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Constraints perceived by the farmers while using bio-control agents

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Abstract
In recent years, concerns have been raised over the effects of the overuse of agricultural pesticides on the environment and human health. Bio-control agents are an important component of integrated pest management and help to counteract insecticide resistant pests, withdrawal of chemicals and minimize the usage of pesticides. Although the adoption of Bio-control agents is strongly affected by the socio-economic environment in which they are to be applied and by farmers' attitudes, these factors have been poorly investigated in Bio-control agent's research and development programs. The purpose of this study was to examine constraints perceived by the farmers while using bio-control agents in district Chhattisgarh plains zone. Face to face interviews of 200 respondents was conducted to collect the data for the study. Purposively sampling method was used to collect data from farmers of study area. Here, we analyse the reasons for the limited uptake and the challenges or constraints facing bio-control agents from two different approaches: general constraints and specific constraints. The results showed that the many technical and institutional constraints affect the use of bio-control agents. Important identified constraints that affect the use of bio-control in the study area are not available at the local market at the right time, they are less effective than the fungicides etc.

Keywords: Constraints, bio-control agents, *Trichoderma*

Introduction
Agriculture is the most important sector of Indian economy. Indian agribusiness contributes eighteen per cent of India's total output (GDP) and generates work to more than 50% of national workforce. India is the highest producer of pulses, rice, wheat, spices and spice in the world. But this is totally based on the agrochemicals products. There are various environmental effects due to agrochemicals have created worldwide concern. Now, the approach is to shift from chemical methods to non-chemical methods for enhancing soil fertility and dealing pests. The alternatives are very expensive and not yet in widespread use. However, Bio-control is effective and economical in nature. Biological Control agents are environmentally safe, non-toxic and non-polluting. Biological control agents are pest-specific and greatly prefer to feed on the target organism, leaving non-pest organisms undisturbed. Once a biological control program is underway, the field aspects of the program are inexpensive compared to other control methods and require little human efforts. Biological control agents can sustain themselves and spread on their own. Beneficial animals and plants as well as people in an area where biological control is being used are unaffected by this method of control (Randhawa, 2015) [11]. With lots of benefits, there are also some constraints while using bio-control agents which directly or indirectly affect the use of bio-control agents.

Methodology
The study was carried out in Chhattisgarh. Out of 15 districts in Chhattisgarh plain zone, the study was undertaken in 4 districts randomly *i.e.* Raipur, Durg, Dhamtari and Rajnandgaon. Two villages from each selected district were identified for investigation purposively, where most farmers were using bio-control agents in their crop. In this way a total eight villages (2 X 4 = 8) was taken for the study**.** Each village is considered as one group and total 8 groups were undertaken. The respondents were the farmers who are using the bio-control agents in their crop. 25 farmers were selected purposively from each selected village, in this way a total of 200 farmers (Total 25 X 8 = 200) were selected for the survey considered as per the scheduled design for the study. The major criterion considered for the selection of farm technology was that it should be new and need based one. Accordingly, "bio-control agents" was selected.

Data were collected from April, 2018 to February, 2019. For studying various constraints faced by the bio-control agent's users, the respondents were asked to mention constraints which had perceived by farmers while using and influenced their decision for non-adoption of the recommended bio-control practices. The data were analyzed with the help of suitable statistical measures such as frequencies and percentages.

Frequency
A frequency is the number of times a data value occurs in an experiment or study.

Percentage
Percentages were calculated in simple and cross tables for the purpose of comparisons; F / n × 100. Where F represents the class frequency and n stands for total respondents.

Range
The range of a set of data is the result of subtracting the smallest value from largest value.

Results and Discussion
A constraint is something that imposes a limit or restriction or that prevents something from occurring. Constraints perceived by bio-control agent user are as follow:

General constraints
The data furnished in Table 4.38 indicated the constraints perceived by farmers using bio-control agent, majority (54.50%) of the respondents were said, "bio-control agent are not available at the local market at the right time" (ranked- I) followed by 41.50 per cent were said that "they are less effective than the fungicides" (ranked-II) followed by "unavailability of bio-control agents in sufficient quantity and of good quality" that was said by 39.50 per cent (ranked-II).While the third major, constraints faced by the farmer of study area were "bio-control agent is not available for all insect pests, weeds and plant diseases" (37.00%). Further one-fourth (25.00%) of respondents faced the constraints in "bio-control agent does not immediately show its effect. It's take time to control pest and diseases" and 22.50 per cent said, "bio-control agent is influenced by nature".
Whereas, lack of proper source of availability, bio-control agent does not prove effective during highly infestation period of insect pest and diseases, the bio-control agent takes time to control the diseases and pests, lack of awareness, knowledge, technical skill and training related to bio-control agents and at the initial level, profitability is not realized were the major constraints found by 21.00, 19.50, 19.00, 17.00 and 15.00 per cent respondents, respectively. The least (14.00%) per cent of respondents were said that the bio-control agent under certain circumstances may become a pathogen.

Table 1: Distribution of respondents according to their general constraints faced in using bio-control agents

Sl. No.	Constraints	Respondents (n=200)		
		Frequency	Percentage	Rank
1.	Bio-control agents are not available at the local market at the right time	109	54.50	I
2.	They are less effective than the fungicides	83	41.50	II
3.	Unavailability of bio-control agents in sufficient quantity and good quality	79	39.50	III
4.	Bio-control agents is not available for all insect pests, weeds and plant diseases	74	37.00	IV
5.	Bio-control agents do not show its effect immediately	50	25.00	V
6.	Bio-control agents are influenced by nature.	45	22.50	VI
7.	Lack of proper source of availability	42	21.00	VII
8.	Bio-control agents does not prove effective during highly infestation period of insect, pest and diseases	39	19.50	VIII
9.	The bio-control agents takes time to control the diseases and pests	38	19.00	IX
10.	Lack of awareness, knowledge, technical skill and training related to bio-control agents	34	17.00	X
11.	At the initial level, profitability is not realized	30	15.00	XI
12.	A bio-control agent under certain circumstances may become a pathogen	28	14.00	XII

Note: Data are based on multiple responses

Specific constraints
Data related to various specific constraints by the selected bio-control agents are presented and compiled under Table 4.39. It is cleared from the data that *Trichoderma* efficacy reduced under direct sun rays (23.00%) are the major specific constraints faced by the *Trichoderma* farmers in the study area followed by 21.00 per cent respondent faced that *Trichoderma* formulations are having short shelf-life. So we can't able to store or use it for a long time. In case of *Trichogramma* 29.50 per cent of respondents were said that *Trichogramma* is host specific hence it cannot be use for all the insect pests while 20.00 per cent respondents found that specific time of emergence is important for management of insect pests.

Table 2: Distribution of respondents according to their specific constraints faced while using bio-control agents

Sl. No	Constraints	F	%
1.	***Trichoderma*** (n=183)		
	Trichoderma viride is viable only for four months	27	13.50
	Trichoderma formulations are having short shelf-life. So we can't able to store or use it for a long time.	42	21.00
	Trichoderma efficacy reduced under direct sun rays.	46	23.00
2.	***Bacillus sp.*** (n=8)		
	Bacillus sp. when applied in spray or liquid form is susceptible to degradation by sunlight.	3	1.50
	Easily removed from plant surface by wind and rain. Therefore needs to be reapplied for full effect.	4	2.00
	Bacillus sp. kills insects but this killing occurs in a slow process.	1	0.5
3.	***Metarhizium sp.*** (n=14)		
	One of the limitations of mycopesticides is that they do not work on contact, but require a few days to colonize on the insect body and then kills the insect.	2	1.00

	Metarhizium anisopliae formulation viaility is up to 10 months.	5	2.50
4.	***Pseudomonas*** (n=53)		
	Storage viability *Pseudomonas fluorescens* is less.	53	26.50
	Their viability in soil is very less.	45	22.50
5.	***Trichogramma*** (n=120)		
	Need skilled person for releasing of *Trichogramma spp.*	36	18.00
	The one downfall for these parasitoids is ants; as they love to *Trichogramma* eggs and can rob them from the squares.	23	11.50
	Trichogramma is host specific hence it cannot be use for all the insect pests.	59	29.50
	Specific time of emergence is important for management of insect pests.	40	20.00
6.	**Nuclear polyhedrosis virus (NPV)** (n=13)		
	Rapid inactivation by the UV radiation in the fields comprises limitation of the NPV formulation.	4	2.00
	NPV have very slow rate of infection, may take 4 to 14 days to kill their host. So the infected larvae keep feeding on the plant during this period and causes damage.	2	1.00
	Another limitation of the NPV is their high specificity towards insect species.	7	3.50

Note: Data are based on multiple responses

Similarly in case of *Pseudomonas* 26.50 per cent of respondents said that storage viability *Pseudomonas fluorescens* is less followed by 22.50 per cent was found that their viability in soil is very less. However very meager per cent of respondents suggested specific constraints for NPV, *Metarhizium sp.* and *Bacillus sp.* This is because there is low awareness about these bio-control agents and there is also poor adaptation among the farmers in the study area. To avoid these constraints at optimum level training and demonstration should be arranged.

Conclusion

The results revealed that unavailable of bio-control agents at the local market at the right time and they are less effective than the fungicides were reported by the respondents as major constraints. Holistic planning provides farmers with the management tools they need to manage biological complex farming systems in a profitable manner. A successful bio-control agent's programme requires time, money, patience, short- and long term planning, flexibility and commitment.

The government could create a policy environment for the promotion of bio-control agents. The central and state governments must take lead in changing the pest control picture through measures that would make chemical control less attractive through legislation, regulatory and fiscal measures.

References

1. Anandaraja N. Developing farmer friendly interactive multimedia compact disc and testing its effectiveness in transfer of farm technology. Ph.D. Thesis, TNAU, Coimbatore, 2002.
2. Castro, Peck. Learning styles and foreign language learning difficulties. Foreign language annals. 2005; 38(3):401-409.
3. Ganesan. An exploratory study of mobile multimedia agricultural advisory system: challenges and lessons from Tamil Nadu, India. The Electronic Journal of Information Systems in Developing Countries. 2013; 56(5):1-14.
4. Jagannadharaju D, Jayaramreddy D. Agricultural information management behaviour of farmers. MANAGE Extension Research Review. 2003; 4:144-151.
5. Karunakaran B. A study on the potential of modern information technology gadgets for agricultural development. M.Sc. (Ag.) Thesis, TNAU, Coimbatore, 2004
6. Manjunath L, Balasubramanya. Effectiveness of Kannada farm magazines as related to readers characteristics, Karnataka Journal of Agricultural Sciences. 2002; 15(4):737-739.
7. Meenambigai J, Ravichandran V. Constraints in media utilization by farm women. Journal of Communication Studies. 2004; 22(2):34.
8. Michael TA. Analysis of mass media use of for agricultural information by farmers in Nigeria. Journal of Extension Systems. 2003; 19:45-53.
9. Mooventhan P. Impact of web education on knowledge and symbolic adoption of farmers- An experimental study, M.Sc. Thesis, TNAU, Coimbatore, Tamil Nadu, India, 2006.
10. Platsidou M, Metallidou P. Validity and reliability issues of two learning style inventories in a Greek sample: Kolb learning style inventory and Felderand Soloman's index of learning styles. International Journal of Teaching and Learning in Higher Education. 2009; 20(3):324-335.
11. Randhawa AA, Mangan T, Rais MN, Solangi AW. Constraints in adoption of biological control in sugarcane crop. Journal of Biology, Agriculture and Healthcare. 2015; 5(5):170-175.
12. Sandesh HM. A profile study of Kannada farm magazine readers in Karnataka. M. Sc. Thesis, University of Agricultural Science Dharwad, India, 2004, 46-52.
13. Senthilkumar M. Field testing cyber extension techniques for transfer of farm technology- A feasibility study. Ph.D. Thesis, TNAU, Coimbatore, 2003.