Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.5246

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (5):** 298-301 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Extent of Thrips Infestation and Watermelon Bud Necrosis Viral Disease Incidence in Major Watermelon Growing Areas of Karnataka

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Received: 19.07.2017 | Revised: 25.08.2017 | Accepted: 27.08.2017

ABSTRACT

Thrips infestation and WBNV disease incidence in major watermelon growing regions of Karnataka ranged from 2.02 to 4.94 and 75.44 to 92.08 per cent, respectively. Among the different localities surveyed, the watermelon fields from Bagalkot, Belgaum and Kolar district recorded relatively higher level of mean number thrips per plant and per cent WBNV disease incidence (4.94±0.24 and 92.08, 3.80±0.20 and 79.28 and 4.76±0.22 and 91.68, respectively). However, the lowest mean number of thrips per plant and per cent WBNV disease incidence (2.02±0.16 and 75.44%, respectively) was recorded from the fields of Mysore district.

Key words: *Thrips infestation, Watermelon budnecrosis virus, Tospovirus*

INTRODUCTION

Watermelon, *Citrullus lanatus* (Thunb.) is a well-known vegetable of summer season, indigenous to tropical Africa. World over watermelon is grown in an area of 3.69 million hectares with an estimated annual production of 97.43 million tonnes and average productivity of 26.37 tonnes per hectare. Leading watermelon growing countries in the world are China, Turkey, Iran, Brazil, USA, Egypt, Russian federation and Mexico. In India, watermelon is being grown since prehistoric period. It is a major crop of various river beds.

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[5,7]. This species has spread to several continents and it is a significant pest in Asia, Africa, Central and South America[7,10] and the Carribbean[2]. *T. palmi* has also been reported from the Netherlands[9].

Hence, the present investigation was undertaken to know extent of thrips infestation and watermelon bud necrosis viral disease incidence in major watermelon growing areas of Karnataka.

MATERIAL AND METHODS

To know the extent of thrips infestation and WBNV disease incidence in major watermelon growing areas of Karnataka *viz*., Bagalkot, Belgaum, Kolar and Mysore, the roving survey was conducted during February to April, 2014, corresponding to a crop stage of 30-45 days after sowing.

Cite this article: Shruthi, C.R., Narabenchi, G.B., Devaraju, G. and Nirmala, H.R., Extent of Thrips Infestation and Watermelon Bud Necrosis Viral Disease Incidence in Major Watermelon Growing Areas of Karnataka, *Int. J. Pure App. Biosci.* **5(5):** 298-301 (2017). doi: http://dx.doi.org/10.18782/2320-7051.5246

Totally, thirty watermelon fields were visited from all four localities. Of which, nine from Bagalkot, five from Belgaum, seven from Kolar and nine fields from Mysore (Table 1 and 2). The area of each field was about 1-2 acres. In each field, 30 plants were selected randomly and the growing tips of these plants were tapped on a stiff black paper board and fallen thrips were counted visually.

Simultaneously, in each field, 250 plants were selected randomly by leaving five border rows for recording WBNV disease incidence. The disease was diagnosed in the field based on symptoms exhibited on plants like leaf mottling, yellowing and necrotic spots on leaves, necrotic streaks on vein, petiole and stem, shortened internode, necrosis of the terminal bud. A total of 250 plants were observed randomly and among these plants, number of plants infected with WBNV was recorded. Then, the per cent disease incidence was calculated by using following formula.

$$\text{Per cent disease incidence} = \frac{\text{No. of plants infected}}{\text{Total no. of plants observed}} \times 100$$

Efforts were also made to collect details about the cultivars, agronomical practices, plant protection measures adopted, previous cropping history, neighboring crops etc., through developed survey formats. The information on weather parameters such as temperature, relative humidity and rainfall was obtained from nearest meteorological stations from all the four localities. An attempt was made to correlate the weather parameters with level of thrips infestation and WBNV disease incidence in each locality and compared across the localities.

RESULTS AND DISCUSSION

Thrips infestation and WBNV disease incidence in major watermelon growing regions of Karnataka ranged from 2.02 to 4.94 and 75.44 to 92.08 per cent, respectively. Among the different localities surveyed, the watermelon fields from Bagalkot, Belgaum and Kolar district recorded relatively higher level of mean number thrips per plant and per cent WBNV disease incidence (4.94±0.24 and 92.08, 3.80±0.20 and 79.28 and 4.76±0.22 and 91.68, respectively). However, the lowest mean number thrips per plant and per cent WBNV disease incidence (2.02±0.16 and 75.44, respectively) was recorded from the fields of Mysore district (Figure 1).

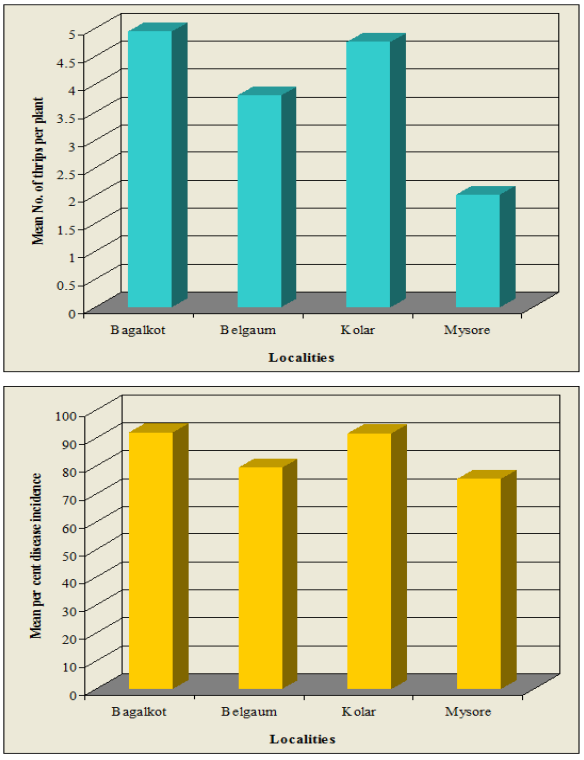

Fig. 1: Extent of thrips infestation and WBNV disease incidence in unsprayed watermelon fields across localities

The difference in the level of thrips infestation across the localities could be due to the interaction of various factors such as prevailing weather conditions, cultural practices (particularly polyethylene mulching) adopted by the farmers in that locality, varietal difference, crop stage at the time of recording observations, previous cropping history, adjoining crops *etc*. Among the weather parameters, the higher level of temperature prevailed in Bagalkot and Belgaum localities during the study period might have contributed the higher level of thrips infestation. The higher temperature might have helped in faster multiplication and dispersion of *Thrips palmi* under field conditions. Further, it was supported by the output of the correlation and regression analysis that both maximum and minimum temperature found to be positively correlated with level of thrips population and it was statistically significant, whereas with rainfall significantly negative relationship was found (Figure 2).

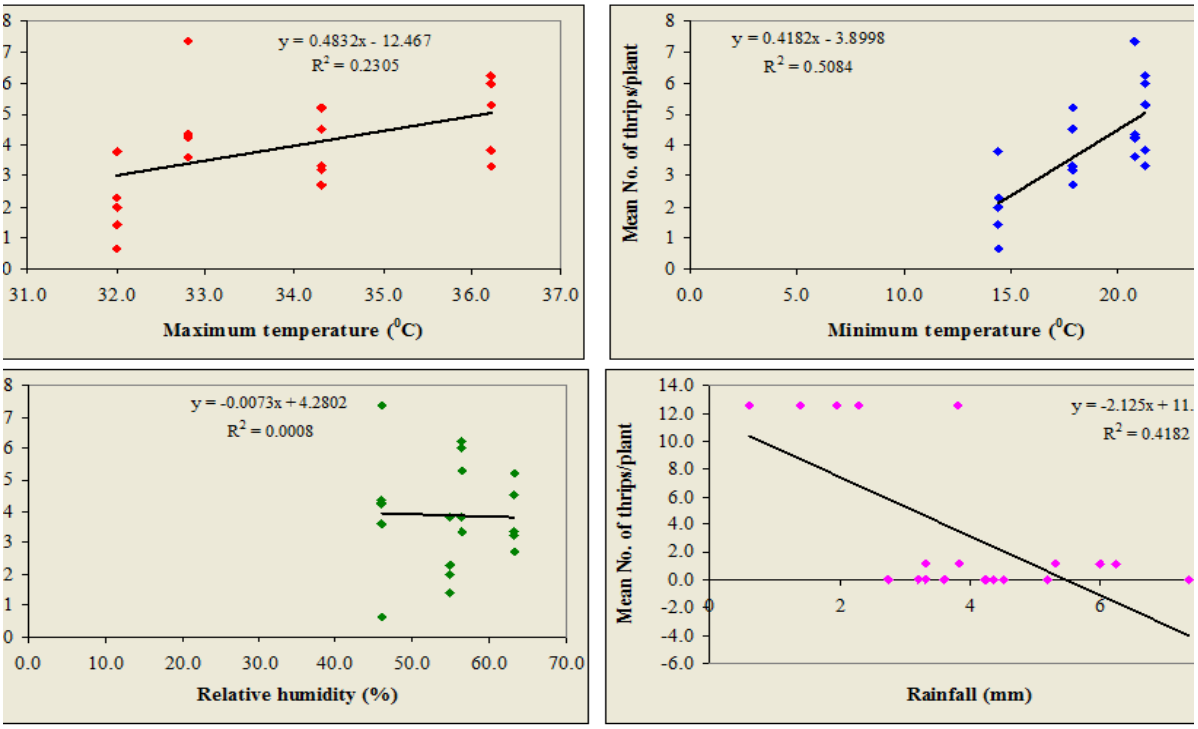

Fig. 2: Influence of weather parameters on population density of *Thrips palmi* on watermelon crop

Present results are in accordance with the findings of the surveys carried out in Karnataka and Andhra Pradesh during 2006-2008 by Rajasekharam[8]. The results revealed that the WBNV disease incidence on watermelon ranged from 0 to 100 per cent in various parts of the Karnataka during both the years and more than 90.00 per cent incidence was observed in Belgaum, Bellary, Kolar, Dharwad and Uttar Kannada districts. In Andhra Pradesh the highest disease incidence was observed in Chittor district (80%) and overall incidence was less as compared to Karnataka.

Relatively lesser level of WBNV disease incidence was reported from Karnataka and Maharastra as compared to the results of the present investigation. The incidence of bud necrosis in watermelon ranged from 0 to 40 per cent in Maharastra during 2004 and from 1 to 30 per cent in Karnataka during 2002. Out of 21 fields surveyed, 17 fields showed incidence of bud necrosis disease in watermelon. High incidence up to 40 per cent was observed in Kalegaon area in Jalna district of Maharashtra[1].

It was observed during the survey that the relatively lesser level of thrips and WBNV disease incidence was observed from the watermelon fields which had silver colour polyethylene mulch compared to without mulch. It may be due to the interruption of the proper landing of thrips on the plant as the

silver colour mulch as reflects light. Similar opinion was expressed by earlier workers also[4,6].

CONCLUSION

Survey carried out in unsprayed fields of major watermelon growing areas of Karnataka during 2014 revealed that, the mean number of thrips per plant and mean per cent disease incidence was ranged from 2.02 to 4.94 and 75.44 to 92.08 per cent, respectively. Among the different localities surveyed, the watermelon fields from Bagalkot, Belgaum and Kolar district recorded relatively higher level of mean number thrips per plant and per cent WBNV disease incidence (4.94±0.24 and 92.08, 3.80±0.20 and 79.28 and 4.76±0.22 and 91.68, respectively). The lowest mean number thrips per plant and per cent WBNV disease incidence was recorded from the fields of Mysore district (2.02±0.16 and 75.44, respectively).

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