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Seasonal incidence of thrips, *Thrips tabaci* on onion

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Abstract
The present investigation was conducted to study the Seasonal Incidence of *Thrips, Thrips tabaci* on Onion at Horticulture farm, Department of Entomology and Laboratory during December to May (Rabi) of 2008-09. The incidence of thrips on onion was commenced in the third week of February (3.66 thrips / plant) and reached to it's peak in the last week of March (40.32 thrips / plant). Whereas, the predator, *Coccinella septumpunctata* Linn. was commenced in the last week of February (0.10 / plant plant) and reached to maximum in the last week of March (3.40 / plant), thereafter, declined and completely disappeared in the last week of April. The correlation studies revealed that the thrips population had non significant positive correlation with the temperature and non significant negative with the relative humidity whereas; the population of predator *C. septumpunctata* was significantly positively correlated with thrips population (0.949).

Keywords: Seasonal incidence, *Thrips tabaci, Coccinellids, onion*

1. Introduction
Onion (*Allium cepa* L.) belongs to family Alliaceae is one of the most important vegetable cum condiment crop grown throughout the worldwide [1]. The main onion growing states in India are Maharashtra, Gujarat, Karnataka, Andra Pradesh, Bihar, Orissa, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Rajasthan [2]. In Rajasthan the main onion growing districts are Alwar, Jodhpur, Nagaur, Jhunjhunu, Jaipur and Sikar [3]. Onion is one of the unique vegetables that are used throughout the year in the form of salad or condiments or for cooking with other vegetables. It is also used in preparing soups, sauces, curries, pickles and flavouring or seasoning foods. Onion bulbs have many medicinal properties [4]. It is recommended for the persons suffering from high cholesterol, weakness, lethargy and lack of vitality. It increases the appetite and suppresses gas formation. It's use against sunstroke is the best remedy during summers. Onion bulbs are rich sources of minerals like phosphorus, iron, calcium and also contains carbohydrates, proteins, vitamin 'C', fibers [5].
Insect pests, viz., thrips, *Thrips tabaci* (Lindeman); maggot fly, *Delia antigua* (meigen); caliothrips, *Caliothrips indicus* (Bangall) and tabacco caterpillar, *Spodoptera litura* (fabricius) are the major limiting factors for higher production of good quality onion bulbs as well as seeds [6]. Among them, thrips, *T. tabaci* was reported as a regular and major pest in Rajasthan and other parts of the country [7]. Thrips cause both quantitative and qualitative losses to the tune of 34-43 percent [8]. Thrips puncture the tender leaves and suck the exuding sap. As a result of continuous feeding by such a large population the plant leaves become curl, wrinkle and gradually dry up, resulting in shriveled bulb and seed formation [7].
It is well established fact that incidence of insect pests depends upon climatic conditions, crop growth stages and natural enemies of a pest at a particular time. Hence, the knowledge of seasonal incidence of pest with alterations in sowing time of the crop cause a significant effect on the infestation of a specific pest on a given crop. Earlier these practices were evaluated by [9, 10] on onion crop, but the climatic conditions have changed now and their effects on pests need reconsideration to study the seasonal incidence of thrips, *T. tabaci* on onion.

2. Materials and Methods
The present investigation was conducted at Horticulture farm and the Department of Entomology of S.K.N. College of Agriculture, Jobner (Rajasthan) on onion crop during December to May, Rabi, season 2008-09. Geographically, Jobner is located at longitude of $78^{0}28^{0}$ East latitude, $26^{0}26^{0}$ North and at an elevation of 427 meter from mean sea level (MSL)

in Jaipur district of Rajasthan. The climate of the region was typically semi-arid which was characterized by extremes of the temperature both during summer and winter. During summer, temperature may rise as high as 47 ^{0}C and in winter it may fall as low as 2-3 ^{0}C. The total rainfall was 480 mm which mostly received from July- September. This region provides a safe long growing season for most of the crops. Onion seedling was raised in nursery beds. Nursery beds of 2 x 1 m^2 size were prepared by mixing well rotten farm yard manure in the soil at the rate of 10 kg per square meter. To avoid mortality of seedlings due to damping off, drenching of the beds was done with Bavistin @ 15 g per 10 liters of water. Prior to sowing, seeds were treated with Thiram @ 2 g per kg of seeds. Seed of onion genotype R.O.-1 was sown @ 10 kg ha-1 in the nursery beds on 20th October, 2008. A thin layer of powdered leaf mould was applied to cover the seeds. Timely irrigation and plant protection measures were followed. The recommended dose of NPK for onion in this zone (semi-arid eastern plain zone III-A) are 100: 50: 100 kg ha-1. Nitrogen was applied thought urea, half as basal dose and remaining half in two equal splits at 30 and 50 days after transplanting. Phosphorus and potassium was applied through single super phosphate and murate of potash, respectively just before transplanting. Well rotten farm yard manure was incorporated in the soil at the time of field preparation @ 25 t ha-1.

To study the effect of environmental factors, viz., temperature, relative humidity and rainfall on the incidence of thrips on onion crop, the genotype R.O.-1 was transplanted (about eight week old seedlings) on 8th Jan, 2009, in five plots of 1.5 x 1.5 m^2 size keeping row to row and plant to plant distance of 15 and 10 cm, respectively. For this purpose the crop was left for natural infestation of thrips. The observations on thrips population and coccinellid predators, *Coccinella septumpunctata* Linn. were recorded from five and ten randomly selected and tagged plants, respectively in each plot at weekly interval from the first appearance till harvesting of the crop. The data recorded were used for statistical analysis. The simple correlation was computed between thrips population, coccinellids and environmental factors, viz., maximum and minimum temperature, relative humidity and rainfall.

The following formula was used for calculating correlation coefficient

$$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{N\Sigma x^2 - (\Sigma x)^2}\ \overline{N\Sigma y^2 - (\Sigma y)^2}}$$

Where,
r = Simple correlation coefficient
x = Independent variable *i.e.* abiotic component
y = Dependent variable *i.e.* pest
N = Number of observations

$$t = r\sqrt{\frac{n-2}{1-r^2}}$$

t = test significance of a correlation coefficient

3. Results and Discussion

The data presented in table-1 revealed that the thrips population on onion crop first commenced in the third week of February (3.66 thrips/ plant) which gradually increased and reached to it's peak in the last week of March (40.32 thrips/ plant) at 30.70 ^{0}C maximum, 15.0 ^{0}C minimum temperature and 41.0 percent relative humidity thereafter, declined and completely disappeared in the last week of April. The present finding is partial agreement with those of Anonymous [9] who reported that the incidence of thrips on onion started from December and reached highest in February and drastically came down in March. Likewise, Chhatrola, *et al*. who reported that thrips population was active throughout the season on onion crop, however, it remained comparatively higher during the first week of January to the third week of February, support the above findings [6].

The weather parameters viz., maximum and minimum temperature, relative humidity and rainfall play a significant role in planning the pest management schedules. In the present study the incidence of thrips was not affected by weather parameters significantly however, temperature and relative humidity showed non significant positive and negative correlation, respectively with a thrips incidence on onion crop. The present results are in agreement with those of Ghosh *et al.* [11] who reported that relative humidity had non significant correlation with thrips incidence on onion crop however, temperature showed significant positive correlation. Chhatrola *et al.* [6] reported that the temperature had non significant correlation with thrips population and relative humidity had a significant negative correlation, support the present findings. The present study also corroborate with those of Domiciano *et al.* [12] who reported that thrips population in onion crop was negatively correlated to relative humidity and positively correlated with temperature.

The biotic factors particularly coccinellid predators (Table 1) played a significant role in reducing the infestation of thrips. In the present investigations coccinellid predator, *Coccinella septumpunctata* Linn. was first observed in the last week of February (0.10/ plant) i.e. one week after thrips incidence and reached maximum during last week of March (3.40 / plant). The population persisted as long as the thrips population was observed on the crop. The population of *C. septumpunctata* was significant positively correlated (r = 0.949) with thrips population. The present finding partially corroborate with that of Kadri and Goud [10] who reported that coccinellids were major predator of thrips and possessed positive correlation with thrips incidence.

Table 1: Seasonal incidence of thrips, *T. tabaci* on onion crop in relation to environmental factors during *Rabi*, 2008-09

S. No.	Standard Meteorological Week (SMW)	Date of observations	Mean population of thrips (per plant)	Mean population of *Coccinella septumpuntata* Linn. (per ten plants)	Temperature (^{0}C)		Relative humidity (%)	Rain fall (mm)
					Maximum	Minimum		
1	8	20.02.09	3.66	0.00	28.30	9.60	47	0.00
2	9	27.02.09	7.12	0.10	31.70	9.70	44	0.00
3	10	6.03.09	13.20	1.40	31.40	11.00	39	0.00
4	11	13.03.09	27.56	2.20	32.00	11.80	34	0.00
5	12	20.3.09	31.32	2.60	31.50	15.70	44	4.80
6	13	27.03.09	40.32	3.40	30.70	15.00	41	0.00
7	14	3.04.09	38.00	2.80	33.60	15.50	34	0.00
8	15	10.4.09	32.00	2.00	36.40	16.50	37	0.00
9	16	17.4.09	21.66	1.40	38.50	18.90	29	0.00
10	17	24.4.09	9.12	1.20	38.80	18.50	25	0.00
Correlation coefficient with mean thrips population (r)				-	NS (0.057)	NS (0.435)	NS (-0.089)	-
Correlation coefficient with mean *C. septumpuntata* population (r)				0.949	-	-	-	-

*Significant at 5 percent level
NS: Non significant

4. Conclusion

From the present investigation it can be concluded that the incidence of thrips was not affected by weather parameters significantly however, temperature and relative humidity showed non significant positive and negative correlation, respectively with thrips incidence on onion crop whereas; coccinellid predators played a significant role in reducing the infestation of thrips.

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6. References

1. FAO. World onion production. Food and Agriculture Organization of the United Nations. http:// faostat.fao.org, accessed February 27, 2009
2. Anonymous. State level summary of principal crops in Rajasthan, Vital Agricultural Statistics. Directorate of Agriculture, Pant Krishi Bhavan, Jaipur-Rajasthan, 2007, 90p.
3. Anonymous. Studies on seasonal incidence of onion thrips. Annual Report. National Research Centre for Onion Garlic, Nashik, 2001, 63-64.
4. Griffiths G, Trueman L, Crowther T, Thomas B, Smith B. Onions: A global benefit to health. Phytother Res. 2002; 16(7):603-615
5. Mettananda KA, Fordham R. The Effects of Plant Size and Leaf Number on the Bulbing of Tropical Short-day Onion Cultivars (*Allium cepa* L.) Under Controlled Environments. Journal of Horticultural Science. 2001; 14(5):22-31.
6. Chhatrola DP, Vyas HJ, Baraiya KP. Influence of abiotic factors on population buildup of thrips, *T. tabaci* (Lindemen) in garlic. Indian Journal of Plant Protection. 2003; 31:98-100.
7. Srinivas PS, Qureshi AA, Lawande KE. Growth stage susceptibility of onion (*Allium cepa*) and it's role in thrips management. Indian Journal of Agricultural Sciences. 2008; 78:98-101.
8. Kumar NK, Veeregowda R, Sreenivas RE, Krishna Moorthy PN. Response of onion genotypes for thrips, *T. tabaci* (Lindemen), resistance. Proceedings of the Second National Symposium on IPM in Horticultural Crops, New Molecules Pesticides and Biopesticides, Bangalore, India, 2001, 17-19.
9. Anonymous. Studies on seasonal incidence of onion thrips. Annual Report. National Research Centre for Onion Garlic, Nashik, 2001, 65-66.
10. Kadri S, Goud KB Survey and seasonal incidence of onion thrips, *T. tabaci* (Lindemen). Karanataka Journal of Agricultural Science. 2005; 18:510-512.
11. Ghosh SK, Laskar N, Senapati SK. Seasonal fluctuations in the population of thrips, *T. tabaci* (Lindemen) in the tarai region of West Bengal and its control on brinjal, Pest Management and Economic Zoology. 2005; 13:185-190.
12. Domiciano NL, Ota AY, Tendari CR. Population fluctuations of thrips on onion, its association with climatic elements and control, Anais da Sociedade Entomologica do Brazil. 1993; 22:77-83.