

SMUT: MONITORING & CONTROL

Introduction

Annual smut surveys are carried out by Technical Services (TS) to monitor the status of the disease, the effectiveness of the control methods used in the industry such as roguing and to encourage growers to intensify the smut inspection and roguing on all varieties. Roguing is the most practical effective method of controlling smut after germination. Roguing open smut whips is costly and ineffective and therefore discouraged. Other effective methods include the use of **disease-free planting material** and relatively **resistant varieties**. If all efforts are not successful, then fields with excessive smut infection levels are ploughed out. The aim is to prevent the spread of the disease from spores released by open smut whips as well as carried in seedcane

Inspections

Inspection of commercial fields is done between September and February at 3-5 months of crop age, depending on the time of harvest. This should allow growers enough time to rogue each field at least twice before TS inspection.

TS continuously highlight problem areas and advise growers on the appropriate control strategy through Extension Officers and the Pest and Disease Teams. High smut notices are issued to fields with smut levels greater than 5% in the Lowveld or greater than 1% in the Malkerns area, and these are sent to growers and Extension Officers during the season.

Selection of fields

Selection of fields for the smut survey is based on varietal susceptibility (**Figure 5**), crop dispositions (% area planted), location and smut infection levels during the previous season. All fields of variety NCo376 and any field with smut levels between 5% and 10% in the Lowveld and 1% and 3% in Malkerns in the previous year are surveyed at least once. In addition, all fields in the Malkerns area are surveyed due to their proximity to the primary seed cane scheme. Fields of other varieties are selected at random according to crop disposition on each estate. Fields that had smut levels above the maximum allowed during the previous season are inspected more than once.

In the 2018/19 season, varieties M1176/77, N25, N41, N14 and N40 ranked higher than NCo376 in the smut susceptibility index. The dominance of N25 may be attributed to the increased disease pressure hence the observed levels in the past few years.

Method of inspection

An inspection site comprises 50 meters of cane row with an assumption of 100 stools of cane (2 stools per meter). The number of sites inspected depends on field size as shown below (Table 1). Sites are determined randomly in a manner that the whole field is covered.

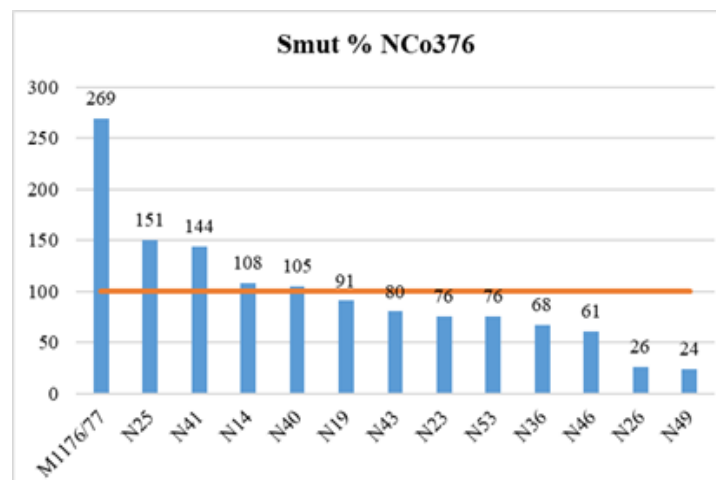


FIGURE 5: Smut survey results for the 2018/19 season

TABLE 2: Number of smut inspection sites per area

Field size (ha)	Number of sample sites
0 to 4,9	10
5,0 to 9,9	20
10,0 to 19,9	30
20,0 to 29,9	40
30,0 to 39,9	50
40,0 to 49,9	60
Over 50	70

Control

Studies have confirmed that high temperatures (25-30°C) and dry conditions favour the disease spread and progress, along with the ratooning practices such as poor field hygiene during replanting. Zhao and Li (2015) reported that the effects of climate change and green harvesting practices are likely to impact the smut incidence through increased temperatures and the maintenance of spores through ratoon crops in non-burnt fields.

- The use of **resistant varieties** remains the most effective way to control smut.
- The use of **certified disease-free seedcane** is very important.
- Roguing affected fields and ploughing out fields with excessive smut levels.
- Ensure field hygiene during replanting by eradicating all volunteers.



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SWAZILAND SUGAR ASSOCIATION TECHNICAL SERVICES

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INSIDE THIS ISSUE:

Is variety NCo376 still 'Boss'? 1

Weather outlook for the last quarter of 2019/20 season 2

Smut: monitoring & control 3



Variety NCo376...

"However, the variety became unpopular when it succumbed to smut and mosaic attacks"

Weather outlook

"According to the weather experts there is hope of receiving normal rain throughout the December 2019 to March 2020 period"

Smut: monitoring & control

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Is variety NCo376 still 'Boss'?

Introduction

In various meetings with stakeholders, in particular growers, it emerges that most growers – across all categories (Large, Medium & Small Scale) uphold that variety NCo376 is the most economically viable relative to newer varieties. This is further supported by that some small scale growers in the industry planted this variety in the 2019 spring much against their Extension Officers' advice. Having been released for commercial growing at SASRI in 1955 after crossing at the Coimbatore Research Station in India, NCo376 was first cultivated for commercial purposes in the Eswatini sugarcane industry in the 1980s – making it one of the oldest varieties in the industry.

be resilient under adverse growing conditions and possesses excellent ratooning ability. It is on record having produced high yields in crops over 30 ratoon cycles in some grower farms within the region. NCo376 has been touted as a scientific model variety for breeders and was used as a control in many variety testing trials in the industry.

Smut and mosaic attacks

However, the variety became unpopular when it succumbed to smut and mosaic attacks. As a result, in the South African sugarcane industry its cultivation was prohibited in the Midlands and Northern Irrigated regions. In the Eswatini sugarcane industry, its cultivation is prohibited in the Malkerns area. This, coupled with the introduc-

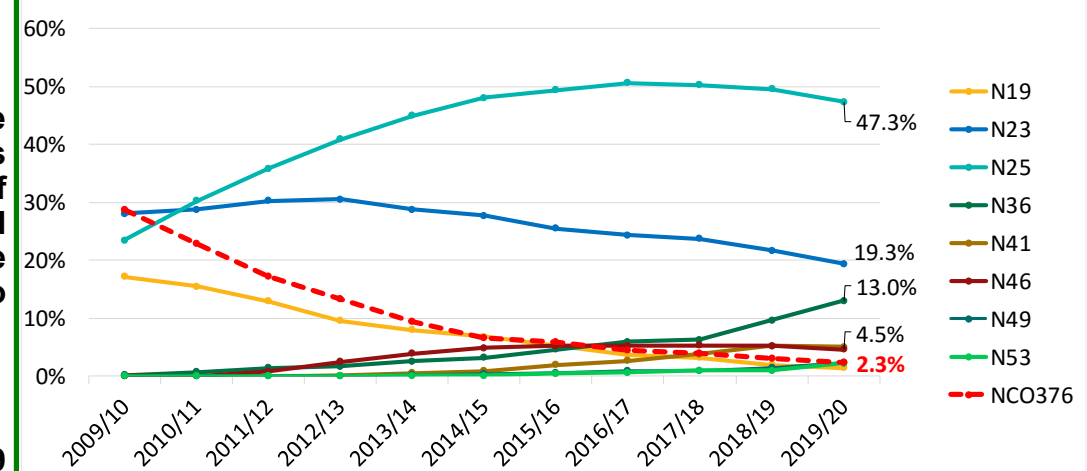


FIGURE 1: 20 year average sucrose yield of nine varieties

Ratooning ability

The variety became popular due to its high yields relative to other varieties at the time. In addition, it was known to

tion of newer high yielding, pests and disease tolerant/resistant varieties, led

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IS VARIETY NCo376 STILL 'BOSS'?... CONT.

to more industry growers' losing interest in it. As such, there was a sharp decline in the land under its cultivation from 63.0 % in 1999 to 2.3% in 2019 (Figure 1). Nevertheless, there are growers who are still fond of this variety in spite of its downside.

Commercial data

An analysis of sucrose yield data for five varieties across three harvest seasons (early, mid and late) and soil types (good, intermediate and poor draining) amassed over two decades sourced from one industry estate is shown in Figures 2 and 3, respectively. On harvest seasons, varieties N25 and N23 had higher sucrose yields than

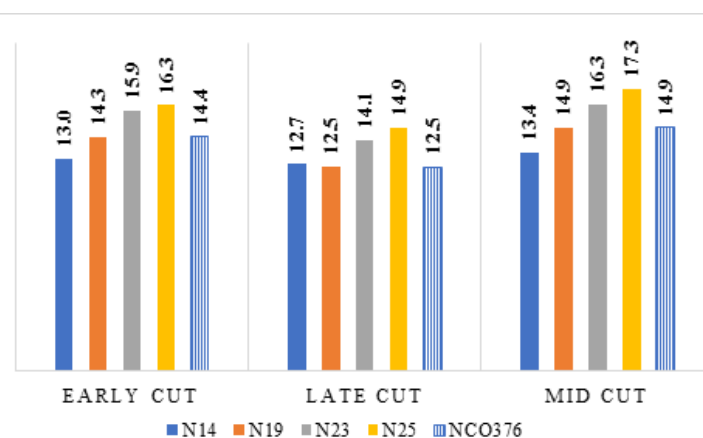


FIGURE 2: 20 year average sucrose yield of five varieties

NCo376 across all three seasons (Figure 2). Similarly, on soil types, varieties N25 and N23 had higher sucrose yields than NCo376 (Figure 3). Variety N19 had higher sucrose yield than NCo376 under poor draining soil.

Trials results

Table 1 shows the performance of NCo376 against the newer industry varieties on selected ESA variety trials. The varieties are ranked according to their average sucrose yield. The results show that newer varieties perform better than NCo376 under diverse growing conditions. As such, growers who still plant

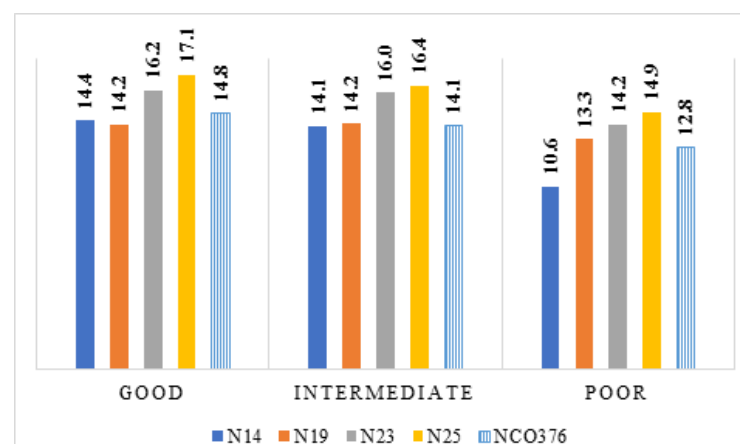


FIGURE 3: 20 year average sucrose yield of five varieties

variety NCo376 are paying a huge yield penalty by neglecting the newer high sucrose yielding varieties. To this point, the Technical Services department of ESA discourages growers, especially small scale growers, to replant any further variety NCo376.

For more information on variety choices, growers are encouraged to liaise with their respective Extension Officers.

TABLE 1: Variety ranking according to sucrose yield from selected trials showing the performance of NCo376 relative to other industry varieties

1	Average of 6-crops; mid-season; good draining soil N43 > N25 > N46 > N26 > N23 > N36 > NCo376
2	Average of 6-crops; late season; intermediate draining soil N25 > N41 > N46 > NCo376
3	Average of 5-crops; early season; intermediate draining soil N41 > N46 > N23 > NCo376
4	Average of 6-crops; late season; intermediate draining soil N53 > N46 > N25 > NCo376
5	Average of 6-crops; early season; intermediate draining soil N53 > N36 > N23 > NCo376
6	Average of 6-crops; early season; intermediate draining soil M1176 > M1400 > NCo376 > M1551
7	Average of 4-crops; late season; poor draining soil N53 > M1176 > N36 > N41 > M1400 > N25 > N46 > N26 > N23 > NCo376
8	Average of 4-crops cycles; Mid-season; poor draining soil; Un-ripened N25 > N36 > N46 > N49 > N53 > MN1 > N57 > N41 > N23 > NCo376



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WEATHER OUTLOOK FOR THE LAST QUARTER OF 2019/20 SEASON

Introduction

According to the weather experts there is hope of receiving normal rain throughout the December 2019 to March 2020 period. The Eswatini Meteorological Service has forecasted the December 2019 to March 2020 period to be normal to above normal rainfall in all the sugarcane growing areas as shown in Figure 4.

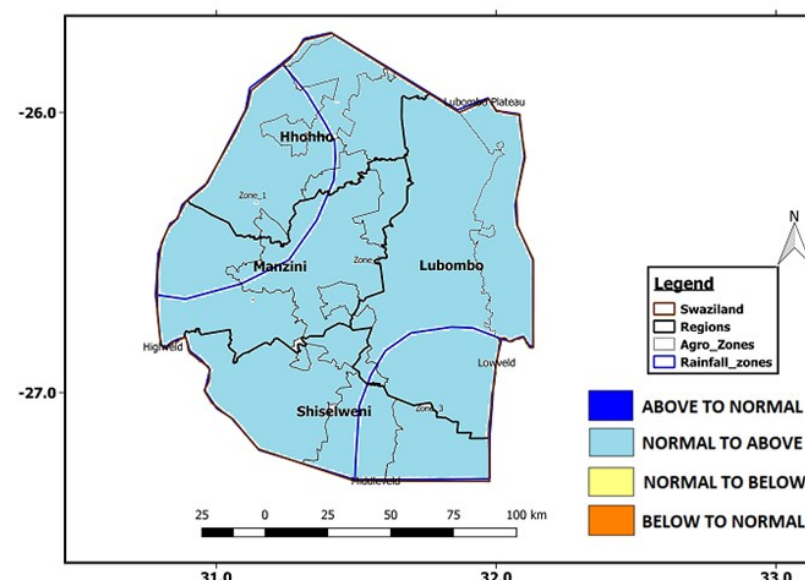


FIGURE 4: Rainfall forecast for December 2019 - March 2020

Forecast

With this rainfall forecast, there is a hope for good rains for the current season; and the current water levels are expected to improve. However, growers should be cautious as weather is a state of the atmosphere that changes regularly. For instance, last season rains were expected to decrease at this period; but the opposite was observed. According to weather experts the rise in rainfall in the late summer season of 2018/19 growing season was due to changes that occurred in the Indian ocean which suddenly became favourably for more rainfall. And again, due to climate change effects weather can be so unpredictable, and rainfall distribution is seldomly spread evenly over all areas. For that reason, whether rains are enough or not; growers are still advised to use water judiciously. The substantial rainfall received during the 2018/19 season, and the promising rainfall forecast for the 2019/20 summer season does not call for laxity on water management by growers. Saving water for the future remains key. This calls for growers to properly schedule their irrigation and to follow water saving strategies as the need arises.

Irrigation scheduling

Strict adherence to irrigation scheduling helps save water ensuring that it is available for a longer period. The decisions on when and how much to irrigate are critical for crop growth and water use efficiency. Irrigation scheduling helps in determining the amount of water to be applied and the timing for application. It also offers an opportunity for improving water efficiency at a farm level. Irrigation scheduling is part of water management where water is applied: (1) according to crop needs; (2) in amounts that can be held in the soils and be available to crops; and (3) at rates consistent with the soil intake capacity.

Other benefits of irrigation scheduling include the following:

- Return time after rainfall has been received can be better estimated.
- Over-irrigation and under-irrigation can be avoided. Both situations lead to poor cane growth, and loss of yield.
- Unnecessary pumping or electricity costs are reduced. Reduced expenses help to improve farm profits.

Available irrigation scheduling software programmes

Commonly used irrigation scheduling software programmes in the Eswatini sugar industry are Canesched and Canepro. Growers with computers are advised to use these programmes as they help improve water management and scheduling. Canesched is ideal for small scale growers because it schedules irrigation events, stores and displays irrigation records, and generates reports on those irrigation events. Currently, the Irrigation Section of Technical Services installs, trains users and troubleshoots it free of charge. Before Canesched is installed, growers need to know their soil type or total available water of the soil and application rate of the irrigation system. Other required details are rain-gauge, size of the fields, and harvesting dates.

For more information on irrigation scheduling techniques and installation of Canesched, contact the Irrigation Section of ESA Technical Services.



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