Cibtech Journal of Zoology ISSN: 2319–3883 (Online)
An Open Access, Online International Journal Available at http://www.cibtech.org/cjz.htm
2015 Vol. 4 (3) September-December, pp.1-6/Samarbafzadeh and Noorivandi
Research Article

BIOLOGICAL CONTROL OF CORN LEAF WORM (*SESAMIA CRETICA)* (ATTITUDE OF CORN FARMERS)

Sima Samarbafzadeh and *Azade N. Noorivandi
Department of Agricultural Management, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran
**Author for Correspondence*

ABSTRACT
The purpose of this research was to analyze the attitude of corn farmers towards biological control of *Sesamia cretica* in Shoushtar Township, Iran. The population of this study included corn farmers in Shoushtar Township. The total number of members was 170 persons. By census method all of them were studied. Questionnaire reliability was estimated by calculating Cronbach's alpha and it was appropriate for this study. Data were analyzed using the Statistical Package for the Social Sciences (SPSS). To reach the research objectives, appropriate statistical procedures for description were used. Data analysis was carried out through data description and data inferential analysis. The results of research showed the correlation between farm sizes, technical knowledge, social participation, participation in extension programs, communication channel, social status, land size ownership, level of education and attitude toward biological control of *Sesamia cretica* in Shoushtar Township was significant. Therefore, we can conclude that farmers with high farm sizes, technical knowledge, social participation, participation in extension programs, communication channel, social status, land size ownership, level of education had high attitude toward biological control of *Sesamia cretica*. The result of regression analysis by stepwise method indicated level of education, technical knowledge, social participation, participation in extension programs, communication channel, social status, participation in extension programs may well explain for 69.8% changes ($R^2 = 0.698$) in attitude of corn farmers.

Keywords: *Attitude, Corn Farmers, Biological Control, Sesamia cretica*

INTRODUCTION
In recent years, concerns have been raised over the effects of the overuse of agricultural pesticides on the environment and human health. Biological control can serve as an alternative to chemicals in integrated pest management systems. Although the adoption of biological control 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 biological control research and development programs (Moser *et al.,* 2008). Based on the results from the research conducted by Ommani (2011), farmers have a favorable attitude toward biological control of the pest. According to the obtained relationship between the variables, extension and education classes in the field of biological control, emphasis on training needs must be considered and necessary background to develop technical knowledge and skills of farmers should be provided. Cullen *et al.,* (2008) examined the factors that may influence uptake of biological control amongst farmers and considered what policies or strategies might be introduced to increase the incentive to adopt biological control. Relative advantage of biological control over other production systems, trialability (ease of informal field experimentation and learning before adoption) of biological control and the social dynamics of biological control development and extension are key factors influencing adoption. The most important social factors are the social learning processes to support agroecological practices, and the configuration of economic incentives to reward farmers for undertaking the transition to conservation biological control. By itself, neither social pressure to reduce insecticide use nor sophisticated scientific research guarantees expanded implementation of biological control. Some researchers in the world studied effective factors on new technology adoption including biological control adoption by farmers (Hosseini *et al.,* 2010; Singh *et al.,* 2008; Niyaki *et al.,* 2010, Mahdavi and Fahimi, 2001; Pezeshki-Rad *et al.,* 2006). Salami and Khaledi (2001) reported that farmer literacy, farm size and ownership, family size affect on adoption of biological control application in Mazandaran province of Iran.

MATERIALS AND METHODS

The purpose of this research was analyzing attitude of corn farmers toward biological control of *Sesamia Cretica* in Shoushtar Township, Iran. The population of this study included corn farmers in Shoushtar Township. The total number of members was 170 person. By census method all of them were studied. Questionnaire reliability was estimated by calculating Cronbach's alpha and it was appropriate for this study. Data were analyzed using the Statistical Package for the Social Sciences (SPSS). To reach the research objectives, appropriate statistical procedures for description were used. Data analysis was carried out through data description and data inferential analysis. A five-point Likert-type scale was used as the instrument to gather data in order to measure attitude of corn farmers toward biological control of *Sesamia cretica* in Shoushtar Township, Iran.

RESULTS AND DISCUSSION

Results

Demographic Profile

Table 1 shows the demographic profile and the descriptive statistics for some characteristics of corn farmers. The results of the demographic information of the farmers indicated that the age of 40% of corn farmers was between 33-47 years. The minimum age of participant was 19 years and the maximum age was 75 years. Based on educational levels, a greater proportion (24.12%) of them had guidance school level. Based on the income, 50% of them had 12-50 million rial in year.

Table 1: Demographic profile of corn farmers

variables	Frequency	Percentage	Cumulative Percentage	
Age				
24-32	30	10.3	10.3	Mean=38.5
33-41	179	61.5	71.8	Sd= 4.55
42-48	71	24.4	96.2	Min=24
No answer	11	3.8	100	Max=48
educational levels				
Illiterate	33	19.41	19.41	
Elementary	18	10.59	30.00	
Guidance school	41	24.12	54.12	
High school	15	8.82	62.94	
Diploma	38	22.35	85.29	
University	25	14.71	100.00	
Income (Million Rials)				
12-50	85	50	50	
50-100	79	46.5	96.5	
100-150	3	1.8	98.2	Mean=58.35
150-200	2	1.2	99.4	Sd=36.68
200-250	1	0.6	100	

Attitude of Corn Farmers Toward Biological Control of Sesamia cretica

In this study, for analyzing attitude of corn farmers toward biological control of *Sesamia cretica* in Shoushtar Township, the Likert scale was used. The ratings on the Likert scale were from one to five (1. Strongly Disagree, 2. Disagree, 3. No opinion, 4. Agree, 5. Strongly agree). The final computed score represented the overall level of attitude. The Table 2 revealed the answer of farmers to each item of attitude of corn farmers toward biological control of *Sesamia cretica* in Shoushtar and Table 3 identified the level of overall attitude of corn farmers toward biological control of *Sesamia cretica* in Shoushtar after computing 10 items of attitude.

Table 2: Frequency of corn farmers to each item of attitude toward biological control of *Sesamia cretica* in Shoushtar Township

Items	5	4	3	2	1	Mean	sd
Biological control of corn leaf worm (*Sesamia cretica)*, not suitable for pesticides.	28	33	52	49	8	2.86	0.147
Biological control of corn leaf worm (*Sesamia cretica*) is increased product safety.	166	3	1	0	0	3.94	0.402
Biological control of corn leaf worm (*Sesamia cretica*) reduce the environmental pollution	147	17	4	2	0	3.51	0.588
Excessive use of pesticides will lead to resistant leaf worm (*Sesamia cretica*).	106	47	16	1	0	3.33	0.715
Biological control of corn leaf worm (*Sesamia cretica*) is to increase farmers' income.	76	79	12	2	1	3.11	0.712
Biological control of corn leaf worm (*Sesamia cretica*) reduces costs.	74	79	14	2	1	3.23	0.723
Overuse of pesticides has led to soil contamination.	84	47	35	3	1	2.44	0.879
By Biological control, leaf worm (*Sesamia cretica*) disappears.	42	28	85	13	2	3.18	0.985
I don't use biological control of corn leaf worm (*Sesamia cretica*) because its effect is low.	1	1	26	54	88	3.89	0.798
May be harmful biological agent for the product.	1	3	21	32	113	3.93	0.823

1. Strongly Disagree, 2. Disagree, 3. No opinion, 4. Agree, 5. Strongly agree

Table 3: Level of overall attitude toward biological control of *Sesamia cretica* in Shoushtar Township

attitude	Frequency	Percent	Cumulative percent
Very low	0	0	0
Low	0	0	0
Moderate	1	0.6	0.6
High	51	30	30.6
Very high	118	69.4	100
Total	170	100.00	

Correlation study:

Independent variable	Dependent variable	r	p
Farm size	attitude toward biological control of *Sesamia cretica*	0.560	0.000
Technical knowledge		0.197	0.001
Social participation		0.168	0.013
Participation in extension programs		0.178	0.011
Communication channel		0.569	0.000
Social status		0.498	0.000
Age		-0.101	0.076
Social status		0.498	0.000
Land ownership		0.321	0.000
Income		0.108	0.054
Level of education		0.593	0.000

Spearman correlation coefficients to test hypotheses was used, the results of this test are as follows (Table 4):

The results of table 4 showed the correlation (r=0.560) between farm size and attitude toward biological control of *Sesamia cretica* at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that corn farmers with high farm size had high attitude.

The results of table 4 showed the correlation (r=0.197) between technical knowledge and attitude toward biological control of *Sesamia cretica* at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that corn farmers with high technical knowledge had high attitude.

The results of table 4 showed the correlation (r=0.168) between social participation and attitude toward biological control of *Sesamia cretica* at the level of 0.05 was significant. Therefore, the null hypothesis is rejected. It means that with 95% of confidence, we can conclude that corn farmers with high social participation had high attitude.

The results of table 4 showed the correlation (r=0.178) between participation in extension programs and attitude toward biological control of *Sesamia cretica* at the level of 0.05 was significant. Therefore, the null hypothesis is rejected. It means that with 95% of confidence, we can conclude that corn farmers with high participation in extension programs had high attitude.

The results of table 4 showed the correlation (r=0.569) between using communication channel and attitude toward biological control of *Sesamia cretica* at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that corn farmers with high using communication channel had high attitude. The results of table 4 showed the correlation (r=0.498) between social status and attitude toward biological control of *Sesamia cretica* at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that corn farmers with high social status had high attitude.

The results of table 4 showed the correlation (r=0.321) between land size ownership and attitude toward biological control of *Sesamia cretica* at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that corn farmers with high land size ownership had high attitude. The results of table 4 showed the correlation (r=0.593) between level of education and attitude toward biological control of *Sesamia cretica* at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that corn farmers with high level of education had high attitude.

Table 4: Relationship between attitude toward biological control of *Sesamia cretica* in Shoushtar Township and independent variables

Independent variable	Dependent variable	r	p
Farm size	attitude toward	0.560	0.000
Technical knowledge	biological control of	0.197	0.001
Social participation	*Sesamia cretica*	0.168	0.013
Participation in extension programs		0.178	0.011
Communication channel		0.569	0.000
Social status		0.498	0.000
Age		-0.101	0.076
Land size ownership		0.321	0.000
Income		0.108	0.054
Level of education		0.593	0.000

Regression Analysis

Table 5 shows the result for regression analysis by stepwise method. Liner regression was used to predict changes in attitude by different variables. Level of education, technical knowledge, social participation,

participation in extension programs, communication channel social status, participation in extension programs may well explain for 69.8% changes ($R^2 = 0.698$) in attitude of corn farmers.
$Y=11.232+0.230x_1+0.442x_2+0.365x_3+0.235x_4$

Table 5: Multivariate regression analysis

Independent variable	B	Beta	T	Sig
Level of education	0.565	0.236	3.476	0.000
Technical knowledge	0.654	0.172	2.347	0.000
Social participation	0.543	0.186	2.753	0.000
Participation in extension programs	0.512	0.465	2.863	0.000
Communication channel	0.454	0.734	3.473	0.000
Social status	0.642	0.346	2.948	0.000
Participation in extension programs	0.354	0.453	2.198	0.000
Constant	10.566	----	4.916	0.000

$R^2=0.698$ F=16.654, Sig= 0.000

Conclusion

The results of research showed the correlation between farm sizes, technical knowledge, social participation, participation in extension programs, communication channel, social status, land size ownership, level of education and attitude toward biological control of *Sesamia cretica* in Shoushtar Township was significant. Therefore, we can conclude that farmers with high farm sizes, technical knowledge, social participation, participation in extension programs, communication channel, social status, land size ownership, level of education had high attitude toward biological control of *Sesamia Cretica*. The result of regression analysis by stepwise method indicated level of education, technical knowledge, social participation, participation in extension programs, communication channel, social status, participation in extension programs may well explain for 69.8% changes ($R^2 = 0.698$) in attitude of corn farmers.

Therefore, to development of the attitude toward biological control of *Sesamia cretica* in Shoushtar Township, considering variables of level of education, technical knowledge, social participation, participation in extension programs, communication channel, social status, and participation in extension programs are essential. This should be considered by policy makers and decision makers.

ACKNOWLEDGMENT

This paper is part of MSc thesis of Sima Samarbafzadeh graduate student of agricultural management department, Shoushtar branch, Islamic Azad University. Thus, appreciate of professors and lectures of agricultural management department.

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