

RESEARCH ARTICLE

Influence of abiotic factors on incidence of thrips, *Scirtothrips dorsalis* Hood of cashew in Gujarat

■ D.M. Damasia, Z.P. Patel and J.B. Dobariya

SUMMARY

A study was carried out on cashew variety Vengurla-4 at farmer's field in hilly area of the Dangs district, Gujarat, India during 2017-18 and 2018-19 to examine the association of pest occurrence with abiotic factors like temperature, humidity, sunshine, wind speed and evaporation. Consistent weekly observations were recorded on the per cent incidence of thrips on three arbitrarily selected trees. The weather-related data was collected for the study from meteorological observatory located at Hill Millet Research Station, Waghai, the Dangs, Gujarat for the retro of two years. The damage by thrips on apple and nut was initiated in the month of January. After ward, damage found rising and it was maximum in the month of February. After the month of February, the damage went on lessening leisurely and almost absent by the end of April. Per cent incidence of thrips exposed non-significant correlation with temperature, relative humidity, sunshine, wind speed and evaporation.

Key Words : Abiotic factors, Cashew, Incidence, Thrips

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Cashew (*Anacardium occidentale* L.) is used in most homes of the world because of its taste and nutritious importance. It is an inborn of

Eastern Brazil from where it was introduced in India by the Portuguese closely five centuries ago where it became a key profitable crop.

In India, Kerala, Maharashtra, Tamil Nadu, Andhra Pradesh, Goa, Karnataka, Orissa, West Bengal Chhattisgarh and Gujarat are the states where cashew is grown in an area of 10.62 lakh hectares with a production of 8.17 lakh MT with the national productivity of 769 kg/ha (Anonymous, 2018). In Gujarat the cashew is generally grown in the area of the Dangs, Valsad and Dahod districts occupying an area of 7250 ha area with the production of 6500 MT with state productivity of 897 kg/ha (Anonymous, 2018).

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The production of cashew nut is very low as connected to its growing demand in India as well as in the foreign. There are many restraints ascribed to low yield. Among the various production restraints recognized, the insect pests form one of the major preventive factors causing a crop loss of 30 to 40 per cent (Satapathy, 1993). As many as, 196 arthropod pests are recognized to cause injury to the crop. Rai (1984) recorded 133 species of insects on cashew. Sixty species triggering regular damage has been documented by Pillai *et al.* (1976). Amongst these, the thrips are one of the most damaging insect pests of cashew and no systematic work has so far been undertaken on the aspects related to this pest.

In recent times, much of the weights are being given on viable agriculture based on appropriate integrated pest management tactics. Hence, information of pest population ecology is crucial for suitable control tactics. Further, the pest's interaction with abiotic influences supports in planning need based application of insecticides, as it clearly tells the insect peak activity periods during the crop growth. Hence, data on seasonal incidence and influence of weather on development of pests is of major importance for predicting the occurrence of pests in a specific region.

MATERIAL AND METHODS

A field experiment was lead during 2017-18 and 2018-19 on cashew variety Vengurla-4 at farmer's field in mountainous part of the Dangs, Gujarat. The occurrence of thrips in cashew ecosystem was studied in kin to weather parameters. The observation on occurrence of thrips of cashew was noted throughout fruiting period at weekly interval. For recording the observations, three cashew trees were carefully chosen randomly from investigational plot area. The whole investigational plot was kept free from any insecticide application.

Hundred nuts and apples per tree on three randomly selected trees were observed and damaged (Plate 5) ones were scored as below:

0	No damage
1	1-25 per cent nut or apple surface damaged
2	26-50 per cent nut or apple surface damaged
3	51-75 per cent nut or apple surface damaged
4	76-100 per cent nut or apple surface damaged

The recorded data converted into percentage on the basis of formula given below:

$$\text{Per cent incidence} = \frac{\text{Sum of all numerical rating}}{\text{Number of observation} \times \text{Maximum rating}} \times 100$$

With a view to study the impact of different weather parameters on pest incidence, a simple correlation between per cent incidence and weather parameters were worked out.

RESULTS AND DISCUSSION

The result presented in Table 1 revealed that, per cent incidence ranged from 0.50 to 12.75 per cent with an average of 5.0 per cent throughout its occurrence during the year 2017-18. Furthermore, thrips incidence started from January and subsequently found increasing and reached to a peak (12.75%) in the month of February 7th SMW. Thereafter, it was gradually declining and remained absent during May to December.

More or less similar pattern of per cent incidence of thrips was observed during the year 2018-19. It was ranged from 1.75 to 10.50 with an average of 4.81 per cent. As high as 10.50 per cent incidence was recorded in the month of March 9th SMW during the period under report.

Likewise, same trend of per cent incidence was apparently observed from the average data of two years (2017-18 and 2018-19). As mentioned individually for two years, the average per cent incidence was ranged from 0.25 to 10.75 per cent with an average of 4.92 per cent (Table 1).

Average data of two years on per cent incidence clearly indicated that, the activity of thrips was initiated after initiation of fruit setting *i.e.* in the month of January in hilly area of the Dangs. It was well coincided with setting of fruit which is most suitable to suck the cell sap from tender nuts and apples. Thereafter, thrips incidence found increasing and it was maximum during February during which plenty tender nuts and apples are made available to the nymphs and adults of thrips for sucking cell sap. After the month of February, thrips incidence went on decreasing slowly and almost absent by the end of April.

It is also indicative from the available literature that, the thrips incidence was exists between January to May with maximum during February-March in various cashew growing area of the country. It was observed by Mohapatra and Lenka (2003) in Orissa as well as

Anonymous (2004) as well as Jalgaonkar *et al.* (2015) and Navik *et al.* (2016) in Maharashtra. Thus, the above reports made by various scientists strongly support the present findings.

Effect of abiotic factors on thrips incidence :

The effect of abiotic factors on per cent incidence of thrips presented in Table 2 indicated that, none of the tested weather parameters significantly influenced the incidence of thrips during year 2017-18.

It is evident from the Table 2 that the morning relative humidity had significant negative influence on incidence of thrips while, evening relative humidity had significant positive influence on the per cent incidence of thrips at 5 % level during 2018-19. The other tested

abiotic factors had non-significant effect (Table 2).

The average data of two years (2017-18 and 2018-19) pertaining to abiotic factors and per cent incidence (Table 2) indicated that, none of the tested abiotic factors had significant impact on per cent incidence of thrips.

In previous investigation, a non-significant association with weather factors was reported by Anonymous (2015) in Gujarat is strongly support the present findings. However, the reports of Mohapatra and Lenka (2003) as well as Anonymous (2011) in Orissa, Anonymous (2005) in Chhattisgarh, Chakraborti and Majumder (2007) as well as Kar and Poduval (2016) in West Bengal, Anonymous (2011) in Maharashtra, Jalgaonkar *et al.* (2015), Zote *et al.* (2015 and 2017) as well as Navik *et al.* (2016) in Maharashtra are not

Table 1: Incidence of thrips in cashew during 2017-18 and 2018-19

Month and week	SMW	Per cent incidence			
		2017-18	2018-19	Average	
January	IV	4	1.50	0.00	0.75
February	I	5	2.75	2.25	2.50
	II	6	12.00	5.50	8.75
	III	7	12.75	8.75	10.75
	IV	8	11.00	9.00	10.00
March	I	9	7.00	10.50	8.75
	II	10	5.75	10.25	8.00
	III	11	2.75	5.25	4.00
	IV	12	2.25	4.50	3.50
April	I	13	1.25	1.75	1.50
	II	14	0.50	0.00	0.25
	III	15	0.50	0.00	0.25
	IV	16	0.00	0.00	0.00
Mean			5.00	4.81	4.92

Table 2 : Correlation between abiotic factors and thrips incidence in cashew during 2017-18 and 2018-19

Abiotic factors	Per cent incidence		
	2017-18	2018-19	Average
Maximum temperature (°C)	-0.414	-0.295	-0.345
Minimum temperature (°C)	-0.531	-0.377	-0.466
Mean temperature (°C)	-0.489	-0.339	-0.410
Morning relative humidity (%)	-0.149	-0.626*	-0.404
Evening relative humidity (%)	0.194	0.568*	0.487
Mean relative humidity (%)	0.045	-0.232	-0.083
Bright sunshine hours (hr/day)	0.263	0.388	0.358
Wind speed (km/hr)	0.080	-0.529	-0.389
Evaporation(mm/day)	-0.213	0.083	-0.049

* and ** indicate significance of values at P=0.05 and 0.01, respectively

matched with present findings. It might be due to the difference in location and magnitudes of the abiotic factors.

Conclusion:

From the present study, it is concluded that, thrips incidence was mostly confined during January to April with maximum incidence (10.75%) in the month of February 7th SMW and remained absent during May to December. Further, none of the tested abiotic factors had significant impact on per cent incidence of thrips.

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REFERENCES

- Anonymous (2004). *Annual Report 2003-04*. All India Coordinated Cashew Improvement Project, National Research Centre for Cashew, Puttur, Karnataka, India, pp. 59-66.
- Anonymous (2005). *Annual Report 2004-05*. All India Coordinated Cashew Improvement Project, National Research Centre for Cashew, Puttur, Karnataka, India, pp. 97-98.
- Anonymous (2011). *Annual Report 2010-2011*, ICAR-Directorate of Cashew Research, Puttur, Karnataka, India, pp. 99-101.
- Anonymous (2015). *11th Plant Protection Sub-Committee Report*, Agriculture Experimental Station, Navsari Agricultural University, Paria, Gujarat, India, pp. 25-28.
- Anonymous (2018). Horticultural statistics at a glance. Horticulture statistics division, Department of Agriculture, Cooperation and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare, Government of India, pp. 18.
- Chakraborti, S. and Majumder, A. (2007). Meteorological determinants of the incidence of insect pests and their damage on cashew in coastal region of West Bengal. *Indian Journal of Agricultural Sciences*, **77**(4):264-266.
- Jalgaonkar, V.N., Chavan, S.A. and Naik, K.V. (2015). Seasonal incidence of insect pests of cashew in Coastal Maharashtra. *Annals of Plant Protection Sciences*, **23** (2):390-417.
- Kar and Poduval (2016). Seasonal incidence of insect pests in cashew in relation with weather conditions in red and laterite zone of West Bengal. *The Ecoscan*, **10** (3&4):535-537.
- Mohapatra, R. and Lenka, P. C. (2003). Correlation of weather parameters with the incidence of major foliage and flower pests of cashew in Orissa, *Journal of Plantation Crops*, **31**(1):64-65.
- Navik, O.S., Godase, S.K., Turkhade, P.D. (2016). Population fluctuation of cashew thrips under konkan region of Maharashtra. *Environment and Ecology*, **34** (2A): 615-618.
- Pillai, G.B., Dubey, O.P. and Vijay Singh (1976). Pests of cashew and their control in India. A review of current status part III. *Journal of Plantation Crops*, **4**(2):37-50.
- Rai, P.S. (1984). Hand book of cashew pests. Research Co. Publication 199, East Azad Nagar, Delhi, pp. 124.
- Satapathy, C.R. (1993). Bioecology of major insect pests of cashew (*Anacardium occidentale* L.) and evaluation of certain management practices. *Ph.D. Thesis, University of Agricultural Sciences, Bangalore, Karnataka*, pp. 224.
- Zote, V.K., Gajbhiye, R.C., Salvi, S.P. and Salvi, B.R. (2015). Population dynamics of tea mosquito bug and thrips of cashew in relation to weather parameters in konkan region of Maharashtra. *Pestology*, **39**(7):39-42.
- Zote, V.K., Salvi, S.P., Haldavnekar, P.C. and Narangalkar, A.L. (2017). Influence of abiotic factors on the population dynamics of cashew pests in konkan region of Maharashtra. *Journal of Entomology and Zoology Studies*, **5**(1):860-863.