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Species Composition, Identification and Relative Abundance of *Thrips palmi* on Watermelon

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ABSTRACT

Roving survey was undertaken in major watermelon growing areas of Karnataka viz., Bagalkot, Belgaum, Kolar and Mysore during February to April, 2014. The thrips species collected from different localities viz., Bagalkot, Belgaum, Kolar and Mysore districts was identified as Thrips palmi Karny and Thrips sp.. Among the two different species occurring on watermelon, Thrips palmi was more abundantly occurred in watermelon crop in all localities. T. palmi was the only species found on the watermelon from Bagalkot region. Whereas in case of Belgaum, Kolar and Mysore regions, along with T. palmi the unidentified species also observed, however, the relative abundance of the T. palmi was about 94.00, 84.00 and 88 per cent, respectively.

Key words: *Thrips infestation, Watermelon bud necrosis virus, Tospovirus*

INTRODUCTION

Watermelon is a common man's fruit relished by both rich and poor alike. The fruit contains 95 per cent water, 0.2 per cent protein, 0.3 per cent minerals and 3.3 per cent carbohydrates per 100 g fresh weight[1]. Watermelon is rich in iron content among all the cucurbitaceous crops. Most of the cultivars have deep pink or pale pink flesh colour with slightly reddish tinge containing largely lycopene and anthocyanin pigments. It is popular especially in hot weather, for its sweet and juiciness.

The main limiting factor in watermelon cultivation is occurrence of thrips, *Thrips palmi* Karny (Thysanoptera: Thripidae), as it acts as a vector for Watermelon Bud Necrosis Virus (WBNV) belonging to genus *Tospovirus* the only plant infecting genus in the family Bunyaviridae. *T. palmi* was first reported from Sumatra in 1925[3]. During the past two decades, *T. palmi* has achieved a wide geographical distribution[7]. This species has spread to several continents and it is a significant pest in Asia, Africa, Central and South America[8,9,15,16] and the Carribbean[2]. *T. palmi* has also been reported from the Netherlands[11].

T. palmi attacks a wide variety of vegetable crops including Beans, Cucumber, Melons, Bitter melons, Capsicum, Eggplant, Pumpkin and Zucchini[4]. Both nymphs and adult thrips lacerate the tissues and suck the oozed out sap.

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This feeding behaviour gives tissues a silver or bronze colour where damaged cells coalesce and can lead to stunting, distortion and scarring of plants and yield being significantly reduced[13].

Besides its direct damage, it can also transmit a number of plant TOSPO viruses including ground nut bud necrosis and watermelon silvery mottle virus[14]. Among the viral diseases, thrips transmitting WBNV has been cautioning us as an emerging pathogen causing significant yield reduction during last decade in the country. Presently, it is very severe on watermelon, resulting in huge yield losses ranging from 60 to 100 per cent depending upon the time of sowing and variety/hybrid[5,6].

The present investigations were carried out during 2013-2014 to know the species composition of thrips and their relative abundance on watermelon.

MATERIAL AND METHODS

Roving survey was undertaken in major watermelon growing areas of Karnataka *viz.*, Bagalkot, Belgaum, Kolar and Mysore during February to April, 2014, corresponding to a crop stage of 30-45 days after sowing to know the species diversity and their relative abundance. Totally, thirty watermelon fields were visited from all four localities. Of which, twenty were unsprayed and ten were sprayed (Table 1 and 2). The thrips were collected by tapping the growing tips on a stiff black paper board (30×30 cm) and fallen thrips were collected immediately using a fine camel hair brush dipped in 70 per cent alcohol and transferred in to pre-labeled specimen tubes containing 70 per cent alcohol. A minimum of 100 thrips were collected from each locality. The part of collected samples was sent to Department of Entomology, University of Agricultural Sciences, Bengaluru for identification.

Based on the species identification, the relative abundance of the thrips species was worked out from the remaining collections by counting each species by observing under stereo binocular microscope in the laboratory.

RESULTS AND DISCUSSION

Identification of thrips species occurring on watermelon

The thrips species collected from different localities *viz.*, Bagalkot, Belgaum, Kolar and Mysore districts was identified as *Thrips palmi* Karny and *Thrips* sp. By Dr. K. S. Jagadish, Professor of Entomology, Department of Entomology, University of Agricultural Sciences, Bangalore (Table 4). Light microscopic observations of mounted specimens of thrips revealed that the adult thrips is medium to small, almost entirely pale yellow in colour, antennae always seven segmented, segments I, II are pale and III is yellow with apex shaded, red coloured ocellar pigment, post ocular setae II and IV much smaller than remaining setae, ocellar setae III situated outside ocellar triangle, forewings first vein with seven basal and 2-3 distal setae, scale with five setae, apical seta longer than sub-apical sternites and abdominal pleurotergites without discal setae. Whereas in case of *Thrips* sp. red coloured ocellar pigment is absent and the antennal segments varied (Plate 7).

Plate 1: Overall view of insects- *Thips palmi* and *Thrips* sp.

Earlier, Singh and Krishna Reddy[12] reported that the bud necrosis disease of watermelon was transmitted by thrips and it was identified as *Thrips flavus* Shrank. Further, they also reported that, *Thrips flavus* was the most abundant thrips species occurring on watermelon in and around Bangalore. Since lot of similarities were assumed to be existing between *Thrips flavus* Shrank and *Thrips palmi* Karny, the authors sent the specimens to L. A. Mound, CSIRO Division of Entomology, Canberra 2601, ACT, Australia for further confirmation. After a detailed study on the vector as well as identification, it was reidentified as *Thrips palmi* Karny and also indicated that *Thrips palmi* is the potential vector for watermelon bud necrosis disease[7]. Krupashankar[6] and Rajasekharam[10] were observed only *Thrips palmi* from the watermelon fields of Karnataka during the survey.

Relative abundance of thrips species occurring on watermelon

Among the two different species occurring on watermelon, *Thrips palmi* was more abundantly occurred in watermelon crop in all localities where the survey was conducted. *T. palmi* was the only species found on the watermelon from Bagalkot region. Whereas in case of Belgaum, Kolar and Mysore regions, along with *T. palmi* the unidentified species also observed, however, the relative abundance of the *T. palmi* was about 94.00, 84.00 and 88 per cent, respectively (Table 1).

Table 1: Relative abundance of thrips species occurring on watermelon

Locality	*Thrips palmi* (%)	*Thrips* sp. (%)
Bagalkot	100	0.00
Belgaum	94.00	6.00
Kolar	84.00	16.00
Mysore	88.00	12.00

N = 50 thrips samples observed from each locality

CONCLUSION

The thrips species collected on bud necrosis infected plants of watermelon from different localities of Karnataka *viz.*, Bagalkot, Belgaum, Kolar and Mysore was identified as *Thrips palmi* and *Thrips* sp. Among these two thrips species, *Thrips palmi* was more abundantly occurred on watermelon fields of all four localities surveyed.

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