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Assessment of Yield loss in Two Promising varieties due to White Leaf Disease

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ABSTRACT

An experiment was conducted to assess the loss in yield of cane and sugar of two promising varieties Isd. 16 and Isd. 17 due to white leaf disease (WLD) in plant crop during 1984-85. Significant losses on yield of cane dueto the disease were 59.9 and 58.0% in the varieties Isd. 16 and Isd. 17 respectively. Sugar yield also dropped down by 60.62 and 59.10% respectively.Significant difference of millable stalks was also found between healthy and diseased canes in both the varieties.

INTRODUCTION

The white leaf disease (WLD) is considered as the second most serious disease of sugarcane in Bangladesh at present. The disease is spread all over the country causing a lot of troubles in cane cultivation. The most badly affected areas are the greater districts of Kushtia, Jessore, Rajshahi, Faridpur, Mymensingh, Dhaka and Dinajpur. In Taiwan, white leaf incidence was over 10% in the cane fields of 682, 446, 668, 165, 135, 20 and 11 hectarages during the crop years 1965-'66 to 1972-'73 respectivelv (Leu, 1974). Rahman *et.al.* (1982) reviewed the report of some authors on sugarcane plantation in Thailand and reported that white leaf was an epidemic disease there and it was impossible to get a plantation free from this disease. The yield loss due to white leaf disease contributed less by the shortening of cane (37.2%) by the reduction in weight (51.01%) and more by the reduction in sucrose content (81%) compared to their healthy cane (Chuang-Yang and Ling, 1983). Liu *et.at.* (1963) reported that yield loss depends on the time of occurance and the degree of incidence of the disease. If diseased cuttings were used, the yield loss could reach upto 77-78%. Rahman *et.al.* (1982) found 52.54 and 57.54% loss in cane and sugar yield respectively in the infected canes compared with their healthy canes. Hutchinson (1982) reported 50% loss in sugar in the variety Isd-2/54 due to white leaf disease.

A few years back this desease was not so serious in Bangladesh. Now it has become alarming for cane production. Most of the commercial varieties are susceptible to this disease (SRTI Annual Report, 1985). In the crop year 1984-85, the most recently released varieties Isd. 16 and Isd. 17 were found to be seriously affected by white leaf disease in all the sugarcane growing areas in the country and the infection were ranged from5-80%. In July, 1986, it was observed that the promising clones. I-41/75, I-491/76, I-24/76, I-59/74, I-112/76 and I-21/75 affected by WLD and the infection ranged from 0.50 to 7.38% at MKSM (SRTI Annual Report, 1986). Almost all the commercial varieties and promising clones are infected by WLD. As the incidence of the disease is increasing day by day in Bangladesh and causing severe losses, so this study was undertaken to findout the actual losses incurred by the disease.

MATERIALS AND METHODS

The experiment was conducted in the experimental farm of Mobarakganj Sugar Mills Ltd. during the crop season 1984-'85. White leaf infected and healthy seeds of the varieties Isd. 16 and Isd. 17 were collected from commercial and foundation seed crop of the farm respectively. Sterilized cutting implements were used during preparation of the setts. The experiment was set up in CRD design with four replicated plots for each treatment. Fifty three-eyed setts for each treatment were planted in each plot containing five rows. Germination and tillering data were taken on 60 and 180th day respectively since plantation. Disease incidence was recorded at a regular interval upto harvest. The data on millable canes and weight of canes of three inner rows were recorded at ten months old crop. The three rows of each plot were constituted with 30 clumps. Randomly selected five number of canes from each plot were also analysed for sugar content at harvest. Later on the results on germination, number of millable canes, weight of cane and sugar recovery of both diseased and healthy canes were statistically analysed.

RESULTS AND DISCUSSION

Assessment of losses in diseased canes compared to healthy ones were made on different parameters contributing to yield such as germination, tillering, millable cane, weight and sucrose content. No significant difference on germination was found between healthy and diseased crops. Non-effective chlorotic tillers developed in diseased clumps of both varieties which are the characteristic symptoms of white leaf disease. Very few of those white leaf affected tillers succeeded into millable canes. It was noted that the infected seeds produced 100% diseased clumps and the healthy seed produced 100% healthy ones. Losses in millable canes of Isd. 16 (51.8%) were much more than that of Isd. 17 (31.8%) due to the disease (Table 1).

Table 1. Impact of WLD on germination, millable cane, yield and sucrose content.

Variety	Treatment	Germination		Millable cane		Weight of cane		Yield of sugar		
		Germination on 60th day of plantation (%)	Reduction on germination (%)	Av. millable cane per plot (No.)	Reduction in millable cane (%)	Av. wt. of canes per plot (kg)	Reduction in weight (%)	Av. sucrose (%)	Av. Yield of sugar (kg)	Reduction in sugar yield (%)
Isd. 16	Healthy	97.50	—	297.75		198.25		9.11	18.07	
Isd. 16	Diseased	91.50	6.15	143.50	51.8**	79.50	59.9**	8.95	7.16	60.62**
Isd. 17	Healthy	96.50	—	273.50		199.12		9.20	18.31	
Isd. 17	Diseased	96.50	—	186.50	31.8**	83.62	58.0**	8.96	7.49	59.10**

** indicates significance at 0.01 level as per 't' test.

The total weight loss due to WLD infection of Isd. 16 and Isd. 17 showed 59.9 and 58.0% respectively (Table 1). The results agree with the findings of Rahman *et. al.* (1982) who found 52.54% reduction on yield in the variety Co. 1158. Though the recovery percentage between healthy and diseased canes did not differ significantly but the difference in sugar yield were highly significant in both the varieties due to decline of cane yield due to disease infection (Table 1). The results were concurrent

with the findings of Rahman *et. al,* (1982) and Chuang-Yang and Ling (1963). The varieties selected for this project were highly susceptible to white leaf disease and the losses in number of millable canes, weight of canes and recovery percentage were not rigid but varied from one variety to another due to their varying degree of susceptibility.

REFERENCES

Chuang-Yang, C. and Ling, K.C. 1963. Studies on the White Leaf Disease of Sugarcane. V. Comparative Test of Healthy and Diseased Stools. Rept. Taiwan Sugar Expt. Sta. **32**: 123-130.

Hutchinson, P.B. 1982. Report of Pathology Advisor, Bangladesh Australia Sugar Industry Project, March 1982, Part 1,p. 7.

Liu, H.P.; Lee, S.R. and Teng, W.S. 1963. Studies on the Effect of cane yield and the Heat Treatment of White Leaf Disease of Sugarcane. Rept. Taiwan Sugar Expt. Sta., **32**: 103-110.

Leu, L.S. 1947. An Insectary Method for Testing Sugarcane Varieties for Resistance to White Leaf Disease. *Proc. ISSCT,* **15**: 266-274.

Rahman, S.; Kamal, M.M. and Malek, M.A. 1982. The White Leaf Disease and Its Control by Hot Water Treatment. *Bangladesh J. Sugarcane,* **4**: 75-79.

SRTI Annual Report, 1986. Sugarcane Research and Training Institute Annual Report 1985. Ishurdi, Pabna, Bangladesh. p. 46.