

Effects of weather parameters on incidence sucking pests on Bt cotton

■ D.B. KADAM*¹, D.R. KADAM¹ AND S.M. UMATE²

¹Department of Agricultural Entomology, College of Agriculture, Vasantao Naik Marathwada Krishi Vidyapeeth, PARBHANI (M.S.) INDIA

²Department of Agricultural Botany, Vasantao Naik Marathwada Krishi Vidyapeeth, PARBHANI (M.S.) INDIA

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*Corresponding author:
Email: umatesunil@gmail.com

ABSTRACT

Abiotic factors *viz.*, temperature, rainfall, humidity etc. affect the incidence of insect pest population. The effects of weather parameters on incidence of sucking pests of Bt cotton was studied during *Kharif* 2013 at Department of Agricultural Entomology, Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani (MS). The weather parameter studied regarding sucking pests of Bt cotton concluded that aphid, jassid and whitefly showed positively significant correlation with maximum temperature. Whereas, jassids and thrips showed negatively significance with relative humidity and rainfall.

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Cotton (*Gossypium hirsutum* L.), is the King of fibre popularly known as White gold, an important cash crop in India. Among the various causes of low productivity of cotton in India, the insect pest is one of the major causes. About 200 insect pests are reported to attack cotton crop in India (Anonymous, 1992). The pests of major significance in Bt cotton are sucking pests like aphids (*Aphis gossypii*, Glover), jassids (*Amrasca biguttula*, Ishida), whiteflies (*Bemisia tabaci*, Gennadius) and thrips (*Thrips tabaci* Linnman). These affect the yield considerably causing losses of 11.20 per cent to 20.90 per cent in Marathwada region. Sucking pests, also referred to as sap feeders, limit the realization of potential productivity of cotton, they are deleterious to the cotton plant growth and development by being assimilate sappers, stand reducers and light stealers. The heavy infestation of nymph and adults of sucking pests resulted in leaf yellowing, wrinkled leaves, leaf distortion and oily spots on leaves. Secondly, they found to secrete honey dew which leads to growth and

development of sooty mould fungus (*Capnodium* sp.) on leaves. The fungus inhibits the photosynthetic activity of the plants resulting into chlorosis that affect the seed cotton yield. Moreover, whitefly also act as a vector to transmit leaf curl disease in cotton. In the present investigation, the effect of weather parameters on the incidence of sucking pests of Bt cotton was studied.

Studies on the effect of weather parameters on the incidence of sucking pests of Bt cotton was carried out during *Kharif* 2013 in research farm, Department of Agricultural Entomology, Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.). The cotton variety Bunny Bt was grown in the observation plots with recommended agronomic package of practices without any crop protection measures. The experiments were carried out in Randomized Block Design (RBD) with eight treatments replicated thrice.

Observations on the number of nymph and adults of aphids, jassids, thrips and whiteflies was recorded at weekly

interval from three leaves per plant selected from top, middle and bottom canopy of five randomly selected plants per quadrant from 30th day after germination. The data obtained regarding relationship between weather parameters and sucking pests was determined through correlations.

The findings of the present study as well as relevant discussion have been presented under the following heads :

Effects of weather parameters on incidence of sucking pests of Bt cotton :

Population dynamics of aphids (*Aphis gossypii* Glover) :

The data on population of aphids, *A. gossypii* during Kharif 2013-2014 (Table 1) revealed that on Bunny Bt cotton aphid population ranged from 4.61 to 42.91 aphids/3 leaves. During 31st MW when, weather parameters average rainfall, average temperature and average relative humidity were 77.5, 28.3°C, 91 per cent, respectively. The aphid population was 4.61 aphids/3 leaves which increased up to 35th MW (27 August to 02 September) and recorded 1st peak of 42.91 aphids/3 leaves in 35th MW when, weather parameters average rainfall, average temperature, average relative humidity were 0.0, 31.0°C, 82 per cent, respectively. More or less similar trends of aphid incidence were reported by More *et al.* (2009). They observed 52.20 aphids in first week of September, while Parsai and Shastry (2009) recorded 35.1 to 45.7 aphids/3 leaves during 33rd MW (mid August).

Population dynamics of jassids (*Amrasca bigutulla bigutulla* Ishida) :

The data on population of jassids *A. bigutulla bigutulla* during Kharif 2013-14 on Bt cotton revealed that the jassid population ranged from 0.23 to 17.62 jassids/3 leaves. The incidence of jassids started from 31st MW 0.23 jassids/3 leaves when, weather parameters average rainfall, average temperature, average relative humidity were 77.5, 28.3°C, 91 per cent, respectively. First peak of 17.62 jassids/3 leaves was observed during 36th MW (3-9 September) when, weather parameters average rainfall, average temperature, average relative humidity were 29.8, 33.1°C, 85 per cent, respectively.

The present findings are more or less similar to those of Hedge *et al.* (2004) who noticed the incidence during the 2nd fortnight of August which reached peak in first fortnight of

September. Gosalwad *et al.* (2009) reported that leafhopper attained its peak during September and October during 2004-05. *A. bigutulla bigutulla* population was maximum during 27th August to 2nd September in 2001-02 Rajput *et al.* (2010).

Population dynamics of thrips (*Thrips tabaci*) on Bt cotton:

The data on population of thrips (*Thrips tabaci*) on Bt cotton during 2013-14 (Table 1) revealed that the population of thrips varied from 1.54 to 32.55 thrips/3 leaves. The incidence of thrips started from 31st MW (1.54 thrips/3 leaves) when, weather parameters average rainfall, average temperature, average relative humidity were 77.5, 28.3°C, 91 per cent, respectively and attained first peak in 35th MW (32.55 thrips/3 leaves) when, weather parameters average rainfall, average temperature, average relative humidity were 0.0, 31.0°C, 82 per cent, respectively. The population of thrips declined to (16.31 thrips/3 leaves) in 36th MW when, weather parameters average rainfall, average temperature, average relative humidity were 29.8, 33.1°C, 85 per cent, respectively.

The present findings corroborate findings of Pawar *et al.* (2008) who recorded the highest thrips population (92.65 thrips/3 leaves) during 35th MW on Bt cotton. Gosalwad *et al.* (2009) studied population dynamics of major insect pests of cotton and showed that thrips attained its peak in August.

Population dynamics of whitefly (*Bemisia tabaci*) on Bt cotton:

The data on population dynamics of whitefly (*B. tabaci*) on Bt cotton during 2013-14 (Table 1) revealed that the population of whitefly varied from 0.42 to 3.63 whiteflies/3 leaves. The incidence of whiteflies started from 31st MW (0.42 whiteflies/3 leaves) when, weather parameters average rainfall, average temperature, average relative humidity were 77.5, 28.3°C, 91 per cent, respectively, with first peak (3.63 whiteflies/3 leaves) in 36th MW when, weather parameters average rainfall, average temperature, average relative humidity were 29.8, 33.1°C, 85 per cent, respectively.

The present findings are in conformity with the findings of Daware *et al.* (2003) recorded that whitefly incidence in cotton started from first week of August (31st MW). The whitefly, *B. tabaci* was recorded on Bt cotton, Kalkal *et al.* (2009) from 22nd MW to 41st MW.

Table 1 : Effect of weather parameters on incidence of sucking pests on Bt cotton (Kharif, 2013)

MW	Duration	Population per 3 leaves				Weather parameters		
		Aphid	Jassid	Thrips	Whitefly	Rainfall	Temp.	RH
31	30-05 August	4.61	0.23	1.54	0.42	77.5	28.3	91
32	06-12 August	7.78	0.90	4.97	1.42	19.7	29.8	89
33	13-19 August	13.93	1.75	9.31	1.81	59.8	30.5	91
34	20-26 August	21.79	4.20	11.97	2.38	9.3	28.5	89
35	27-02 Sept.	42.91	9.42	32.55	2.8	0.0	31.0	82
36	03-09 Sept.	35.62	17.62	16.31	3.63	29.8	33.1	85

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