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Appraisal of Community Integrated Pest Management Program on Cotton in Tehsil Hasilpur, Punjab, Pakistan

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ABSTRACT

The use of latest cotton production technologies may help to improve its production to enhance the profit margin of the farmers and boost the national economy. To educate the cotton growers in Farmer Field Schools, a Community Integrated Pest Management project was launched by the government of Punjab in 2004. An interview schedule was prepared for respondents (150 FFS Farmers) of tehsil Hasilpur district Bahawalpur, Pakistan. Data were analyzed with Statistical Package for Social Sciences (SPSS) using chi-squared test. Results revealed that all IPM farmers had awareness and adopted cultural control of insects-pests of cotton before sowing crop and possessed knowledge, adoption regarding seed bed preparation. While 99.3% and 95.33% adopted seed technology and recommended time of cotton sowing, 91.30% maintained recommended plant population. Majority were aware of harmful insects eaten by beneficial insects. There was strong association between adoption of all recommended practices and increased cotton yield of the respondents. The program impacted positively on the lives of cotton growers through trainings in farmer field schools and ultimately caused improvement of their knowledge, awareness and adoption regarding latest cotton production technologies.

INTRODUCTION

Agriculture Extension Department has been engaged and playing an important role in training of farmers by providing technical assistance on continuous basis regarding improved crop production technologies through Farmer Field Schools (Butt et al., 2015; Cai et al., 2016; Ngozi et al., 2017). The prime objective of farmer field schools is to enable the farmers to grow healthy crops, observe fields regularly, conserve natural enemies through understanding ecology and become experts in their own fields (Khatam et al., 2010). In Pakistan, Integrated Pest Management (IPM) started in 1971 at Pakistan Agriculture Research Council (PARC). The Government of Punjab launched a four years IPM Project in 2004 which was run by Agricultural Extension Department. IPM practices increased the knowledge level of farmers in IPM villages ultimately resulted in lesser use of pesticides in cotton crop and increased use of safer chemicals to conserve the natural enemies (Mallah and Korejo, 2007; Dhawan et al., 2009). Farmer Field School had played an important role in the reduction of chemical usage which had not only conserved the natural fauna but also increased the yield, ultimately filled the gaps through reduction in cost benefit ratio (Mahmood et al., 2005; Haq et al., 2008; Settle et al., 2014; Zahid et al., 2013, 2017). The objective of this study was to assess and highlight the impact of community Integrated Pest Management program on cotton growers of tehsil Hasilpur, Punjab, Pakistan.

MATERIALS AND METHODS

The study was conducted at Department of Agricultural Sciences, Allama Iqbal Open University Islamabad, Pakistan during the year 2010-11 to evaluate the community integrated pest management project. The Government of Punjab launched this project in five districts including Lodhran, Khanewal, Vehari,

Bahawalpur and Dera Gazi Khan. Bahawalpur district comprises of five tehsils including Ahmed Pur East, Yazman, Bahawalpur, Khairpur Tamewali and Hasilpur.

Study area

Among five tehsils of district Bahawalpur, Hasilpur was selected for the appraisal of IPM project. In Hasilpur farmers grow cotton and wheat as major crops, therefore this tehsil was selected as study area, it comprises of 15 union councils and 108 villages. In IPM project, each village was equivalent to farmers field school (FFS). The lists of FFS were obtained from the office of the Deputy District Officer Agriculture (Extension), Hasilpur. Data was collected from 15 randomly selected villages of 15 union councils of tehsil Hasilpur. Ten FFS farmers from a village of a union council were selected randomly by making a composite sample size of 150 respondents. Interview schedule was prepared from the related literature reviewed, discussions with experts in the discipline of agriculture extension education. In Farmer Field Schools, farmers were taught by extension field assistants, Agriculture Officers, and Deputy District Officer (Agriculture) of IPM project.

Data collection

Data collection was accomplished through the use of interview schedule. Registered farmers were interviewed personally at their farms or homes. Although, the interview schedule was constructed in English, yet the questions were administered in Punjabi and Urdu language for the convenience of respondents to get required information with maximum accuracy.

Statistical analysis

For the analysis of data statistical package for social sciences (SPSS) was used (Levesque, 2007).

RESULTS

Keeping in view the cotton production technology, knowledge, awareness and adoption about land preparation, sowing time, cotton varieties, seed rate, seed treatment, sowing methods, thinning, recommended plant population, fertilizer and irrigation in line sowing and bed sowing, insect-pests, diseases, weeds control, identification of insects-pests, economic threshold levels, pest scouting, biological control of harmful insects, spray timings, spraying techniques and clean cotton picking were considered. The data collected on these aspects has been presented as follows:

The data in Fig. 1 reflected hundred percent IPM farmers had acquired awareness and adopted uprooting of previous cotton sticks, grazing animals in standing previous cotton sticks and ploughing of fellow lands in February. The data in Fig. 2 showed that all IPM farmers were aware of using one-time chisel plough for land preparation. But its adoption was only 27.3% while
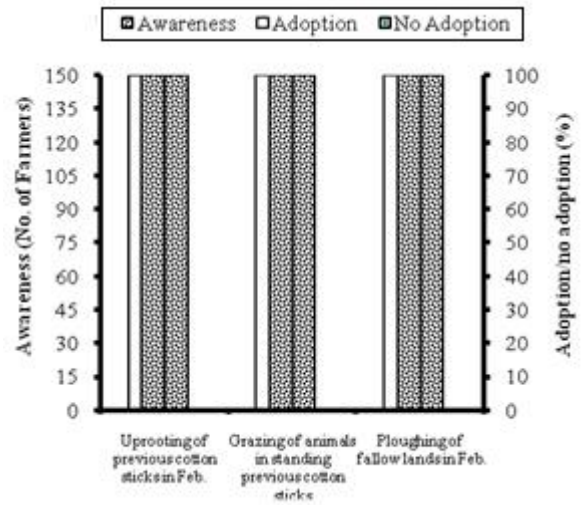

Fig. 1: Distribution of IPM farmers with regard to knowledge, awareness and adoption of cotton production technology
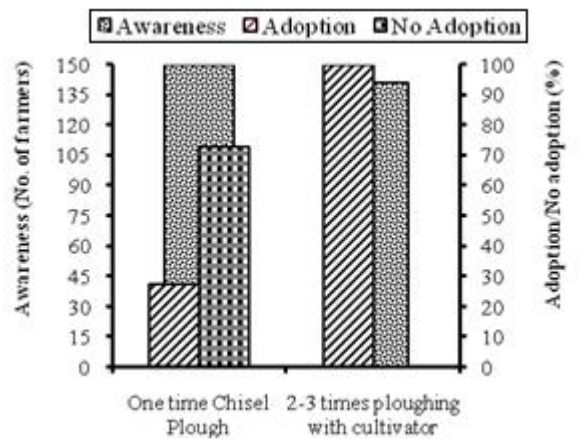

Fig. 2: Distribution of IPM farmers with respect to knowledge about awareness and adoption of proper land preparation practices.

remaining 72.7% had not adopted due to several reasons. 94% respondents were aware of 2-3 times ploughing with cultivator and all of them had adopted it. Fig. 3 revealed that 99.3% growers were aware of recommended seed rate while its adoption was 82.6%. It also showed that 99.3% of IPM farmers were aware of seed treatment while 64.4% had adopted it. Fig. 4 showed that majority (95.33%) of respondents had acquired awareness about sowing of cotton in recommended time 1st May-31st May and all of them had adopted it. Maximum 91.3% respondents had maintained recommended plant population (23000-35000/acre). Fig. 5 indicated that 98.7% respondents had knowledge about beneficial fauna like ants while 57.3, 20.7, 16, 95.3, 81.3 known dragon fly, crysopa,
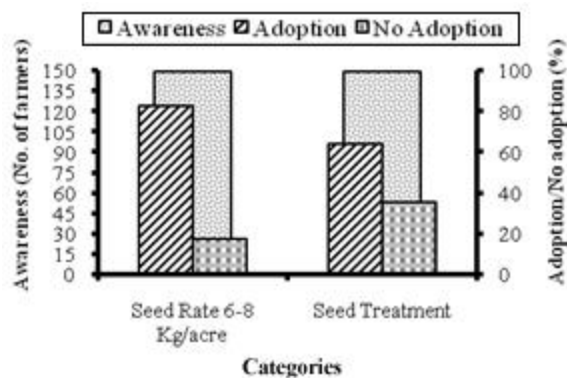
Fig. 3: Distribution of IPM farmers with respect to knowledge about awareness and adoption of recommended seed rate and seed treatment.
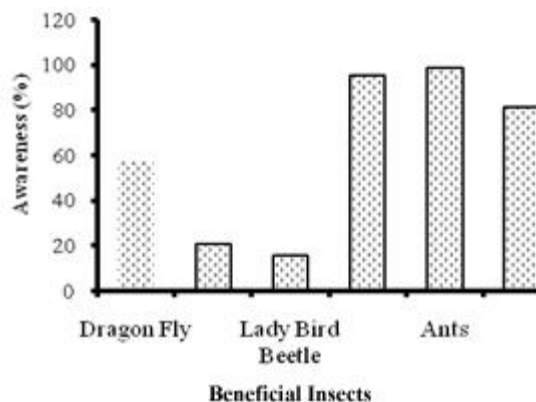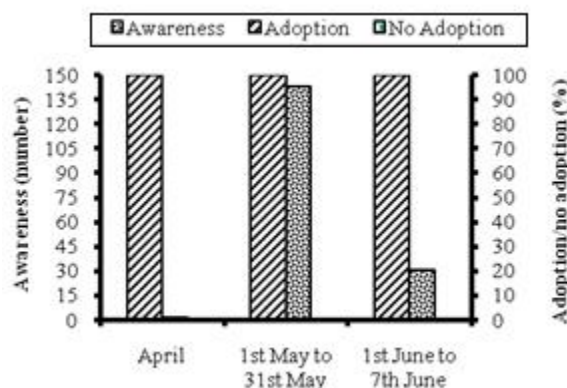

Fig. 4: Distribution of IPM farmers with regard to knowledge, awareness and adoption of recommended sowing time.

Fig. 5: Distribution of IPM farmers with regard to identification of beneficial insects.
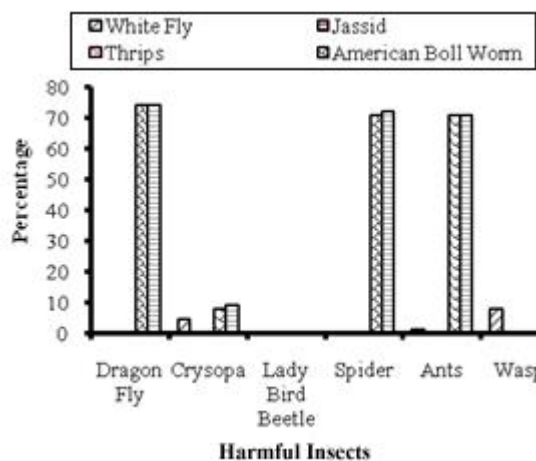

Fig. 6: Distribution of IPM farmers with regard to awareness of harmful insects-pests eaten by beneficial insects in cotton.

lady bird beetle, spider and wasp respectively. Fig. 6 indicated that 74% IPM farmers had known about american and spotted boll worms were eaten by dragon fly. However, 4.7% known about whitefly eaten by crysopa. Eight and 9.3 percent respondents had knowledge about crysopa which predated american and spotted boll worms respectively. While 0.7% had knowledge about whitefly, jassid and thrips eaten by lady bird beetle. 70.7 and 72% farmers had knowledge about american and spotted boll worm eaten by spider. 1.3 percent growers had knowledge about ants which predated white fly, 0.7% about jassid and thrips while 70.7 percent about american and spotted boll worms respectively. Eight percent IPM farmers had known whitefly eaten by wasp.

DISCUSSION

Farmer field school was an innovative approach because farmers learned with great interest from their facilitators and fellow farmers, ultimately got higher

economic returns than non-FFS farmers. Results of this study showed that farmers had learned different aspects of cotton production technology efficiently through farmer field school under IPM project. Butt et al. (2015) reported the effectiveness of FFS as cost effective and capacity building approach of poor farmers of Punjab, Pakistan. Present study declared that all IPM farmers uprooted previous cotton sticks in February and grazed sheep and goat in the standing sticks of previous cotton crop. These results similar to Kalaskar et al. (1999) who conducted a study to examine the use of integrated pest management (IPM) practices in cotton at Amravati, Maharashtra, India and found that majority of the farmers adopted deep ploughing during land preparation and grazed sheep and goats in cotton fields after last picking. The results revealed that majority of IPM farmers had gained knowledge of identification of insects of cotton. These results were similar to Mancini et al., (2008) who studied that FFS farmers in Andhra

Pradesh, India had significantly improved their ability to identify cotton insects at different stages. The findings are also similar to Mallah and Korejo (2007) who studied the impact of farmer field school in Sakrand, Sindh, Pakistan and found that 65% improvement observed regarding identification of insect-pest of cotton. The findings reflected that 98.7% IPM farmers had knowledge about beneficial insects of cotton. Ali et al. (2013) reported the haphazard use of pesticides resulted in the development of resistance and ultimately greater number of pesticides spray. That situation directed and diverted the farming community to use IPM approaches. FAO (2007) report revealed that FFS farmers decided to spray pesticides in cotton after observation of beneficial insects. These findings are in agreement to our outcomes. These results are also in agreement with Mallah and Korejo (2007) who reported 50% improvement in cotton yield was due to identification of natural enemies in cotton because the decision of pesticide spray had been taken according to the presence and numbers of natural enemies. The outcomes of Cabanilla et al. (2005) are in agreement to our findings who studied the impact of IPM in Mali, West Africa and reported that beneficial predators and parasite insect had eaten harmful insects in cotton and cause of reduction in the application of broad-spectrum sprays. Our findings are also in agreement that 74 and 4.7 percent IPM farmers had knowledge about bollworms eaten by dragonfly and whitefly eaten by crysopa while 0.7% had known about whitefly, jassid and thrips were eaten by ladybird beetle. Waddington et al. (2014) concluded that the farmer field school were the source of improvement in the existing knowledge of the farmers about the production technology, timing of pesticides sprays, identification of natural enemies and capacity building. Our findings are in close association that we found improvement of existing knowledge, awareness and adoption level of the farmers of farmer field school.

Conclusion

This study concluded that all IPM farmers had got awareness and adopted recommended agronomic practices regarding cotton production technology. All IPM farmers had knowledge about beneficial fauna of cotton and majority of them were able to identify them. Due to IPM project farmers were fully aware about biological control of harmful insects of cotton and sprayed pesticides after conducting pest scouting and observing presence of natural enemies. Based on results of present study, it is suggested that Integrated Pest Management projects should also be expanded in the remaining cotton growing districts/parts of the country.

Authors' contributions

MZ performed the experiments, analyzed data and wrote the article. MAJK performed the role as supervisor in planning, execution and guidance during whole study. AKK helped in data collection and statistical analysis. All the authors read and approved the final draft.

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