Research Note

EFFECT OF TRASH MULCHING AND *TRICHOGRAMMA CHILONIS* (ISHII) ON SUGARCANE BORERS INFESTATION

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ABSTRACT

These studies were conducted at farmer's field in Faisalabad during 2002 and 2003 to find out an effective and economical IPM measure against sugarcane borers. Layout system was RCBD with three replications. The data revealed that trash mulching between rows+ release of egg parasite *Trichogramma chilonis* @ 20000 eggs/acre effectively controlled sugarcane borers with minimum borers infestation (5.00% in 2002 and 4.33% in 2003) followed by the plots where only egg parasites were released (6.75% in 2002 and 6.40% in 2003) with 18.33 and 26.65 percent parasitism. Check showed maximum borer infestation (11.33% in 2002 and 12.65% in 2003) with minimum parasitism (0.42 and 0.33%).

KEYWORDS: Sugarcane; straw mulches; Chilo; Scirpophaga; parasite; Pakistan.

INTRODUCTION

Sugarcane is one of the most important cash crops of Pakistan but its per hectare yield is low as compared to many other sugarcane growing countries. Among many factors responsible for low yield, sugarcane borers play a pivotal role. The predominant species causing damage to this crop are; top borer (*Scirpophaga nivella* F.), stem borer (*Chilo infuscatellus* Snell), root borer (*Emmalocera depressella* Swin.) and Gurdaspur borer (*Acigona steniellus* Hampson) (3).

Indiscriminate use of pesticides has created many serious problems like development of pest resistance, resurgence of pests, outbreak of secondary pests, environmental pollution, hazardous to human and livestock, etc. To avoid such problems and to minimize pesticide use, cultural practices and release of bio-control agents are of prime importance (11).

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Trichogramma chilonis, a polyphagous egg parasite, has been successfully used in Pakistan against lepidopterous insect pests including sugarcane borers (8). The economically effective release rate (EERR) of *Trichogramma* eggs for various borers of sugarcane crop should be at least 15000 to 30000 per acre. *Trichogramma chilonis* started parasitizing eggs of *Chilo infuscatellus* in the month of March (9,12). Reduction in dead hearts in young canes and internodes infestation has been noted in sugarcane fields where *Trichogramma chilonis* was released (4, 5). *Trichogramma* was successfully used in Sindh over an area of about 50000 hectares of sugarcane where borers infestation has been reduced from 30 percent internodes damage to less than 5 percent (13). *Trichogramma* sp. parasitized 10-15 percent egg masses of sugarcane borers primarily due to innudative releases (14).

Trash mulching also plays an important role in reducing borers infestation in sugarcane and has been recommended as an alternative for chemical control of sugarcane shoot borer, *Chilo infuscatellus* Snell.(15). It has also been reported that sugarcane trash proved better with minimum cane damage and maximum yield (1,7). *Chilo infuscatellus* infestation was significantly lower in trash mulched plots and incidence of egg parasitoid, *Trichogramma chilonis* was comparatively higher in plots where trash mulching was done (2). However, other crop residues such as wheat straw mulch had higher cane yield than sugarcane trash (6) but sugarcane trash is easily available and economical.

Keeping in view the importance of sugarcane in Pakistan's economy, present studies were planned to overcome its borer problems by implementing IPM practices.

MATERIALS AND METHODS

These studies were carried out at farmer's field in Faisalabad during 2002 and 2003 (cv. BL-4). Layout system was RCBD with three replications and plot size was 22.86 x 45.72 meter. There were four treatments i.e. sugarcane trash mulching between rows 15 days after germination(T_1), parasitized egg cards stapled on sugarcane leaves at one month interval @ 20000 eggs per acre from April to September (T_2), sugarcane trash mulching + parasitized eggs cards(T_3) and a check(T_4). The effectiveness of parasitoid in controlling sugarcane borers was observed by assessing the damage caused by borers from five randomly selected spots at 15 days interval. Egg masses of borers from each treatment were collected and examined in the laboratory for emergence of parasites to record parasitism. The data were statistically analyzed with LSD (P=0.05).

RESULTS AND DISCUSSION

During 2002, minimum borers' infestation (5.00%) with maximum parasitism (40.00%) was observed where trash mulching + egg parasites (T_3) were released followed by T_2 (6.75% borers infestation with 18.33% parasitism). In T_1 borers infestation was 8.00 percent with 10.00 percent parasitism. However, in check (T_4) borers infestation and parasitism was 11.33 percent and 0.42 percent, respectively.

During 2003, minimum sugarcane borers infestation (4.33%) and maximum parasitism (37.70%) were also observed in T_3 followed by T_2 (6.40% borers infestation and 25.65% parasitism). In T_1 borers infestation and parasitism were 8.00 and 10.00 percent, respectively. Trash mulching performed better than check (T_4) but it is important for increase in parasitism and decrease in borers infestation.

Table: 1 Average sugarcane borers infestation and parasitism during 2002 and 2003.

Treatments	2002		2003	
	Av.borers infestation (%)	Av. parasitism (%)	Av.borers infestation (%)	Av. parasitism (%)
T_1 = Sugarcane trash mulching	8.00 b	10.00 c	7.64 b	12.33 c
T_2 = Release of parasites @ 20000 eggs/acre	6.75 b	18.33 b	6.40 b	25.65 b
T_3 = Sugarcane trash mulching + release of parasites @ 20000 eggs/acre	5.00 c	40.00 a	4.33 c	37.70 a
T_4 = Check	11.33 a	0.42 d	12.65 a	0.33 d
LSD (0.05)	1.695	3.035	2.475	2.835

Trash mulching between rows + release of egg parasites *Trichogramma chilonis* @ 20000 eggs per acre was found as the most effective with minimum sugarcane borers infestation (5.00%, 4.33%) and maximum parasitism (40.00 % , 37.70%) during both years followed by T_2 where only egg parasites were released. These findings are in conformity with earlier studies (1,2,4,5,13,14,15) where less internodes damage and more parasitized egg masses of sugarcane borers were found in the plot having trash mulching and egg parasites. Khan and Alam (12) also confirm the present findings regarding number of eggs released per acre.

REFERENCES

1. Anon.1991. Annual Report. Mauritius Sugar Industry Research Institute, Pp.9.
2. Arif. H.M., J.W.Mathew and A. Shahzad. 2001. Effect of trash mulching on the infestation of stem borer *Chilo infuscatellus* Snellen, its natural enemies and overall sugar productivity in the Habib Sugar Mill area at Nawabshah Sindh. Pak. Sugar J.16 (3):6-14.
3. Ashraf, M. and B. Fatima.1980. Status of research work on sugarcane borers in Pakistan. The Nucleus. 17:9-17.
4. Ashraf, M. and B. Fatima. 1993. Control of sugarcane borers by inundative release of *Trichogramma chilonis* (ISHII). Pak. J.Zool, 25(1):23-25.
5. Cheng, W.Y. 1986. Research on *Trichogramma chilonis* (ISHII) and its utilization for the control of sugarcane borers in Taunan. Plant Prot. Bull. 28:41-58.
6. Deho, Z.A., S.D. Tunio, Y.J.Minhas and H.J.Majeedano. 2002. Effect of mulching techniques on the growth and yield of sugarcane. Pak. Sugar J. 17(4):22-26.
7. Habib, A., M.Ashfaq, S.M.Ismail and A.Ali. 1995. Effect of different mulches on borers attack and weeds in sugarcane. J. Agric.Res.33 (4):217-222.
8. Hamid.F., M.A. Qureshi, and A.I.Mohyuddin. 1998. Use of *Trichogramma chilonis* (ISHII) as biological control agent for Gurdaspur borer, *Acigona steniellus*(Hampson) at Tandlianwala Sugar Mills Ltd., Kanjwani. Faisalabad.Proc. 33rd Annu. Conv. Pak. Soc. Sugar Tech., Lahore., p.63-70 PP.
9. Hashmi, A.A. and A. Rahim. 1985. Pest management model of sugarcane borers in Sindh. Pak. Intern. Pest Control, 27:88-91.
10. Hassan, S.A., E. Stein, K Dammeman and W.Reichel.1986. Mass production and optimization of *Trichogramma* control of European corn borer, *Ostrinia nubilalis* Hubner J.Appl. Ent.101:508-515.
11. Huffaker, C.B. 1980. New Technology of Pest Control. John Wiley and Sons. New York U.S.A. 500.
12. Khan, K.A. and M.M.Alam. 2001.Some facts regarding the use of *Trichogramma* against the sugarcane borers. Proc. 36th Annu. Conv., Pak. Soc.Sugar Tech., Rawalpindi .103-107.
13. Mohyuddin, A.I., A.Hamid and A. Mohammad. 1994. Integrated pest control of sugarcane borers in the NWFP. Int. Instt. Bio.Contr., Pak. Agri. Res. Council, Islamabad, Pp.8.
14. Panday, K.P., R.G.Singh and S.B.Singh.1997.Integrated control of top borer *Scirpophaga excerptalls* Walker in Eastern, U.P. Indian Sugar. 47 (7):491-492.
15. Subramanian,A., K.Kukasekaran and B.Velayantgham. 1977. Trash mulching an alternative for chemical control of sugarcane shoot borer *Chilo infuscatellus*(Snell).Indian Sugar. 27(8):575.