

RESEARCH ARTICLE

Evaluation of second generation Bt cotton hybrids against sucking pests and bollworms

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ARTICLE INFO

Received : 17.07.2012

Revised : 25.01.2013

Accepted : 14.02.2013

Key Words :

Bt cotton,
Sucking pests,
Bollworms,
Boll damage,
Seed cotton yield

ABSTRACT

The field trials were conducted at Cotton Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri during 2009 to 2011 to monitor the population of sucking pests as well as boll damage in commercially released second generation Bt cotton hybrids. The results revealed that second generation transgenic Bt cotton does not afford any protection against sucking pests of cotton and their tolerance or resistance is mainly dependent on the morphological or genetic base. Jassids and thrips population were above ETL both in Bt as well as non-Bt cotton hybrid. More than eight Bt cotton hybrids recorded higher population of sucking pests than non Bt cotton hybrid. The *Helicoverpa armigera* damage to square and green bolls was completely nil in almost all Bt cotton hybrids whereas non Bt hybrid Phule 492 recorded higher damage of 15.23 per cent and 10.90 per cent, respectively. The incidence of *Pectinophora gossypiella* on green bolls was also nil in all Bt cotton hybrids; while it was 14.29 per cent in non Bt cotton. In addition, Bt cotton hybrids recorded lower open boll and locule damage compared to non Bt cotton hybrid. The seed cotton yield of Bt cotton hybrids were more than that of non Bt cotton hybrid. This revealed the superiority of second generation Bt cotton hybrids in terms of pest resistance and yield.

How to view point the article : Hole, U.B., Gangurde, S.M., Sarode, N.D. and Bharud, R.W. (2013). Evaluation of second generation Bt cotton hybrids against sucking pests and bollworms. *Internat. J. Plant Protec.*, 6(1) : 77-81.

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INTRODUCTION

Cotton is an important commercial crop in India playing a major role in agricultural economy. Before introduction of transgenic Bt cotton, farmers of Maharashtra witnessed instability in cotton production due to frequent crop failures because of outbreaks of insect pests. Among the problems, bollworms especially American bollworm, *Helicoverpa armigera* and pink bollworm, *Pectinophora gossypiella* cause considerable damage to cotton crop. *Helicoverpa* alone cause significant losses to the tune of Rs. 1000 crores in the country annually warranting insecticides application which many a times exceeds 20 sprays especially in epidemic years (Prasad *et al.*, 2009).

In order to reduce dependence on chemical insecticides and resistant effect on non target organisms, tools of

biotechnology have been applied to develop cotton that can withstand certain problematic and insecticide resistant pests more efficiently. Transgenic Bt cotton containing Cry1Ac gene which offers resistance to major bollworms was first commercially released in the world in 1996 and during 2002 in India. Since then transgenic Bt cotton has been adopted at an unprecedented pace in our country with the area crossing more than 90 per cent in last nine years of commercialization. The area under Bt cotton tripled over just one year *i.e.* between 2005-06 and 2006-07 (Jaykumar *et al.*, 2008). There have been substantial gain in terms of lint yield and we have crossed the targets set for 11th Plan by many folds. Now Bt cotton comes with next generation technology called Bollgard II with increased efficacy for the control of bollworms. This technology provides a wider spectrum and season long control of bollworms and also provides convenient insect management