

CHEMICAL CUM CULTURAL CONTROL OF SUGARCANE LODGING

By

Muhammad Aslam*, Ghulam Sarwar*, Shafiq Ahmad**, M. Haroon Ashraf***

*Sugarcane Research Station, Khanpur. **Sugarcane Research Institute, Faisalabad

*** M. Sc Student, Agronomy Department, UAF

ABSTRACT

An investigation on the control of sugarcane lodging through chemical and cultural means was carried out at Sugarcane Research Station, Khanpur during 2010-11. The treatments included the application of Modus @ 320 ml/ac hundred days after sowing, earthing up with tractor ridger or spade and combined application of Modus and earthing up against untreated control. The results revealed significant improvement in cane weight, cane formation cane and sugar yields due to reduced cane lodging in treated plots against control. A measurable increase in cane yield and CCS up to 15.26 and 14.68 % was recorded in the plots where Modus was applied along with earthing up, respectively.

Keywords: Sugarcane, Weedicides (Modus), Yield, Recovery, Cane weight, Earthing up.

INTRODUCTION

Globally sugarcane is the main source for sugar production. It has become the most important cash and industrial crop of Pakistan. The agricultural sector contributes about 22% to country's GDP with sugarcane share of 0.7% (Jamil *et al.*, 2007). Out of 12 major Cane growing

countries of the world, Pakistan ranks 5th in area and production but 11th in cane yield and 7th in sugar production. One of the important factors affecting cane and sugar yields is lodging of cane stalks. A lodged sugarcane crop is more liable to damage by rodents. Its auxiliary buds sprout or may be damaged by rotting or false tillering starts which reduces cane weight and sugar recovery. Besides yield and quality losses, lodged cane remains no fit for seed purpose. About 30% reduction in cane yield and 8.63% in CCS due to lodging has been reported by Ahmad, 1997. Sarwar *et al.*, 2000 observed 27.50% increase in cane yield and 5.54% in CCS due to earthing up with cane ridger. In a field study under Faisalabad conditions, earthing up gave significant more cane yield over no earthing up (Anonymous, 2003). Afzal and Chattha, 2004 concluded that earthing up helps in sugarcane lodging as it gives sufficient anchorage to cane stalks. Earthing up should be done at the completion of tiller formation in the month of March for September planting and May-June for spring planting. Minhas *et al.*, 2004 noticed that earthing up increased cane yield significantly through improvement in cane height, girth and tillers per plant. Aslam *et al.*, 2008 carried out

a two years field study and recorded 19.20% increase in final cane yield due to earthing up in pre sown sugarcane. A measurable increase in CCS was also noticed owing to reduced lodging in earthed up plots.

Keeping in view the drastic decline in cane and sugar yields due to lodging, the present studies were undertaken to chalk out strategy for reducing lodging in spring planted sugarcane.

MATERIALS AND METHODS

The studies were carried out at Sugarcane Research Station, Khanpur during 2010-11 to quantify the role of chemical and cultural means in reducing sugarcane lodging. A commercial sugarcane cultivar SPF-234 was sown by dry method in February using a seed rate of 75000 double budded setts per hectare. The experiment was laid out in RCBD with three replications and a net plot size of 6m x 10m. The row to row distance was 1.2m. The treatments included the application of Modus @ 320 ml/ac hundred days after sowing, earthing up with tractor ridger or spade and combined application of Modus and earthing up against untreated control. The crop was fertilized at the rate of 168-112-112 Kg NPK/ha. The

whole P and K were applied at the time of sowing. The N was applied in three splits, 1/3 at the completion of germination, 1/3 at tillering and remaining 1/3 at the time of earthing up in the month of May. All other cultural practices were kept uniform at recommended level. The data on different yield and quality parameters were recorded using standard procedures during the course of study. The data thus collected were analyzed using Fisher's Analyses of Variance Techniques and the treatments were compared using Least Significance Difference Test at five percent level of probability (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Germination and Tillering

Germination is the most crucial factor which determines the plant population to a great extent and ultimately final cane yield. It denotes the activation of eye buds with formation of root primordia. The data presented in table-1 explicate that germination percentage ranged from 46.59 to 49.00. The statistical analysis of the data depicts non significant differences among the treatments with respect to germination. So far as tillers per plant are concerned, the studied practices remained at par with one another as the statistical analysis reveal non significant differences. The matching effect of different treatments on cane germination and tiller formation is probably

because of the fact that all the treatments were applied after the completion of tillering. The non significant effect of earthing up on germination and tillering has also been reported by Anonymous, 2003 and Aslam *et al.*, 2008.

Cane Weight and Density

Individual cane weight is an important character which directly contributes to final crop harvests. It is explicit from the data given in table-1 that all the treatments produced heavier canes than those of control plot. The test factors, however, remained at par with one another. The production of heavier canes in the treated plots may be due to reduced lodging.

Millable cane density plays a tangible role in determining the final cane yield. A narrow glance at the data embodied in table 2 elucidate that the treatments exerted a measurable effect on cane formation. The combined application of modus and earthing up established maximum stand of 108.78 thousand canes per hectare which was comparably followed by earthed up plot with spade. It was in turn at par with alone modus application. The development of thick cane stand in treated plots is probably due to low trend of cane lodging which reduced tiller mortality and as such high cane formation was recorded. Aslam *et al.*, 2008 and Minhas *et al.*, 2004 have also reported similar results.

Stripped Cane Yield

High cane yield is the ultimate target of each and every grower. The collation of the data set out in table 2 evinces pronounced effect of treatments in uplifting the final cane yield. The highest cane yield of 120.45 t/h was harvested from the plot where modus was applied along with earthing up. It was matchingly followed by modus alone, earthing up with spade or tractor ridger. A close perusal of data depicts 15.26% increase in cane yield due to combined application of modus and earthing up over untreated control. Better cane yield in earthed up Plots may be attributed to the reduced lodging, better cane weight and high cane formation. Significantly higher cane yield with earthing up has also been noticed by Ahmad, 1997, Sarwar *et al.*, 2000, Anonymous, 2003, Jamil *et al.*, 2007 and Aslam *et al.*, 2008.

Cane Lodging

Lodging in sugarcane fields is an undesirable character which drastically lowers the final cane and sugar yields. The data packed in table 3 predict that cane lodging was confined to 10.33 percent in the plot where modus was applied along with earthing up, closely followed by alone application of modus and earthing up either with tractor or spade. The crop was lodged up to 50.33% in untreated control plot. The minimum lodging in treated plots may be ascribed to chemical effect of modus and proper soil compaction around the cane stalks due to

earthing up which provided sufficient anchorage to cane stem against lodging. The similar observations have also been reported by Aslam *et al.*, 2008.

CCS and Sugar Yield

Sugarcane is actually grown for sugar in Pakistan. It is well clear from the data presented in table 3 that CCS was improved up to 14.68% due to the adoption of different practices in the investigation. The production of better quality and more

number of millable canes due to different treatments resulted in high sugar yields over control. Sugar yield was improved up to 32.19% in treated plots. Higher CCS and sugar yields in treated plots may be attributed to minimum lodging which reduced sprouting of auxiliary buds and false tillering. Improvement in cane quality as a result of earthing up has also been disclosed by Anonymous, 2003 and Aslam *et al.*, 2008.

CONCLUSION

On the basis of the results recorded in the present study, it may be concluded that the application of Modus alone, earthing up or their combined application improved cane and sugar yields significantly, A wider scale testing of the studies in different agro ecological conditions is invited to strengthen the results widely.

Table-1 Cane germination, tillering and weight as affected by chemical cum cultural control of sugarcane lodging

Sr. No.	Treatment	Germination %	Tillers Plant ⁻¹	100-cane weight (Kg)
1	Moddus @320ml/Ac	49.00	2.46	112.33a
2	Earthing up with Tractor	46.59	2.44	109.00a
3	Earthing up with spade	47.60	2.48	108.33ab
4	Moddus + earthing up	48.92	2.46	110.67a
5	Control	48.64	2.45	101.33b
LSD 0.05		N.S	N.S	7.51

Values with different letter(s) differ significantly (P=0.05)

Table-2 Cane density and yield as affected by chemical cum cultural control of sugarcane Lodging

Sr. No.	Treatment	Cane stand 000/ha	Cane Yield t/ha	Variation %
1	Moddus @320ml/Ac	106.39bc	118.45a	13.35
2	Earthing up with Tractor	103.61c	112.95ab	8.09
3	Earthing up with spade	106.27ab	115.11a	10.15
4	Moddus + earthing up	108.78a	120.45a	15.26
5	Control	103.17c	104.50b	-----
LSD 0.05		N.S	N.S	-----

Values with different letter(s) differ significantly (P=0.05)

Table-3 Cane lodging, CCS and sugar yield as affected by chemical cum cultural control of sugarcane lodging

Sr. No.	Treatment	Cane lodging (0– 9)	CCS %	Sugar Yield t/ha
1	Moddus @320ml/Ac	1.67	11.21	13.28
2	Earthing up with Tractor	2.67	11.10	12.54
3	Earthing up with spade	2.33	11.17	12.86
4	Moddus + earthing up	1.33	11.25	13.55
5	Control	5.33	9.81	10.25
LSD 0.05		-----	-----	-----

Values with different letter(s) differ significantly (P=0.05)

Fig.1 Cane germination, tillering and cane weight as affected by lodging control treatments

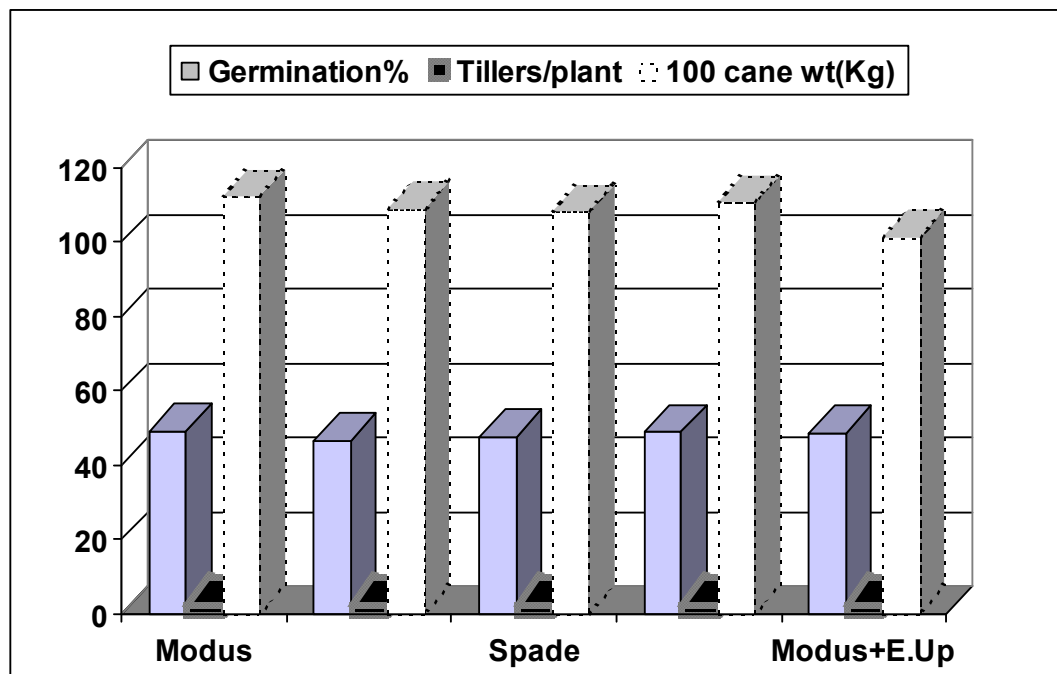
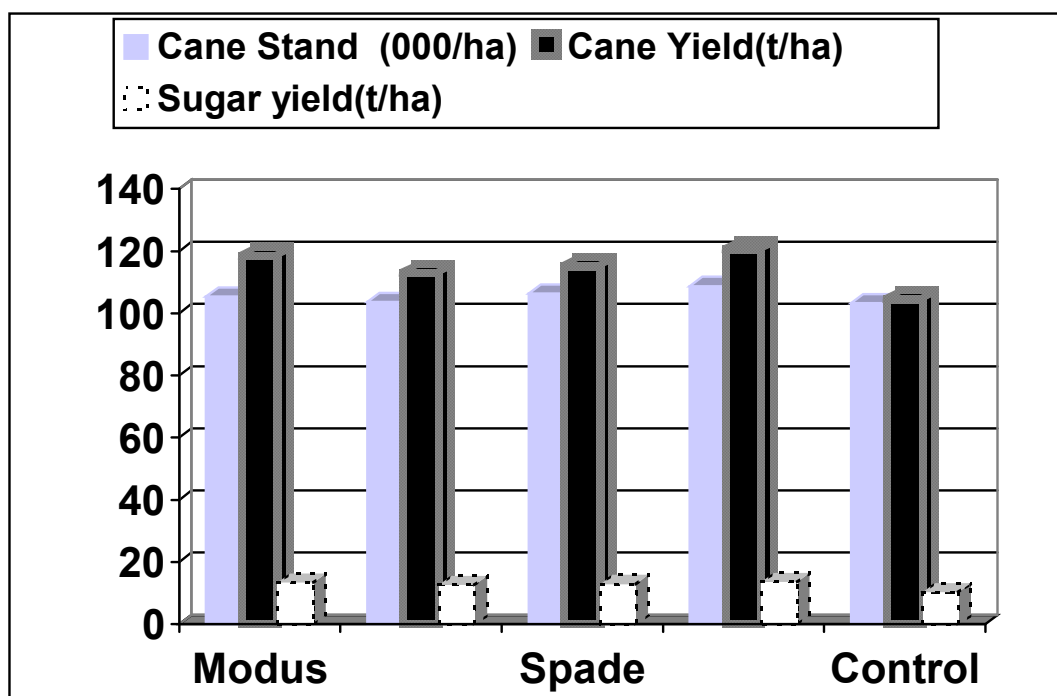


Fig.2 Cane Stand, Cane and Sugar yield as affected by lodging control treatments



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