



2018

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Workplace injuries – what farmers should know In a previous article we emphasised the fact that farmers as employers must provide and maintain, as far as is reasonably... t has again been a difficult season – parts of the country have been very wet and parts are still very dry. We are told that this could be known as 'weather amplification', which really means that the weather is just stronger. If you are in a dry area, it will get drier, and if you are in a wet area, it will get wetter. We need to keep this in mind for the future when we decide what to plant and when to plant it. Farming is not getting easier.

There is a lot of talk about land and land redistribution. If you are reading this Pula Imvula then you quite possibly are farming on land – it would be communal land, hired land, own land, commonage or land that you received through redistribution. The most critical aspect of land as an asset is that the land has to be productive. Just having land or access to land will not change your life – your life could change if you are able to use the land that you have.

In order to use the land, you need knowledge and skills; you also need money for the production inputs, and unless you are going to do all the work by hand, you will need access to some mechanisation. This is where the challenges come in – where are you going to gain knowledge and experience, where are you going to get your inputs (the right ones on time), and what mechanisation are you going to use?

As Grain SA, the primary focus of our development programme is to transfer knowledge and skills to empower you to take the right decisions and do the right thing. By attending the study group meetings and training courses, and by reading the Pula Imvula, you will gain information. We have various programmes to help farmers with inputs – the Jobs Fund Project is one of those where the farmers pay a contribution per hectare and then we supply the inputs and mentoring to the farmers. We also have a project with the DRDLR through their REID programme where we are able to supply inputs and mentor the farmers. There is a huge need for financial support to farmers and currently as Grain SA we are not able to meet the needs of all the farmers. We continue to try to find additional partners to help us with this challenge.

Let us continue to care for the crop that we have managed to plant this year – remember to apply topdressing to the maize, and keep the lands clean of weeds – your crops still needs your love and attention.





# Make ROUTINE MAINTENANCE a priority this year

2018 is here. Let us make this year, one of good management and good maintenance. I know that this is a common topic of discussion in the Pula Imvula but it can never be stressed enough as it is one of the foundations of a good farming operation.

As farmers, we usually hit the road running in the New Year as January and February is a very busy time of year for us. But we cannot let the busy season prevent us from having good management practices. Our capital outlay on our equipment is too great to neglect this aspect of our business.

Our farming machines and implements are made up of many intricate parts, parts that move, spin, turn, twist and shake. All of this causes wear and tear and therefore requires routine maintenance in order to keep them operating without any problems. Time is too valuable to have constant hold ups which prevent us from getting our tasks done timeously. Just this month I have been battling with a tractor that keeps having 'niggles' and I keep thinking to myself that had I been more thorough in the quiet time perhaps I wouldn't be in this predicament now.

## **Crucial guidelines**

Here are some guidelines which I believe are crucial to a smooth operation:

- Start by focussing on primary machinery. These are our machines and implements that we rely on. These will need the most of your attention as they more often than not do the most work.
- On each machine or implement identify the parts that take the most strain such as bearings and belts and get them working like they should.
- Be thorough and always do a double check once you are finished to make sure that all nuts and bolts are tightened. It is easy to overlook something.
- Finally, move it out of the working space to where it can easily be hooked up. If you like you can take it for a short test run nearby to be sure that all is working well.

Whilst using the equipment in the field, we cannot afford to abuse our machines. We need to



Repairing the planter to make sure it is working perfectly.

give them the correct care and attention that they need at all times. Usually the best method is to instil a routine in your labour which they practice on a daily basis. This routine should be performed every morning before the work starts. Be sure to check things like chains and bearings daily as well as oil levels and fuel. It is good practice to have a portable maintenance kit which has tools and grease and spares close at hand.

These checks may very possibly save you an unwanted stop, which would more often than not happen at the worst possible time. So, don't be slack about it, rather be proactive and save time and money in the long run.

Our good efforts at maintenance cannot stop there. As you are well aware anything that works in the field needs continuous attention. We can't be good about our maintenance right through the season and then let it slip once the planting season is over. Be sure to go through all machinery after the busy work is complete. Do a good inspection on everything because even though it might have still been working well when you finished the job, it does not mean that something might not need replacing. Farming can be a very pleasant experience when things are going well, thus we need to do everything we can to keep them going well.

## Before putting your machine away

Here are some tips as to how you can care for your machines before you put them away for a while.

- Firstly, everything can be given a good power wash to get rid of all soil and dirt.
- After a good wash, all ploughs and discs should be brushed down with a light coat of old oil to prevent rusting.
- Bearings should be greased and hydraulic hose nozzles covered so that they are protected from the elements.
- All remaining seed in planter bins must be removed.



Struggling with old equipment. Photo: Johan Kriel



Maintenance of chains and bearings is very important. Photo: Johan Kriel

- Fertiliser hoppers on planters and spreaders must also cleaned out to prevent rust, this is essential as fertiliser is very corrosive.
- All chains must be checked and oiled, many farmers even take them off during the down season and store them in the shed.
- The same can be said for planter plates and fingers.
- Chemical sprays must be cleaned out with fresh water, nozzles should be cleaned, removed and stored away in the shed.

If we want our work to be enjoyable and a pleasure rather than a pain then I would advise making these steps in routine maintenance a priority in 2018. Farming can be a very pleasant experience when things are going well, thus we need to do everything we can to keep them going well. My grandfather used to say: 'Just because you cannot see a problem, it doesn't mean that there isn't a problem...so check and then check again to avoid that problem.'

Article submitted by Gavin Mathews, Bachelor in Environmental Management. For more information, send an email to gavmat@gmail.com.



# ALWAYS SOMETHING NEW TO LEARN

here is great knowledge wealth to be mined by developing farmers who attend Grain SA's Farmer Development study group meetings regularly.

Farming has always involved hard work and it truly can be said that farmers are not afraid to work hard in pursuit of their goals. However, these days farming requires far more than just hard work. The Grain SA Farmer Development team has identified certain factors which are common to new farmers around the country that slow development such as a lack of knowledge, skills and experience particularly regarding modern technology and recognised best practices for agriculture in the modern world.

Farming is a very broad field and farmers today need to understand an overwhelming diversity of issues. Theoretical knowledge alone is not enough. Farmers learn from years and years of experience. In the South African context, developing farmers are mostly new entrants to the game and the rules of this game are complicated. Good performance requires extreme fitness. With the profit margin being under extreme pressure, there is no margin for error. How do you gain experience, and who will catch you if you fall?

We approach farmer development with a multi-pronged strategy which offers different projects and programmes. The study group is effectively the starting point where we meet farmers and start walking a road alongside them. So, it is probably fair to say that the study group is the heartbeat of farmer development in a particular region. Our nine Regional Managers are based in key grain growing areas of the country:

- Jerry Mthombothi is based in Nelspruit and he mentors over 1 200 farmers who attend 17 study groups.
- Du Toit van der Westhuizen is based in Lichtenburg and visits 15 Study groups with over 630 members.
- Jurie Mentz manages eleven study groups from Louwsburg which sees over 650 members.
- Graeme Engelbrecht is based in Dundee and manages 15 study groups which have almost 900 farmer members.

**C** Through study group participation farmers learn from experts and from each other.

- Johan Kriel manages from Ladybrand and assists 15 study groups with about 520 new era commercial farmers, advanced farmers, smallholder and subsistence farmer members.
- Sinelizwi Fakade manages the programme from Mthatha and runs 33 study groups with a total membership of 2 572 farmers.
- The Kokstad office has been managed by lan Househam and more recently Luke Collier. This office runs 15 study groups with a total membership of 1 185 farmers.
- The same management team oversee the Maclear office which was operating 15 study groups and had over 1 000 members.
- Liana Stroebel is the Regional Manager for the project in the western and southern Cape.



Photos: Study groups are the heartbeat of farmer development.

Farming is a lifelong journey which never ends!

The office is based in Paarl and operates seven study groups with about 88 farmers. There is an open invitation for interested farmers to sign up to their nearest study group for the nominal fee of R40,00 per year (2017 rates). The only requirement is that the farmers must want to farm, be eager and willing to learn, and to even make changes if advised, and then to have some form of access to land.

It is through our interactions with farmers who regularly attend their study group meetings that our Regional Managers and Mentors get to know them, learn of their challenges and can get the best idea of how to begin the mentoring and training process. Relationships and trust are key elements of the development path we follow.

The Grain SA Farmer Development Team believes that sustainable development only occurs once an individual farmer is better equipped to take full responsibility for his or her own farming business. You will never find us financing a farmer directly nor will we be prescriptive about anything and we definitely never will take over the running of any farmers farming operations or business management processes – but **WE WILL** talk, teach and advise – and **WE WILL** encourage, chivvy, urge – and yes **WE WILL** help as far as possible and **WE WILL** show why modern technology returns best results.

We are always looking for fresh new insights to share in creative and dynamic ways. We keep our eyes open as we travel around the country looking for most suitable tools and equipment for small or developing farmers. WE WILL ALWAYS do our best as champions of developing farmers because we believe that we need every farmer to contribute to household and national food security by using the land and resources at their disposal as effectively and responsibly as possible! Our measure of success is not how many hectares are planted, not the total numbers of tons harvested but rather if there has been sustainable, optimal production of profitable crops on **EVERY SINGLE HECTARE planted!** 

The Grain SA Farmer Development team members have proved themselves to be reliable and have been 'pitching up' to support farmers for more than 18 years now. We meet in farmers' homes and sheds, community venues like halls and classrooms and even under big trees...and we go to the fields and see and learn from the good and the bad that we find there.





It is through our interactions with farmers who regularly attend their study group meetings that our Regional Managers and Mentors get to know them, learn of their challenges and can get the best idea of how to begin the mentoring and training process.

The study group meetings are dynamic and varied in an effort to cover as many relevant and helpful topics as possible. Topics are usually selected according to the rhythm of the seasons so as to offer most support at the right time. We look at slides and video clips and give practical demonstrations where helpful. We don't hesitate to get down and dirty in the fields and are not afraid of dirtying our hands investigating a funny noise in an engine – but we love to show others how to too!

There is always something new to learn. Through study group participation farmers learn from experts and from each other. They learn (and earn) faster than if they were struggling on alone. They get new perspectives and learn new skills from sharing in discussion groups. Farming is a lifelong journey which never ends!

Article submitted by Jenny Mathews, Pula Imvula contributor. For more information, send an email to jenjonmat@gmail.com.

# **GRAIN SA MEMBERSHIP LEVELS – how it works...**

Frain SA is a commodity organisation which monitors the sector and acts in the best interests of the grain producers of South Africa. This means the organisation acts as a watchdog, monitors input costs and input quality.

The team also negotiate and lobby on behalf of ALL grain farmers in South Africa. The organisation strives to represent one common voice on behalf of all farmers when addressing issues with government and other role-players.

Anyone who produces grain may become a member of the producer organisation Grain SA. Membership fees are paid annually for the period from 1 March to end of February. There are TWO completely different levels of membership.

# **1.Commercial members**

Full membership is available to a grain producer who produces at least 100 tons grain per annum for marketing; and pays the stipulated membership fee and the prescribed commodity levy to Grain SA on every ton of grain he/ she produces. A minimum of R1 000 plus VAT is prescribed for full membership. The producer is also required to endorse the objectives of Grain SA.

Producer members are required to sign a form authorising an affiliated collecting agent

Table 1: Current levy per ton for grain.

Сгор	Levy per ton
Maize	R2,70
Soybeans	R5,40
Sunflower	R5,40
Sorghum	R2,70
Groundnuts	R10,70
Wheat	R3,20
Canola	R4,30
Barley/Gars	R3,20
All other grains	R3,20

\* All levies exclude VAT

where his/her grain is delivered, to deduct the levy where the produce is delivered. The current levy per ton for grain is shown in **Table 1**.

# 2. Study group members

The organisation welcomes developing farmers and offers an entry level study group membership at a fee of R40,00 per annum. Members of study groups produce grain on a small scale and produce less than 100 tons of grain. The members of Grain SA's Farmer Development programme are supported in many different ways which have been specifically identified to accelerate growth and development of the individual farmer so that he or she can be fast tracked onto a sustainable path using modern farming methods and technologies.

Every study group member will be linked to one of the active study groups which will have a dedicated team member available to train, mentor and advise on best practices for grain production in each region.

Article submitted by Jenny Mathews, Pula Imvula contributor. For more information, send an email to jenjonmat@gmail.com.



# Pula Imvula's Quote of the Month

Do the right thing. It will gratify some people and astonish the rest.

~ Mark Twain

# WORKPLACE INJURIES – what farmers should know

n a previous article we emphasised the fact that farmers as employers must provide and maintain, as far as is reasonably possible, a working environment that is safe and without risk to the health of employees.

The Occupational Health and Safety Act (No. 85 of 1993) regulates health and safety in the workplace, being your farm.

In the same article, we discussed the responsibilities of the employer where as in this article we will focus on the responsibilities of employees and should incidents (injuries) occur.

Employees must:

- Take care of his/her own health and safety, as well as that of other people who may be affected by his/her actions.
- Carry out any lawful and reasonable instruction regarding health and safety issued by the employer.
- Comply with the employer's workplace procedures.
- Use the prescribed personal protective clothing and equipment when required.
- Report any potential hazard to the employer as soon as possible.
- Report any incident that can influence his/ her health or cause an injury to the employer as soon as possible, but no later than end of the shift.

However, it remains the responsibility of the employer to ensure that all employees are aware of the above-mentioned responsibilities. Should an injury occur, and the employer found to be negligent, there could be serious repercussions for the employer. You could be fined a substantial fine and/or face imprisonment and be ordered to rectify the matter. Unqualified repercussions could be that the productivity and attitude of your employees may be affected negatively by regular injuries occurring.

For the benefit of the employee and employer it is important, should an incident occur to follow the correct procedure to report any major injury (especially were medical attention is required) or death to the Compensation Commissioner within seven days. An employee has the right to claim any medical expenses from the Commissioner. If the correct procedure is not being followed the employee would have the right to claim compensation from the employer.

A fund, the so-called Compensation Fund was established by law, Act No.130 of 1993, Compensation for Occupational Injuries and Diseases Act (COIDA) to provide for compensation for disablement caused by injuries and diseases sustained or contracted by employees during their employment period as a direct result of their occupation. It also compensates for death because of injuries and diseases in the same manner. Employers pay an amount every year (compulsory) to the fund from where these benefits are paid.

It is a compulsory insurance cover for employers should any of their employees die, sustain an injury or contract an occupational disease during the period of their employment.

The fund is controlled by the Compensation Commissioner and administration of reporting, penalties, collections etc. is handled by the Department of Labour.



A safe working environment must be provided to prevent any injuries on duty.

Please, please note, if you have but only one employee, it is compulsory to register with the Department of Labour to contribute to this fund.

## Procedure in the case of an incident

The correct procedure in the case of an incident is as follows:

A minor incident or injury where no professional medical attention is required need not be reported. However, it will be a good managerial practice to keep a record of such an incident. By keeping the necessary records, you may be able to determine an area of concern or that a specific employee is very negligent. Because you have information, you will then be able to manage the problem.

In case of a more severe injury (professional medical attention is required), the incident must be reported to the Compensation Commissioner (Department of Labour) by completing Part A of the Employers Report of an Accident Form WC12. Part B – a carbon copy of part A – must be handed to the employee to give to the doctor or hospital where he/she is treated.

Medical evidence plays an important part when liability for the payment of compensation and medical expenses is considered. There are three reports to be completed by the doctor/hospital:

- The first medical report WCI 4;
- The monthly progress medical report, if required WCI 5;

• The final medical report – also on WCI 5; and then finally the employer must complete the resumption of work report – WCI 6.

In case of a very serious incident the employer must demarcate the site with a ribbon, gather as much evidence as possible, take photos, obtain signed statements from eyewitnesses, determine the sequence of events and the cause and apply improvements. In case of a death, the entire site must be left untouched till the police arrive.

All forms and information are available from the Department of Labour. Ensure that you always have forms available – it is proper management.

Complying with the requirements of the two acts mentioned requires a good deal of administration. But, this is far outweighed by the benefits of creating a safe working environment and the compensation of medical costs and ensuring productivity.

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



# LEAF DISEASES ON MAIZE: What does the new season hold?

n a perfect world it would be ideal if we could predict what the season will look like and which problems to expect. The incidence of pests and diseases is completely dependent on the environmental conditions during the critical growth stages of the crop.

The disease triangle (**Figure 1**) illustrates this principle the best, where a disease can only occur when all three factors overlap: the host, pathogen and suitable environmental conditions.

All of this develops over time and this determines when the infection will occur, how fast the disease establishes and the epidemic develops, and what the damage will be in the end. There are many models that can predict the prevalence and development of certain leaf diseases on various crops and that can even predict when and whether to use control measures.

There are no new leaf diseases in South Africa on maize that can catch the producer unawares. It is usually the incidence of diseases in areas where they were previously less relevant that causes surprises. They are often the direct consequence of climate conditions changing. It is therefore important for producers to recognise the well-known leaf diseases on maize, and also to know when one can expect to see them.

Only the correct diagnosis of a disease can determine if the control strategy will be successful. One of the most common mistakes producers still make is, for example, to administer fungicides for diseases caused by viruses, bacteria or even physical damage (sunburn or wind damage).

This usually leads to more damage due to unnecessary input costs incurred and the eventual yield loss because the real problem was not addressed correctly.

Grey leaf spot, bacterial streak and sunburn damage are sometimes confused by the untrained eye. Management of these problems is very different, and in some cases not even possible. A good local reference resource will help the producer to recognise diseases and to then make the correct management decisions.

Pannar Seed's free smartphone app, *Sprout* (**Figure 2**), illustrates this. It summarises and provides a brief description of the most important diseases found on maize in South Africa. This enables the producer to better inform his local agriculturist or chemical representative about the relevant disease, so that the correct recommendation can be made.



Northern corn leaf blight.

Before they occur, the most important maize leaf diseases have unique needs in terms of environmental conditions. Furthermore, the physiological growth stage of the plant determines when certain diseases appear.

The most important maize leaf diseases for which the producer should be on the lookout are combined in **Table 1**, and the growth stage referred to is illustrated in the diagram (**Figure 3**).

The most common leaf disease that occurs in most of the maize-producing areas of South Africa is northern corn leaf blight (**Photo 1**). The disease is caused by the fungus *Exserohilum turcicum*.

Environmental conditions that promote the disease are moderate temperatures (18°C - 27°C), moist conditions and long dew periods. The fungus survives on maize leaf residues, and multiple secondary infections develop throughout the season from existing lesions.

The lesions are usually noticed on the bottom leaves first, and as spores are released under favourable conditions from these lesions, the upper leaves are infected and it gives an appearance of a disease creeping up in the plant.

Common rust (**Photo 2**) is usually noticed for the first time during the season on the young maize plants. The disease is caused by the fungus *Puccinia sorghi*. Environmental conditions that promote the disease are moderate temperatures (16°C - 25°C) and moist conditions (>95% humidity). Common rust infection is promoted by dew/fog conditions – especially during the night when spores on the leaf surface germinate and penetrate the leaf through the stomata.

Early signs of rust infection are visible approximately five days after initial infection as small flecks on the leaves, and proper rust pustules (ten to 14 days) (Photo 2) then develop and release spores. On release these spores can be distributed across great distances by the wind and infect neighbouring plants or even the same plant again within the same season.

Another important maize leaf disease is grey leaf spot (**Photo 3**), which is caused by the fungus *Cercospora zeina*. Environmental conditions that promote the disease are moderate to high temperatures and high humidity (>95%).

The disease symptoms become particularly visible around flowering – although they can be visible earlier under high disease pressure conditions. This is a leaf disease that occurs specifically in KwaZulu-Natal and the eastern Highveld, where fog and/or high humidity and high temperatures prevail.

A misperception exists that the spores of the fungus are only airborne and distributed by the wind and the rain. Spores can indeed be spread by the wind, but these are secondary spores that can be spread from one planting to the next

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# Table 1: More general leaf diseases on maize in South Africa, the disease-causing organisms and growth stages in which they are commonly observed, and the control strategies for them.

Leaf disease/ symptom	Pathogen (disease-causing orgnanism)	Туре	Growth stage	Conditions	Fungicide	Control
Common rust (Photo 2)	Puccinia sorghi	Fungus	Later V stages (V8+)	Moderate tempera- tures (16°C - 25°C)	Yes	Fungicides and hybrid selection
Northern corn leaf blight (Photo 1)	Exserohilum turcicum	Fungus	V6 to R stages	Moderate temperatures (18°C - 27°C); long dew periods/ high humidity	Yes	Fungicides, hybrid selection, crop rotation and ploughing in of plant residues
Grey leaf spot (Photo 3)	Cercospora zeina	Fungus	From flowering (VT - R1+)	Moderate to hot temperatures (22°C - 30°C); long dew periods/high humidity (>95%)	Yes	Fungicides, hybrid selection, crop rotation and ploughing in of plant residues
Maize streak disease (Photo 6)	Maize streak virus (MSV)	Virus	V stages	Tropical areas where hosts are present all year, as well as condi- tions that increase vector activity (particularly hot irrigation areas)	No	Control leaf hoppers (systemic seed treatments and sprayings) and weed control
Bacterial streak (Photo 5)	Xanthomonas vasicola pv. vasculorum (X. campestris pv zeae)	Bacterium	From flowering (VT - R1+)	Warm, irrigation areas	No	Crop rotation, fallow fields and destroy infested plant residues
Sunburn (Photo 4)	None	Environment	All stages	Heat/sun inhibition	No	Hybrid selection and moisture management
<i>Phaeosphaeria</i> leaf spot	Various: Phaeosphaeria maydis, Phoma sorghina, Phyllosticta spp., Sporomiella spp.	Fungus and possible bacterium complex	R3+	Areas with high humidity and cool night temperatures	Less effective	Not usually necessary, but hybrid selection destroys infested plant residues and moving of planting date can help
Downy mildew	Peronosclerospora sorghi	Fungus	Early V stages	Warm, moist areas (tropical areas), particularly in fields where the disease was observed be- fore. Soil tempera- tures above 20°C promote infection	Yes	Soil treatments with metalaxyl, earlier planting date in infested fields, good quality seed and avoid crop roation with sorghum
Diplodia Leaf streak	Stenocarpella macrospora	Fungus	All stages	Warm, moist areas and minimum tillage	Yes	Crop rotation, good agl practices and plouhing in of plant residues
Eyespot	Aureabasidium zeae	Fungus	R3+	Cool, moist conditions, minimum tillage, insect pests like thrips and aphids can promote infestation	Yes	Crop rotation, ploughing in of plant residues and insect control
Polysora rust	Puccinia polysora	Fungus	R3+	Tropical areas, warm (24°C - 28°C), humid weather	Yes	Fungicides and earlier plantings



# Leaf diseases on maize: What does the new season hold?





## Common rust.

later in the season - and usually over shorter distances.

The real source of the disease is plant residues from the previous season in which the fungus survives, and as soon as the conditions become favourable in the new season, spores are released that can affect the lower leaves of plants.

These lesions produce new spores that, as the growing season progresses, are released

#### Grey leaf spot.

and distributed by rain droplets and wind to newer leaves higher up on the plant. Grey leaf spot is often confused with sunburn/ drought stress (**Photo 4**). Needless to say, the drought damage cannot be controlled and the unnecessary administration of fungicide causes a double setback for the producer. None of the fungal leaf diseases mentioned is seed-borne. Bacterial leaf streak (**Photo 5**) is a disease that specifically occurs in the western production areas and these symptoms are confused with those of grey leaf spot. A bacterial disease cannot be controlled with fungicides and spraying for it can be an expensive mistake – without any result.

Maize streak disease (Photo 6) is caused by the maize streak virus. It is a complex



Figure 1: The plant disease triangle.



Sunburn/drought inhibition symptoms on maize leaves.

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*Figure 3: Maize growth stages and the control of leaf diseases. Source: Pannar Seed* \**Risk for arrested ear development (AED) is high if inhibition occurs during the V10 to V14 growth stage. Avoid additional wetting agents and mixtures.* \*\*R1 (pollination period) – very important to prevent any form of inhibition.

disease, where the virus is transferred by a leafhopper. The environmental conditions affect the incidence, survival and distribution of the leafhopper – which determines the incidence and intensity of the disease.

As is the case with bacterial diseases, maize streak virus cannot be controlled with fungicide. Controlling maize streak virus involves a combination of measures to reduce or limit the risk of the disease. Although insecticides are effective as seed treatments and prevent the leafhoppers from feeding on the young plants and transferring the virus, they are no guarantee or instant solution for the disease.

# Management guidelines

General management guidelines for the risk management of maize leaf diseases include:

- Planting resistant maize hybrids.
- Planting a maize hybrid package and not only concentrating on one vulnerable hybrid with a high yield potential.
- Tillage and crop rotation to reduce disease pressure.
- Preservation tillage practices with all the advantages they offer. Unfortunately, they promote the survival of leaf diseases such as grey leaf spot and northern corn leaf blight, as the fungi mainly survive in the maize plant residues. To enjoy the actual benefits of a



Bacterial leaf streak.



Maize streak disease.

# Ontmoet PANNAR Sprout



Figure 2: Pannar Seed's Sprout smartphone app is a good, free reference for the most important crop diseases.

conservation tillage system, disease control is critical.

- The judicious use of registered fungicides in a good fungicide spray programme can effectively control most of the fungus diseases on leaves.
- However, the economic justifiability of an expensive chemical input is important and factors such as the maize price, yield potential and disease vulnerability of the hybrid and risk of disease in certain areas are very important. Do not spray injudiciously. It is important to remember that the primary goal of fungicide sprayings is disease control. This protects genetic yield potential, and improved standability is secondary and a bonus.
- An integrated management strategy of all the above is the best approach to risk management.

There are various other leaf diseases that were not mentioned in this article because they are less common or occur sporadically. However, this does not mean that they cannot cause huge yield losses under the right conditions. In order to react timeously, it is wise to still consult a good source or expert if suspicious symptoms are observed.

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# **GIBBERELLA** on maize, sorghum and wheat

he three most important crops grown in South Africa are maize, sorghum and wheat. These crops are essential food sources (such as carbohydrates and vitamins) for humans and animals. They are also important in industrial products and therefore the cultivation of these crops are of economic importance. It assists in job creation, with export of products and helps to generate international currency.

Unfortunately, these crops can be infected by fungal pathogens that can influence the yield and also lead to economic losses. The whole plant can be infected – which can lead to root-, crown-, stem and ear rot (maize), grain mould (sorghum) and head blight (wheat).

The fungal pathogens that most commonly occur on these crops and can cause severe damage, belong to the genus *Fusarium*. Recently in South Africa there has been an increase in the occurrence of the *Fusarium graminearum* species complex infection of these three crops. The diseases caused by the *Fusarium graminearum* species complex are also known as Gibberella rot.

Previously it was thought that the diseases were caused by *F. graminearum* s.s., but with recent molecular technology new species were found. Up to date there have been 16 different fungal species that occur in the *Fusarium graminearum* species complex.

Another reason why the *Fusarium graminearum* species complex is important lies in the fact that these fungal pathogens can produce toxic products known as mycotoxins. The toxins that are produced are nivalenol (NIV) and deoxynivalenol (DON). Each fungal species in the *Fusarium graminearum* species complex can either produce DON or NIV and some species can even produce both toxins (**Table 1**).

It is possible that the health of people and animals can be negatively influenced when heavily mycotoxin-contaminated food based products of maize, sorghum or wheat are ingested over a long period of time. Up to date there has been no way to remove mycotoxin from contaminated food crops and the best way to reduce or limit mycotoxins in food is to control *Fusarium graminearum* species complex.

The fungal pathogens occurring in the *Fusarium graminearum* species complex can also differ in virulence (degree to which disease severity can occur), plant part specificity (some fungal pathogens can only infect roots/ crowns/stems or above ground plant parts) and then some species display geographi-

 Table 1: In South Africa, there are six Fusarium graminearum species complexes

 that occur on crops and each produce different mycotoxins.

Fusarium graminearum	Mycotoxins	
species complex	Deoxynivalenol	Nivalenol
F. acacia-mearnsii	Х	Х
F. boothii	Х	
F. brasilicum	х	х
F. cortaderiae	х	х
F. graminearum s.s.	х	х
F. meridionale		Х

Table 2: The distribution of the Fusarium graminearum species complex on maize in South Africa. Fusarium boothii is the dominant Fusarium graminearum species complex on maize ears.

Provinces (maize)	Fusarium graminearum species complex			
	F. graminearum s.s	F. boothii*	F. meridionale	
KwaZulu-Natal		х	X (roots)	
Gauteng		х		
Mpumalanga		х		
North West		х		
Free State	Х	х		

\* Indicates the most frequent occurring Fusarium graminearum species complex specie

cal specificity (occur only in specific areas in South Africa).

Research information gathered will help producers to be more aware of the *Fusarium graminearum* species complex occurring in their fields, as well as how to better control and prevent the infection.

# Symptoms

## Maize

Studies found that the fungal pathogen most likely infecting maize ears was *F. boothii* (**Table 2**), however, *F. graminearum* s.s. was also isolated a few times (Table 2). In the stems and roots these two species as well as *F. meridionale* were isolated (Table 2).

Visible fungal growth on a maize ear usually starts from the tip of the ear and spreads down to the base of the ear. Ears are more susceptible during grain filling stage and become less susceptible to infection as the ear matures.

Insects and birds that feed on the mature grain can expose the ear and make it more susceptible to infection of the fungal pathogen through the wounds. The visual symptoms showed that the grain turned a pinkish-red colour (**Photo 1**).



Fusarium graminearum species complex causing Gibberella ear rot of maize.





The characteristic tan discolouration of head blight of wheat caused by the Fusarium graminearum species complex. Photo: Gert van Coller

Table 3: The distribution of Fusarium graminearum species complex in wheat in South Africa. Fusarium graminearum is the dominant Fusarium graminearum species complex that has been isolated from wheat.

Provinces (maize)	Fusarium graminearum species complex					
	F. graminearum s.s*	F. boothii	F. meridionale	F. acacia-mearnsii	F. cortaderiae	F. brasilicum
KwaZulu-Natal	х	Х	х	х	х	
Limpopo	х					
Mpumalanga	х					
Northern Cape	х	Х				х
North West	х					
Free State	х	Х	х			
Western Cape	Х				Х	

\* Indicates the most frequent occurring Fusarium graminearum species complex specie

The discolouration affects the quality of the grain. Severely infected maize ears will lead to the grain not being suitable for food or feed. With stem rot, there is usually the presence of leave damage. Infected stems and roots also show a characteristic pink red discolouration when cut open. Severe stem- and root rots can lead to plants lodging in the field and leading to lower yields.

# Wheat

In South Africa there are six *Fusarium graminearum* species complexes identified that infect wheat (**Table 3**). The fungal spores that occur on the plant debris in the field will infect the wheat rachis during flowering stage. A dark brown lesion becomes visible on a single spikelet and then the disease spreads to the spikelets via the rachis. The spikelets turn into a bleached colour and the tissue dies (**Photo 2**). It is also possible that the pink-red fungal growth can be seen on the spikelets. The kernels will shrivel up and can also be covered with fungal growth (**Photo 3**). These kernels become light in weight and can be blown out during the harvest process from the harvester and leads to yield losses.

If these kernels are used in the new season, the seed will have poor germination which will result in seedling wilt. It is also possible



# Gibberella on maize, sorghum and wheat



The Fusarium graminearum species complex-infected wheat grain has a pink-red colour and is dwarfed in comparison to the healthy wheat grain. Photo: Gert van Coller

to observe brown discolouration at the base of the stem and the rot will spread until the whole stem is rotten. This will lead to weak stems and the plant will lodge as in the case of maize.

## Sorghum

The three *Fusarium graminearum* species complexes that infect sorghum in South Africa are *F. meridionale*, *F. acacia-mearnsii* and *F. cortaderiae* (**Table 4**).

The visual disease symptoms are quite difficult to identify and then to assign to a specific pathogen. The reason is that the visual symptoms are not as characteristic as on maize and wheat. The grain mould discolouration can be pink, grey, white or even black (**Photo 4**).

The stem rot symptoms are similar to stem rot of maize giving a characteristic pink or even purple discolouration of the internal stem tissue. Grain mould usually leads to loss of grain, severe grain discolouration, a decrease of grain size and weight and reduced market and nutritional value.

#### **Control measures**

Maize, wheat and sorghum each will have its own set of management strategies. Overall, achieving control of *Fusarium graminearum* species complex is very challenging and in most cases integrated management strategies are the best way to prevent infection of the crops. Each control strategy has a level of effectiveness towards the control of *Fusarium graminearum* species comlex infection (**Table 5**).

> Insects and birds that feed on the mature grain can expose the ear and make it more susceptible to infection of the fungal pathogen through the wounds.

# Highly effective control strategies

Crop rotation

Fields that are grown in monoculture or rotated with similar crops result in crop residue from host plants, enabling the pathogens to overwinter on their crop of choice.

#### Crop residue management

Crop residue from the previous seasons will serve as the primary inoculum source for new infection in the growing season. In order to lessen disease, the residue can be physically removed, tilled into the field or be treated with microbial agents that aid in decomposition.

# Harvest time and storage

Late harvest poses a high risk and it is therefore important to choose cultivars that are adapted to local climatic conditions. Moisture should be restricted to a minimum during storage, so grain can be dried to less than 15%. Good storage practices such as appropriate temperature and moisture content, as well as insect control, aeration and clean bins should be maintained.

#### Insect control

Both the maize stalk borer (*Busseola fusca*) and spotted stalk borer (*Chilo partellus*) are linked to an increase in *Fusarium* spp. infection as the feeding wounds create openings for the pathogens.

### Medium effective control strategies

Good nutrient supply

High levels of nitrogen and low levels of potassium can predispose the maize plant to *Fusarium graminearum* species complex infection.

*Table 4: The distribution of the three* Fusarium graminearum *species complexes that infect sorghum in South Africa.* 

Provinces	Fusarium graminearum species complex				
(sorghum)	F. meridionale	F. acacia-mearnsii	F. cortaderiae		
KwaZulu-Natal	х	х	х		

Table 5: Tentative ranking on effectiveness of management factors on Fusarium graminearum species complex infection.

Management factors	Impact on ear/kernel/grain rot reduction			
Preventive control				
Crop rotation	High			
Crop residue management	High			
Harvest time and storage	High			
Good nutrient supply	Medium			
Varietal choice	Medium			
Seed quality	Low			
Sowing time	Low			
Crop structure	Low			
Direct control				
Insect control	High			
Weed control	Low			
Chemical disease control	Low			

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# Varietal choice

There seems to be two types of hybrids that are more susceptible to Fusarium and Gibberella ear rot, namely those cultivars with vertical ears that have poor ear cover and those with tight ear husks, respectively.

# Low effective control strategies

Seed quality

Although seed quality has a minimal effect on *Fusarium graminearum* species complex infection, it should be of the best quality and free of disease.



Visible fungal growth observed on infected sorghum grain. Photo: Neal McLaren

#### Sowing time

Early planting usually escapes the worst infection.

#### Crop structure

High plant density favours disease development.

# Weed control

Although weeds have a low effect on *Fusarium* graminearum species complex disease development, it may serve as an indirect control measure by increasing the humidity in the field.

### Chemical disease control

Chemical control can be applied when *Fusarium* spp. systemically infects the maize plant early in the season. However, this does not work later in the season. Presently, there is no fungicide known to control *Fusarium graminearum* species complex.

# **Future research**

Present research is performed in collaboration with researchers at Stellenbosch University in order to better understand the disease complex. The factors that are investigated include inoculum build-up (of the fungal isolates), pathogenicity of the *Fusarium graminearum* species complexes, epidemiology of species in the specific plant tissues, as well as development of management strategies.

The information will help to improve existing management strategies and will help to give more specific information to producers in order to prevent *Fusarium graminearum* species complex diseases to break out.

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Article submitted by Christin Hunter, Communications manager, PANNAR Seed. For more information send an email to christin.hunter@pannar.co.za. VIEWPOINT

# The Corner Post

# EDWIN MAHLATSI Forget your age and live life to the fullest

here is an old saying that age is just a number. Edwin Thulo Mahlatsi, from Bothaville in the Free State, fully agrees with this statement. At the age of 75, he became the 2017 Grain SA/Absa/ John Deere Financial New Era Commercial Farmer of the Year – which just proves that success can come at any age.

# Turning stumbling blocks into stepping stones

Being a farmer at heart, Edwin had to work hard to realise his lifelong dream of becoming a commercial producer. He was born on 2 August 1942 on a farm in the Bothaville district. Both his parents were farm workers and after passing Grade 6 he started working on the farm as well. When the farm was purchased by Frikkie Rautenbach, Edwin stayed on as a farm worker. He says Mr Rautenbach bought him with the farm.

In 2012, his employer helped him to obtain a lease agreement on a farm through the government's Proactive Land Acquisition Strategy (PLAS) programme. The 463 ha farm, Swartlaagte has 208 ha of arable land with 255 ha of grazing. Rautenbach subsequently made farming equipment, a tractor and inputs available to Edwin on a barter deal. Unfortunately, Frikkie passed away in 2014 and the equipment was put into the estate. Edwin was left with no work, no implements or income and no production capital.

This is when he became a member of Grain SA and enrolled in the Grain SA Farmer Development Programme. He joined the Bothaville Study Group, attended farmers days and has completed several training courses which include 'Introduction to Maize Production' and 'Farming For Profits'. Edwin is full of praise for the Grain SA team as they assisted him to make the most of his 210 ha of good, arable soil. They also supported him to get government funding and showed him how keeping up with the latest farming techniques and agricultural technology can aid him to achieve better results than in the past.

# **Dreams become reality**

On Swartlaagte teamwork is important and early morning briefing sessions are held to plan the day's activities. Thulo's daughter, Doreen, is also part of this farming enterprise and together with local farmer and Grain SA mentor, Christiaan Bouwer, they tackled the challenging 2015/2016 season. Despite the severe drought Edwin still managed to harvest 250 tons of maize. This year, he has yielded a substantial 5 and a half tons/ha. It was in deed a festive occasion with Adam, Edwin's son, taking time out of the office to be with his family.

Edwin was part of the 2015/2016 Recapitalisation Project managed in partnership with the Department of Rural Development and Land Reform and Grain SA. The grant he was given enabled him to purchase the necessary implements. With his own equipment, he is able to do timely soil preparation, spraying and planting with only the harvesting done by a contractor. Soil analysis is done and used as a departure point for production.

# A role-model to many

The review panel, who visited his farm in 2017 described Edwin as a very knowledgeable man who has a passion for agriculture. Edwin received his award as the 2017 New Era Commercial Farmer of the Year at the Grain SA Producer of the year function held on 13 October 2017 in Johannesburg. Mr Johan Kriel (Development Co-ordinator, Grain SA) who was the interpreter during Edwin's acceptance speech said that Edwin and his family are phenomenal people.

Mr Danie van den Berg (Development Co-ordinator), who evaluated this passionate farmer mentioned that Edwin has farming running through his veins. He has been involved in farming from a very young age and was coached and My success I attribute to the fact that agriculture is all I know. Grain SA has been there for me with training and support. They have helped me to become part of the Recap Project and blessed me with a mentor who is so good. My neighbours also help me a lot.

trained by a well-known farmer in the Bothaville district for a period that spans over 40 years.

About his success, this humble farmer says, 'My success I attribute to the fact that agriculture is all I know. Grain SA has been there for me with training and support. They have helped me to become part of the Recap Project and blessed me with a mentor who is so good. My neighbours also help me a lot.'

Edwin is motivated by the dream to be successful and he says that the accumulation of knowledge about agricultural practices is one of his strong points. The fact that he is blessed with good health and a wonderful support system, not only at home and in his own community, but all over the agricultural sector. He hopes to make a difference in the lives of people and animals who are hungry and suffering for many years to come.

With Grain SA's help this 75-year old farmer bought himself a brand-new Isuzu bakkie in 2017 – it is the very first new vehicle he has ever owned! This goes to show you are never too old to dream, because dreams do come true, no matter what age you are!

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.





