IJPP

RESEARCH ARTICLE

Knowledge of sugarcane growers regarding integrated pest and disease management practices in Nandurbar district

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ABSTRACT

The present study was undertaken in Nandurbar district with the specific objectives to know the knowledge level of sugarcane grower regarding IPDM practices. It was observed that regarding practice wise knowledge level of IPDM most of respondents had good information about cultural operations followed by Mechanical practices. In distributional analysis it was concluded that majority of the respondents had medium level of knowledge of IPDM practices. In relational analysis it was observed that education , land holding, area under sugarcane , annual income , socio-economic status and sources of information were positively and significantly correlated with Knowledge level.

How to view point the article : Patel, P.L., Supe, S.V. and Babar, M.S. (2013). Knowledge of sugarcane growers regarding integrated pest and disease management practices in Nandurbar district. *Internat. J. Plant Prote*c., **6**(1) : 1-5.

INTRODUCTION

Sugarcane is an important cash crop in Nandurbar district. Sugarcane production per unit area is comparatively low in this area. The lower yields are attributed to infestation of the crop by insect, pest and diseases. Therefore, the present study was conducted to know the extent of knowledge level of integrated pest and disease management practices by sugarcane growers. Thus, the study was conducted with following specific objectives to study the extent of knowledge of integrated pest and disease management practices by sugarcane growers and to study the relationship of selected characteristics of sugarcane growers with their level of knowledge about integrated pest disease management practices in Nandurbar district.

On the basis of the review of literature having direct and indirect bearing on the problem, conceptual framework was developed for the study and various concepts were operationalised suitably.

MATERIALS AND METHODS

The study was conducted in Shahada and Taloda Panchayat Samitees of Nandurbar district in Maharashtra state, where the sugarcane production was comparatively on large area. From this Panchayat Samiti, 15 villages were selected on the basis of more area under sugarcane crop. The village wise list of sugarcane growers, cultivating sugarcane since, last three years was prepared with help of Shahada and Taloda Panchayat Samitees officers and talathi. Out of these lists 150 sugarcane growers were selected by proportionate random sampling.

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Distributional analysis :

The study of personal, socio-economic and communication was made with reference to age, education, land holding, area under sugarcane, farming experience, annual income, socio-economic status and source of information. The results pertaining to the characteristics have been presented.

From the above table it was observed that majority of the sugarcane growers (48.67 %) represented middle age group, about half of the respondents (46.00 %) were educated up to high school level followed by one third of sugarcane growers

(62.67 %) possessed medium land holding (4.01 ha to 10 ha).

The data revealed that majority of the sugarcane growers (53.34 %) had put the area upto 1.0 ha under sugarcane crop, followed by above one-third of them (36 %) putting the area under sugarcane crop to the extent of 1.01 to 2.0 hectares. Majority of sugarcane growers (36.67 %) had their annual income between Rs. 1,00,001 to Rs. 150,000/-. As concerned to farming experience forty per cent of the respondents had 4 to 5 years experience in sugarcane cultivation. More than half of the sugarcane growers (57.33 %) were found to occupy upper middle level of socio-economic status in their social system while 50 per cent of sugarcane growers had an access to the various source of information at medium level.

Practice wise level of knowledge of IPDM practices :

The data in Table 2 indicated that majority of the respondents had knowledge about grazing by goat, cow, buffalo and other animal after harvesting in sugarcane field (82.00 %), deep ploughing (94.66 %), crop rotation (80.00 %), judicious use of manure and fertilizer (65.33 %) and using pests and disease

Sr. No.	Category	Respondents	
		Frequency (n=150)	Percentage
1.	**Age**		
	Young (upto 35 yrs.)	56	37.33
	Middle (36 to 50 yrs)	73	48.67
	Old (Above 50)	21	14.00
2.	**Education**		
	Illiterate	00	00
	Primary school	20	13.33
	Middle school	24	16.00
	High school	69	46.00
	College	37	24.67
3.	**Land holding**		
	Marginal	00	00
	Small	00	00
	Semi-medium	16	10.66
	Medium	94	62.67
	Big	40	26.67
4.	**Area under sugarcane**		
	Up to 1.0 ha	80	53.34
	1.01 to 2.00 ha	54	36.00
	2.01 to 3.00 ha	09	6.00
	3.01 to 4.00 ha	07	4.66
5.	**Annual income**		
	Up to 50,000 /-	06	4.0
	Rs. 50,001/- to Rs. 1,00,000/-	34	22.66
	Rs. 100,001 to Rs. 150,000/-	55	36.67
	Rs. 150,001 to Rs. 200,000/-	26	17.33
	Above Rs. 200,000/-	29	19.34
6.	**Farming experience**		
	Low	39	26
	Medium	60	40
	High	51	34
7.	**Socio-economic status**		
	Lower SES	00	00
	Lower middle SES	02	1.33
	Middle SES	58	38.67
	Upper middle SES	86	57.33
	Upper SES	04	2.67
8.	**Sources of information**		
	Low	37	24.66
	Medium	75	50.00
	High	38	25.34
		150	100.00

Table 1 : Distribution of respondents according to their personal socio-economic and communication characteristics

Table 2: Distribution of respondents according to their level of knowledge about different practices of IPDM		
Sr. No. Practices (IPDM)	Frequency (n-150)	Percentage
A. **Cultural practices**		
I **Pest and disease management**		
1. Grazing by cow, buffalo, goat and other animal in sugarcane field after harvesting for breaking the life cycle of pest and diseases	123	82.00
2. Deep ploughing to a depth of 20 to 25 cm	142	94.66
3. Crop rotation	120	80.00
Cotton – suru-ratoon		
Pulses – pre-seasonal-ratoon		
4. Pest and disease resistant and tolerant variety	80	53.33
Pest and disease resistant – CO- 86032, CO-7219		
Pest resistant – CO-7302, CO-7303		
Disease resistant – CO-7527, CO-7125, CO-740		
5. Recommended dose of manure and fertilizer	98	65.33
Application of manure – 20-25 tonnes/ha		
Application of Fertilizer – Pre-seasonal and suru-175:100:100 NPK kg/ha		
II **Pest management**		
1. Early earthing up operation – 45 days after germination	87	58.00
III **Disease management**		
1. Green manuring crop rotation – Green gram, Sannhamp, Pulses, Dhaincha	47	31.33
B. **Mechanical practices**		
I **Pest and disease management**		
1. Burning and destruction of affected plant parts, weed and other waste	128	85.33
II **Disease management**		
1. Hot water treatment-Dipping setts of sugarcane for 2.5 hours in hot water at 54^0C	53	35.34
C. **Biological practices**		
I **Pest management**		
1. Use of bio-agent *Trichogramma chilonis* @ 50,000 /ha – 4 releases	55	36.67
2. Conserving natural enemy – *Crysoperla carnea* @ 1000 adult /ha	34	22.67
3. Spraying of NPV @ 250 ml /ha - 4 spray	26	17.33
II **Disease management**		
1. Setts treatment with bio-culture *Azotobacter* @ 5 kg /ha	22	14.66
2. Name the disease control by *Trichoderma viride* @ 1.5 kg /ha	14	9.33
D. **Use of plant product**		
I **Pest management**		
1. Spraying of neem seed extract (5 %)	81	54.00
E. **Use of pheromone traps**		
1. Use of pheromone traps 25 traps/ha	6	4.00
F. **Chemical practices**		
I **Pest and disease management**		
1. Spraying should be undertaken when pest and disease population reaches ETL (Economics Threshold Level)	78	52.33
2. Maximum permissible limit for spraying insecticides, pesticides and fungicides	54	36.00
II **Pest management**		
1. Spraying of dimethoate (Rogar)	51	34.00
2. Spraying of pesticides and insecticides- Malathion, Endosulfan, Monocrotophos, Quinalphos etc.	89	59.23
III **Disease management**		
1. Setts treatment with fungicides Carbendazim (0.1 %) 100 g + 100 lit water (10 min)	37	24.66
2. Spraying of fungicides-Carbendazim, copper oxychloride, ferrous sulphate etc	47	31.63

resistant and tolerant variety (53.33) these practices are common for pests and diseases management. Early earthing up operation (58 %) for pest management and green manuring crop rotation (31.33 %) for disease management.

In case of mechanical practices it was found that majority of the respondents were having knowledge about burning and destruction of affected plant parts, weed and other waste (85.33 %), while 35.34 per cent of them were found to be aware of the hot water treatment for disease management.

Thus, it can be inferred that the respondents had good knowledge level with regard to cultural and mechanical practices of IPDM.

In case of biological component of IPDM practices. 36.67 per cent respondents possessed the knowledge about bio-agent. However, the knowledge with regards to sett treatment with bio-culture (14.66 %) and name the disease control by *Trichoderma viride* (9.33 %) for controlling seed born diseases. Data with regards to the knowledge possessed by the respondents about spraying of neem seed extract against pest, 54.00 per cent of the respondents had the knowledge about same. Further, it was also noted that only 4 per cent of the respondents had the knowledge about use of pheromone traps for pest management.

Regarding to chemical control of pests and diseases, it was noticed that majority of respondents (59.33 %) had knowledge about spraying of pesticides and insecticides for pest management, followed by almost 52.33 per cent had knowledge about spraying to be undertaken when pest and disease population reaches economic threshold level (ETL), whereas maximum permissible limit for spraying insecticides, pesticides and fungicides was known to nearly (36.00 %), 34 per cent had knowledge about spraying of dimethoate for pest control, further, it was observed that knowledge about spraying of fungicides (31.33 %) and 24.66 per cent of respondents had knowledge about setts treatment with fungicides for disease management.

From the above findings it may be inferred that the sugarcane growers in majority were aware about the cultural method of pests and diseases control. However, most of the respondents were not aware about biological and chemical methods for pests and diseases management on sugarcane.

There is a need to impart knowledge about biological and chemical control methods for pests and diseases management in sugarcane.

Table 3: Distribution of respondents according to their knowledge level

Sr. No.	Category	Frequency (n=150)	Percentage
1.	Low	34	22.66
2.	Medium	92	61.34
3.	High	24	16.00
	Total	150	100.00

Table 4: Correlation coefficients of characteristics of the respondents with their knowledge

Sr. No.	Variables	'r' values
1.	Age	– 0.4546**
2.	Education	0.8008**
3.	Land holding	0.4574**
4.	Area under sugarcane crop	0.2874**
5.	Annual income	0.6675**
6.	Farming experience	0.0229[NS]
7.	Socio-economic status	0.6228**
8.	Sources of information	0.6693**

** Indicate significance of value at P=0.01, NS= Non-significant

Table 5: Multiple regression analysis of independent variables with knowledge

Sr. No.	Variables	Regression co-efficient	SE (B)	't' value
1.	Age	0.0106	0.1424	0.0751
2.	Education	2.8379	0.5009	5.6652**
3.	Land holding	0.1779	0.4146	0.4291
4.	Area under sugarcane crop	– 2.7097	1.6217	1.6708
5.	Annual income	0.0000	0.0000	3.0113**
6.	Farming experience	0.0057	0.7005	0.0081
7.	Socio-economic status	– 0.0146	0.3666	0.0400
8.	Sources of information	0.0471	0.4749	0.0993

R^2 = 0.7027, 'F' value = 41.6726, ** Indicate significance of value at P=0.01

Levels of knowledge :

The data with regards to the level of knowledge possessed by the respondents about Integrated pest and disease management of sugarcane has been presented in Table 3.

The data with regards to the level of knowledge of respondents about Integrated pest and diseases management practices have been furnished in Table 3 showed that majority of the respondents (61.34 %) had medium level of knowledge about integrated pest and disease management practices of sugarcane. It could be concluded that the sugarcane growers had medium level of knowledge regarding integrated pest and disease management practices of sugarcane.

Relational analysis :

Characteristics and knowledge :

The correlation co-efficients of personal, socio-economical and communication variables with knowledge of respondents have been presented in Table 4.

It is observed from Table 4 that education (0.8008), land holding (0.4574), area under sugarcane (0.2874), annual income (0.6675), socio-economic status (0.6228) and sources of information (0.6693) were positively and significantly correlated with the knowledge level of the respondents. The relationship was significant at 0.01 level of probability. Age (–0.4546) was found to be negatively and significant with the knowledge level of the respondents. However, relationship of farming experience was found to be non-significant with knowledge level of the respondents.

The results of correlation analysis of knowledge with various variables showed that education, land holding, area under sugarcane, annual income, socio-economic status and source of information were positive and significantly correlated with knowledge, where as farming experience was non-significant and age was found to be negatively significant with knowledge.

Multiple regression analysis of independent variables with knowledge :

It was appropriate to find out the contribution of selected independent variables towards the variation in knowledge of IPDM practices of sugarcane.

In order to find out the contribution of different factors, regression co-efficient values (b) were calculated and presented in Table 5. The regression analysis contained in Table 5 indicated that out of eight variables the co-efficient of education and annual income were positively and significant with knowledge.

All these eight variables explained variation of 70.27 per cent in possessing the knowledge about IPDM practices of sugarcane an indicated by R^2 value (0.7027). The 'F' value (41.67) for R^2 was also found to be significant at 0.01 level of probability.

It indicated that out of total contribution eight variables education and annual income were positive contribution in explaining the variation in knowledge of the respondents about integrated pests and disease management practices of sugarcane.

Multiple regression analysis indicated that all eight independent variables jointly explained variation up to 70.27 per cent variation in knowledge possessed by sugarcane growers. Among education, area under sugarcane and annual income were major contributors influencing knowledge seeking of respondents.

Conclusion :

It is necessary that agricultural extension workers, through regular contacts and visits with the sugarcane growers should guide the farmers and demonstrate the impact of IPDM practices on yield per hectare by planning and implementing the whole village demonstration on IPDM in sugarcane.

It is observed that most of the sugarcane growers are lacking in detail knowledge about *Azotobacter, Trichoderma*, bio-agent, NPV, conservation of natural enemies, pest and disease resistant and tolerant varieties, hot water treatment, use of neem seed extract and Judging of ETL for pest and disease control. The extension workers of should therefore convince the farmers about various biological, chemical and mechanical measures through the organization of demonstration and visit of farmers to research stations and progressive farmers field. The bio-control measures needs to be made available in adequate quantity at the easily accessible places.

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Internat. J. Plant Protec., **6**(1) April, 2013 : 1-5

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