



STUDIES ON POPULATION DYNAMICS OF LEAF HOPPER, *Amrasca biguttula biguttula* (Ishida) ON TRANSGENIC BT COTTON

G.V. KRISHNA REDDY, I. SURYAKALA, B. SHESHAIAH, V.RAMESH, V.SUNITHA.

Department of Zoology, Nizam College, Basheerbagh, Hyderabad-500 001. Department of Zoology, Kakatiya University, Warangal-506 009. Department of Entomology, College of Agriculture, Acharya N G Ranga Agricultural University, Hyderabad-500 030. Agricultural Polytechnic College, Acharya N G Ranga Agricultural University, Palem, Mahabubnagar-509 205.

ABSTRACT

Studies on population dynamics of leaf hopper, *Amrasca biguttula biguttula* (Ishida) on transgenic Bt cotton were carried out in the farmers fields in Central Telangana agro climatic zone of Andhra Pradesh during 2009-10 and 2010-11 Kharif season. The incidence of leaf hopper (green jassid) was found moderate to high in 2009-10 crop season (0.74 to 10.82/leaf), where as moderate level was noticed in 2010-11 crop season (0.57 to 6.02/leaf). The peak incidence was observed from the second fortnight of October to first fortnight of November in 2009-10 (10.11 to 10.82/leaf) and in the season of 2010-11, the peak incidence was noticed in mid September to first fortnight of October (6.02 to 5.48/leaf). There was no significant difference of leaf hopper populations recorded among the various Bt cotton genotypes.

KEY WORDS: Bt cotton, Population dynamics, sucking pests

INTRODUCTION

Cotton (*Gossypium spp*), the white gold of India is one of the important commercial crop and greatly contributes to national economy. The insect pest constitute one of the major limiting factors in the production as the crop is vulnerable to attack by about 162 species of insects and mites (Satpute et al., 1988).

Already commercialized transgenic Bt cotton offer an opportunity to contain the bollworm problem, but the cultivation of the crop under diversified agro climatic situations makes the crop to suffer a lot by different kinds of pests and diseases. Large area under rain fed situations and extensive replacement of conventional varieties with superior hybrids makes the crop easily vulnerable to insect sucking pests. Among the key pests of cotton, the cotton leafhopper, *Amrasca biguttula biguttula* (Ishida) (Homoptera: Cicadellidae) is an alarming pest throughout the crop growth. The nymphs and adults suck the sap from leaves and cause phytotoxic symptoms known as hopper burn which results in complete desiccation of plants and has become one of the limiting factors in economic productivity of the crop. (Shivanna B K et al 2009)

A good cotton crop with minimal pest attack brings prosperity, while severe incidence brings misery. Thus pest is an important determinant of

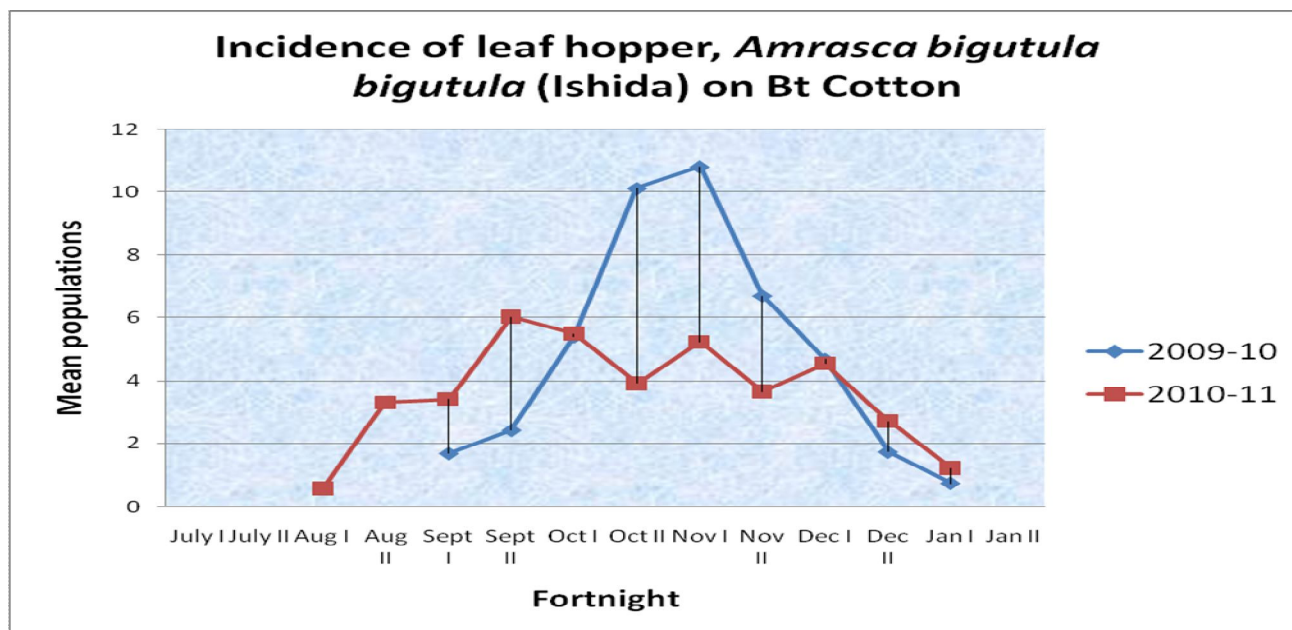
the prosperity of the cotton farmers. The knowledge about incidence of pest during the cropping season and its possible dynamics help in designing pest management strategies (Santhosh et al.,2009). Hence the present study on population dynamics of leaf hopper, *Amrasca biguttula biguttula* (Ishida) was undertaken during the Kharif seasons of 2009-10 and 2010-11.

MATERIALS AND METHODS

Field experiment was carried out in Wyra and Thallada area of Khammam District. This region is geographically located in Central Telangana agro climatic zone of Andhra Pradesh. The complete experiment was carried out in farmer's fields by following all standard agronomical practices under semi irrigated conditions.

The sowings were done on last week of June to first week of July in both seasons. The observations recorded randomly selected 25 plants per each genotype at fortnightly intervals till the harvest of the crop from the beginning. The observations of leaf hopper populations were counted on three leaves selected randomly from top, middle and bottom, 15 days after sowing and later calculations worked out per leaf per plant.

The selected Bt genotypes in the study were Brahma Bt, Dyna Bt, NCS-207 Mallika Bt, NCS



145 BG II (Bunny), Akka BG II in 2009-10 season and VICH 15 BG II, MRC 7929 BG II, NCS 207 BG II, RCH 533 BG II, Tulasi 7 BG II in 2010-11 season. The Bt genotypes selected in the experiment are incorporated genes coding for Cry 1 Ac (Event MON 531) and Cry1Ac + Cry2Ab (Event MON 15985).

2010-11 season. The Bt genotypes selected in the experiment are incorporated genes coding

for Cry 1 Ac (Event MON 531) and Cry1Ac + Cry2Ab (Event MON 15985).

Table: Fortnightly mean population of leaf hopper on transgenic Bt Cotton

RESULTS AND DISCUSSION

Field experiment was carried out in Wyra and Thallada area of Khammam District. This region is geographically located in Central Telangana agro climatic zone of Andhra Pradesh. The complete experiment was carried out in farmer's fields by following all standard agronomical practices under semi irrigated conditions.

The sowings were done on last week of June to first week of July in both seasons. The observations recorded randomly selected 25 plants per each genotype at fortnightly intervals till the harvest of the crop from the beginning. The observations of leaf hopper populations were counted on three leaves selected randomly from top, middle and bottom, 15 days after sowing and later calculations worked out per leaf per plant.

The selected Bt genotypes in the study were Brahma Bt, Dyna Bt, NCS-207 Mallika Bt, NCS 145 BG II (Bunny), Akka BG II in 2009-10 season and VICH 15 BG II, MRC 7929 BG II, NCS 207 BG II, RCH 533 BG II, Tulasi 7 BG II in

Fortnight	2009-10	2010-11
July I	0 (0.7)	0 (0.7)
July II	0 (0.7)	0 (0.7)
Aug I	0 (0.7)	0.57 (1.03)
Aug II	0 (0.7)	3.31 (1.95)
Sept I	1.68 (1.47)	3.42 (1.97)
Sept II	2.41 (1.7)	6.02 (2.55)
Oct I	5.4 (2.42)	5.48 (2.44)
Oct II	10.11 (3.25)	3.92 (2.1)
Nov I	10.82 (3.36)	5.22 (2.39)
Nov II	6.7 (2.68)	3.66 (2.03)
Dec I	4.68 (2.27)	4.54 (5.04)
Dec II	1.73 (1.49)	2.71 (1.79)
Jan I	0.74 (1.11)	1.22 (1.31)
Jan II	0 (0.7)	0 (0.7)
Feb I	0 (0.7)	0 (0.7)
Feb II	0 (0.7)	0 (0.7)
Seasonal Mean	2.76 (1.8)	2.50 (1.73)

Figures in parenthesis are ($\sqrt{X+0.5}$) transformations.

ACKNOWLEDGEMENT

The first author wish to express gratitude to Dr.I.Suryakala, Asst Professor, Department of Zoology, Nizam College, Hyderabad for constant encouragement and helpful guidance.

REFERENCES

1. Ali, MM, I. and Ali, M. R., (1991), Comparative resistance of some exotic cotton genotypes against the cotton jassid. *Amrasca devastans* (Dist.) in Bangladesh. *Bangladesh Journal of Zoology*, 19 : 249-251.
2. Anitha, K. R. and Nandihalli, B. S., (2008), Seasonal incidence of sucking pests in okra ecosystem. *Karnataka J. Agric.Sci.*, 21: 137-138.
3. Anonymous, (2002), Evaluation of Bt Cotton Hybrids. *Project co-coordinator (Cotton) final Report, 2001-02*, CICR, Coimbatore, India, pp.25-42. www.cicr.org
4. Arif, M. J., Gogi, M. D., Mirja, M., Zia, K. and Hafeez, F., (2006), Impact of plant spacing and abiotic factors on population dynamics of sucking insect pests of cotton. *Pak. J. Biol.Sci.*, 9: 1364-1369.
5. Cui, J.J. and Xia, J.Y.,(1998), Effect of early seasonal strain of Bt transgenic cotton on population dynamics of main pests and their natural enemies. *Acta Gossypii Sinica*,**10**: 255-265
6. Cui, J.J. and Xia, J.Y., (2000), Effect of Bt transgenic cotton on the structure and composition of insect community. *Journal of Yunnan Agricultural University*, **15**: 342-345.
7. Quyum, A. and Sakkhari, K., (2003), Did Bt cotton save farmers in Wangal ? A season
8. long impact study of Bt cotton – Kharif 2002 in Warangal District of Andhra Pradesh, AP Coalition in Defense of Diversity and the Deccan Development Society, Hyderabad, June 2003.
9. Santhosh, B. M., Patil, S.B., Udikeri, S.S., Awaknavar, J.S. and Katageri, I.S. (2009) Impact of Bt cotton on pink bollworm, *Pectinophora gossypiella*(saunders) infestation. *Karnataka J.Agric.sci.*, **22**(2): 322-326.
10. Satpute, U.S., Sarnaik, D.N. and Bhale Rao, P.O. (1988). Assessment of avoidable loss in cotton yield due to sucking pests and boll worms. *Indian journal of plant protection*.**16**:37-39.
11. Sharma, H.C. and Ortiz, R. (2000), Transgenics, pest management and the environment. *Current Science*, **79**: 421-437.
12. Shivanna, B.K., Nagaraja, D.N., Manjunatha, M., Gayathridevi, S., Pradeep, S., Girijesh, G.K. (2009), Bionomics of leafhopper, *Amrasca biguttula biguttula* (Ishida) on transgenic Bt cotton. *Karnataka J. Agric. Sci.*, **22**(3-Spl. Issue) : (538-540)
13. Shivanna, B.K, Nagaraja, D.N, Manjunatha, M, Mohani Naik, (2009) Seasonal incidence of sucking pests on transgenic Bt cotton and correlation with weather factors, *Karnataka J. Agric. Sci.*, **22**(3-Spl. Issue) : (666-667) 2009
14. Sun, C.G., Zhang, Q.W., Xu, J., Wang, Y.X. and Liu, J.L., (2003), Effect of transgenic Bt cotton pests and transgenic Bt+CpTI cotton on the population dynamics of main cotton pests and their natural enemies. *Acta Entomologica Sinica*, **46**: 705-712.