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Factors affecting knowledge of sugarcane growers about integrated disease management practices

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Abstract
Sugarcane is the most important cash crop grown worldwide and plays a key role in economic and social development of the farmers. Now a days sugarcane cultivation and sugar industry stands as supporting pillar of Indian economy. The present study was conducted on 180 sugarcane growers selected from 12 villages in Karnal district of Haryana state during the period of 2018. Majority of the farmers were found to have medium level of knowledge about the elementary aspect and cultural practices of disease. In case of chemical control of disease, majority of the farmers had low level of knowledge. However, farmers had medium to low level of overall knowledge on integrated disease management. The study further revealed that sugarcane growers having higher education status, large land holding, more social participation, higher socio-economic status, more number of information sources, high risk capacity, economic motivation, more change proneness and better management orientation had high level of knowledge on IDM practices in sugarcane crop. Thus, it can be concluded from the foregoing discussion that information sources, risk orientation and management orientation had significantly contributed towards knowledge of integrated disease management.

Keywords: Practices, sugarcane growers, management

Introduction
Today sugarcane is one of the most important cash crop of the world and plays a key role in economic and social development of the farmers. Sugarcane crop is attacked by a number of insect pests, diseases and weeds right from the time of sowing till harvesting the crop. Yield losses due to these pests range from 15 to 20 per cent in spite of extensive use of pesticides (anonymous, 1994) [1]. Sugarcane is also afflicted by a number of diseases caused by fungi, bacteria and viruses which are important limiting factors in the successful cultivation of sugarcane. In this way diseases also make serious inroads into sugarcane production.

As such, Integrated Disease Management (IDM) practices is the integration of all pest and disease management measures in a compatible manner, so as to keep pest population below economic injury level, in such a way that is not only economically viable but also eco-logically sound. The objectives of IDM are to minimize environmental pollution, and to maintain eco-logical equilibrium by minimizing the use of pesticides. IDM aim is to generate sustainable practices. The pesticide use is allowed as a control measure, but only as a last resort. Therefore, knowledge of IDM practices is very necessary to contain the damages in sugarcane crop to sustain the productivity of sugarcane. Rate of knowledge of farm technology is different from individual to individual according to their characteristics familiarity with the technical component and availability of the resources. Farmers although may know and try to use the recommended IPM practices, but they are not aware about IDM to the desired level. Taking these facts into consideration and significance of IDM in sugarcane crop, the present study was undertaken with the following specific objectives: 1. To ascertain the sugarcane growers' existing level of knowledge about Integrated Disease Management practices. 2. To find out the relationship between socio-psychological factors of the sugarcane growers with their knowledge about IDM practices.

Research Methodology
The present study was conducted in Karnal district purposively selected on the basis of maximum numbers of sugarmills in Haryana state during 2018. The ex-post facto research design was applied for this study. There are six blocks in Karnal district, out of them, four blocks namely Karnal, Indri, Gharaunda and Nilokheri were selected randomly and from each

selected block, 3 villages adopted under IPM-FFS programme during 2016-17, were selected randomly. Thus the total number of 12 villages were selected from 4 blocks. From each selected village, a list of 30 trained farmers under IPM-FFS was prepared and from that list 15 farmers were selected from each village randomly. So the total sample size of 180 respondents were taken for data collection. The data was collected with the help of pre-tested well structured schedule by using interview with the sugarcane growers.

Variables and their measurement techniques

The term knowledge has been operationally defined as the amount of understood information possessed by the cotton growers on the IDM practices recommended by the IPM experts of State Agricultural Universities (SAUs) and Indian Council of Agricultural Research (ICAR) for sugarcane cultivation. The existing knowledge was measured with the help of well structured schedule developed for this purpose. Major technological components in relation to IDM practices such as identification of disease and their symptoms, cultural, biological and chemical control of various aspects of disease management were prepared on the basis of package of practices published by CCS HAU in consultation with the IPM experts. The schedule was administered to the farmers and responses were obtained on three point continuum, i.e. 'correct', partially correct' and 'wrong' and the scores assigned were 2, 1 and 0, respectively. The obtained scores on each aspect were added up both component-wise and respondent-wise to obtain the over-all knowledge score. Thus, the mini-mum and maximum possible attainable scores were 0 and 102, respectively. The overall knowledge scores of the respondents were arranged and divided into three categories, i.e. low, medium and high level of knowledge on the basis of equal-distance method. Ten important socio-psychological variables, namely, age, education, land holding, social participation, socio-economic status, information sources, risk orientation, economic motivation, change proneness and management orientation were selected and these variables were measure on the basis of indexces/scale available in the literature.

Findings and Discussion

Farmer's knowledge on different technological components of integrated disease management

It is apparent from the data in Table 1 that majority of the respondents (83.33%) had medium level of knowledge regarding elementary aspect of diseases followed by low (8.88%) and high (7.77%) level of knowledge. Regarding cultural practices, it was observed that 52.22 per cent of the total respondents were found to have medium level whereas, 25.00 and 22.77 per cent had low and high level of knowledge on cultural practices of disease control, respectively. The analyzed data contained in Table 1 revealed that majority of the respondents (66.66%) had low level of knowledge on chemical control of disease followed by medium level (25%) and remaining 8.33 per cent respondents had high level of knowledge.

Table 1: Distribution of respondents according to their level of knowledge of sugarcane growers about integrated disease management (IDM) practices (N= 180)

Sr. No.	Technological Components	Category	Score range	Frequency	Percentage	Mean score
1.	Elementary aspect	Low	Upto-1	16	8.88	3.03
		Medium	2-3	150	83.33	
		High	4 & above	14	7.77	
2.	Cultural	Low	Upto- 3	45	25.00	5.91
		Medium	4-6	94	52.22	
		High	7 & above	41	22.77	
3.	Chemical	Low	Upto- 2	120	66.66	2.96
		Medium	4-6	45	25.00	
		High	7 & above	15	8.33	
4.	Overall Knowledge	Low	Upto -8	70	38.88	11.12
		Medium	9-16	85	47.22	
		High	17 & above	25	13.88	

The table further made clear with regard to overall knowledge of integrated disease management that as high as 47.22 per cent of the respondents had medium level of knowledge followed by low level (38.88%) whereas, only 13.88 per cent respondents were found to have high level of knowledge on integrated disease management in sugarcane crop. The conclusion can, therefore, be drawn from the data that majority of the farmers were found to have medium level of knowledge about the elementary aspect and cultural practices of disease. In case of chemical control of disease, majority of the farmers had low level of knowledge. However, farmers had medium to low level of knowledge on integrated disease management. The findings of this study more or less are in line with the contentions of Alagesan (1998b), Ekka (1999) [2] and Jana (2000) [3].

Correlation between respondents' background variables and their knowledge of IDM practices in sugarcane crop

The correlation coefficients were worked out to establish the relationship between both the independent and dependent variables and the results have been presented in Table 2. It is evident, from the Table that out of ten, nine socio-psychological variables namely, education (0.573), land holding (0.487), social participation (0.365), socio-economic status (0.727), information sources (0.780), risk orientation (0.732), economic motivation (0.620), change proneness (0.712) and management orientation (0.741) were found to have positive correlation with the knowledge of sugarcane growers about IDM practices. But negative and non-significant correlation was observed with age (-0.118) of the respondents.

Table 2: Correlation and Regression between socio-psychological variables and their knowledge level of IDM practices in sugarcane crop (N=180)

Sr. No.	Socio- Psychological Variables	Correlation coefficients and Regression coefficients		
		r'	'b'	't'
1.	Age	-0.118NS	0.026	1.910
2.	Education	0.573**	0.110	1.198
3.	Land holding	0.487**	0.019	0.064
4.	Social participation	0.365**	-0.116	-0.757
5.	Social- economic status	0.727**	0.034	0.372
6.	Information sources	0.780**	0.268	4.426**
7.	Risk orientation	0.732***	0.135	2.750**
8.	Economic motivation	0.620**	0.068	1.207
9.	Change proneness	0.712**	0.030	0.263
10	Management orientation	0.741**	0.076	2.924**

R2 0.7184

** Significant at 1 per cent level ^{Ns}-Non- significant

This implies that sugarcane growers having higher education status, large land holding, more social participation, higher socio-economic status, more number of information sources, high risk capacity, economic motivation, more change proneness and better management orientation had high level of knowledge on IDM practices in sugarcane crop. It means that with the increase in these variables the knowledge will increase which would affect the knowledge of sugarcane growers. It implies that the farmers having young, middle and old age group had more or less same level of knowledge about the IDM practices of sugarcane. The findings of this study are in line with the contention of Murthy (1990) [5], Juliana *et al*. (1991) [4], Sumathi and Alagesan (1998a) [6], Ekka (1999) [2] and Jana (2000) [3].

Multiple regression analysis of sugarcane growers' background variables and knowledge of IPM practices

It may also Seen from the Table 2 that R2 value of 0.7184 with regard to IDM practices indicating that all the independent variables fitted in the regression equation accounted for 71.15 per cent variation towards the knowledge of IDM provided that other factors are held constant. The regression coefficients of information sources (0.268), risk orientation (0.135) and management orientation (0.076) were observed to be statistically highly significant in the knowledge of integrated disease management.

Thus, it can be concluded from the foregoing discussion that information sources, risk orientation and management orientation had significantly contributed towards knowledge of integrated disease management. This means that with the increase in one unit of these variables, the knowledge level of sugarcane growers will increase in the same proportion. More or less similar results were also reported by Ekka (1999) [2] and Jana (2000) [3].

Conclusion

On the basis of the study it can be concluded that most of the respondents were found to have medium level of knowledge about elementary aspect and cultural practices of diseases control whereas, majority of the farmers had low level of knowledge about chemical control of diseases. However, farmers had medium to low level of knowledge on integrated disease management. Regression analysis revealed that information sources, risk orientation and management orientation had significantly contributed towards knowledge of integrated disease management. Lack of knowledge about recommended dose of pesticides & bio-pesticides and lack of knowledge for determining ETL were reported by the sugarcane growers.

Hence, it is suggested that major emphasis in the IPM-FFS training should be given on the specific practices pertaining to determining Economic Threshhold Level, ETL based application of recommended dose of pesticides & bio-pesticides. IPM literature should be supplied to the sugarcane growers. The training should be repeated every season to enable the left over farmers to also get advantage of training. Integration of different agencies *viz*., the Directorate of Plant Protection, Quarantine and Storage, Govt. of India (Nodal agency for implementing national IPM programme), Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs), State Agriculture Department and pesticides companies are necessary for development of comprehensive system for future implementation of IPM-FFS programmes.

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