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Seasonal incidence of sucking insect pests in tomato in relation to weather parameters in the Chhattisgarh plains

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Abstract
An experiment on incidence of aphid, *Aphis gossypii* in Tomato, (*Solanum lycopersicum* Mill) was studied during 2016-17 and 2017-18 at the area of Horticulture Research cum instructional farm of vegetable science, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. On the basis of pooled mean various abiotic parameters *viz.* Maximum temperature and minimum temperature *viz.* aphid were showed negative highly significant impact on the population of aphid but in case of rain fall, evening relative humidity and wind velocity show negative non-significant impact were shown. During this period, pooled two year mean maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, rainfall, wind velocity and sunshine was 29.2°C, 10.9°C, 85%, 24.5, 0 mm, 1.7 Km hr-^{1} and 8.7hr day-^{1} respectively. The maximum population of aphid, *Aphis gossypii* were observed during 6th SMW (13.75 adults 3 leaf^{-1} plant^{-1}) and 4th SMW (15.20 adults 3 leaf^{-1} plant^{-1}) during *rabi* season 2016-17 and 2017-18, respectively. There was a non-significant negative trend of correlation between the adult population with the maximum temperature, minimum temperature, evening relative humidity and wind velocity with '*r*' value of -0.182, -0.277, -0.065 and -0.096. But in case of rainfall, morning relative humidity and sunshine with '*r*' value of 0.086, 0.117 and 0.143 positive correlation was observed. The maximum population of leaf hopper, *Amrasca devastans* were observed during 5th SMW (3.35 adults 3 leaf^{-1} plant^{-1}) and 6th SMW (2.76 adults 3 leaf^{-1} plant^{-1}) during *rabi* season 2016-17 and 2017-18, respectively. There was non-significant negative trend of correlation between the adult population with the maximum temperature, minimum temperature and wind velocity with '*r*' value of -0.159, -0.219 and -0.050 but in case of rainfall, morning relative humidity, evening relative humidity and sunshine with '*r*' value of 0.116, 0.078, 0.014 and 0.106 positive correlation was observed.

Keywords: Tomato, Aphid, Abiotic factors, Correlation, Non-significant

Introduction

Tomato (*Solanum lycopersicum* Mill) is one of the most important vegetables in the world, ranking second in importance to potato in many countries. It is a warm season crop. It is grown as an off-season vegetable in the hill of India and farmers fetch good income after sending their produce in the plains from June to September. Tomato provides vitamins C and adds variety of colours and flavors to the foods. Large quantities of tomatoes are used prepare soup, juice, ketchup, puree, pickle, paste and powder (Choudhary 2002) [1]. Vegetable production can be adopted as a strategy for improving livelihood and alleviating status of the people. Tomato is a rich source of vitamins A, C and E and minerals that are very good for health (Olaniyi, 2010) [2]. Tomato (*Solanum esculentum* Mill.) is a popular and widely grown vegetable in the world. Among the various sucking insect-pests one of the destructive pests causing serious damage to tomato crop and is responsible for lowering its yield (De Barro *et al*., 2011) [3]. In sucking up the insect pest complex, the whitefly is important as it provides direct damage to the crop. The yield losses due to direct and indirect damage caused by whitefly have been recorded as a percentage of 20 to 100 per cent (Rapisarda and Garzia, 2002).

Material and methods

Population of tomato Aphid, *Aphis gossypii* Glover. Adult were recorded during the year 2016-17 and 2017-18 at Raipur districts of Chhattisgarh. The population of Aphid, *Aphis gossypii* Glover adult was observed on 5 randomly selected plants. Population of Aphid were taken on 6 leaves per plant *viz.* (two upper, two middle and two lower plant canopies). For the case of study and findings, meteorological data were pooled out at weekly interval". Among weather parameters relative humidity (morning and evening), maximum tempera

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ture, minimum temperature and rainfall were considered for correlating with occurrence of the insects pests of tomato (Shukla *et al*., 2005, Meena *et al*., 2010) [4]. To work out the relationship between the occurrence of the insect pests of tomato and the weather parameters, correlation and multiple linear regressions (MLR) method was adopted (Panse *et al*., 1985) [5].

Results and discussion

The data on infestation of aphid, *Aphis gossypii* during 2016-17 was first appeared in first week of December with 0.53 adult 3 leaf^{-1} plant^{-1}. Maximum aphid were (13.75 adult 3 leaf^{-1} plant^{-1}) noticed during first week of February (6th SMW) (Table 3 & Fig.1); during this period rainfall (0.00 mm), maximum temperature (32.2 °C) and minimum temperature (14.1 °C), morning relative humidity (81%), evening relative humidity (26%), wind velocity (1.8 Km h^{-1}) and bright sunshine hours (9.3 h day^{-1}) prevailed (Table 1). Thereafter, the aphid number was gradually decreased and reached 0.89 adult 3 leaf^{-1} plant^{-1}during second week of March. The numbers of aphid was correlated with prevailing rainfall, temperature, relative humidity, sunshine hours and wind velocity. There was a non-significant negative correlation between the aphid population with the minimum temperature, rainfall, morning relative humidity, evening relative humidity and wind velocity with '*r*' value of -0.056, -0.053, -0.016, -0.040 and -0.097 respectively. But in case of maximum temperature (0.048) and sunshine hours (0.14) positive correlation (Table 4).

However, during the year 2017-18, aphid population was first appeared in last week of November (0.12 adult 3 leaf^{-1} plant^{-1}). The maximum number of aphid (15.20 adult 3 leaf^{-1} plant^{-1}) was noticed during fourth week of January (4th SMW) (Table 3 & Fig.1). During this period rainfall, maximum temperature and minimum temperature, morning relative humidity, evening relative humidity, wind velocity and bright sunshine hours were recorded 0.00 mm, 28.26 °C, 10.2 °C, 83%, 25%, 2.2 Km h^{-1}& 8.5 h day^{-1}, respectively (Table 1). Thereafter, the number of aphid laid gradually decreased 0.58 adult 3 leaf^{-1} plant^{-1}during second week of March. Similarly, there was a non-significant negative trend of correlation was found between the adult population and maximum temperature, minimum temperature, evening relative humidity and wind velocity with '*r*' value of -0.338, -0.466, -0.193 and -0.081 respectively but in case of rainfall, morning relative humidity and sunshine hours with '*r*' value of 0.073, 0.246 and 0.229 non-significant positive trend of correlation was observed (Table 4).

On the basis of pooled mean of aphid, *Aphis gossypii* was first appeared in the last week of November with 0.06 adult 3 leaf^{-1} plant^{-1}. The peak population (13.14 adult 3 leaf^{-1} plant^{-1}) was observed during fourth week of January (4th SMW) (Table 3 & Fig.1). During this period the pooled rainfall (0.00 mm), maximum temperature (29.25 °C) and minimum temperature (12.25 °C), morning relative humidity (83%), evening relative humidity (27%), wind velocity (2.05 Km h^{-1}) and bright sunshine hours (8.10 h day^{-1}) prevailed (Table 1). Thereafter, the adult number gradually decreased & reached 0.74 adult 3 leaf^{-1} plant^{-1}during second week of March. There was a non-significant negative trend of correlation between the adult population with the maximum temperature, minimum temperature, evening relative humidity and wind velocity with '*r*' value of -0.182, -0.277, -0.065 and -0.096. But in case of rainfall, morning relative humidity and sunshine hours with '*r*' value of 0.086, 0.117 and 0.143 positive correlation was observed (Table 4).

Present findings are in accordance with those of Chaudhuri *et al.* (2001) [6] and Umesh *et al.* (2002) [7] also reported that the *A. gossypii* to be an important sucking pest of tomato and was present throughout the growing period of the crop. Hath *et al.* (2004) [8] noted maximum *A. gossypii* population on tomato during the first week of March. Mandloi *et al.* (2015) [9] also reported that correlation coefficient among *A. Gossypii* population and meteorological parameters was positively but not significantly associated with rainy days (0.379), evening relative humidity (0.336) and maximum temperature (0.116). However, it was exhibited negative correlation with minimum temperature (-0.121) and morning relative humidity (-0.066).

Table 1: Weekly meteorological data recorded during the crop growth period 2016-17 and 2017-18 IGKV, RAIPUR

Meteorological Week No.	Month	Date	Max. Temp (°C)	Min. Temp (°C)	Rainfall (mm)	Relative humidity (%) Morning	Relative humidity (%) Evening	Wind Velocity	Sun shine (hr day^{-1})
48	November	26-02	30.2	12.5	0.0	86.0	26.5	1.5	8.7
49	December	03-09	28.7	13.7	0.0	87.5	34.5	1.9	8.0
50	December	10-16	29.3	12.1	0.0	84.0	29.0	2.0	8.3
51	December	17-23	28.2	9.9	0.0	86.5	26.5	1.7	8.2
52	December	24-31	28.3	9.7	0.0	85.5	26.0	1.5	8.1
1	January	01-07	28.0	11.1	0.0	80.0	29.0	1.8	7.1
2	January	08-14	27.7	11.0	2.8	82.5	29.0	2.3	7.7
3	January	15-21	29.2	10.9	0.0	85.0	24.5	1.7	8.7
4	January	22-28	29.3	12.3	0.0	83.0	27.0	2.1	8.1
5	January	29-04	30.6	11.5	0.0	74.5	21.5	2.1	9.6
6	February	05-11	31.8	15.2	0.0	79.5	30.0	2.2	7.8
7	February	12-18	29.7	15.2	8.2	84.5	36.0	3.3	7.4
8	February	19-25	33.8	15.6	0.0	73.0	19.5	2.4	9.8
9	February	26-04	34.9	16.5	0.0	74.5	18.5	2.3	9.6
10	March	05-11	33.9	19.4	2.8	67.0	29.0	3.4	7.1
11	March	12-18	33.6	18.7	0.6	65.5	25.5	3.7	7.6

Table 2: Major Sucking pests population of tomato during *rabi* season 2016-17 and 2017-18

S. No.	Common name	Pest species	Order	Family	Population range /plant		Period of incidence
					2016-17	2017-18	
1	Leafhopper	*Amrasca devastans*	Hemiptera	Cicadellidae	0.02-3.35	0.12-2.76	Dec-Feb

(continued on next page)

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2	Aphid	*Aphis gossypii* (Glover)	Hemiptera	Aphididae	0.53-13.75	0.12-15.20	Dec-March

Table 3: Seasonal incidence of sucking pests on tomato during *rabi* 2016-17 and 2017-18

SMW	Aphid 3 leaf^{-1} plant^{-1}			Leaf hopper 3 leaf^{-1} plant^{-1}		
	2016-17	2017-18	Pooled mean	2016-17	2017-18	Pooled mean
48	0.00	0.12	0.06	0.00	0.00	0.00
49	0.53	1.70	1.12	0.00	0.00	0.00
50	1.18	2.35	1.77	0.00	0.00	0.00
51	2.32	4.05	3.19	0.02	0.00	0.01
52	3.52	3.98	3.75	0.15	0.35	0.25
1	4.53	5.29	4.91	1.00	0.85	0.93
2	7.35	9.21	8.28	1.21	1.32	1.27
3	9.26	12.23	10.75	2.35	2.05	2.20
4	10.53	15.20	13.14	2.48	2.10	2.29
5	11.24	13.27	12.26	3.35	2.58	2.97
6	13.75	10.32	12.04	2.89	2.76	2.83
7	8.31	7.65	7.98	2.35	1.12	1.74
8	5.56	4.08	4.82	1.09	0.21	0.65
9	4.61	3.21	3.91	0.00	0.12	0.06
10	2.17	1.10	1.64	0.00	0.00	0.00
11	0.89	0.58	0.74	0.00	0.00	0.00
Mean	5.36	5.93	5.65	1.06	0.84	0.95

Table 4: Correlation of tomato aphid and Leaf hopper with weather parameters

Weather parameter	Correlation coefficient (r)					
	Aphid			Leaf hopper		
	2016-17	2017-18	Pooled	2016-17	2017-18	Pooled
Maximum Temperature (°C)	0.048	-0.338	-0.182	-0.009	-0.298	-0.159
Minimum Temperature (°C)	-0.056	-0.466	-0.277	-0.059	-0.418	-0.219
Rainfall (mm)	-0.053	0.073	0.086	-0.142	0.046	0.116
Morning relative humidity	-0.016	0.246	0.117	-0.029	0.170	0.078
Evening relative humidity	-0.040	-0.193	-0.065	0.052	-0.221	0.014
Wind velocity (km h^{-1})	-0.097	-0.081	-0.096	-0.137	-0.014	-0.050
Sunshine hours (hours)	0.146	0.229	0.143	0.101	0.179	0.106

*: Significant at 5% = 0.497
**: Highly significant at 1% = 0.623

Figure 4.14. Aphid, *Aphis gossypii* Glover population on tomato during 2016-17 and 2017-18

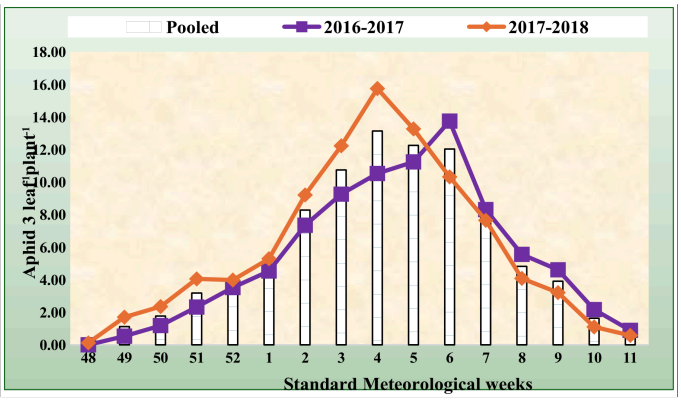


Figure 1. Aphid, *Aphis gossypii* Glover population on tomato during 2016-17 and 2017-18

Leafhopper, Amrasca devastans

The data on infestation of leaf hoppers during 2016-17 was first appeared in third week of December with 0.02 leafhoppers 3 leaf^{-1}plant^{-1}. Maximum leafhoppers were (3.35 adult 3 leaf^{-1}plant^{-1}) noticed during last week of January (5th SMW) (Table 3 & Fig.2); during this period rainfall (0.00 mm), maximum temperature (30.4°C) and minimum temperature (12 °C), morning relative humidity (69%), evening relative humidity (26%), wind velocity (1.6 Km h^{-1}) and bright sunshine hours (9.4 h day^{-1}) prevailed (Table 1). Thereafter, the leafhoppers was gradually decreased and reached 1.09 leafhoppers 3 leaf^{-1}plant^{-1}during third week of February. The numbers of leafhoppers was correlated with prevailing rainfall, temperature, relative humidity, sunshine hours and wind velocity. There was a non-significant negative correlation between the leafhoppers population and maximum temperature, minimum temperature, rainfall, morning relative humidity and wind velocity with '*r*' value of -0.009, -0.059, -0.142, -0.029 and -0.137 respectively but in case of evening relative humidity (0.052) and sunshine hours (0.101) positive correlation (Table 4).

However, during the year 2017-18, leaf hoppers population was first appeared in fourth week of December (0.35 leafhoppers 3 leaf^{-1}plant^{-1}). The maximum number of leaf hoppers (2.76 leaf hoppers 3 leaf^{-1}plant^{-1}) were noticed during first week of February (6th SMW) (Table 3 & Fig.2). During this period rainfall, maximum temperature and minimum temperature, relative humidity, wind velocity and bright sunshine hours were recorded 0.00 mm, 31.30 °C, 16.2 °C,

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78%, 2.6 Km h^{-1}& 6.3 h day^{-1}, respectively (Table 1). Thereafter, the number of leaf hoppers laid gradually decreased 0.12 adult 3 $leaf^{-1}plant^{-1}$during last week of February. Similarly, there was a non-significant negative trend of correlation was found between the adult population and maximum temperature, minimum temperature, evening relative humidity and wind velocity with '*r*' value of -0.298, -0.418, -0.221 and -0.168 respectively but in case of rainfall, morning relative humidity and sunshine hours with '*r*' value of 0.046, 0.170 and 0.179 non-significant positive trend of correlation was observed (Table 4).

On the basis of pooled mean of leafhoppers was first appeared in third week of December with 0.01 adult 3 $leaf^{-1}plant^{-1}$. The peak population (2.97 adult 3 $leaf^{-1}plant^{-1}$) was observed during last week of January (5^{th} SMW) (Table 3 & Fig.2). During this period the pooled rainfall (0.00 mm), maximum temperature (30.6 °C) and minimum temperature (11.5 °C), relative humidity (74.5%), wind velocity (2.10 Km h^{-1}) and bright sunshine hours (9.6 h day^{-1}) prevailed (Table 1). Thereafter, the adult number gradually decreased & reached 0.06 adult 3 $leaf^{-1}plant^{-1}$during fourth week of February. There was a non-significant negative trend of correlation between the adult population and maximum temperature, minimum temperature and wind velocity with '*r*' value of -0.159, -0.219 and -0.050 but in case of rainfall, morning relative humidity, evening relative humidity and sunshine hours with '*r*' value of 0.116, 0.078, 0.014 and 0.106 positive correlation was observed (Table 4).

The present observations were more or less similar with the results of earlier workers Kumar (2008) [10] reported that the *Amrasca devastans* appeared in the 1^{st} week of January. Correlation coefficient of *Amrasca devastans* population exhibited non-significant and positive with rainy days (0.389), relative humidity evening (0.280) and maximum temperature (0.115), while, negative association of this character was observed with minimum temperature (-0.189) and relative humidity morning (-0.060). Similarly Mandloi *et al.* (2015) [9] also reported that correlation coefficient of *Amrasca devastans* population exhibited non-significant relationship with all the weather parameter.

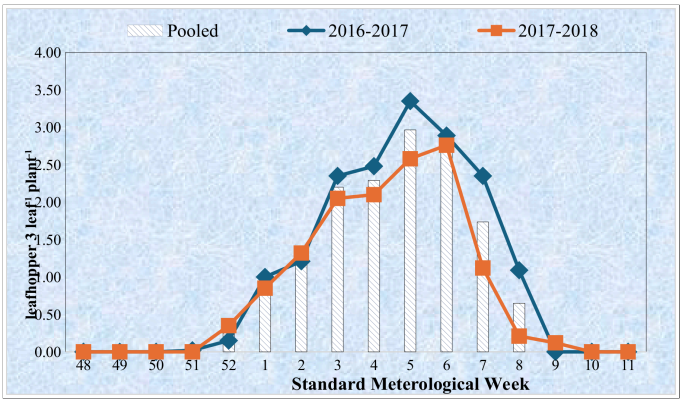


Figure 2. Leafhopper, *Amrasca devastans* population on tomato during 2016-17 and 2017-18

References

1. Choudary BR. Important of tomato vegetable crop. P. B. 2002;121(4):292-296.
2. Olaniyi JO. Vegetable production can be adopted as a strategy for improving livelihood and alleviating the nutritional status of the people. African J. of F. Sci. 2010;4(6):398-402.
3. De Barro PJ, Liu SS, Boykin LM, Dinsdale AB. *Bemisia tabaci*: a statement of species status. Annu Rev Entomol. 2011;56:1-9.
4. Shukla S, Kumar A, Awasthi BK. Study of bio-efficacy of botanicals against tomato crop. Vegetable Sciences. 2005;32(2):210-212.
5. Panse VG, Sukhatne PV. Statistical methods for agricultural workers. ICAR, New Delhi. 1985:381.
6. Chaudhuri N, Deb DC, Senapati SK. Assessment of loss in yield caused by pest complex of tomato under terai region of West Bengal. Res on Crop. 2001;2(1):71-79.
7. Umesh VC, Onukwu D. Development of environmentally friendly tomato insect pest control options under tropical conditions. Journal of vegetable science. 2002;11(3):73-84.
8. Hath TK, Das BR. Incidence of insect pests in late planted tomato under terai agroecology of West Bengal. Environ. Ecol. 2004;22(1):136-140.
9. Mandloi R, Pachori R, Prajapati S, Patel S. Seasonal incidence of insect complex on tomato. J. ent. Res. 2015;39(4):347-352.
10. Kumar P. Studies on loss of bio-efficacy of two indirect neem application over time (seed and soil) against bemisia tabaci (*Homoptera*: Aleyrodidae) under semi-field conditions. J. of Asia-Pacific Entomo. 2008;11:185-190.
11. Meena NK, Kanwat PM, Sharma JK. Seasonal incidence of leafhopper and whitefly on okra, *Abelmoschus esculentus* (L.) Monech. Disease Reporter. 2010;62:259-262.
12. Rapisarda C, Garzia GT. Tomato yellow leaf curl sardinia virus and its vector *Bemisia tabaci* in Sicilia (Italy): Present status and control possibilities. OEPP/EPPO Bull. 2000;32:25-29.

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