



DIVERSITY AND ECOLOGY OF PLANT MITES AND DAMAGES CAUSED BY THEM ON ORNAMENTAL AND GARDEN PLANTS IN SOUTH BENGAL

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INTRODUCTION

Flowers and leafy ornamentals have in India immense values in socio-cultural-religious aspects apart from having a good deal of commercial values both in domestic and export markets. India has 2,32,540 ha under flower cultivation with production of 4,59,156 tonnes of loose flowers and 1,15,613 cut flowers (Chadha, 2010 and Gupta, 2012). The huge garden in the Ashrama of the Narendrapur Ramakrishna Mission has a very rich collection of both flowers and leafy ornamentals and those are regularly infested with a large variety of insects and mites which have not so far been explored, studied and documented. In view of this, the present study was undertaken to explore the mites both phytophagous and predatory species infesting these plants, their importance as pests or beneficial predators, if any, and some information has also been provided as to their management mostly by herbal pesticides as application of synthetic chemical pesticides are environmentally unfriendly.

MATERIAL AND METHODS

The collection of mite specimens both phytophagous and predatory forms was made from the garden of the Ramakrishna Mission Ashrama, Narendrapur, 16 kms south of Rajbawan, Kolkata during the period from August, 2007 to July, 2009 at monthly intervals.

The mites were collected mainly by hand picking method and also by separation of mite specimens from leaves through Tullgren funnels. Those were preserved in 70% ethyl alcohol and were studied after mounting in Hoyer's medium. Most of those were identified by the second author (SKG) by examining the specimens under Olympus research microscope and consulting the updated literature.

RESULTS AND DISCUSSION

The identification of the collected mite specimens from 25 types of flowers and ornamental plants from the garden of the Ramakrishna Mission revealed the occurrence of 21 species under 14 genera belonging to 8 families and 2 orders as given in Table - 1 with their hosts, nature of association, status as pests/predators and period of occurrence. At the end, a paragraph has been devoted suggesting management of the pest species and profitable utilization of the predatory mites for biocontrol.

MANAGEMENT OF MITE PESTS

Chemical Method : For management of injurious tetranychid mites some of the chemical pesticides which have been found effective are : wettable sulphur (0.14%), difenturon (0.1% @ 300 gm/ha), bromoprophyllate (0.1%), monocrotophos (0.036%) + hippe (*Madhuca latifolia* oil 0.04%), dicofol (0.02%) + pongamia oil (0.04%), abamectin (1.9% EC @ 2 ml/l of water).

Table-1 : List of mite species collected on floricultural and leafy ornamental plants at Ramakrishna Mission Ashrama, Narendrapur

Family/Order/Species	Hosts/Habitats	Nature of association	Remarks (Nature of damage / Predatory importance, etc.)
ORDER I: PROSTIGMATA			
Family 1: Tetranychidae			
1. <i>Tetranychus urticae</i> Koch	Rose (<i>Rosa centifolia</i>), Zinia (<i>Zinia elegans</i>), Marigold (<i>Tagetes patula</i>), Dahlia (<i>Dahlia</i> sp.), Sunflower (<i>Helianthus annuus</i>), Aparajita (<i>Clitoria ternatea</i>), Siuli (<i>Nyctanthes arbortristis</i>)	Phytophagous, occurs on undersurface of leaves in colony covered with thin webs.	It is a serious pest of rose, dahlia and aparajita. Infested leaves become yellow, later brown and finally fall off. Consequently the plant becomes unhealthy, affects flower production. This mite is available throughout the year on one or the other ornamental plant but its attack is more serious during May-June and relatively less during rainy season.
2. <i>Tetranychus bharensis</i> Hirst	Rose	-do-	Occasionally attacks, no serious damage is done. It occurs during May-June and none during rest of the year.
3. <i>Tetranychus macfarlanei</i> Pritchard & Baker	Chrysanthemum (<i>Chrysanthemum coronaria</i>), Champa (<i>Magnolia champaca</i>)	-do-	As above. This mite also occurs throughout the year but its population remains at high level during April-May and occasionally during October-November, absent during monsoon months.
4. <i>Tetranychus ludeni</i> Zacher	Marigold, Dahlia	-do-	As above
5. <i>Tetranychus neocaledonicus</i> Andre	Jasmine (<i>Jasminum sambac</i>), Rose	-do-	As above
6. <i>Eutetranychus orientalis</i> (Klein)	Sthal Padma (<i>Hibiscus mutabilis</i>), Rose, Oleander (<i>Nerium indicum</i>), Snflower, Kolke (<i>Thevetia peruviana</i>)	Phytophagous, occurs on upper surface of leaves	Very serious pest especially of Sthal padma and Oleander, the infested leaves develop brownish patch, such leaves gradually dry up. This mite infests one or the other ornamental plant all through the year. However it assumes serious status during May-June and again during October -November. It is rarely seen during monsoon months when these are washed away because of its occurrence on upper leaf surface.
Family 2: Tenuipalpidae			
7. <i>Brevipalpus californicus</i> (Banks)	Bougainvillea (<i>Bougainvillea spectabilis</i>), <i>Tabernaemontana coronaria</i> , Jaba (<i>Hibiscus rosa-sinensis</i>), Sunflower	Phytophagous, occurs on undersurface along mid- ribs	Seriously attacks all these plants, infested leaves turn pale yellow, later dry. This is available all through the year but its population reaches to an alarming stage during April -July and again during October to early part of December.
8. <i>Brevipalpus phoenicis</i> (Geijskes)	Rose, Oleander, Zinia	As above	As above
9. <i>Brevipalpus obovatus</i> Donnadieu	Coleus, Canna (<i>Canna indica</i>), Croton	As above	As above This is rather uncommon mite on ornamental plants, population always remains low hence causes no economic damage to the host plant.

Family 3: Tarsonemidae				
10. <i>Polyphagotarso-nemus latus</i> (Banks)	Marigold		As above	The attacked young apical leaves turn crinkled/curled. This mite occurs on ornamental plants especially during dry months and scares during monsoon months. During winter it occurs on young marigold leaves.
Family 4: Eriophyidae				
11. <i>Aceria jasmini</i> Channa Basavanna	Jasmine		Phytophagous, occurs on upper surface of leaves	No apparent damage symptoms noticed. Population never attains any alarming state to inflict economic damage though in other parts of India it is quite a serious pest.
Family 5: Cunaxidae				
12. <i>Dactyloscirus</i> sp.	Cosmos (<i>Cosmos sulphureus</i>)		Predatory	Very low population, no predatory importance noticed.
13. <i>Cunaxa capreolus</i> (Berlese)	Atashi (<i>Crotalaria sericea</i>)		-do-	As above
Family 6: Stigmaeidae				
14. <i>Agistemus terminalis</i> (Quayle)	Kadamba (<i>Neolamarckia cadamba</i>), Chhatim (<i>Alistonia scholaris</i>)		-do-	As above This mite was found in field associated with <i>Brevipalpus</i> mite. However feeding was not observed.
15. <i>Agistemus</i> sp. nr. <i>hystrix</i> Gupta	Akanda (<i>Calotropis procera</i>)		-do-	As above
Family 7: Tydeidae				
16. <i>Pronematus fleschneri</i> Baker	Gandharaj		-do-	This mite was quite common on this host as well as several other crop plants. Elsewhere it was found feeding upon eggs of tetranychid mites (Gupta, 2012).
ORDER II: MESOSTIGMATA				
Family 8: Phytoseiidae				
17. <i>Neosailus longispinosus</i> (Evans)	Rose, Siuli, Aparajita		-do-	Very efficient predator of <i>Tetranychus urticae</i> on rose, aparajita, found feeding in the field the immature stages of this mite, consequently the body colour turned red.
18. <i>Ablyseius largoensis</i> (Muma)	Rose, Bougainvillea, Kamini (<i>Murraya exotica</i>)		-do-	Very effective predator of <i>Brevipalpus</i> sp. on Tagar. It is more common on fruit trees than on ornamental plants where it feeds on adults and immatures of <i>Tetranychus</i> sp.
19. <i>Euseius coccineae</i> Gupta	Tagar, Marigold		-do-	Good predator of <i>T. urticae</i> on marigold
20. <i>Typhlodromips suknaensis</i> Gupta	Kolke		-do-	Good predator of <i>Eutetranychus orientalis</i>
21. <i>Paraphytoseius multidentatus</i> (Swirski & Shechter)	Sunflower, Siuli		-do-	Good predator of <i>Brevipalpus californicus</i> on sunflower. This species is quite common on several fruit trees as well as on weeds.

Some botanical pesticides like leaf extracts of karanja, neem, nishinda and tulsi, rhizome extracts of turmeric and garlic may also be used at 3-5% levels. In addition some commercially available botanical pesticides like Replin, Aza - 3000, Econeem plus are also useful if used at early stage of infestation.

Cultural Method : Using of resistant varieties and adopting barrier crop, intercropping, etc. will also be effective in management of mite pests.

Biological Method : Using and conserving biological agents like Coccinellid beetles, Chrysopids and predatory mites belonging to Phytoseiidae will also be effective.

It is also to be borne in mind that indiscriminate spraying of synthetic chemical

pesticides especially at their sublethal doses should be avoided as it leads to pest resistance and resurgence. Therefore, attempts to be made to take up spraying programme at early stage of pest infestation and conserve the natural enemies mentioned earlier which can keep the pest mite population below EIL.

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