



Effect of Different Spacing of Bt and Non Bt Cotton Hybrid on Population of *P. gossypiella* under High Density Planting

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A field experiment was conducted at Experimental farm of Department of Entomology, Dr. PDKV, Akola, on evaluation of various cotton cultivars against sucking pests under high density planting during kharif 2013 in Factorial Randomized Block Design with three replications. It is evaluated from the study that the higher population of *P. gossypiella* was harboured on Bt and non Bt cotton hybrid. The population of *P. gossypiella* larvae was in PKV Hy-2 and RCH-2 BGII was ranging from 0.25 to 1.28 and 0.05 to 0.11, respectively. The lowest mean population of *P. gossypiella* larvae (0.40) was observed in plant spacing of cotton 120 x 45 cm followed by plant spacing of 90 x 45 cm.

Keywords: *P. gossypiella*; cotton; high-density planting.

1. INTRODUCTION

Cotton is one of the principal commercial crops playing key role in economic, social

and political affairs of the country. It provides live hood for about four million families (Wan, et al., 2017). It also provides 65% raw material to textile industry and contributed

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1/3rd of total foreign exchange earning of India [1].

India has a larger area of cotton than any country in the world (116.4) lakh hectares with the production of 334 lakh bales and productivity of 489 lint kg/ ha [2]. Maharashtra comes under west zone contributing an area of 41.30 lakhs hectares with production of 80 lakh bales and the productivity of 329 lint kg/ ha [3].

The causes for its low productivity compared to national level can be attributed to various problems [4]. Menace caused by the insect pests is a major one. Cotton crop is subjected to damage by 162 species right from emergence till the final picking, Cotton pests can be primarily categories in to sucking pests and bollworms [5].

Among the sucking pests is of economic importance. Since, these pests suck the sap from the plants which leads to reduction in growth and vigour of the plants. In severe case of infestation, the plants get dried up and eventually die. Climatic conditions largely influence the pest numbers and activity as well as several predators and parasites either directly or indirectly [6].

Cotton hybrids and high yielding varieties are more susceptible to insect pests like sucking pests (Trapero et al., 2016). However, with the introduction of Bt cotton hybrids menace of bollworms has been solved for time being [7].

Manipulation of planting density, plant population and spatial arrangement of cotton plants continues to be topics of cotton research worldwide and India is no exception. The availability and acceptance of effective alternate insect pest management strategies has rekindled interest on high density cotton planting systems [8].

Considering all above facts, researchers are therefore giving emphasis and promoting high density planting cotton. Hence, sucking pests abundance (aphids, leafhoppers, thrips, whiteflies) natural enemies (lady bird beetle, chrysopa, spider, syrphids), correlation with weather parameter and spatial distribution of leafhoppers and whiteflies was studied with the objectives of the abundance of major pests and predators under high density planting as compare to normal planting, the correlation between sucking pests and important predators in relation to weather parameter and the spatial

distribution pattern of leaf hopper (*Amrasca biguttula biguttula*) during peak incidence.

2. MATERIALS AND METHODS

A field experiment was conducted at Experimental farm of Department of Entomology, Dr. PDKV, Akola, on "Evaluation of various cotton cultivars against sucking pests under high density planting" during kharif 2013 in Factorial randomized Block Design gwith three replications. The gross plot size was 6.0 x 5.4 m. All the agronomical practices were followed as per recommendations except, plant protection. Treatments compromising two factors i.e factor A and factor B. Factor A was V₁ and V₂ (PKV Hy-2 and RCH-2 BGII) and factor B consist of various planting spacing. i.e. S₁ (90 x 60 cm), S₂ (90 x 45 cm), S₃ (90 x 30 cm), S₄ (120 x 45 cm), S₅ (120 x 30 cm) and S₆ (120 x 15 cm). These factors individual and in combination was evaluated *P. gossypiella* abundance was recorded from each treatment plot at weekly interval.

3. RESULTS AND DISCUSSION

The data show in Table 1 on larval population (number per boll) of *P. gossypiella* recorded after spilt opening of the green both form 79 to 124 DAG revealed significant difference among hybrids plant spacing and interaction of hybrids and plant spacing. Population in PKV Hy-2 was significantly higher than RCH-2 BGII. The population of *P. gossypiella* larvae was in PKV Hy-2 and RCH-2 BGII was ranging from 0.25 to 1.28 and 0.05 to 0.11, respectively.

The seasonal mean of pink bollworm incidence on cotton clearly revealed that significantly lower recorded in Bt cotton compared to non-Bt hybrid [3].

The data the mean population of *P. gossypiella* larvae was significant as regards hybrids, plant spacing and interaction among hybrids and plant spacing. Significantly higher population of *P. gossypiella* larvae (0.69) was recorded than RCH-2 BGII hybrids (0.08). The lowest mean population of *P.gossypiella* larvae (0.40) was observed in plant spacing of 120 x 45 cm followed by plant spacing of 90 x 45 cm. The population in plant spacing of 90 x 30 cm, 90 x 60 cm, 120 x 30 cm was equal and ranked third. Highest population of *P.gossypiella* larvae (0.56) was recorded in densely planted spacing of 120 x 15 cm.

Table 1. Effect of different spacing of Bt and non Bt cotton hybrid on population of Pink bollworm

Treatments	Population of pink bollworm larvae per plant at				
	79 DAG	94 DAG	109 DAG	124 DAG	Mean
A. Variety					
V ₁ (PKV Hy2)	0.25 (0.86)*	0.53 (1.00)*	0.72 (1.09)*	1.28 (1.29)*	0.69 (1.08)
V ₂ (Rashi Bt)	0.05 (0.74)*	0.08 (0.79)*	0.04 (0.74)*	0.07 (0.75)*	0.08 (0.76)*
F test	S	S	S	S	S
SE(m)±	0.01	0.02	0.02	0.02	0.01
CD (P=0.05)	0.03	0.06	0.05	0.06	0.02
B. Spacing					
S ₁ (90 x 60 cm)	0.20 (0.83)*	0.54 (1.01)*	0.56 (0.99)*	0.57 (1.00)*	0.47 (0.96)*
S ₂ (90 x 45 cm)	0.05 (0.74)*	0.13 (0.78)*	0.65 (1.07)*	0.22 (0.83)*	0.26 (0.87)*
S ₃ (90 x 30 cm)	0.25 (0.85)*	0.00 (0.71)*	0.21 (0.83)*	1.13 (1.22)*	0.40 (0.93)*
S ₄ (120 x 45 cm)	0.02 (0.72)*	0.30 (0.93)*	0.16 (0.81)*	0.08 (0.76)*	0.14 (0.80)*
S ₅ (120 x 30 cm)	0.05 (0.74)*	0.43 (0.94)*	0.55 (1.00)*	0.93 (1.13)*	0.49 (0.97)*
S ₆ (120 x 15 cm)	0.33 (0.90)*	0.43 (1.00)*	0.36 (0.91)*	1.13 (1.20)*	0.56 (1.01)*
F test	S	S	S	S	S
SE(m)±	0.02	0.04	0.03	0.04	0.01
CD (P=0.05)	0.05	0.11	0.08	0.11	0.04
C. Interaction (A x B)					
F test	S	S	S	S	S
SE (m)±	0.03	0.05	0.04	0.05	0.02
CD (P=0.05)	0.07	0.15	0.11	0.16	0.06

4. CONCLUSION

The mean data on pink bollworm incidence recorded during the season revealed significant differences in *P.gossypiella* in both hybrids tested. Similarly such data in varying planting spacing and interaction of spacing and hybrids was also significant. Significantly higher population of *P.gossypiella* larvae (0.69 larvae per boll) recorded in PKV Hy-2 than RCH-2 BGII (0.08). These results are in the conformity where in significantly higher population of *H.armigera* Larvae, *E. vitella* larvae and *P.gossypiella* larvae was recorded and their damage was recorded in non Bt cotton than Bt cotton hybrid [9].

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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