



EXTENSION NEWSLETTER

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SUGARCANE MOSAIC VIRUS

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Current SSA P&D surveys have not recorded the disease to date, but infection could still occur in the lowveld through aphid activity

Sugarcane mosaic disease is the most important virus disease of sugarcane in Southern Africa. It is widely distributed, but severe outbreaks are generally restricted to cooler regions. However, heavy infection levels have been recorded in the Mpumalanga lowveld this spring. SSA P&D teams have been on the look out for signs of infection since September, and **growers are advised to check their fields for this potentially devastating disease.**

Symptoms

Infected plants are characterized by their leaves, which bear a pale green mottling effect against a dark green background (Figure 1 overleaf). The mottling is most distinctive towards the base of young leaf blades, and is most visible on overcast days. This appearance should not be confused with the localised pale "birthmark" patches on NCo376. Infected stools have a yellow-green appearance and may be severely stunted (Figure 2 overleaf). Symptoms can sometimes be seen on the young internodes of the stalk.

Damage caused by infection

Mosaic is capable of causing severe yield losses in several important varieties, including N19 and NCo376. These two varieties comprise approximately 80 % of our industry. Research on NCo376 by SASEX has revealed that for every 1 % of stalks that are infected with mosaic, a 0.4 % reduction in yield can be expected, and that a field with all stalks infected will suffer a 40 % yield loss. N19 is expected to have a similar reaction to the disease. Mosaic can spread extremely rapidly, especially on young cane in mid summer. The disease is spread primarily through planting infected seedcane, but can also be spread by the maize aphid. Maize and several species of grass act as a host of the virus.

Control measures

The disease can be controlled effectively by planting healthy seedcane, cultivating resistant varieties and avoiding proximity to maize crops. The cultivation of varieties N19 and NCo376 is prohibited in Malkerns, partly because they are highly susceptible to the disease, and may therefore provide a source of infection for the Highveld Seedcane Scheme.

Heat treatment and dips are ineffective against the disease because it is caused by a virus.

Current SSA pest and disease surveys have not recorded the disease in our industry to date, indicating that the Highveld Seedcane Scheme continues to produce mosaic-free seed. However, infection could still occur in the lowveld through aphid activity, which is at its peak in mid-summer. Aphids show a preference for young cane, and it is important that susceptible varieties should be restricted to an early to mid season cycle so that they are past the most vulnerable growth stage by mid-summer. SASEX recommend that susceptible varieties should not be planted or harvested between mid-October and the end of February.

Resistant varieties grown in Swaziland include N14, N23, N25 and N32. N25 is more suitable to a late season cycle than N23 because it does not flower heavily. N32 is still under test by SSA Technical Services but has been released in limited quantities to the large estates for commercial assessment.

Precautions can also be taken by creating field conditions that discourage aphids. Rapid and even germination of sugarcane should be encouraged because aphids prefer a scattered stand for feeding. It is also important to keep grass weeds under control because they attract aphids and may act as a source of infection. Field breaks and drains should be mowed regularly to keep grasses short and prevent them from flowering. Roguing of infected stools is recommended, but fields with over 10 % of stools infected should be considered for ploughing out.

N19 and NCo376 are extremely important to our industry. All possible precautions should be taken to keep mosaic virus under control:

- Do not plant infected seed cane
- Favour resistant varieties for late season harvest
- Rogue infected fields
- Keep grass weeds under control
- Inform SSATS of suspected infection. Call 383 8998.

SUGARCANE MOSAIC VIRUS CONTD.



Figure 1 Leaves of infected N19 with distinctive pale mottling on a dark green background. The uppermost leaf gives the best example.



Figure 2 Infected N19 stool with characteristic pale appearance and mosaic effect on leaves.

WEED CONTROL

Summer, and hopefully the rainy season, has arrived. High temperatures and irrigated conditions will lead to rapid growth of weeds and growers should turn their attention to weed control. This is especially important given the risk of mosaic infection this year (see above).

Herbicide prices are on the increase and growers should be careful to apply the right products in the correct manner for cost effective chemical control. Remember that the most important instructions on handling, dosage rates, use, application, storage and disposal are included on the product label attached to the container.

It is important to know the type of weed spectrum that needs to be controlled. There are three categories of weeds that may occur independently or together. These are broad leaf weeds, grasses and specific problem weeds such as sedges (water grass), *Cynodon* species (e.g. couch) and others resistant to normal choice of herbicide. Correctly identifying the type of weed spectrum assists in choosing the right herbicides.

Once the weed spectrum has been identified there is a choice of time of application. Pre-emergence (before the weed emerges at the soil surface) is recommended in a plant crop and is optional and very effective in a ratoon crop. Post-emergence (after the weed emerges) is useful as a follow-up in a plant crop and can be used on ratoon crops.

These and other important principles of chemical weed control are well described in the SASEX herbicide guide. Copies of the latest edition, released in August 2002, are available from SSA Technical Services. The herbicide guide lists the various combinations of chemicals that are most effective against given weed problems, listing optimum rates and timing for each one. It also gives an index of chemical trade names and includes a new section on knapsack sprayer calibration. With herbicide costs on the increase, the guide is a highly recommended tool towards effective and well timed weed control. Similar information is also provided in the Swaziland Sugarcane Production Manual. Call 383 8998 to ask for a copy of either publication.

NEW VARIETIES

The SSA variety screening programme has seen an influx of varieties from South Africa and Mauritius in recent years. The latest release from SASEX for irrigated areas, variety N40, was imported in September this year for testing alongside N38 and N36 at experiment sites across the industry. N38 was imported in 2001, and N36 was imported in 2000.

Early reports suggest that N36 will be a useful robust variety for our conditions, while N38 is less promising. N40 is a high sucrose variety with good disease resistance, but it is too early to comment on its yield performance or longevity. All three varieties will be tested in screening trials for another two to three years before a decision is made to bulk them up for commercial evaluation.

N32, which was imported for screening trials in 1999, is only now being planted in nurseries at Malkerns for commercial evaluation next year. Trial results to date have indicated that it may be useful for late season harvest on poor soils, but this and other agronomic traits have to be confirmed on a larger scale, concurrent with further testing in small scale trials.

Varieties that have fallen by the way side include N22, N24, N28, N30 and possibly N26. N14 is also losing popularity with growers but still performs well if managed carefully on a mid to late season cycle. Pest and disease problems occasionally arise "out of the blue", such as the current mosaic problem in Mpumalanga (see above), and it is important to maintain a healthy mix of varieties in the industry that are not all susceptible to the same risks.

In addition to SASEX releases, seven Mauritian varieties and one variety from Reunion were released from quarantine en route to Swaziland earlier this year. They were imported as germinated, single eyed sets in February and have grown well since they were transplanted to a bulking site at Simunye. These will be incorporated into the trial programme once sufficient seed is available, and in time may provide some valuable additions to our armory.

76TH ANNUAL SASTA CONGRESS

The 76th annual congress of the South African Sugar Technologists Association was held at the new Kwashukela building in Mount Edgecombe from 30th July to 2nd August this year.

The congress was well attended with some agricultural papers attracting audiences in excess of the seating capacity. Swaziland was well represented in the agricultural sessions, with papers reporting work on fertigation, evaporation estimates, irrigation economics, irrigation scheduling, stillage and mechanical harvesting all conducted in our industry.

Fertigation. Duncan Butler (SSA) reported on assessments of nitrogen splitting strategies made possible by fertigation through sub surface drip irrigation at Simunye. This included an appraisal of the growth curve nutrition approach to nitrogen application in drip-irrigated sugarcane, which tested the accuracy of seasonal growth curve fertigation schedules developed by SASEX. Results indicated that the winter curve correctly predicted the proportional monthly nitrogen demand of a winter ratoon crop but did not account for the effect of late nitrogen application on cane quality. The summer curve appeared to underestimate the nitrogen demand of a summer plant crop between January and April. Splitting nitrogen applications evenly over the first four months of crop development led to more efficient and productive use of nitrogen than the growth curve nutrition approach.

Evaporation estimates. Mark McGlinchey (SSA) gave an account of the results of parallel research programmes in Swaziland and Australia aimed at validating the determination of sugarcane water demand (evapotranspiration, ETC) for irrigation scheduling. The Bowen Ratio Energy Balance technique was used at sites in both countries to determine ETC from measurements taken directly above the canopy of the crop for comparison with ETC derived from equations (Figure 3). Despite the distance between locations and the use of different varieties, results were remarkably similar and showed that the mathematical estimates of ETC used in CANEGRO and CANESCHED are satisfactory.

Irrigation economics. Oswald Magwenzi (SSA) described the development of a decision support tool to help growers make economically sound choices in an irrigated sugarcane production system. Historically, growers have often made irrigation systems and management decisions based on minimizing capital costs without considering the long-term nature of irrigation investments. This approach frequently results in the selection of a system that does not maximize profits and may not meet other production system requirements. The decision support tool helps to evaluate the relative trade-offs between water, capital and running costs over the life of the system.

Stillage. Peter Turner (Sugarcane Research Services) described results of a trial established at RSSC (Simunye) on an S set soil to study the effect of increasing levels of stillage (which contains about 5 % potassium) on cane and sucrose yield, recovery of ash in the mill and the impact of stillage on the environment. Results indicated no significant differences in cane and sugar yields when the source of K was either conventional KCl or stillage, provided that the recommended amount of K was adhered to (in this case, 160 kg K/ha, supplied by 3 t/ha stillage). Over-application impacted negatively on cane growth and sucrose yield. The paper concluded that application of stillage to supply the recommended amount of K would maintain soil fertility and sugar productivity without causing environmental contamination, despite its high salt content and Chemical Oxygen Demand (COD).

Mechanical Harvesting. Eddie Meyer (SASEX) summarized the results of three harvesting trials conducted at RSSC (Simunye) in 1998, 2000 and 2001 which have been featured in previous Extension Newsletters (most recently December 2001). Two out of the three trials showed that the quality of cane delivered to the mill by chopper harvester treatments was not significantly different to that delivered by the manually harvested treatments. Mechanical loader and chopper harvester performance varied considerably depending on the type of machine, cane yield and crop and field conditions. The paper was awarded the Kynoch prize for agriculture (Figure 4).

Other papers of interest included an assessment of fly ash, boiler ash and filter cake as soil ameliorants by BM Dee. Additions of filter cake enhanced soil carbon content and nitrogen mineralisation while all three waste products had a liming effect on low pH soils. DN Reitz studied the effect of irrigation-induced salinity and sodicity on sugarcane yield in Zimbabwe. She concluded that sodicity limited cane growth more than salinity. The effects of trashing on soil water and nitrogen dynamics and the possible impacts of these effects on cane production management practices were described in two papers by Peter Thorburn and Rian van Antwerpen respectively.

Proceedings were provided on CD to all delegates. Anyone who would like to view the proceedings or print a particular paper should contact SSA Technical Services on 383 8998.

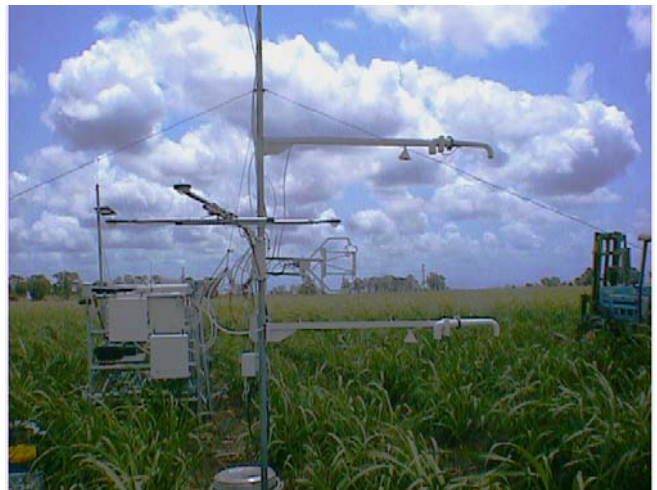


Figure 3: Bowen Ratio equipment for determination of evapotranspiration (courtesy of CSIRO)



Figure 4: Harvesting trial at RSSC. The summary of the Simunye harvesting trials won top prize.

THE DO'S AND DONT'S OF LEAF SAMPLING

Leaf analysis is a way of checking that the young sugar cane crop has been given enough fertiliser. It is a useful tool when using whole cycle fertiliser advice, or when nutrient deficiency is suspected due to poor growth or leaf colour.

Leaf analysis results are only useful if the leaf samples have been taken in the correct way and at the right time during the development of the crop. The following notes should allow growers to make the most of their leaf sampling this summer.

1 Timing

Leaf sampling should take place between October and March, at least four weeks after the last fertilizer application. Winter harvested fields should be sampled at five to six months of age with cane age at sampling decreasing gradually for later harvested fields. Summer harvested fields should be sampled at about three months of age. Incorrect timing is likely to lead to misinterpretation of the crop's nutrient status. Make sure that the crop is not under moisture stress at the time of sampling and that growth has been vigorous for at least a month prior to sampling. Samples should always be taken in the early morning.

2 Sampling Procedure

- Select stalks of average height, avoiding young shoots.

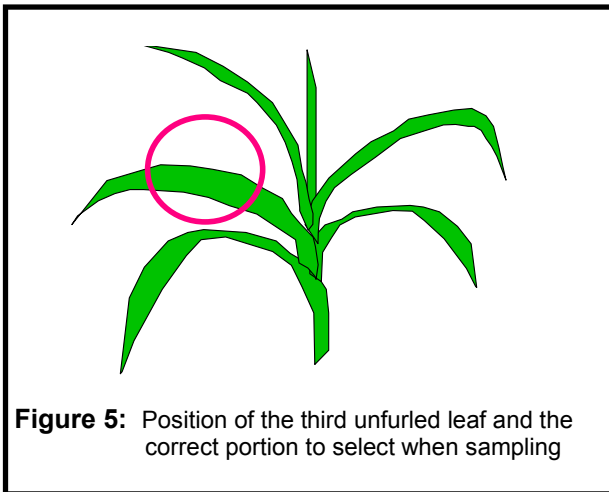


Figure 5: Position of the third unfurled leaf and the correct portion to select when sampling

- Remove the third leaf from the top (the first leaf from the top being the one that is at least half unfurled - Figure 5).
- Collect about 40 leaves from well-spaced intervals throughout the field.
- Holding the leaves in a bundle, cut off the tops and bottoms leaving a central portion of about 300mm long.
- Strip out the midrib from this central portion as soon as possible after sampling.
- Spread the leaves out on a clean surface to dry in the sun.
- Bundle the dried leaves and attach a green label for analysis at SASEX or a white label for analysis at Mhlume. Ensure all details are given on the label. These labels are available free of charge from SSA Technical Services.

3 Information

For further information, interpretation of results and training, contact D Butler or D Zwane at SSA Technical Services, Simunye. Tel 383-8998. Alternatively, standard procedures can be found in the following sources:

SSA Fertilizer Recommendations
SSA Sugarcane Production Manual
SASEX information sheet 7.9 (Leaf Sampling)

IMPORTANT

1. **Do** take samples early in the morning
2. **Do not** sample stressed cane
3. **Do** remove the midrib immediately after sampling
4. **Do not** take samples at the incorrect age
5. **Do** contact SSATS for help with interpretation
6. **Do not** contaminate samples by contact with fertiliser or used fertiliser bags

SSA TECHNICAL SERVICES QUESTIONNAIRE

All growers in the industry were recently asked to complete a questionnaire to determine whether SSATS is meeting their needs and addressing industry priorities, and to give them the opportunity to highlight requirements for additional services.

Responses keep coming in and each one is being replied to and the issues raised are being addressed. Growers who have not yet completed the questionnaire are asked to do so and to return it to the Director, SSA Technical Services, PO Box 367, Simunye.

Completed questionnaires have generally been very positive. Most encouraging is that no growers have replied "Yes" to the question "Have you asked for services from Technical Services that have not been provided to you?".

The exercise has so far raised a few interesting points:

- Growers are reminded that extension and training are currently provided on request or statute, allowing us to give you the most efficient use of our resources.
- The current direction and emphasis of SSATS was determined in a strategic review that was completed in 1995. Responses to this year's questionnaire confirm the relevance of the outcomes of the review, seven years later.
- New topics raised included a request for a directory of cane growers, calls for a "SugarMech" to be held in Swaziland, and training in accounting.
- A number of respondents asked for fluctuations in the sugar price to be reported in the Extension Newsletter. Watch this space ...