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Study on the Infestation of various Borers in Sugarcane from District Dadu Sindh

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ARTICLE INFORMATION

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Author's contribution

AA observed the samples in field noticed the infestation, RS designed the experiment and supervised this work & SK & IK compiled the data.

Key words:

Pest, sugarcane, varieties, Chilo, infestation, quality, damage

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1. INTRODUCTION

he sugarcane (Saccharum officinarum L.) is the vital cash crop in the world including Pakistan. It belongs to the family Gramineae and is a big source of economy from the agriculture field. This crop is mainly grown for the sugar and sugary production. Sugarcane grows the worldwide about 20.42 million ha and the production is 1333 million metric tons [1]. In Pakistan, Sugarcane is occupying about 1128.10 thousand hectors, yearly production 62.8 million tons. The Pakistan is suited in 5th position among the top ten sugarcane growing country. However, there are so many factors that inherently low cane and sugar yielding varieties are major constraint of cane and sugary production in Pakistan. Almost 1500 species of insects feed on the sugarcane throughout the world [2], about 48 species from Indo-Pakistan subcontinent feed on crop [3] and approximately a dozen of important insects pest have been found from Pakistan [4] as well as including the Sindh province [5] among them the borers, and

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ABSTRACT

During the present investigation weekly survey has been carried out in district Daud and the study area was divided into 05 different sectors where 04 varieties of sugarcane i-e: SPF-234, CPF-237, Thatta-10 and BL4 are grown in 08 sectors. During the field survey maximum infestation of 05 borers viz: stem borer (*Chilo tumidicostalis*), shoot borer (*Chilo infuscatellus*), Internode Borer (*Chilo sacchariphagus indicus*), top borer (*Sciropophaga excerptalis*) and root borer (*Emmalocera depressella*) was reported on cane. It was noticed that borers usually damage the cane and effect quantity, quality and reduce the sucrose of cane. The infestation belongs to the *Chilo* species is cause damage approximately 10 - 80% of cane and somewhere causing "dead heart "which low down the market value of crop.

production giving an average cane yield of 56 tons per hectare in Sindh. The District Dadu is total covered of area 7866 square kilometers, and there are five insect pest borers in sugarcane crop i-e: stemborer (Chilo tumidicostalis), shoot borer (C.infuscatellus), internode borer (C. sacchariphagus indicus),top borer (Sciropophaga excerptalis) and root borer (Emmalocera depressella). Effects of these serious Chilo species borers consequently reduce the quality, quantity and sucrose of the cane. The Chilo species was appeared 1st time in 1933 the District Rohtak and Damage the crop about 80% in India [6]. Irshad et al., [7] reported that about 5.2% percent joints of sugarcane were infested by borers and sugar recovery was reduced about 0.55%. Usually, SPF-234, CPF-237, Thatta-10 and BL4 cane verities are grown in Dadu and significantly affected by numbers of pest species including Chilo species which are responsible of huge reduction. 02 varieties i-e: SPF-234 and CPF-237 are grown all sectors of the growing field and Thatta-10 and BL4 are grown somewhere these verities have different resistance against infestation of the borers. In district Dadu there is a" Dadu sugar mill" that is big source for the

farmers which established in 1977-78. But due to this alarming situation yield per annum is reduce and Sindh liable to contribute too much in economy of Pakistan. Present attempt has been made to note the infestation of borers of sugarcane in District Dadu.

2. MATERIALS AND METHODS

2.1 Study Site

The weekly survey was conducted in sugarcane growing areas in District Dadu, the survey was done in order to determine incidence, extensive prevalence and distribution of major sugarcane infecting pests and it was conducted in different seasons. Main 08 sectors i-e: Payaro, Patt Shareef, Kakar, Phulji and Sita were visted time to time these areas are near about 25 - 30 km away from each other and somewhere less or more.

2.2 Collection of samples

The weekly survey was conducted through extensive visit throughout all growing sectors during December 2015 to November 2016 the cropping seasons of borers infestated of sugarcane field were observed early in the morning and afternoon, almost 15 random and 15 non-random samples were collected from each areas by moving diagonally in the field and the survey was conducted in District Dadu, Sindh.

2.3 Identification of Samples

Sugarcane borer were identified by given protocol of [8] and [9]. Further, for correct identification of specific character of each sample was throughly observed under Sterscopic Micrscope. Biside this catterpillar (Larvae) characteristic was also cencentred for confirmation of species.All collected specimens were deposited in the Entomology Bio-Control Research Lab (EBCRL), Department of Zoology, University of Sindh, Jamshoro.

2.4 Quantitative deamage

The observation on the infestation of different borer species was recorded at weekly intervals stating from germination till harvest of the crop. During early vegetative growth stage the infestation was recorded on dead heart basis and later on internode basis.

3. RESULTS

It was observed that District Dadu production is about 20 thousands ton of sugarcane. Sugarcane crop continuously damages by different borers species Present it was noticed that 05 pest borers i.e. Stem

Borer (Chilo tumidicostalis), Shoot Borer (Chilo infuscatellus), Internode Borer (Chilo sacchariphagus indicus), Top Borer (Sciropophaga (Emmalocera excerptalis) and Root Borer depressella) damage the cane and effect quantity, quality and reduce the sucrose of cane. It is observed that most dominate species belonging to genus species Chilo on the cane and causing maximum damage in all visited sectors (Table 1 a-d) Chilo species damages about 10 - 80% of the cane and reduces the yield quantity and somewhere "dead heart". It was also noted that the first time growing sugarcane is less affected then the second time and second time is less effected then the third time or lope is more effected than the second lope such like infestation increase lope by lope (Fig.1). It has been seen from Table 2 that various species of borer show fluctuated occurrence in difference seasons. This infestation of stem borer were significantly highest during this month of October to November in Kakar and Phulji sectors while most of the borer were not found in the Autumn season. In case of the spring season in 03 sectors i.e: Payaro, Patt shareef and Sita were occupied with borer's population while remaining sectors were free from this with exception of few rare numbers of steam borer and root borer seen in March. Beside this, Table 1 indicates that there is great fluctuation in population density of borer in various seasons of the year. During the present study 08 sectors were visited but key concentration was focused on 05 sectors (Fig. 2). Table 2 indicates that infestation percentage of stem borer was significantly higher i-e 28% in Payaro and Phulji followed by 27% in Kakar. Opposing to this, infestation of top borer was significantly low i-e 10% in Phulji and there was no significant differences were observed in infestation rate of shoot borer in all visited sectors.







Fig 1. Infestation of different bores in sugarcane.

Table 1. Seasonal occurrence of borers in various sectors in different month of the year 2016-17

a. October (Autumn) 2016

	Sectors									
Borers	Payaro	Patt Shareef	Kakar	Phulji	Buriri	Sade Mosani	Makhdom Bilawal	Sita		
Stem Borer	+++	+ +	+++	+++	+	++	+	+++		
Internode Borer	+ ++	+ +	++	++	+	++	+	+++		
Shoot Borer	++	+	+++	++	+	+	-	+ +		
Root Borer	+ +	+ +	+	++		+	-	+		
Top Borer	++	+	++	++	+	++		++		

b. November (Autumn) 2016

	Sectors									
Borers	Payaro	Patt Shareef	Kakar	Phulji	Buriri	Sade Mosani	Makhdom Bilawal	Sita		
Stem Borer	+ +	+ +	+++	+++	+	++	+	+ +		
Internode Borer	++	+ +	+ +	++	+	++		+ +		
Shoot Borer	+ +	+	+ +	+++	+	+		++		
Root Borer	+ +	+ +	+	++		+		+		
Top Borer	+ +	+ +	+ +	+ +	+	+		+ +		

c. February (Spring) 2017

	Sectors									
Borers	Payaro	Patt Shareef	Kakar	Phulji	Buriri	Sade Mosani	Makhdo Bilawal	Sita		
Stem Borer	++	++	++	+		+		+		
Internode Borer	++	+ +	++	+				+		
Shoot Borer	++	+ +	+	+++	+			+		
Root Borer	++	+ +	+	++				+		
Top Borer	+	+	+	++				+		

d. March (Spring) 2017

Borers	Sectors									
	Payaro	Patt Shareef	Kakar	Phulji	Buriri	Sade Mosani	Makhdom Bilawal	Sita		
Stem Borer	+	+		+		+				
Internode Borer	_	_	_	_				_		
Shoot Borer	_	_	_	_	+			_		
Root Borer	+	_	_	_				_		
Top Borer										

Table 2: Infestation percentage of Chilo species in five sectors in District Dadu

S. No	Borers	Payaro	Patt shareef	Kakar	Phulji	Sita
1	Stem Borer	26%	24%	25%	26%	22%
2	Internode Borer	20%	21%	20%	23%	20%
3	Shoot Borer	14%	15%	16%	13%	18%
4	Top Borer	12%	14%	12%	10%	16%
5	Root Borer	28%	26%	27%	28%	24%



Fig 2. Infestation rate of the various borers in different localities in District Dadu

4. DISCUSSION

Sugar is essential items in our daily life. It is cash crop in Pakistan and contributes big portion in economy of country. But due to attach of many pest species its proper yield capacity is reducing day-byday. The basic aim of this work was to note the infestation rate of some borers in cane fields. During field it was observed that *Chilo* species reduces the yield capacity. So it was essential to conduct a study of prevalence of *Chilo* species in a sugarcane sectors. At present infestation of borers significant reduce the

yield in various important growing sectors of Dadu. Similar studies were conducted in other regions of Sindh by Khan et al., [13]. They also reported that in Sindh borer's infestation is big thread for formers present study agreed on this account. Further, there are also some conflicting reports about cane stages which suffer maximum borers infestation and there are some factors affecting cane yield as well as sugarcane recovery, several authors [2], [10], [11], [12], [13] carried work on the different aspects of sugarcane pests from different areas of the world including Pakistan, but in the District Dadu there was no such survey done before this. This atempt has been conceded for first time and 08 sectors incuding 05 major sectors were incpected. Overall, it was noticed that borers baddly effect the yield and after infesation cane is no longer in any specific use except we can used this as fuel resource. Rehman et al., [9]

provide the identification and distribution pattern of stem borers from Bangladesh they reported that infestations of cane has been started in the month of May after this it reduce. Present study suggests that it might be due to climatic change in June. Ullah, [14] noticed that C. sacchariphagus damage the crop an internode formation take place and continuous its activity till the harvestmen it was also observed that juice quality deterioration occur when this infestation is severe. A part from this, Khan et al., [13] worked out on the population dynamics of C. infuscatellus, they reported that it is very destructive pest damaging crop when internode formation occurred. They calculated overage percentage of C. infuscatellus was 9.08±3.97 in chamber followed by 8.44±5.69 in Tando Allahyar. However they did not mentioned any specific cane yield variety. During present study we have visited 04 varieties and noticed considerable damage of Chilo on cane verities.

5. CONCLUSION

During this study it is observed the chilo damage almost 10 - 80% of cane and reduces the yield quantity, quality and sucrose. Present study suggests that 05 borer's species significantly damage the 04 varieties, of sugarcane in field. However, there is no significant morphological varieties were observed in the emergence of adult moth. Further, during the field survey it was also observed that this borer also had attached other plant of cane under family graminae poaceae. Present study recommends that Chilo tumidicostalis was found major pest borer for all grown sugarcane varieties which prevails in Dadu, Sindh. This study will be very helpful to know the major insect's pests and their extent of damage so that in future proper control measures can be used to minimize the number of insecticides.

6. CONFLICTS OF INTERESTS

The authors declare that there are no conflicts of interests regarding the publication of this article.

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