Published by the South African Sugarcane Research Institute

The Link

January 2011 ✦ Volume 20 ✦ Number 1

In this issue...

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Layout & Design: Sagie Doorsamy

Website: www.sugar.org.za

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

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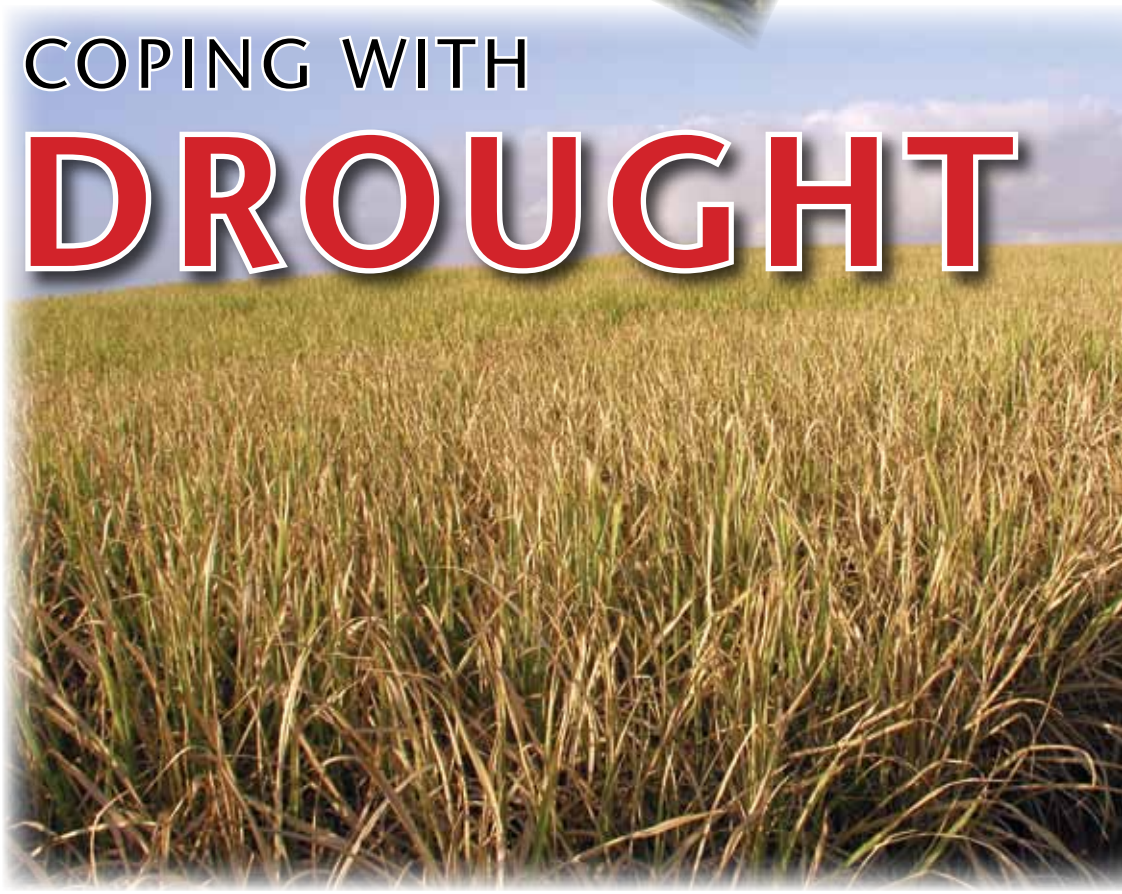
COPING WITH DROUGHT



Whilst the full effects of the devastating drought that hit much of the southern coastal and inland regions last year have yet to be felt, there are nevertheless a number of obvious lessons that can be learned from the experience.

Severe droughts are a regular occurrence. The last three decades have each produced at least one devastating drought, and the recovery from each of these has taken a number of years. Experts also predict that with global warming, whilst total rainfall over the region might increase, the rainfall pattern will become more erratic. These factors point to the need to include the possibility of frequent dry spells into every aspect of long-term farm planning. Whether this is in crop management, such as replant percentage, variety choice and nutrition, or in long-term financial planning, the reality remains that droughts are a factor that simply have to be considered.

Ratoons

The value of having a farm with an adequate percentage of young roots (ratoons) was apparent. Whilst young ratoons are still affected by dry spells, they most often do not carry the additional 'baggage' of older ratoons, for example areas affected and weakened by disease or weed encroachment.

Replant

Parts of fields on farms where stool mortality occurred clearly points to the need to consider the wisdom of replanting some of these areas

Continued on Page 2

in the future. The cane in these areas drains valuable resources from other more productive parts of the farm, with very little or no return.

Roots

The value of a healthy root system can never be over stated. See the article on the effects of subsoil acidity on root development, *The Link-September 2010*. Also, factors such as soil compaction, nematodes and poor general soil health also have a significant effect on root development. Sadly, it was noticed that in areas where excessive soil erosion had taken place in the past, the crop had little chance to survive, highlighting the necessity to practise the basics of soil conservation on every farm.

Seedcane

The shortage of sufficient quantities of good quality seedcane once again highlighted the need for individual growers to become more self-sufficient in this regard. There is also a need for more centralised schemes to produce hot-water treated seedcane for the industry.

Eldana

Along with the drought came increases in eldana levels. Whilst good progress has been made in reducing levels of eldana overall, it remains imperative to implement all aspects of Integrated Pest Management (IPM) in order to limit the negative effects of this pest in the future.

Trash

Last, and by no means least. Although there were unfortunately not many examples, the value of trashing in conserving soil moisture once again showed up in the form of increased yields.

Clearly the drought has forced the situation where growers in the rainfed parts of the industry simply cannot continue into the future without seriously considering each of these factors. For some of the more immediate action necessary following the drought, please refer to the Topical Tips article on pages 14-15.

By Rowan Stranack (Regional Extension Manager-North Coast)

MESSAGE FROM THE DIRECTOR

South Africans are no strangers to drought, and yet for so many of our growers, we are painfully aware that the current season has been worse than ever. The apparent conspiracy between the lack of rain and also the very poor sunshine hours in the early season has been one of the key factors causing the remarkably low yields that have been experienced in all but the irrigated and midlands regions. While managing to escape the immediate effects of the drought, the midlands growers have suffered heavy losses through frost – and the forthcoming season for that region is likely to be extremely difficult as well. At times like this, it is not surprising that growers turn to SASRI for relief. This responsibility weighs heavily on our shoulders and provides an opportunity to recognise the value of the fundamental management practices that SASRI advocates, some of which are reported on in this edition of The Link.

Undoubtedly, there is no easy escape from a drought situation, but the work conducted by SASRI over the years has led to the development of clear guidelines for practices that can alleviate some of the adversity in the short-term and even enable accelerated recovery when weather patterns are normalised. Practices identified in the drought related information in this edition are invaluable, and with the recent rains it is hoped that significant stool recovery occurs. However, beware of the weeds that will be very fast out of the starting blocks, taking full advantage of the available soil nutrients.

Wherever possible we encourage growers in these tough times to concentrate on the basics – to fall back on the sound agronomic practices that form the foundation of a successful operation. Choosing which building blocks to use depends on sound economics, and it is in this area that we need to become collectively smarter. Consulting with Canegrowers' economists in conjunction with SASRI Extension Specialists is an important first step in this regard.

Orange rust

The presence of orange rust has been confirmed in the Cameroon and Ivory Coast, the first reports of this disease in Africa. Until recently, orange rust had only been observed in the Asian-Australian-Pacific region but was reported in Florida and a number of countries in Central America in 2007. The disease was also observed in Brazil in 2009.

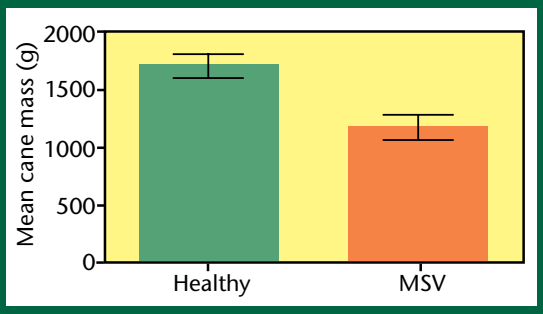
Orange rust was considered to be of minor importance in the Australian sugarcane industry when, in the year 2000, a previously resistant variety Q124, became severely infected. Losses were estimated to be in the region of Aus$200 million, given that Q124 accounted for 45% of the crop at that time.

Orange rust tolerates warmer temperatures than brown rust. Wet and humid summer and autumn conditions favour orange rust development and the disease is more common in more mature cane (>6 months). This is significant as it means that commercial cultivars susceptible to both pathogens could be impacted throughout the growing season. Early symptoms are small, elongated yellow spots. As these spots increase in size, they become surrounded by a pale green halo. Mature spots or lesions are orange to orange-brown in colour and usually occur in clusters near the base of the leaf.

Of the widely grown South African varieties tested for their susceptibility to orange rust in the United States and Australia, N14, N23, N25, N29, N31, N37, N39 and N41 have been rated resistant. N32 developed mild orange rust symptoms in Florida. Varieties N12, N19 and NCo376 are in the process of being tested.

By Sharon McFarlane (Senior Plant Pathologist) and Stuart Rutherford (Senior Pathologist)

Maize Streak Virus



UPDATE

Maize streak virus (MSV) resulted in an average yield loss of 31% in infected N44 plants in a pot trial conducted recently. The stalks of infected plants were shorter and thinner than the healthy cane and severely infected stools tillered profusely, resulting in a lower ERC% at harvest. N44 has been degazetted with a 5 year window period to enable further research to continue at SASRI.

By Sharon McFarlane (Senior Plant Pathologist) & Tania van Antwerpen (Plant Pathologist)

VARIETY CHOICE

Eston

Variety choice can often be a daunting task due to the large number of varieties available to choose from. The susceptibility of varieties to nematode damage is but one of the many factors that need to be considered when making this important decision.

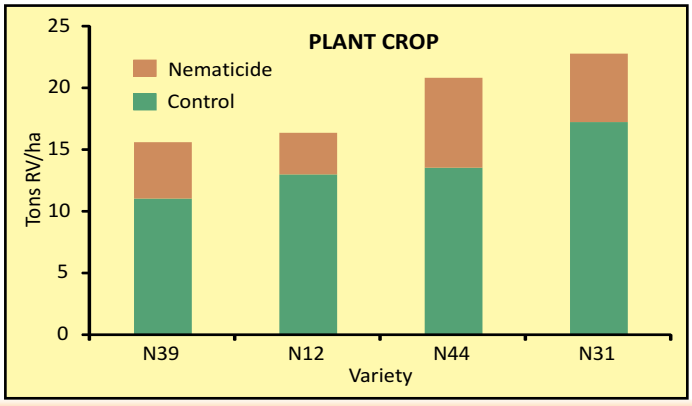
Results from an Eston trial show that of the four varieties planted (N12, N31, N39, N44), N31 was the highest yielding variety in both the plant crop and the first ratoon, both with or without nematicide (Temik) application. All four varieties responded to nematicide application with particularly large responses (3.4 -7.2 tons RV/ha) in the plant crop and smaller, but still economical responses (0.8 – 2.5 tons RV/ha) in the ratoon crop. As seen in other trials, N12 was the most tolerant of the varieties and can, in some cases, be grown without using nematicide. The large responses in the plant crop again validate the necessity to use nematicides in the plant crop where the chemical can be applied 'in the furrow', for better uptake by the plant. It cannot be emphasised enough that a good plant crop will give long lasting benefits for many ratoons.

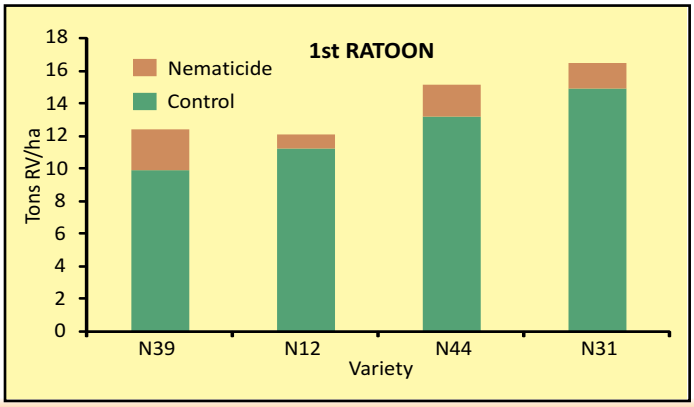
The outstanding performance of N31 confirms earlier reports in *The Link - May 2001* and *February 2003* where N31 performed well in the midlands area particularly on sandier soils. It also confirms the preliminary results described in *The Link - May 2007* (Managing nematodes) where N31 and N44 were identified as being the most promising varieties.

Refer to similar articles in The Link - May 2010 ("Variety choice for sandy soils in Mpumalanga") and May 2007 ("Managing nematodes" – Eston area).

By Prabashnie Ramouthar (Assistant Research Officer), Shaun Berry (Nematologist) and Otto de Haas (Extension Specialist-Midlands South)

Variety N31 and N39 from Temik (T) and control (C) plots at harvest (Photo by Otto de Haas).





One of the six trials on sandy soils in the sugar industry where varieties are rated for their performance where nematodes are a problem. Photo: Eugene Kalafatas.

Ndlavaleni Demonstration Plot

The Ndlavaleni demonstration plot, which is one of sixteen demonstration plots in the Noodsberg mill supply area, was planted about two years ago in Gcumisa. This particular project represents a partnership which involves the co-operator, Mr T Mdunge, the Illovo Noodsberg mill, the Department of Agriculture, Environment and Rural Development. (DAERD) and SASRI. While Mr T Mdunge supplies the labour requirements for the demonstration plot, the seedcane, transport and land preparation costs are funded by the Illovo Noodsberg mill. In addition, the weedicide and fertiliser costs are funded by the DAERD and soil samples funded by SASRI.

Demonstration plots are used to transfer technology to small-scale growers in a structured manner. The information passed on relates to soil form identification, business skills, pest and disease identification, understanding the environment, variety choice, correct herbicide application, soil sampling and fertiliser top dressing. These plots also serve as a source of seedcane, thereby reducing planting costs while expanding the area under sugarcane.

The plant and first ratoon are used for seedcane after which the demonstration reverts to commercial cane and is the responsibility of the cooperator.

By William Gillespie (Extension Specialist: Small-scale Growers-South Coast)

NEMATICIDES

for sugarcane in South Africa

Currently six nematicides are registered for use on sugarcane (Table 1). All six of these chemicals can legally be used on sugarcane in South Africa, however each has their own set of exclusions and instructions for use (Table 2). For example (Table 3), CropGuard is registered for plant cane for both rainfed and irrigated conditions but only for ratoon cane in irrigated conditions; Curaterr 10GR must be applied in a shallow furrow along the cane row and not on the soil surface in ratoon cane; Vydate 100GR is registered for both plant cane and ratoon cane whereas Oxagran 100GR and Vydate SL (although having the same active ingredient as Vydate 100GR) are registered only for plant cane and ratoon cane respectively.

For details on how to use these chemicals and what precautions to take, consult the labels that are attached to each product.

Growers often only see the cost of the nematicides without knowing the economical benefits of using them. Below is a table summarising the current costs of each chemical, the rates to use, the expected yield increases and the final profit for each.

These results show that:

- CropGuard, Temik 15GR and Vydate 100GR cost ~R2 000/ha, Oxagran 100GR is slightly cheaper at R1 730/ha and Vydate SL and Curaterr 10GR cost R1 300 and R1 000 respectively.
- Curaterr has to be incorporated into the soil in ratoon cane thus has higher application costs compared to the other chemicals.
- Temik generally gives the greatest yield responses and greatest expected profits in both plant and ratoon crops.

Over and above the economical benefits from using nematicides, other additional (often unseen) benefits include: quicker cane canopy, less weed control and more high-yielding ratoons. In addition, some nematicides (e.g. Temik and Vydate) have also been shown to reduce thrips infestations in sugarcane.

By Shaun Berry (Nematologist)

Table 1.

Name	Company	Active ingredient	Type of chemical	Rate
CropGuard	Illovo Sugar (Ltd)	Furfural	Aldehyde	50 L/ha
Curaterr 10GR	Bayer CropScience	Carbofuran	Carbamate	30 kg/ha
Oxagran 100GR	Nialcor (Pty) Ltd	Oxamyl	Carbamate	30 kg/ha
Temik 15GR	Bayer CropScience	Aldicarb	Carbamate	20 kg/ha
Vydate 100GR	Du Pont	Oxamyl	Carbamate	30 kg/ha
Vydate SL	Du Pont	Oxamyl	Carbamate	9.6 L/ha

Table 2.

	Plant Cane	Ratoon	Burnt	Trashed	Rainfed	Irrigated
CropGuard	✓	✓*	✓	✓	✓	✓
Curaterr 10GR	✓	✓	✓	✓	✓	✓
Oxagran 100GR	✓	×	✓	✓	✓	✓
Temik 15GR	✓	✓	✓	✓	✓	✓
Vydate 100GR	✓	✓	✓	✓	✓	✓
Vydate SL	×	✓	✓	✓	✓	✓

** CropGuard only registered for Ratoon cane under irrigated conditions*

Table 3.

		CropGuard	Curaterr 10GR	Oxagran 100GR	Temik 15GR	Vydate 100GR	Vydate SL
Cost (per kg or litre)*		R43.28	R34.97	R57.69	R110.51	R67.16	R141.97
Amount used per ha	Plant cane	50 L	30 kg	30 kg	20 kg	30 kg	-
	Ratoon cane	50 L	25 kg	-	20 kg	30 kg	9.6L
Cost per ha - chemical	Plant cane	R2 164.00	R1 048.95	R1 730.70	R2 210.10	R2 014.80	-
	Ratoon cane	R2 164.00	R874. 13	-	R2 210.10	R2 014.80	R 1 362.86
Cost per ha - application**	Plant cane	R69.40	R69.40	R69.40	R69.40	R69.40	-
	Ratoon cane	R69.40	R456.40	-	R69.40	R69.40	R69.40
Expected yield increase (t RV/ha)***	Plant cane	1.1	1.4	0.9	2.1	0.9	-
	Ratoon cane	1.0	1.0	-	1.5	1.1	1.1
Expected profit per hectare****	Plant cane	R571.60	R2 451.65	R494.90	R3 075.50	R210.80	-
	Ratoon cane	R316.60	R1 219.48	-	R1 545.50	R720.80	R1 372.74

* Retail price as at 5 November 2010.

** Based on industry average of R69.40 per man/day/ha for pushing mechanical applicators and based on 2010 Mechanisation Reports used by SASRI and CaneGrowers for tractor, driver and implement usage for Curaterr application in ratoon cane.

*** Based on available trial data. Number of trials vary for each chemical according to data available

**** Calculated using the RV price as at 31 August 2010 (R2 550/t).

V-CHOICE

A NEW VARIETY SELECTION TOOL FROM SASRI

SASRI has recently developed a web-based variety selection tool to assist growers with variety choice for their specific growing conditions.

The system assists with variety selection by creating a shortlist of appropriate varieties for specific conditions, and eliminates the need to sift through each and every SASRI Variety Information Sheet in order to choose correctly.

The system is made up of a six-step process whereby users choose different options from drop-down boxes at each step:

- Users are asked to specify their production region (mill supply area),
- Their irrigation regime (rainfed/supplementary/full irrigation),
- The planned age of harvesting (12, 18, 24 months),
- The planned time of harvesting (early, mid, late season),
- The general yield potential conditions of the field (low, moderate, high), and
- The threat of eldana in the area (low, moderate, high risk).

As each choice is made, the system eliminates varieties from the gazetted list and only carries forward varieties that conform to the selections. The variety list carried forward at each stage becomes smaller and smaller until a final variety shortlist is left at the end. The grower can then click on any of the varieties in the shortlist and is directed to the detailed SASRI Information Sheet.

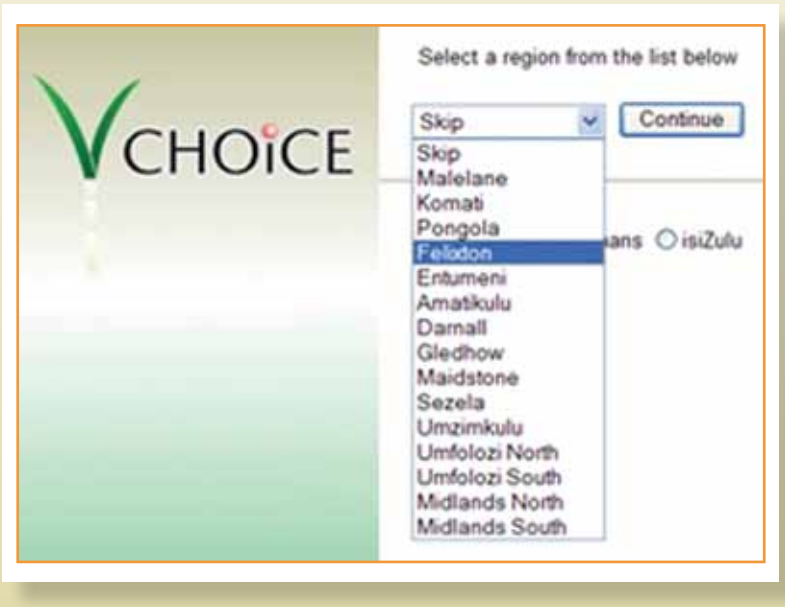
The system is based on detailed statistical analyses of variety trial data, whereby the RV yielding ability of varieties were evaluated at different harvest ages and times of harvest. The adaptability of varieties to different yield potential conditions was evaluated by considering the RV yields of varieties over a range of trials that differed in yield potentials. The suitability of varieties to scenarios with high risks of eldana damage was determined using the current eldana resistance ratings of varieties.

In time, the system will be expanded to allow for the comparison of RV%, cane yield, and RV yields of the varieties under the specified conditions. Growers will also be able to rank varieties according to agronomic and pest and disease characteristics.

It is important to understand that the system makes a 'rigid' objective judgment based purely on available data. Before making any final choices, growers must consult their Extension Specialists, who will use their experience and knowledge to verify the final selections.

The current system can be accessed by going to the SASRI website www.sugar.org.za/sasri and selecting the 'Variety Information' option on the navigation bar on the left. Feedback on the efficiency of the system can be communicated to sanesh.ramburan@sugar.org.za.

By Sanesh Ramburan
(Agronomist: Varieties)



On-farm chemical ripener responses in Mpumalanga

Growers often ask what economic returns can be expected from chemical ripening under commercial conditions. The Ripener Evaluation programme at SASRI is conducted under rigorous experimental conditions in order to supply growers with reliable information about the best ripener treatments for each released variety. These trials often demonstrate the maximum economic gains that can be achieved from chemical ripening. However, a very good approach to inform growers about the economic gains achievable from chemical ripening under commercial conditions are strip-trials on individual farms.

Results from a recent strip-trial conducted in collaboration with TSB on Piet Smith's farm, Noordgrens, near Komatipoort were used to emphasise the substantial economic gains that can be achieved.

Strips (1.6 ha each) within three fields (5th ratoon of N25, plant crop and 3rd ratoon of N23) under sub-surface drip irrigation

Figure 1. Black necrotic ring formation and side-shoot development on upper internodes in response to Fusilade Forte observed nine weeks after application.

Figure 2. Fusilade Forte application resulted in the death of spindle leaves but without damaging the mature green leaves required for sucrose production and storage.

were selected for the trial. At the time of spraying, the sugarcane in these fields had eight or more green leaves and long upper internodes, reliable indicators of vigorous crop growth essential for achieving good ripener responses. The strips were sprayed with chemical ripeners, or left unsprayed, and inspected prior to harvest for the development of visual ripener symptoms.

Ripener Symptoms

Ripener symptoms characteristic of Fusilade Forte were clearly evident in all three fields with wide spread desiccation of spindle leaves and the formation of black necrotic rings on the upper sections of the stalks. Because of the longer than normal spray-to-harvest-interval, forced by the wet conditions, well-developed side-shoots were also common (Figure 1).

Importantly, the mature green leaves were not scorched or damaged by Fusilade Forte application and therefore continued to produce sucrose for storage in the stalk (Figure 2).

Ripener responses

Improvement in RV yields due to the combination ripener treatment varied between 1.18 – 2.11 t/ha. The total cost (chemicals + aerial application) of the combination treatment during 2010 at Komatipoort was approximately R494/ha. However, with a subsidy of 75% from TSB, the actual cost to growers was as low as R123.50/ha. The profit (R/ha) achieved was calculated using the end of May/early June 2010 RV price of R2 465. In this instance, the profit achieved by Piet Smith from using chemical ripeners in these three fields was between R2 785 – R5 077/ha. Only in one case (N23 plant crop) did the combination treatment reduced cane yields slightly by ±11 t/ha, but the very large improvement in cane quality (%RV) more than compensated for this loss, still allowing a substantial profit of R2 785/ha in addition to some savings in transport costs.

These on-farm results clearly emphasise the large economic benefit that chemical ripening of well-managed irrigated sugarcane crops can produce. Considering the low cost of application, and the rapid return on investment, chemical ripening is a low-risk and very profitable best management practice that growers can implement in high-yielding sugarcane crops.

Trial details:

For chemical ripening of both N23 and N25 SASRI recommends the combination ("piggy-back") treatment where Ethephon is applied first followed by Fusilade Forte 5 – 6 weeks later. In this trial, harvest was delayed due to wet conditions, which resulted in spray-to-harvest intervals of 14 weeks for Ethephon and 9 weeks for Fusilade Forte. Ethephon and Fusilade Forte were applied by fixed-wing aircraft at application rates of 1.5 l/ha and 275 ml/ha respectively in a volume of 30 L of water/ha as specified on the product labels. Ethephon and Fusilade Forte were applied on the 23rd of February 2010 and 29th of March 2010 respectively. All three crops were harvested during the last week of May/first week of June 2010 at crop ages of 12 -13 months. At harvest, cane consignments (3 – 5) from each strip were analysed for cane quality (% RV) by the cane testing service at the Komatipoort mill. Since all the cane consignments (8 – 9 per strip) were also weighed at the mill, it was possible to calculate both the cane and RV yields (t/ha) in each strip.

Please contact your Extension Specialist if you are interested in following a similar approach to assess ripener responses on your farms.

By Riekert van Heerden (Senior Scientist – Sugarcane Physiologist)

Table 1. Early-season commercial strip trial ripener responses in N23 and N25 at Komatipoort.

Variety	Treatment	RV (%)	Cane yield (t/ha)	RV yield (t/ha)	Improvement (t/ha) in RV yield relative to control	Profit (R/ha)
N25	Unripened	10.02	139.2	13.95	-	-
(5th ratoon)	Ripened	10.82	143.2	15.50	1.55	3697
N23	Unripened	10.02	132.5	13.27	-	-
(3rd ratoon)	Ripened	11.5	133.7	15.38	2.11	5077
N23	Unripened	10.57	130.3	13.77	-	-
(plant crop)	Ripened	12.55	119.1	14.95	1.18	2785

THE PESTICIDE LABEL

All remedies registered for use in sugarcane agriculture in terms of Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act No. 36 of 1947, have what is called "a label". The label, which is attached to the pesticide container, provides important information about the product. It covers aspects such as directions for safe use, details of the formulation and precautions to take as well as warnings that may apply for use of the product. It is the main means by which users can be informed about the intended purpose and safe and effective use of a remedy.

The diagram below outlines the main features of the product label.

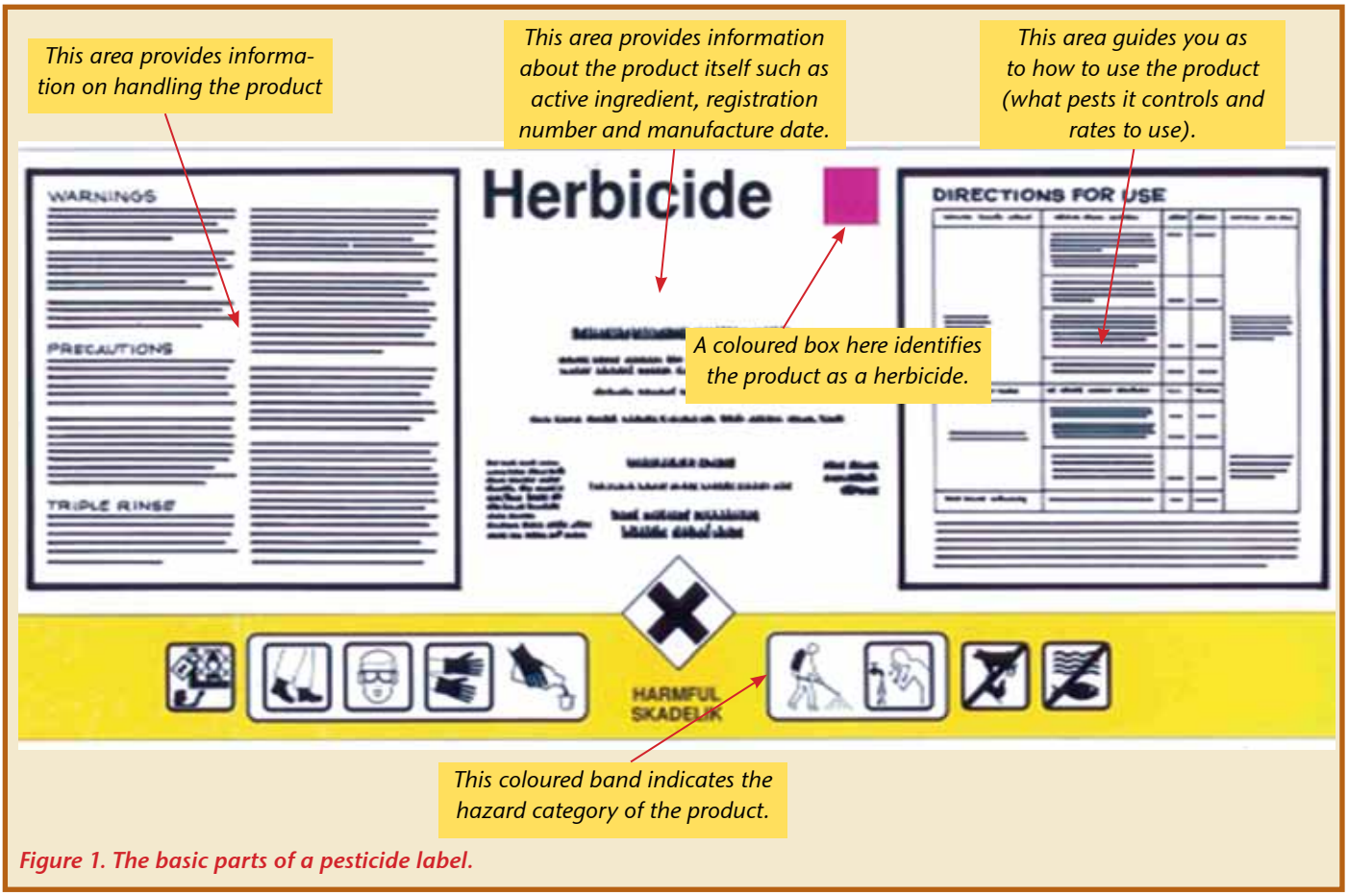
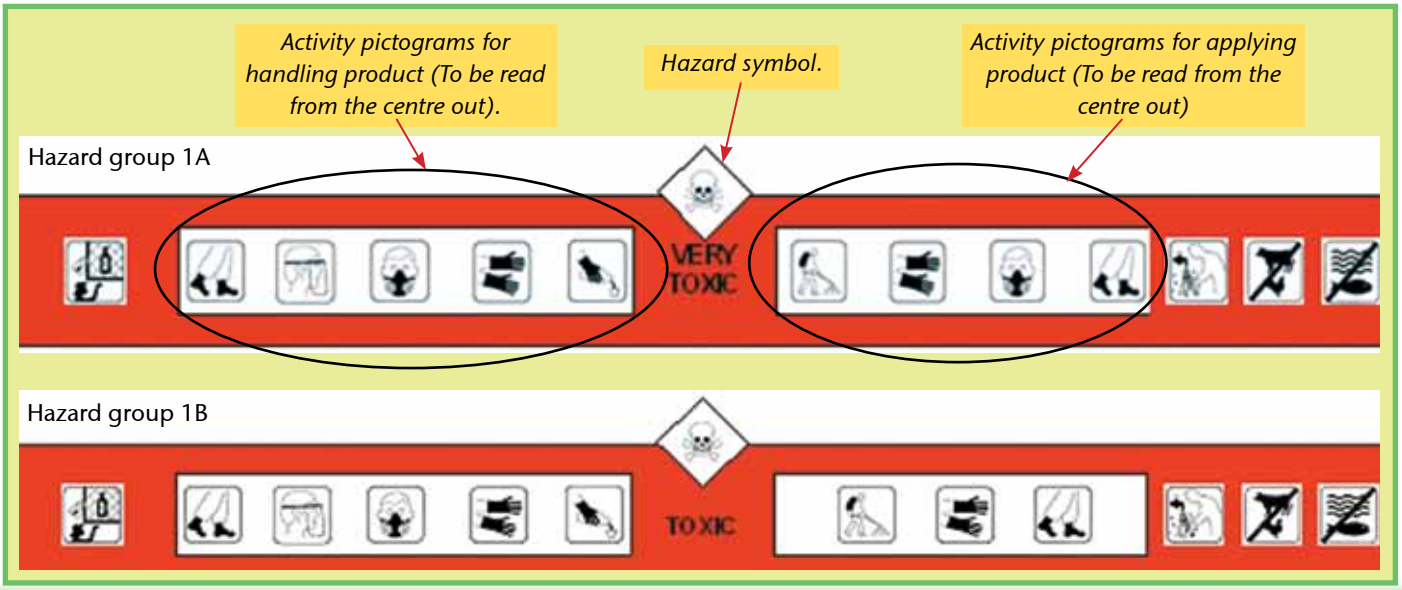


Figure 1. The basic parts of a pesticide label.

The colour of the band at the base of the label indicates the hazard grouping of the pesticide (Figure 2). The hazard level is based on a product's ability to harm the user and the environment. Red band products are the most hazardous while green band products are the least hazardous. In our industry, we have 46 pesticides registered for use against sugarcane pests. Of these, 87% are in hazard groups II, III IV.



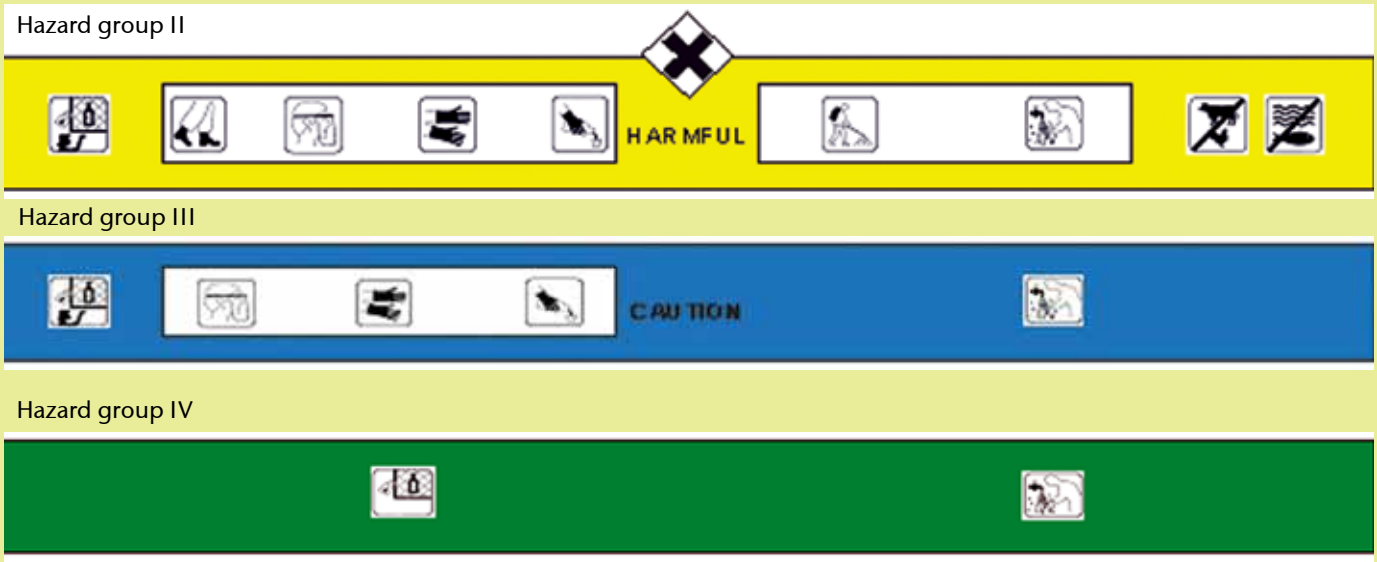


Figure 2. Band colours and pictograms on product labels indicate the various hazard classes for pesticides and required precautions for their use.

Further information on handling and using products is provided in the pictograms included on the coloured band. These cover the basic "do's" and "don'ts" of handling and applying products.

The pictograms are intended to be read from the centre outwards (left and right), indicating what precautions to take when handling the concentrated product (pictograms to the left) and precautions necessary when applying the diluted spray mix (pictograms to the right). Further pictograms, where present, on the extreme right and left of the band, indicate additional precautions relating to the environmental risks and storage requirements respectively. Explanations as to what the pictograms mean are provided in Figure 3.

By following the instructions and guidelines provided on the label, you will not only apply the product correctly, you will be following safe and environmentally sustainable practices. However please note that the container label provides only a basic guide. It is important that you read any technical information provided with the product.

Remember: READ THE LABEL AND FOLLOW THE INSTRUCTIONS.

Thanks to the Agricultural and Veterinary Chemicals Association of South Africa (AVCASA) for providing information used in this article.

By Graeme Leslie (Principal Entomologist)


Dangerous and harmful to livestock and poultry


Dangerous and harmful to fish and bodies of water


Wear gloves


Wear boots


Wear eye protection


Wear respirator


Wash after use


Toxic/very toxic (Group IA&B products)


Application


Handling liquid concentrate


Keep locked away and out of reach of children

Figure 3. The meaning of pictograms appearing on pesticide labels.

UPDATE ON Chilo

The sugarcane stalk borer *Chilo sacchariphagus* in Mozambique remains a serious threat to the South African sugar industry. Crop protection workers in areas close to Mozambique have a particularly crucial role to play in remaining vigilant for the possible invasion of this pest into this country.

SASRI Extension Specialist, Marius Ardendorff who is also the LPD&VC Officer for Pongola, and the LPD&VC Officer from the Lowveld, Karlien Trumpelmann recently visited the Mafambisse sugar estate in Mozambique to obtain first-hand field experience of this pest, where they observed the typical symptoms. These include:

- Typical shot holes in the open leaves clearly visible when viewed against the light (Figure 2);
- Branching or side-shooting on mature, damaged cane (Figure 3);
- Dead or dying stools, when severely infested with the pest (Figure 1).

Part of their experience involved collecting larvae from stalks, eggs from leaves and adult moths from traps, all of which were used to confirm the identity of the pest. These Officers will now share the information among relevant stakeholders and field workers in their areas to improve the monitoring of this pest. This example of practical training forms an important part of the SASRI coordinated *C. sacchariphagus* awareness campaign. This falls within the Regional Biosecurity Programme which aims to respond timeously to any biosecurity threat facing sugar producing industries in the SADC region.

By Mike Way (Entomologist) and
Stuart Rutherford (Senior Pathologist)

Biosecurity basics:

Be vigilant. Look for signs of damage. Know the symptoms: If you know the signs you may be able to tell if something is wrong. Early detection can help prevent the spread of pests and diseases.

Report damage to your crops: Don't wait. If your crops are damaged, contact your local Extension Specialist.

Figure 1. Sugarcane crops in Mozambique badly affected by damage from Chilo sacchariphagus (Photo K. Trumpelmann).

Figure 2. Chilo sacchariphagus larvae bore through the leaf surface in the spindles stage (left) causing shot holes in the open leaves (right) (Photo K. Trumpelmann).

Figure 3. The young C. sacchariphagus larvae feed on the growing tip (apical meristem) thus resulting in the germination of side shoots (left), while the older larvae make tunnels in the top section of the sugarcane stalk (right) (Photo K. Trumpelmann).

GREENHOUSE GASES
AND SUGARCANE FARMING

What is the problem?

Carbon dioxide, nitrous oxide and methane are important greenhouse gases that warm the atmosphere by trapping heat reflected off the earth's surface. Unfortunately a number of human activities enhance their production leading to an increase in their concentrations in the atmosphere. The consequence is higher global temperatures and accelerated climate change.

Of the greenhouse gases, ***carbon dioxide*** is produced in the largest quantities because humans are so reliant on fossil fuels (coal, diesel, oil, etc.). When fossil fuels are burnt, large quantities of carbon dioxide are released into the atmosphere. The biggest culprit is electricity generation, but production of agrochemicals (fertilisers, herbicides, etc.) is another large contributor.

Nitrous oxide and ***methane***, although produced in lower quantities, are of equal concern because they are more potent greenhouse gases than carbon dioxide; one unit of methane has the same global warming potential as 23 units of carbon dioxide and one unit of nitrous oxide is equal to 310 units of carbon dioxide!

Does sugarcane farming contribute to the problem?

Because agriculture involves the use of electricity, fuel and agrochemicals, it contributes to greenhouse gas emissions. Furthermore, all of the gases mentioned above are released into the atmosphere during pre-harvest sugarcane burning. Additionally, methane can be released when manure is allowed to decompose under very wet conditions. Nitrous oxide on the other hand can be released from the soil into the atmosphere following the application of nitrogen fertilisers due to denitrification. Indeed, under sugarcane production, the release of carbon dioxide and nitrous oxide from the soil is the largest contributor to greenhouse gas emissions from sugarcane production, followed by burning of trash and fertiliser production.

A recent study shows that producing sugarcane at a yield of 60 tonnes per hectare using a pre-harvest burning programme on three hectares of land has the same carbon dioxide equivalent greenhouse gas emissions as a passenger vehicle driving about 19 000 km per year.

How can we reduce our greenhouse gas emissions?

Agrochemicals

- Do not over-apply synthetic nitrogen fertilisers such as urea and LAN – use as per recommendation or according to crop demand. The incorporation of fertiliser will help to reduce gaseous N losses and the application of irrigation water just after fertiliser application will reduce losses even further.
- Where possible, use organic fertilisers to supplement synthetic fertilisers. Do, however, take into account the impact of carbon release from any additional transport required for bulky organic fertilisers.
- When using manures, implement measures to reduce the potential for anaerobic decomposition in water during storage. Manures should also be incorporated during application to minimise gaseous N losses.
- Use biocontrol agents as opposed to conventional chemical products to suppress weeds and pathogens.

Pre-harvest burning

Refrain from burning where appropriate. This will reduce greenhouse gas emissions significantly.

Efficient fuel use

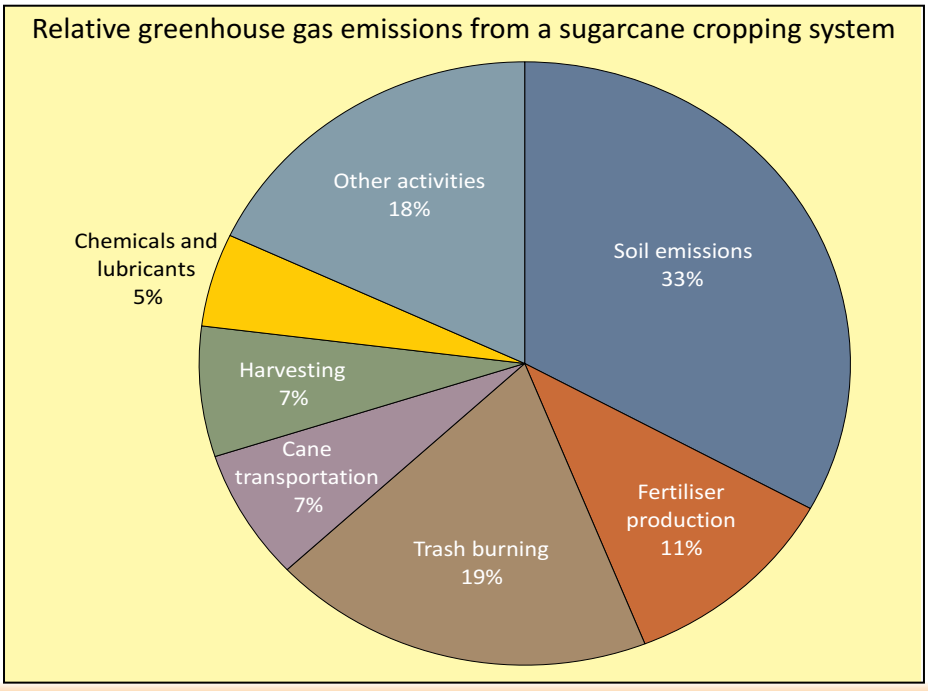
- Use vehicles in a way that optimises fuel consumption, whether it is for transporting cane to the mill or conducting in-field operations. For example use smaller machinery capable of doing the same job.

Conclusions

Sugarcane farming in South Africa currently contributes significant quantities of greenhouse gases to the atmosphere. Much of these emissions can be reduced through improved management practices. Looking into the future, the sugarcane crop has excellent potential to reduce net greenhouse gas emissions through the production of bioethanol, the generation of electricity from crop residues and the sequestration of large amounts of carbon in the soil using appropriate management practices.

By Tarryn Eustice (Soil Scientist), Michael van der Laan (Systems Modeller) and Rian van Antwerpen (Senior Soil Scientist)

Relative greenhouse gas emissions from a sugarcane cropping system



Topical Tips

The drought has disrupted cutting cycles, creating a large pool of relatively immature cane throughout the southern rainfed coastal region. To counter this, a carefully planned ripener application programme is an effective way to overcome inevitable lower levels of cane quality.

Gapping of drought-affected fields is likely to be still going on. All gaps of one meter or more need to be filled with good quality seedcane, and protected with a fungicide to prevent various sett rots.

Planting in late summer and autumn brings additional risks. High soil temperatures as well as the possibility of the soil drying out as winter approaches, leads to the risk of soil-borne diseases such as pineapple sett rot which affects germination. Apply a fungicide to protect the setts, and adequately cover and compact the soil over the setts.

If in doubt, take extra care to plant only if soil conditions are optimum and consider delaying planting until spring.

Do your own surveys or get your Local Pest Disease and Variety Committee to check carryover fields for eldana so that fields with the highest levels of damage can be harvested first in the coming season.

In the event of young ratoon or plant fields not being affected by thrips, leaf samples can be taken to assess the effectiveness of your fertiliser programme.

In the northern irrigated areas there are excellent opportunities to exploit the use of chemical ripeners as well as the scheduling of varieties to be harvested in their appropriate 'window' to ensure the maximum possible income from every field. Please contact your local SASRI Extension Specialist.

Roguing of disease should be in full swing. Remember that diseased stools must be completely removed with all their roots, and in the case of smut, placed in a bag, removed from the field and burnt. Train your staff to identify smut before the whips emerge.

Ratoon stunting disease (RSD) can cause severe yield loss. Between 12 and 50 % reduction in yield has been recorded in trials *(The Link September 1994)*. It makes good sense, therefore, to know if your fields are infected, and if so, to sacrifice some crop growth by fallowing these fields until all traces of the previous crop are removed. This could take up to six months. Plan to sample all fields to be re-established this year. Speak to your local SASRI Extension Specialist or Pest and Disease Officer.

Plan all field operations for the coming season. Although plans change, they form the basis of income and expenditure estimates (budgets) as well as identifying the times at which resources such as labour, fertiliser, herbicide, seedcane etc. will be required. SASRI has programme planning charts available should you require them. Contact your local SASRI Extension Specialist.

You can only manage effectively if you have good accurate information at your disposal. If you are not using a field recording system, think seriously about buying a suitable package. There are many available for use with a personal computer, but even basic manual records are good enough provided the correct data is recorded.

Ask your local SASRI Extension Specialist to help you access the latest SASRI crop forecast for the coming season. There is also a yield benchmarking facility available on the SASRI website: http://www.sugar.org.za/sasri and click on Crop Resources on the left of the screen. Consult your Extension Specialist if you need assistance with the basic inputs.

Crop growth peaks from January to March. Make sure growth is not lost to unnecessary weed competition, ineffective irrigation scheduling or malfunctioning irrigation equipment.

Plan your seedcane requirements now for next year. Nowadays, most varieties are niche specific, and to avoid planting varieties in the wrong place, it pays to plan well ahead.

The quieter times during the off-season provide an opportunity to train staff without much disruption to important operations. Some courses that could be appropriate at this time are: disease, pest and variety identification, planting, Junior or Senior Supervisor training, tractor care, basic workshop skills and welding. Contact the Shukela Training Centre on 031 – 508 7706 or your local extension office.

By Rowan Stranack (Regional Extension Manager-North Coast)

Temik (active ingredient aldicarb) to be discontinued from 2014

In August 2010, Bayer CropScience announced the cancellation of the registration of Temik for use on potatoes and citrus. Registration on other crops, including sugarcane, will be phased out over the next few years. While existing stocks of Temik may be used on potatoes and citrus until the end of 2011, uses on other crops can continue beyond this date with some label changes. However, worldwide production will end by 2014 and distribution by 2016. Farmers will have until August 2018 to use existing supplies.

By Shaun Berry (Nematologist) and Graeme Leslie (Principal Entomologist)

(For more information see http://www.bayercropscience.com/bcsweb/cropprotection.nsf/id/EN_20100816).

WEATHER

Review

Rainfed sugarcane production areas in South Africa received below average rainfall from February (coastal areas from January) to September 2010 (Table 1). In some cases it was the lowest rainfall ever recorded. This had a devastating impact on soil water status (Table 1) and the sugarcane crop.

Taking the Maidstone mill area as an example, Figure 1 clearly shows the devastating impact that the persistent low rainfall in 2010 had on soil water status, compared to much better conditions experienced in 2009. Fortunately conditions improved substantially in October with average, to above average, rainfall falling in most regions.

Outlook

Moderate *La Niña* conditions are currently being experienced and will continue through to March 2011. During *La Niña* summers, the probability of receiving above normal rainfall in the sugar industry is higher than receiving below normal rainfall. The International Research Institute for Climate and Society predicts normal-above normal rainfall for the industry, while the Climate Systems Analysis Group of the University of Cape Town and the European Centre for Medium Range Weather Forecasts predict normal rainfall for December, January and February. Mean surface temperatures over the same period are expected to be slightly cooler than normal.

By Abraham Singels (Prinicipal Agronomist) & Phillemon Sithole (Agrometeorologist)

Table 1. Monthly rainfall totals and monthly reference soil water content expressed as a percentage of the long term mean for different regions.*

Rainfall										
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
South Coast	82	43	45	26	47	12	18	2	24	108
North Coast	60	55	35	45	35	84	28	10	28	97
Midlands	113	64	72	95	60	55	18	28	20	105
Zululand	114	62	80	94	50	35	41	31	26	143
Mpumalanga	134	230	101	372	71	73	91	43	14	127
KwaZulu-Natal	90	57	58	65	45	35	28	20	25	116
Industry	94	65	63	89	47	36	30	18	24	115

Soil water content										
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
South Coast	81	55	44	22	25	7	12	0	1	42
North Coast	63	52	26	38	12	6	54	58	3	31
Midlands	85	147	68	115	79	43	14	8	2	44
Zululand	84	56	67	103	35	10	17	11	2	43
Mpumalanga	60	88	55	182	135	67	37	13	2	21
KwaZulu-Natal	76	70	51	73	30	11	61	52	3	54
Industry	73	72	51	92	43	15	59	49	3	52

Plant available soil water content calculated for rainfed conditions for a soil with a TAM of 100 mm with a full canopy cane crop growing on it.

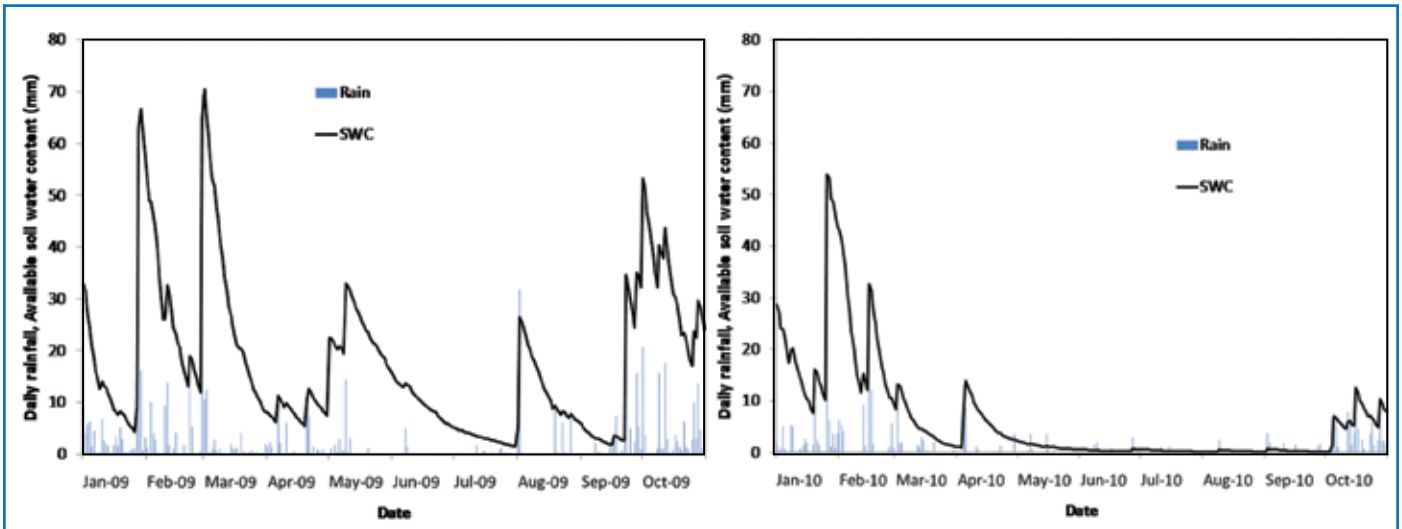


Figure 1. Average daily rainfall and simulated available soil water content (SWC) for full canopy rainfed cane for 2009 and 2010 for the Maidstone mill area.