



Mite fauna associated with major vegetable crops of Thrissur district, Kerala

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ABSTRACT: A survey was conducted to explore phytophagous and predatory mites associated with six major vegetable crops namely, Brinjal, Bhindi, Amaranthus, Cowpea, chilli and bitter gourd in Thrissur district, Kerala during 2011- 2012. A total of 19 species of mites belonging to eight families in two suborders namely Prostigmata and Mesostigmata were identified. The phytophagous mite families recorded were Tetranychidae, Tenuipalpidae and Tarsonemidae represented by the genera *Tetranychus*, *Eutetranychus*, *Brevipalpus* and *Polyphagotarsonemus*. *Tetranychus urticae* was found to be the dominant phytophagous mite genus on Brinjal, Bhindi, Amaranthus and Cowpea, where as in Chilli and Bittergourd the tarsonemid mite, *Polyphagotarsonemus latus* (Banks) was the predominant one. The important phytoseiid predators recorded in the study include *Amblyseius paraaerialis* Muma, *Paraphytoseius orientalis* Narayanan, *Neoseiulus longispinosus* (Evans), *Phytoseius* sp., *Euseius macrospatulatus* Gupta, *Typhlodromips* sp. and *Scapulaseius* sp. © 2013 Association for Advancement of Entomology

KEY WORDS: Mites, Brinjal, bhindi, amaranthus, cowpea, bitter gourd, chilli

Mites are a diverse group which is worldwide in distribution and inhabit all types of habitats. Phytophagous mites are considered to be important pests of crop plants and some are quite injurious causing heavy loss to farmers. Contrary to this, predatory mites help in the natural control of these mite pests to some extent. In India, occurrence of 2350 species of mites belonging to 725 genera under 190 families were reported (Gupta and Gupta, 1999). This forms only a small percentage of the world's known mite fauna. However, information on the diversity

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of phytophagous mites affecting major vegetable crops in Kerala is limited. In this background, the proposed study was made to record important acarine species, both phytophagous and predatory mites associated with major vegetable crops grown in Thrissur district, Kerala.

The work was carried out in the Acarology laboratory of the Department of Agricultural Entomology, College of Horticulture, Vellanikkara during 2011-2012 to explore the faunal composition of mites associated with six major vegetable crops of Thrissur district, Kerala. Random roving surveys were carried out in the farmers' fields from three vegetable growing tracts namely, Pazhayannur, Kannara and Vellanikkara of Thrissur district to collect phytophagous and predatory mites associated with six vegetable crops *viz.*, brinjal, bhindi, amaranthus, cowpea, bitter gourd and chilli. Mite infested leaf samples (3 leaves per plant) were collected from ten randomly selected plants each of brinjal, bhindi, amaranthus, cowpea, bitter gourd and chilli separately in polythene bags (40cm × 30 cm and 50 µ) from each locality and brought to the laboratory. In the laboratory, the leaves were observed under stereomicroscope and mite specimens were collected using camel hair brush and preserved in 70 per cent ethyl alcohol with a few drops of glycerol taken in glass vials of 1.5ml capacity and labelled.

The mites collected in the survey were mounted in Hoyer's media to prepare permanent slides. Single specimen representing both male and female mites of the same species was mounted separately on different slides. The male tetranychid mites were mounted in the lateral position also to ensure the better orientation of the genital structures which were very important for species determination. The mounted specimens were kept in an oven at 40°C for seven to ten days and dried specimens were then labelled and numbered serially for identification. The permanent slides prepared were observed under phase contrast microscope with image analyzer software to study the taxonomic characters. Identification of the slide mounted mite specimens was made using appropriate literature.

A total of 19 species of phytophagous and predatory mites belonging to eight families were recorded in the study (Table 1). The phytophagous mite families recorded were Tetranychidae, Tenuipalpidae and Tarsonemidae represented by the genera *Tetranychus*, *Eutetranychus*, *Brevipalpus* and *Polyphagotarsonemus*. The predatory mite families include Phytoseiidae, Stigmaeidae, Cunaxidae, Bdellidae and Tydeidae. The acarine faunal diversity in different vegetable crop environments is detailed below.

Mite fauna in brinjal

Ten species of mites belonging to three phytophagous and seven predatory mites were observed in brinjal. The two spotted spider mite, *Tetranychus urticae* Koch was the predominant phytophagous mite. *Polyphagotarsonemus latus* (Banks) and *Brevipalpus phoenicis* (Geij.) occurred in very minor form. The predatory mite fauna included *Neoseiulus longispinosus* Evans, *Paraphytoseius orientalis* Narayanan, *Amblyseius* sp., *Phytoseius* sp., *Typhlodromips* sp. and *Euseius* sp. all belonging to the family Phytoseiidae and *Agistemus gamblei* Gupta of the family Stigmaeidae.

Table I Mite fauna in major vegetable crops of Thrissur District, Kerala

Host plant	Phytophagous mites		Predatory mites	
	Mite genus/species	Family	Mite genus/species	Family
Brinjal	<i>Tetranychus urticae</i> Koch <i>Polyphagotarsonemus latus</i> (Banks) <i>Brevipalpus phoenicis</i> (Geij.)	Tetranychidae	<i>Paraphytoseius orientalis</i> Narayanan	Phytoseiidae
		Tarsonemidae	<i>Neoseiulus longispinosus</i> (Evans)	Phytoseiidae
		Tenuipalpidae	<i>Amblyseius</i> sp.	Phytoseiidae Phytoseiidae
			<i>Euseius</i> sp. <i>Phytoseius</i> sp. <i>Typhlodromips</i> sp. <i>Agistemus gamblei</i> Gupta	Phytoseiidae Phytoseiidae Stigmaeidae
Bhindi	<i>T. urticae</i>	Tetranychidae	<i>N. longispinosus</i> <i>Typhlodromips</i> sp. <i>Amblyseius</i> sp. <i>Agistemus</i> sp.	Phytoseiidae Phytoseiidae Phytoseiidae Stigmaeidae
Amaranthus	<i>Tetranychus</i> sp. <i>B. phoenicis</i>	Tetranychidae Tenuipalpidae	<i>N. longispinosus</i> <i>Amblyseius</i> sp. <i>Euseius</i> sp. <i>Scapulaseius</i> sp. <i>Typhlodromips</i> sp.	Phytoseiidae Phytoseiidae Phytoseiidae Phytoseiidae Phytoseiidae
Cowpea	<i>Tetranychus</i> sp. <i>Eutetranychus</i> sp. <i>P. latus</i>	Tetranychidae Tetranychidae Tarsonemidae	<i>N. longispinosus</i> <i>Typhlodromips</i> sp. <i>Amblyseius</i> sp1.	Phytoseiidae Phytoseiidae Phytoseiidae
Bitter gourd	<i>P. latus</i>	Tarsonemidae	<i>Typhlodromips</i> sp. <i>Euseius macrospatulatus</i> Gupta	Phytoseiidae Phytoseiidae
Chilli	<i>P. latus</i>	Tarsonemidae	<i>Amblyseius paraaerialis</i> Muma <i>Euseius</i> sp. <i>Typhlodromips</i> sp. <i>Tydeus</i> sp. <i>Agistemus</i> sp. <i>Cunaxa</i> sp. <i>Bdella</i> sp.	Phytoseiidae Phytoseiidae Phytoseiidae Tydeidae Stigmaeidae Cunaxidae Bdellidae

Mite fauna in bhindi

Of the five species of mites recorded from bhindi, *T. urticae* was the only phytophagous mite. The predatory mites included *N. longispinosus*, *Typhlodromips* sp. and *Amblyseius* sp, of the family Phytoseiidae and *Agistemus* sp. belonging to Stigmaeidae.

Mite fauna in amaranthus

In amaranthus, two species of phytophagous mites recorded were *Tetranychus* sp. and *B. phoenicis* of which *Tetranychus* was the predominant one. Five species of predatory mites recorded include *N. longispinosus*, *Amblyseius* sp., *Euseius* sp., *Scapulaseius* sp. and *Typhlodromips* sp., all belonging to the family Phytoseiidae.

Mite fauna in cowpea

In cowpea, three phytophagous mites and three predatory mites were recorded. The phytophagous mites included *Tetranychus* sp., *Eutetranychus* sp., and *P. latus*. Predatory mites recorded were *N. longispinosus*, *Typhlodromips* sp. and *Amblyseius* sp.

Mite fauna in chilli

P. latus was the only phytophagous mite recorded from chilli. However, seven different species of predatory mites were collected during the study which included *Amblyseius paraaerialis* Muma, *Euseius* sp., *Typhlodromips* sp. of the family Phytoseiidae, *Tydeus* sp. of the family Tydeidae, *Agistemus* sp. of Stigmaeidae, *Cunaxa* sp. belonging to Cunaxidae and *Bdella* sp. of Bdellidae.

Mite fauna in bitter gourd

One phytophagous mite, *P. latus* and two predatory mites namely *Euseius macrospatulatus* Gupta and *Typhlodromips* sp. were recorded in bitter gourd.

Faunal studies of mites in six vegetable crops revealed highest diversity of mites in brinjal with three phytophagous and seven predatory mites and the least diversity in bitter gourd with one phytophagous and three predatory mites. Spider mites belonging to the genus *Tetranychus* were found to be the dominant phytophagous mite in brinjal, bhindi, amaranthus and cowpea whereas, in chilli and bitter gourd, the tarsonemid mite, *Polyphagotarsonemus latus* (Banks) was the predominant species. These mites were reported as important mite pests of vegetable crops from different parts of India (Gupta, 1991; Gulati, 2004; Rai and Indrajeet, 2011). Karmakar (1997) reported the broad mite, *P. latus* as one of the most destructive pests and a major contributing agent of the devastating “Murda” complex in chilli. *Brevipalpus phoenicis* (Geij.) was the only tenuipalpid mite observed during the study and it was reported in amaranthus and brinjal.

The predatory mites found associated with vegetables in the present study belonged to five families viz., Phytoseiidae, Stigmaeidae, Tydeidae, Cunaxidae and Bdellidae among which Phytoseiidae predominates. Several species of phytoseiid mites were reported as effective predators of plant feeding mites all over the world in many diverse crop ecosystems (Sadanandan and Ramani, 2006; Karmakar and Gupta, 2010).

Predatory mites *Cunaxa* sp., *Bdella* sp. and *Tydeus* sp. were found in association with *P. latus* in chilli. The Stigmaeid mites of the genus *Agistemus* was found in association with phytophagous mites on brinjal, bhindi and chilli. *Agistemus* spp. has gained a great economic importance as biocontrol agent and play pivotal role in controlling phytophagous mites and soft bodied insects in different vegetables (Khan *et al.*, 2008).

Studies have to be conducted to identify the host range and extent of damage caused by the mite pests on vegetable crops. Further, potential of the predatory mites in bringing down the population of phytophagous mites in vegetable fields need to be assessed. This would lead to the identification of potential predatory mite species for utilization in successful biological control programmes.

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