PULA IMVULA

>> GROWING FOOD >> GROWING PEOPLE >> GROWING PROSPERITY >>

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NKGONO JANE SAYS...

IN THIS ISSUE...

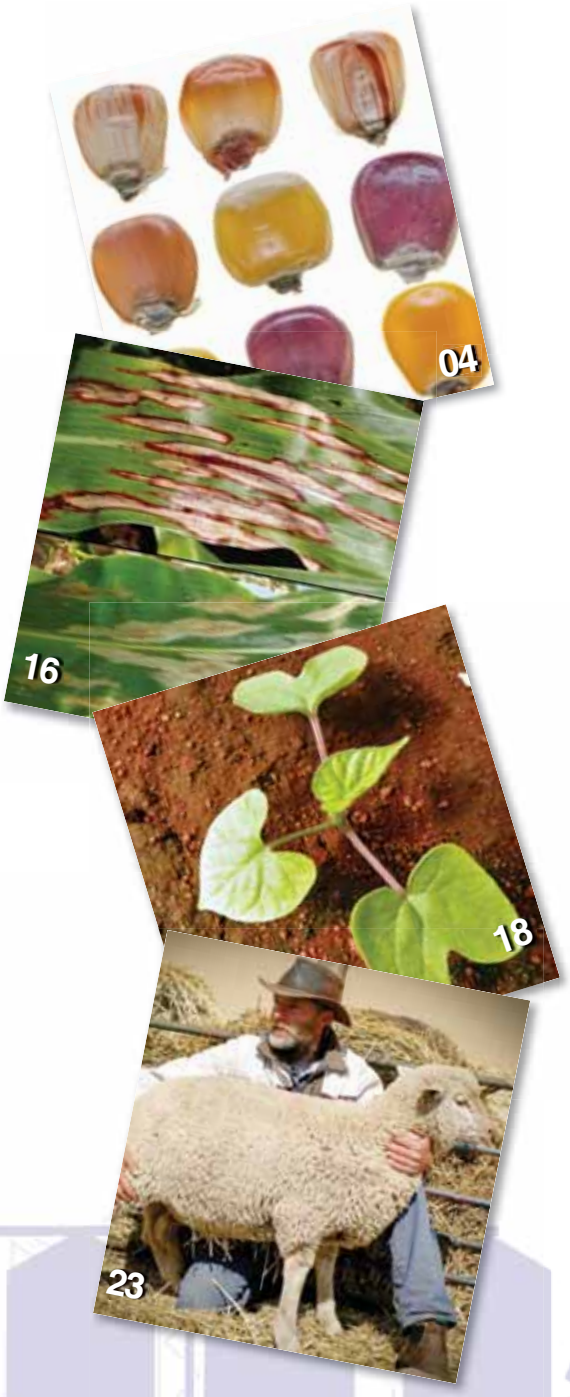
In this issue of the Pula Imvula is an article on eating a balanced diet. This is a very important aspect to farming – we produce food for ourselves and the nation, but we and our livestock eat too! It is crucial that humans and the animals we keep (cattle, sheep, goats, pigs and poultry) eat a balanced diet – in a nutshell, we need starch (carbohydrates), protein and fats (without going into too much detail).

Keeping livestock is part of most farming enterprises. Apart from supplying the market, keeping your own cattle, sheep and chickens can provide you with a ready source of good food (milk, meat and eggs) and these are very important in the diets of particularly children as they are growing and developing. Let us try to remember that farming started as a way of feeding your family and after that the surplus was sold – now we look at selling everything and buying food. We can also grow good and balanced food for ourselves and our families.

As farmers, we usually concentrate on growing the grains and cereals and this is great because this makes up the largest part of our diets. Feeding maize into livestock will enable the livestock to work for you as they provide you with meat and milk (both good sources of protein). We also need proteins in our diet and we should therefore also be growing pulse beans and soybeans (for own use and also for the market).

Growing vegetables for own use is something that we would like to encourage you to do – we all need to eat fresh fruit and vegetables and generally you can grow this for own use around your house. Not only will you be saving money, but you will also have access to very fresh and seasonal produce. Growing vegetables commercially is usually much more challenging as much of this has to be transported in refrigerated trucks – it can be very profitable but is usually done under irrigation and unfortunately most of our farmers do not have access to irrigation.

It is September already and some of you might have received the first rains – what a blessing that we can know that the rains will come and you will be able to plant a summer crop. Please remember that you have to do your best to ensure a good crop – you cannot determine the rain but everything else is in your hands. Do your best and encourage all those around you to do their best too – together we can feed ourselves and feed our nation.



Methods to reduce mycotoxin exposure

In the final article of our series on mycotoxins, we will describe methods to reduce mycotoxin production in commodities and human exposure to mycotoxins.

As mentioned before, mycotoxins are very stable and can only be partly removed. Crops produced for commercial purposes and the production of food and feed, have the advantage of being regulated for mycotoxins using specific mycotoxin safety levels and the monitoring of product quality. Also, the commercial crop production industry has access to advanced and expensive technological methods.

For the sake of this article we will concentrate on simple and affordable methods to reduce mycotoxin exposure such as 1) good agricultural practices (pre-and post-harvest methods), 2) hand sorting and washing, 3) winnowing, shelling, dehulling and milling, and 4) diet diversification (including a variety of foods in the diet).

Good agricultural practices

Good agricultural practice (GAP) is very important to agriculture, both commercial and subsistence farmers, in order to guarantee and maintain the lowest mycotoxin levels possible in cultivated food crops.

Pre-harvest methods

- Implementation of a crop rotation schedule. Wheat and maize are particularly susceptible to *Fusarium* fungi and these two crops should not be used in rotation with each other. Rotation crops such as potato, vegetables and dry beans, should rather be used.
- Adequate preparation of the seed bed for each new crop by ploughing under or by removing old crop debris that may also be affected by the relevant fungi. No-till and other integrated pest management practices may be required in the interests of soil conservation (commercial; subsistence application).
- Utilise soil tests to determine if there is a need to apply fertiliser and/or soil conditioners to assure adequate soil pH and plant nutrition to avoid plant stress, especially during grain development (commercial application). Subsistence farmers should apply livestock manure to their fields to enhance stubble breakdown, improve the soil structure and aid in plant nutrition (subsistence application).
- Use seed that has been developed for resistance to infecting fungi and insect pests, and recommended for a specific area (commercial application mostly).
- Crop planting should optimally be timed to avoid high temperatures and drought stress during the period of pollination and seed development (commercial; subsistence application).
- Avoid overcrowding of plants by maintaining the recommended row and plant spacing (commercial application mostly).
- Minimise insect damage and fungal infection by proper use of registered insecticides, fungicides and other appropriate practices within an integrated pest management programme (commercial; subsistence application).
- Control weeds in the crop mechanically or with the use of registered herbicides or other safe and suitable weed removal/eradication practices (commercial; subsistence application).
- Minimise mechanical damage to plants and fruit during cultivation/farming (commercial; subsistence application).
- Ensure that irrigation is applied evenly and that all plants in the field have an adequate supply of water. Excess moisture during flowering makes conditions favourable for the infection by *Fusarium* fungi; thus irrigation during flowering and crop maturation should be avoided (commercial application mostly).

Post-harvest methods

- Harvest grain at low moisture content and full maturity, unless under extreme heat, rainfall or drought conditions (commercial; subsistence application).
- Ensure that farm personnel are adequately trained and that all farming equipment is kept clean and functioning properly, to minimise damage to plants and the harvested crop (commercial; subsistence application).
- Containers and vehicles to be used for collecting and transporting the harvested crop from the field to drying and/or storage facilities, should be clean, dry and free of insects, soil and visible fungal growth (commercial; subsistence application).
- Determine crop moisture levels immediately after harvest. Where possible, dry the crop to the recommended moisture content for storage. Cereals should be dried in such a manner that damage to the grain is minimised and moisture levels are lower than those required to support mould growth during storage (generally less than 14%). Sun drying of some crops in high humidity may result in fungal infection. Avoid piling or heaping of wet, freshly harvested crops (commercial; subsistence application).

Photo 1: If your maze kernels look like this, they are healthy and good for eating.

Photo 2: If your kernels look like any of these, they are not good for eating. These kernels should be removed and thrown away since they are harmful to human and animal health.

- Freshly harvested cereals and nuts should be cleaned or sorted, where possible, to remove damaged kernels/nuts and other foreign material (commercial; subsistence application).
- Storage facilities must be dry, well-vented structures that provide protection from rain, surface or ground water, protection from pests and birds, and protected from extreme temperature fluctuations (commercial; subsistence application).
- Ensure that storage bags are clean and dry. Filled bags should be stacked on pallets or a system with a water resistant layer between the bags and the floor (commercial; subsistence application).
- The relevant mycotoxin levels in harvested crops should be monitored when needed, using appropriate sampling and testing methods (commercial application).

Hand-sorting and washing of grains

Hand-sorting or separation of crops prior to storage or cooking, is a common practice in many

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African countries such as West Africa (Benin), Nigeria, Tanzania and Southern Africa. Traditional food processing methods such as hand-sorting form a simple and inexpensive post-harvest prevention method to reduce mycotoxin contamination and exposure.

Several studies conducted in Africa among maize subsistence farming communities indicated that the separation of visibly damaged (including broken), discoloured and obviously mouldy maize kernels from visibly good-for-eating kernels reduced aflatoxin and fumonisin mycotoxin levels.

A simple method of hand-sorting and washing has shown that it can reduce the fumonisin mycotoxin levels in home-grown maize by 84%. Recently, a laboratory-based study using the hand-sorting, and an additional density separation step followed by the washing of the sorted good maize, showed a reduction in fumonisin levels of 98% in good maize.

An educational booklet has been developed to teach maize-subsistence farmers how to sort the maize kernels into visibly good maize (**Photo 1 - 2**). Then follows a step whereby clean drinking water is added to the maize, enough to cover all the maize kernels (about two fingers above the surface of the maize kernel layer). Any material floating on top of the water is then removed and finally the maize kernels are slowly mixed with the water and left to stand for about 10 minutes.

The maize is now ready for cooking; remember to throw away the kernels and any other material that was removed from the good maize during the sorting and washing step. The water and the kernels or material removed contains most of the mycotoxins and are harmful to both human and animal health.

What does healthy maize kernels look like?

Visibly good quality maize kernels that is healthy for eating should be shiny or bright, have no stains or marks and should also be intact (**Photo 1**).

What does unhealthy maize kernels (that should be removed) look like?

Visibly good quality maize kernels that is healthy for eating should be shiny or bright, have no stains or marks and should also be intact (**Photo 2**).

How to sort and wash in seven steps

Step 1: Sort visibly good quality maize from bad/ damaged maize.
Step 2: Place the sorted healthy kernels in a clean bucket and pour clean water in the bucket until it covers the maize completely.
Step 3: Remove any material that floats on top of the water.
Step 4: Wash the maize by slow mixing.
Step 5: Leave the maize in the water for about ten minutes.
Step 6: Use the maize for cooking immediately.
Step 7: The water used for the washing and all the visible mouldy/damaged kernels or material that was removed, should be discarded.

1 Sort visibly good quality maize from bad/ damaged maize

2 Place the sorted healthy kernels in a clean bucket and pour clean water in the bucket until it covers the maize completely

3 Remove any material that floats on top of the water

4 Wash the maize by slow mixing

5 Leave the maize in the water for about ten minutes

6 Use the maize for cooking immediately

7 The water used for the washing and all the visible mouldy/damaged kernels or material that was removed, should be discarded

Our 2017 FARMER OF THE YEAR finalists are...

Mavis Hlatshwayo

Simphiwe Gumbi

Ghsasa Dhlongolo

Thembalihle Tobo

Hamu Shuwisa

Meluxolo Mfoxo

Tshediso Maqala

Vuyani Lolwane

Ruben Mothlabane

Paul Malindi

Remember Mthethwa

Edwin Mahlatsi

The celebration of success overshadows the challenges that were encountered along the way to get there. Farming is hard and challenges are plenty but these seem to be all forgotten as soon as a farmer can celebrate his or her success.

Nearly 20 years ago, the Farmer Development team of Grain SA proudly looked at the achievements of some of the farmers taking part in their programme and decided to set aside a Day of Celebration. The idea with this Day of Celebration was then, and still is today, to acknowledge farmers who put in hard work throughout the year and to showcase their successes.

Since its inception in 2009, the Day of Celebration became a highlight on the calendars of the Grain SA farmers as well as the Farmer Development team. It is important to also recognise the role that the Grain SA mentors and co-ordinators play in the success of the farmers under their wing. These people's admirable dedication and passion are surely very important ingredients in the Farmer Development recipe for success.

The 2017 Day of Celebration is around the corner. Farmers were entered in the four categories – Subsistence Farmer of the Year, Smallholder Farmer of the Year, Potential Commercial Farmer of the Year and the New Era Commercial Farmer of the Year.

In previous Pula Imvula's we introduced you to all the candidates taking part in this year's competition. Today, we can proudly announce the finalists of the different categories.

2017 Subsistence Farmer of the Year

Finalists in this division are Simphiwe Elliot Gumbi, Mavis Nomvula Hlatshwayo and Ghsasa Solomon Dhlongolo.

Simphiwe Elliot Gumbi

Simphiwe and his wife, Vuyelwa, farm on a portion of Hoffental farm near Tabhane in KwaZulu-Natal. The couple have no mechanisation and plants their maize by hand. They participated in the Grain SA Jobs Fund Project since 2015.

Development co-ordinator, Graeme Engelbrecht says: 'This is a dynamic husband and wife team with hearts of gold. They are pillars in their community and help those that are less fortunate by supplying them with food.'

Mavis Nomvula Hlatshwayo

Mavis farms on a hectare of communal land on the farm Hereford near Badplaas in Mpumalanga. She joined Grain SA and became a member of the Lijahsisu Study Group in 2005. She regularly attends study group meetings, workshops and courses organised by Grain SA.

Jerry Mthombothi, the Development co-ordinator has this to say about Mavis: 'She is a remarkable woman who is always willing to learn. If you give any instructions to Mavis, she will do exactly what she's told. She is generous and willing to share her knowledge with the less experienced farmers in her community.'

Ghsasa Solomon Dhlongolo

Ghsasa farms on 10 hectares of arable land allocated to him by the Kaluka CPA near Piet Retief. He is a member of the Grain SA Jobs Fund Project and chairperson of the Donkerhoek Study Group.

Development co-ordinator, Jurie Mentz says: 'This farmer is an exceptional neat farmer. Ghsasa has always been a real trouper, a pillar of strength and role-model in his community.'

2017 Smallholder Farmer of the Year

The three finalists in this division are Thembalihle Hopewell Tobo, Meluxolo Mfoxo and Hamu Samson Shuwisa.

Thembalihle Hopewell Tobo

Thembalihle cultivates 25 hectares of the Ndunga communal land near Bizana in Eastern Cape. He became a member of Grain SA in 2006 and is currently the chairperson of the Ndunge Study Group.

'Thembalihle is passionate about farming and keen to share his knowledge. The fact that he was elected to be the chairperson of his study group shows that the community looks up to this man,' says Development co-ordinator, Luke Collier.

Meluxolo Mfoxo

Meluxolo farms with drybeans, maize, cattle and sheep on Goedehoop near Ugie in the Eastern Cape. He joined Grain SA and the Umnga Flats Study Group in 2013.

Development co-ordinator, Luke Collier: 'Meluxolo is keen to learn and he works hard to achieve his goal of becoming a successful commercial farmer in the near future.'

Hamu Samson Shuwisa

Samson farms on a farm called Nooitgedacht, close to Sheepmoor in Mpumalanga. In 2011,

Our 2017 Farmer of the Year finalists are…

he joined a Grain SA study group of which he has been the chairman for the past seven years.

'Samson is an extremely hard working farmer. He started off cultivating 2 ha and gradually grew to where he is today – cultivating 18 ha with yields of 6 t/ha,' adds Development co-ordinator, Jurie Mentz.

2017 Potential Commercial Farmer of the Year

Ruben Mothlabane, Paul Mvelekweni Malindi and Tshediso Daniel Maqala are the three finalists in this category.

Ruben Mothlabane

Ruben farms on the farm Kalkpan, in the Bultfontein district in the Free State. He has been a member of Grain SA since 2012 and diligently attends the monthly study group meetings of the Bultfontein Study Group.

Development co-ordinator, Johan Kriel says: 'Ruben has developed into a farmer with tremendous potential. He harvested close to 1 000 tons of grain this year.

Paul Mvelekweni Malindi

Paul farms on the 441 ha farm Dankbaar, close to Edenville in the Free State. He joined Grain SA's Farmer Development Programme and was one of the founding members of the Edenville Study Group.

Johan Kriel, Development co-ordinator says: 'Paul has an unquenchable thirst for knowledge. This year he has done everything right, he even drove the tractor all by himself.'

Tshediso Daniel Maqala

Tshediso owns two farms, the 197 ha farm Kosmos and the 326 ha Die Hoop farm, both in the Ficksburg district. He joined Grain SA in 2014 and attends study group meetings and farmers days regularly.

'Even though Tshediso is relatively new to the programme, this farmer has the potential to manage a big commercial farm. He farms in a difficult agricultural area but has managed it magnificently,' adds Development co-ordinator, Johan Kriel.

2017 New Era Commercial Farmer of the Year

The finalists in this category are Vuyani Lolwane, Remember Wiseman Mthetha and Edwin Thulo Mahlatsi.

Vuyani Lolwane

Vuyani owns Klippan farm and also leases land on Lareystryd. He has been a member of Grain SA for years and actively attends farmers days and study group meetings and has completed several of the training courses.

Development co-ordinator, Du Toit van der Westhuizen says: 'Vuyani is an ingenious young man and a chip of the old block. He inherited his skills and business sense from his father and has all the attributes that's necessary to become a very successful commercial farmer.'

Remember Wiseman Mthethwa

Remember farms on 662 ha of his own farm Milindale, and leases 150 ha of private land near Dannhauser. He joined Grain SA in 2015 and is an active member of the Newcastle B29 Study Group with Chris de Jager being his mentor.

Graeme Engelbrecht, Development co-ordinator says: 'Remember is an extremely hard worker. He makes sure to do the small things right and does not wait for anybody to come with a solution whenever he encounters problems – Remember will make a plan.'

Edwin Thulo Mahlatsi

The farm Swartlaagte near Bothaville in the Free State was purchased from Frikkie Rautenbach for Edwin by the Department of Rural Development and Land Reform through PLAS. In 2014 he became a member of Grain SA's Farmer Development Programme. He joined the Bothaville Study Group and attended farmers days and training courses.

Development co-ordinator, Johan Kriel says: 'It is a privilege to work with Edwin – he is a meticulous farmer who loves to share his knowledge and is a pillar of strength in his community.'

With all these wonderful finalists in the run, we can once again look forward to a memorable Day of Celebration!

Article submitted by Hanlie du Plessis, Freelance writer. For more information, send an email to hanlieduplessis@telkomsa.net.

05 Methods to reduce mycotoxin exposure

Diet and crop diversification to ensure variety in the diet

Diet diversification is all about the availability, access and use of foods that are nutritious (keeps the body healthy and helps with growth and development) all year around. This can be done by changing the type of crops that are planted, including different kinds of healthy foods in the diet and the preparation and processing of foods in the kitchen.

The following is a summary of some food-based activities that can promote diet diversity:

- Promote the mixing of crops and/or integrated farming with different crops.
- Introduction of new crops (such as soybean).
- Promotion of home gardens.
- Small livestock raising such as chickens.
- Promotion of improved safeguarding and storage of fruits and vegetables to reduce waste and post-harvest losses.
- Nutrition education to encourage the consumption of a healthy and nutritious diet all year round.

Conclusion

Finally, we conclude with the South African Food Based Dietary Guidelines to ensure a healthy diet.

1. Enjoy a variety of foods.
2. Be active!
3. Make starchy foods part of most meals.
4. Eat plenty of vegetables and fruit every day.
5. Eat dry beans, split peas, lentils and soya regularly.
6. Have milk, maas or yoghurt every day.
7. Fish, chicken, lean meat or eggs can be eaten daily.
8. Drink lots of clean, safe water.
9. Use fats sparingly. Choose vegetable oils, rather than hard fats.
10. Use sugar and foods/drinks high in sugar sparingly.
11. Use salt and food high in salt sparingly.

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Article submitted by HM Burger and P Rheeder, Mycotoxicology and Chemoprevention Research Group, Institute of Biomedical and Microbial Biotechnology (IBMB), Cape Peninsula University of Technology (CPUT). For more information, send an email to Burgerh@cput.ac.za or RheederJP@cput.ac.za.

How to achieve a balanced diet

Any mother or caretaker knows the struggle of providing healthy food for their family. Even watching animals, you will see the new mother nursing her offspring to provide the foundation of good health and then moving on to the freshest grasses and feed to give the young one the best possible start.

When you live in a rural area where shops are few and far between then this struggle can become a matter of life and death, as recent studies have found that rural communities have high instances of malnutrition and starvation. All is not lost though, as the following articles will hope to prove. At least the basic information regarding good nutrition is still the same but the application of these facts might have changed somewhat. If you do not have the financial means to produce or buy much more than the staples of maize meal and sugar you can increase and sustain your health by growing vegetables and fruits to add to your diet.

The human body is designed to be able to endure many hardships by adapting to circumstances like food shortages or limited diets that consist of basic staples only, but this puts strain on the body and manifests in poor defenses against viruses and other diseases.

Like any well designed machine has requirements for specific fuels, so your body will be able to perform at its peak with a varied diet containing all the food groups. You won't get far by putting diesel in your petrol bakkie! As you know, unfortunately the farmers producing the foods that end up on the chain store shelves are paid very little and in many instances cannot afford to buy from these same shops. This is where farmers and mothers have to step in and start growing food for their own table. Growing your own food and sharing and trading with your neighbours can provide the varied and healthy foods the family needs.

Basic food groups

As I have mentioned above, all foods can be divided into the basic food groups. They are;

Grains and cereals

Bread, mealiepap, rice, pasta, oats, Matabella – these foods are rich in carbohydrates that easily convert into energy for the body to use. This group is also the best source of B vitamins, vitamin E, minerals and trace elements like zinc, copper, selenium, magnesium and potassium. These foods should form the basis of most meals for example a bowl of mealiepap with a topping of vegetable and meat stew.

Fruits and vegetables

Bananas, apples, mango, watermelon, oranges or spinach, sweet potato, broccoli, carrots, onions etc. Fruits are excellent sources of vitamins A and C as well as potassium. They are considered low in fat and sodium. They do contain sugar but is still considered a healthier option than the processed sugars found in sweets.

Vegetables provide high amounts of vitamins and folate as well as important minerals such as iron and magnesium. Different types of vegetables provide different nutrients. An easy way to help you figure out what to add to your meals is to **'eat the rainbow'**. Try and have all the different colours represented in your meals. Eat dark-grean leafy vegetables (source of iron) such as swiss chard, beetroot leaves, broccoli or spinach. Yellow vegetables such as carrots, sweet potatoes and butternut. Starchy vegetables such as potatoes, maize and peas as well as legumes such as chickpeas, kidney and pinto beans. Other vegetables include tomatoes, lettuce, onions and green beans which can be eaten raw as well.

Milk and dairy

Milk products such as cheese, buttermilk and amasi provide proteins, vitamins and minerals of which the most important one is calcium. Calcium helps to build strong bones and teeth. Dairy is also a good source of fats.

Meat, fish and eggs

Poultry, red meat, eggs and fish provide protein, B vitamins, iron and zinc. Dry beans and nuts also provide similar amounts of these nutrients so a constant supply of meat is not always necessary.

Fats and oils

Internationally there is a big debate raging over the benefits of fat in the modern diet these days. From personal experience, I fall into the "good fat" group and believe that fatty cuts of meat, real butter and certain oils such as found in avocadoes do benefit brain function and overall health. I am no doctor though so can only vouch for what I have experienced and urge the mothers and caregivers to follow and trust their own wisdom in this.

> *"Growing your own food and sharing and trading with your neighbours can provide the varied and healthy foods the family needs.*

Sugar and specifically added sugar needs a special mention. Sugar doesn't have nutrients but is high in calories. If too much extra sugar is consumed the organs in the body that has to convert the sugar to energy for the person to use, gets so overworked that it starts storing the excess sugar as fat to be used at a later stage. That is not a bad idea but since the human is still consuming extra sugar every day the stored energy (fat) never gets used and just accumulates leading to obesity and possibly type 2 diabetes.

Use sugar sparingly and sweets and cold drinks only as special treats. Adding fruits to the diet will still satisfy the sweet-tooth but at least there are beneficial nutrients and fiber included in the treat.

In future articles we will look at some practical ideas and gardening tips to incorporate these food groups into your diet.

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Why CROP ROTATION is important in wheat production

Crop rotation is one of the principle pillars on which conservation agriculture (CA) is based. The other two are minimal soil disturbance and maximum soil cover. The question now is: Why is crop rotation important?

To explain this we will start at what do we imply with crop rotation. It is the practice of alternating different crops on the same field from year to year. The aim is to alternate crop types as much as possible. By alternating grain crops, like wheat, with broadleaf crops such as canola, lupin or a pasture crop like medics we have the opportunity to create diversity on a field.

When looking at nature, a monoculture only occurs in very rare situations. Diversity is king and has well known benefits. One of the most important ones is that diversity above the soil impacts the biodiversity in the soil. Over the last five years the knowledge about the effect of the biodiversity in the soil has grown exponentially and we now know that this diversity plays an immense role in production.

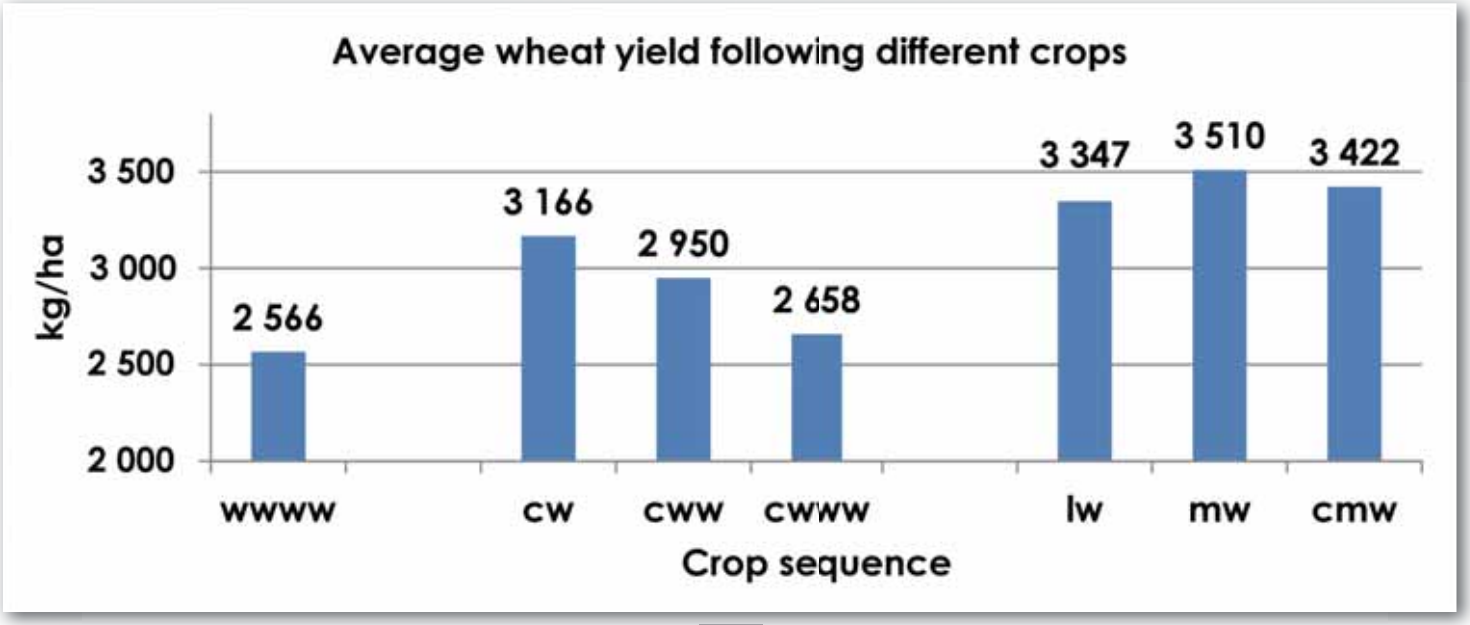
By bringing diversity into your cropping system you have the opportunity to break disease cycles that can become destructive if the same crop is produced every year. By including legume crops like lupin, vetch, peas and legume pastures you have the ability to fix nitrogen from the air for free. The nitrogen that is fixed by the legume plants will break down in the coming year and farmers can thus lower the amount of nitrogen fertiliser needed in the following crop, thus saving money.

Photo 1: Alternate your wheat with broad leaf crops.

To explain the benefit of crop rotation in more practical terms we will have a look at the effect of crop rotation on wheat yields from the long-term crop rotation trial at Langgewens Research farm in the Swartland (Western Cape). **Graph 1** shows the average yield in wheat following different crops in the trial.

In graph 1, monoculture production is indicated by the wwww sequence. The average

Graph 1: Average wheat yield following different crops in rotation systems practiced in the Swartland. (w = wheat, c = canola, l = lupin and m = medics)



yield in the monoculture system, which serves as a control in this system, is 2 566 kg/ha. The data used to generate the graph was obtained over a 20 year period. When we break the monoculture practice by including a canola crop (1 in 4 years), the average yield of the wheat following the canola (cw sequence) increased by 600 kg/ha to 3 166 kg/ha. If you then plant

wheat again for another two years, the average yield drops by 216 kg/ha in the second year of wheat (cww) and another 292 kg/ha in the third year (cwww) of wheat. Two possible reasons for the drop in production might be attributed to disease and weed pressure. If you keep producing the same crop year after year, weed pressure of grass weeds increase in the system because it is difficult fighting such weeds in a cash crop that is also a grass.

Photo 2: Lupins planted after wheat.

By including a legume crop the average yield increases even more. In the lw sequence wheat is planted following lupin and in the mw sequence, following medic pasture. The average yield of the wheat following lupin was 781 kg/ha more than in the monoculture and 944 kg/ha more following the medic pasture. The extra nitrogen in the system that was fixed by the legume crops and weed control contributed to this increase. By alternating a grass crop with a legume or a broadleaf crop like canola, you can control grass weed in those years lessening the competition with a grass cash crop.

The last remaining sequence is where wheat is produced following canola (broadleaf crop) and medics (legume pasture). The average yield of wheat produced in this sequence was 856 kg/ha higher than the monoculture. It is a little lower than where wheat followed only medics, but it is because the canola also uses some of the fixed nitrogen. The benefit of this sequence is also attributed to extra nitrogen in the system and you have two opportunities to eliminate grass weeds, during the pasture and the canola crop.

It is thus clear, from the data we discussed, that by implementing crop rotation into your production system, you benefit much more than by just producing a single crop type.

Article submitted by Dr Johann Strauss, Directorate Plant Sciences, Research and Technology Development Services, Department of Agriculture Western Cape. For more information, send an email to johannst@elsenburg.com.

Pula Imvula's Quote of the Month

For changes to be of any true value, they've got to be lasting and consistent.

~ Tony Robbins

UNDERSTANDING THE WHEAT IMPORT TARIFF

South Africa produces an average of 1,7 million tons of wheat annually, while the annual average total commercial demand for wheat amounts to just over 3 million tons. In order to meet total commercial demand, South Africa relies on imports which are usually between 40% - 50% of local consumption.

South Africa is therefore a net importer of wheat. There lies potential to grow the wheat production locally, however this is constrained by the high volume of imports that enter the country. Low international wheat prices, which are caused by subsidies in developed countries, has placed pressure on the growth possibility of the local market which has been uncompetitive at the low international wheat prices.

The wheat tariff is calculated by means of the variable tariff formula in order to ensure that the prices local wheat prices are supported when the international prices are at low levels, but that when the international prices are high the local consumers are not influenced negatively. The tariff is therefore only active when the international prices drop below a certain price level which is called the international reference price. This price is set equal to an international wheat price of $279/ton and the tariff will only be in place when the international prices are below this level. Currently the international market trades below around $245/ton and therefore the tariff is in place. **Graph 1** indicates the international wheat prices with the reference price level shown as well. It is clear from graph 1 that the international prices are well below this level and the purpose of the tariff is to fill the gap between the reference price and the international price.

Table 1: Wheat import tariff calculation.
Source: SAGIS

Wheat Tariff	Published on 23 June 2017	
Base Price: World Reference Price (US No2 HRW fob Gulf) – *3 weeks moving average as on*	09-Aug-16 $189,67	*A*
RSA Initial Reference Price	**$279,00**	***B***
Dollar duty on wheat	$89,33	*(B-A) = C*
Rand duty on wheat before adjustment	R1 199,35	*(C*D) = E*
Real effective Exchange Rate Index	0,79	*E*
Real effective Exchange	R947,49	*(F*E) = G*
$/R exchange rate	13,4261	*D*

The **Base Price** is the 3-week moving average calculated as at 9 August 2016. This value is subtracted from the **Reference price**, which is calculated by taking an average price of the past 5-years of US Hard Red Wheat No.2 (as at 09 August 2016), plus adjustments for distortion factors (international subsidies), then subtraction of average transport costs to South African shores. The difference between these two variables (B-A) is the wheat tariff rate in dollar terms. This rate must then be converted to Rand terms which is then calculated by the published real effective Exchange Rate Index to obtain the final wheat import tariff.

From the calculation above, it is therefore clear that the only adjustment made was on the RSA initial reference price. The wheat import review does not have a direct effect on local wheat prices; the only effect is that imports are now imported at the $279 dollar level.

Graph 1: International wheat price and tariff reference price.
Source: Grain SA

Conclusion

The wheat import tariff is imposed to protect the local industry and to make it possible for local producers to be able to compete with wheat that is imported at lower levels. The higher the international wheat prices, the lower we can expect the import tariff to be. Therefore, it can be concluded that wheat import tariff does not increase prices; it only changes the reference price level of $279.

Article submitted by Michelle Mokone, Agricultural Economist: Grain SA. For more information, send an email to Michelle@grainsa.co.za.

MADE POSSIBLE BY THE WINTER CEREAL TRUST

Do you manage the **cashflow of your business?**

We're living in a strange world. During the previous production season, most grain farmers, especially in the summer rainfall area, experienced a drought with low production but high crop prices. This production season it is vice versa – record crops but low prices. However, for many farmers the result of these totally different circumstances is the same – a problem with cashflow.

Just a reminder – should you claim that your business is successful, your business must be successful in three areas. The financial position must be positive, indicating that you have at least twice as much assets than liabilities. Secondly, you must make a profit – income must be more than expenditures. Thirdly, your cashflow ratio must be at least 120%, indicating that you normally have cash available when needed. To be without cash can be very harmful to your business for many reasons. To manage a business, brings daily opportunities and challenges. One of the challenges you will experience, is the management of cash.

Management of cash

Let's consider a few steps to do just that. Manage your debtors (people who have bought something from you, but must still pay you) with the first step being to reduce debtors as much as possible. Should they not pay when arranged, it will put you under severe pressure with regards to your cashflow. Follow up on them if they do not pay as arranged – call them, send a sms, email them. If possible, do not sell on credit.

Manage your creditors – the people you have bought something from and still owe them money. Pay them on the last day that you should as arranged to keep your cash in your pocket as long as possible. Normally you will have a 30-day limit, interest free. Make use of this period and if possible keep your cash in some account where you can earn some interest. However, be mindful to build a good credit record with your creditors, you may need it at some point in time.

Pay attention to stock levels – we are especially referring to the level of input stock you keep on the farm. Sometimes you may be tempted to purchase an input such as fertiliser at a 'special' price, but must then keep it in stock for 3 or 4 months before using it. Remember, that is cash tied up in stock.

Many farmers sell products for cash from the farm or at an informal market. Nothing wrong with doing this, but keep proper records of these sales and the cash involved. Do not let the cash in your pocket tempt you to buy something that you do not need. Rather deposit the cash in a savings account and earn interest on it.

When you have cash in your bank account ensure that you earn interest on it. Negotiate it with your bank. Remember financial institutions will never forget to charge you interest on money you earn them, but will never pay you interest voluntary if you do not negotiate it with them. It is your right to negotiate, do it – you can only score from it.

Lastly, the best way to manage your cash, is to manage it by ways of a monthly cashflow budget basis for a financial year. This budget will then project the way you should use your cash in a financial sound way.

> *"Remember cash is king, treat it with respect.*

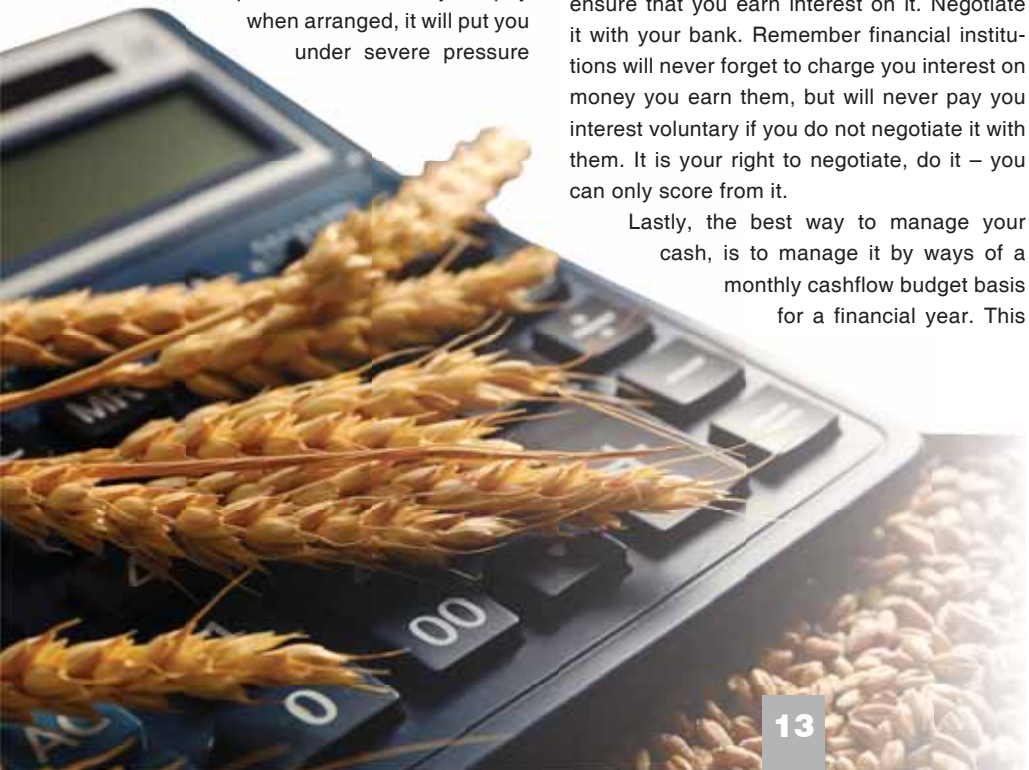
This implies that you must discipline yourself to use your cash as planned. When something unforeseen happens adapt your plan accordingly, and then stick to your adapted plan. Be very careful of spontaneous buying or on the spur of the moment. Before you buy consider your plan! What will the affect be on your cashflow budget? That is financial management.

Many owners of small businesses think they do not have to keep good records and control the finances of his/her business simply because they are small. They think that all 'bookkeeping' stuff is for the bigger businesses and they think because my business is small I know exactly what's going on with the finances of my business.

It might be true for a while but one of the main reasons for the failure of small businesses is because they do not understand or manage their finances properly. The fact of the matter is, the smaller your business, the better your management – especially financial management – should be. Simply because the smaller your business, the less leeway you have for mismanagement.

Why is cashflow important? Any business has expenses which must be paid, for instance on a regular monthly basis such as salaries, electricity bills, telephone accounts, feed, etc. There may also be contractual payments on loans which must be paid on a quarterly, six-monthly or annual basis or at harvest time. These expenses must be paid when they are due and the payments cannot be postponed or changed at will.

Remember cash is king, treat it with respect.



Article submitted by Marius Greyling, Pula Imvula contributor. For more information, send an email to mariusg@mcgacc.co.za.

HERBICIDE DAMAGE: Who is responsible?

Photo 1: Chemical herbicides are essential to economical cropping, however, the large variances in soil and climate factors influencing the working of herbicides trigger situations under which crop plant damage may occur.

Since 1993 I have investigated several hundred cases where herbicides have damaged crops. These are only the ones I know of. This is definitely an alarming state of affairs, since most of these could have been prevented if herbicides had been administered according to registered recommendations.

Herbicides are not all equally safe for the crop plant concerned

Although the requirements for registration define that evidence should be provided proving that the herbicide concerned is in fact safe for the crop plant, it does not specify the level of safety. During the development of a new chemical herbicide, the relevant company also determines the potential risks involved with marketing the product.

This is done by conducting a large number of trials, under different environmental conditions with various administration quantities. These trials are conducted exclusively by scientists from international companies or their local agencies. The companies involved are usually insured against possible damage that the herbicide might cause – provided it is administered according to prescription. It goes without saying that if a company should act negligently, it will not easily obtain insurance again or they will be subject to higher premiums.

When a herbicide patent expires (after 20 years in South Africa), any person or company is free to manufacture the product. Currently there are a large number of these generic herbicides on the market.

In order to obtain registration, the organisation concerned has to prove chemical as well as biological equivalence. Consequently, it can be assumed that the generic products will deliver results similar to those of the original. It goes

without saying that the generic product will carry the same risks as the original product.

Who issues the recommendations?

Sales representatives for distribution companies no longer exist. Recommendations on the farms are currently done by agents. It is therefore important to find out if the agent is insured properly.

It is also important to ensure that the recommendations correspond to the recommendations on the label. If the agent's recommendations differ from those on the label, the responsibility shifts to the registration holder.

Unregistered recommendations are often not researched properly and are therefore risky. In addition it is a criminal offence to make unregistered recommendations. Although a recommendation may be registered, it may still cause damage under certain circumstances.

> *When a registered recommendation causes damage, and it can be proven that the herbicide was used according to the registered label, the registration holder is responsible.*

The damage becomes the responsibility of the registration holder where the specific circumstances are not excluded on the label. Therefore, it is essential for users of herbicides to familiarise themselves with any exclusions on the label.

However, there are some exclusions on the label that will not be accepted in a court of law, because they are not specific enough. Here is an example: 'The herbicide might damage the crop under cold and wet conditions'.

Why is it important for the recommendations to be registered?

When a registered recommendation causes damage, and it can be proven that the herbicide was used according to the registered label, the registration holder is responsible.

If an agent makes an unregistered recommendation, it is doubtful if his insurer will cover any of the resulting damage. Note that if two different herbicides are registered for a crop, they cannot be used in combination, unless it is clearly recommended on the label or labels.

Adding a fungicide or insecticide is also in conflict with the label. Fungicides and insecticides may contain wetting agents in their formulation and this can lead to damage, putting the recommendation outside of registration – unless it is recommended on the herbicide label. The main cause of herbicide damage is the fact that unregistered recommendations are not researched properly.

When crop damage is observed

In the event of damage, the magic words are quick action. The responsible agent must be informed immediately. A written acceptance of responsibility should be demanded immediately from the agent and/or the registration holder (preferably both). An independent expert should be called in if this cannot be obtained.

One needs to make sure that the expert is competent to pass a verdict in the case involved and would be willing to testify in court, if necessary.

Attempt at all times to resolve the responsibility for the damage and the scope thereof yourself or through mediation. Nevertheless, care should be taken to preserve all the relevant data in case it is needed in a court case at a later stage. Serious problems usually develop where action was not taken fast enough.

Why do differences arise?

There are agents and companies that will take responsibility for herbicide damage on crops immediately, provided they are convinced that it is really their responsibility. However, there are others that will dispute their responsibility on principle. Similarly, differences exist among producers and experts, according to their knowledge and experience. Disputes arise because everybody's viewpoint on a situation differs.

In the past companies sent through potential claims to insurers as soon as they were convinced that the damage had been caused by the specific herbicide(s) and that the extent of the damage was quite large. The insurer then appointed a claims mediator to investigate the case and to make recommendations.

The claim was subsequently administered by the claims mediator. In most cases, the claims could be resolved to the satisfaction of both parties. However, in a few cases the claims were referred to court. For reasons that are unclear this practice has decreased significantly in the last couple of years. Apparently, insurers increasingly respond only to official claims received through a summons.

The earlier practice meant that potential claims could be investigated early, and if necessary, the assistance of weed scientists could be called in. If this practice did not exist, many claims would have ended up in court. As this practice is evidently decreasing or disappearing, it is very important that the producer act pro-actively if any crop damage is noticed to ensure that his case is not harmed.

Something to think about

Chemical herbicides are essential to economical cropping, but the major differences in soil and climate factors influencing the working of herbicides cause crop damage to occur in certain circumstances.

In the case of registered recommendations, little damage occurs. Most cases of crop damage due to herbicides are the result of unregistered recommendations. Therefore, the person recommending the herbicide should make sure that the recommendations are in fact registered by reading the label, otherwise he or she is liable. Even if the agent had sufficient insurance, it is doubtful if his insurer would pay for damage caused by an unregistered recommendation.

Article submitted by Jack Jooste, speciality consultant in Weed Science, for SA Graan/ Grain September 2016. For more information, send an email to docjackj@vodamail.co.za.

A LOOK AT *EXSEROHILUM* LEAF BLIGHT OF SORGHUM

Leaf diseases are problematic in crops for various reasons, one being that they damage that part of the plant tasked with the production of glucose (sugars). Every square millimetre of the plant's leaf surface lost due to infection results in less glucose produced.

A second reason mostly unknown to producers, is the fact that when the leaves are damaged to such an extent that they cannot photosynthesise effectively, the plant utilises stored glucose from areas like the roots and stalks to fill the grain. This predisposes the plant's roots and stalks to infection, resulting in an increase in root rot and lodging, which further reduces the yield potential.

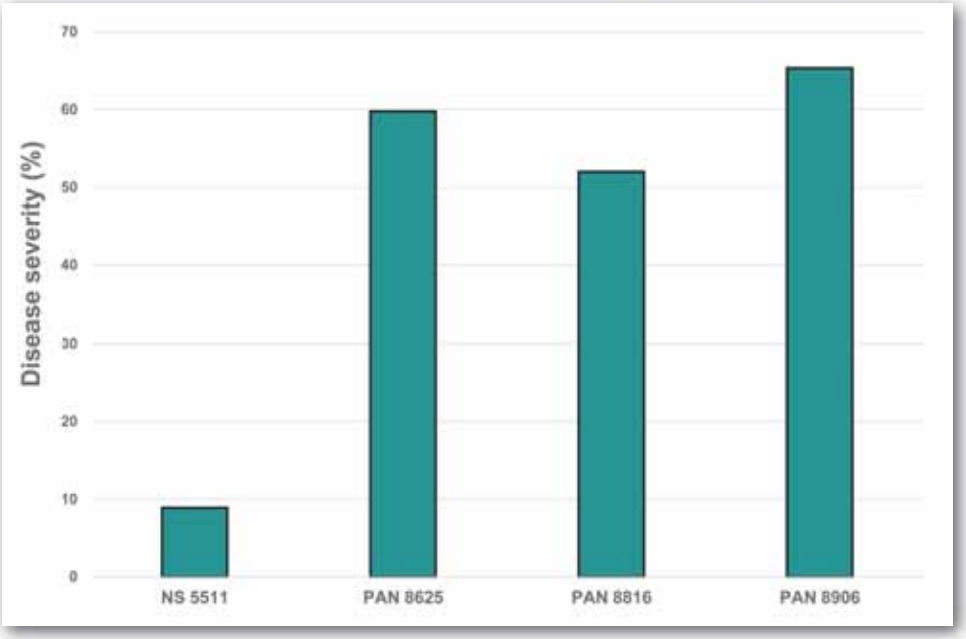
Knowing which leaf diseases are a potential threat is accordingly vital in ensuring optimal yields. Maize and sorghum share a common pathogen in this regard. *Exserohilum turcicum* is the causal organism of northern corn leaf blight of maize, as well as *Exserohilum* leaf blight of sorghum (**Photo 1**).

Photo 1: Lesions produced by Exserohilum turcicum on sorghum (A) and maize (B).

Although the lesions produced on these two crops are very similar, an interesting fact is that not all isolates from this pathogen can infect sorghum and maize equally well. A specific isolate from a sorghum plant will thus not necessarily be able to infect a maize plant and *vice versa*.

In both these crops the yield impact associated with the disease is, however, severe in susceptible cultivars if the disease is established before flowering. Although much has been reported on northern corn leaf blight in this regard, information regarding the impact of leaf blight on sorghum is somewhat lacking. During the 2014/2015 season, a trial was conducted at the ARC-Grain Crops Institute (ARC-GCI) to establish the resistance levels of selected cultivars as well as to establish sorghum yield loss associated with *E. turcicum* infection (**Photo 2**).

Graph 1: Disease severity (%) of four sorghum cultivars at hard dough stage.



Although the trial had many technical aspects, the basic components of the study were the following: Four sorghum cultivars were included, i.e. PAN 8816, PAN 8906, PAN 8625 and NS 5511. The disease severity levels required to establish the yield loss impact associated with the disease, were created through eleven fungicide treatments which consisted of two fungicides (azoxystrobin/difenoconazole and epoxiconazole/pyraclostrobin) being applied on five different dates (six weeks, six to eight weeks, eight weeks, eight to ten weeks and ten weeks after planting).

A control was included, which did not receive any fungicide application. The trial was inoculated with *E. turcicum* at approximately six-leaf stage and the resultant disease development recorded at critical growth stages.

High levels of disease severity were achieved (**Photo 3**) with the final disease severity measured at the hard dough stage, varying between 4,4% and 69,33% over the

Photo 3: Degree of Exserohilum turcicum disease severity achieved during the 2014/2015 season with a sorghum trial planted at Potchefstroom.

various cultivars and treatments. Evaluation on the control plots results only, indicated that PAN 8906 as well as PAN 8625 were the most susceptible cultivars measuring leaf blight disease severity of 65,33% and 59,78% respectively (**Graph 1**).

PAN 8816 had 52% diseased leaf area, whilst NS 5511 demonstrated a high level of disease resistance, with only 8,9% disease leaf area measured at hard dough stage. Both fungicides tested, gave similar control to each other at the various application dates, with the best control being obtained when they were applied twice during the season (eight and ten weeks after planting).

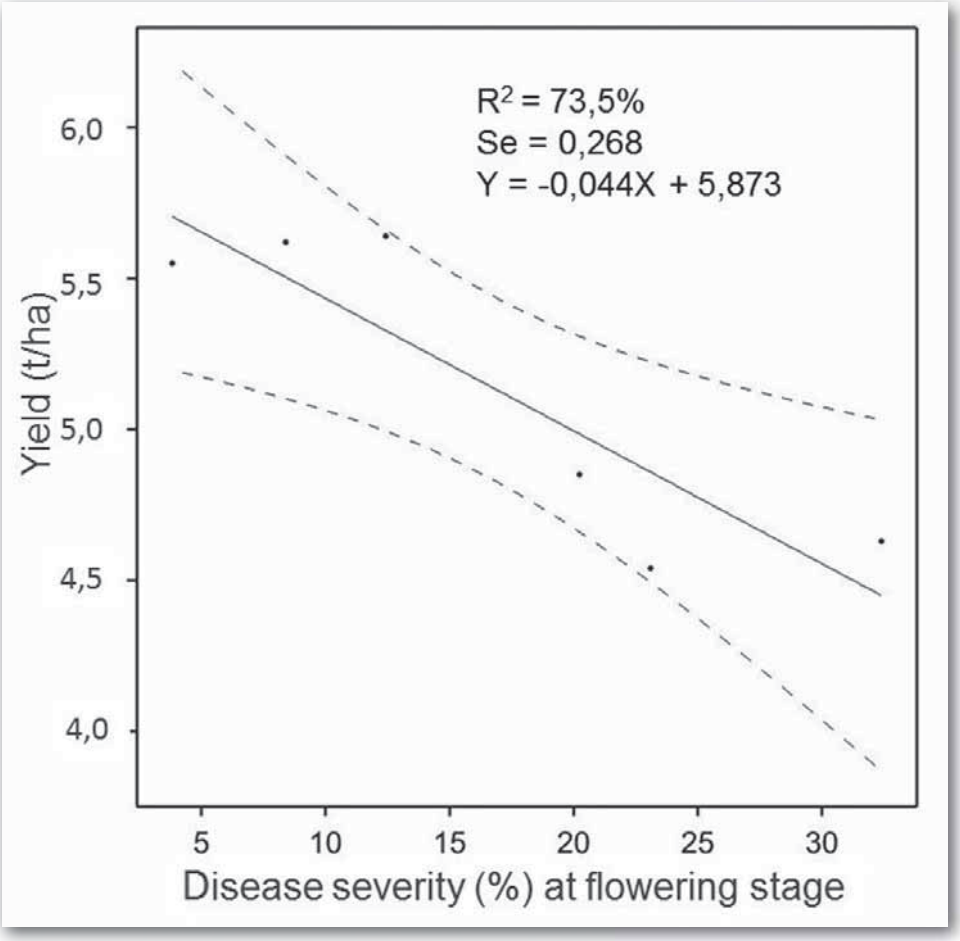
None of the applications significantly reduced the leaf blight severity with the resistant NS 5511 when compared to its control treatment, indicating that even under such severe inoculum pressure, it was not economically viable to spray this specific cultivar in order to control the disease. Regression analyses were conducted on the different cultivars and fungicides used in order to establish the yield loss impact. The best fit with regard to regression analysis was obtained with PAN 8625 (azoxystrobin/difenoconazole treatments).

Yield loss of 7,6% was observed at flowering for each 10% increase in disease severity (**Graph 2**). For the same cultivar, a yield loss of 5% for every 10% increase was observed at soft dough stage (R2 = 80,2%, SE = 0,231). Although more research is required to confirm the findings of the current study, these figures are quite similar to that which have been reported internationally for northern corn leaf blight on maize, i.e. a 2% to 8% yield decline for every 10% increase in disease severity.

Two important aspects highlighted by the preliminary study should accordingly be taken note of. Firstly, the importance of monitoring disease development or taking preventative steps to control the disease, as any level of disease development has a yield implication associated with it. The earlier the disease development occurs, the greater the loss.

The second aspect is knowing the resistance level of the cultivar. Resistance cultivars are available in the market and producers should contact their seed suppliers in this regard. The utilisation of resistant cultivars is a viable method to reduce inoculum levels, as well as impute costs associated with fungicide application.

Graph 2: Yield decline observed with an increase in disease severity on PAN 8625 during the 2014/2015 season.



Article submitted by Dr Maryke Craven, ARC-Grain Crops, Potchefstroom, for SA Graan/Grain September 2016. For more information, send an email to CravenM@arc.agric.za.

Photo 2: Sorghum trial conducted during the 2014/2015 season at Potchefstroom to establish yield loss impact of Exserohilum leaf blight on sorghum.

CLIMBING WEEDS: A headache in maize production

In most cases producers only become aware of climbing weeds once they start climbing up mature plants. Climbing weeds are fierce competitors for nutrients – especially sunlight – and will therefore climb up any crop in search of sunlight.

In this way they can smother the crop and prevent the plants from reaching normal physiological maturity, with resulting yield losses. Furthermore, these climbing weeds can make the harvesting process much more difficult where plants have already formed ears.

The most common climbing weeds in South Africa – which have the potential to become problem weeds in maize production – are morning glory (*Ipomoea purpurea*), field bindweed (*Convolvulus arvensis*) and black bindweed (*Fallopia convolvulus*).

> *"Climbing weeds are fierce competitors for nutrients – especially sunlight – and will therefore climb up any crop in search of sunlight.*

These weeds have extensive root systems with deep-growing tap roots. All three species propagate with seed. Field bindweed is a perennial and can also propagate with underground rhizomes.

Field bindweed and black bindweed can easily be confused with each other, because they have the same pale dark-green, arrow-shaped leaves.

However, black bindweed leaves are actually more heart-shaped at the base, while field bindweed leaves appear more triangular. These two are easily distinguished from morning glory, which has bright green, heart-shaped leaves.

Field bindweed and morning glory have large white, light pink or purple flowers; black bindweed has almost invisible small white flowers in the axils. This climbing specie can produce up to 1 000 seeds per plant and can survive for up to ten years in the soil. Field bindweed and morning glory are both classified as category 1 invader plants, which means that wherever they occur, they should be controlled to restrict spreading.

Table 1: Active ingredients of herbicides registered for the control of morning glory, field bindweed and black bindweed in maize.

Morning glory	Field bindweed	Black bindweed
Acetochlor/atrazine/ terbuthylazine	Atrazine/terbuzine	Bromoxynil
Atrazine/cyanizine	Glyphosate	Bromoxynil/terbuthylazine
Atrazine/ terbuthylazine	Mcpa	Dicamba
Atrazine/mesotrione/s-metalochlorine		Dicamba/tropamezone
Atrazine/metazachlorine/terbuthylazine		
Bendioxide		
Bromoxynil		
Bromoxynil/terbuthylazine		
Dicamba		
Dicamba/tropamezone		
Glyphosate*		
Halosulfuron		
Mesotrione		
S-metalochlorine/terbuthylazine		

**Glyphosate can only be administered overall before planting, or after planting where Roundup Ready maize cultivars have been planted*

Black bindweed

Photo 8: Black bindweed (Fallopia convolvulus). Photo: Hestia Nienaber

The control of climbing weeds is a challenge – especially once they have started climbing. Plants should be controlled as early as possible, around the four to six-leaf stage. These species are known for having a high tolerance for herbicides.

However, there are herbicides registered for controlling these weeds in various crops. The label instructions should be read very carefully to determine if the specific weeds are actually listed in the table of weed control.

To ensure effective control, there will be very specific prescriptions regarding doses in most cases. **Table 1** lists the active ingredients of herbicides registered for the control of the above-mentioned weeds in maize.

Furthermore, these climbing weeds can also cause big problems in wheat and sugar cane. Mechanical tillage can be done early in the season, when these weeds are still small. The weeds will be more difficult to control the bigger they are.

Field bindweed also has underground rhizomes and tillage can often aggravate the problem, because new plants can grow from the broken rhizomes below ground. It is recommended that where high infestation levels oc-

Morning glory

*Photo 1: Morning glory (*Ipomoea puperea*).*

Photo 2: Seedling of morning glory.

Photo 3: The characteristic white or purple flowers of morning glory.

Photo 4: Climbing morning glory can make the harvesting process difficult.

Field bindweed

*Photo 5: Field bindweed (*Convolvulus arvensis*).*

Photo 6: The arrow-shaped leaves of field bindweed.

Photo 7: The underground rhizomes of field bindweed.

> *The control of climbing weeds is a challenge – especially once they have started climbing.*

cur, deep tillage should be done to bury seeds deep enough.

The best control will be obtained when more than one controlling measure is used, for example a combination of deep tillage and chemical control, followed up throughout the season.

These climbing weeds can become a problem and grow rampantly between rows of plants that do not form a dense foliage. Row widths and plant population can therefore also, where possible, be used to control these climbing weeds and reduce infestation levels.

Like any other weed, climbing weeds should not be allowed to flower, otherwise the problem will just get worse over time. These three weeds also have the ability to germinate throughout the growing season. The ones that escaped the first round of control (mechanical or chemical control) can therefore cause serious issues late in the season.

Article submitted by Elbé Hugo and Marlene van der Walt, ARC-Grain Crops, Potchefstroom, for SA Graan/Grain September 2016. For more information, send an email to VDWaltM@arc.agric.za.

Determine the effectiveness of chemical herbicides and pesticides yourself – DO IT CORRECTLY AND SAVE

Weeds are one of the grain producer's biggest enemies. Sometimes it seems as if this enemy gets the upper hand, which means that producers lose production and money. In many cases affected fields were sprayed, but due to some mistake, the weeds survived.

What caused the herbicide to not work? Was the herbicide faulty, was there a mistake with administration, were there problems with the equipment or climate? Think carefully. If you as the producer can increase the effectiveness and efficiency of the chemicals, you will feel the benefits in your pocket.

I would like to share with our readers a few practical problems that I observed from producers:

Educate yourself

We are now at the start of the new season. Refresh your knowledge on what, where, when and how spraying needs to be done. Make sure you know how to adjust and use the equipment. Remember to also educate the workers.

Service the spraying equipment

Problems may not be picked up if spraying equipment is not serviced before the season. Service your equipment properly and sort out all problems before the work season starts. Remember: the effects of equipment not working properly will only be noticed later on and then the damage has already been done.

It is important for the spraying equipment to be cleaned thoroughly inside and out – this includes spraying nozzles, pipes and all filters. Some of the chemical products cause a deposit on the inside of the pipes and when the sprayer works again, the deposit loosens and blocks the filters and nozzles.

There are various methods and products available for cleaning the spray tank and pipes. Talk to your chemical representative to identify the best product. It is particularly advisable to install an additional set of filters to protect the spraying nozzles.

It is essential to do a thorough flow ratio test annually – especially with the large, self-propelled sprayers – to ensure that these specific nozzles deliver the correct spraying pressure and strength (litre/ha). Once the sprayer starts working and the speed starts to vary, the pressure should also be able to change in order to keep the delivery per hectare constant. Ensure that your equipment works optimally.

The nozzles are another aspect that needs attention – they sometimes need replacing due to wear and tear. Check the delivery and the spraying patterns, and replace them if there are any deviations from the specifications. If the sprayer consists of more than one section controlled separately and fed by different pipes, each section should be checked separately.

Certain nozzles, like air induction nozzles, have the ability to form larger air-filled drops – which cause less spray drift and can spray at a higher pressure. Ensure the nozzles you are using are suited to the job you want to perform.

The spraying pump is the heart of the whole operation. Check the delivery. Check the oil level and oil colour. Ensure the spraying pump can deliver the correct pressure as required. If the pressure is too low, the chemical products will not be able to reach the target area, and pressure that is too high will cause too much spray drift, causing the same result in the end.

Limit spray drift

Product that is sprayed away because of too much drift is lost. The product that actually settles on the plant is then too little to be effective. Spray drift can be influenced by various factors, namely:

- Drop size;
- Spray height;
- Spray speed;

Photo 1: We are now at the start of the new season. Refresh your knowledge on what, where, when and how spraying needs to be done. Make sure you know how to adjust and use the equipment.

- Wind speed;
- Air temperature and humidity; and
- Spray volume.

Drop size is the factor that will influence the drift of the product the most during spraying. Low volumes sprayed at too high pressure cause very small drops that blow away easily and cause drift. Make sure that the correct nozzles and correct pressure are used and check that the nozzles form the desired drop sizes that will cause the least drift and will ensure the most plant coverage.

Do not spray at a wind speed of 5 m/s. It will be necessary to adjust the drop size when spraying at a lower wind speed of approximately 3 m/s. When spraying at a wind speed of 3 m/s, the drop size will need to be increased by reducing the spray pressure.

Generally air-induced nozzles cause less drift and can contribute to longer spray hours. Remember: wind also influences these nozzles.

Spray height determines the amount of spray drift. The spray drift increases as the spray height from the ground increases. Adapt the nozzles when spraying high above the ground. Wind speed, temperature and humidity will influence the amount of spray drift.

Do not spray during the hottest time of the day. This influences the spray drift as well as the effective working of the chemical products. Rather try to spray at lower temperatures and when there is no wind, and follow the specifications of the nozzle manufacturer.

The spray volume can also give rise to spray drift. When spray volumes are too low, the pressure can be too high and the drops too small – giving rise to more spray drift. Try to maintain a balance between spray volume and drift. Take the water requirements of the chemical products to be sprayed into consideration when the decision is being made.

Add an anti-evaporation product as well if possible. This will give the spray product on the plant a longer time to be absorbed, and therefore increases the effectiveness of the product.

Other practical difficulties that occur

Producers should make sure that filters and nozzles are cleaned regularly. The spray pattern and delivery will be affected if something is stuck in the nozzle.

The calibration of the sprayers should be checked regularly. It is important for the calibration to be correct and for the operator to know at what speed and engine revolutions to drive. Many operators do not stay within the guidelines and then the products do not work as they should.

The mixing sequence of chemical products is very important. Make sure that the products are added to the sprayer in the correct sequence and that the operator knows how to mix the products. Check that it is done correctly. One regularly hears that the spray product was not enough. Ensure that the operator sprayed the correct amount of product over the right area.

Dust is detrimental to the chemical products sprayed. The machines move fast and the wheels cause dust. Check the nozzles close to the wheels carefully. Discuss ways in which the effect of dust can be limited with your representative.

Providing quality water to a sprayer is a huge challenge – it is expensive and large volumes are usually required. A possible way to get around this is to reduce the spray volumes. Be careful of this, as most spray products are tested and recommended at very high water volumes.

Discuss this with your representative, and find out exactly what is the least water volume per hectare allowed.

The water being used also varies substantially in quality and purity. Sometimes the water is very clean and other times it contains so much pollution that the chemical products cannot work effectively. Ensure that clean water is used at all times and that the necessary products are added to correct the pH and other qualities of the water. Using impure water increases the frequency of cleaning the filter and nozzles – to at least daily. Pumping the water through a filter system before pouring it into the sprayer already makes a big difference.

Suppose there is too little spraying capacity to complete the work timeously and efficiently: A few unfavourable spraying days can change everything, and then a surplus spraying capacity is essential. Keep a surplus sprayer, even if it is a lower specification sprayer, on hand to help out during these times.

Timing is critical when it comes to spraying. It is very important that weeds are sprayed when they are as small as possible and not strained at all. Be particularly wary of winter weeds. It looks like the winter weeds are not growing, but in the meantime their roots are developing deeply and strongly below the surface.

Where weeds are observed, care should be taken that the dosage is high enough to kill the weeds and not just burn it. Once the weed starts growing, it is very difficult to kill it with spray. If the weed is strained, it can affect the working of the herbicide. Discuss this with your representative to ensure that spray can be administered under the conditions concerned.

Many producers are not fully aware of the weed spectrum on their farms. In some cases the dosages of the spray products are then calculated incorrectly and a certain extent of herbicide resistance develops. Varying the active ingredients of the herbicide regularly also helps to prevent this.

If you are not making use of satellite technology to identify driving lanes, you have to clearly instruct the driver where to drive and which crop rows to use to prevent double spraying. Spraying sections twice is just as ineffective as not spraying a section.

If you are innovative and mix your own chemical products (which in most cases are outside specifications and administration guidelines), be careful: buying cheap stuff can sometimes end up being very expensive. Read the pamphlets and stick to the products' application guidelines.

These are only a few thoughts. Talk to your own as well as other chemical representatives to identify the best solution for your farm's problems. Strictly apply the recommendations and if circumstances should change, talk to your chemical representative again to make adjustments.

Article submitted by Pietman Botha, SA Grain contributor. For more information, send an email to pietmanbotha@gmail.com.

Why does maize lodge?

Most farmers have already started harvesting this season's maize. Usually the first lands to be harvested are those that were planted first, or those that experienced stress sometime during the season. Lands that experienced stress are usually the first to show any signs of lodging.

Healthy maize plants that received enough nutrients throughout the season usually do not lodge. The maize plant needs sufficient carbohydrates produced through the process of photosynthesis to fill the root and main stem cells to keep it alive and healthy. It also needs to store enough carbohydrates for the high energy demand during the grain filling stage.

When maize experiences any stress during the grain filling stage, photosynthesis is reduced or even temporarily stops. This reduces the carbohydrates meant for grain filling. The maize plant reacts to this deficiency by extracting stored carbohydrates from the leaves, stems and roots and channels it to the developing kernels. This 'self-destructive' process ensures that carbohydrates reach the developing cobs on the plant to the detriment of the stem and roots, which in turn leads to the early death of the stem and roots. This early death of the cells may create the conditions conducive to a fungal infection in the stem and roots of the plant. The first symptom of this is usually only observed when the plant is almost physiologically mature and the lower leaves start to deteriorate. They generally turn yellow as a result of dying off.

Various other stress factors can also cause stem and root rot. These include:

- The loss or reduction of leaf surface due to leaf disease (Northern Corn Leaf Blight), insect damage, sunburn or hail damage.
- Any damage to the roots caused by insects or chemicals.
- Imbalances in nutrients, especially high Nitrogen in relation to Potassium levels.
- Soil compaction which can limit root growth.
- A plant population too high for the cultivar or potential of the soil.

Most cultivars do not show any signs of stem or root rot right up until just before physiological maturity. It is usually difficult to differentiate between the different fungi responsible for which infection, as a complex of fungi are usually present. In addition, stalk borer damage as well as late autumn rain as experienced during this past season can also intensify the symptoms and rate of infection.

The presence of stem rot, however, does not always cause maize to lodge. It can be avoided by harvesting the infected lands early. Many maize hybrids have very strong stalk walls which contributes to its ability to stay standing even though the core of the stem is destroyed.

Lodging of maize can however still be avoided, especially in cases where the maize was harvested late or where the plants have been exposed to winter rains and/or strong winds. Through good land inspections, a problem land could be harvested early and potential damage avoided.

Damage to the core of the stem is a symptom of all types of stem rot. It can easily be tested for by flattening the internode between your thumb and forefinger. The plant can also be tested by taking hold of the cob and pressing it approximately 15 cm to 25 cm towards the next row. If the plant bends/breaks between the head and the roots, then stem and root rot is most likely present.

To avoid losses due to maize plants falling over, it is important to identify the infected lands as soon as possible for them to be harvested first. The lands which have experienced drought during the season or those that are infected with Northern Corn Leaf Blight should be the first to be inspected and harvested.

Article submitted by Nico Barnard, Agronomist, PANNAR SEED (PTY) LTD, South Africa. For more information contact Nico at 082 850 1503.

Photo 1: Maize which has lodged is very difficult to harvest and can cause significant financial loss.

The Corner Post

PAUL WIGGILL
Mentoring makes dreams come true

In this series, *The Corner Post* is featuring the mentors who form part of the Grain SA mentorship programme. A mentor is that person who gives you advice on how to achieve your own goals and dreams.

The English singer-songwriter, John Lennon said, 'A dream you dream alone is only a dream, but a dream you dream together is a reality'. Grain SA's mentorship programme makes it possible for mentors like Paul Wiggill, to dream with emerging farmers and turn possibilities into realities.

Paul grew up on a sheep farm called Caledonia in the Free State on the border of Lesotho, not far from where he currently farms. He shares that the farm was very secluded with no access to it from the South African side. The only way the farm could be reached was from Lesotho and they also had to cross the Caledon river to get there. The Wiggill family are primarily traders and sheep farmers.

Passion becomes reality

Paul attended Weston Agricultural College in Mooi River, KwaZulu-Natal – an agricultural secondary school for boys. Here boys are educated through the integration of academic as well as practical farming principles. He says that farming has always been his passion and he has made time, whenever possible, to assist others who share this passion. He firmly believes in the old Chinese proverb, 'Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime.' To him sharing his expertise with developing farmers is a dream come true as he knows development assistance can better people's lives.

> *"Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime.*

Because of this he was very excited to learn about the Grain SA mentorship programme from his brother, Eric, who has been a mentor with Grain SA for longer than him. 'Eric inspired me to become a mentor and trainer as he knew of the passion I held to teach and assist others with agricultural practices. 'This is actually what we had done for many years on our farm in Lesotho,' he adds.

He began his mentorship training in May 2016 and started mentoring in July last year. Speaking IsiZulu, Sesotho and Xhosa makes him a noteworthy mentor in the Bergville area. An area which includes Dukuza, Bethany and Zwelisha. In total, Paul mentors approximately 230 farmers and all farmers are visited personally with Study Group meetings being held on a weekly basis. Paul mentions that it has been very helpful having a brother who was part of the mentorship programme before him. 'I have been fortunate as Eric started with the programme before me and I have therefore picked up many useful tips from him.' As they both enjoy working with people, they often discuss situations or problems that occur in their groups.

Teaching to improve

To him the three most important agricultural practices that need to receive attention in his area are the following:

- The importance of applying lime and applying it correctly as this practise is crucial in maximising the yield potential of the soil. He says that farmers must learn how to look after their soil.
- Explaining what no-till entails and how to make no-till practices work for them. Understanding this practise is the key here. The idea of not preparing the land before planting may not be a well-known practise, but once the advantages become apparent more and more farmers become interested.
- Applying the correct amount of seed and fertiliser.

A rewarding programme

Paul thoroughly enjoys being part of the mentorship programme as it has given him the opportunity to fulfil a lifelong calling. Farming and teaching others about farming has always been part of who he is, so this programme fits him like a glove. Showing the ropes to those who are eager to learn and whom appreciate the information you convey has made him even more eager to teach. He applauds Grain SA for the insight to develop this programme. Seeing the impact it has in the lives of the farmers excites Paul. 'Agriculture is a language all on its own and is essentially rewarding to those who are practical,' he adds.

One of the highlights during Paul's first year as mentor was when he got a big hug from Gogo who said, 'Thank you for all your help. I could not have done it without you.' He says at this moment he realised that the Grain SA mentorship programme is making a big difference in people's lives and that he is truly blessed to be part of it.

There is a saying from an unknown source which states that a lot of people have gone further than they thought they could, because someone else believed they could. Perhaps this is what this Grain SA programme is all about: Mentors believing in the mentees.

This month's edition of The Corner Post was written by Louise Kunz, Pula Imvula contributor. For more information, send an email to louise@infoworks.biz.

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