



E-ISSN: 2320-7078

P-ISSN: 2349-6800

www.entomoljournal.com

JEZS 2022; 10(3): 145-148

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Received: 05-04-2022

Accepted: 09-05-2022

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A preliminary study of Mites and Insects occurring on plants used as Ethnomedicines collected from different medicinal plant gardens of Narendrapur Campus Ramakrishna Mission (South 24 Parganas, West Bengal)

Anushka Sengupta and Salil Kumar GuptaDOI: <https://doi.org/10.22271/j.ento.2022.v10.i3b.9014>**Abstract**

The present study was conducted at Narendrapur Campus of Ramakrishna Mission during September 2021 to April 2022 for occurrence of Mites and Insects on plants used for ethnomedicinal purpose. The identification of the mites and insects reveals the occurrence of 20 spp. of mites belonging to 15 genera, 8 families and 3 orders as well as 11 species of insects under 11 genera, 9 families and 3 orders. Out of the collected mite species, 11 species belonging to 9 genera and 4 families are phytophagous in nature, 7 species belonging to 5 genera and 2 families are predatory in nature and 2 species which are fungal associates. In case of insects, all belong to phytophagous group. Among the mites only 3 species, viz. *Panonychus citri*, *Polyphagotarsonemus latus* and *Tetranychus ludeni* on *Carica papaya*, *Ocimum tenuiflorum* and *Calotropis gigantea*, respectively, were found abundantly, causing chlorosis of leaves. The occurrence of other mites and insects are only casual. In addition, a Host-Mites/Insects Table is also appended.

Keywords: Diversity, mites, insects, ethnomedicinal plants, West Bengal**Introduction**

India is very rich with diversity of medicinal plants and many such plants like - *Ocimum sanctum*, *Ocimum tenuiflorum*, *Ocimum gratissimum*, *Carica papaya*, *Abrus precatorius*, *Terminalia chebula*, *Calotropis gigantea*, *Cocos nucifera*, *Datura metel* are used as Ethnomedicines for getting cured from diseases suffered by ethnic people and their pets. Many of these plants are infested by mites and insects and some of those do substantial damage to their hosts. Narendrapur campus of Ramakrishna Mission is having hundreds of medicinal plants in its three gardens and out of those the plants like *Ocimum sanctum*, *Ocimum tenuiflorum*, *Ocimum gratissimum*, *Carica papaya*, *Abrus precatorius*, *Terminalia chebula*, *Calotropis gigantea*, *Cocos nucifera*, *Datura metel* have ethnomedicinal values. Unfortunately, no exploration of mites and insects from those plants has been concluded earlier. Hence, this preliminary work was undertaken to collect and identify those and to find out their nature of association with their respective hosts. The Present paper is based upon the results of that study. In addition, a Host-Mites/Insects Table has also been appended.

Materials and Methods

The entire collection reported in this paper was made from the different medicinal plant gardens located at Narendrapur campus of Ramakrishna Mission (Latitude: 19°19'60.00"N and Longitude: 84°51'59.99"E) during September 2021 to April 2022. The leaves twigs of 9 species of Ethnomedicinal plants in the gardens were collected from field in polybags and those were examined under Stereo-binocular microscope in the laboratory and mites and insects which were encountered were collected with the help of a fine brush, moistened with alcohol and preserved in 70% alcohol. The mounting of mites was done in Hoyer's medium and identification was done by the junior author. The soft insects were mounted in lactic acid and then identified, comparing with the identified collection.

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Results

The identified mites and insects have been listed in Table 1 and Table 2; giving their respective host/habitat plants, date of

collection and nature of association with their respective hosts. The Tables are self-explanatory.

Table 1: List of mites collected on different species of plants used for ethnomedicinal purpose, collected from different medicinal plant gardens of Narendrapur campus of Ramakrishna Mission (South 24 Parganas, West Bengal)

Sl. No.	Name of the Mites species	Name of Hosts/Habitats	Date of Collection	Remarks
Order 1- Trombidiformes Sub-order - Prostigmata				
1.	Phytophagous Group Family 1- Tetranychidae <i>Eutetranychus orientalis</i> (Klein)	<i>Cocos nucifera</i> , <i>Datura metel</i>	10.03.2022 26.03.2022	The population of this mite on <i>Cocos nucifera</i> was unusual as it was not its Normal host. On <i>Datura metel</i> it produced brownish patches.
2.	<i>Oligonychus indicus</i> (Hirst)	<i>Cocos nucifera</i>	14.02.2022	The infestation caused appearance of white stipplings on the ventral surface of leaf. The colony was covered with thin webs where all stages were observed.
3.	<i>Panonychus citri</i> (McGregor)	<i>Carica papaya</i>	08.10.2021 14.02.2022 10.03.2022	Infested under surface of <i>Carica papaya</i> leaf, colony not covered with web; eggs were reddish, laid scatteredly and adults and nymphs sucked plant sap - causing severe chlorosis, the plant became devitalized.
4.	<i>Tetranychus ludeni</i> Zacher	<i>Calotropis gigantea</i> , <i>Datura metel</i>	10.12.2021 04.01.2021	Heavy infestation of mites on upper surface of leaf of <i>Calotropis gigantea</i> , was observed causing severe chlorosis; also infested most seriously on lower surface. In <i>Datura metel</i> , symptoms were yellowing of leaves.
5.	<i>Tetranychus macfarlanei</i> Baker & Pritchard	<i>Datura metel</i>	04.01.2022	Occurrence on ventral surface of leaves, small colonies covered with webs were observed; white spots were found at the points of feeding.
6.	<i>Tetranychus urticae</i> Koch	<i>Abrus precatorius</i> , <i>Ocimum gratissimum</i>	17.12.2021 10.03.2022	Noticeable infestation of mite was observed near basal part of leaves causing discolouration of leaves and appearance of brownish spots at the points of feeding.
7.	Family 2- Tenuipalpidae <i>Brevipalpus obovatus</i> Donnadieu	<i>Ocimum sanctum</i>	16.09.2021	Population scatterly distributed near mid ribs, infested leaves produced brownish patches.
8.	Family 3- Tarsonemidae <i>Polyphagotarsonemus latus</i> (Banks)	<i>Ocimum tenuiflorum</i>	22.11.2021	Huge number of mites found on under surface of young leaves; causing rinkling of leaves. The mites were more on young leaves compared to matured ones.
9.	<i>Tarsonemus</i> sp.	<i>Ocimum sanctum</i> , <i>Calotropis gigantea</i>	09.09.2021 22.11.2021	A few mites were observed on undersurface of leaves, population was too poor to cause any damage.
10.	Family 4- Eriophyidae <i>Aceria guerreronis</i> Keifer	<i>Ocimum sanctum</i> , <i>Cocos nucifera</i>	08.10.2021 11.01.2022	This is a serious mite pest of coconut, called Coconut perianth mite, causing appearance of first white then brownish fibrous patches on <i>Cocos nucifera</i> nuts, caused premature nut fall.
11.	<i>Bakeriella ocimis</i> Chakrabarti & Mondal	<i>Ocimum tenuiflorum</i>	16.09.2021	Few of this mite species were noticed on under surface of <i>Ocimum tenuiflorum</i> . These tiny mites were seen as vagrants doing no damage to its host.
12.	Predatory group Family 5- Iolinidae <i>Pronematus elongatus</i> (Baker)	<i>Terminalia chebula</i>	11.01.2022	This is a predatory mite, mostly was seen feeding upon eggs of Tetranychid mite.
13.	<i>Pronematus sextoni</i> Baker	<i>Ocimum gratissimum</i>	14.02.2022	These predatory mite mainly fed on eggs.
Order 2- Mesostigmata				
14.	Family 6- Phytosiidae <i>Amblyseius herbicolus</i> (Chant)	<i>Terminalia chebula</i>	24.02.2022 07.04.2022	This is a predatory mite, fed upon scale insects.
15.	<i>Euseius ovalis</i> (Evans)	<i>Carica papaya</i>	11.01.2022 18.04.2022	Occasionally encountered, it is a good predator of immatures of <i>Panonychus citri</i> .
16.	<i>Paraphytoseius multidentatus</i> (S. & S.)	<i>Ocimum sanctum</i> , <i>Ocimum tenuiflorum</i>	22.10.2021 10.03.2022	It is a predatory mite seen feeding upon Tarsonemid mites.
17.	<i>Paraphytoseius orientalis</i> (Ghai & Mrnon)	<i>Ocimum gratissimum</i>	11.11.2021	This predatory mite was observed in association with <i>Polyphagotarsonemus latus</i> .

18.	<i>Scapulaseius suknaensis</i> (Gupta)	<i>Ocimum sanctum</i> , <i>Ocimum gratissimum</i>	11.11.2021 17.12.2021	Commonly encountered with no noticeable damage symptoms.
20.	Family 8- Suidaseiidae <i>Suidasia nesbitti</i> Hughes	<i>Carica papaya</i>	26.03.2022	Fungal associates.

Table 2: List of Insects collected on different species of plants used as ethnomedicinal purpose, collected from different medicinal plant gardens of Narendrapur campus of Ramakrishna Mission (South 24 Parganas, West Bengal)

Sl. No.	Name of Insects	Name of Hosts/Habitats	Date of Collection	Remarks
Order 1- Coleoptera				
1.	Family 1- Chrysomelidae <i>Aspidomorpha</i> sp.	<i>Ocimum tenuiflorum</i>	18.04.2022	Fed on leaf lamina producing holes.
Order 2- Hemiptera				
2.	Family 2- Aleyrodidae <i>Aleurolobus</i> sp.	<i>Ocimum gratissimum</i> , <i>Carica papaya</i>	10.03.2022 07.04.2022	Infestation was observed on Upper surface of leaves.
3.	<i>Bemisia tabaci</i> (Green)	<i>Datura metel</i>	18.04.2022	All stages sucked plant sap making the leaves unhealthy.
4.	Family 3- Aphididae <i>Aphis gossypii</i> Glover	<i>Ocimum sanctum</i> , <i>Ocimum tenuiflorum</i>	08.10.2021 17.12.2021 24.04.2022	Good infestation was observed on under surface of leaves; Making those yellow and curled.
5.	<i>Myzus persicae</i> (Sulzer)	<i>Ocimum sanctum</i>	08.10.2021	Good infestation was observed on under surface of leaves; making those yellow and curled.
6.	Family 4- Cicadellidae <i>Kolla vesta</i> (Distant)	<i>Calotropis gigantea</i>	26.03.2022	Infested leaves curved like a boat, turned brownish and dried up later.
7.	Family 5-Coccidae <i>Ceroplastes</i> sp. (near cajani)	<i>Ocimum sanctum</i> , <i>Terminalia chebula</i>	17.12.2021 10.03.2022	In case of <i>Ocimum sanctum</i> , stray occurrence, no damage was observed. In case of <i>Terminalia chebula</i> , severe infestation on under surface of leaves. The affected leaves turned yellowish and unhealthy.
8.	Family 7- Diaspididae <i>Aspidiotus destructor</i> Signoret	<i>Cocos nucifera</i>	17.12.2021	Abundantly infested undersurface of coconut leaves, such leaves turned blackish and dried up.
9.	Family 6- Margarodidae <i>Lebioproctus polei</i> (Green)	<i>Ocimum gratissimum</i>	10.03.2022	Stray occurrence.
10.	Family 7- Tingidae <i>Monanthia globulifera</i> Walk	<i>Ocimum sanctum</i>	24.02.2022 26.03.2022	Occurred on undersurface of leaves causing crinkling of leaves.
Order 3- Thysanoptera				
11.	Family 8- Thripidae <i>Thrips</i> sp.	<i>Ocimum gratissimum</i>	26.03.2022	Infestation was of minor nature, no noticeable damage symptoms.

Table 3: List of plants (used for ethnomedicinal purpose) against collected mite/insect species from different medicinal plant gardens of Narendrapur campus of Ramakrishna Mission (South 24 Parganas, West Bengal)

Sl. No.	Name of the Host/Habitat plants	Name of the Mite species	Name of the Insect species
1.	<i>Abrus precatorius</i> (Fabaceae)	<i>Tetranychus urticae</i> Koch	---
2.	<i>Calotropis gigantea</i> (Apocynaceae)	<i>Tarsonemus</i> sp. <i>Tetranychus ludeni</i> Zacher	<i>Kolla vesta</i> (Distant)
3.	<i>Carica papaya</i> (Caricaceae)	<i>Euseius ovalis</i> (Evans) <i>Panonychus citri</i> (Me. Gregor) <i>Suidasia nesbitti</i> Hughes	<i>Aleurolobus</i> sp.
4.	<i>Cocos nucifera</i> (Aricaceae)	<i>Aceria guerreronis</i> Keifer <i>Eutetranychus orientalis</i> (Klein) <i>Oligonychus indicus</i> (Hirst)	<i>Aspidiotus destructor</i> Signoret
5.	<i>Datura metel</i> (Solanaceae)	<i>Eutetranychus orientalis</i> (Klein) <i>Tetranychus ludeni</i> Zacher <i>Tetranychus macforlanei</i> Baker & Pritchard	<i>Bemisia tabaci</i> (Green)
6.	<i>Ocimum gratissimum</i> (Lamiaceae)	<i>Paraphytoseius orientalis</i> (Narayan <i>et al.</i>) <i>Pronematus sextoni</i> Baker <i>Scapulaseius suknaensis</i> (Gupta) <i>Tetranychus urticae</i> Koch	<i>Aleurolobus</i> sp. <i>Lebioproctus polei</i> (Green) <i>Thrips</i> sp.
7.	<i>Ocimum sanctum</i> (Lamiaceae)	<i>Acarus farris</i> (Oudemans) <i>Brevipalpus obovatus</i> Donnadieu	<i>Aphis gossypii</i> Grover <i>Myzus persicae</i> (Sulzer) <i>Ceroplastes</i> sp. (near cajani)

		<i>Paraphytoseius multidentatus</i> (S.& S.) <i>Scapulaseius suknaensis</i> (Gupta) <i>Tarsonemus</i> sp.	<i>Monanthia globulifera</i> Walk
8.	<i>Ocimum tenuiflorum</i> (Lamiaceae)	<i>Aceria guerreronis</i> Keifer <i>Bakeriella ocimis</i> Chakrabarti & Mondal <i>Paraphytoseius multidentatus</i> (S.& S.) <i>Polyphagotarsonemus latus</i> (Banks)	<i>Aphis gossypii</i> Grover <i>Aspidomorpha</i> sp.
9.	<i>Terminalia chebula</i> (Combreraceae)	<i>Amblyseius herbicolus</i> (Chant) <i>Pronematus elongates</i> (Baker)	<i>Ceroplastes</i> sp. near Cajani

Discussion

Since, no study has been found on mites and insects occurring on ethnomedicinal plants in India in general and West Bengal in particular, the results obtained in the present study could not be compared with those of earlier studies. However a good number of studies [Lal & Mukherjee (1977), Ghosh & Gupta (2003), Ghosh & Singh (2004), Lahiri *et al.* (2004), Gupta *et al.* (2005), Gupta (2005, 2012), Roy *et al.* (2007, 2008, 2010), Mondal & Gupta (2019) [7, 1, 2, 6, 3-5, 9-11, 8]] have been conducted on Medicinal plants in general and the present study conforms with results of some of those.

Acknowledgement

Sincere thanks are due to Swami Sarvalokananda Maharaj, the Secretary, Ramakrishna Mission, Narendrapur for providing infrastructure facilities, to Dr. Sumana Saha, Head of the Post Graduate Dept. of Zoology, Barasat Government College, for constant encouragement and extending necessary facilities for carrying out the work and a special thanks to my parents and elder sister for continuous support.

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