilometers away from the forest area | e—Koro hill (122 m) located about five km away from the village | f—Sali Reservoir or Gangdua Dam and Susunia hill (448 m) located about four and 18 km away from the village, respectively. © Ananya Nayak.

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