THE INTRODUCTION OF A NEW VARIETY TO FARMS IN THE DUMISA AREA IN AN EFFORT TO COMBAT A MOSAIC PROBLEM

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Abstract

High levels of sugarcane mosaic became widespread in the Dumisa district of the Natal south coast between 1943 and 1985. A substantial reduction in the incidence and severity of the disease has been achieved since 1985, primarily by changing to N12, a variety more resistant to mosaic than other locally grown varieties. Achieving this change in the varieties grown required the co-operation of all the growers and grower bodies in the district. The paper describes how this was achieved.

Introduction

Sugarcane mosaic virus has been a problem in the South African sugar industry since its very early days. The variety Green Natal (circa 1880) succumbed to the disease. In the Dumisa district of the Natal south coast, situated at an altitude of about 500 m, high levels of mosaic have been recorded since 1943. Since then, the problem has been closely studied by the SASA Experiment Station research and extension staff. Since it was formed in 1982, the Sezela Local Pest and Disease Control Committee, which is responsible for the Dumisa district, has also concentrated its efforts on the problem.

Of the predominant varieties planted between 1943 and 1985, Co281, NCo339 and NCo293, followed by NCo376, were highly susceptible to mosaic and have been a major cause of the spread of the disease, and the high levels of mosaic which had developed in the Dumisa district by 1985 (unpublished data). The problem was exacerbated by the cropping of maize, which is also a host plant to the aphid vector which transmits the mosaic virus. Large areas of maize are grown in the Dumisa area and in the neighbouring areas of KwaZulu.

Initially, there was strong resistance by the farmers to change from the favoured variety NCo376. They believed that with or without mosaic, this was the variety best suited to the area. However, there has been a steady increase in the area planted to the mosaic resistant variety N12 since its release in 1980, and a corresponding decrease in mosaic levels has occurred (See Table 5).

Method

The widespread incidence of mosaic in the Dumisa district and the fact that the main solution was the introduction of a mosaic resistant variety, meant that there could be no solution to the problem in the short term. It was therefore necessary to keep farmers aware of the need to sustain a total mosaic control strategy and to monitor the incidence of this disease.

The strategy included the following practices:

- The planting of mosaic resistant varieties
- The use of disease free seedcane
- The elimination of all volunteer cane from fields to be replanted
- The elimination of diseased cane stools from plant cane fields and seedcane nurseries
- The avoidance of planting during the period of peak mosaic vector activity, from mid-November to mid-February.

The introduction of local pest and disease committees in 1982 was an important development. Routine surveys by the Sezela LP&DC Committee's inspection team produced a clear picture of the extent of the mosaic problem in the Dumisa area, focusing on those farms where it was more serious.

Table 1

Sezela Mill area disease survey results - Ward IV Dumisa June 1990 to May 1991 (unpublished data)

Variety	Fields inspected	Area inspected (ha)	Fields with mosaic	Av. % mosaic	Highest field %
NCo376	76	878	75	2,03	25,90
N12	52	577	49	1,04	4,40

The Sezela Local Pest and Disease Control Committee's activities in the Dumisa area include:

- Disease survey results are sent to growers with written recommendations by the Pest and Disease Control Officer
- Ward members of the committee visit farmers who have a problem with mosaic, to discuss control measures
- The Pest and Disease Officer reports at grower meetings, visits the growers, and organises disease and survey inspection training days for farm employees
- Strict control of seedcane quality used and its movement between farms.

Since 1980, the Experiment Station has managed variety and yield trials and mosaic susceptibility trials on Tanhurst Estate in the Dumisa district. In November 1989 another variety trial was established on "Drumdarroch" farm to compare the relative susceptibility to mosaic of varieties N12, N16, N17 and N21 with that of NCo376. The better yield of N12 in the field, and its greater resistance to mosaic compared with NCo376 are well illustrated in Tables 2, 3 and 4. These results were reported to growers at every opportunity (Bailey, 1991).

Table 2

Variety performance figures - Drumdarroch farm 1991/92 season (personal communication)

Variety	Area (ha)	Tons cane/ ha	Age (mth)	Tons cane/ ha/mth	Tons sucrose/ ha/mth
N12	123,7	105,8	21,2	5,0	0,70
NCo376	138,4	99,4	22,6	4,4	0,60

Table 3

Mosaic in released varieties in screening trials - Tanhurst Estate 11 July, 1986 (unpublished data)

Variety	No. of trials	No. of crops	% shoots with mosaic
NCo376	12	24	33,4
NCo293	4	10	24,6
N14	10	21	11,5
N12	11	21	6,9
N13	7	12	10,0
N11	8	12	0,2
N17	6	10	4,1
N16	9	16	3,1

Table 4

Mosaic inspections - Drumdarroch trial site - EVT 11/09/P (unpublished data)

Inspections Date/Age	23 May 1990 5,4 months		30 July 1990 7,7 months	
Variety	Mosaic %	Mosaic as % of NCo376	Mosaic %	Mosaic as % of NCo376
NCo376	10,7	100	12,3	100
N12	3,0	28	3,9	32
N16	2,3	22	4,4	36
N17	3,0	28	4,8	39
N21	1,4	13	1,5	12

Experiment Station research staff have attended numerous grower meetings to present and discuss their trial results, and articles have been published in the South African Sugar Journal to keep growers informed.

The Dumisa mosaic problem has received the close attention of the Experiment Station extension officer since the disease became an issue in the mid-1950s. Control measures for mosaic, in particular the promotion of N12, have been the subject of many discussions with growers. Other extension activities have included newsletters, field days at the local trial sites, productivity group meetings, situation surveys, and support for the Sezela Pest and Disease Control Committee programmes.

Peer pressure cannot be under-estimated in the effect it has on farmers to make changes. In the same way that varieties are a regular topic of discussion among farmers, the issue of mosaic is also debated. Such informal debate has a marked influence on a farmer's decision to change his old practices and adopt new ones.

By serving on the Local Pest and Disease Control Committee, producing good quality seedcane for sale, and their commitment to work together in the community the growers also have made an important contribution to the mosaic control strategy.

Results

The effect of the mosaic control measures implemented by growers, and more specifically the introduction of N12, has been positive. The area planted to N12 on 22 farms in the Dumisa district since 1987, and the corresponding mosaic levels for each season are shown in Table 5.

Table 5

Dumisa area - Seasonal mosaic levels and area planted to N12 (unpublished data)

Season	Average mosaic %	% of cane area under N12
1985/86	7,5	
1986/87	6,7	
1987/88	3,8	19
1988/89	2,7	22
1989/90	1,4	27
1990/91	2,1	36
1991/92	2,0	45

As growers in the Dumisa district harvest their crop on a two year cutting cycle, it requires more time for a new variety's impact on production to be felt. N12 was released to Dumisa growers early in 1980 and its influence on the area only became marked during the 1987/88 season.

Discussion

Resistance to mosaic was not the only motivation for growers to have replaced NCo376 with N12. A number of factors contributed to the increased popularity of N12, in particular its ability to withstand extended periods of moisture stress. The Dumisa area has soils which are derived from TMS Ordinary, Dwyka, and to a lesser extent the Granite parent materials, all of which have relatively low total available moisture values, subjecting the crop to periodic stress. During the relatively dry years of the 1980s, N12 has shown its tolerance of these conditions and has given superior cane and sucrose yields (see Table 2). As N12 requires a longer growing period to reach maturity, it is well suited to the cooler climate of the Dumisa area.

In the Dumisa trials, roguing mosaic infected stools of cane in commercial ratoons was shown to be relatively ineffective, and has not therefore been recommended; but the operation is recommended in seedcane nurseries and in plant cane in commercial fields. Although only practised to a limited extent, roguing has contributed to the lowering of mosaic levels in seedcane. Seedcane quality has been further improved by the propagation of seed in the form of transplants produced by CG Smith Sugar Ltd at Sezela, in an area where mosaic levels are normally low. The movement of seedcane as transplants from the coast to Dumisa is both easy and economical.

As a recommended management practice, Dumisa farmers are now required to complete their planting programmes by the end of November, to avoid the period of peak activity of the mosaic vector aphid.

Conclusion

The variety N12 has made the greatest contribution towards decreasing mosaic levels in the Dumisa district. However, it is noteworthy that the extent to which N12 has already been planted there has been influenced also by the variety's superior yields when compared with NCo376. Consequently productivity has increased and the serious levels of mosaic which once threatened the area, are now down to acceptably low levels.

The efforts of the farmers to adopt the mosaic control programme, and to influence others to follow suit, strengthened by the commitment of the Sezela LP&DC Committee and by an effective extension programme, provided a co-ordinated approach which has been highly successful.

Acknowledgement

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