ASSESSING THE FARMER'S KNOWLEDGE REGARDING MANAGEMENT OF INSECT PEST AND DISEASES OF HONEYBEES (*Apis mellifera.* L.)

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ABSTRACT: *Like all insects, honeybees (*Apis mellifera*) are susceptible to pests and diseases, the majority of them are related to honeybees. Ranging from trivial stress to the decease of colony, these have impact on the colony strength. In this regard, the essential factor is to make aware the beekeepers to learn and identify pests and diseases and their management for the maintenance of colony strength, since health of single colony can affect another colony in the surrounding areas. Purpose of this study was to evaluate the beekeepers perceptions regarding insect-pest and diseases of honeybees. A survey Instrument such as questionnaire was used for data collection in proposed study area. Different factors like demographic profiles of the respondents; training and information for management of honeybees from pests and diseases and their knowledge level were evaluated. A list of 400 potential beekeepers was prepared with the help of Extension Department of District Sargodha. Of the 400 respondents a systematic random sample of 80 respondents was taken for analysis. Almost 45.6 % of respondents have no advisory services and they are not using any latest technology regarding honeybee's management from insect pests and diseases. Results showed that the cost is most prominent constraint with mean value (2.13) in the adoption of advanced management techniques. The respondents are in dire need of training and knowledge to improve their skills for management practices of honeybees. Government should facilitate the beekeepers for implementation of latest management practices. . The results revealed that the factors like age, education, experience and training and information have significant contribution in explaining the dependent variable of knowledge. These factors play pivotal role in the adoption of advance technologies by the respondents.*
Key words: Honeybees, insect-pests, management, assessment, perception

INTRODUCTION

Around the globe, knowledge is considered the absolute solution in any field of life. Particularly in agriculture, education and training of the farmers are key attributes those lead towards farmers learning and growth. Result oriented education mainly depends upon learning enrichment which could be gained through various educational approaches. , Assessment (systematic collection, review and use of information about programs undertaken for the purpose of improving learning and development [2] of any phenomenon and perceptions (process of gathering information through senses, organizing and making sense of particular phenomenon through previous experience and learning, attitudes and interests, needs and feelings and the existing situation) of the respondents could have great significance for evaluation of learning practice.

Keeping in view the above narrated facts, the study was designed to assess the knowledge of the respondents regarding pests and diseases of honeybees. Honeybees are social insects having great importance concerning religious and medicinal. Honeybees are economical and valuable pollinators of agricultural crops worldwide and kept commercially around the globe. Honeybees are social insects, which have colossal importance. These are most important pollinators for agricultural crops. In Pakistan, bee pollination of agricultural crops is said to account for wide range of high value fruits, vegetables, tree nuts, forage crops and some other field crops. Without proper rearing and management of honeybees, the pollination industry would become weak and ultimately quality and quantity of production of fruits, vegetables and other crops could badly reduce. On the other hand, at present, honeybees are suffering severely from a huge decline due to many diseases and notorious pests. Due to various disease and pests attack, their in-colony and out-colony activities are diluted. In Pakistan, presently, the main problems of farmers are pests and diseases, which create hindrance in the colony development.

Research Objectives:

- To determine demographic profiles of the respondents
- To determine training and information resources used by respondents regarding insect-pest and diseases of honeybees
- To determine knowledge level of the respondents regarding insect pest and diseases of honeybee
- To evaluate constraints in adoption of beekeeping management practices

MATERIALS AND METHODS

The study was undertaken in District Sargodha, Punjab-Pakistan. Due to conducive climatic conditions and available flora and fauna, the area is suitable for rearing honeybees. Four Tehsils of district Sargodha (Bhalwal, Sahiwal, Kot momin, Sargodha) were randomly selected for the data collection. From each Tehsil, a list of 60 potential honeybee keepers was prepared with the help of Extension Department of each Tehsil and hence gives population size of 240 honeybee keepers in district Sargodha. Of the 240 respondents, a systematic random sample of 80 respondents was selected for data collection. . Those beekeepers having 10 colonies were included as respondents and thus a sample of 80 respondents was obtained. A 43-items 5-point Likert-type scale questionnaire was developed for the factors such as demographic characteristics (4-items), advisory services available to the respondents (3-items), training and information regarding pests and diseases (7-items) and (8-items) respectively, knowledge level about insects pests and diseases (10-items) and (7-items) respectively. The content and face validity of the questionnaire was checked by the

panel of experts and cronbach alpha r=0.80 was computed to check the reliability of the instrument.

RESULTS AND DISCUSSIONS

The first objective of the study was regarding demographics, comprises of age, education, experience and colonies size. Maximum respondents (34.2 %) were from age group 45-54 and (31.8%) were from group 35-44. Results reveal that maximum respondents were experienced having sufficient knowledge about apiary management.

Table.1: demographic attributes of respondents

Demographic characteristics	Frequency	Percentage
Education		
None	29	36.3
Primary	22	27.5
Middle	17	21.3
Matric	10	12.5
Intermediate	2	2.5
Age		
15-24	9	11.4
25-34	18	22.9
35-44	25	31.8
45-54	27	34.2
55-64	1	1.3
Experience		
1-5	28	35.5
6-10	43	53.8
11-15	8	10.1
16-20	1	1.3
Advisory Services		
None	37	45.6
Private	17	21.5
Public	26	32.9
Total	**80**	**100.0**

Table-1 shows that, 36.3 % of the respondents were completely uneducated. Almost 27.5% of the respondents were educated up to grade -5 and only 2.5% respondents had education up to intermediate level. Experience plays significant role in adoption and diffusion of any new practice or technology. The results from above table reveal that 53.8 % respondents were having 6-10 years experience which shows that most of the respondents have had considerable experience in beekeeping and their management regarding pests and diseases. The advisory services to the beekeepers were evaluated and the results depict that only 32.9% of the respondents were receiving advisory services from extension department while 45.6 % were getting advisory services from public and rest of the 21.5 % were using private information source. It is concluded from results that strong and approachable extension system could play role in improving beekeeping industry in the area.

Table.2: Frequency Table of constraints opine Means and Std. Deviations of the constraints

Constraints	N	Mean	Std. Deviation
Limited access	80	1.763	0.661
Cost	80	2.137	0.670
Lack of expertise	80	1.900	0.740
Any other	80	1.900	0.704

1=little, 2=some, 3= much

Table -2 shows that many of the respondents were opined that cost of the honeybees is somewhat constraint since the mean score was 2.13 which means that beekeeping management techniques are costly and are considered as hindrance in improvement of beekeeping industry. The second most important constraint was lack of expertise in the beekeeping field with mean score (1.900). The least constraint was limited access with mean score as (1.762).

Training and information sources available to respondents for insect pest management were assessed during the study. Seven questions were asked for training and information regarding insect pest to the respondents. The results showed that highest mean was 2.42 about supplement feeding which means that most beekeepers have had sound knowledge regarding supplement feeding in the scarcity periods when there is shortage of flora and fauna. The second highest mean was group discussion with mean value 2.1, which shows that respondent manage the problems and issues of apiaries through group discussion. The least mean (1.687) was calculated about the question regarding their interaction with research institutions for apiaries and other related issues.

Table .3: Mean and Std. Deviation of Training and Information

Training and information	N	Mean	Std. Deviation
Have training about insect pest management	80	1.875	0.769
Any organization train about management	80	1.963	0.683
Information about supplement	80	2.425	0.612
Media TV radio	80	1.863	0.545
Short course	80	1.763	0.767
Group discussion	80	2.150	0.618
Interaction with research institution	80	1.688	0.704

1=very low, 2=low, 3=moderate, 4= high, 5= v.high

Regarding training and information about diseases of honeybees, eight questions were asked to the respondents. Results revealed that many of the respondents received information from their fellow farmers to cope up the diseases problems with mean score was 3.50. The second highest mean was 2.06 which shows that respondent mostly respondents seeks information in group discussion about disease management in honeybees. The minimum mean was calculated about the newspaper question with mean value 1.48 which shows that only few respondents were using the information from newspaper to protect their colonies from diseases.

The knowledge level of the respondents regarding management of insect pest was assessed. 10 different questions were asked from the respondents. The maximum mean was 3.53 which show that by using latest and advanced techniques there are maximum advantages as compared to the disadvantages in the beekeeping industry. The second highest mean was about disadvantages with 3.41 mean which depict that by using traditional beekeeping methods, respondent face many losses due to traditional methods of beekeeping.

Table.4: Means and std. deviations of training and information regarding diseases

Training and information about diseases of honeybee	N	Mean	Std. Deviation
Agriculture officer	80	1.850	0.554
Fellow Farmers	80	3.500	0.637
TV. Radio	80	1.900	0.756
Newspaper	80	1.488	0.693
Diagnostic expert	80	1.613	0.562
Any system	80	1.838	0.462
Group discussion	80	2.063	0.623
Interaction with institution	80	1.663	0.762

Table.5: Means and std. deviations of knowledge level regarding insect pest

Knowledge about insects pests	N	Mean	Std. Deviation
Knowledge about insect pest	80	2.5750	1.07650
Traditional method	80	3.4250	.59054
Management techniques	80	2.3875	.58448
Disadvantage	80	3.4125	.58879
Advantages	80	3.5375	.76214
Colonies damage	80	2.5500	.57147
Ants	80	2.9875	.80338
Wasps	80	2.9625	.78666
Mice	80	3.2875	.65976
Mites	80	3.1125	.67494

The knowledge level of the beekeeper regarding management of disease was evaluated by asking 7 most related questions. Maximum mean was recorded as 3.65 about regular monitoring of the colonies which show that the respondents monitor their honeybee colonies regularly daily. The second highest mean was 3.12 of American foul brood and American chalk brood diseases which depict that respondent have adequate knowledge about these disease.

Table.6: Means and std. deviations of knowledge level regarding disease

Knowledge level about disease	N	Mean	Std. Deviation
Prevention is better than cure	80	2.488	0.746
Disease attack by using Old method	80	2.875	0.905
Disease control measure effective	80	2.188	0.553
Regular monitoring	80	3.650	0.713
American foul brood	80	3.125	0.700
American chalk brood	80	3.125	0.700
Frogs attack	80	2.563	0.777

None=1, low=2, moderate=3, high=4, v.high =5

A simple regression model was applied with independent variable of training and information insect pest management and dependent variable was knowledge level of insect pest management the results of the model were found significant since the p-value of independent variable was less than from 0.05 alpha level. The model shows that knowledge level of the respondents depends upon the training and information regarding the particular phenomenon.

Table.7: Standardized and unstandardized regression coefficient

Model	Un standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	19.17	2.40		7.99	0.00
Training and information regarding insect pest	0.806	0.172	0.468	4.68	0.00

Dependent variable: knowledge level regarding insect pest
Independent variable: training and information regarding the insect pest

CONCLUSION AND RECOMMENDATION

The previous studies showed that education plays pivotal role in the development of learning societies of particular fields. Like in all fields, the education and training of the farmers is very much important regarding implementation of advanced technologies in the field. [1] emphasized in their study that extension educators must have the required level of competencies needed for the transfer of technology to the end-users. Same in beekeeping industry, the education and training of beekeepers is equally important. The beekeeping is done by traditional methods that's why diseases affect the colonies in the apiaries. The beekeepers in district Sargodha use old fashioned storage techniques and they bear loses in production of honey. Results of the study revealed that the knowledge level of beekeepers depends upon training and information of the respondents. Government should develop training and information centers to train beekeepers for use of latest methods. There is a dire need to make respondents aware regarding beekeeping and their management. Provision of pesticides and insecticides at the doorstep of beekeepers is another important step towards motivating the respondents for keeping honeybees.

Recommendations
- Government should formulate transparent policy regarding beekeeping industry in the country.
- Follow up training must be arranged for beekeepers.
- Government should relocate the experts of the field of apiculture in the extension department at Tehsil level to save the apiculture industry.
- Government should announce subsidies on advanced and costly technologies for management of honeybees.

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