YIELD, ECONOMICS AND ICBR OF DIFFERENT IPM MODULES IN BT COTTON IN MAHARASHTRA

N.K.BHUTE, B.B.BHOSLE

Abstract: The field experiments were conducted during *kharif* season of the year 2007-08 at the experimental farm of the Department of Agricultural Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth,Studies on evaluation of different IPM modules for Bt cotton in relation to yield economics and ICBR revealed that MAU and CICR IPM modules proved superior. It was, however, on par with chemical control. Considering the ICBR and safety to natural enemies, an inference can be drawn that Bt cotton with IPM module is the most ideal combination. Besides reduction in insecticide use, it is also expected to ensure favourable ecological and economic returns in contrast to the adverse effects due to conventional insecticides. The IPM approach, which takes care of varying pest situation, appears to be essential for gaining higher advantage from Bt cotton.

Keywords: Yield, Economics and ICBR of Different IPM Modules in Bt Cotton.

Introduction: Cotton, the important cash crop, globally known as "King of Fibre" offers an important natural fabric material to the world has been a point of fascination. Since it is grown as major cash crop in India, thus appears to have been the centre of an important cotton industry as early as 1500 BC. Besides serving as a source of natural fibre, it is also an oilseed crop, providing raw material to the oil and textile industries. The crop is cultivated in more than 80 countries, but ten countries *viz.,* USA, Australia, China, India, Brazil, Pakistan, Turkey, Mexico, Egypt and Sudan account for nearly 85 per cent of the total production, playing dominant role in the economic and social status of the people. Cost of cultivation and monetary returns are the important factors in cotton cultivation helping to know the net monetary return rather than gross monetary return. Hence, studies on yield economics and ICBR of different IPM modules in Bt cotton are essential.

Material And Methods: The field experiments were conducted during *kharif* season of the year 2007-08 to study the yield, economics and ICBR of different Bt cotton IPM modules. The materials used and methods are as follows-

Yield of seed cotton:- Picking of seed cotton was carried out after full bursting of bolls. Yield obtained at each picking from net plot was recorded. Total three pickings were undertaken. Total yield of seed cotton obtained from these three pickings in each treatment from each net plot was recorded and converted to q/ha.

Economics:- The economics of treatments is of prime importance. The yield of individual treatments was converted to monetary return per hectare by considering the price declared by Maharashtra Government for respective years. The cost of plant protection measures applied was worked out.

Gross Monetary Returns (GMR):- For working out GMR the yield obtained from untreated control was subtracted from the yield given by different treatments presuming that certain minimum yield will be obtained even without plant protection measure. Thus the yield so obtained was termed as 'increased yield over control'. The value of increased yield was termed as GMR.

Net monetary Return (NMR):- The net monetary return was calculated by subtracting the expenditure on cost of treatments.

Incremental cost benefit ratio (ICBR):- ICBR is the ratio between additional expenditure on treatment application and net profit. It is based on the total seed cotton yield in terms of rupees per ha, and cost of inputs including, treatments and labour charges, cost of application. The net monetary returns were calculated at the prevailing market rates declarded by State Government during the period of experimentation in order to evaluate cost of different treatments against pests of Bt cotton. ICBR thus worked out is presented in respective table 1.

Results and Discussion: Seed cotton yield (q/ha) in different IPM modules :- Results presented in Table 1 showed that during *kharif* 2007-08 all modules were significantly superior over untreated control. Significantly higher yield (18.42 q/ha) was obtained in MAU module which was at par with CICR module (18.12 q/ha), chemical control (18.10 q/ha), and BIPM module (17.76 q/ha). Untreated control recorded lowest yield (13.07 q/ha). The present findings are in agreement with those of Ameta *et al.* (2004) observed that seed cotton yield in IPM fields was 1806 and 1723 kg/ha as against 1570 and 1486 kg/ha in non-IPM fields. Dhawan *et al.* (2009) studied the impact of IPM practices on socioeconomic condition of farmers. The study revealed that there was increase in the yield 20-25 per cent.

Economics: Studying the economics of different

treatments (Table 1) it is found that the highest gross income was obtained from the MAU IPM module (Rs. 11,770/ha.) followed by CICR IPM module (Rs.11,110.50/ha), chemical control (Rs. 11,066/ha) and from BIPM module it was Rs. 10,318/ha during 2007-08. The present findings are parallel with those of Puri *et al.* (2006) and. Bhosle *et al.* (2008) who reported that the data on economics indicated that cost of production was less in Bt cotton IPM and net monitory return was more.

Incremental Cost Benefit Ratio (I.C.B.R.):- For judging the most economical module, the studies on I.C.B.R. is the best tool as it gives the ratio of expenditure and net profit on the basis of one rupee expenditure. Incremental Cost Benefit Ratio for different modules was worked out During 2007-08, highest I.C.B.R. were obtained (1:3.48) in MAU IPM module, followed by CICR IPM module (1:2.22) and chemical control (1:2.45) respectively. The lowest I.C.B.R. (1:1.76) was obtained in BIPM module. Thus considering the I.C.B.R., MAU IPM module gave higher I.C.B.R. than the remaining modules. The main reason of high I.C.B.R. was the expenditure incurred in MAU IPM treatments was less than that of other module treatments. The present findings are more or less parallel to Naved Sabir *et al.* (2008a) observed that the cost benefit ratio of 1:4.27 in IPM conditions over non-IPM one. Zanwar *et al.* (2009) evaluated the IPM module in Bunny Bt at CRS Nanded reported that the cost benefit ratio obtained was 1:2.70. Considering the yield and economics the IPM modules proved their effectiveness by increasing yield, natural enemies, protecting environmental pollution than chemical and untreated control. These results are confirmed by above workers.

References:

1. Ameta, O.P., Rana, B.S and Bambawale, O.M. (2004). Validation of IPM technology in cotton in southern Rajasthan. Pestology 28(11):27-30.
2. Bhosle, B.B., Bhede, B.V., More, D.G., Patange, N.R. and Baig, K.S. (2008). Pest management in Bt cotton. Proceedings of Seminar on Transgenic Cotton: Emerging trends and policies, 7th Dcember, 2007, MAU, Parbhani. (M.S).
3. Dhawan, A.K., Anand, A., Singh, J. and Saini, S. (2009). Population dynamics of key pests on Bt cotton as influenced by meteorological parameters in Punjab. National Symposium on "Bt-cotton: Opportunities and Prospects" at CICR, Nagpur. November 17-18, 2009:108.
4. Naved Sabir, Trivedi, T.P., Singh, J., Sardana, H.R., Dhandapani, A., Sohi, A.S., Dhaliwal, G.S. and Sharma, P.D. (2008). Development and promotion of farmer participatory IPM technology in irrigated cotton cropping system- a case study-I. Pesticide Res. J. 20(1):38-42.
5. Puri, S.N., Sharma, O.P., Lavekar, R.C., Murthy, K.S., Dhandapani, A. (2006). On farm validation of Bio-intensive IPM module in rainfed cotton in southern Maharashtra. Indian J. plant Protection. 34(2):248-249.
6. Zanwar, P.R., Deosarkar, D.B., Shelke, L.T., Chavan, S.J. and Yadav, G.A. (2009). Evaluation of IPM module in Bt cotton. National Symposium on "Bt-cotton: Opportunities and Prospects" at CICR, Nagpur. 17-18 November 2009:108.

Table 1: Yield Economics and I.C.B.R. in different Bt cotton modules during 2007-08.

Sr. No.	Module/ Treatment	Cotton yield (q/ha)	Increased yield over control (q/ha)	Gross income (Rs/ha)	Cost of treatment (Rs./ha)	Net profit (Rs./ha)	I.C.B.R.
1	M.A.U. IPM	18.42	5.35 q/ha	11,770.00	2,625.50	9,144.50	**1:3.48**
2	C.I.C.R. IPM	18.12	5.05 q/ha	11,110.00	3,450.50	7,659.50	**1:2.22**
3	BIPM	17.76	4.69 q/ha	10,318.00	3,732.50	6,585.50	1:1.76
4	Chemical control	18.10	5.03 q/ha	11,066.00	3,205.00	7,861.00	**1:2.45**
	5) Untreated control	13.07	----	---	---		---

Market price of seed cotton during **2007-08 was Rs. 2200/q**

N.K.Bhute / B.B.Bhosle/Department of Agricultural Entomology/
Vasantrao Naik Marathwada Krishi Vidyapeeth/ Parbhani-431402/ nandu.bhute@gmail.com

***