Knowledge and Adoption of Farmers about the Management of Pod Borer Complex in Pigeon pea

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ABSTRACT

This study was conducted in Kalmeshwar panchayat samiti of Nagpur District. Total sixty farmers were interviewed from ten villages and data ware collected regarding knowledge and adoption of farmers about management of pod borer complex in pigeon pea as dependant variables. Knowledge of majority respondents (46.67%) was found at medium level whereas the adoption recorded low by over half (58.33%) of respondents. To control the pod borer in pigeon pea package of nineteen practices ware recommended by Dr. PDKV, Akola. Therefore in practice wise knowledge and adoption of farmers it was observed that cultural, mechanical and physical practices were known to most of the respondents but its adoption was not remarkable. Some of the farmers partially adopted these practices which could not give effective control of pod borer. Uses of botanical pesticides are also important but its use was not known to more than half of the respondents (up to 56.67%). It was not also adopted by 70.00 per cent respondents. In relational analysis education, annual income, extension contacts and innovativeness were highly and significantly correlated with knowledge and adoption of farmers. Knowledge was also positively and highly significant with adoption of management practices of pod borer in pigeon pea.

Keywords : *Knowledge; Adoption; Pod borer*

Pigeonpea (Cajanus cajan L. Millsp.) commonly known as redgram, tur or arhar is a very old crop of this country. After chickpea, pigeon pea is the second most important pulse crop in the country. It accounts for about 11.8 per cent of the total pulse area and 17 per cent of total pulse production of the country. It contributes about 15 per cent in total pulses area as well as production of India. It is one of the most widely cultivated pulse crops of India next to chick pea. It is grown over an area of 3.5 million hectares with a production of 2.8 million tons (Chhidda Singh et al., 2005). Maharashtra, Andhra Pradesh and Karnataka are the major pigeon pea-growing states in the Deccan Plateau (DP) of India. Maharashtra has the maximum area (1.02 million ha) with a production of about 0.77 million tonnes.

The lower productivity of pigeon pea is due to many factors, among which the loss due to severe incidence of pests is predominant in recent years. In India, pigeon pea is prone to attack by more than 200 species of insect pests among which the pod borer (Helicoverpa armigera) causes enormous losses. The losses have been estimated to vary from 46.6 to 63.6 per cent. To control the pod borer, pesticides have been used indiscriminately leading to a series of consequences like pest resistance to pesticides, pest resurgence, outbreak of secondary pests, harmful residues, imbalance in the natural eco-system, higher production costs, etc. Thus, cultivation of redgram mainly depends upon the management of pests which took a major share in the total cost of cultivation. This has initiated a complete change in the strategy of pest control, wherein more emphasis is given on environment friendly methods of plant protection known as Integrated Pest Management (IPM).

In Vidharbha the control of pod borer in pigeon pea involves adoption of various recommendations of Dr. PDKV, Akola. The technology for control of pod borer is available however, its application at farmers level is not adequate. Hence, the present study was undertaken with the following specific objectives.

1. To study the personal, socio-economic, psychological and communicational profile of farmers.
2. To study the knowledge and adoption of Dr. PDKV recommendations for control of pod borer in pigeon pea.
3. To study the relationship of personal, socio-economic, psychological and communicational profile with knowledge and adoption of Dr. PDKV recommended practices for control of pod borer in pigeon pea.
4. To study the constraints in adoption of Dr. PDKV recommendations for control of pod borer in pigeon pea.

METHODOLOGY

Present study was conducted in Kalmeshwar Panchayat Samiti of Nagpur District where the considerable area of pigeon pea was recorded. From this Tahsil six villages were selected and from every village 10 farmers were selected randomly. In total 60 respondents were selected from six villages with the help of proportionate random sampling method. All the selected respondents were personally interviewed with the help of pre tested interview method and data ware collected.

Ten independent variables were selected for the study with two dependant variables viz. knowledge and adoption. Practice wise knowledge and adoption were measured and quantified with the help of three point

continuum i.e. full, partially and no. On the basis of obtained score knowledge and adoption index were calculated with the help of following formula.

$$\text{Index} = \frac{\text{The individual obtained score}}{\text{Maximum score possible}} \text{ X } 100$$

Constraints were listed out as expressed by the farmers. Frequency and percentage were calculated for individual constraint. Constraints were ranked as per the higher percentage.

FINDINGS AND DISCUSSION

It is observed from Table 1 that majority of respondents were found in middle (46.67%) to old age group (43.33%), only 10.00 per cent respondents studied were young. In educational status two respondents (3.33%) were illiterate who belonged to old age category. From the literate category 70.00 per cent respondents were having education up to high school. From the total respondents 43.33 per cent respondents had medium land holdings followed by 40.00 per cent respondents had small land holdings. It means the farmers studied were medium to small farmers. The economic status of respondents was medium because majority of respondents (70.00%) were found in medium category of annual income. Similarly, majority of respondents were observed in medium category of socio-economic status (73.33%) and extension contact (76.67%). Most of the respondents (76.67%) had no participation in any organization, while 16.67 and 6.67 per cent respondents were member or office bearer in one and more than one organization, respectively. For getting information about the control of pod borer in pigeon pea, 63.33 per cent respondents were using medium sources of information, followed by 23.33 per cent used less sources of information. Under psychological characteristics, innovativeness was found to be evenly distributed, 40.00 per cent respondents had been found in medium category of innovativeness, whereas, in each category of low and high innovativeness 30.00 per cent respondents were observed. Scientific orientation of majority of respondents (83.33%) was observed to be medium.

Table 1. Personal, socio-economic, psychological and communicational profile of farmers.

Sr. No.	Characteristics	Level	N=60	Percentage
1	Age	Young (Upto 35)	06	10.00
		Middle (36 - 50)	28	46.67
		Old (Above 50)	26	43.33
2	Education	Illiterate	02	3.33
		Primary School	04	6.67
		Middle School	08	13.33
		High School	42	70.00
		College & Above	04	6.67
3	Land holding	Small (Up to 2.00 ha.)	24	40.00
		Medium (2.01 – 4.00 ha.)	26	43.33
		Large (Above 4.00 ha.)	10	16.67
4	Annual income	Low (Below 78000)	08	13.33
		Medium (78000 - 223000)	42	70.00
		High (Above 223000)	10	16.67
5	Socio-economic status	Low	08	13.33
		Medium	44	73.33
		High	08	13.33
6	Social participation	No Participation	46	76.67
		Participation in one organization	10	16.67
		Participation in more than one organization	04	6.67
7	Extension contacts	Low	08	13.33
		Medium	46	76.67
		High	06	10.00
8	Sources of information	Low	14	23.33
		Medium	38	63.33
		High	08	13.33
9	Innovativeness	Low	18	30.00
		Medium	24	40.00
		High	18	30.00
10	Scientific orientation	Low	08	13.33
		Medium	50	83.33
		High	02	3.33

Knowledge and adoption

For control of pod borer complex in pigeon pea Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola has recommended the package of practices. By the use of this package farmers can control the pod borer of pigeon pea. Therefore, in the present study practice wise knowledge and adoption was studied and results are presented in Table 2.

Table 2. Practice wise distribution of respondents according to their knowledge and adoption of recommended technology for control of pod borer in pigeon pea.

Sr. No.	Technology	Knowledge			Adoption		
		F K	PK	NK	FA	PA	NA
1	Crop Rotation of cereal and oil seed crop	37 (61.67)	12 (20.00)	11 (18.33)	15 (25.00)	24 (40.00)	21 (35.00)
2	Deep ploughing and hoeing	36 (60.00)	11 (18.33)	13 (21.66)	25 (41.67)	12 (20.00)	23 (38.33)
3	Removal of unwanted plants	46 (76.67)	01 (1.67)	13 (21.66)	33 (55.00)	11 (18.33)	16 (26.67)
4	Sowing at proper time in first week of June	51 (85.00)	8 (13.33)	01 (1.67)	28 (46.67)	00 (00.00)	32 (53.33)
5	Sowing of resistant variety	25 (41.67)	27 (45.00)	08 (13.33)	18 (30.00)	00 (00.00)	42 (70.00)
6	Seed treatment with Trichodurma/ Carbendasim/ Thyrum +250 gm. of Rhyzobium to 10 to 15 Kg. of seed	28 (46.67)	27 (45.00)	05 (8.33)	05 (8.33)	15 (25.00)	40 (66.67)
7	Inter crop of bajra, jowar, g. nut, cotton, etc.	12 (20.00)	18 (30.00)	30 (50.00)	02 (3.33)	12 (20.00)	46 (76.67)
8	Mixing of 100 to 200 gm. sorghum seed in Pigeon pea seed at the time of sowing	11 (18.33)	00 (00.00)	49 (81.67)	05 (8.33)	04 (6.67)	51 (85.00)
9	Intercultural operation at proper time	48 (80.00)	12 (20.00)	0 (00.00)	38 (63.33)	00 (00.00)	22 (36.67)
10	To collect and destroy leaf rolled leaves	19 (31.67)	07 (11.67)	34 (56.67)	05 (8.33)	03 (5.00)	52 (86.67)
11	When attack of hairy cater pillar the larvae and eggs are destroyed in kerosene mix water	48 (80.00)	08 (13.33)	04 (6.67)	10 (16.67)	00 (00.00)	50 (83.33)
12	To collect fully developed larvae and destroy them	45 (75.00)	05 (8.33)	10 (16.67)	06 (10.00)	00 (00.00)	54 (90.00)
13	Installation of pheroman trap 20 no. per hectare	21 (35.00)	25 (41.67)	14 (23.33)	06 (10.00)	00 (00.00)	54 (90.00)
14	Installation 20 bird parcher per hectare	23 (38.33)	21 (35.00)	16 (26.67)	12 (20.00)	05 (8.33)	43 (71.67)
15	Use of botanical with chemical insecticides	23 (38.33)	03 (5.00)	34 (56.67)	11 (18.33)	08 (13.34)	41 (68.33)
16	Use of HaNPV	20 (33.33)	09 (15.00)	31 (51.67)	08 (13.33)	00 (00.00)	42 (70.00)
17	1st spraying of insecticide at buds formation stage	29 (48.33)	00 (00.00)	31 (51.67)	15 (25.00)	05 (8.33)	40 (66.67)
18	IInd spraying of insecticide at 50% flowering stage	28 (46.67)	00 (00.00)	32 (53.33)	08 (13.34)	02 (3.33)	50 (83.33)
19	IIIrd spraying after 15 days of 1st spraying	7 (11.67)	00 (00.00)	51 (58.00)	05 (8.33)	01 (1.67)	54 (90.00)

Figures in parentheses indicate percentages

FK-Full Knowledge, PK-Partial Knowledge, NK-No Knowledge

FA- Full Adoption, PA- Partial Adoption, NA- No Adoption

Package of pod borer control in pigeon pea includes nineteen integrated practices under physical, mechanical, cultural, biological and chemical treatments. It is observed from Table 2 that cultural, mechanical and physical practices were known to most of the respondents. These practices are crop rotation, deep ploughing, removal of unwanted plants, sowing in time, sowing of proper varieties, seed treatment, mix cropping, intercultural operations, collection and destroy eggs and larvae, installation of bird percher etc. These practices are very important to control the pod borer of pigeon pea, but the adoption of these practices was not remarkable. Some of the farmers had partially adopted these practices which could not give effective control of pod borer. Uses of biological pesticides are also important but its use was not known to more than half of the respondents (up to 56.67%), it was not also adopted by the 70.00 per cent respondents. In chemical method, three insecticide sprays are recommended at given interval and stages. The chemical treatments for control of pod borer were not known more than half of the respondents studied. The first, second and third spraying's of insecticide was done by 25.00 per cent, 13.33 per cent, and 8.33 per cent respondents, respectively.

Table 3. Distribution of respondents according to knowledge and adoption of farmers

Sr. No.	Variables	Level	(N=60)	Percentage
1	Knowledge	Low	06	10.00
		Medium	28	46.67
		High	26	43.33
2	Adoption	Low	35	58.33
		Medium	15	25.00
		High	10	16.67

As we have previously observed the practice wise knowledge and adoption, now we have analysed and categorized the respondents as shown in Table 3.

It is revealed from Table 3 that knowledge of respondents about the package of practices of pod borer control in pigeon pea was medium (46.67%) to high (43.33%) and 10.00 per cent respondents were having low level of knowledge.. In adoption, more than half of respondents (58.33%) had low level of adoption followed by 25.00 and 16.67 per cent respondents in medium and high level of adoption of recommended practices of pod borer control in pigeon pea. It indicates that medium to high level of knowledge was not converted in to adoption. Adoption gap was found in the study area possibly because some of the farmers were not having full knowledge of practices. The partial knowledge could not be converted in to adoption, if adopted partially it might not be effective against the pod borer. Darling and Vasanthakumar (2004) had also observed the medium level of knowledge and low level of adoption of farmers about biological pesticides. Independent characteristics of respondents were correlated with the knowledge and adoption of respondents about control of pod borer and results are presented in Table 4.

Table 4. Relationship of personal, socio-economic, psychological and communicational characteristics with knowledge and adoption of farmers about recommended package of practices for control of pod borer in pigeon pea.

Sr. No.	Variables	'r' value	
		Knowledge	Adoption
1	Age	-0.1227	-0.1736
2	Education	0.5022**	0.3399**
3	Land holding	0.2669*	0.0350
4	Annual income	0.5030**	0.5056**
5	Socio-economic status	0.3839**	0.1586
6	Social participation	-0.1989	-0.2018
7	Extension contacts	0.4254**	0.4206**
8	Sources of information	0.1429	0.3333**
9	Innovativeness	0.4621**	0.3649**
10	Scientific orientation	0.2352	0.2264
11	Knowledge	1.0	0.7046**

** Significant at 0.01 level of probability * Significant at 0.05 level of probability

Table 4 shows that education, annual income, socio-economic status and innovativeness were positively and significantly correlated with knowledge at 0.01 level of probability and land holding was correlated at 0.05 level of probability. It indicates that the farmers having more education, income generation, socio-economic status, contacts with extension functionaries and innovativeness helped to increase their knowledge about pod borer control in pigeon pea. It was also observed that knowledge was also positively and highly significant with the adoption of control of pod borer techniques. Hence education, annual income, sources of information and innovativeness were also found highly significant. It means increase in the level of these variables increases the adoption of recommended package of practices of pod borer control in pigeon pea. The findings about the relationship of education and knowledge corroborates with the findings of Bankadakatti (2007). For getting the information of IPM in red gram use of mass media was significantly correlated with the adoption of technology as noted by Shivraj (1997). Relationship of land holding with the adoption of IPM technology was found non significant by Sangram (1997).

It is noted that age and social participation of the respondents here shown no significant relationship with knowledge and adoption but show negative effect on them. It means that old age farmers and involvement of farmers in social organizations kept them away from getting the knowledge and use of the techniques of pod borer control in pigeon pea.

Constraints

Table 5. Constraints faced by the farmers in adoption of package of practices of pod borer control in pigeon pea.

Sr. No.	Lack of technical knowledge	Frequency	Percentage	Rank
1	Lack of technical knowledge	55	91.67	I
2	Non availability of labour at proper time	51	85.00	II
3	Expensive labour	51	85.00	II
4	Non availability of money at the time of input purchase	45	75.00	III
5	Poor extension service	39	65.00	IV
6	Adoption of package is the costly affair	38	63.33	V
7	Total package create some complexity	34	56.67	VI
8	Lack in supervision of field	32	53.33	VII

Table 5 revealed that first ranked constraint in adoption of recommended pod borer control practices was lack of technical knowledge expressed by 91.67 per cent respondents, followed by non availability of labour at proper time, expensive labour and non availability of money at the time of input purchase was told by 85.00, 85.00 and 75.00 per cent respondents, respectively. The 65.00 per cent farmers focussed attention on poor extension services in the area. Adoption of whole package was the constraint expressed by 63.33 per cent respondents. Complexity of integrated practices and lack in supervision of the field by the farmers were the constraints faced by 56.67 and 53.33 per cent respondents, respectively.

It clearly depicted that farmers in the study area had knowledge but lacking in technical knowledge of integrated practices that was counted in partial knowledge which was not converted into the full adoption of package of practices. The integrated package includes a physical, mechanical, cultural, biological and chemical practice, which require labour at proper time. In the study area non availability of labour and expensive labours were the important hindrances to follow the practice properly. Problem of non availability money at proper time leads to non adoption of practices which require purchasing the inputs from market. Due to the poor extension services the technical information was not known to the farmers. It results into partial knowledge or no knowledge and consequently resulted in partial adoption or non adoption of the practices. Whole package includes the integration of different practices which require different inputs is the costly affair for the farmers. Implementation of different practices of different nature at different stages creates complexity of technology as expressed by the farmers. Costly package and complex nature results in non adoption or partial adoption of the package. Identification of pest incidence at proper stage is very important to decide the control measures. But, more than fifty per cent of the farmers fields in study area were not visited on regular basis for close supervision to identify the pest incidences. More practices are for the treatment of pod borer and which make, it more complex and lower down the adoption behavior of farmers.

CONCLUSION

It is observed that cultural, mechanical and physical practices were known to most of the respondents. But the adoption of these practices was not up to the level desired. Some of the farmers had partially adopted these practices which could not give effective control of pod borer. Hence, it is concluded that in the present situation money problem, lack of technical knowledge and complex nature of integrated package, cultural, mechanical and physical methods are effective practices for control of pod borer.

It indicates that medium to high level of knowledge was not converted in to adoption. Adoption gap was found in the study area possibly because some of the farmers were not having full knowledge of practices. The partial knowledge could not be converted in to adoption, if adopted partially it might not be effective against the pod borer. Therefore, conclusion is that intensive extension activities should be conducted in the area for continuous persuasion of farmers about the technical information.

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