

Association of *Thrips parvispinus* (Karny) on different hosts of South India

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ABSTRACT: Thrips pose serious threat to a wide array of crops produced across different parts of India. The species *Thrips parvispinus* (Karny) is recently invaded serious pest causing major threat to many economically important crops. Random surveys were conducted in 13 different districts of Karnataka and a few places of Tamil Nadu and Andhra Pradesh, to know the associational diversity of *T. parvispinus* in different host crop ecosystems. Of the different host crops surveyed, the invasive *T. parvispinus* was observed in almost all the surveyed chilli growing regions. Other hosts were Capsicum, Chilli, Ridge guard, Cucumber, Marigold, Coriander, Carrot, Garlic, Coccinia, Beans, Cowpea, Papaya, Brinjal, Field bean, Tomato, Bhendi, Bitter guard, Beach spider lily, Madagascar periwinkle, Crape jasmine, Sweet clock vine and Morning Glory. Multiple host families like Solanaceae, Cucurbitaceae, Asteraceae, Apiaceae, Amaryllidaceae, Cucurbitaceae, Fabaceae, Caricaceae, Malvaceae, Apocynaceae, Convolvulaceae and Acanthaceae were found to be associated with *T. parvispinus*. This is a highly polyphagous quarantine pest and hence, may pose a potential threat to various crop ecosystems in future.

Keywords: Diversity, Thripidae, Thrips, chilli, quarantine pest.

INTRODUCTION

The fauna of thrips is very unique owing to its slender and minute appearance with fringed wings and asymmetrical mouth parts. They possess a protrusible bladder at the tarsal tip and a pre pupal stage between larval and pupal stages. Thrips pupates and spend part of its life cycle in soil or ground litter (Lewis, 1973). Their small size is often compensated by their quick as well as high breeding potential (Ananthkrishnan, 1968). A small proportion of thrips species are serious pests of commercially important crops (Kumar *et al.*, 2008). The invasive thrips, *T. parvispinus* is a highly polyphagous and cosmopolitan pest native to Thailand and has widespread occurrence in other South East Asian countries (Mound and Collins, 2000). In India, infestation of *T. parvispinus* was initially noticed in papaya (*Carica papaya*) in Bangalore during 2015 (Tyagi *et al.*, 2015). From the past two years India is known to witness a drastic expansion of *T. parvispinus*. At present this pest is fast spreading and attacking different commercial agricultural and horticultural crops. This pest is known to cause severe damage to the

plant by sucking on flowers as well as leaves leading towards whittling (Kalshoven, 1981). Despite the fact that *T. parvispinus* being serious pests of agricultural crops, an updated host range still needs to be studied. Hence, surveys were conducted across different vegetable ecosystems to understand the diversity of thrips associated with the crops.

MATERIALS AND METHODS

Surveys were conducted to collect thrips associated with different vegetable crop ecosystem in different districts of Karnataka. Thrips were collected randomly from different vegetable crop ecosystem. Thrips were tapped on to a white plastic tray and collected individually using a fine paint brush and transferred into vials containing AGA preservative media (9 parts 10% alcohol + 1 part glacial acetic acid + 1 ml Triton-X-100 in 1000 ml of the mixture) (Bhatti, 1999). Thrips specimens thus collected and curated were identified to species level based on the taxonomic keys provided by (Mound and Masumoto, 2005). These vials were labelled with name of host, location and date

of collection for identification. The examined specimens were sent to ICAR-National Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru for confirmation.

RESULTS AND DISCUSSION

Thrips parvispinus was found associated with hosts like Capsicum, Chilli, Ridge guard, Cucumber, Marigold, Coriander, Carrot, Garlic, Coccinia, Beans, Cowpea,

Papaya, Brinjal, Field bean, Tomato, Bhendi, Bitter guard, Beach spider lily, Madagascar periwinkle, Crape jasmine, Sweet clock vine and Morning Glory (Table 1 and 2). Multiple host families like Solanaceae, Cucurbitaceae, Asteraceae, Apiaceae, Amaryllidaceae, Cucurbitaceae, Fabaceae, Caricaceae, Malvaceae, Apocynaceae, Convolvulaceae and Acanthaceae were found to be associated with *T. parvispinus*.

Table 1: Association of *Thrips parvispinus* on different ecosystems of Karnataka.

Sr. No.	Different districts of Karnataka	Name of the host	Host family	Location
1.	Bangalore (ICAR-IIHR)	Capsicum, Chilli	Solanaceae	13°7'55.4448" N, 77°29'21.2424" E, 890m
		Beach spider lilly	Amaryllidaceae	
	Bangalore (Yelahanka)	Capsicum, Chilli	Solanaceae	13°6' 27.2448" N, 77°34'16.3128" E, 915m
		Ridge guard, Cucumber	Cucurbitaceae	
2.	Bagalkot	Chilli	Solanaceae	16°10'48"N, 75°42'54"E, 526m
		Marigold	Asteraceae	
		Crape jasmine	Apocynaceae	
3.	Belgaum	Chilli, Capsicum	Solanaceae	15°51'10.0512" N, 74°29'55.3308" E, 785m
4.	Bellary	Chilli	Solanaceae	15°08'31.38" N , 76°55'26.33" E, 485 m
5.	Bijapur	Chilli	Solanaceae	16°49'39.1620" N, 75°43'31.1772" E, 592m
6.	Chitradurga	Chilli	Solanaceae	14°01'3.834" N, 76°28'24.329" E, 716m
7.	Dharwad	Carrot, Coriander	Apiaceae	15°29'44.2392" N, 74°58'57.288" E, 695m
		Chill	Solanaceae	
		Garlic	Amaryllidaceae	
		Coccinia	Cucurbitaceae	
		Madagascar periwinkle	Apocynaceae	
8.	Hubli	Chill	Solanaceae	15° 21' 52.9488" N, 75° 7' 26.2380" E, 671m
		Marigold	Asteraceae	
9.	Gadag	Chilli	Solanaceae	5° 25' 56.874" N, 75° 38' 16.9224" E, 654m
10.	Haveri	Chilli, Capsicum	Solanaceae	14°47'45.2508" N, 75°23'49.6500" E, 785m
11.	Kolar	Chill, Tomato, Brinjal	Solanaceae	13° 8' 8.65"N 78° 7' 57.22"E, 850m
		Bhendi	Malvaceae	
12.	Koppal	Chilli	Solanaceae	15° 21' 2.5488" N, 76° 9' 19.5624" E, 529m
13.	Shimoga	Capsicum, Chilli, Brinjal	Solanaceae	13°58'15"N, 75°34'47"E, 636m
		Cowpea, Field bean	Fabaceae	
		Papaya	Caricaceae	
		Morning Glory	Convolvulaceae	
		Sweet clock vine	Acanthaceae	

Table 2. Association of *Thrips parvispinus* on different ecosystems of Andhra Pradesh (AP) and Tamil Nadu (TN).

Sr. No.	Other districts of AP and TN	Name of the host	Host family	Location
1.	Thalavedu, Thiruttani, Tamil nadu	Chilli	Solanaceae	13°58'15"N, 75°34'47"E, 636m
2.	Krishnagiri, Tamil nadu	Chilli	Fabaceae	12° 31' 6.9996" N, 78° 12' 49.4532" E, 492 m
		Beans, Cowpea		
3.	Tenali, Guntur, AP	Chilli	Solanaceae	16° 14' 12.19"N, 80° 38' 50.91"E , 695m
4.	Rayalacheruvu, Sri Balaji, AP	Chilli	Solanaceae	15° 2' 46.176" N, 77° 49' 14.376" E, 348m
		Coriander	Apiaceae	
5.	SV Agriculture college, Tirupathi, Sri Balaji, AP	Chilli	Solanaceae	13°37'30"N, 79°22'14"E, 193m
6.	Chandraiahgaripalli, Chittor, AP	Chilli	Solanaceae	13° 25' 25.6"N, 79°00'12.6"E, 332m
		Coriander	Apiaceae	
		Bitter guard	Cucurbitaceae	
7.	Pulicherla, Chittor, AP	Chill	Solanaceae	13° 31' 59.9664"N, 79° 5' 31.0992"E, 438m

Of these severe incidence of *T. parvispinus* was noticed on chilli as the most predominant host plant in all the surveyed locations followed by capsicum and Coriander (Table 1 and 2). The species *T. parvispinus* was previously recorded on chilli, papaya, *Brugmansia* sp. and eight different hosts in Karnataka (Tyagi *et al.*, 2015; Verghese, 2021; Roselin *et al.*, 2021; Rachana *et al.*, 2022). The infestation in Telangana and Andhra Pradesh was reported by (Hulagappa *et al.*, 2022; and Veeranna *et al.*, 2022). From the present study it is confirmed that *T. parvispinus* is a highly polyphagous quarantine pest and hence, may pose as a potential threat to agriculture. More number of females were noticed on different parts of flower like petals, stamens and ovary in aggregated form. Since it is a new pest without any potential natural enemies, irregular IPM practices and improper awareness about the pest management may be the reason for the outbreak in different regions. Further the study highlights the importance to adopt management strategies and regular monitoring against the invasive pest *T. parvispinus*.

CONCLUSION

The present study gives information regarding the *T. parvispinus* associated with different crop ecosystems. During the survey, 18 host plants were recorded belonging to 12 families from different districts of south India. Dominance of *T. parvispinus* was observed in chilli crop ecosystem irrespective of the location. Since this is a highly polyphagous quarantine pest, the report warrants special caution. Unless successful quarantine measures are put in place, the spread and subsequent depredations of cultivated crops is inevitable. Host plant documentation of thrips from south India is lacking and hence, our work demands further survey and study in this field from the state. The presence of *T. parvispinus* in other parts of India needs to be closely monitored because it is likely to become a greater nuisance in the future.

FUTURE SCOPE

An extensive survey needs to be carried out on different ecosystems *viz.* trees, wild plants and weeds in other parts of south India to know the thrips species composition. Since *T. parvispinus* is a serious pest on vegetables, efficient biocontrol measures should be tested for effective management. Association of different species of thrips on same host can be taken up.

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Conflict of Interest: None.

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