RESEARCH ARTICLE :

Constraints in adoption of integrated pest management practices by cotton growers in Nimar region of Madhya Pradesh

■ NEERJA PATEL, MANISH KUMAR, NISHITH GUPTA AND ANKITA PANDEY

SUMMARY : Integrated Pest Management (IPM) is a pest management system that in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible manner as possible and maintain the pest population at level below these causing economic injury. This approach has been globally accepted for achieving sustainability in agriculture and maintaining the agro-eco-system. Cotton being a major commercial crop of the Nimar region in Madhya Pradesh and keeping in view the importance of IPM to manage the insects and pests of cotton crop, the present study was carried out to assess the present status of adoption of IPM practices by cotton growers in Barwani district of Nimar region. The multistage sampling technique was employed to select 140 respondents from seven blocks of the district for present study. The perusal of data indicated that the majority of respondents adopted recommended chemical control measure (95.33%). The great majority of the farmers are using chemicals to protect their cotton crop along with other cultural practices like grazing by sheep and goat in cotton field after last picking (79.16%), use of certified seed (85.66%) and use of recommended dose of fertilizers (66.33%). The findings also indicated that the majority of cotton growers faced problems that inadequacy of labours and high wage rate for undertaking the manual work like handpicking (87.85%), adoption of biological control measures and mechanical control (82.14%). The lack of knowledge about yellow sticky traps for control of white fly (74.28%), lack of knowledge about use of pheromone trap (82.14%), lack of knowledge about intercropping of cotton with cowpea/maize/lady finger as trap crop (73.57%), lack of knowledge about use of bio-agent (58.57%) and lack of knowledge about procedure of preparing extract of neem seed kernel (52.14%) were the major constraints in adoption of IPM programme.

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Author for correspondence :

NEERJA PATEL
Krishi Vigyan Kendra
(R.V.S.K.V.V.), DEWAS (M.P.)
INDIA

See end of the article for authors' affiliations

BACKGROUND AND OBJECTIVES

Madhya Pradesh is one of the major cotton producing states in the country. Cotton is cultivated in an area of 0.5 million hectares with a productivity of 442 kg of lint per hectare, which is lower than the potential yield (1000 kg of lint per hectare).The major requirement for sustainable production of

cotton is to guard it against the attack of pest, diseases and weeds, without any hazardous affect of control agents. As a commercial crop, it alone consumes 54 per cent of total quantity of pesticides used in the country. There is no doubt that chemicals have played a significant role in the past in production of crops. However, their excessive and inappropriate use of pesticides leads to problem of chemical residues in food, pollution in soil and water in the last two decades or so has resulted in degradation of our environment while our pest problems seen greater than ever. There are various reports of resistance of pests to pesticides, the number of pest out breaks has increased and many innocuous species have attended the status of serious pests. The extent of pesticide reduce in the environment is also a matter of great concern (Raheja, 1998). Hence, the use of chemicals should be minimizing for balancing agro-eco-system.

Integrated Pest Management (IPM) is a pest management system that in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible manner as possible and maintain the pest population at level below these causing economic injury. This approach has been globally accepted for achieving sustainability in agriculture and maintaining the agro-eco-system. It has more relevant due to advantages like safety to environment, pesticide-free food commodities, low input based crop production. In order to minimize the indiscriminate and injudicious use of chemical pesticides,

IPM has been enshrined as basic principle of plant protection in overall crop production programme under National Agricultural Policy of the Government of India. IPM is eco- friendly approach for managing pest and disease problems encompassing available methods and techniques of pest management such as cultural, mechanical, biological and chemical in a compatible and scientific manner. It thus implies that the farmer's needs to learn principles of IPM and acquire the minimum knowledge and skill necessary to take decision based on specific farm condition to discourage the indiscriminate use of pesticides.

Cotton being a major commercial crop of the Nimar region in Madhya Pradesh and keeping in view the importance of IPM to manage the insects and pests of cotton crop, the present study was carried out to assess the present status of constraints in adoption of IPM practices perceived by cotton growers with the main objective to assess the constraints perceived by cotton growers in adoption of Integrated Pest Management Practices.

RESOURCES AND METHODS

The present study was conducted in Barwani district of M.P. In view of the fact that the aim of this research investigation is out to study the adoption of Integrated Pest Management Practices by cotton growers in terms of constraints in adoption of IPM practices. The Barwani district was selected purposively having

Table A : List of villages selected for the study			
Selected blocks	Selected villages	No. of cotton farmers	No. of selected farmers
Barwani	Balkua	143	10
	Pipari	121	10
Rajpur	Khajuri	110	10
	Bhilkheda	140	10
Thikri	Mandwada	159	10
	Mohipura	191	10
Sendhwa	Balwadi	182	10
	Amjhiri	148	10
Pati	Anjrada	102	10
	Budi	75	10
Pansemal	Khetia	97	10
	Jaitpura	89	10
Niwali	Pichhodi	96	10
	Morgun	87	10
	Total		140

highest area under cotton cultivation. There are seven blocks in the district, namely Barwani, Thikri, Rajpur, Pati, Pansemal, Sendhwa, Niwali. The 2 villages were selected from all block by using simple random sampling method. The list of the selected villages is given below:

A village wise list of the cotton growers from each selected village was prepared. From this list, 10 respondents were randomly selected from each village. In this manner, the total sample comprised 140 respondents for the present study. The primary data were collected from the respondents by using a pre-tested interview schedule.

OBSERVATIONS AND ANALYSIS

The result indicated that the majority of respondents adopted recommended chemical control measure (95.71%). The great majority of the farmers are using chemicals to protect their cotton crop along with other cultural practices like grazing by sheep and goat in cotton field after last picking (79.28%) burning of residues/ stables (80.81%) deep ploughing (83.57%), removal of alternate host by cleaning bunds (85.23%), crop rotation (56.42%), delinted cotton seed (86.42%), use of certified seed (85.00%) and use of recommended dose of fertilizers (66.42%) (Table 1). The correlation between

Table 1 : Distribution of respondents according to adoption of IPM practices in cotton (n=140)

Sr. No.	Adoption of IPM practices	Frequency	Percentage	Rank
1.	Adopted recommended chemical control measure	134	95.71	I
2.	Using chemicals to protect their cotton crop along with other cultural practices like grazing by sheep and goat in cotton field after last picking	111	79.28	VII
3.	Burning of residues/stables	113	80.81	VI
4.	Deep ploughing	117	83.57	V
5.	Removal of alternate host by cleaning bunds	120	85.71	III
6.	Use of delinted cotton seed	121	86.42	II
7.	Crop rotation	79	56.42	IX
8.	Use of certified seed	119	85.00	IV
9.	Use of recommended dose of fertilizers	93	66.42	VIII

Table 2 : Distribution of respondents according to the constraints faced by them in adoption of integrated pest management practices (n=140)

Sr. No.	Constraints	Adoption Frequency	Per cent	Rank
1.	**Cultural practices**			
	Deep ploughing make the soil more lose and in not economical	68	48.57	VIII
	Lack of Knowledge about intercropping of cotton with cowpea/maize as trap crops	90	64.19	V
	Non-availability of delinted cotton seed and certified seed	73	52.14	VII
2.	**Mechanical practices**			
	Inadequacy of labourers and high wage rate for undertaking the manual work like handpicking of eggs/larvae destruction of affected fruiting bodies and removal of rosette flower etc	123	87.85	I
	Lack of knowledge about yellow sticky traps for control of white fly	104	74.28	III
3.	**Biological control**			
	Lack of detail technical knowledge about the use of bio-agent, about identification of beneficial insects etc	82	58.57	VI
	Non-availability of bio-agent of seed treatment, eggs of *Chrysoperla* sp. *Trichogramma*, HNPV etc.	115	82.14	II
4.	**Use of pheromone traps**			
	Lack of knowledge about use of pheromone traps	103	73.57	IV
5.	**Use of plant product**			
	Lack of knowledge about procedure of preparing 5 per cent extract of neem kernels	61	43.58	IX
6.	**Chemical control**			
	Non availability exorbitant prices of pesticides and its ineffectiveness against pest	10	7.14	X

the selected variables and adoption of IPM practices for cotton revealed that socio-economic status, extension participation, risk orientation, economic motivation, innovativeness, information seeking behaviour, market orientation and land under cotton crop had positive and significant correlation with the adoption of IPM practices. Similar results were reportedly Sharma *et al.* (1997).

The findings also indicated that the majority of cotton growers faced problems that inadequacy of labourers and high wage rate for undertaking the manual work like handpicking of eggs/larvae destruction of affected fruiting bodies and removal of rosetted flower etc. (87.85%), non availability of bio-agent of seed treatment, eggs of *Chrysoperla* sp. *Trichogramma*, HNPV etc. (82.14%), lack of knowledge about yellow sticky traps for control of white fly (74.28%), lack of knowledge about use of pheromone trap (73.57%), lack of knowledge about intercropping of cotton with cowpea/maize as trap crops (64.19%), lack of detail technical knowledge about the use of bio-agent, about identification of beneficial insects etc. (58.57%), non-availability of delinted cotton seed and certified seed (52.14%), deep ploughing make the soil more lose and in not economical (48.57%), lack of knowledge about procedure of preparing 5 per cent extract of neem kernels (43.58%), non-availability exorbitant prices of pesticides and its ineffectiveness against pest (07.14%) (Table 2) were the major constraints in adoption of IPM programme. Similar findings were also reported by Chander and Singh (2003). More of lies similar results were obtained by the research conducted by Chander and Singh (2003); Katole *et al.* (1997); Krishnamurthy and Veerabhadraiah (1999); Neema and Verma (2000); Sharma *et al.* (1997) and Shinde *et al.* (1997)

Conclusion :

The result indicated that the majority of cotton growers adopted recommended chemical control measure. The problem in the adoption of IPM technology opined by the respondents mainly in adoption of biological and mechanical control measures. The major problems faced by them that inadequacy of labourers and high wage rate for undertaking the manual work like handpicking of eggs/larvae destruction of affected fruiting bodies and removal of rosette flower, lack of knowledge about use of pheromone trap, lack of knowledge about yellow sticky traps for control of white fly, non-availability of bio-agent of seed treatment, eggs of *Chrysoperla* sp. *Trichogramma*, HNPV etc. The other major problems are lack of knowledge about use of pheromone traps, procedure of preparing 5 per cent extract of *Neem* kernels, intercropping of cotton with cowpea/maize as trap crops etc.

Authors' affiliations :
MANISH KUMAR, NISHITH GUPTA AND ANKITA PANDEY, Krishi Vigyan Kendra (R.V.S.K.V.V.), DEWAS (M.P.) INDIA

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