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RESEARCH ARTICLE

A SURVEY ON THE DIVERSITY OF MITES INHABITING THE ORNAMENTAL AND FRUIT PLANTS IN SOUTH BENGAL, INDIA.

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Abstract

Mites are akin to spiders and most of them are inhabitant of plants. Phytophagous mites cause depletion in quality and quantity of ornamental and floricultural as well as fruit plants and thus causing substantial economic loss to the farmers and growers. Besides these, there are also some predatory mites which contribute actively in the biological pest control. Though some stray works have been done on ornamental and fruit plant mites, a consolidated record is so far unavailable. So the present study was undertaken to prepare a consolidated list of ornamental and fruit plant mites, their host, nature of damage, etc. The present study reports mites occurring on floricultural and fruit trees in 9 districts of South Bengal and the study period was 2009-2013. Among these mites, 6 species were found as major pests and those were *Tetranychus urticae* on rose, marigold and tuberose, *Oligonychus biharensis* on temple tree, *Brevipalpus karachiensis* on chrysanthemum, *Brevipalpus phoenicis* on temple tree, *Polyphagotarsonemus latus* on marigold, and *Aceria jasminii* on jasmine. 6 species appeared to be major predatory mites which could be used effectively in biological control of pests and those were *Amblyseius largoensis*, *Amblyseius herbicolus*, *Paraphytoseius multidentatus* etc. Among the fruit tree mites, mention may be made of *Eutetranychus orientalis*, *Oligonychus mangiferus*, *Panonychus citri*, *Raoiella indica*, *Dolichotetranychus floridanus*, *Aceria mangiferae*,, etc. as major phytophagous mites and *Neoseiulus longispinosus*, *Euseius coccineae*, *Euseius ovalis*, *Cunaxa setirostris*,, etc. as major predatory mites.

Introduction:-

Mites are microscopic or sub-microscopic arthropods belonging to Phylum Arthropoda, Class Arachnida and Sub-class Acari. These creatures, although may be small or tiny but have tremendous importance in horticulture and agriculture. The injurious phytophagous mites feed on plant sap causing mechanical, chemical and physiological damages to the host plants which lead to discoloration of fruits and leaves, stunted growth, defoliation, malformation, reducing yield, etc. and all these lead to causing economic loss to the growers.

The mite problem was never so serious up to the middle of the last century, but has become very acute especially during the period thereafter due to several reasons like indiscriminate and injudicious use of synthetic chemical

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pesticides which not only eliminates natural enemies from the crop field, but also lead to develop resistance along with inviting problems like resurgence and residual effects.

The phytophagous mites which attack the floricultural and horticultural crops are known to inflict damage causing loss to the extent of 5-70% and in some cases, the loss may be far reaching leading to total crop failure. Some of the reported losses in various fruit trees are 50-80% in mango due to *Aceria mangiferae*, 30% in litchi due to *Aceria litchii*, 22-25% in ber due to *Eriophyes cernuus*, 5-60% in jasmine due to *Aceria jasmini*, 53% on roses by *Tetranychus urticae*, etc. (Gupta, 2012).

The export potentiality of horticultural crops is very high and exported Rs. 8760.96 crores worth of fruits to the countries like UAE, Bangladesh, Malaysia, UK, Netherlands, Pakistan, Saudi Arabia and Nepal. India shares about 12% of the global market as per the record of 2010-2011 but with the initiatives of APDEA, the curve is gradually on the rise.

Because of this tremendous importance the floricultural and horticultural crops have received global attention and diverse types of works pertaining to survey, bio-ecology, and control have been done in different parts of the world including India and some of those have been reviewed by Bindra and Singh (1970), Gupta (1985, 2012), etc.

Objectives:-

Though, some works have been done on fruit trees and ornamental plants from West Bengal, (Karmakar *et.al*. 2010, Chatterjee &Gupta 1995) but so far no comprehensive account has been published including diversity of this mite along. In view of this paucity of knowledge, it was thought desirable to take up a comprehensive study on mites occurring on ornamental and fruit trees in West Bengal.

Material and Methods:-

Collection Sites: Different localities in South Bengal covering districts of Kolkata, Howrah, Hoogly, North and South 24 Parganas, Nadia, East and West Midnapur, Burdwan. The places visited in different districts of South Bengal for collection of mites are indicated in the map (Figure 1). Collection trips were made 3-4 times a year covering all the seasons during 2009-2013. Mostly, the fruit trees and ornamental plant gardens belonging to government and public sectors were selected for collection of mites.

Total plant species examined: 26 types of ornamental and floricultural plants and 22 types of fruit trees.

Method of collection:

In Majority of the cases, collection was done mostly by examining the leaves and other plant parts directly in the field and mites were picked up with the help of a fine brush moistened with ethyl alcohol and kept into vials (4cm x 1cm) containing 70% alcohol. Wherever possible, infested leaves were also brought to the laboratory and then examining the leaves under stereo binocular microscope for collection of mites. Apart from leaves, the infested twigs, galls, malformed plant parts were also brought to the laboratory for examination under microscope and collection of mites. This facilitated the collection of tiny mites like Tenuipalpidae, Tydeidae, Tarsonemidae, Eryophidae etc. which are otherwise difficult to locate with hand lens in the field.

Preservation and Mounting:

For this, 70% alcohol with few drops of glycerol was used and mounted in Hoyer's medium.

Examination of specimens:

This was done under Olympus Research Microscope Wherever needed, the illustrations were prepared with inbuilt drawing tube.

Result and discussion:-

The present study deals with the diversity of mites of floricultural and fruit plants covering 9 districts of South Bengal. The overall objective of this study was to identify the most serious pests of horticultural crops, and to study the extent of damage. This study has reported the important predatory mites which can be used as effective biocontrol agents (Karmakar*et al*., 2016, Chakraborty 2010).

Major pest mites found on ornamental plants:

1. *Tetranychus urticae*: rose, chrysanthemum, zinia, carnation, tuber-rose, marigold, dahlia, sunflower, gladiolus.
2. *T. neocaledonicus*: jasmine, rose, geranium
3. *T. ludeni*: cosmos, marigold
4. *Eutetranychus orientalis*: rose, bougainvillea, sunflower
5. *Oligonychus biharensis*: *Plumeria alba*
6. *Aceria jasminii :* jasmine

Important predatory mites found on ornamental plants :

1. *Amblyseius largoensis* : rose, oleander, croton, mussandra
2. *A. herbicolus*: rose, croton
3. *Neoseiulus longispinosus*: wax flower
4. *Euseius ovalis* : rose, chrysanthemum, china rose
5. *E. alstoniae*: oleander
6. *E. coccineae*: mountain ebony
7. *Paraphytoseiu smultidentatus*: rose, sunflower
8. *Indoseiulus eharai:* oleander

Fruit Trees: Total plant species examined: 22
Major pest mites collected from fruit plants:
Family I. Tetranychidae

1. *Eotetranychushirsti :* fig
2. *E. syzigii:* blackberry
3. *Eutetranychus orientalis:* citrus
4. *Oligonychus mangiferus*: mango
5. *O. oryzae*: banana
6. *Panonychus citri:* papaya
7. *Schizotetranychus hindustanicus*: citrus
8. *Tetranychus urticae :* cucumber

Family II: Tenuipalpidae

9. *Brevipalpus phoenicis:* guava
10. *Dolichotetranychus floridanus:* pineapple
11. *Raoiella indica:*coconut, date palm

Family III: Eriophydae
Aceria litchi: litchi

Important Predatory mites found on fruit plants
Family I: Phytoseiidae

1. *Amblyseiuslargoensis:* litchi, guava
2. *Euseiuscoccineae:* jackfruit, citrus, palm
3. *E. ovalis:* Sapota, guava, pepo
4. *Neoseiulus longispinosus*: citrus, mango, fig
5. *Paraphytoseius multidentatus:* fig, sapota

Family II.Cunaxidae
Cunaxa setirostris: fig, sapota

References:-

1. Karmakar, S., Bhattacharya, D.K. and Gupta, S. K. 2016. Exploration of economically important mites infesting horticultural crops in South Bengal and studies on their bioecological aspects. Ph. D. Thesis. Dept. of Zoology, University of Kalyani , 258pp.
2. Gupta, S.K. 2012. *Handbook. Injurious and beneficial mites infesting agri-horticultural crops in India and their management*. Nature Books India, New Delhi. 362pp.

3. Chakraborty, A. 2010. Association of the predatory mites with *Aceria litchi* Keifer (Acari: Eriophyidae) under West Bengal condition. Abst. V Int. *Symp-cum-Workshop Acarology*: 41-42.
4. Karmakar, S., Gupta, S. K. and Bhattacharya, D.K. 2010. Phytophagous and Predatory mites (Acari) occurring on ornamental plants in South Bengal, with their economic importance. *Abst. Int. Symp. Workshop Acarology, Kalyani*: 40-41.
5. Chatterjee, K. and Gupta, S. K. 1995. Mites occurring on vegetables, fruit trees and ornamental plants in West Bengal with comments on their pest status. *Abst. V. Nat. Symp. Acar. Bangalore*:13.
6. Gupta, S.K. (1985). *Handbook, Plant mites of India*. Zoological Survey of India Pub., Kolkata, p.520.
7. Bindra, O. S., and Singh, G. S. 1970. Mite pests of ornamental plants of India. *Pesticides* 4:17-24.
8. [The statistical and economical records mentioned in the "Introduction" have been collected from "Google" and "Wikipedia"].