Published by the South African Sugarcane Research Institute

THE LINK

January
2017
Volume 26, Number 1

COMPACTION & CRUSTING

Compaction and crusting of soils can result in major production losses, particularly in the following ratoon crops. Possible causes of this soil issue, as well as management factors to assist in dealing with this problem are further discussed in the Soil Health article on page 12.

Also in this issue...

Besproeiing

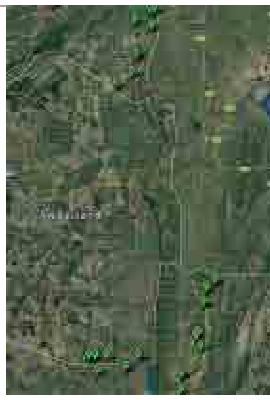
Korrekte besproeiing skedulering kan besparings op beide water- en elektrisiteitskostes tot gevolg hê en sal ook onder-of oorbesproeiing voorkom. Die ekonomiese voordele word verder verduidelik op bladsy 17.

Longhorn beetle

Larvae of the longhorn beetle have been found in sugarcane on a farm in Entumeni. To read more on this potential pest, see page 16.

Biosecurity

SASRI and CROPWATCH AFRICA are taking a proactive approach to keeping your fields safe from the Chilo stalk borer (Page 10).



SASRI
Unlocking the potential of sugarcane

Message from the Director

Dr Carolyn Baker

Detection of the latest pest incursion impacting our industry – the longhorn beetle – reminds us once again of the significant benefits of having a structured extension and biosecurity service in our industry. The sugar industry is unique in South Africa in having its research, extension and biosecurity endeavours all clustered under the same umbrella and delivered in a coordinated and comprehensive manner. It is this close articulation of functions that enables early detection, understanding and swift responsiveness to such incursions that threaten our industry.

The value conferred by a close relationship between research and extension, really demands further emphasis. Without the necessary framework and institutional structures in place and also correctly located, the ability to convey the value derived from research is severely limited. At SASRI, considerable effort has been devoted to developing a robust research, development and innovation system that is strongly reliant on engagement with all stakeholders. It goes without saying that the fundamental element in this approach is a stable partnership with growers that enables a full understanding of their agricultural practices and challenges.

It was back in 1954, when the research endeavour was well established and supported, that the industry had the foresight to enable development of an extension service through appointment of two field advisory officers. This action served as the key to securing a comprehensive extension support system for the industry that has persisted since then in several guises.

It is the SASRI Extension Specialist that serves as the primary link between the researchers and the growers to deliver considerable benefits. The partnership between extension and growers enables dialogue amongst growers and scientists and serves as a conduit for knowledge exchange that addresses grower issues, sparks innovation and mitigates risks such as those posed by pest and disease incursions.

On the one hand, it is extension 'on the ground' that serves as the vital link to provide scientists with a sounding board for their research ideas and simultaneously advise on the value and delivery of practical solutions arising from research outcomes. While on the other hand, it is the world class research backup and knowledge repository at SASRI that provides the backbone for this support. Perfectly aligned, these two functions (extension and research) work in concert to realise research value and deliver it to growers' farms.

SASRI field trials being conducted at Mount Edgecombe

A meeting of minds
at the SASIAA symposium

Kerisha Raghunandan (Publications Officer)

In late October 2016, SASRI hosted the South African Sugar Industry Agronomist's Association (SASIAA) symposium. Each year, the symposium attracts a number of sugarcane industry stakeholders (mainly agronomists) to share in the experiences of growers, Extension Specialists, research scientists and a guest speaker – chosen specifically to talk on the theme for the day. The theme is carefully selected by the SASIAA Committee in conjunction with the members of the Association. The symposium is well-attended and has resulted in many of its attendees leaving with either enthusiasm to improve practises or knowledgeable enough to educate their peers.

This year's theme was one that has been on the mind and lips of every grower, scientist and South African, "How do we recover from the drought?". There were five presentations covering topics from the present situation of the country's climate to the Extension and grower efforts in some of the hardest hit areas.

This year's guest speaker was Professor ***Francois Engelbrecht*** from the CSIR, who is currently working on climate change research. Prof Engelbrecht presented a sobering look at climate change, not only in South Africa, but the world. He also discussed the effects of rapid industrialisation on global warming. Other speakers included:

- ***Paul Botha***, SASRI Extension Specialist based in Midlands South, who gave an enlightening talk on Land Use Plans (LUP) and the dire consequences a grower could face without one. He also discussed the positive impact that LUP's have on soil conservation.
- ***Richard Nicholson***, an economist at the South African CANEGROWERS Association, focused on farming practises that could potentially save a grower thousands of rands.
- ***Dean Percival***, a Gingindlovu grower, presented a brief summary of all his farm management practises - much of which are heralded SASRI ideals.
- ***Marius Adendorff***, SASRI Extension Specialist based in Pongola, who presented a talk which was prepared in collaboration with Cobus Horn (a local Pongola grower) on lessons learned from the drought and prioritised management practises growers need to focus on in such times.

The day closed with an address from the Convenor of the SASIAA Organising Committee and SASRI Senior Soil Scientist, Dr Rian van Antwerpen. In addition, there was a brief look back at the SASIAA Field Day held in August on Dieter Lütge's family farm, a palate cleanser after the day's events. The symposium was yet another success and undoubtedly left us all praying for a rainy 2017.

If you would like more information on the SASIAA or if you wish to download the PowerPoint presentations for this year's symposium, visit the SASRI website: www.sasa.org.za/sasiaa.

From left to right: Dean Percival, Marius Adendorff, Rian van Antwerpen, Richard Nicholson, Paul Botha and Francois Engelbrecht

Topical Tips

Rowan Stranack (Extension and Biosecurity Manager)

WEEDS

Where there have been good rains following the drought, weeds are likely to be a major challenge. In particular, take care to remove mature *Panicum* and *Sorghum* from fields. Knockdown chemicals will delay the pressure but these weeds must eventually be removed from fields.

Under canopy spot-spraying of creeping grasses using glyphosate products should be in full swing. Mark these areas carefully with flags and return regularly with follow-up sprays.

Creeping grasses can spread into fields from roads and breaks. Make sure the field edge is kept free of grasses by carefully spraying glyphosate against the cane stools. At planting, put in a single line of cane at right angles to the rows in order to shade and prevent grass runners entering the field.

DISEASES

In the irrigated areas, smut is likely to be an ongoing problem through the summer due to the drought. Be sure to rogue regularly and remove all infested stools.

The humid, wet conditions in some areas could encourage the spread of brown and tawny rusts, particularly in susceptible varieties. Discuss possible control measures with your Extension Specialist.

Also be on the lookout for orange rust. Report any suspicious rust symptoms to your Biosecurity Officer or Extension Specialist. Refer to the recently published SASRI Information Sheet 2.10 Sugarcane Rusts to assist with identification and control.

INSECT PESTS

Regularly scout fields where spray programmes to control eldana have been carried out. If necessary, and based on the results of the scouting, continue the spray programme as recommended.

There could be outbreaks of yellow sugarcane aphid in some parts of the industry. Discuss the need to treat with your Extension Specialist.

RIPENING

Plan your ripener programme early. The use of the SASRI **PurEst**™ app will aid significantly with the suitability for ripening as well as the product to use.

CROP NUTRITION

It is still not too late to take leaf samples. Where crop growth has been vigorous, leaf samples will give a good indication of crop nutrient uptake as well as any potential macro- or micro-nutrient deficiencies.

In the Midlands, where the application of chicken litter is widely practised, leaf and soil samples will provide a good indication of where Phosphorous (P) levels in the soil are approaching undesirable excesses. This problem can be addressed by planning to apply inorganic fertiliser blends with no P.

Category 1 and 2 N-mineralising soils where P levels are starting to rise above the 80 mg/L mark are of particular concern.

Category 1:
<2% organic matter

Category 2:
2 - 4% organic matter, <35% clay

WATER USE

Dry spells and droughts are a reality and as such need to be planned for. Consider implementing an overall farming strategy that will maximise rainfall and irrigation water efficiency. This should include amongst other things, conservation structures, protection of wetlands, green cane harvesting, irrigation scheduling, more efficient irrigation systems and careful variety placement according to soil type.

Repair your conservation structures, particularly waterways, before the spring rains. Waterways should be grassed and cared for to ensure rapid and extensive ground cover.

Speak to your Extension Specialist if you require a Land Use Plan or if you are requiring advice on your existing one.

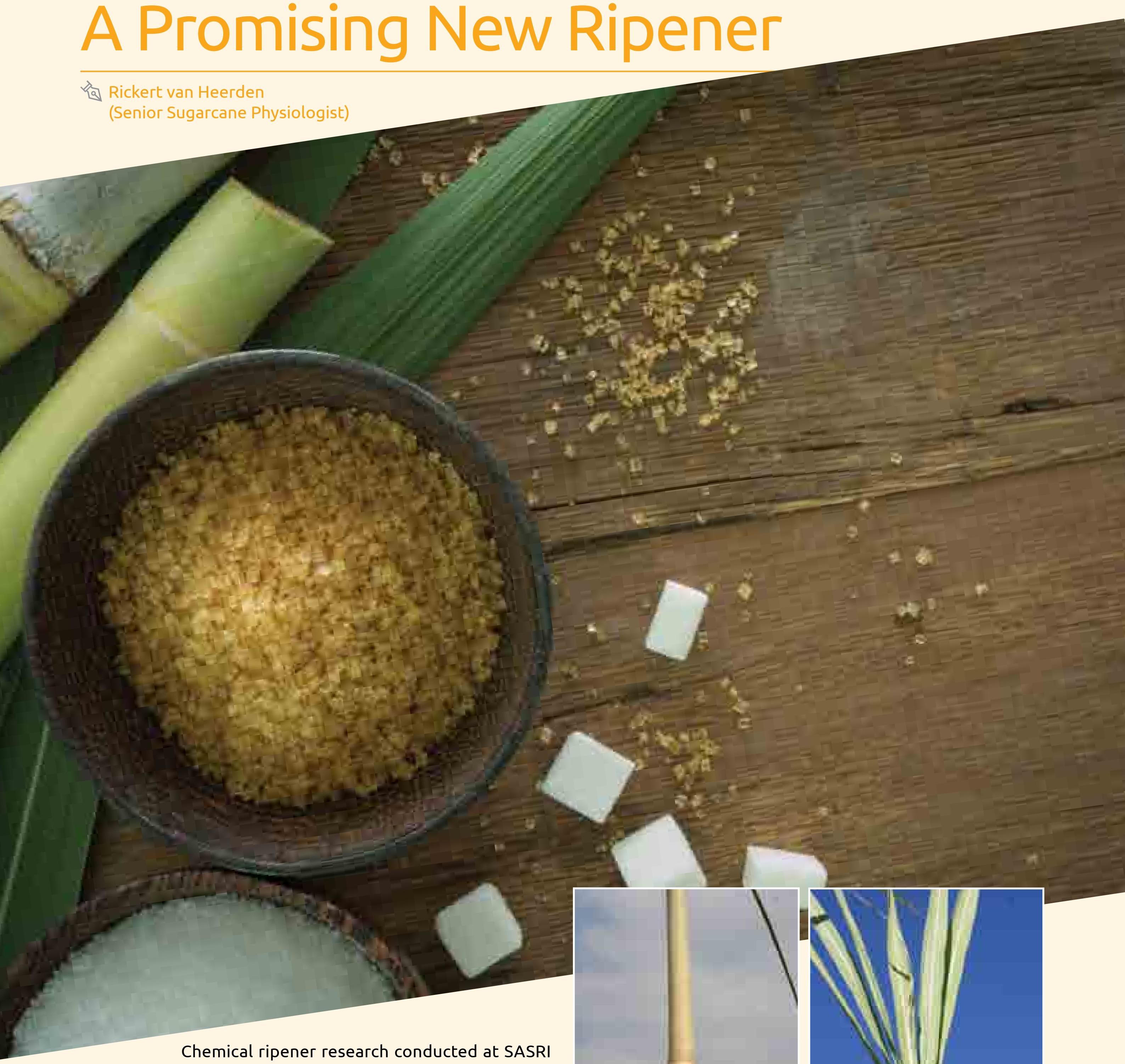
SEEDCANE

The drought has again highlighted the need to ensure that adequate supplies of Certified or Approved seedcane are available in order to be able to replant after the drought.

If you do not have a regular and reliable source of seedcane from other growers, it would be wise for you to establish your own seedbeds in the coming year in order that your farm can be self-sufficient.

A Promising New Ripener

Rickert van Heerden
(Senior Sugarcane Physiologist)



Chemical ripener research conducted at SASRI over the past few years have resulted in the registration of Moddus® (Syngenta South Africa (Pty) Ltd) during October 2016. Moddus® is a plant growth regulator that contains 250 g/litre of the active ingredient *trinexapac-ethyl*.

After application Moddus® temporarily blocks the synthesis of one of the main bioactive forms of the plant hormone gibberellic acid, which results in the inhibition of internode elongation (Figure 1), the formation of a compressed leaf whorl, and shortening of new leaves emerging after application (Figure 2). Once the active ingredient has been sufficiently broken down, normal internode and leaf elongation gradually resumes.

Figure 1. Inhibition of internode elongation at the top of a Moddus®-treated stalk.

Figure 2. Compressed leaf whorl and shortened leaves in Moddus®-treated cane.

ECONOMICS:

Economic benefit analysis of registration trial data obtained in the test variety during field experimentation at the SASRI-Pongola Research Station revealed that, although Moddus® will be more expensive than other ripeners, the increase in gross margin (R/ha) justified its use (Table 1).

This analysis factored in the expected cost (R/ha) of Moddus® (excluding any miller subsidy) relative to the current cost of the other chemicals. RV yield responses over four seasons of field experimentation as well as savings in harvest and transport costs, associated with slightly lower cane yields in ripened crops, were also considered. Typical costs for the Pongola area were used in the analysis.

Table 1. Cost-benefit analysis of ripening the test variety in the registration trial at Pongola with Moddus® and two other ripeners. Data represent the average response over four seasons (plant crop + three ratoons).

Treatment	Product and application cost (R/ha)*	RV %	Cane yield (t/ha)	RV yield (t/ha)	Saving in harvest and transport costs (R/ha)**	Gross margin increase (R/ha)
Control	0	9.7	112.1	10.87	0	0
Ripener 1[a]	730	11.9	108.5	12.91	334	9784
Ripener 2[b]	730	11.7	107.2	12.54	455	8061
Moddus®	1090	12.4	107.3	13.31	446	11 502

* Product and application cost excludes any miller subsidy;

** Savings in harvest and transport costs are the result of lower cane yields achieved in ripener treatments.

a: Ripener 1 is a ripener with the active ingredient 2-*chloroethyl phosphonic acid*.

b: Ripener 2 is a ripener with the active ingredient *fluazifop-P-butyl*.

TIP: A rapid method to assess crop suitability for chemical ripening is to measure Brix% in stalks from the target field with a portable refractometer and to use these values to estimate juice purity with the smartphone app **PurEst**™. For more information on this procedure consult your local Extension Specialist or SASRI Information Sheet 12.2.

ONGOING RESEARCH: Research conducted in other countries (Australia, Brazil and USA) suggests that there might be varietal differences in response to Moddus®. Screening of local varieties for their responsiveness to Moddus® has commenced at SASRI during 2015 and variety-specific recommendations will be communicated to growers as they become available. At this stage positive responses have been observed in a number of popular rainfed and irrigated SASRI varieties.

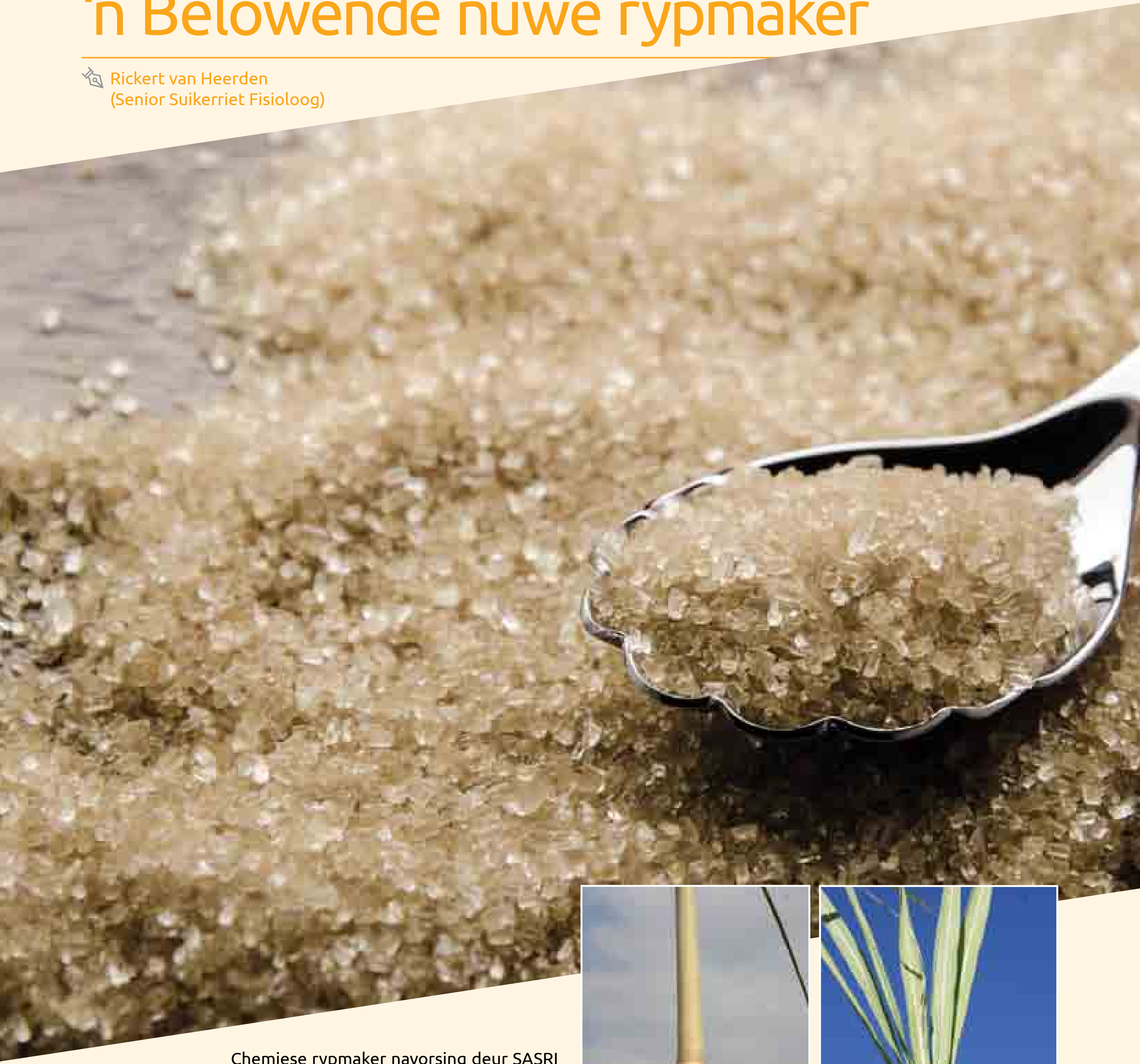
BENEFITS:

- Moddus® is capable of ripening relatively mature cane with whole-stalk juice purities up to 85% at time of application.
- This distinguishes Moddus® from ripeners with the active ingredient 2-*chloroethyl phosphonic acid*, which are only effective in very immature crops with juice purities below 75%.
- Moddus® can be used for both early and late-season ripening.
- The ability to ripen more mature crops bodes well for the widespread use of Moddus® in rainfed cane.
- Unlike ripeners with the active ingredient *fluazifop-P-butyl*, Moddus® does not target and kill the stalk growing point (apical meristem). Hence, late-season ripening, especially in irrigated cane, can be approached at far lesser risk in the event of carry-over.
- Published evidence indicates that accidental spraying of Moddus® onto a diverse range of non-target broad-leaf species (e.g. citrus, mango, potato, common bean, soybean, cotton and sunflower) do not affect flowering and yield, unlike ripeners with the active ingredient 2-*chloroethyl phosphonic acid*, which can have severe consequences.

It is anticipated that Moddus® will become available to growers by mid-March 2017.
For more information on application rates, spray-to-harvest intervals etc. consult your local Extension Specialist or SASRI Information Sheet 12.5.

‘n Belowende nuwe rypmaker

Rickert van Heerden
(Senior Suikerriet Fisioloog)



Chemiese rypmaker navorsing deur SASRI het oor die afgelope klompie jare in Oktober 2016 tot die registrasie van Moddus® (Syngenta Suid-Afrika Pty Ltd.) gelei. Moddus® is ŉ plantgroei reguleerder wat 250 g/liter van die aktiewe bestanddeel *trinexapac-etiel* bevat.

Na toediening blokkeer Moddus® die sintese van een van die primêre biologies-aktiewe vorme van die fitohormoon gibberelliensuur, wat aanleiding gee tot die remming van litverlenging (Figuur 1), die saambondeling van blare in ‘n digte klossie asook verkorte blare wat na toediening gevorm word (Figuur 2). Sodra die aktiewe bestanddeel genoegsaam afgebreek het hervat normale lit- en blaarverlenging stelselmatig.

Figuur 1. Remming van litverlenging aan die bokant van ŉ Moddus®-behandelde stronk.

Figuur 2. Saambondeling van blare in ‘n digte klossie en hul verkorting in Moddus®-behandelde riet.

EKONOMIESE ANALISE:

Ekonomiese analise van resultate wat bekom is in die toets-variëteit tydens registrasieproewe op die SASRI-Pongola proefplaas dui aan dat, alhoewel Moddus® duurder sal wees as ander rypmakers, die toename in bruto marge (R/ha) dié van die ander twee rypmakers oorskry (Tabel 1).

Hierdie analise het die verwagte prys (R/ha) van Moddus®, relatief tot die huidige pryse van die ander rypmakers, in ag geneem (subsidie deur meulenaar uitgesluit). RV opbrengste oor vier seisoene van proefneming, asook besparings in oes- en vervoerkoste as gevolg van effe laer stronkopbrengste in rypgemaakte riet, is ook in ag geneem. Tipiese produksiekostes vir die Pongola area is in hierdie analise gebruik.

Tabel 1. Analise van rypmakervoordeel met twee rypmakers en Moddus® in die toets-variëteit tydens registrasieproewe in Pongola. Resultate verteenwoordig die gemiddelde respons oor vier seisoene (plantriet + drie ratoene).

Behandeling	Produk- en toedieningskoste (R/ha)*	RV %	Stronk-opbrengs(t/ha)	RV-opbrengs (t/ha)	Besparing in oes- en vervoerkoste (R/ha)**	Toename in bruto marge (R/ha)
Kontrole	0	9.7	112.1	10.87	0	0
Rypmaker 1[a]	730	11.9	108.5	12.91	334	9784
Rypmaker 2[b]	730	11.7	107.2	12.54	455	8061
Moddus®	1090	12.4	107.3	13.31	446	11 502

* Produk- en toedieningskoste sluit enige subsidie deur meulenaar uit;

** Besparing in oes- en vervoerkoste is die gevolg van laer stronkopbrengste in rypgemaakte riet.

a: *2-chloro-etiel fosfoonsuur*

b: *fluasifop-p-butiel*

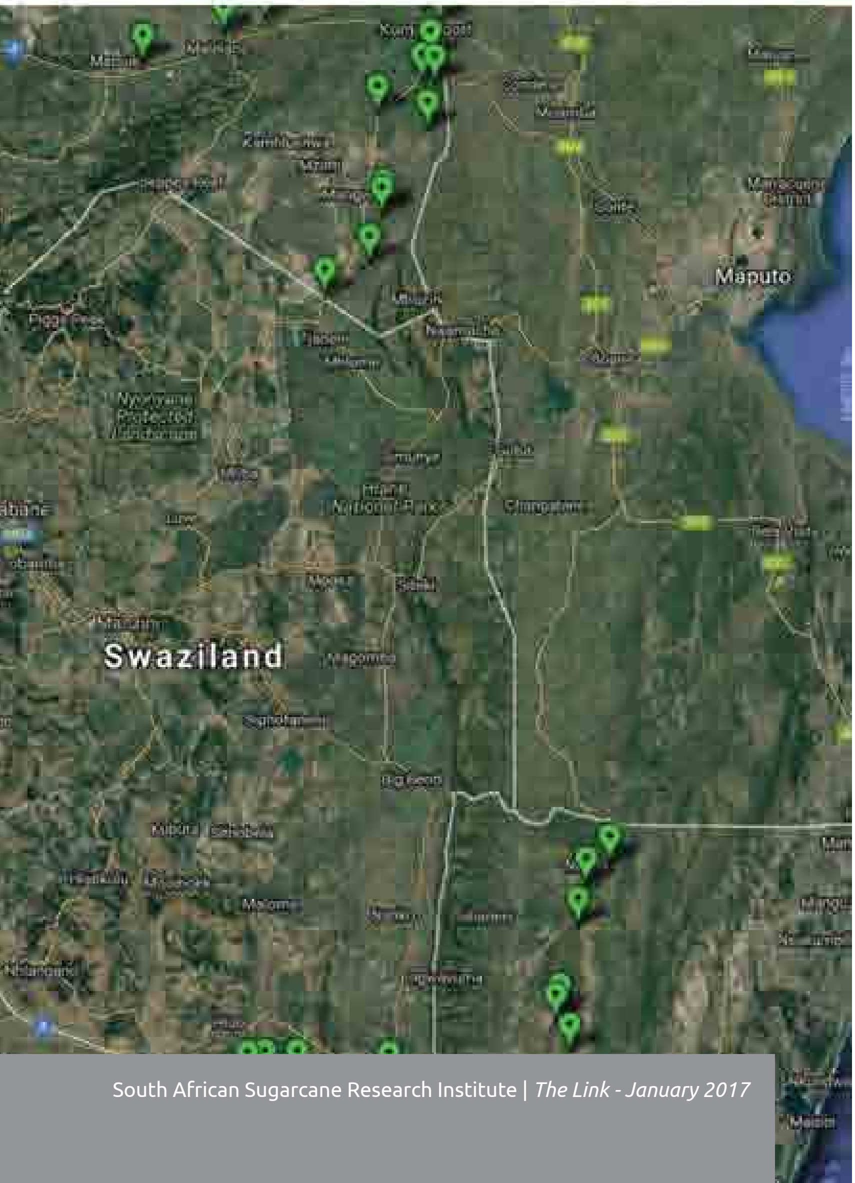
WENK: ǹ Vinnige metode om die geskiktheid van riet vir chemiese rypmaking te bepaal is om Brix% in stronke met ǹ draagbare refraktometer te meet en dan hierdie waardes aan te wend om sapsuiwerheid met die mobiele toepassing **PurEst**™ te beraam. Vir meer inligting oor hierdie metode raadpleeg u plaaslike Voorligtingsbeampte of SASRI Inligtingsblad 12.2.

VERDERE NAVORSING: Navorsing in ander lande (Australië, Brasilië en VSA) dui daarop dat variëteite moontlik verskillend op Moddus® mag reageer. Toetsing van plaaslike variëteite vir hul reaksie op Moddus® het reeds gedurende 2015 by SASRI in aanvang geneem en variëteit-spesifieke aanbevelings sal mettertyd aan kwekers gekommunikeer word. Op hierdie stadium is positiewe reaksies reeds in ǹ aantal populêre variëteite waargeneem.

VOORDELE:

- Moddus® is in staat om relatief volwasse riet, met heelstronk sapsuiwerheid tot en met 85% by toediening, ryp te maak.
- Dit onderskei Moddus® van ander rypmakers met *2-chloro-etiel fosfoonsuur* as aktiewe bestandeel wat slegs in staat is om baie on volwasse riet, met sapsuiwerheid onder 75%, effektief ryp te maak.
- Moddus® kan gebruik word vir beide vroeë- en laatseisoen rypmaking.
- Die vermoë om meer volwasse riet ryp te maak is belowend vir die wydverspreide gebruik van Moddus® op droëland riet.
- Anders as rypmakers met *fluasifop-p-butiel* as aktiewe bestandeel teiken Moddus® nie die groeipunt (apikale meristeem) van die stronk nie. Daarom kan laatseisoen rypmaking, veral in besproeide riet, met veel groter selfvertroue aangepak word vanweë baie laer risiko in die geval van oorstaanriet.
- Gepubliseerde bevindinge dui aan dat die terloopse bespuiting van Moddus® op ǹ wye verskeidenheid van nie-teiken breëblaar spesies (bv. sitrus, mango, aartappel, boontjies, sojabone, katoen en sonneblom) nie blomvorming of opbrengs affekteer nie, in teenstelling met *2-chloro-etiel fosfoonsuur*, wat ernstige gevolge het.

Dit word beraam dat Moddus® teen middel-Maart 2017 beskikbaar sal wees vir gebruik deur kwekers. Vir meer inligting oor toedieningsdosisse, toediening-tot-oes intervalle ens. raadpleeg u plaaslike Voorligtingsbeampte of SASRI Inligtingsblad 12.5.



Catching Chilo:

Biosecurity's Monitoring Network

Kerisha Raghunandan (Publications Officer)

SASRI's Biosecurity service, proactively monitors pests and diseases to ensure the safety of sugarcane. This includes the monitoring of Orange Rust, a potential fungal pathogen of sugarcane, using SASRI-developed spore traps positioned along the borders of South Africa, and an even bigger threat to sugarcane - the spotted stem borer Chilo sacchariphagus. Chilo is a known pest of sugarcane and, just like the already damaging Eldana saccharina, bores into the stalks of cane plants. This damage leads to loss in both cane yields and cane quality. The pest is already known to be present in neighbouring Mozambique and an incursion of this pest into our industry could possibly lead to millions, if not billions, of Rands in losses.

In order to monitor a possible incursion into South Africa, SASRI Biosecurity procured the expertise of CROP WATCH AFRICA to continuously monitor for the presence of Chilo along the border of South Africa and Mozambique. This allows Biosecurity teams to be sufficiently alerted to implement incursion plans should Chilo be found in the country.

CROP WATCH AFRICA "PROTECTION THROUGH DETECTION "

CROP WATCH AFRICA provides a service that allows for the monitoring and early detection of southern Africa's invasive pest species as per government regulations. This Early Warning System (EWS) is used to detect pests in a variety of agricultural sectors including the tomato, olive, peach and tobacco industries, amongst several others. Their website provides information and maps on identifying, recording and trend analysis of these pests. CROP WATCH also maintains international relationships with governments abroad to assist with information and research on potential pests. This is beneficial to SASRI as we are now able to interact with other countries such as the USA to further our knowledge on several other pests.

The CROPWATCH AFRICA website allows users to view information on maps that identify and record trend analyses of the pests being monitored.

THE TRAPS IN ACTION!

Currently, CROP WATCH has approximately 33 traps at sites determined by SASRI. The area monitored at this stage extends from Kaapmuiden in Mpumalanga, ending at Kosi Bay in KwaZulu-Natal. SASRI may alter the positioning and numbers of traps in the grid, if necessary. Traps are also situated either near or at each of the border posts between South Africa, Swaziland and Mozambique. There are also traps at each mill in the Mpumalanga Lowveld and at Pongola.

The traps are Delta Traps with sticky liners baited with a *Chilo sacchariphagus* pheromone lure. The traps are mounted off the ground on a suitable post away from public thoroughfares. All of the traps are serviced and catches are recorded at least every ***14 days***. The pheromone lures and sticky paper are replaced during these visits.

To date, there have been no Chilo moths captured in the Delta traps, neither have there been any reports of cane infested with the pest in the areas being monitored. Further to the EWS service, SASRI also ensures that any cane moving between the borders are inspected for any suspicious insect specimens. If any such damage is found, stalks are confiscated, photographed and sent to SASRI for assessment of the damage.

Monitoring insect incursions through early warning systems is an important part of the South African Sugar Industry's Biosecurity strategy and partnerships with companies and neighbouring countries go a long way in strengthening our position in fighting off incursions.

Agronomic Assessments

Thulani Masondo (Small Scale and Land Reform Extension Manager) and
Nolwazi Madlala (Extension Technician)

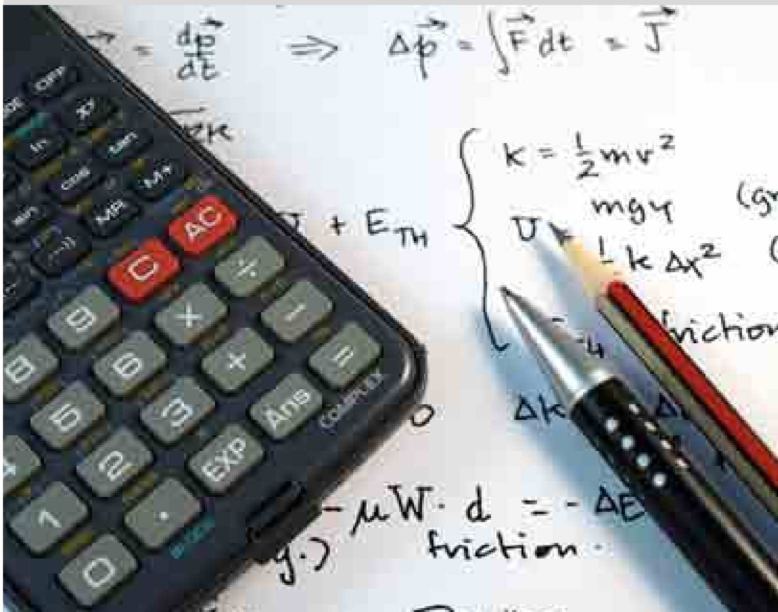
Under the government land reform programme, the Department of Rural Development and Land Reform (DRDLR) purchases farms and makes funds available to assist new farmers with farming operations.

However, as with all state funding, the Department has to ensure that the money is spent in a responsible and justifiable manner. The DRDLR will therefore call for an agronomic assessment of a farm before making a decision about releasing any funds.

The agronomic assessment is a process with very strict deadlines. It involves various stakeholders (CANEGROWERS, SASRI, Millers, Growers) who come together as a team to conduct the assessment. The Miller acts as the coordinating facility and will arrange a suitable date for all parties to meet on the farm to conduct the assessment.

The grower will be sent an assessment form before the farm visit. The form specifies all the information that will be required (e.g. farm map, climatic information, soil types, production history, variety disposition, ratoon age, farm assets, etc). It is in the grower's interest to gather all this information in preparation for the assessment visit. This will help to ensure that the assessment proceeds smoothly and that the DRDLR deadlines are met.

Failure to provide all information will lead to delays in funds being released. Where growers are unsure of what the form requires, they should contact the Extension Specialist well before the farm assessment date.



Soil Health

Neil Miles *and Rian van Antwerpen*
(Senior Soil Scientists)

COMPACTION & CRUSTING

Frequent problems in Ratoons

Recent research results and infield observations suggest that surface soil compaction and crusting under ratoons may be responsible for significant losses in production over large areas of the industry. The following management practices and soil conditions tend to favour the development of these problems:

- ***Infield traffic*** (loading in particular).
- ***Traffic on wet soils.*** Correct timing of trafficking is more difficult for clayey than for sandy soils because the former take much longer to dry to a suitable moisture content to allow infield traffic without damage.
- ***Bare soils*** (no residue cover). The impact of water droplets from rain or irrigation on the soil surface causes aggregates (clods) to break-down and form a surface seal or crust.
- ***Residue covered soils.*** It is important to ensure that soils are covered with a residue blanket in order to retain moisture and maintain soil health. However, covered soils are normally wetter compared to bare soils and often infield traffic may result in severe compaction, despite the residue blanket.

Poorer soils, low in organic matter, such as Westleighs, Cartrefs and Longlands soil forms are particularly vulnerable to compaction and crusting problems. However, when abused, even high potential soils such as humics may develop compacted layers (see picture below).

▼ *Compacted surface layer of a high-potential humic soil.*

Detrimental Effects of Compaction and Crusting

Soil compaction and crusting are bad news from a crop growth point of view. Factors responsible for decreased yields on affected soils are numerous, and include the following:

- Root growth is restricted, since root penetration into dense soil layers is impeded.
- Root health is compromised through a lack of oxygen.
- Water supply to the crop is diminished as a result of the following conditions:
  - A compacted/crusted surface restricts water infiltration into the soil profile, and promotes runoff, thus diminishing the effect of rainfall.
  - Storage of plant-available water in soils decreases with increasing compaction.
- Soil compaction results in the poor utilisation of fertiliser and manure nutrients. This is because surface-applied nutrients are readily lost in runoff water, while poor root growth limits the crop's ability to scavenge for nutrients.

Dealing with the problem

Prevention is better than cure – management strategies such as maintaining surface residue cover and controlled traffic will go a long way towards minimising the development of these problems. However, where soils are already crusted and compacted, inter-row ripping is required. This is a costly intervention, and in order to ensure maximum benefits, the following practical guidelines should be followed:

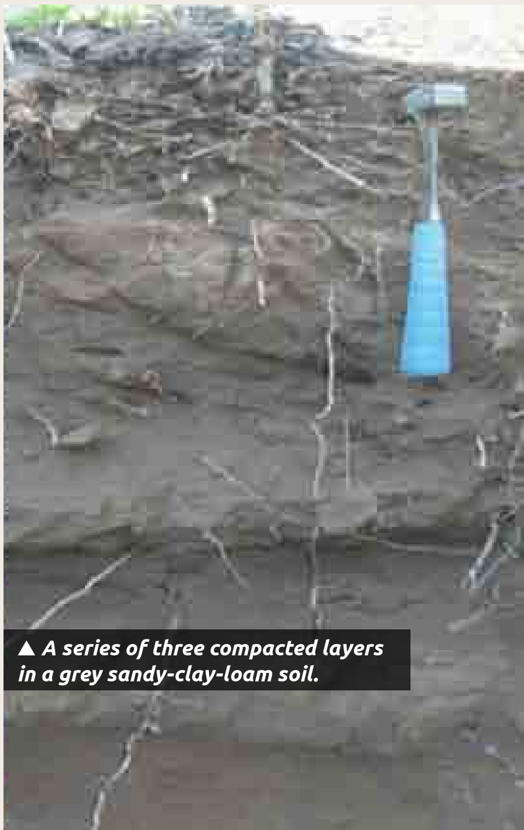
1. The depth of ripping should be restricted to the depth of soil compaction. All too often ripping to 60 cm or more is carried out, when only the top 20 cm or so is compacted, and ripping to a depth of 30 cm would have been quite adequate. Compacted layers must be accurately identified by:
   a. Opening pits and lightly chipping away at the soil face with a pocket knife or screw driver. Your Extension Specialist will help with this.
   b. Pushing a 5 mm sharpened steel rod into the soil to detect the presence and depth of compacted layers.
2. Ripping must not be carried out when the soil is too dry or too wet. If the soil is too wet, ripping will not lift and crack the soil, whereas if the soil is too dry, large blocks of soil will be lifted but not cracked. These considerations are particularly relevant in the case of loamy and clayey soils.

In recent times there has been increasing interest in the use of ripper-applicators for applying fertilisers. Use of this type of implement implies the combined advantages of burying fertiliser and also addressing the compaction/crusting problems in a single operation.

Finally, it is worth noting that the application of gypsum and/or the retention of residues have been shown to be effective in preventing surface crusting. In field trials, gypsum-treated soils have been shown to have greater water infiltration and be subject to less erosion than untreated soils. Similar beneficial effects accompany the retention of crop residues on the surface.

▲ *Inter-row ripping.*

▲ *Surface crusting in a ratoon field on the North Coast.*



▲ *A series of three compacted layers in a grey sandy-clay-loam soil.*

Erratum: The axes on the graph in the Link Soil Health article, September 2016 (page 6-7) had inadvertently been exchanged. We apologise for this error. Please see the corrected graph:

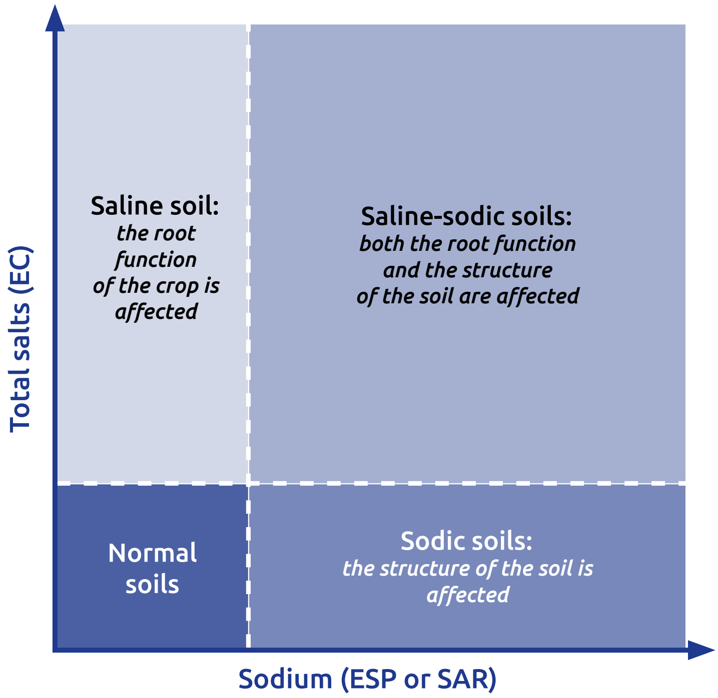


Figure 1: Laboratory-measured parameters used to reflect salt problems (on axes), and indications of the impact of salt conditions on either crop growth or soil properties.

Biosecurity alert

Rowan Stranack
(Extension and Biosecurity Manager)

Many of the southern rainfed regions have received good rains this spring. Despite this however, there are indications that eldana could remain a problem in the coming season. Reports have been received of "dead hearts" in young ratoons, indicating the presence of either eldana or sesamia damage. In many instances both borers have been found. Growers are urged to regularly scout their fields, particularly those where there were high levels of eldana in the previous crop. Should eldana be found in young cane, contact your SASRI Extension Specialist or Biosecurity Officer to discuss an appropriate control programme.

Longhorn Beetle in Sugarcane

Rowan Stranack (Extension and Biosecurity Manager)

During the course of last year, a grower in the Entumeni area noticed patches of yellowing cane and stunted growth in a few fields. Upon inspection, severe stalk damage was noted, together with the presence of larvae of a longhorn beetle (Cerambycid family). Efforts are still under way to determine the exact species.

The larvae of the longhorn beetle are white to cream in colour and can grow to a length of 90 mm. It has an enlarged head with no distinct legs. They burrow in cane stubble and attack the base of the stalk. Larvae then travel 20-30 cm up a cane stalk causing severe damage as they hollow out the inside of the stalk. Infested crops turn yellow and suffer poor growth. Elsewhere in the world, yield losses of up to 50% have been reported. In cases of severe infestation crops fail to ratoon properly or die completely. Ratoon crops usually sustain more damage than plant cane.

SASRI Biosecurity teams have been trained to identify this pest and are scouting for its presence throughout the industry. At this stage, however, it seems infestations of this beetle is limited to only a few farms in the Entumeni area. Growers are urged to be on the lookout for suspicious damage symptoms in their cane and to immediately notify SASRI Biosecurity Officer or Extension Specialist if damage is noted.

Larvae can be found by digging up cane plants and inspecting the base of the stalk and the stubble. Cane bundles should be inspected for burrowings on the ends of stalks. Alternatively, a stalk can be split lengthwise for inspection, in a similar fashion as is done for eldana.

The only current recommendation for control of this pest is eradication of cane stools through ploughing out, followed by a long fallow. Longhorn beetles have a long life-cycle (18-24 months) hence the need for a long fallow.

SASRI is in the process of conducting field trials to test the efficacy of several biological and chemical insecticides. The Department of Agriculture, Forestry and Fisheries has also been contacted to enlist their assistance in dealing with the pest.

Cost-to-benefit of irrigation scheduling

Ashiel Jumman (Agricultural Engineer)
and Francois Olivier (Irrigation Scientist)

SASRI was asked to quantify the cost to benefit ratio of irrigation scheduling with soil water probes. The underlying signal suggested, firstly, that growers were wary of paying too much for a scheduling solution. Secondly, growers want to be reassured that the benefit is substantial enough to justify the investment in irrigation scheduling. Results from a study conducted by SASRI specialists show that a grower could save an average of R 19 413 on water and electricity costs, and attain an average RV gain of R 74 796 over 10 hectares, if irrigation scheduling is done correctly.

WHAT IS THE COST OF SOIL WATER SENSOR (PROBE) SCHEDULING?

A recent survey showed that the **capital costs** of capacitance probes can range from R 4 000 to R 20 000. The capital costs included hardware, software, installation and/or calibration for specific soils/crops, dependant on the supplier. The **operating costs**, which can include maintenance, battery replacement, data/sim card fees, periodic farm visits, or a subscription for the interpretation of data and provision of irrigation scheduling advice, ranged from R 1 000 to R 10 000. In some instances, service providers make use of a crop simulation model in conjunction with the probe data. The costs for this package was slightly higher, but included additional information and functionality such as incorporating weather data, site specific soils information, crop type and irrigation system parameters to forecast the exact volume or duration of irrigation required ahead of time.

Of utmost importance in selecting a service provider is not to only look at the costs involved, but to also do some homework on the quality of the aftersales support. It will make the worlds difference if a service provider/representative in your specific area is willing to walk the extra mile and address queries in a timeous

and professional manner. Therefore growers must also be willing to pay a little extra to get the full benefit from their investment in the equipment and peace of mind. In addition, consideration must be given as to whether the package provides access to soil water data only, or offers advice (in the form of when or how much to irrigate).

WHAT IS THE BENEFIT OF SCHEDULING?

If over-irrigation is the current farm practice, the benefit of scheduling can result in water savings and an associated decrease in electricity bills, without negatively affecting crop yields. If over-irrigation is excessive and prolonged, scheduling can also bring about an increase in crop yield and cane quality. If the current irrigation practice is resulting in under-irrigation and crop stress, scheduling can increase crop yields and cane quality, usually enough to pay for the associated increase in water and electricity use.

The preliminary results from an irrigation scheduling demonstration trial using sub-surface drip irrigation in Pongola delivered water savings ranging from 30 to 52% in the first crop (2015 harvest). The associated cost savings for water and electricity ranged from ± R1 400 to R2 500 per ha per year. Not all irrigation scheduling treatments realised an increase in crop yield. Sucrose yields, however, did increase by 1 – 3 tons/ha. The irrigation scheduling trial in Pongola is still ongoing, and the ratoon results are expected to confirm and strengthen the above findings.

HOW LONG WILL IT TAKE ME TO RECOVER THE COST OF THE IRRIGATION SCHEDULING EQUIPMENT?

If the assumption is made that one capacitance probe covers an area of approximately 10 ha, it is estimated that an average saving of R19 413 in water and electricity can be attained. This alone is sufficient enough to cover the cost of the investment in the scheduling equipment/service **within the first year**. If the potential increase in income associated with higher cane and RV yield is also taken into account (an average of R74 796 in RV gain), there should be no doubt whatsoever as to the benefits of accurate irrigation scheduling. The costs are thus relatively small in relation to the benefits that there are to be gained.

It is important to acknowledge that these results are preliminary, reflecting a plant crop in a specific rainfall season for a specific site. The results will likely differ for other crop cycles, soil profiles and/or rainfall seasons. Nevertheless, a one ton increase in sucrose or a 30% savings in water & electricity costs in the first year **alone** can go a long way to paying for the cost of irrigation scheduling with capacitance probes. It pays to schedule irrigation.

Koste-tot-Voordeel
van besproeiingskedulering

Ashiel Jumman (Landbou Ingenieur) and Francois Olivier (Besproeiings Navorser)

'n Versoek is aan SASRI gerig om die koste tot voordeel verhouding van besproeiingskedulering met behulp van grond water sensors, te bepaal. Die onderliggende rede vir die versoek is eerstens dat boere bang is hulle betaal teveel vir besproeiingskedulering as 'n oplossing. Tweedens wil boere gerus gestel word dat die voordeel van besproeiingskedulering die onkostes daaraan verbonde geregverdig is. Resultate van 'n studie wat deur 'n SASRI spesialis gedoen is het getoon dat 'n boer gemiddeld R 19 413 op water en elektrisiteit kostes kan bespaar en dat 'n gemiddelde RV wins van R 74 796 (oor 10 hektaar) verkry kan word indien besproeiingskedulering op die regte wyse toegepas word.

WAT IS DIE KOSTE VAN GROND WATER SENSOR SKEDULERING?

In 'n onlangse ondersoek is daar gevind dat die kapitale onkoste van sensors tussen R4 000 en R 20 000 kan beloop. Kapitale onkoste sluit hardeware, sagteware, installasie/of kalibrasie vir spesifieke gronde/gewasse in, en is afhanklik van die beskikbaarheid van goedere deur die verskaffer.

Die operasionele koste, wat die onderhoud, vervanging van die battery, data/simkaart kostes, periodieke besoeke aan plase of 'n subskripsie vir die interpretering van data en besproeiings skedulering advies insluit, kan tussen R 1 000 tot R 10 000 beloop. In sommige gevalle kan diensverskaffers gebruik maak van 'n gewas simulasie model tesame met die sensor data. Die kostes vir hierdie pakket is 'n bietjie meer, maar dit sluit addisionele inligting, gewas tipe en besproeiing sisteem parameters in om die werklike volume of die lengte van die besproeiingstyd wat benodig word voor die tyd te kan bepaal.

Wanneer daar besluit word van watter diensverksaffer gebruik gemaak gaan word, is dit van uiterste belang om nie net die onkostes in aanmerking te neem nie, maar ook jou huiswerk te doen met betrekking tot die kwaliteit van die na-verkope diens. Dit sal 'n wêreldse verskil maak indien 'n diensverskaffer of verteenwoordiger in jou spesifieke area gewillig is om die ekstra myl saam met jou te stap en alle vrae betyds en op 'n professionele manier te beantwoord. Dit sal dus die moeite werd wees vir boere om eerder 'n bietjie meer

te betaal en sodoende die volle voordeel van hulle belegging in die toerusting te kry en daarby saam ook gemoedsrus te verkry. Oorweging moet ook gegee word aan die feit of die pakket toegang tot slegs grondwater data gee en of dit ook advies gee in terme van hoeveel en wanneer besproeiing moet plaasvind.

WAT IS DIE VOORDELE VAN SKEDULERING?

Indien oorbesproeiing die huidige praktyk op die plaas is, sal die skedulering van besproeiing beslis 'n groot besparing op elektrisiteitrekeninge tot gevolg hê sonder om 'n negatiewe effek op die gewas opbrengste te hê. Indien oorbesproeiing teveel en te lank plaasvind, sal die skedulering van besproeiing ook 'n positiewe invloed op opbrengs en rietkwaliteit (RV) hê. Indien die huidige praktyk op die plaas onderbesproeiing en stres tot gevolg het, sal die regte skeduleringsprogram oes opbrengste en kwaliteit van riet verhoog, gewoonlik genoeg om die geassosieerde verhoging in waterverbruik en elektrisieteit uitgawes, te betaal.

Voorlopige resultate in 'n besproeiingskedulering proef in Pongola waar daar van 'n ondergrondse drupbesproeiing stelsel gebruik gemaak is, is bevind dat 'n water besparing van tussen 30% to 40% in die 2015 oesjaar verkry is. Die geassosieerde koste besparing van water en elektrisiteit het gewissel tussen ± R 1 400 tot R 2 500 per hektaar per jaar. Sukrose opbrengs het tussen 1-3 ton per hektaar verhoog, die besproeiingsskedulerings proef op Pongola is nog steeds aan die gang en daar word verwag dat die ratoen resultate bogenoemde bevindings sal bevestig.

HOE LANK SAL DIT NEEM OM DIE KOSTE VAN DIE BESPROEIING SKEDULERING TOERUSTING TE VERHAAL?

As daar veronderstel word dat een kapasitansmeter 'n oppervlakte van ongeveer 10 ha kan dek, kan aangeneem word dat dit 'n gemiddelde besparing van R 19 413 aan water en elektrisiteit kan beloop. Hierdie besparing is genoeg om die koste van die belegging en die skedulerings toerusting/diens binne die eerste jaar te dek. Indien daar 'n toename is in inkomste wat geassosieer kan word met 'n hoër RV opbrengs en dit word ook in ag geneem, ('n gemiddelde van R 74 796 in RV toename), behoort daar geen kommer oor die voordele van akkurate besproeiingsskedulering te wees nie. Die onkostes is dus relatief min in verhouding met die voordele wat daaruit voortspruit.

Dit is belangrik om te onthou dat die bogenoemde resultate slegs voorlopig is. Die voorlopige data reflekteer 'n eerste plant wat in 'n spesifieke seisoen en op 'n spesifieke plek geneem is. Die resultate sal heel warskynlik varieer vir ander gewas seisoene, grondprofiele en/of reënval seisoene. Een ton verhoging in sukrose of 'n 30% besparing in water- en elektrisiteitkoste kan in die eerste jaar alleen al 'n lang pad gaan om te betaal vir die koste van besproeiingskedulering met kapasitansmeters. Die voordele van die skedulering van besproeiing is dus voor die hand liggend.

Weather

Phillemon Sithole (Agrometeorologist) and Abraham Singels (Principal Agronomist)

Review

Most parts of the industry received near normal spring and early summer rainfall (August to November 2016). This, coupled with the unseasonal high rainfall in July (Figure 1), caused much improved crop growth in the rainfed areas. However, the northern irrigated regions of Pongola and Mpumalanga remained largely dry until November when good rainfall was recorded. Rainfall in most dam catchments in the industry was inadequate to raise dam levels and irrigation water supply remained critically low, or diminished further.

Outlook

The El Niño-Southern Oscillation (ENSO) system is currently in a weak La Niña (cold) state and is expected to persist for the rest of the 2016/17 summer season. Seasonal forecasts of summer rainfall vary from normal to above normal. The South African Weather Service (SAWS) predicts above normal rainfall across the industry for the rest of this summer while the Global Forecasting Centre for Southern Africa (CSAG of UCT) predicts normal rainfall for mid-summer. The International Research Institute for Climate and Society predicts above normal rainfall for the midsummer (December 2016 to February 2017) and normal rainfall thereafter. The European Centre for Medium-Range Weather Forecasts predicts normal summer rainfall.

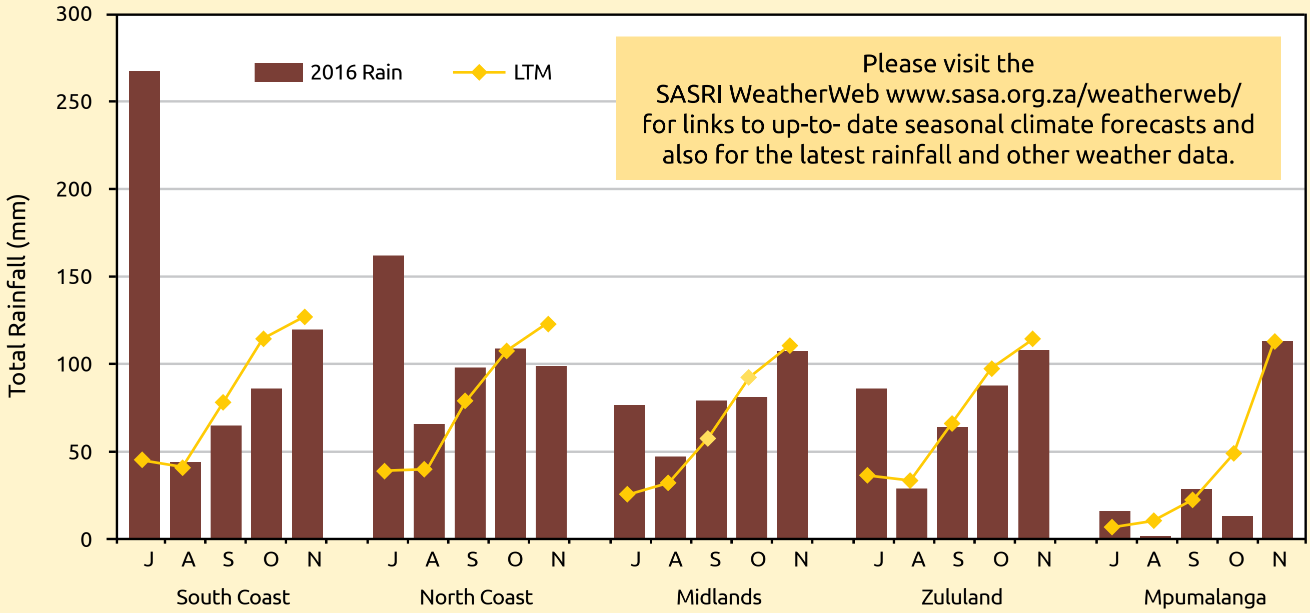


Figure 1: Regional average monthly total rainfall for 2016 (July to November) and the monthly long term means (LTM).

Editorial Team: Kerisha Raghunandan, Poovie Govender, Michelle Binedell, Sharon McFarlane, Rowan Stranack, Prabashnie Ramouthar, Alana Patton, Sumita Ramgareeb & Deborah Sweby.

Layout & Design: Julie Barnes

Afrikaans translation: Abraham Singels, Marius Adendorff, Adrean Naude, Tania van Antwerpen & Francois Olivier.

Publication Details: Published three times a year, usually January, May & September

Feedback & Enquiries: Kerisha Raghunandan: 031-508 7515
Email: pubs@sugar.org.za
Website: www.sugar.org.za