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SEASONAL INCIDENCE OF PESTS OF CAPSICUM IN BANGALORE CONDITIONS OF KARNATAKA, INDIA

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Abstract

Field experiment was conducted to study the seasonal incidence of pests of capsicum during kharif 2012. The incidence of insect pests associated with capsicum variety Indra was recorded. A total of 10 species of insect and mite pests were recorded on the crop at Bengaluru condition. The recorded species belonging to 8 different families in six different orders. The insect pests included *Scirtothrips dorsalis, Myzus persicae, Trialeurodes vaporariorum, Attractomorpha crenulata, Monolepta signata, Myllocerus discolor, Thysanoplusia ni, Spodoptera litura, Helicoverpa armigera* and one mite pest *Polyphagotarsonemus latus. S. dorsalis* and *H. armigera* were the predominant species. The population dynamics of *S. dorsalis, M. persicae, P. latus* and *H. armigera* discussed in relation to weather parameters.
Key words: Bangalore, capsicum, fruit borer, seasonal incidence, thrips.

1. Introduction

Capsicum is one of the most popular and highly remunerative vegetable crops grown throughout the world. India's contribution was estimated to be 130.71 thousand metric tonnes from an area of 9.91thousand hectares. In India, Karnataka has highest area of Capsicum cultivation in 3.10 thousand hectares with a production of 45.80 thousand metric tonnes (Indiastat, 2012). Bell pepper has attained the status of a high value crop in India during recent years. The high market price it fetches is attributed to the heavy demand from the urban consumers and even a small blemish on the fruit will drastically reduce its market value. Under these circumstances the study of insect pests which reduce the fruit quality are very important. Butani (1976) reported over 20 insect species on chillies (*Capsicum* spp.) from India of which thrips (*Scirtothrips dorsalis*), aphids (*A. gossypii*) and *A. laburni* (*Craccivora*) are among the most damaging pests. Thrips may cause 30 to 50 per cent crop loss and are also responsible for transmitting leaf curl disease. Over 35 species of insect and mite are reported as pests of pepper which includes thrips, aphids, whiteflies, fruit borers, cutworms, plant bug, mites and other minor pests (Sorensen, 2005). Due to variations in climatic conditions insects show varying trends in their incidence and extent of damage to the crop. At present information on seasonal incidence and influence of various environmental factors on the fluctuation of insect pests of capsicum is scanty. Hence, an attempt has been made to a study on the population dynamics which gives an idea about peak period of their activity and may be helpful in developing pest management strategies.

2. Materials and Methods

The study was carried out under open field conditions at Gandhi krishi vignyana Kendra, Bangaluru, Karnataka, India to know the pest scenario of capsicum during 2012-13. For this study 30 days old seedlings of popular variety Indra was transplanted in 100 m^2 area. The crop was raised / grown as per the recommended package of practices except the plant protection measures. Observations were recorded at four quadrates; from each quadrate ten plants were selected and tagged; further, detailed observations were made at weekly intervals on the incidence of major insect pests, by following standard protocols, at different crop growth stages. The population of thrips, aphids, leaf hoppers and whiteflies (nymphs and adults) were recorded from three leaves one each from the upper, middle and lower position on ten selected plants. The density of *P. latus* (eggs and mobile stages) was recorded under stereo binocular microscope on 2 × 2cm leaf bit area. The incidence of grasshoppers, weevils, beetles and semi looper was estimated by making counts on ten randomly selected plants. To assess the incidence of fruit borers, *viz*., *Helicoverpa armigera* and *Spodoptera litura* observations were recorded as number of larva per plant at weekly interval. The immature stages of different insect species occurring on the crop was collected and reared in the laboratory till adult emergence to confirm the species identity.

Meteorological parameters like temperature, rainfall, relative humidity and daily sunshine hours during the study period were recorded. Correlation analysis was made to study the relationship between weather parameters and incidence of major insect pests of capsicum by following standard statistical methods.

3. Results and Discussion

Based on the observations made at various growth stages of capsicum to know the incidence of insect pests from fifteen days after transplanting to till end of the crop are presented in Table 1.

The incidence of thrips, *Scirtothrips dorsalis* Hood was observed throughout the cropping season with varying inensity ranging from 0.07 to 5.88 with a mean of 3.53 thrips per top 3 leaves per plant. The infestation of thrips, was initiated in the third week of September and remained continue up to fourth week of December. The data on correlation between incidence of thrips and weather parameters showed significant relationship. A Negative relationship was observed with maximum (-0.76**) and minimum temperature (-0.47), morning RH (-0.24) and sunshine hours (-0.13); while, positive correlation was observed with the rainfall (0.24) and evening RH (0.47) (Table 2). The present

observations are in confirmation with the results obtained by Patel (1992) who reported negative correlation between thrips population, rainfall and temperature. The present findings on incidence are in close agreement with the findings of Panickar and Patel (2001) who reported the effect of climatic conditions on the activity of *S. dorsalis* was found during first week of September to second week of January.

The infestation of aphid *Myzus persicae Sulzer* commenced in the third week of September. The incidence was observed throughout the cropping season with varying number ranging from 0.10 to 2.21 with a mean of 1.13 aphids per three leaves per plant. However, the peak incidence was observed during third and fourth week of October (2.21 aphids /3 leaves/plant). Thereafter, the population declined gradually and reached up to 0.90 aphids /3 leaves/ plant. The population exhibited a negative correlation with maximum temperature (-0.71**), minimum temperature (-0.25) and sunshine hours (-0.29); whereas, positive correlation was observed with the evening RH (0.60), rainfall (0.37) and morning RH (0.10) (Table 2). The present findings are in confirmation with the findings of Butani (1970) who reported the appearance of aphid from July to till harvest. The results on incidence are in close conformity with the observations made by Anon (1987) who reported *M. persicae* was an important virus vector and most widespread insect infesting pepper in 37 countries including several tropical countries. Among the most important pests of bell pepper (*Capsicum annuum*) in Argentina are aphids stand out, of which *M. persicae* is the key pest as reported by Vasicek *et al*. (2001).

The incidence of white fly *Trialeurodes vaporariorum* Westwood was observed with varying number ranging from 0.00 to 0.10 with a mean of 0.04 per three leaves per plant. The maximum incidence was noticed during 3rd week of November. The present results are in accordance with the observations made by Anon (1987) who reported that *T. vaporariorum* was an important virus vector and the most widespread insect infesting pepper in 10 tropical countries. The four species of insect pests (*Bemisia tabaci, S. dorsalis, A. gossypii* and *Amrasca devastans*) were recorded on chilli. Among them *B. tabaci* was the predominant species (Baloch *et al*. 1994).

The incidence of mite *Polyphagotarsonemus latus* (Banks) was observed with varying intensity ranging from 0.00 to 2.82 with a mean of 0.91 mites per top 3 leaves per plant. However, the peak incidence of 2.62 and 2.82 mites /3 leaves /plant was observed during 1st and 2nd week of November. Incidence of mites population showed negative relationship with maximum temp (-0.48), minimum temperature (-0.46) and morning RH (-0.01). Whereas positive correlation with the evening RH (0.23), rainfall (0.13) and sunshine hours (0.28) (Table 2). The present findings concord with the findings of Butani (1976) who reported that *P. latus* was most destructive pest caused 25 per cent yield loss in chilli. The results on incidence are in close agreement with the findings of Mote (1976), who reported that chilli crop is subjected to attack by a number of pests among which the mite (*P. latus*) is considered as a major one. Eswara Reddy and Krishna kumar (2006) reported that mite *P. latus* was serious pest of sweet pepper under both protected and open field conditions. Patil and Nandihalli (2009) who reported that the yellow mite population showed negative correlation with morning and evening humidity, rainfall and age of crop. This supports the present findings.

The incidence of Grass hopper *Attractomorpha crenulata* Fabricius was noticed during first week of November and third week of December. However, incidence was very low, which varied from 0.00 to 0.15 with a mean of 0.01 per plant. . The results on the mode of infestation and incidence are in close agreement with the findings of Banjo *et al*. (1999), who reported insects associated with agro-ecosystems of the spindle and globose varieties of bell pepper plants (in Yoruba sombo and Atawewe), Orthoptera was the most abundant Order.

The incidence of Flea beetle *Monolepta signata* Olivier was very low, which varied from 0.00 to 0.20 with a mean of 0.07 weevils per plant. The results on incidence are in confirmation with the findings of Sorensen (2005) who reported that Flea beetle acts as minor pests of pepper in North Carolina.

The incidence of Weevil *Myllocerus discolor* Boheman was very low, which varied from 0.00 to 0.20 with a mean of 0.07 weevils per plant. These findings are in similar line with earlier observations made by Sorensen (2005) who reported that weevil was a minor pest of pepper in North Carolina.

The incidence of Tobacco cut worm *Spodoptera litura* Fabricius was observed with varying number ranging from 0.00 to 0.25 with a mean of 0.07 larvae per plant. The incidence of Tobacco cut worm was quite high during first week of October (0.25 larvae per plant). These results are in agreement with the findings of Reddy and Puttaswamy (1985), who reported the pests infesting, transplanted crop of the chilli variety Byadagi. Among the pests, *S. litura* was the major pest infesting chilli.

The incidence of fruit borer was noticed from last week of September to till end of the cropping season. However, peak incidence was noticed during 4th week of October to 2nd week of November (3.27 to 3.32 larvae/ plant); the incidence was very low during early stage of the crop (0.02 to 1.30 larvae/ plant), because this pest is more likely to feed fruits. The pest population gradually decreased towards the harvest of crop. The results of the present study almost in line with the findings of Vos and Frinking (1998) reported that cotton bollworm; *H. armigera* was found infesting the capsicum. Fruit borer was found damaging the fruits of pepper during reproductive stage resulting into 20.68 per cent of fruit damage as reported by (Sunitha, 2007). The population exhibited a negative correlation with incidence of fruit borer and maximum temp (-0.67**), minimum temperature (-0.64**) and morning RH (-0.23). Whereas, positive correlation was observed with the evening RH (0.31), rainfall (0.16) and sun shine hours (0.20). The observations are similar to the findings of Srinivas (1984) who reported negative significant correlation of trap catches of *H. armigera* with maximum temperature at Bangalore. Patil *et al*. (1992) also obtained significant negative correlation between *H. armigera* trap catches with maximum temperature (r=-0.496*) and minimum temperature (r=-0.702*).

4. Reference

Anonymous, 1987, Literature survey of insect pests of pepper. ARDC Prog. Rep., pp. 77-78.

Anonymous, 2012, *www.indiastat.com.*

Baloch, H. B., Baloch, L. S., Rustamani, M. A., Hussain, T., Talpur, M. A. And Rao, S. A., 1994, Insect pests associated with *Capsicum annuum* (Linn.) during summer season at Tandojam. *Proc. Pak. Congress Zool*., **14**: 243-247.

Butani, D. K., 1976, Pests and diseases of chilli and their control. *Pesticides*, **10**: 38-41.

Eswara Reddy, S. G. and Krishna Kumar, 2006, A comparison of management of thrips *Scirtothrips dorsalis* Hood on sweet pepper grown under protected and open field cultivation. *Pest Manag. Horti. Eco*., **12**(1): 45-54.

Mote, U. N., 1976, Seasonal fluctuation in population and chemical control of chilli mites (*Polyphagotarsonemus latus* (Banks)). *Veg. Sci*., **3**(1): 54-60.

Panickar, B. K. and Patel, J. R., 2001, Population dynamics of different species of thrips on chilli, cotton and pigeonpea. *Indian J. Ent*., **63**(2): 170-175.

Patel, V. N. 1992. Studies on insect Pest of chillies, their association with leaf curl disease and evaluation of pest management tactis, Ph. D. (Agri.) Thesis Submitted to Rajasthan Agricultural University, Udaipur.

Patil, B. V., Nandihalli, B. S., Hugar, P. S. and Somshekhar, 1992, Influence of weather parameters on pheromone trap catches of cotton bollworms. *Karnataka J. Agric. Sci*., **5**: 346-350.

Patil, R. S. and Nandihalli, B. S. 2009. Seasonal incidence of mite pests on brinjal and chilli. *Karnataka J. Agric. Sci*. **22**(3): 729-731.

Reddy, D. N. R. and Puttaswamy, 1985, Pests infesting chilli (*Capsicum annuum*) in the transplanted crop. *Mysore J. Agric. Sci*., **17**(3): 246-251.

Sorensen, K. A., 2005, Vegetable insect pest management. www. ces.ncsu.edu/depts./ent/notes/vegetables/veg37.htm1-11k.

Srinivas, N., 1984, The influence of moonlight and some weather factors on selected species of insect caught in light trap. *M. Sc. (Agri) thesis*, *Uni. Agric. Sci*, Bangalore., p. 224.

Sunitha, T. R., 2007, Insect pests of *Capsicum annum* var. f*rutescence* (L.) and their management. *M. Sc. Thesis. Uni. Agric. Sci*., Dharwad (India).

Vasicek, A., Rossa, F-De-La and Paglioni, A., 2001, Biological and populational aspects of *Aulacorthum solani* (Kalt), *Myzus persicae* (Sulz) and *Macrosiphum euphorbiae* (Thomas) (Homoptera: Aphidoidea) on pepper under laboratory conditions. *Boletin de Sanidal Vegetal Plagas*, **27**(4): 439-446.

Vos, J. G. M. and Frinking, H. D., 1998, Pests and disease of hot pepper (*Capsicum* spp.) in tropical low lands of Java, Indonesia. *J. Plant. Prot. Trop*., **11**(1): 53-71.

Annexure

Table 1: Seasonal Incidence of insect pests of Capsicum at Bangalore

Std. Week	*S. dorsalis* (3 leavse per plant)	*M. persicae* (3 leaves per plant)	*T. vaporariorum* (3 leaves per plant)	*P.latus* (top 3 leaves per plant)	*A. crenulata* (per plant)	*M. signata* (per plant)	*M. discolor* (per plant)	*T. ni* (per plant)	*S. litura* (per plant)	*H. armigera* (per plant)
38	0.07	0.35	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.54	0.22	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	1.49	0.10	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.02
41	2.74	1.27	0.06	0.18	0.00	0.00	0.10	0.12	0.25	0.20
42	4.63	1.23	0.02	0.54	0.00	0.00	0.12	0.00	0.20	0.22
43	5.64	2.18	0.03	1.10	0.00	0.00	0.00	0.00	0.12	1.30
44	5.61	2.21	0.01	1.48	0.00	0.10	0.00	0.00	0.07	3.27
45	2.38	1.19	0.04	2.62	0.15	0.10	0.10	0.00	0.07	3.22
46	3.84	1.19	0.09	2.82	0.00	0.25	0.00	0.15	0.00	3.32
47	5.88	1.21	0.10	1.46	0.00	0.25	0.20	0.00	0.10	3.20
48	5.02	1.20	0.05	1.35	0.00	0.00	0.20	0.00	0.10	2.17
49	3.80	1.17	0.03	1.35	0.00	0.00	0.00	0.00	0.07	2.17
50	3.66	1.30	0.03	0.80	0.00	0.00	0.00	0.00	0.00	2.12
51	2.78	1.25	0.02	0.00	0.10	0.00	0.00	0.00	0.00	2.10
52	2.22	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80
Mean	3.53	1.13	0.04	0.91	0.01	0.04	0.07	0.02	0.07	1.67
Max	5.88	2.21	0.10	2.82	0.15	0.25	0.20	0.15	0.25	3.32
Min	0.07	0.10	-	-	-	-	-	-	-	-
SD±	1.82	0.59	0.02	0.94	0.04	0.08	0.04	0.04	0.07	1.29

Table 2: Correlation between weather parameters and insect and mite pests population on capsicum

Parameters	Max. Temp	Min. Temp	Morning RH	Evening RH	RF	Sun shine
Thrips	-0.76**	-0.47	-0.24	0.47	0.24	0.13
Aphids	-0.71**	-0.25	0.10	0.60*	0.37	-0.29
Mites	-0.48	-0.46	-0.01	0.23	0.13	0.28
Fruit borer	-0.67**	-0.64**	-0.23	0.31	0.16	0.20

* Correlation is significant at $P \leq 0.05$; ** Correlation is significant at $P \leq 0.01$