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A CASE STUDY

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Impact assessment of plant protection technologies validated/ demonstrated by KVK, Angul (Odisha) during 2002-2009

■ NIRANJAN DAS* AND R.P. MISHRA

Krishi Vigyan Kendra, BOUDH (ODISHA) INDIA

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ABSTRACT

A good number of agro technologies have been assessed and demonstrated in the farmers' field by KVK, Angul during 2002-2009. Impactassessment of plant protection technologies revealed that the technologies are being adopted by the farmers at variable rate over time. Highest adoption rate (65%) was observed with application of Acephate 75 per cent SC twice @ 0.2 per cent at 15 days interval for management of aphid in mustard with horizontal expansion to 382 ha area. On the other hand lower adoption rate (6%) was observed for the technology of release of bio-agent *Chrysoperla cornea* for management of this insect pest. The IPM technology consisting of removal of affected fruits and shoots followed by alternate spraying of Triazophos@ 0.2 per cent and neem oil @ 0.5 per cent with teepol at 15 days interval for management of shoot and fruit borer was found to be adopted by 52 per cent participants with horizontal spread to 264 ha of additional area. Non-availability of inputs and seeds of high yielding variety of crops, delay in input availability, non-availability of resistant variety, inadequate supply of inputs and poor quality of inputs, non-availability of skilled labours ,high cost of labour and lack of credit facility are the major constraints for low adoption of these technologies. These constraints need to be addressed systematically to improve the adoption percentage of these technologies.

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*Corresponding author:
Email: ndasouat@yahoo.co.in

INTRODUCTION

Assessment and refinement of technology through farmers' participatory on farm research is one of the major activities of KrishiVigyanKendras (KVK) established by Indian Council of Agricultural Research (ICAR), New Delhi. KVK, Angul being established during 2001-02 under the administrative control of Orissa University of Agriculture and Technology (OUAT), Bhubaneswar and technical guidance of Zonal Project Directorate (ZPD), ICAR, Jabalpur (M.P) has been accomplishing this assignment in a systematic manner. A good number of plant protection technologies have

Table A : Plant protection technologies tested by KVK, Angul (Odisha) during 2002-09

Sr. No.	Year	Identified pest problem	Plant protection technology tested
1.	2002-03	Shoot and fruit borer infestation in brinjal	Removal of affected fruits and shoots followed by alternate spraying of Triazophos @ 0,2% and neem oil @ 0.5% with teepol at 15 days interval.
2.	2003-04	Infestation of thrips in chilli	Application of Monocrotophos @0.2% at initiation of infestation and 2nd spraying at 15 days interval.
3	2004-05	Aphid infestation in mustard	Application of Acephatetwice at 15 days interval after appearance of pest.
4.	2006-07	Aphid infestation in mustard	Release of *Chrysoperla cornea* @40000 larvae/acre 3 times at 10 days interval starting from the initiation of flower bud.
5.	2007-08	Pod borer infestation in pegion pea	Use of HNPV(Helimar) @1.5 ml/ltr. at 15 days interval.
6.	2008-09	Diamond Back Moth in cabbage	Use of Biodart(Bt) @ 2.5 gm/ltr water 4 times at 10 days interval

been assessed/ refined and disseminated through various extension programmesto address the emerging pest and disease problems of crops faced by the farming community. But no action has yet been taken up to assess the impact of these technologies. Therefore, this study was undertaken.

MATERIAL AND METHODS

The study was conducted during 2013-14 in 10 adopted villages of KVK about 6plant protection technologies tested, demonstrated and disseminated among the practicing farmers during 2002-2009. It was based on individual interactions as well as Focussed Group Discussion (FGD)of 120 farmers (20 for each technology) exposed to these technologies previously under the direct supervision of KrishiVigyan Kendra. The list of these 6 technologies under the study has been given in Table A. After successful assessment, the technologies had earlier been demonstrated in the farmers' field in the succeeding years through Front Line Demonstration programme (FLD) of KVK. The impact of these technologies on production system was analyzed on the basis of probed questions to the practicing farmers and extension functionaries of the locality. The adaptability of these technologies was assessed by scoring their adaptation rate and continuity. Constraints in adoption were recorded and categorized in to different groups. The problems experienced by the respondents were recorded and their frequency was found out for easy inference.The extent of horizontal spread of these technologies over the years was also estimated to determine their sustainability and social implications.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under the following heads:

Performance of the technologies:

The performance of the plant protection technologies tested against the traditional farmers' practices is given in Table 1. Removal of affected fruits and shoots followed by alternate spraying of Triazophos and neem oil with teepol at 15 days interval resulted in 39 per cent enhancement of brinjal yield over farmer's practice ofindiscriminate spraying of chemicals.Net profit of Rs. 45,500.00 was obtained from this technology with B:C ratio of 2.4 against Rs. 32,500.00 from farmer's practice. Application of Monocrotophos @ 0.2 per cent at initiation of thrips infestation in chilly and 2nd spraying at 15 days intervalresulted in a net profit of Rs. 48,000.00 as against of Rs. 35,000.00 fromfarmers practice of no systematic control measure.Similarly a net profit to the tune of Rs. 15,220.00 was realized from aphid management in mustard by application of Acephate twice at 15 days interval after appearance of pestover Rs. 11,600.00 from farmers practice ofone spraying of Endosulphan at variable dosage .On the other hand release of bio agent *Chrysoperla cornea* @40000 larvae/acre 3 times at 10 days interval starting from the initiation of flower bud of mustard exhibited 59.7 per cent more yield over application of Acephate with net profit of Rs. 16,000.00/ ha. Use of HNPV (Helimar) @ 1.5 ml/lit. of water at 15 days intervalgave the yield advantage of 60 per cent in pigeonpea infested by pod borer with net profit of Rs. 36,000.00 and B:C ratio of 2.9.Similarly application of Bio-dart (Bt) @ 2.5 g/lit. of water 4 times at 10 days interval resulted in 37 per cent increased yield with B:C ratio 2.8 over one spraying of Endosulphan @ 0.2 per cent.

Table 1 : Effect of plant protection technologies tested by KVK, Angul (Odisha) during 2002-2009

Year	Identified problem	Technology tested	Yield			Net profit		B:C ratio	
			FP (q/ha)	RP (q/ha)	% change	FP	RP	FP	RP
2002-03	Shoot and fruit borer infestation in brinjal	Removal of affected fruits and shoots followed by alternate spraying of Triazophos and neem oil with teepol at 15 days interval. FP-Indiscriminate spraying of chemicals	117.0	163.5	39	32,500	45,000	1.8	2.4
2003-04	Infestation of thrips in chilli	Application of Monocrotophos @0.2% at initiation of infestation and 2nd spraying at 15 days interval. FP-No systematic control measure.	60	80	33	35,000	48,000	1.7	2.8
2004-05	Aphid infestation in mustard	Application of Acephatetwice at 15 days interval after appearance of pest. FP-One spraying of Endosulphan @ 0.2%	6.5	10	53	11,600	15,220	1.6	1.9
2006-07	Aphid infestation in mustard	Release of *Chrysoperla cornea* @40000 larvae/acre 3 times at 10 days interval starting from the initiation of flower bud. FP- Application of Acephatetwice at 15 days interval after appearance of pest.	7.2	11.5	59.7	12,800	16,000	1.7	2.1
2007-08	Pod borer infestation in pegionpea	Use of HNPV(Helimar) @ 1.5 ml/lit. at 15 days interval. FP-One spraying of Endosulphan @ 0.2%	7.1	11.4	60	24,000	36,000	2.4	2.9
2008-09	Diamond back moth in cabbage	Use of Biodart(Bt) @ 2.5 g/lit. water 4 times at 10 days interval FP-One spraying of Endosulphan @ 0.2%.	122.5	168.4	37	30,500	42,000	2.5	2.8

FP- Farmers' practice RP- Recommended practice (Tested technology)

Table 2 : Impact of plant protection technologies tested by KVK, Angul (Odisha)

Identified problems	Technologies tested/demonstrated	Adaptability of technology	Horizontal spread
Shoot and fruit borer infestation in brinjal	Removal of affected fruits and shoots followed by alternate spraying of Triazophos@ 0.2% and neem oil @ 0.5% with teepol at 15 days interval.	52%	264 ha
Infestation of thrips in chilli	Application of Monocrotophos @0.2% at initiation of infestation and 2nd spraying at 15 days interval..	16%	170 ha
Aphid infestation in mustard	Application of Acephate twice @ 0.2% at 15 days interval after appearance of pest.	65%	382 ha
Aphid infestation in mustard	Release of *Chrysoperla cornea* @40000 larvae/acre 3 times at 10 days interval starting from the initiation of flower bud.	6%	NA
Pod borer infestation in pegionpea	Use of HNPV(Helimar) @1.5 ml/lit. at 15 days interval.	17%	20 ha
Diamond Back Moth in cabbage	Use of Biodart (Bt) @ 2.5 g/lit. water 4 times at 10 days interval	45%	120 ha

Table 3 : Constraints in adoption of plant protection technologies tested by KVK, Angul, Odisha

Biological constraints	Frequency (%)	Technological constraints	Frequency (%)	Socio-economic constraints	Frequency (%)
Non-availability of resistant variety	72	Non-availability of skilled labour	75	High cost of input/machineries	72
Non-availability of inputs/ HYV seed	80	Lack of trained extension personnel for follow up	65	High cost of labour	90
Poor quality of inputs	63	Lack of training for farmers	62	Lack of credit facility	82
Inadequate supply of inputs	68			Lack of strong support price	74
Delay in input availability	76			Fluctuated market price of produce	65

Impact of the technologies:

Impactassessment of these technologies revealed that the technologies are being adopted by the farmers at variable rate (Table 2). Highest adoption rate (65%) was observed withapplication of Acephate 75 per cent SC twice @ 0.2 per cent at 15 days interval after appearance of aphid in mustard. This technology was found to be extended horizontally to 382 ha more area of that locality. On the other hand lower adoption rate (6%) was observed for the technology of release of bio-agent *C. cornea* for management of this insect without having any information for its horizontal spread. The IPM technology as mentioned above for management of shoot and fruit borer was found to be adopted by 52 per cent participants. It was found to spread over 264 ha of additional area. The impediments identified for variable adoption of these technologies were broadly under three groups *viz.*, Biological hindrances, Technological hindrances and Socio-economic hindrances (Table 3). Among the biological constraints, non-availability of inputs and seeds of high yielding variety of crops ranks first with frequency of 80 per cent followed by delay in input availability (76%). The other deterrents under this category with frequency more than 60 per cent are non-availability of resistantvariety (72%), inadequate supply of inputs (68%) and poor quality of inputs (63%). In technological category non-availability of skilled labours ranks first (with frequency of 75%) followed by lack of trained extension personnel for follow up. High cost of labour is the major socio-economic constraints (with frequency of 90%) followed by lack of credit facility (82%) for adoption of these technologies. For successful adoption of these technologies in a sustainable manner it is highly essential to address these constraints in a timebound manner and system paradigm mode. The findings of this study are in conformity of the findings of Bhardwaj and Sharma (2014). Tomar (2014) has also reported similarly results in impact assessment of plant protection technologies for management of insect pests and diseases in Madhya Pradesh condition.

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