

Survey of Sugarcane diseases in early stages of plantation, its incidence and distribution in the Sugar Mills Zone in Bangladesh.

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ABSTRACT

A preliminary survey of the diseases of sugarcane in early period of plantation showed that grassy shoot disease (GSD) symptoms resembling white leaf, smut, leaf spot, mosaic and pokka boeng disease were common in different mills zones. The occurrence of these diseases varied, however, in different varieties and mill zones. Red rot, was not evident at the time of survey. This was perhaps due to carrying out of survey on younger crops. The occurrence of GSD and symptoms resembling white leaf diseases were noticed in Co.1158 and ISD-2/54 in all mills zones. Smut and mosaic were also noticed in Co.1158 and ISD-2/54 in the souther zone. Incidence of mosaic was moderate to severe in Co.975, Co.1158, ISD-1/53 variety at MKSM and in I-112/67 and I-156/66 in the mills trial plot at Jaipurhat Sugar Mills and Thakurgaon Sugar Mills. Symptoms resembling pokka boeng were noticed in ratoon crops of BO-70 and ISD-5/55 in non-supervised plot at Jaipurhat Sugar Mills. Leaf spot diseases were noticed in all varieties, specially in plots which were inter-cropped with mustard.

INTRODUCTION

Sugarcane is one of the major cash crop in Bangladesh where an attempt is being made to produce sufficient sugar and 'gur' to fulfill minimum per capita requirements. However, diseases of sugarcane are hampering this programme. So far twenty one diseases have been recorded in Bangladesh (Annual Report, Special Issue 1973-78, SRI, Ishurdi).

Grassy shoot disease which is potentially a serious one in the early stage of cane, is characterised by excessive and premature tillering accompanied by suppressed plant growth and marked reduction in root system (Singh, 1963). Smut in sugarcane was found in all areas and high incidence was recorded in ratoon cane in the variety Co. 1158. (Annual Report 1973-1978. Special issue, SRI, Ishurdi), Chona (1956) reported a reduction in yield of 70 percent in some ratoon crops in India.

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Various leaf spot diseases are not considered to be of great economic importance at present in Bangladesh although in some countries these may reduce both cane and sugar yields of susceptible varieties. In Louisiana, Abbot (1951) compared the yield of cane and sugar recovery in the brown-spot susceptible variety CO-36-105 and found that both were markedly lower in severely diseased plots. Sett rots are important in that they cause germination failure which results in poor stands in commercial cane. Considering all these facts a survey was conducted on disease incidence on the cane plantation and constraints due to manpower and available time dictated the survey to be carried out during the month of November, December and January 1979-80 in only 3 of the 15 sugar mills zones. This paper describes the results of initial survey aimed at determining the distribution and severity of some more common diseases in Bangladesh.

MATERIALS AND METHODS

There are 15 sugar mills and approximately 200 thousand acres of land are under cultivation in the mill zones of Bangladesh. The present survey was conducted in 3 mill zones, namely, Thakurgaon, Mobarakganj and Jaipurhat Sugar Mills Ltd. representing northern, southern and central cane growing areas respectively. The following categories of crops were sampled :

- Supervised plants (SP)
- Supervised ratoons (SR)
- Non-Supervised plants (NP)
- Non-supervised ratoons. (NR)

In addition, several categories in mills farm, like nursery plots, mills trial plots and commercial plots were included. Low and high land plantings were considered proportionately.

The zones selected for survey were divided into 4 sectors such as north, south, east and west as suggested by Hutchinson (1979). In each sector, 4 locations were selected. Twenty plots were chosen in each location in such a manner that on an average all categories and varieties were represented. However, it was flexible in that if the categories were not equally represented within a single location, an attempt was made to sample an equal number of plot of each category within the sector as a whole. For example, the distribution of plots in 4 locations within a representative sector was as follows :

Category	No. of Plots at Location				Total
	1	2	3	4	
SP	5	7	6	2	20
SR	7	3	4	6	20
NP	3	4	5	8	20
NR	5	6	5	4	20
	20	20	20	20	80

The disease incidence was assessed as the percentage of inspected stools which was based on a multiple of 100 stools. Five hundred stools representing approximately 1/20 acre were considered to be representative sample size. To provide a representative sample of the whole plot, the rows inspected were such that they were more or less evenly distributed across the plot. The 20 plots at each location were inspected in a single day. It was possible to make inspection of each plot during the survey period.

RESULTS AND DISCUSSION

The results are presented in table 1. The degree of incidence stated as slight moderate etc. are expressed in the table. The main constraint of the experiment was that a range of commercial varieties was often not available in a particular location. As expected, very few ratoon crops were available for inspection.

Table 1. Incidence of disease in different sugar mills during November—January (1979-1980).

Mills.	Variety	Disease and degree of infection.					
		White leaf.	GSD	Smut	Leaf spot	Mosaic	Pokka boeng.
Central zone (JSM Ltd.)	Co. 975	—	—	—	M	—	—
	Co. 1158	VSL	VSL	VSL	M	—	—
	ISD-1/53	—	—	—	—	—	—
	ISD-2/54	VSL	VSL	VSL	VSL	—	—
	ISD 5/55	—	—	—	M	—	SEV
	ISD-9/57	—	—	—	M	—	—
	Bo-17	—	—	—	M	—	—
	Bo-67	—	—	—	M	—	—
	Bo-70	—	—	—	M	M	SEV
	I-155/66	—	—	—	M	VSEV	—
	I-112/67	VSL	—	—	M	VSEV	—
	L. Jaba-C	—	—	—	M	—	—
Northern zone (TSM Ltd.)	Co. 1148	—	—	—	M	—	—
	Co. 1158	VSL	—	—	M	—	—
	ISD-1/53	—	—	—	M	—	—
	ISD-2/54	—	—	—	M	—	—
	BO-70	—	—	—	M	—	—
	BO-71	—	—	—	M	—	—
	I-156/66	—	—	—	M	—	—
Southern zone (MKSM Ltd)	L. Jaba-C	—	—	—	M	—	—
	Co. 975	—	—	VSL	VSL	M	—
	Co. 1158	SL	M	VSL	VSL	M	—
	ISD-1/53	—	—	—	—	SEV	—
	ISD-2/54	SEV	M	VSL	VSEV	—	—
	I 112/67	—	—	—	—	SL	—
	L. Jaba-C.	—	—	—	VSEV	—	—

Degree of infection :

1. Very slight	=	0.5%	VSL	=	Very slight
2. Slight	=	0.5-1%	SL	=	Slight
3. Moderate	=	1.0-5%	M	=	Moderate
4. Severe	=	5.0-20%	SEV	=	Severe
5. Very severe	=	More than 20%	VSEV	=	Very severe.

In the central zone (Jaipurhat Sugar Mills Ltd), slight infection of white leaf, GSD and smut were noticed in the varieties Co. 1158 and ISD-2/54. Severe GSD and smut symptoms had developed in a particular plot of Co. 1158 ratoon cane which may cause severe losses in yield. Rao and Prokasham (1956) reported losses in yield due to smut infection ranging from 39 to 59 percent in plant cane as compared to 52 to 73 percent in ratoon crop. Moderate leaf spotting and sett decaying were noticed in all varieties namely Co. 975, Co. 1158, ISD-1/53, ISD-5/55, ISD-9/57, BO-17, BO-57, BO-70, I-156/66, I-112/67 and Latereejaba-C. Leaf spot diseases were noticed in all the varieties specially in plots which were intercropped with mustard. Very slight white leaf infection was noticed in I-112/67 and very severe mosaic infection (100%) in mills trial plot. However, only 4% mosaic was recorded in foundation plots which had been planted from clean seed material derived from a plot where careful roguing was carried out. This provided convincing evidence that this disease could be controlled to a large extent by using mosaic free materials. This is in agreement with the observation of Steib & Chilton (1968) who stated that removal of primary infection by digging of the whole stalk in early spring plus an early July roguing of infected stools with a sugarcane knife was the most effective technique used in controlling mosaic. The early July roguing apparently removed the secondary spread which occurred between April and early June. This seemed desirable because (a) removal of infected stalks, early results in elimination of source of inoculum from the area and (b) an earlier roguing makes the jobs in July easier when temperature is high. Shaffer (1939) was able to maintain the moderately susceptible Co. 290 free of mosaic by roguing but was less successful with the more susceptible Co. 281. Moderate infection of mosaic in Bo. 70 in the nursery crop and very severe mosaic infection were noticed in I-156/66 in mills trial plot. Pokka boeng incidence was noticed in ratoon crop of Bo-70 and ISD-5/55 in non-supervised plot at Jaipurhat Sugar Mills Ltd.

In the northern zone (Thakurgaon Sugar Mills Ltd), very slight white leaf infection was noticed in Co.1158. Moderate leaf spot and sett rot were found in all the varieties viz: Co.1148, ISD- 1/53, BO- 70, BO-71, I-156/66, I-112/67 and L.Jaba-C. This mill zone was late planted and thus only limited disease could be expected in the very young plants.

In the southern zone (Mobarakganj Sugar Mills Ltd), slight white leaf and smut infection were recorded in Co. 1158 and ISD-2/54. Moderate GSD and mosaic infection was noticed in Co. 1158. Very severe white leaf, leaf spot, mosaic and very slight smut was recorded in Co. 975. Very severe mosaic and leaf spot infection was noticed in ISD-1/53. Slight mosaic infection was noticed in I-112/67 which had not developed symptoms fully in the early stages. Sett-decaying infection was recorded in all varieties namely Co. 975, Co. 1158, ISD-1/53, ISD-2/54, I-112/67 and L. Jaba-C. However, further works on the incidence of diseases in different zones will confirm the distribution and severity of some more common diseases and resistance potential of several cultivated varieties to the prevailing diseases in Bangladesh.

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