SWAZILAND SUGAR ASSOCIATION TECHNICAL SERVICES

EXTENSION NEWSLETTER

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MOSAIC VIRUS IN SWAZILAND

INSIDE THIS ISSUE:

Mosaic in Mpumalanga presents a threat to NCo376 and N19 in Swaziland

To Rogue or to Plough-out?

If mosaic occurs in commercial fields, roguing is strongly recommended when less than 10% of stools are infected. Fields with more than 10% stools infected should be ploughed out after harvest. Fields with more than 20% stools infected should be ploughed out immediately.

A serious outbreak of sugarcane mosaic virus (SCMV) in Mpumalanga this spring has caused concern that the disease may spread to Swaziland (see October 2002 Newsletter). Regular inspections by SSA pest and disease teams have since revealed low levels of infection in two nurseries. Keith McFarlane from the SASEX pathology department recently visited Swaziland to advise on the severity of the outbreak and how it should be managed. This article contains excerpts from his report.

Infection in Malkerns seedcane

The Highveld Seedcane Scheme (HVSCS) was established at Malkerns in 1978. This area was chosen as the site for the scheme due to its altitude (less favourable for smut) and its isolation from commercial cane. Initially a cordon sanitaire was implemented to prevent diseases, particularly smut, from affecting seedcane crops of susceptible varieties such as NCo376. Since then growers have started to produce commercial cane in Malkerns. These growers are not permitted to plant NCo376 or N19 due to the susceptibility of NCo376 to smut and mosaic and N19 to mosaic, which might compromise the seedcane scheme.

This year a very low level of mosaic (0,08% plants) was observed in a one-hectare block of NCo376 seedcane that had been planted in mid-January in the HVSCS. All the infected stools were found in the first 20 metres of the block next to the farm boundary. Directly adjacent to the affected field, the neighbour had grown a crop of maize. The maize aphid spreads mosaic and it is therefore possible that the mosaic was spread from the maize to the cane via aphids. It was suggested that where possible, NCo376 and N19 should not be grown next to the farm boundary to avoid this problem reoccurring. It was also suggested that the planting of mosaic-susceptible varieties should be avoided between mid-October and the end of February, as young cane is particularly susceptible to infection if planted during this period in areas where mosaic occurs.

Infection in Lowveld seedcane

Mhlume sugar estate relies heavily on NCo376 and N19, and this year mosaic was recorded in a nursery of N19 on the estate. Sporadic occurrence of infected plants along the field edge indicated that aphids had spread the infection. Grasses on the side of the field had not been trimmed and had flowered. Mosaic can infect many species of grass, and aphids live and multiply on flowering grasses. It is therefore important to keep grasses trimmed around seedcane field boundaries to reduce the aphid numbers and minimize the spread of mosaic to the cane.

Small-scale grower areas

Maize is widely grown in most small-scale grower areas and mosaic symptoms have been observed in some maize fields in the Nhlanguyavuka development. Fields of N19 grown in the vicinity were inspected but no mosaic was seen. However, the maize is a source of potential infection and small-scale growers should continue to be discouraged from growing NCo376. N19 must be closely monitored and it is recommended that the area under this variety should be reduced in light of the mosaic threat (NCo376 and N19 are virtually identical in susceptibility to mosaic).

Once established, mosaic is likely to spread rapidly through the susceptible varieties grown by the small-scale growers because the availability of management and manpower to inspect and rogue out infected stools will not be as high as that on the estates. Maize planted near cane and intercropping with maize in fields of NCo376 and N19 must be discouraged, as it is a prime source of mosaic infection.

General comments and recommendations

Mosaic can cause yield losses of approximately 0,4% for every 1% stalks infected in susceptible varieties, and is therefore a serious threat to cane production. There has been a serious outbreak of mosaic in N19 in Mpumalanga and the disease has now spread to the less susceptible varieties N25 and N32. Expanding cane production in both Mpumalanga and Swaziland has brought the two industries closer, hence the current mosaic problem in Mpumalanga presents some threat to NCo376 and N19 in Swaziland.

The report recommends that the seedcane scheme should remain at Malkerns, as it is the best area for producing smut-free seedcane. Mosaic infection is still possible so inspections in all nurseries (primary and secondary) of susceptible varieties should be carried out fortnightly between October and March. This will double the inspections in the critical months.

Planting of susceptible varieties NCo376 and N19 into commercial fields should not be carried out between mid-October and the end of February. Grassed cane breaks and headlands around all fields, especially seedcane plots, should be kept mown to reduce aphid numbers. Also, all fields should be kept as weed-free as possible.

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Gallant Super Trial Results

Gallant Super is registered as an early season chemical ripener for NCo376, N12, N14 and N19 in South Africa. It has a similar mode of action to Fusilade Super but recommended application rates are approximately half those given for Fusilade because of differences in formulation. This year SSA Technical Services initiated a trial programme to confirm the ripening response of NCo376 to Gallant Super, to assess Gallant Super as an alternative to Fusilade Super, and to establish the responses of N23 and N25 to Gallant Super.

Gallant Super was applied at rates of 0.150 to 0.225 l/ha and compared with Fusilade Super applied at rates of 0.30 to 0.45 l/ha in two replicated small plot trials at Simunye. The trials were harvested in the first weeks of May and July, 10 and 11 weeks after application respectively. Results of the July-harvested trial indicated that both Fusilade Super (0.3 l/ha) and Gallant Super (0.165 l/ha) increased the cane quality (sucrose % cane) of NCo376, but the increase due to Fusilade was significantly greater than that due to Gallant (**Figure 1 a**). However, when combined with Ethrel, both Gallant and Fusilade increased cane quality more than Ethrel, Gallant or Fusilade alone, but cane quality was still greater in the Ethrel + Fusilade treatment than in the Ethrel + Gallant treatment (**Figure 1 b**). These results add to observations from trials at Tambankulu and Ubombo, where commercial NCo376 fields sprayed with Ethrel + Fusilade and Ethrel + Gallant combinations were compared with unsprayed control strips.

In the May-harvested trial, the response of NCo376 to Fusilade and Gallant was not significantly different to that of N23 or N25, although this may have been because the trial design did not allow each variety to be studied in adequate detail. Both Fusilade and Gallant substantially increased overall cane quality, but again the increase due to Fusilade was significantly greater than that due to Gallant (**Figure 2**). Although differences in cane quality were significant, differences in cane and sucrose yields were not, but there was an indication that N25 may be as sensitive to Gallant Super as it is to Fusilade Super at equivalent rates.

New trials will be established in early 2004 to examine the response of varieties N23 and N25 in greater detail, and to determine whether the performance of Gallant can be improved by adjusting application rates. At least one of the existing trials will also be continued to check the repeatability of results and to ensure that there are no residual effects from repeated Gallant applications. Results to date show that there is no doubt that Gallant is effective as a chemical ripener on NCo376, but it would be advisable to await further confirmation on application rates and variety responses before adopting it as an alternative to Fusilade.

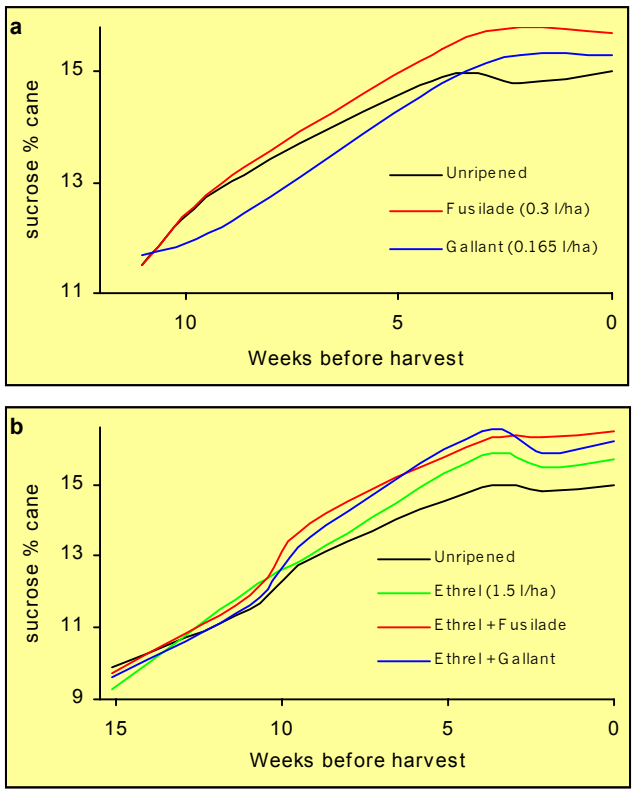

Figure 1: Effect of Gallant and Fusilade on s%c of NCo376, (a) without Ethrel and, (b) with Ethrel

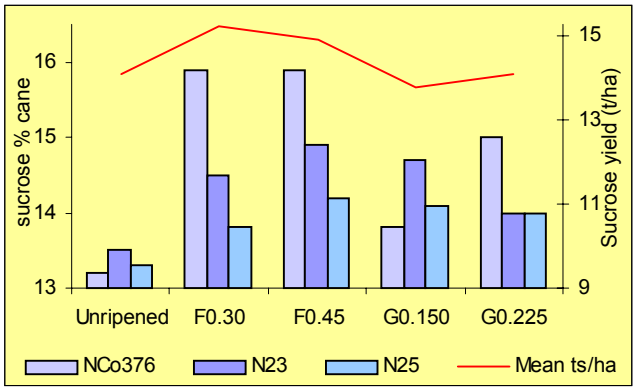

Figure 2: Effect of Gallant (G) and Fusilade (F) on s%c of NCo376, N23 and N25 (bars) and on mean sucrose yield of all three varieties (line)

Staff Changes at SSA Technical Services

The second quarter of 2003 has seen a number of staff changes at SSA Technical Services, affecting the Agronomy, Irrigation and Extension sections.

Oswald Magwenzi has left SSA to assume a position with Illovo at Ubombo Sugar in Big Bend. The position of Irrigation Engineer at SSA has been filled by **Musa Dlamini**, who recently returned from the USA having studied for and completed his MSc and PhD degrees in the field of irrigation. Musa joined SSA in 1997 and has spent the past four years studying at Utah State university.

Duma Zwane recently completed the UNISWA MSc Crop Science programme and has moved from Agronomy to join Pat Ntuli in Extension. Duma will be based at Simunye to serve growers in the northern mill areas, while Pat will continue to be based at Big Bend. Both Duma and Pat will be co-ordinating the activities of two government extension officers as well as conducting their own extension programmes. SSA's extension activities will continue to grow as another three extension officers are recruited in the near future.

Bernard Shongwe has replaced Duma as Assistant Research Agronomist. Bernard holds a BSc degree in Agriculture from UNISWA and has worked at Mhlume Sugar Company since graduating in 1999. Among other duties, Bernard's responsibilities at Mhlume included the Agronomy Laboratory and his experience in this field will be valuable in his new position.

We wish every success to all staff involved in these changes and it is hoped that everyone in the industry will be able to benefit from their expertise.

Swaziland Variety Disposition

The Swaziland sugar industry currently comprises three mills and approximately 46,000ha of irrigated sugarcane with an average cane yield of 101 t/ha. By world standards, this makes us a small but highly productive industry. Miller-cum-planters and large-scale commercial farmers produce more than 70% of the crop, but the smallholder sector of the industry is increasing rapidly with 16,000ha of association sugarcane expected to come on stream over the next 10 years.

Swaziland does not have its own sugarcane plant-breeding scheme but is well positioned to rely on the breeding and selection programmes conducted by SASEX in neighbouring Kwa Zulu-Natal and Mpumalanga. Ties between the two industries have been close and SASEX releases have been imported to Swaziland since the 1970's to the extent that the current industry disposition is made up entirely of SASEX-bred or SASEX-selected varieties, bearing the prefix N (Natal).

Swaziland has been heavily reliant on one of these varieties, NCo376, since the early 1980's, when it comprised over 80% of the industry area. NCo376 is highly susceptible to smut and at the peak of its popularity in 1984, it was estimated that 4.4% of all sugarcane stools in Swaziland were infected with the disease. However, the variety continues to be cultivated on more than 50% of the industry area due to its hardiness and its yield performance when chemically ripened, making it a major contributing factor to the productivity of the industry (Figure 3).

At a recent meeting of the International Society of Sugarcane Technologists (ISSCT) plant breeding section, most sugarcane producing countries acknowledged that a single variety should comprise no more than 20% of their industry or regional variety dispositions. Partly because of the unusually long plough out cycles achieved in Swaziland (up to 36 ratoons), it has taken 20 years to reduce our reliance on NCo376 from 80% to 60%. With an increased supply of varieties from both South Africa and Mauritius, and due to the changing composition of growers in our industry, our reliance on NCo376 should begin to decline at a greater pace.

The current outbreak of mosaic in the region illustrates the importance of a well balanced variety disposition. Both NCo376 and N19 are highly susceptible to mosaic and without the industry's adherence to the Highveld Seedcane Scheme and other basic pest and disease regulations, over 70% of our crop would be exposed to major yield losses from this single disease (see page 1, "Mosaic in Swaziland").

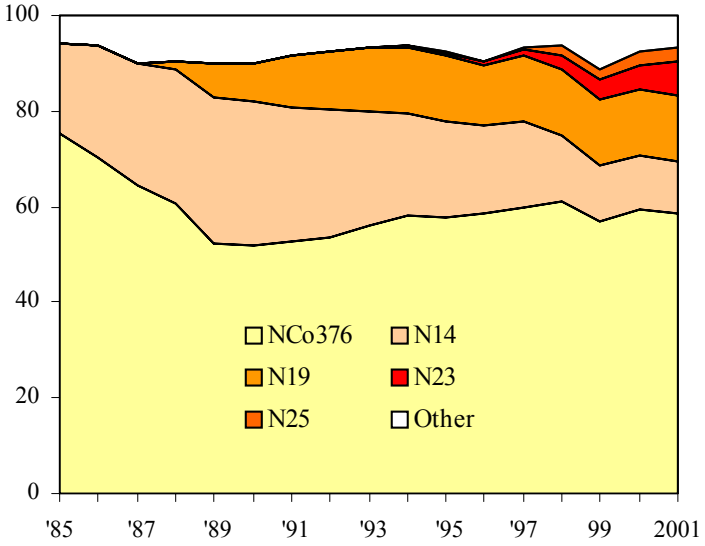

Figure 3: Swaziland variety disposition, 1985 to 2001

New, productive varieties are in high demand and SSA Technical Services imports new N- varieties as they are released by SASEX to evaluate them further under a wide range of local conditions. The objective is to select smut tolerant releases that are as hardy and ratoon as well as NCo376 and produce sucrose yields equal to or better than chemically ripened NCo376 in all situations where ripeners are beneficial. Varieties are only recommended for commercial production in Swaziland once they meet these criteria, and the current range of recommended varieties includes N19, N23 and N25 in addition to NCo376 and N14. N32 is also showing some promise on poor soils harvested late in the season, and has been bulked up for commercial testing on three estates.

The advantage of the screening system is that growers are not exposed to poor varieties and SSA takes the risk on behalf of the industry. The disadvantage is that the benefit from good performers is substantially delayed, as is any increase in the range of productive varieties available to growers. Consensus at the ISSCT meeting was that the disadvantages of this approach outweigh the advantages, and future strategy in Swaziland may have to include commercial bulking of varieties at an earlier stage.

The current variety disposition shows that the SSA variety screening trials favour varieties with high stalk populations and cane yields, and relatively low sucrose content that can be increased with chemical ripeners. These varieties suit miller-cum-planters and large commercial farms where large field sizes and high daily deliverable rates make it feasible to apply ripeners with aircraft. But as the smallholder sector of the industry grows, so will the number of small fields with irregular boundaries. Aerial application is less suitable for these conditions while application by knap-sac sprayer is fraught with difficulties, so there will be increasing demand for hardy, smut-tolerant varieties that do not require chemical ripening. Selection criteria will have to be adjusted to suit these growers without compromising industry productivity.

Promising varieties on the horizon include N36, which was released in South Africa in 2000 and has performed well in trials in Swaziland since they were established in 2001. Three of the eight varieties imported from Mauritius in 1998 have since become well established in their home industry and are currently looking good in bulking plots at Simunye (Figure 4). After two years in quarantine and two years of bulking, there should be sufficient seed from these varieties to include them in screening trials in 2004.

Figure 4: A healthy stand of M1186/86, imported from Mauritius via quarantine at SASEX in 1998

Management Tips for Spring

Temperatures are rising and days are getting longer as we enter "windy August" and the onset of spring. The following tips should act as a reminder of the most critical operations as summer approaches.

Delivery of cane to the mill

Warmer weather results in more rapid deterioration of cane from the time it is burnt to the time it is eventually milled. One percent of sugar can be lost per day after the first 24 hours, and no grower can afford this loss. Burning must be linked to delivery so only burn the smallest area possible –preferably for one day's harvest and delivery. However this is not always practical and above this you have to accept losses in sugar delivered to the mill. Desiccation (loss of moisture after cutting) conceals the sugar loss when sugar is recorded as pol%cane. It is essential to ensure there is good management of bundle weights (4.5 t to 5.0 t is ideal) so that the cane can be delivered to meet daily allocation and also to ensure that economic loads are delivered. This means ensuring that the cutter tasks are properly calculated and that weighbridge tickets are traced in order to track bundle weights. It is therefore essential to have good communication with transporters and to make sure that they are not delayed waiting for loads, and that they come on time for collection.

Weed control

Weeds will begin to appear with the warmer weather and it is important to control them early on (see the 2nd Quarter 2003 edition of the Extension Newsletter for a full account of weed control in sugarcane). Chemical control tends to be more effective with the warmer weather but hoeing and hand pulling are also effective if done properly. Avoid damage to the cane from herbicides and hoeing by taking the necessary care. In the case of herbicides read the label and get advice from your supplier. Make sure that sprayers are checked for leaks and that they are properly calibrated. Select the correct nozzle - it is advisable to use new nozzles at the start of the season as they are prone to wear over time and with constant use. Ensure that you recognise the major weeds and that the treatment selected is appropriate for the weed spectrum. Ensure that the weeds in the verges and pathways are prevented from seeding by regular slashing. Chapter 14 of the Swaziland Sugarcane Production Manual contains all details of herbicides for the different crop and weed situations and tasks for manual weeding. Herbicides vary in their mode of action, cost and target (pre-emergent applied to the soil surface or contact applied direct onto the weed foliage). Obtain good advice on choice, cost, timeliness and target and ensure that the equipment is suited for the job.

Irrigation management

Ensure that you check the irrigation system for leaks and that pressures are correct. Pumps should be checked for wear to ensure that they are delivering the correct amount of water. The onset of the warmer weather results in stalk elongation but potential growth is only realised by good scheduling of irrigation and proper infiltration. Check when irrigating that the water is infiltrating into the soil and that there is no ponding of water on the soil surface. Ensure that water can run off the soil surface in times of heavy rainfall and directed off the field into well designed and grassed waterways. If properly designed and commissioned, all irrigation systems can apply the required amount of water to the crop. The main constraints are how well each of the systems are managed and maintained by the grower. Chapter 3 in the Swaziland Sugarcane Production Manual provides guidelines for irrigation and dry-off and it should be referred to. It is important to ensure that water use is kept within allocation and that it is managed well as water demand by the crop increases from now on into the main summer months. Do not over-irrigate as this will result in you running out of water later on when crop potential is even greater than now.

Spring planting

Planting has to be with inspected and certified seed cane produced either from the primary nursery on Mdimba Estate in Malkerns or from secondary nurseries within the industry established from primary seedcane. It is illegal and against your own interests to plant commercial cane as seedcane. The use of commercial cane poses serious disease risks to the grower and the industry. The Sugar Act and the Pest and Disease Regulations forbid the use of commercial cane for seed. There is adequate certified seedcane available for any grower requiring seedcane this spring.

Fertilisers

It is essential that fertiliser is applied in time and not delayed now that the weather is warming up and the crop will respond well to fertiliser under these conditions. It is advisable to take soil samples for analysis at either Mhlume laboratory or FAS (SASEX). On plant fields, fertiliser advice can be given for the whole cycle (Plant crop and two to four ratoon crops). The best time to sample is after a field has been ploughed out and before it is replanted. Fertilisers are applied in the furrow and also top-dressed on the soil surface. Chapter 17 of the Swaziland Sugarcane Production Manual gives full details of fertilisation on the basis of crop, soil type, variety and soil analysis. This will help determine the amounts required. Make sure that fertiliser is applied uniformly. Fertiliser needs moisture for plant uptake and this must be borne in mind when drip irrigation is used – contact SSA Technical Services for advice. Good scheduling of irrigation and good weed control are essential for effective fertiliser uptake by the sugarcane plant. It is essential that fertiliser application is not delayed. Sugarcane has to have a good start for it to produce well in the end.

New Faces (and old) At Technical Services

Bernard Shongwe (**left**) has replaced Duma Zwane as Assistant Research Agronomist. Musa Dlamini (**right**) has returned from the USA, having completed his PhD at Utah State University. He has replaced Oswald Magwenzi as Irrigation Engineer.

See page 2 for full details of recent staff movements at SSA Technical Services.