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Mites and insects occurring on plants used as spices from South 24 Parganas district of West Bengal, India

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Abstract

The present paper reports occurrence of a total of 13 species of mites under 6 families, 9 genera, 2 orders and 9 species of insects under 9 genera, 6 families, 2 orders, occurring on spices plants in the Narendrapur campus of Ramkrishna Mission, collected during September 2021 to April 2022. Out of 13 species of mites, 6 and 7 species belonged to phytophagous and predatory groups, respectively. In case of insects, all were phytophagous in nature. Among the phytophagous and predatory mites, none of those occurred abundantly on any of the spice plants and in fact, in all cases, their occurrence was only occasional. Hence, from the present study neither any pest species nor any potential predatory species could be identified. Probably more intensive study in future may throw some light in this matter.

Keywords: Diversity, Spices plants, Mites, Insects, West Bengal (South 24 Parganas)

Introduction

Since ancient time India is the home of spices and very rich with production of diverse types of spices. India is also one of the largest exporters of spices and exports about 17, 58, 985 tonnes earning US\$ 4178.81 million foreign exchange (during 2020-22). Some of important spices produced in India are black pepper, cardamom (small & large), ginger, garlic, turmeric, chilli and a variety of trees and seed spices. The major spices growing states of India are Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, Rajasthan, Maharashtra, West Bengal. According to International Organization for Standardization (IOS), India produces about 75 of the total 109 varieties of spices known from the world. The spices are exported to China, Vietnam, Thailand, Bangladesh, UAE, UK, Malaysia, Sri Lanka, Indonesia, Germany. Like all other horticultural crops, spice crops are also attacked by a large number of pests which include both mites and Insects and sometimes the damage done by those is so enormous that the growers suffer heavy economic loss.

The Narendrapur campus of Ramkrishna Mission is rich with several spice plants like *Amomum aromaticum* (boro elach), *Elettaria cardamonum* (choto elach), *Piper cubeba* (kabab chini), *Cinnamomum zeylanicum* (dalchini), *Cinnamomum tamala* (tej pata), *Piper nirgum* (golmorich), *Myristica fragrans* (jaiphal-jaitri), *Trigonella foenum* (methi), *Murraya koenigii* (curry paata), etc. So far, no information is available about occurrence of mites/ insects on those plants of Narendrapur campus, though it is a fact that many of those are attacked. Hence, to have some preliminary idea about the occurrence of mites and insects on those plants, surveys were conducted during September 2021 – April 2022 and all those which were collected were identified and their importance if any were observed in the field and documented. The present paper is based on the result of that study.

Materials and Methods

The entire collection reported in this paper was made from different spice plants maintained in the medicinal plant gardens, located at Narendrapur campus of Ramkrishna Mission (Latitude: 19°19'60.00"N and Longitude: 84°51'59.99"E), during September 21- April 22.

The leaves, twigs of 9 species of spice plants available in the garden 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

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brush, moistened with ethyl alcohol and preserved in 70% alcohol.

The mounting of mites was done in– Hoyer's medium and the soft insects were mounted in lactic acid and then identified. The mites were identified by the junior author while the insects were identified by comparing with previously identified specimens.

Results

A total of 13 species of mites under 9 genera, 6 families and 9 species of insects under 9 genera and 6 families were identified and have been reported here. Of those, 6 species of mites belonged to phytophagous group and 7 species belonged to predatory group and in case of insects, all the 8 species belonged to phytophagous group. All the identified species have been listed in Table-1 and Table -2 respectively.

Table 1: Mite species collected on different spice plants at Narendrapur campus of R.K. Mission during September 2021- April 2022

Name of the mite	Host	Date of collection	Remarks
Order- Trombidiformes Suborder- Prostigmata			
Phytophagous group 1.Family - Tetranychidae <i>Eutetranychus africanus</i> (Tucker)	<i>Murraya koenigii</i> (curry paata)	6.04.22	Occurred on upper leaf surface, feeding produced brownish patches
2.Family – Tenuipalpidae <i>Dolicoetetranychus floridanus</i> (Banks)	<i>Amomum aromaticum</i> (boro elach)	16.09.21	It is normally a pest of cardamom, producing reddish patches but such symptoms could not be seen.
<i>Brevipalpus californicus</i> (Banks)	<i>Amomum aromaticum</i> (boro elach)	29.10.21	Occurred in poor number, caused no damage.
<i>Brevipalpus phoenicis</i> (Geij.)	<i>Elettaria cardamomum</i> (choto elach)	14.12.21	Population was occasional, no damage.
3.Family – Tarsonemidae <i>Tarsonemus</i> sp.	<i>Elettaria cardamomum</i> (choto elach)	14.12.21	Stray occurrence was noticed on upper surface of leaves, importance unknown.
<i>Steneotarsonemus</i> sp.	<i>Cinnamomum tamala</i> (tej pata)	17.01.22	Stray occurrence was noticed on upper surface of leaves, importance unknown.
Predatory group 4.Family – Iolinidae <i>Pronematus ubiquitus</i> (Mc Gregor)	<i>Amomum aromaticum</i> (boro elach) <i>Myristica fragrans</i> (jaiphal-javitri)	22.10.21	It is a predatory mite
<i>Pronematus sextoni</i> Baker	<i>Cinnamomum tamala</i> (tej pata)	20.02.22	Collected from undersurface of leaves in association with <i>Steneotarsonemus</i> sp., importance unknown.
<i>Pronematus elongatus</i> Baker	<i>Cinnamomum zeylanicum</i> (dalchini)	16.03.21	Recorded from undersurface of leaves, the species is in fact an egg feeder.
5.Family – Tydeidae <i>Tydeus</i> sp.	<i>Cinnamomum zeylanicum</i> (dalchini)	16.03.22	Belongs to predatory group.
Order- Mesostigmata			
6.Family – Phytoseiidae <i>Euseius coccineae</i> (Gupta)	<i>Trigonella foenum</i> (methi)	12.11.21	A predatory mite
<i>Amblyseius channabasavannai</i> Gupta	<i>Piper cubeba</i> (kabab chini)	11.01.22	It is a predatory one, associated with scale insects.
<i>Amblyseius herbicolus</i> (Chant)	<i>Myristica fragrans</i> (jaiphal-jaitri)	25.03.22	It is a predatory mite.

Table 2: Insect species collected on different spice plants at Narendrapur campus of Ramkrishna Mission during September 2021- April 2022

1.Order – Hemiptera			
Name of the insect	Host	Date of collection	Remarks
Phytophagous group 1. Family – cicadellidae <i>Empoasca</i> sp.	<i>Cinnamomum tamala</i> (tej pata)	4.12.21	Casual occurrence on undersurface of leaves.
2. Family – Diaspididae <i>Cornuaspis</i> sp.	<i>Cinnamomum zeylanicum</i> (dalchini)	17.01.22	Poor infestation, no damage.
3. Family – Pseudococcidae <i>Planococcus</i> sp. <i>Pseudococcus</i> sp. <i>Ferrisia virgata</i> (Cockrell)	<i>Piper cubeba</i> (kabab chini) <i>Cinnamomum zeylanicum</i> (dalchini) <i>Piper nigrum</i> (Golmorich)	4.12.21 11.01.22 19.4.22	Occasional occurrence Poor infestation High infestation on leaves, such leaves became unhealthy
4. Family – Psyllidae <i>Paurophylla</i> sp. <i>Diaphorina</i> sp.	<i>Piper cubeba</i> (kabab chini) <i>Piper cubeba</i> (kabab chini)	18.11.21 18.11.21	Casual occurrence. Occasional occurrence.
5. Family – Pentatomidae <i>Bagrada cruciferum</i> F.	<i>Amomum aromaticum</i> (boro elach)	16.09.21	Collected from undersurface of leaves, it is a leaf juice sucker.
2.Order – Thysanoptera			
6.Family – Palaeothripidae <i>Scirtothrips cardamomum</i> (Ramk.)	<i>Elettaria cardamomum</i> (choto elach)	23.09.21	Scatteredly found moving on undersurface of leaves.

Discussion

This preliminary study reported 13 species of mites and 9 species of insects occurring on plants used as spices maintained in the medicinal plant garden of Ramakrishna Mission, Narendrapur campus. Most of the species reported here have not been earlier reported regarding occurrence of mites/ insects on spice plants and therefore these respective plants form new host records. However, except in case of *Ferrisia virgata* on black pepper which was seen on undersurface of leaves in colony form, all the remaining species of insects were in such poor number that they caused no noticeable damage to their host plants.

In case of mites, none of those were found in the form of pests to cause any noticeable damage. The occurrence of both phytophagous and predatory mites were of casual nature.

Gupta and Karmakar, (2011) ^[2] while reporting mites from medicinal plants reported 2 species viz. *Eutetranychus orientalis* (Klein) on *Murraya koenigii* and *Tetranychus urticae* Koch on *Coriandrum sativum* and *Piper nigrum*.

Further Gupta *et al.* (2014) ^[1] reported in his book a large number of mites for the first time in India occurring on spice plants from Kerala. Among the mite species recorded in present study there were 6 species as given undermentioned Table were common with the above studies. Though in some cases the host plants they represented did not match with that of the present study.

Name of the mite	Host
<i>Dolicoetranychus floridanus</i> (Banks)	<i>Elettaria cardamomum</i> (choto elach)
<i>Brevipalpus</i> sp.	<i>Pimenta diocia</i> (Allspice)
<i>Amblyseius herbicolus</i> (Chant)	<i>Elettaria cardamomum</i> (choto elach) <i>Cinnamomum verum</i>
<i>Euseius coccineae</i> (Gupta)	<i>Cinnamomum verum</i>
<i>Euseius</i> sp.	<i>Elettaria cardamomum</i>
<i>Tydeus</i> sp.	<i>Syzygium aromaticum</i> (clove)

Again, Kumar *et al.* (2020) ^[3], reported insects belongs to Papilionidae, leaf minor, shoot and leaf webber and chaffer beetle from cardamom, stem borer and scale insects from clove and some scale insects from nutmeg. Unfortunately, in the present study no insect representing butterflies and beetles could be recorded though of course *Ferrisia virgata*, a mealybug was found as only important pest. The study represents a preliminary one and confined to one particular area only and that might be the reason for recording such poor number of mites and Insects on spice plants. Expectedly, more thorough surveys, if conducted on different localities growing spices, more number of mites and insects will be discovered.

Again Roy *et al.* (2011) ^[4], reported some mites from medicinal plants from West Bengal which included species from some spice plants also.

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