



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(8): 1822-1825
© 2023 TPI
www.thepharmajournal.com
Received: 07-05-2023
Accepted: 19-07-2023

Ganesh N Gote

Ph.D. Research Scholar,
Department of Agricultural
Entomology, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Maharashtra, India

Dr. Uttam B Hole

Professor, Department of
Agricultural Entomology,
Mahatma Phule Krishi
Vidyapeeth, Rahuri,
Maharashtra, India

Dnyaneshwar A Raut

Ph.D. Research Scholar,
Department of Agricultural
Botany, Mahatma Phule Krishi
Vidyapeeth, Rahuri,
Maharashtra, India

Corresponding Author:

Ganesh N Gote
Ph.D. Research Scholar,
Department of Agricultural
Entomology, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Maharashtra, India

Prevalence of pink bollworm in Dhule, Jalgaon and Ahmednagar Districts of Maharashtra

Ganesh N Gote, Uttam B Hole and Dnyaneshwar A Raut

Abstract

A present survey was undertaken to find out the intensity of pink bollworm incidence on *Bt* cotton in major cotton cultivating districts of western Maharashtra viz. Ahmednagar, Jalgaon and Dhule in farmers' fields at 60, 90, 120 and 150 DAS during *Kharif* 2018-19. The incidence of pink bollworm was not found at 60 DAS in all surveyed districts but it was started at 90 DAS in Ahmednagar, Jalgaon and Dhule districts. Moreover, the mean percent green bolls damage, percent locule damage in green bolls, larval population per 20 green bolls, percent open boll damage and percent locule damage in open bolls was recorded maximum in *Bt* cotton fields in Jamner Tahsil of Jalgaon district which was 18.50, 9.02, 6.53, 42.50 and 33.84 percent, respectively. Whereas, the mean percent green boll damage, percent locule damage in green bolls, larval population per 20 green bolls, percent open boll damage and percent locule damage in open bolls was recorded minimum in Rahuri Tahsil of Ahmednagar district which was 14.19, 5.57, 3.59, 32.45 and 23.60 percent respectively.

Keywords: Pink bollworm survey, percent green boll damage and percent locule damage in green boll

Introduction

Cotton is the most important commercial crop grown for fibre, fuel and edible oil under diverse agro climatic conditions (Ezaddin and Salih, 2023) [2]. It provides a source of livelihood and employment to millions of farmers, farm workers and persons employed in related industries. The pink bollworm (PBW), *Pectinophora gossypiella* (Saunders) (Gelechiidae: Lepidoptera) is one of the most important destructive pests of cotton and distributed throughout the world's cotton growing areas causing maximum seed cotton loss in quantity and quality (Fabrick *et al.*, 2023) [3]. It poses greater threat to the cotton in recent past and has known to cause loss in normal opening of bolls, loss in oil content, seed cotton yield and damage locules. This pest is emerged as a serious pest and its activity is observed for a brief period from January to till the end of the season in April (Bhute *et al.*, 2023) [1]. In the recent past, this pest has been frequently noticed from early flowering, soon after emergence, the PBW larvae enter the fruiting body (Garg *et al.*, 2022) [4]. As a result, farmers remain totally ignorant about the damage caused by PBW till the boll opening and hence could not exercise any target specific control measures against the pest (Shrinivas *et al.*, 2019) [6].

Maharashtra is having more than 90% area under *Bt* cotton genotypes and there was necessity to generate the information on assessment of crop losses due to PBW in *Bt* cotton. So present investigation tried to collect the information about PBW'S distribution and origin, seasonal incidence, life history, nature of damage, symptoms and different management tools in Dhule, Jalgaon and Ahmednagar districts of Maharashtra. This information will helpful to the scientists to plan their research on pink bollworm which is the most destructive pest of cotton.

Materials and Methods

A current survey was undertaken to know the intensity of pink bollworm incidence on *Bt* cotton in major cotton cultivating districts of western Maharashtra viz. Ahmadnagar, Jalgaon and Dhule in farmers' fields at 60, 90, 120 and 150 days after sowing (DAS) during *Kharif* 2018-19. The percent green boll damage and percent locule damage in green boll were estimated from 20 cotton green bolls by fixed plot survey method. The total number of pink bollworm larvae per 20 bolls were worked out. Whereas, observations on open boll damage and locule damage in open bolls were recorded after the last picking. From each surveyed district, three tahsils were selected and from the each surveyed tahsils one farmer was selected. The number of bolls damaged were counted and expressed in terms of percent green boll damage using formula (Nadaf, 2006) [5].

$$\text{Percent green boll damage} = \frac{\text{No. of damaged green bolls}}{\text{Total No. of green bolls observed}} \times 100$$

$$\text{Percent locule damage in green boll (\%)} = \frac{\text{Damaged locules}}{\text{Total number of locules}} \times 100$$

$$\text{Percent open boll damage (\%)} = \frac{\text{Bad opened bolls}}{\text{Total opened bolls}} \times 100$$

$$\text{Percent locule damage in open boll (\%)} = \frac{\text{Damaged locules in open boll}}{\text{Total number of locules in open boll}} \times 100$$

Results and Discussion

Percent green boll damage

The data on percent green boll damage is presented in table 1 and figure 1. The incidence of pink bollworm was not found at 60 DAS in all the surveyed regions but it was started at 90 DAS in Ahmednagar, Jalgaon and Dhule districts. Moreover, maximum green bolls damage was recorded in *Bt* cotton fields in Jamner tahsil of Jalgaon district at 90, 120 and 150 DAS which was 8.86, 29.55 and 35.60 percent, respectively. Whereas, minimum green bolls damage was registered in Rahuri tahsil of Ahmednagar district which was 6.24, 22.32 and 28.21 percent at 90, 120 and 150 DAS, respectively. The results revealed that the maximum incidence was recorded in Jalgaon district 17.68 percent followed by Dhule district 16.01 percent, whereas minimum incidence was recorded in Ahmednagar district 15.36 percent. Moreover, percent green bolls damage increased as the season of cotton advanced in all surveyed regions.

Percent locule damage in green bolls

The data on percent locule damage in green boll is presented in table 2 and figure 2. The incidence of PBW was not found at 60 DAS in all surveyed regions but the incidence was started at 90 DAS in Ahmednagar, Jalgaon and Dhule districts. Maximum percent locule damage in green bolls was recorded in *Bt* cotton fields in Jamner tahsil of Jalgaon district at 90, 120 and 150 DAS which was 3.94, 14.89 and 17.26 percent, respectively. Whereas, the minimum locule damage in green bolls was recorded in Rahuri tahsil of Ahmednagar district which was 2.12, 8.58 and 11.56 percent at 90, 120 and 150 DAS, respectively. The foregoing results revealed that the maximum 8.27 percent locule damage in green boll was recorded in Jalgaon district, followed by Dhule district (7.53%), whereas minimum incidence of 6.71 percent was recorded in Ahmednagar district 6.71 percent and the percent locule damage in green bolls increased as the season of cotton advanced in all surveyed regions.

Number of pink bollworm larvae in green bolls

The data on number of pink bollworm larvae in green bolls is presented in table 3 and figure 3. At 60 DAS, the incidence of pink bollworm was not noticed in all surveyed regions but the

incidence of pink bollworm was started at 90 DAS in Ahmednagar, Jalgaon and Dhule districts. Maximum 2.91, 9.98 and 13.21 PBW larvae per 20 green boll was recorded in *Bt* cotton fields in Jamner tahsil of Jalgaon district at 90, 120 and 150 DAS, respectively. Whereas, minimum 0.95, 5.27 and 8.13 larvae per 20 green boll was registered in Rahuri tahsil of Ahmednagar district at 90, 120 and 150 DAS, respectively. The preceding results revealed that the maximum 6.06 larvae per 20 green bolls was recorded in Jalgaon district followed by 5.48 larvae in Dhule district. Whereas, 4.53 larvae per 20 bolls was recorded in Ahmednagar and the larval population per 20 green bolls damage increased as the season of cotton advanced in all surveyed regions.

Percent open boll damage

The data on percent open bolls damage shown in table 4 and figure 4. Among the different locations surveyed, Jamner tahsil of Jalgaon district recorded highest percent open bolls damage (42.69 percent), followed by Pachora tahsil of Jalgaon district (38.39 percent), Jalgaon tahsil of Jalgaon district (37.97 percent), Shirpur tahsil of Dhule district (36.20 percent), Rahata tahsil of Ahmednagar district (34.41 percent), Sindkheda tahsil of Dhule district (33.98 percent), Shrirampur tahsil of Ahmednagar district (33.38 percent), Dhule tahsil of Dhule district (33.11 percent), while, Rahuri tahsil of Ahmednagar district recorded lowest open bolls damage (32.45 percent) in *Bt* cotton.

Percent locule damage in open bolls

The data on percent locule damage in open bolls displayed in table 5 and figure 4. Among the different locations surveyed, Jamner tahsil of Jalgaon district recorded highest percent open damage in open boll (33.84 percent), followed by Pachora tahsil of Jalgaon district (29.54 percent), Jalgaon tahsil of Jalgaon district (29.12 percent), Shirpur tahsil of Dhule district (27.35 percent), Rahata tahsil of Ahmednagar district (25.56 percent), Sindkheda tahsil of Dhule district (25.13 percent), Shrirampur tahsil of Ahmednagar district (24.53 percent), Dhule tahsil of Dhule district (24.26 percent). While, Rahuri tahsil of Ahmednagar district recorded lowest percent open boll locule damage (23.60 percent) in *Bt* cotton.

Table 1: Percent green boll damage in *Bt* cotton

Percent green boll damage									
District	Ahmednagar			Jalgaon			Dhule		
Tahsil	Rahuri	Shrirampur	Rahata	Pachora	Jamner	Jalgaon	Dhule	Sindkheda	Shirpur
60 DAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90 DAS	6.24	7.21	6.68	8.11	8.86	7.97	6.95	7.85	8.01
120 DAS	22.32	25.44	26.54	28.15	29.55	27.59	23.21	26.12	27.96
150 DAS	28.21	30.12	31.58	33.11	35.60	33.28	29.05	30.65	32.44
Tahsil wise average	14.19	15.69	16.20	17.34	18.50	17.21	14.80	16.15	17.10
District wise average	15.36			17.68			16.01		

Table 2: Percent locule damage in green bolls in *Bt* cotton

Percent locule damage in green boll									
District	Ahmednagar			Jalgaon			Dhule		
Tahsil	Rahuri	Shrirampur	Rahata	Pachora	Jamner	Jalgaon	Dhule	Sindkheda	Shirpur
60 DAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90 DAS	2.12	2.45	2.91	3.56	3.94	3.45	2.98	2.94	3.20
120 DAS	8.58	10.91	11.52	12.96	14.89	11.23	11.12	12.84	13.09
150 DAS	11.56	14.51	15.95	16.01	17.26	15.96	12.37	15.03	16.78
Tahsil wise average	5.57	6.97	7.60	8.13	9.02	7.66	6.62	7.70	8.27
District wise average	6.71			8.27			7.53		

Table 3: Number of pink bollworm larvae in *Bt* cotton

Mean number of PBW larvae / 20 bolls									
District	Ahmednagar			Jalgaon			Dhule		
Tahsil	Rahuri	Shrirampur	Rahata	Pachora	Jamner	Jalgaon	Dhule	Sindkheda	Shirpur
60 DAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90 DAS	0.95	1.37	1.96	2.21	2.91	2.14	2.01	2.12	2.33
120 DAS	5.27	7.51	7.94	8.56	9.98	8.37	7.12	7.65	9.46
150 DAS	8.13	10.01	11.18	12.96	13.21	12.42	11.23	11.30	12.44
Tahsil wise average	3.59	4.72	5.27	5.93	6.53	5.73	5.11	5.27	6.06
District wise average	4.53			6.06			5.48		

Table 4: Open boll damage in *Bt* cotton

Districts									
After harvest	Ahmednagar			Jalgaon			Dhule		
Tahsil	Rahuri	Shrirampur	Rahata	Pachora	Jamner	Jalgaon	Dhule	Sindkheda	Shirpur
Mean OBD (%)	32.45	33.38	34.41	38.39	42.69	37.97	33.11	33.98	36.20
Average	33.08			44.85			37.11		

Table 5: Open boll locule damage in *Bt* cotton 2018-19

Districts									
After harvest	Ahmednagar			Jalgaon			Dhule		
Tahsil	Rahuri	Shrirampur	Rahata	Pachora	Jamner	Jalgaon	Dhule	Sindkheda	Shirpur
Mean LDOB (%)	23.60	24.53	25.56	29.54	33.84	29.12	24.26	25.13	27.35
Average	15.81			21.20			18.16		

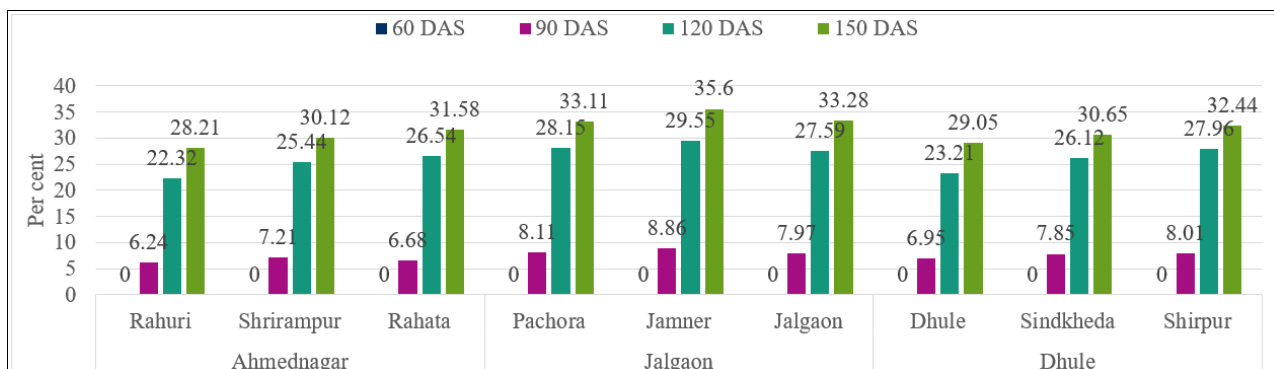


Fig 1: Percent green boll damage in *Bt* cotton

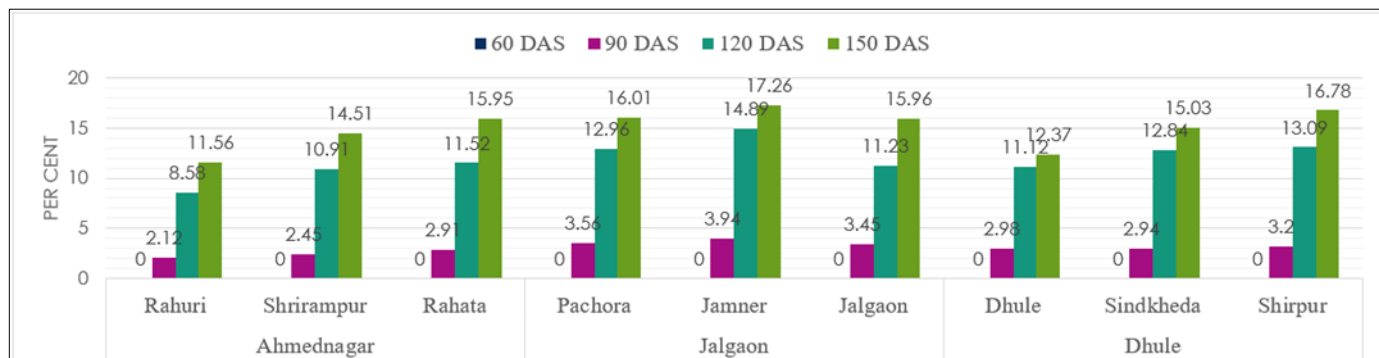


Fig 2: Percent locule damage in green bolls in Bt cotton

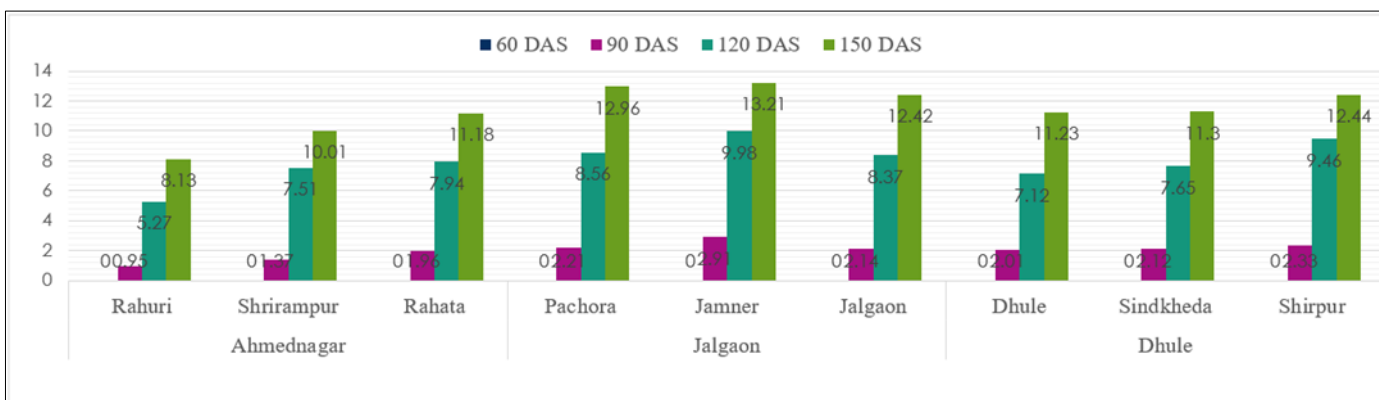


Fig 3: PBW larval population per 20 bolls in Bt cotton

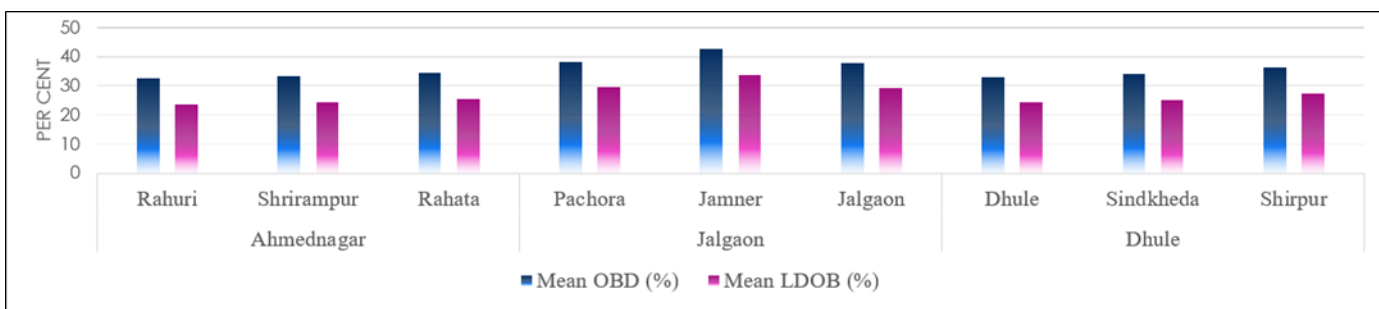


Fig 4: Percent open boll damage and percent locule damage green bolls in Bt cotton

Conclusion

The result of present study revealed that the maximum incidence of percent green boll damage, percent locule damage in green boll, number of pink bollworm larvae in green bolls, percent open bolls damage and percent locule damage in open bolls were maximum in Jalgaon district followed by Dhule district, whereas minimum incidence was recorded in Ahmednagar district.

References

1. Bhute NK, Patil CS, Deshmukh KV, Wagh RS, Medhe NK. Pink bollworm, *Pectinophora gossypiella* (Saunders) a destructive pest of cotton: A review. The Pharma Innovation Journal. 2023;12(3):2036-2042.
2. Ezaddin NA, Salih RF. Cultivated Natural Fiber Crops in Iraq and their uses: A review. Passer Journal of Basic and Applied Sciences. 2023;5(1):191-201.
3. Fabrick JA, Li X, Carrière Y, Tabashnik BE. Molecular genetic basis of lab and field selected *Bt* resistance in pink bollworm. Insects. 2023;14(2):201.
4. Garg R, Singh B, Kargwal R, Tiwari S, Yadav S, Jakhar A, et al. Resistance in pink bollworm, *Pectinophora*

gossypiella (Saunders) against *Bt* cotton, a major threat to cotton in India: A brief Review. International Journal of Plant and Soil Science. 2022;34(22):248-261.

5. Nadaf ARM. Studies on pink bollworm, *P. gossypiella* (Saunders) in *Bt* and non *Bt* cotton, Ph.D. dissertation, University of Agricultural Science, Dharwad (Unpublished); c2006.
6. Shrinivas, Sreenivas AG, Hanchinal SG, Sujay H, Beldhadi RV. Comparative biology of pink bollworm, *Pectinophora gossypiella* (Saunders) (Lepidoptera: Gelechiidae) on different hosts. Journal of Entomology and Zoology Studies. 2019;7(1):1053-1060.