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Report on some bugs, beetles, bees and other insects associated with medicinal plants of West Barrackpore, India

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Abstract
The survey of insect diversity associated with some medicinal plants from different places of West Barrackpore, North 24 Parganas Disrict during November 2022 to April 2023, reveal the occurrence of a total 34 species of insects belonging to 26 genera under 13 families and 6 orders, all these insect species associated with the different medicinal plants are being reported here for the first time from the West Barrackpore area.

Keywords: Medicinal plants, pest, predators and pollinators, diversity, new report, West Barrackpore, North 24 Parganas Disrict, West Bengal, India

Introduction

Medicinal plants are gaining increasing importance in India not only because of the fact that they are largely used in Indian Systems of Medicines (ISM) but also because they have various other uses like preparing nutraceuticals and food supplements, herbal cosmetics, toiletries, phytopesticides, phyto-chemicals, coloring and flavoring agents, etc. [3].

According to the WHO, 80% of the population of the developing world depends upon traditional and herbal medicines in their primary healthcare [7, 12]. Apart from being used as drugs, medicinal plants are also used for the production of different phytochemicals, toiletries, cosmetics, coloring and flavoring agents, nutraceuticals, food supplements, etc. [2,4]. Due to all these importance the Medicinal Plants are considered as valuable and profitable cash crops and have good export prospective also. The Medicinal plants also provides better opportunity for the farmers as well as Entrepreneurs. Considering the growing importance of these plants, the Indian government has provided incentives in cash and kinds for their intensive and extensive cultivation in the country. Like all other agriculture crops, medicinal plants are also attacked by a good number of insect pest and cause moderate to serious damage. This leads to appearance of various damage symptoms like yellowing or browning of leaves, defoliation, reducing in size of flowers and fruits as well as reducing the quantity of active ingredients which are used in preparing of drugs[13]. As a result, the medicinal plants has invited pest problems causing substantial loss to the farmers [14].

Previously very few works on the insect pests occurring on medicinal plants from India have been observed [1, 4, 5, 17], but no relevant literatures were found on the insets fauna associated with some medicinal plants from this District. So to fulfill these lacunae, in the present investigation, an attempts have been made to collect insect species from some Medicinal plants of different places of West Barrackpore area of North 24 Parganas Disrict and identify those and making an inventory giving host/ habitat records, status and abundance.

Materials and methods

The present study was carried out at different medicinal plants fields and gardens cultivated at different places of West Barrackpore area of North 24 Parganas Disrict. The collection was done during the period from November 2022 to April 2023, and field was visited twice a month.

Collection was done by using beating sheet technique, hand picking and sweep net method. For storage and preservation the killing jars with nail polish remover were used to killed large insects. Small insects were preserved in glass vials consisting of 70-90% ethyl alcohol. In case of butterflies, photographs were taken by the help of camera for further identification. All the collected insects were identified in laboratory under stereo binocular following Jiming *et al*., [6]; Sharma *et al*., [15], Smetacek, [16]; Kasambe, [8]; Kehimkar, [9]. The identified species were documented given the respective insect species name, name of host medicinal plant, number of species observed and remarks or status of occurrence on that medicinal plant. Moreover the insect species occurring on different medicinal plants were categorized according to their functional groups (feeding type) was done following Ghosal *et al*. [1]; Sharma *et al*. [15]; Khatun and Mondal [10, 11]. To study the relative abundance of different insects following formula was used:

Relative abundance in percentage (%)= (Total number of individual insect species/ Total number of insect species recorded)X100

Results

During this study, from November 2022 to April 2023, 34 insect species under 26 genera under 13 families and 6 orders of insects collected from some medicinal plants at different places in West Barrackpore, North 24 Parganas (Table 1; Fig. 1&2). Among them, 26 species under 19 families and 4 orders belonged to the group of insect pests, 4 species under 2 families and 2 orders belonged to the group of insect predators, and 4 species under 2 families and 1 class were recorded as insect pollinator (Table 1; Fig. 1&2).

Table 1: List of insects collected from some medicinal plants at different places of West Barrackpore area of North 24 Parganas Disrict

Order	Family	Species	Host	Feeding Status	Date of Collection	Place of collection	Number of individual observed
Coleoptera	Chrysomelidae	*Aulacophora foveicollis* (Lucas, 1849)	*Artocarpus heterophyllus*	Pest	10.03.2023	Dhobi Ghat, Barrackpore	5
Hemiptera	Cicadellidae	*Jacobiaska formosana (Paoli 1932)*	*Mangifera indica*	Pest	10.03.2023	Dhobi Ghat, Barrackpore	8
Lepidoptera	Satyrinae	*Ypthima huebneri* Kirby, 1871	*Coccinia grandis*	Pollinator	11.11.2022	Dhobi Ghat, Barrackpore	4
Hemiptera	Ricaniidae	*Ricania* sp.	*Citrus maxima*	Pest	11.11.2022	Dhobi Ghat, Barrackpore	2
Diptera	Tephritidae	*Bactrocera dorsalis (Hendel)*	*Mangifera indica*	Pest	18.11.2022	Gandhi Ghat, Barrackpore	9
Hemiptera	Cicadellidae	Idioscopus nitidulus (Walker)	*Mangifera indica*	Pest	18.11.2022	Gandhi Ghat, Barrackpore	15
Hemiptera	Alydidae	*Leptocorisa vericornis*	*Carica papaya*	Pest	25.11.2022	Gandhi Ghat, Barrackpore	10
Hemiptera	Diaspididae	*Ceroplastodes cajani* Maskell	*Oscimum sanctum*	Pest	02.12.2022	Gandhi Ghat, Barrackpore	9
Hemoptera	Membracidae	*Otinotus oneratus* (Walker)	*Tamarindus indica*	Pest	09.12.2022	Gandhi Ghat, Barrackpore	7
Hemiptera	Pyrrohocoridae	*Dysdercus cingulatus* Fabricius	*Calotropis gigantea*	Pest	19.12.2022	Mangal Pandey Park, Barrackpore	11
Coleoptera	Chrysomelidae	*Platycorynus* sp.	*Cassia fistula*	Pest	19.12.2022	Mangal Pandey Park, Barrackpore	6
Hemiptera	Aphididae	*Aphis nerii* (B.d.F.)	*Aegle marmelos*	Pest	19.12.2022	Mangal Pandey Park, Barrackpore	15
Hemiptera	Monophlebidae	*Icerya* sp.	*Artocarpus heterophyllus*	Pest	12.01.2023	Gandhi Ghat, Barrackpore	9
Coleoptera	Coccinellidae	*Epilachna vigintioctopunctata* Dejean	*Capsicum frutescens*	Pest	12.01.2023	Gandhi Ghat, Barrackpore	17
Coleoptera	Melolonthidae	*Holotrichia consanguinea* Blanchard	*Ricinus communis*	Pest	03.02.2023	Annapurna temple, Barrackpore	10
Hymenoptera	Apidae	*Apis cerana* Fabricius	*Annona muricata*	Pest	03.02.2023	Annapurna temple, Barrackpore	18
Hemiptera	Aleyrodidae	*Bbemisia tabaci* (Gennadius)	*Carica papaya*	Pest	17.02.2023	Annapurna temple, Barrackpore	20
Hemiptera	Aleyroididae	*Aleurocanthus piperis* Maskell	*Ocimum sanctum*	Pest	17.02.2023	Annapurna temple, Barrackpore	14

Contd.

Order	Family	Species	Host	Feeding Status	Date of Collection	Place of collection	Number of individual observed
Lepidoptera	Pieridae	*Eurema hecabe* Linnaeus	*Oxalis corniculata*	Pollinator	24.02.2023	Shiv Ghat, Barrackpore	10
Lepidoptera	*Papilionidae*	*Papilio demodocus Esper, 1798*	*Aegle marmelos*	Pest	24.02.2023	Shiv Ghat, Barrackpore	15
Lepidoptera	Nymphalidae	Batocera rufomaculata DeGeer	*Mangifera indica*	Pollinator	24.02.2023	Shiv Ghat, Barrackpore	5
Hymenoptera	Apidae	Apis dorsata Fabricius	*Moringa oleifera*	Pollinator	24.02.2023	Shiv Ghat, Barrackpore	1
Hymenoptera	Vespidae	*Polisters hebracus*	*Aegle marmelos*	Pollinator	03.03.2023	Shiv Ghat, Barrackpore	5
Hemiptera	Aphrophoridae	*Poophilus costalis* Walker	*Manilkara zapota*	Pest	03.03.2023	Shiv Ghat, Barrackpore	7
Hemiptera	Tinigidae	*Urentius sentis* Distant	*Cassia fistula*	Pest	10.03.2023	Shiv Ghat, Barrackpore	8
Coleoptera	Coccinellidae	*Coccinella transversalis* Fabricius	*Mentha piperita*	Predator	10.03.2023	Shiv Ghat, Barrackpore	15
Coleoptera	Coccinellidae	*Cheilomenes sexmaculata* Fabricius	*Lantana camara*	Predator	24.03.2023	Jahar Kunj, Barrackpore	2
Hemiptera	Aphididae	*Myzus persicae* (Sulzer)	*Cassia biflora*	Pest	24.03.2023	Jahar Kunj, Barrackpore	7
Lepidoptera	Nymphalidae	Tirumala limniace (Cramer)	*Crotalaria juncea*	Pollinator	24.03.2023	Jahar Kunj, Barrackpore	5
Odonata	Libellulidae	Brachythemis	*Eclipta prostrata*	Predator	24.03.2023	Jahar Kunj,	4

		contaminata (Fabricius,)				Barrackpore	
Odonata	Coenagrionidae	*Ischnura rufostigma Selys*	*Andrographis peniculata*	Predator	24.03.2023	Jahar Kunj, Barrackpore	3
Lepidoptera	Pieridae	*Eurema hecabe* Linnaeus	*Catharanthus roseus*	Pollinator	28.04.2023	Eastland Quarter, Barrackpore	7
Lepidoptera	Lycaenidae	Euchrysops cnejus (Fabricius)	*Sida acuta*	Pest	28.04.2023	Eastland Quarter, Barrackpore	2
Lepidoptera	Scythrididae	Eretmicera impactella (Walker)	Ludwigia octovalvis	Pest	28.04.2023	Eastland Quarter, Barrackpore	3
Total							288

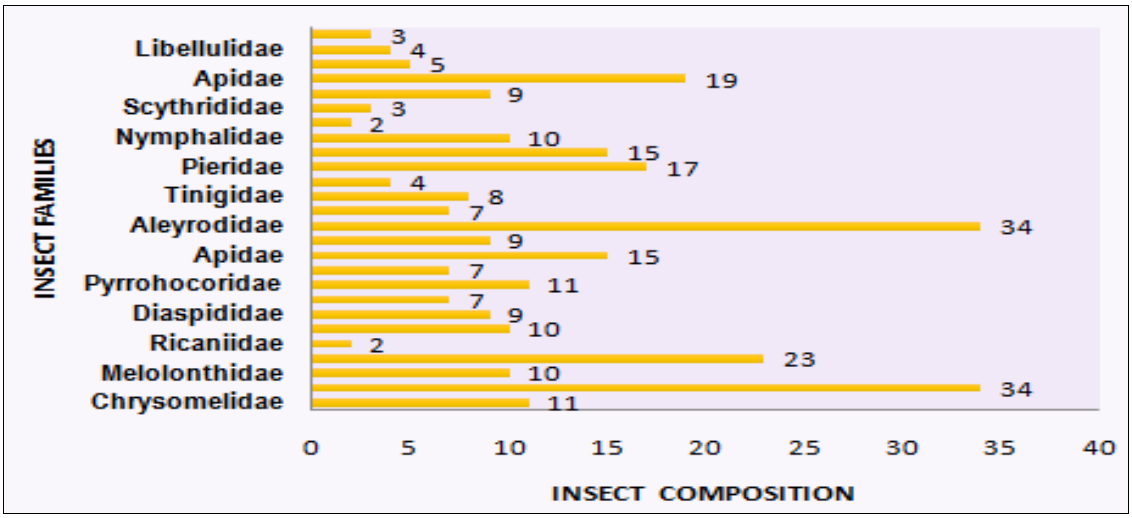

Fig 2: Percentage composition of insects sampled from some medicinal plants at different places of West Barrackpore area of North 24 Parganas Disrict

Table 2: List of the insects order, family and calculation of relative abundance based on number of individual species that were observed.

INSECT ORDER	INSECT FAMILY	NUMBER OF INDIVIDUALS	RELATIVE ABUNDANCE
Coleoptera	Chrysomelidae	11	20%
	Coccinellidae	34	61.81%
	Melolonthidae	10	18.18%
Hemiptera	Cicadellidae	23	16.20%
	Ricaniidae	2	1.41%
	Alydidae	10	7.04%
	Diaspididae	9	6.33%
	Membracidae	7	4.92%
	Pyrrohocoridae	11	7.75%
	Aphididae	7	4.93%
	Apidae	15	10.56%
	Monophlebidae	9	6.34%
	Aleyrodidae	34	23.94%
	Aphrophoridae	7	4.92%
	Tinigidae	8	5.63%
Lepidoptera	Satyrinae	4	7.84%
	Pieridae	17	33.33%
	Papilionidae	15	29.41%
	Nymphalidae	10	19.60%
	Lycaenidae	2	3.92%
	Scythrididae	3	5.88%
Diptera	Tephritidae	9	100.00%
Hymenoptera	Apidae	19	79.16%
	Vespidae	5	20.83%
Odonata	Libellulidae	4	57.14%
	Coenagrionidae	3	42.85%
	Total	288	

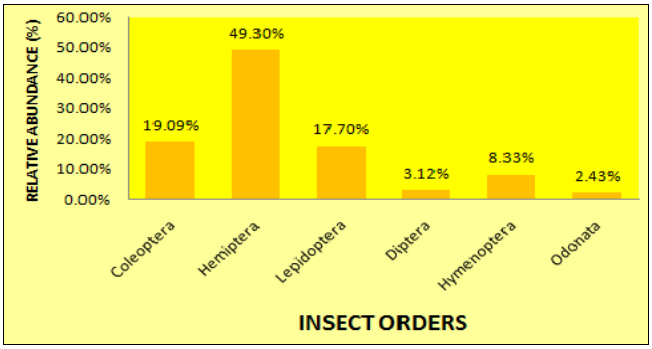

Fig 3: Relative abundance of insect families found on some medicinal plants at different places of West Barrackpore area of North 24 Parganas Disrict

The present study observed that the relative abundance of Order Hemiptera was 49.30% and significantly higher than that of Order Coleoptera (19.0%) and Order Lepidoptera (17.70%). However, the relative abundance of the orders Odonata was found to be 2.43%, the lowest relative abundance. Thus, the percent relative abundance of Hemiptera was highest followed by Coleoptera which is again followed by Lepidoptera. Order Hymenoptera, Diptera and Odonata relative abundance was found to be the lowest among the other three orders (Table: 2; Fig. 2&3).

Table 3: List showing insect diversity in terms of their feeding types which was recorded during the survey period.

Sl. No.	Type of insects diversity recorded	No. of species observed
1	Pest insects	23
2	Predator insects	7
3	Pollinator insects	4

The insects recorded during the survey were further divided into 3 categories according to their functional status which are pests, pollinators and predators (Table: 3&4; Fig: 4). Of these3 different insect groups, insect pests were found very high (23 in number) in comparison to insect predators (7 in number) and insect pollinators (4 in number).

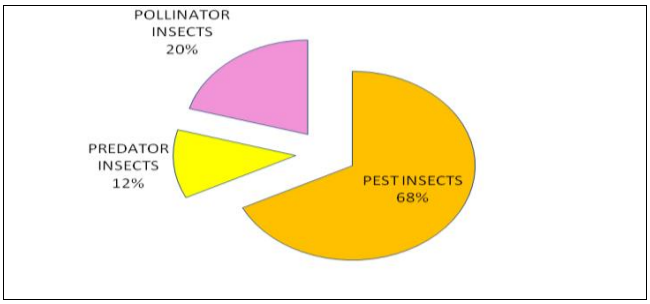

Fig 4: Representing diversity of insects based on their functional group observed on medicinal plants at different places of West Barrackpore area of North 24 Parganas Disrict, West Bengal

Discussion

In the present dissertation project work reveals the occurrence of 34 insect species under 26 genera under 13 families and 6 orders. Of these, 1 family (Tephritidae) belongs to the order Diptera, 3 families (Crysomeledae, Coccinellidae, Melolonthidae) belong to the order Coleoptera, 2 families (Apidae, Vespidae) belongs to the order Hymenoptera, 12 families (Cicadellidae, Ricaniidae, Alydidae, Diaspididae, Membracidae, Pyrrohocoridae, Aphididae, Apidae, Monophlebidae, Aleyrodidae, Aphrophoridae, Tinigidae) belong to the order Hemiptera, 6 families (Satyrinae, Pieridae, Papilionidae, Nymphalidae, Lycaenidae, Scythrididae) belongs to the order Lepidoptera, 2 families (Libellulidae,Coenagrionidae,) belongs to the Odonata.

The occurrence of the above insect species with different feeding habits from medicinal plants were also reported by earlier workers from India as well as Abroad [1, 5, 6, 17].

All the insects species associated with the different medicinal plants which are reported here have not been published earlier from the West Barrackpore area and hence form new records.

Again, the Hemipteran insect *Ricania* sp. recorded from the medicinal plant *Citrus maxima*, found to be a new report from India and abroad.

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