PULA IMVULA

GRAIN SA
GRAAN SA

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

MONSANTO

PULA IMVULA

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NKGONO JANE SAYS...

IN THIS ISSUE...

"Each of us must work for his own improvement and at the same time share a general responsibility for all humanity". Marie Curie.

This is the quote for this Pula Imvula – is this not amazing in the context of farming and farmer development? Remember that as we each work towards our own improvement (with regard to production practices), we are also taking responsibility for 'all humanity' in that it is the farmers who feed 'all humanity'. How blessed we all are as farmers to be making a difference in the lives of people all around the world. May we never forget that farmers feed and clothe 'all humanity'.

February is usually a quieter month on a grain and oil seeds producing farm as there is not much more that you can do to the crop except just wait for the seed to develop and ripen. However, this is different on the winter cereals crop farms where the farmers are preparing for the next crop. For those who are resting and waiting for the crop to ripen, this is a good time to look at the lands and see what you have done well, and what you can perhaps improve upon next year. How was the plant population, are there any visible signs of nutrient deficiencies, what weeds are present and how do you plan to control them?

For the summer crops, the supply and demand has a huge impact on the price that you get for your grains – the larger the crop, the lower the price is likely to be. It is therefore most important that you get good advice from someone that you can trust about the marketing of your grain – it is always good to contract some of your grain for in case the price drops badly and you may not be in the financial position to store your grain. Remember always to find someone that you can trust – not everyone is your friend!

Grain SA will be holding regional meetings this month – if you can, please attend those meetings as you will get valuable information, and you could be selected to be a delegate to the Grain SA congress which is held in Bothaville during the first week of March each year.

I do hope that you have received good rains and that you are also preparing for a good harvest.

MAIZE MARKETS – a challenging field for experts and farmers

Have a look at the following headlines written in the media during 2014:

- South Africa is set to produce its largest maize crop in 33 years!
- A bumper harvest has seen prices of the country's staple diet fall in the past three months…
- Lower prices are not good news for everyone, especially farmers who have not taken out contracts to protect their prices!
- South African farmers needed to devote more time to managing the prices they were able to get for their crops by hedging their production.

Maize production in South Africa has increased considerably over the past ten years and the Bureau for Food and Agricultural Policy (BFAP) says this trend looks like it will remain for the next few years.

> *"The key to success is being informed every day and learning to pick the brains of experts who work in the markets on a daily basis.*

What this means for the maize producer is there is increased pressure to concentrate on how, why, when and where the maize is marketed off the farm – and in truth there is no easy answer! The maize price is highly volatile and can fluctuate dramatically within the space of weeks – and sometimes even from one day to the next. Marketing your maize is a challenge, but farmers have to monitor the price trends and learn how to make the best decisions possible of when to sell – and even though the prices may climb after you have sold, it is important to be at peace about the reasons why you made your decision to sell when you did.

The key to success is being informed every day and learning to pick the brains of experts who work in the markets on a daily basis. Every farmer needs an open communication channel with his trader. It is not a privilege every farmer has, but another secret to successful marketing is having the freedom to sell only if you decide it's the right time – not if somebody else (e.g. your financier) decides you must sell!

> *"Maize production in South Africa has increased considerably over the past ten years and the Bureau for Food and Agricultural Policy (BFAP) says this trend looks like it will remain for the next few years.*

The main areas where the maize we produce is consumed could be: 1) for human consumption; 2) in animal feeds; 3) for the production of bio-fuel; and 4) for starch, which is processed into many diverse household items ranging from beer, syrup, polish, glue, ink, paint, cosmetics and aspirin.

The reality we face is there has been a significant decline in the amount of maize milled for human consumption. Many of the smaller millers in rural areas are finding it hard to make a living because more and more farmers are choosing to market their maize crop through the big co-operatives, to generate a cash income, rather than to store bags for the gristing

Import tariffs explained

In a nutshell an import tariff can be levied against any product coming into the country. It is an import duty or a tax that the importer has to pay to bring foreign goods into his country. The tariff varies depending on the product and how much protection the government of the day wishes to offer the same product being produced in the local arena. There is often a conflict of interests so heavy debates are held around the tariff structuring. For example local farmers don't want maize flowing into the country which would depress their prices so they would want the tariff to be as high as possible to deter imports of maize. But on the other hand, poultry farmers who wish to buy the cheapest maize possible may want low import tariffs to make it viable for them to import cheaper maize. The local maize import tariff has been free since 2006.

of their monthly rations over the course of the year. Furthermore the status quo at the moment is that the government has banned the use of maize for producing bio-ethanol fuels so that market opportunity is closed for now. Fortunately for maize producers the livestock industry is still using our maize and the animal feed consumption is on the increase.

South African maize growers are widely considered to be among the top producers in the world. Despite challenging growing conditions, we regularly produce far more tons than we can consume. Our annual consumption is around 9 million tons whilst production ranges between 12 - 14 million tons depending on the season.

Consequently South Africa needs to consistently find export markets for our product. If there is a constant surplus here, then the natural law of supply-and-demand kicks into action and oversupply will result in poor local maize prices. For this reason too, producers will always need to monitor the inflow of cheaper (and often inferior quality) maize being imported into the country. They can call for the import tariff to be raised in order to protect our produce against falling prices when other countries have a surplus and find a way to market into South Africa. (This is why we farmers pay our organisations like Grain SA to monitor and lobby on our behalf.)

The argument that the government must get cheap food for its people weighs against the argument that long term food security is only guaranteed if local farmers can keep their businesses afloat in the face of such volatile, insecure markets. To be sure, if there really is a food disaster those other countries will most certainly be holding on to their own food supplies – and then there will be big trouble for our national food security if local farmers have not been empowered to successfully produce food for our local markets!

Most maize producers deliver their crop to the nearest silos and co-operatives. Here the grain is received if it is dry enough and the sample is clean. The harvest will be graded and safely stored in the silos and from there it will be traded either locally or into international markets. The farmer must be certain that his crop is dry by the time he delivers it to the silos otherwise he will have to pay extra to dry the crop

> *"Farmers need to be particular about the quality of the grain which they deliver to the silos otherwise there will be additional costs to get the delivery clean.*

in grain driers as the silo manager cannot risk storing too damp maize which could become mouldy and spread disease though his stores. The same applies to the clean sample. Farmers need to be particular about the quality of the grain which they deliver to the silos otherwise there will be additional costs to get the delivery clean.

We are increasingly more dependent on finding international markets for our maize and therefore have to be vigilant to produce a top quality grain which those markets will find desirable. Farmers need to know what the market wants for example, there is a demand for non-GM maize and knowledge of this demand may encourage a farmer who sees an opportunity to export his own maize, to explore this market possibility. Grain traders who specialise in trading physical grain as well as agricultural derivatives on the futures exchange (JSE) also play a key role in the successful marketing of ones' crop. This trading environment is highly specialised and will be examined more closely in a future article.

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

"Each of us must work for his own improvement and at the same time share a general responsibility for all humanity".

~ Marie Curie

Post-emergence herbicides for MAIZE

The previous article discussed the general principles of an integrated pest control management programme within the various cultivation options including full tillage and minimum or conservation tillage methods.

Post-emergence control of weeds takes place after the crop has germinated and has emerged through the planting bed. The post-emergence control programme must be planned long before the planting season and be part of the whole weed control programme. The methods used could include mechanical cultivation between the rows as well as row applied chemicals or a full swath spray covering plants and rows.

The choice of the ideal option for your operation is further complicated by the planting of herbicide and insect resistant hybrid trans genetic maize cultivars or the traditional naturally selected hybrids. The creation of the weed chemical resistant cultivars is the result of the transfer of one or more genes from different plants or organisms to produce the desired resistant effects in the maize plants.

> *"The effectiveness of your spray programme will be influenced by environmental conditions, rates used, application techniques and severity and range of the weed infestation to be controlled.*

Maize cultivars that have been developed that are resistant to various herbicides are IMI maize that has a tolerance to imidazolinone and sulphonamide herbicides, GR maize is genetically engineered to allow over the top applications of glufosinate and RR maize allows post-emergence applications of glyphosate type directly to growing maize.

One must carefully consider whether or not resistant or traditional cultivars are suitable for your weed control programme. Critically compare and decide and whether or not there is a long term cost saving in seed, chemicals, diesel and the number of passes made through the maize production cycle.

> *Post-emergence control of weeds takes place after the crop has germinated and has emerged through the planting bed. The post-emergence control programme must be planned long before the planting season and be part of the whole weed control programme.*

Smaller farmers might find it is too expensive to change over to minimum tillage with respect to buying the right planters and modern spray rigs.

Post-emergence maize herbicides available

Always remember that no one herbicide programme is best for all farming situations. Continued reliance on a single programme repeated year after can lead to severe weed resistance problems. In some areas weeds have built up a resistance to the triazine group of herbicides.

The effectiveness of your spray programme will be influenced by environmental conditions, rates used, application techniques and severity and range of the weed infestation to be controlled.

There are a minimum of a 110 different combinations of active herbicide chemical ingredients that use a single chemical or a combination of 2,4 -D amine, nicosulfuron, atrazine, iodosulfuron, isoxaflutole, s metolachlor, bromoxynil, acetochlor and many others. This short list illustrates that a farmer must identify his problem weeds so that the optimum programme can be developed in conjunction with his herbicide and seed supplier and the relevant consultants. There are literally thousands of combinations, pre-packaged mixes and co-packs available for conventional tillage or conservation tillage practices.

The “burn down” and post-emergence herbicides used kill weeds by burning the leaves, stopping the weed growth, twisting bending and cupping of foliage, whitening of plant tissue and control both broad leaved weeds and grasses.

Be aware that each chemical or chemical combination must be applied according to strict guidelines in which the growth stage of the maize plants in conjunction with the growth stage of the weeds is taken critically into account. The soil type and clay content of the soil will also affect the concentrates of chemicals used.

In a conservation tillage programme the amount of previous crop residues still found on the soil surface will also determine the effectiveness of the post-emergence spray programme.

Considerations for livestock

If your farming operation is conducted with pastures and cropping lands close together, be aware that cross drifting sprays onto maize or pastures can be poisonous to livestock. For instance the withdrawal period and recommendations for a widely used herbicide such as glyphosate is 50 days and post emergent gramoxone applied to maize is “do not graze” and in the case of silage is “do not feed”.

Conclusion

As a farmer be aware of the nature of chemicals that are suitable for your specific production programme and take care to use the optimum required to cost effectively control the problem as well as keeping in mind the need to protect our environment from overuse of chemicals and for future generations of farmers.

Article submitted by a retired farmer.

Monsanto supports youth in agriculture

MONSANTO

Buhle Farmers’ Academy (BFA), founded by Monsanto’s Food Health and Hope Foundation® in 2000, is an agricultural training institution funded by the Monsanto Fund® and various other donors. BFA offers AgriSETA accredited courses in basic vegetable, crop, livestock and poultry production; nutrition and project management courses, to name a few.

Monsanto is a committed sponsor of the bi-annual BFA Graduation and the awards sponsored by Monsanto to top-performing graduates include premium DEKALB® cultivars like DKC78-45BR GEN® and leading herbicides like Roundup PowerMAX® per award recipient.

The most prestigious award of the BFA graduation is the Star of Buhle Award, a recognition award presented to the most progressive alumni. A co-operative of seven farmers from BFA’s 2007 alumni group, GSG Ithuba Group farming in Ekhuruleni, received this award at the June 2014 graduation. GSG farms 3 000 ha of land, with over 150 and 80 cattle and sheep, respectively, as well as grazing land which they lease in exchange for weaners (having acquired 43 pure bred Beefmaster weaners from this). Dudu Sibaya, from Mpumalanga, walked away with the November 2014 award for her outstanding dedication to her 903 ha farm that she received from the Mpumalanga Department of Land Affairs. Dudu, a multi-business woman, started farming in 2009 and now has a self-funded operation of over 30 mixed breed beef cattle; 2 000 broilers per cycle; and over 100 ha of soybeans.

Monsanto’s Andrew Bennet, Technology Development Lead, addressed the graduates encouraging them to be the custodians that will move Africa towards sustainable agriculture and food security.

Article submitted by Clara Mohashoa, Marketing Communications Assistant, Monsanto. For more information, send an email to clara.mohashoa@monsanto.com.

A brief overview on local maize prices

Agriculture is generally an uncertain/risky business. Farmers face multiple challenges, from inputs, weather and crop yield, to harvesting and selling of produce at fair prices. South Africa produces a number of commodities, but this article will focus on maize, specifically the fundamental factors behind maize price movements. This topic has recently generated interest, especially after maize prices reached high levels between November 2013 and February 2014.

There are a number of factors that influence maize price movements, but the fundamental factors are domestic weather conditions, supply and demand, exchange rate (that is, the value of South African Rand to the US Dollar), and Chicago Board of Trade (CBOT) prices. Generally, these factors drive maize prices on day to day basis. However, their impact is not always the same. A more practical example is that; between October and February annually, domestic maize price movements are to a large extent generally influenced by domestic weather conditions.

Putting the aforementioned into context, in the beginning of 2014 South African maize prices were at their highest levels due to increased buying appetite from countries such as Mexico, Zimbabwe, Taiwan and Japan. Additionally, there was an unexpected appetite from Zimbabwe, which totalled South Africa's exports to Zimbabwe at around 240 000 tons.

It is important to note that, at that time climatic weather conditions were expected to be the main driver of maize prices, but were outweighed by unexpected buying appetite and low old season stocks.

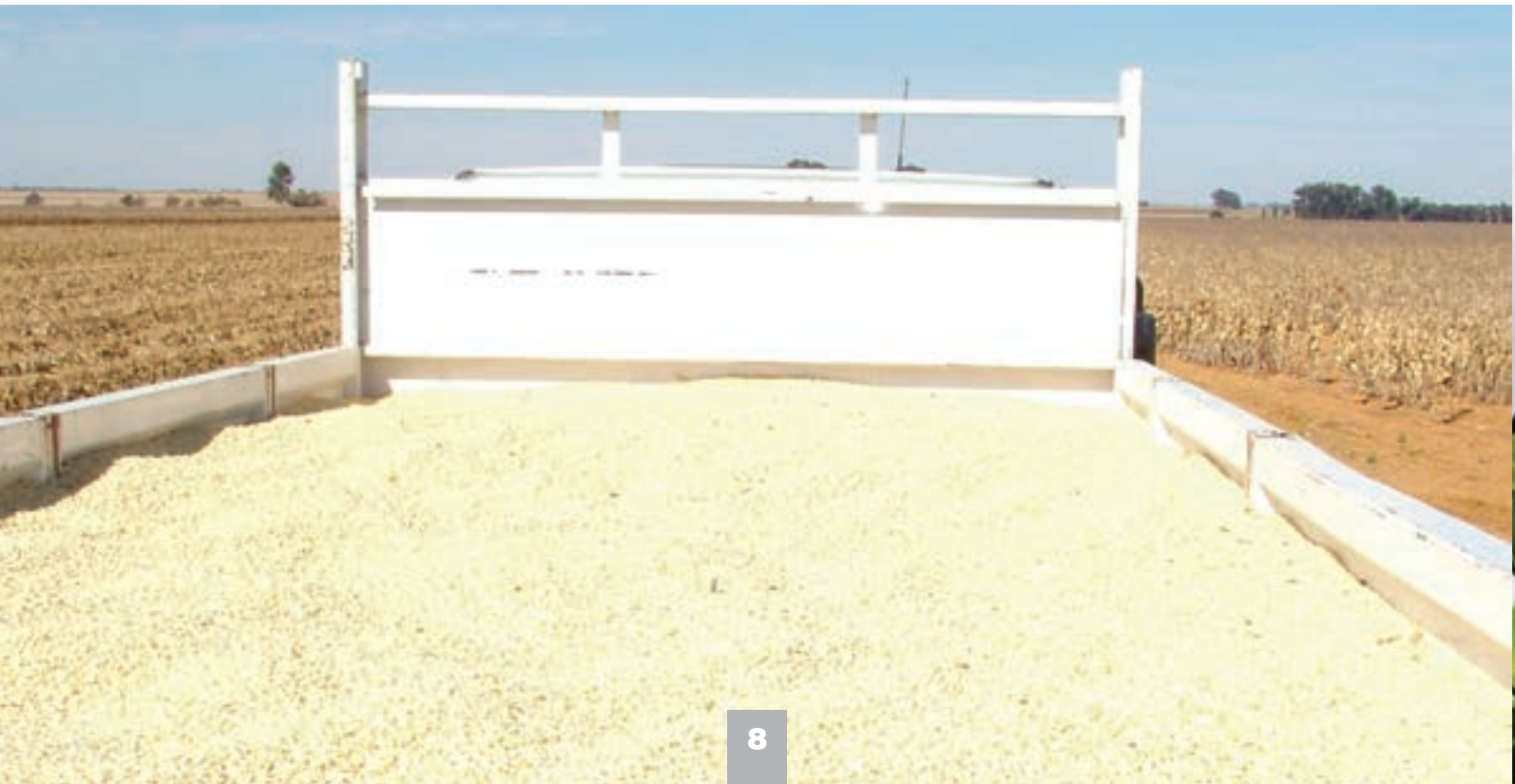
However, around May 2014, maize prices softened to the lowest levels due to increased harvest pressure. Additionally, 2014/15 marketing year had a big crop, estimated at 14,3 million tons, which further pressured the maize prices. Moreover, South Africa also experienced soft demand from traditional export markets, hence pushing down the maize prices. These factors are hoped to have briefly highlighted the dynamics of the maize markets.

Looking forward to 2015, the Crop Estimate Committee expects South Africa's total maize area plantings to slightly decrease by 3,3% year-on-year, to 2,6 million hectares. Moreover, throughout November 2014, there have been generally favourable climatic conditions across the country. If these favourable climatic conditions persist, the country might stand a good chance of receiving a good crop. Nevertheless, it is important to note that in Mpumalanga Province, the maize crop will be behind schedule due to delayed plantings which were caused by dry weather condition around October 2014. Assuming that conditions remain favourable, South African maize prices are expected to remain at soft levels, with additional pressure coming from soft prices in the CBOT at the back record United States crop.

> *"Producers are encouraged to consistently communicate with Grain SA Industry Service team on advice about market conditions as the season unfolds.*

Hereafter, producers are encouraged to consistently communicate with Grain SA Industry Service team on advice about market conditions as the season unfolds. Grain SA Industry service also sends out SMS's to the producers showing daily grain and oilseed price movements, as well as the morning and afternoon market commentary.

Article submitted by Wandile Sihlobo, Grain SA Economist. For more information, send an email to wandile.sihlobo@grainsa.co.za.



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CLIMATE – improve your efficiency by keeping records

We see it on the television and we read it in the newspapers, climate change is upon us. There is no denying the fact that we live in times of volatile climatic conditions. Even as I am writing this now, midway through summer I am wrapped up in a big jacket as if it were a winter's afternoon. The change in weather and climate has a huge effect on farmers and agriculture as a whole.

It has already been predicted that farmers will need to look at adjusting their threshold planting dates in order to fit in with the altering climate. Be that as it may, the fact of the matter is that we need to keep our farming operation tuned in to what is happening in our atmosphere. Weather patterns are continuously changing, for this reason we need to make an effort to understand how it is changing and why. For the farmer the best method to keep track of these changes from year to year is to do our own personal weather keeping record. By making this little effort, we can achieve a whole lot of advantages on our farms.

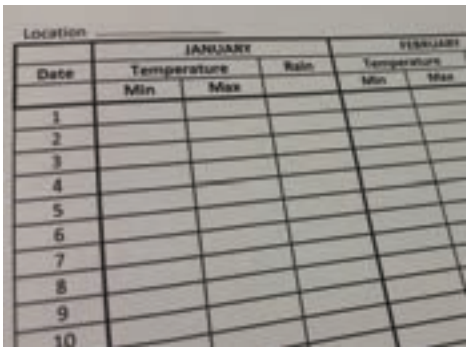
How to keep good records

Weather records should not be done on the back of a cigarette box, but rather with precision on the computer or in a proper record-keeping book. The point of keeping weather records is to look back on them and to analyse trends and patterns.

To measure rain, it is a good idea to have a few rain gauges scattered around on the farm in order to get a good average of the rainfall that you are receiving. You will be amazed at how varied the measurements will be over a short distance. Make sure that the gauge is not obstructed by anything like buildings or trees and that the gauge is fastened to the top of a pole and not a little way down it as the protruding bit of pole will obstruct rainfall. Always record the rainfall on the day that you receive it as you may forget to log it in. Monthly rainfall can be converted into a graph which makes it easy to view trends and patterns. It is also very useful to record unusual weather such as hail or snow or the sighting of uncommon phenomenon's such as tornados, extreme winds or localised flooding.

> *"Weather records should not be done on the back of a cigarette box, but rather with precision on the computer or in a proper record-keeping book. The point of keeping weather records is to look back on them and to analyse trends and patterns.*

The weather which you receive on your farm may be a lot different compared to your neighbours even though geographically you may be in the same climatic zone. My neighbour always seems to receive a few millimetres less rain than I do and I am led



to believe that it is due to a slight variation in altitude as well as a big hill on my farm which I believe creates a friction in the clouds causing them to rain down a little more. This is just a theory but by keeping my record of the rainfall I have been able to analyse the data and form my own theories.

By keeping an eye on the weather records we are able to plan our farming operations much more efficiently. We can set planting dates that according to our records will most likely be a good time to plant with sufficient moisture. Obviously the weather is never and will never be totally predictable. But we will always be able to have some kind of rough idea as to what will happen. This ability is an advantage that we as farmers need to grab a hold of – so start your own logbook now!

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

CONSERVATION AGRICULTURE – the solution for mixed farming in marginal grain areas

After Manus Fouché had visited his son, Francois, in Australia in 2005, he viewed conservation agriculture in a different light. On his return he started to experiment by adapting his own planter, but he could not find any assistance in his area.

Later he saw an example in Swellendam (Donald Buxton of Alpha Engineering), borrowed a unit and mounted it on his planter. It worked well and he then ordered all the units for a full no-till planter on an Agrico chisel-plough framed that had been enlarged (see **Photo 1**).

They then spent a lot of time and money and experimented to develop the right system. Initially Manus learnt the most through communication with and information he received from Francois from Australia.

There Francois contacted experts from whom he learnt the science behind conservation agriculture and at the same time he saw good examples on farms. Francois had also started working on a farm that applied conservation agriculture and followed the major debates on row widths and tines versus coulters.

These debates included arguments like coulters packing mud and tines dragging crop residue.

Controlled track traffic

In Australia Francois also learnt about controlled track traffic and stubble that had to be upright. The most important decisions regarding this system are: Select a combine harvester, build a planter on the same row width and move all the other implements in the same tracks.

Francois mentions that controlled track traffic alone leads to a 10% increase in yield because densification is then concentrated only on tracks, stubble protects the groundwater and the root system improves the soil biology.

His advice is to plant right next to the previous row (winter crops between summer crop stubble and summer crops between winter crop stubble), otherwise the root system and standing stubble are destroyed. The latter also creates shade, which helps to provide a favourable environment for the small plants (see **Photos 2a and 2b**).

"Everything that affects soil health is important to us, particularly crop rotation and ground cover, and that is what we are working towards," Francois emphasised.

Some Australians regard controlled track traffic as more important than anything else in conservation agriculture, particularly because it has such major benefits. Western Australia has virtually pure sandy soil (close to sea sand) where controlled track traffic and no-till planters

Table 1: Three different crop cultivation systems on the farm Fennysdale, Zastron.

Crop 1	Crop 2	Crop 3	Crop 4	Crop 5	Crop 6	Crop 7
Crop: Soy **Plant date:** 15 Oct - 15 Nov **Plant population:** 300 000 - 450 000 **Row width:** 0,914 m *** Harvest yield:** 1	**Crop**: Soy **Plant date:** 15 Oct - 15 Nov **Plant population:** 300 000 - 450 000 **Row width:** 0,914 m *** Harvest yield:** 1	**Crop**: Maize **Plant date:** 20 Nov - 15 Dec **Plant population:** 18 000 - 20 000 **Row width:** 0,914 m *** Harvest yield:** 2 - 3	**Crop**: Maize **Plant date:** 20 Nov - 15 Dec **Plant population:** 18 000 - 20 000 **Row width:** 0,914 m *** Harvest yield:** 2 - 3	**Crop**: Oats/wheat **Plant date:** from 15 Feb **Plant population:** 30 kg/ha - 40 kg/ha **Row width:** 0,457 m *** Harvest yield:** 1	**Crop**: Sunflower **Plant date:** around 15 Dec **Plant population:** 36 000 **Row width:** 0,914 m *** Harvest yield:** 1	**Crop**: Oats/wheat **Plant date:** from 15 Feb **Plant population:** 30 kg/ha - 40 kg/ha **Row width:** 0,457 m *** Harvest yield:** 1
Crop: Radish **Plant date:** end Jan **Row width:** 0,457 m Used for grazing	**Crop:** Maize/sorghum **Plant date:** 20 Nov - 15 Dec **Plant population:** 18 000 - 20 000 **Row width:** 0,914 m * **Harvest yield**: 2 - 3	**Crop:** Lucerne **Plant date:** April **Plant population:** 3 kg/ha Used for grazing and settled for five years to improve soil	**Crop:** Wheat **Plant date:** from 15 Feb **Plant population:** 25 kg/ha - 30 kg/ha **Row width**: 0,457 m * **Harvest yield**: 1 Wheat crop residue is used for grazing			
Crop: Lucerne **Plant date:** April **Plant population:** 3 kg/ha Used for grazing and settled for five years to improve soil	**Crop:** Maize **Plant date:** 20 Nov - 15 Dec **Plant population:** 18 000 - 20 000 **Row width:** 0,914 m * **Harvest yield**: 2 - 3					

**** Average long-term crop yield (ton/ha)***

Table 2: Fertiliser application levels on the farm Fennysdale, Zastron.

Crop	N (kg/ha)	P (kg/ha)	K (kg/ha)
Maize	29,5	14,7	0
Sunflower			
Sorghum	22,7	11,3	0
Soybeans			
Oats	9,7	4,9	2,4
Wheat	5,5	11	0
Radish	16	10,7	5,3
Lucerne	5,5	11	0

with coulters (cutting wheels) are employed with great success. The improvement brought about by conservation agriculture in different soils was the same – from pure sand to clay.

The Australian conservation tillage system is based on the following five practices: soil health (soil chemistry, soil structure and soil biology in balance, and also in balance with one another), controlled track traffic (preserve crop residue, ground cover and planting between rows), crop rotation, weed control and minimum soil disturbance (by using coulter planters).

"We would really like to make controlled track traffic work here. We believe this can make things easier – the tractor driver drives only on the tracks and not everywhere in the field, which causes densification" – this is Francois's vision.

Soil information

The marginal soils in the grain fields of the South-eastern Free State vary a lot and must be identified and managed carefully. The Fouchés started by identifying the limitations of their soils and improving them, for example through soil analyses and precision applications of lime (dolomite), gypsum and fertiliser mixtures. The soils on average have 13% clay in the topsoil. Soil in better fields are monitored through observations on every 4 ha. Fertiliser application is based on soil analyses and crop needs. The next step will be to properly establish controlled track traffic to improve soil health.

Crop cultivation systems

In the past the Fouchés planted mainly oats, but realised that crop rotations were essential to combat densification. As stock farmers they should try to protect crop residue (see **Photo 3**).

They first introduced sorghum and maize, and later also radishes, soybeans and sunflower to the crop rotation. According to them an important rule is to start with crops that you know work in the area (or on your farm) (see **Photos 4a to 4c**).

Their end goal is to develop the right crop rotation programme that can reconcile conservation farming with a stock factor. Francois is convinced that the planting of cover crops after the summer crops have been harvested (to get more material on the fields) will also play a major role in integrating the stock factor successfully with conservation farming.

He is also of the opinion that permanent grazing with multi-species legumes and grasses can also have a major impact on this integration. He says that when you want to apply conservation farming in a stock farming setup it will be important for manage the stock in the fields correctly to get the maximum potential from your fields and stock.

The Fouchés' crop cultivation systems are a good example of a very diverse system and are described in **Table 1**. Such diversity in crop cultivation is regarded as the 'engine' of sustainability.

Profitability

According to the Fouchés the biggest saving is derived from tractor hours, time in the fields and labour. It has been calculated (in Queensland, Australia) that a 24-row (12 m) coulter (disc) planter can work at a planting speed of 18 km/hour and with a diesel consumption of 3 litres/ha - 3,5 litres/ha.

Photo 1: Home-built Agrico chisel-plough frame with (yellow) tine units by Alpha Engineering in Swellendam.

Photo 2a: Oats (winter crop) growing between maize stubble (summer crop).

Photo 2b: Sunflower (summer crop) growing between oats stubble (winter crop).

Photo 3: Oats 18" rows @ 40 kg/ha between oats crop residue.

Photo 4a: Wheat 18" rows @ 23 kg/ha between wheat crop residue.

Photo 4b: Sunflowers 36" rows sprayed with paraquat between the rows.

Conservation agriculture – the solution for mixed farming in marginal grain areas

Conservation agriculture innovators:
Manus and Francois Fouché

Name of farm:
Fennysdale

District:
Boesmanskop/Zastron, South-East Free State

Mean annual rainfall:
600 mm

Photo 4c: Grain sorghum 36" rows @ 76 000 plants/ha.

Table 3: Weed management programme on the farm Fennysdale, Zastron.

Spraying session	Type of substance
Maize pre-plant	Glyphosate (Roundup Turbo)
Maize on planting	Guardian Vantex Bio buffer 5
Maize 4 - 6 weeks post emergence	Roundup Power Max Harness Extra
Grain sorghum pre-plant	Glyphosate (Roundup Turbo)
Grain sorghum on planting	Guardian Vantex Bio buffer 5
Grain sorghum 4 - 6 weeks after planting	MCPA Buctrill DS Parathion EC
Soy pre-plant	Glyphosate (Roundup Turbo)
Soy on planting	Metolachlor Vantex Bio buffer 5
Soy after planting	Roundup Power Max Vantex

To them, contours are a problem in conservation agriculture, as they concentrate water and waste a lot of time, diesel and space. The Fouchés therefore prefer to plant across the contours for greater efficiency and profitability.

Weed management

Their weed management programme is discussed in **Table 3**. Also see **Photo 5**.

Mechanisation

The mechanisation plan for this farm works as follows: for the winter crops they use a home-made planter with a tine from Alpha Engineering (see Photo 1). For summer crops they use a John Deere 1750 (6 row), which is a vacuum planter with a cutting disc. An Agrico three-point sprayer (10 m) of 1 000 litres is also used.

Photo 5: Sunflower 36" rows @ 36 000 plants/ha between oats crop residue 18" rows sprayed with paraquat between the rows.

As far as access to knowledge and information is concerned, the internet was and is the main source of information – particularly from Australia. Francois gained sound experience in Australia, which he is systematically integrating into their farming system. They are also members of the Boesmanskop Conservation Faming Study Group and although they communicate quite regularly, there is a need for more frequent meetings.

Nine of the members visited Queensland, New South Wales and Victoria in Australia in 2010 and returned with a lot of inspiration and knowledge.

"Go and have a look at people (producers) who make it work and visit Australia," is the advice the Fouchés offer farmers who are interested in conservation agriculture.

Article submitted by Dr Hendrik Smith, Conservation Tilling Facilitator, Grain SA, for SA Graan/Grain January 2014. For more information, send an email to hendrik.smith@grainsa.co.za.

Risk management on your farm

First of all what is a risk? A risk is the possibility that an unforeseen, unplanned, un-natural, out of the ordinary, un-expected event may occur and could cause a loss of some nature.

To refresh – remember as a farmer you are busy producing and marketing agricultural products with the aim of being financial successful.

How then does farming and risks relate to each other? When you commence with the production of any agricultural product you face possible risks. During the production process numerous events can occur such as extraordinary climatic conditions (droughts, flooding, hail, severe frost) and the occurrence of other disasters such as veldt fires and the outbreak of plant diseases and pests. Even during the marketing process, events may occur that could disrupt the marketing process and/or affect prices adversely. You may also experience unpredicted negative conduct by your staff such as a strike.

The occurrence of these events will cause a lower income and/or problems with maintaining a positive cash-flow position, thus affecting the financial success of your business. It is a fact that there is no other business as prone to risks as a farming business. Therefore it is absolutely necessary to manage your farming business in such a way that the negative effect of unforeseen events are at least minimised. Try to consider what you will do if a flood occurs, or a veld fire, or the outbreak of a pest, or you experience a drought and plan accordingly before the time. Also plan and implement measures to minimise the effect of risks.

For the purpose of this article let's focus on the production of crops. What can I do to minimise the effect of risk even though I cannot control them?

First of all, we all know the saying: "Do the basics right". In practice, with whatever you are farming with, do it as correct as possible. Prepare your lands correctly, plant at the correct depth and plant population, do proper weed and pest control. Doing the basics right will counter the effect of risks of the outbreak of diseases and pests and even drought. Strong healthy plants can withstand negative effects far better.

Do whatever you can to soften the blow of risks. Make the necessary fire breaks to at least give yourself an opportunity to fight an unexpected veldt fire. Attend to water runoff courses and contours to soften the damage of a sudden flood, attend to dongas, and divert runoff water from roads away from your lands.

Very important if possible – diversify your farm business into more than one enterprise, but bear in mind your managerial capabilities. Diversification entails a combination of farming enterprises that are not subject to the same risks. Diversify into crops that have different growth periods and are not equally susceptible to drought. Diversify by producing some products under irrigation and/or overhead cover. The addition of a livestock enterprise will have a great effect on lowering risk.

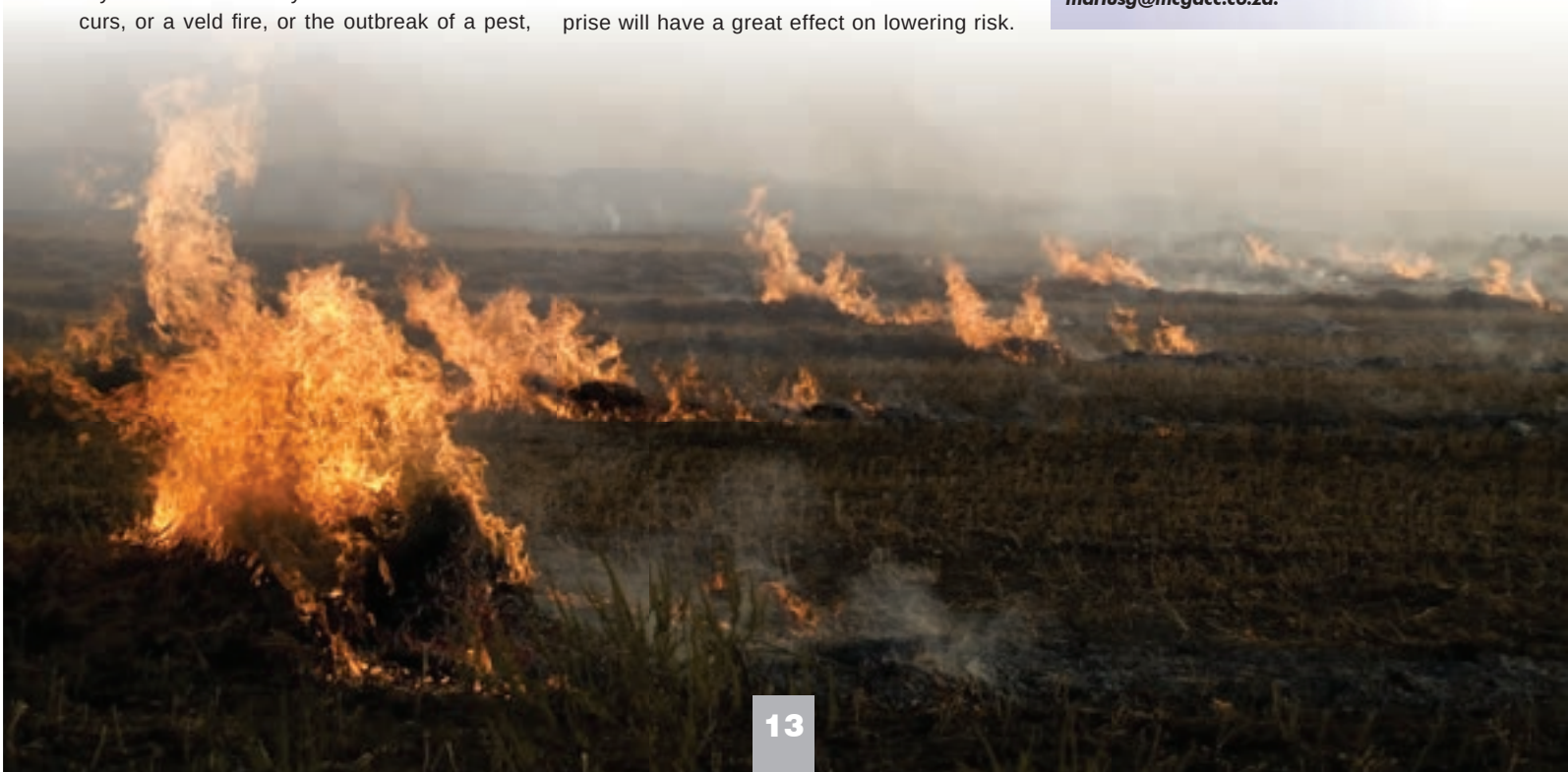
> *"A risk is the possibility that an unforeseen, unplanned, un-natural, out of the ordinary, un-expected event may occur and could cause a loss of some nature.*

The more diverse enterprises are the more risks are countered.

Also diversify your marketing strategy to address most of the price risks. As a rule of thumb attempt to market each of your products/crops in three different ways – it is possible especially if you can add value in one way or the other to a portion of your basic products. Be satisfied with a good average price rather than aiming for the highest price and end with the lowest price.

Thus by implementing the practical aspects correctly – production processes, water courses, contours, fire breaks – and by diversifying your enterprises and the marketing of all products you can go a long way to reduce the negative effects of risk.

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



Safeners against herbicides

Photo 1 and 2: Symptoms of damage caused by chloracetamides (alachlor, acetochlor, metolachlor) in maize are usually most visible on the coleoptile, the main absorption route of these herbicides during the stage when the coleoptile is extending underground. Photos: Charlie Reinhardt

With chemical crop protection the onus for crop safety is on the pesticide, and never more strongly so than in the case of herbicides. Because herbicides basically kill plants, expectations of the selective action of herbicides are high – something that is seldom, if ever, a strong consideration in insecticides and fungicides.

Herbicides for grass control in crops belonging to the grass family, like maize and small grains, and for the control of broad-leaved weeds in broad-leaved crops, for instance beans and sunflower, naturally have to possess some special property to avoid crop damage in these instances.

The next article in the series will look extensively at the selectivity of herbicides and the factors affecting this. At this stage the discussion focuses on chemicals that achieve the selectivity of herbicides by acting as safeners. Without a safener it would be impossible to use several very popular herbicides in major crops.

A safener is not an antidote in the true sense, since in contrast to an antidote to snake toxin, no antibodies are formed to break down the 'toxin' more quickly.

The action of safeners against herbicides is in most cases based on the stimulation of plant enzymes that are already present and that are responsible for breaking down (inactivating or neutralising) the herbicide in a plant.

Development of safeners

Safeners are used in conjunction with certain herbicides to protect the crop against the effect of the latter. Quite early (1960s to 1970s) in the development of herbicides experiments were conducted with the treatment of crop seeds with activated carbon, resins and certain types of clay to protect crop seeds against herbicides. The principle was that the herbicide would bind with the above substances and therefore not be available to be absorbed by the crop seed, but would be absorbed by the weed seed. Because of various practical problems, these physical barrier applications were not used for very long.

To mention only one problem experienced with the application of a physical barrier for crop seeds against the herbicide to protect the crop: pre-emergence application herbicides are absorbed in a very small measure by seeds, and plant roots and underground stems are the main routes of absorption for soil-applied herbicides.

It was therefore clear very soon that a physiological instead of a physical mechanism was required to protect the crop – protection against the herbicide within the plant system and not outside it would be the ideal solution.

The observation in the early 1950s of the antagonistic action between two closely related herbicides, 2,4-D and 2,4,5-T, led to the development of the first commercial safener, which was released in 1972. This safener, naphthalic anhydride, protected maize against the thiocarbamate group of herbicides, of which EPTC is the main member. EPTC is applied pre-emergence and mainly controls grasses and nut grass in a selective manner in a crop like maize.

In time R-25788 or dichlormid (N,N-diallyl-2,2-dichloroacetamide) became the safener for the herbicide EPTC and other members of the thiocarbamate group. PTC PLUS 720 EC (L4504, Villa Crop Protection) is an example

Table 1: Safeners against herbicides that are used worldwide in certain crops.

Safener	Herbicide	Crop
**Benoxacor*	*Metolachlor/S-metolachlor*	Maize
**Cloquintocet-methyl*	*Clodinafop-propargyl*	Wheat
Cyometrinil (Concep)	*Metolachlor*	Sorghum
**Cyprosulfamide*	*Thiencarbazone-methyl*	Maize
**Dichlormid*	*EPTC*	Maize
Fenclorim	*Pretilachlor*	Rice
Fluorazole	*Alachlor*	Sorghum
**Fluxofenim (Concep III)*	*Metolachlor*	Sorghum
**Furilazole*	*Acetochlor*	Maize
**Isoxadifen-ethyl*	*Tembotrione*	Maize
**Mefenpyr-diethyl*	*Iodosulfuron/Pyrasulfotole/Sethoxydim*	Wheat
Naphthalic anhydride	*EPTC, alachlor, metolachlor*	Maize
Oxabetrinil (Concep II)	*Metolachlor*	Sorghum

****Currently used in South Africa***

of a product that contains EPTC herbicide plus safener. The following information appears in the label under the heading 'Active ingredient':

EPTC (thiocarbamate) – 720 grams/litre; dichlormid – 76 grams/litre.

Uses

The action of safeners depends on specific combinations of herbicides and crops. For this reason the use of safeners is not common, but is limited to specific crop/herbicide combinations. In many cases the mechanisms according to which safeners work have not yet been fully identified, and research in this regard is ongoing.

Among all the safeners naphthalic anhydride is the most diverse, because it protects various crops against a wide range of herbicides. Among other things it protects maize against the thiocarbamates (such as EPTC) and the chloracetamides (for example alachlor and metolachlor). These days they are apparently obsolete and have been replaced by more effective substances.

Dichlormid is a multipurpose safener that has been proven to be effective against herbicides from four chemical groups: EPTC from the thiocarbamate group, alachlor and metolachlor from the chloracetamide group, sethoxydim from the aryloxyphenoxypropionate group ('fops'), and chlorsulfuron from the sulphonyl urea group.

Benoxacor is a relatively new safener that was marketed for the first time by Ciba-Geigy (currently Syngenta) in 1987. It protects maize in particular against metolachlor and S-metolachlor in a wide range of environmental conditions that can affect herbicide action. Benoxacor is not used to treat seed like certain other safeners, but is an integrated part of the herbicide formula.

The special effectiveness of benoxacor is indicated by its relatively low concentration in the metolachlor-containing product METOLACHLOR 915 EC (L7841, Villa Crop Protection), which contains 915 grams per litre metolachlor and 32 grams per litre benoxacor as active ingredient. The recommended dosage of 1 litre of product per hectare means that as little as 32 grams of benoxacor, spread over 1 hectare, offers good protection for maize, which would without it have been damaged and killed.

Restrictions on use

Napthalic anhydride is effective only if it is used to treat seeds, as application to soil causes weeds to be protected against the herbicide as well. In contrast, dichlormid provides good protection for the crop after soil application, and it can therefore form part of the herbicide formula that is applied to soil pre-emergence. The same applies to benoxacor.

Without exception, safeners protect grass crops against grass herbicides, and although these crops are among the most important in the world, the use of safeners indicates limited

Safeners against herbicides

application of safener technology to date – see **Table 1.**

Cases have been recorded where a difference in the leaching ability of herbicide and safener have led to damaged crops. If the safener were to leach more readily than the herbicide in the soil environment, there would be a risk of crop damage because the essential herbicide: safener ratio has been disturbed by the difference in leaching. In such a case too little safener in proportion to the herbicide is available for plant absorption and crop damage is therefore a threat. The safeners generally used all have some restrictions on their use, for instance that they are crop and herbicide-specific, and there are also restrictions on the method of application. The challenge is to develop new safeners that have a wide application in the field.

> *"The action of safeners depends on specific combinations of herbicides and crops. For this reason the use of safeners is not common, but is limited to specific crop/ herbicide combinations.*

How safeners work

The evidence that safeners cannot reverse crop damage caused by herbicides, but can prevent damage from occurring in the first place, lies in the fact that for safeners to be effective, they must be applied either before the herbicide (seed treatment), or with the herbicide (part of the product formulation).

After decades of research, opinions on the mechanisms through which safeners restrict the action of herbicides and thus protect the crop still differ. However, reasonable agreement exists on the ways in which the safener suppresses the action of the herbicide.

Evidence exists that absorption by plants and the subsequent translocation of herbicides in the plant are inhibited by safeners, so that the herbicide gets to the seat of action in smaller quantities and/or more slowly and thus sacrifices activity. It was also found that safeners can cause the seat of herbicide action (e.g. an essential enzyme) to be blocked, so that the herbicide cannot act at all.

The mechanism of herbicide inactivation about which everybody agrees is the formation of a bond between the herbicide and the enzyme glutathione-S-transferase (GST), which deactivates herbicides by breaking them down. Safeners stimulate the action of GST so that the herbicide is broken down more quickly.

The GST enzyme is concentrated in the outer cell layers of the coleoptile (leaf winding that encapsulates the growing point below ground) of the grass seedling, which is the main route of absorption of chloracetamide (acetanilide) grass herbicides like alachlor, acetochlor and metolachlor. If the safener does not work adequately, the coleoptile is the first to show the damage of the herbicide – see **Photo 1** and **Photo 2**.

Major grass crops are much better equipped with the GST enzyme than most weeds and broad-leaved crops, and this explains why safeners can be applied to these types of crops – see **Table 1**.

Another major enzyme system involved in the inactivation of herbicides by safeners is cytochrome P450. Its stimulation by certain safeners breaks down herbicides very quickly through the process of oxidation (addition of a single oxygen atom to the herbicide molecule).

Extremely innovative developments in the field of crop protection against herbicides are foreseen for the future. One exceptional possibility is the transfer of genes that produce enzymes that, in turn, inactivate herbicides to bacteria that live on and in plant roots and subterranean stem parts. These bacteria would then in effect sieve out herbicides and prevent toxic quantities from penetrating a sensitive crop.

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Article submitted by Prof Charlie Reinhardt, Extraordinary Professor: Weed Science, Department of Plant Production and Soil Science, University of Pretoria, and Dean: Villa Academy, for SA Graan/Grain January 2014. For more information, send an email to dr.charlie.reinhardt@gmail.com.

Watch out for the maize root worm

The maize root worm (Buphonella sp.) was reported in South Africa for the first time in 1959, and in 1977 an outbreak was investigated for the first time. This lesser known pest was reported in the past in KwaZulu-Natal (Vryheid, Blood River, Greytown and Howick) and Mpumalanga (Bethal and Piet Retief). However, a case was recently reported in North West in the Koster district, where up to 42% of the seedlings in fields were damaged (**Photo 1**).

Photo 1: Damage occurs in patches in the field.

Photo 4: A pupa.

Photo 2: A typical maize root worm.

Photo 5: Visible supraterranean damage.

Photo 3: Larva forming a pupal case.

Photo 6: Subterranean damage.

In this case the environment also played a major role, as the damage occurred in a newly prepared field that had been a grass field in the past. As soon as grass fields are destroyed, there is no longer a source of food and this probably led to the maize root worms attacking the crop. The planting was also done without seed treatment, which might have alleviated the attack.

The maize root worm (**Photo 2**) is the larval stage of a beetle. However, the beetle itself does not harm maize. The beetle is a dark grey colour and the females become up to 7 mm long and 2,3 mm wide. The males are usually smaller. Eggs are a pale orange colour, oblong and approximately 0,9 mm long and 0,6 mm wide. The larvae are butter yellow and cylindrical in shape. The fully grown larvae are approximately 10 mm long. The head and upper side of the final abdominal segment is dark brown, while the rest of the body had light-brown spots.

The eggs are laid singly or in groups of twelve alongside grass roots or just below the soil surface. A female beetle can lay up to 30 eggs, which take about 15 to 18 days to hatch. During the winter months the eggs are dormant and only hatch in spring.

These newborn larvae then bore into the underground stems of the seedling. The larvae moult three times, after which pupal cases (**Photo 3**) are formed in the soil. The pupal stage (**Photo 4**) lasts 7 to 19 days. There are three to four generations per year and beetles are particularly abundant where there is thick grass in fields, and also where maize plants were attacked by maize root worms earlier in the season.

Maize seedlings can be damaged to such an extent that the plant establishment is reduced to the point that the maize has to be replanted. Plant establishment can be reduced by as much as 80%, but the infestation usually occurs in patches in a field.

This pest is particularly serious in years when good spring rains are followed by a relatively dry period. The first visible damage above ground (**Photo 5**) corresponds with that of the black maize beetle and the false wireworm. The sepals of the maize plant wilt and dry out and then the entire plant dies.

Plants can survive this damage, but a cluster of useless sprouts is formed. The damage below ground is caused by the larvae that penetrate the underground stem (**Photo 6**) of the maize seedlings and bore several holes into them. If more than one larva occurs per plant, the larvae can leave the plant, crawl across the soil surface and damage adjacent plants.

The larvae eat only plants belonging to the grass family. It is therefore important to keep fields in which maize is to be planted free of graminaceous weeds. This can be done through tillage or, in the case of conservation farming, through spraying. The best chemical control that can be used is seed treatment, which provides preventive control. However, it is a difficult pest to control if damage has already been done to underground stems, as it is then problematic to reach the larva with chemical control.

Article submitted by Dr Annemie Erasmus, ARC-Grain Crops Institute, for SA Graan/Grain January 2014. For more information, send an email to erasmusa@arc.agric.za.

A special word of appreciation to Grain SA

Anna Mutloane attended the Day of Celebration awards in October 2014 and received her certificate to join the 1 000 Ton club.

I am a female farmer in the Lichtenburg area in the North West Province. I joined this farming fraternity in the 2011 - 2012 seasons where I started with cattle, assisted by my first born Morapedi, the name of my company is Pinnacle Agricultural Holdings. The business grew, operating in feed-lot in Vallefontein where we generated capital for starting crop farming.

During the 2012 - 2013 season, we leased 340 ha of communal land in the most rural village of Kaalpan and Driehoek. This season was drought stricken and production was very bad and we lost a lot.

In 2013 - 2014 we did not lose hope, we leased another 1 100 ha of communal land and we planted 700 ha sunflower and 400 ha maize. This season has been the best, production was excellent thus the Golden 1 000 Tons Award. Morapedi has always been there to make everything possible. Well done my boy! We were also assisted by his brother Motsamai.

The main aim here is to congratulate Grain SA for the wonderful involvement during the two seasons, guiding us through, with the Study group meetings, where Du Toit (affectionately known as Thabo in this area) played the most wonderful role, sharing the knowledge and information with us and much as he possibly could. Grain SA, appointing Thabo to this position was a big blessing indeed. He is a real asset and good representative for Grain SA. We would like to congratulate Thabo together with his secretary Lebo for the commitment, passion and dedication they have displayed throughout this season.

Well done guys, you represent Grain SA exceptionally well.

On the 31st of December 2013, I called Thabo in the morning as I was having a problem with my planter, you know what? Thabo (Du Toit) came rushing to my lands and assisted me. Imagine that on New Year's Eve! I would just like to extend my out most appreciation to him for the support he has shown, not just to me but my other fellow farmers. Well done Thabo! You are the best.

Mama Jane, behind this successful organisation there is a powerful and courageous woman who is called Mama Jane, I would just like to extend our appreciation. Keep it up Mama! Keep the torch burning.

To all the staff of Grain SA thank you so much for all the effort that you put into farming, you are really making a huge difference in people's lives and also in this beautiful country.

To the chairman and the executive and the entire Grain SA Organisation, thanks a million for organising such an electrifying award ceremony. It really signifies that you have the welfare of all SA farmers success at heart, who are the back-bone and the basic food producers in the world. The reception, accommodation, food, was all exclusive!

I salute you guys! More blessings for you. You are the best Grain SA. Keep the torch burning.

Nanikis

This letter of appreciation was submitted by Metsiatsile Anna Mutloane, (affectionately known as Nanikis worldwide). Anna resides in Lichtenburg, North West Province.

The Corner Post

The imperatives

Land reform and transformation is an imperative to redress the ravages of the 1913 Land Act and the subsequent rule of apartheid that denied the majority of our citizens an equal opportunity to take part in the mainstream economy and of critical importance denied this very same people the basic human dignity which is so critically important for life.

However, within the confines of the greater debate, it is of cardinal importance to afford an equal status to both constitutional and economic reason and the resultant national asset of food security. This equal status is necessary if we are to progress with this challenge because these equally important imperatives will serve South Africa and its people best. Civil society must pose and answer the uncomfortable question as to why efforts regarding land reform thus far have failed so dismally? Whilst all the agricultural land in South Africa is valued at R180 billion and the Department of Rural Development and Land Affairs have spent R80 billion on land reform, we have transferred less than ten percent of the land to previously disadvantaged South Africans.

Candid honesty is needed by all stakeholders if we are to progress with this challenge. It must be saidthat our inability as South Africans to cooperate across the entire food value chain in the very same fashion that our late, beloved President Nelson Mandela illustrated to us all, we seemingly have forgotten the primary lesson that he taught us all. On the anniversary of the celebrations and remembrance of this great man, I implore South Africans to think about these things anew. For in the lesson he taught us all, lies all the answers, an inclusive process that is both constitutionally and economically sound.

Furthermore it must be stated that the scourge of corruption in all spheres of life are the greatest threat to our raw democracy and the imperatives that Grain SA hold dear. Grain SA recommits itself to the greater debate and the processes that we deem necessary for the transformation of the agricultural sector and we will continue to partner with all likeminded South Africans as to the challenge that faces us.

> *“Grain SA recommits itself to the greater debate and the processes that we deem necessary for the transformation of the agricultural sector and we will continue to partner with all likeminded South Africans as to the challenge that faces us.*

To the 4 115 developing farmers whose lives have been touched by the programs launched by Grain SA and the cooperation of Commodity Trusts, we assure the same commitment as in previous years. For the Grain SA program under the sterling leadership of the Chairman of Grain SA Farmer Development program, Victor Mongoato and the Manager Jane McPherson have touched the lives of all these individuals. With the resultant achievement of 115 farmers that are now producing 250 tons of maize and more, what an example they have set and we in turn applaud their success.

> *“Our dream is to build on this success and in so doing enhance household food security and that surpluses be produced which can be sold and processed in rural South Africa.*

Our dream is to build on this success and in so doing enhance household food security and that surpluses be produced which can be sold and processed in rural South Africa. If we are serious aboutaddressing the scourge of poverty and joblessness, South Africans must take heed of the meritious work done by Grain SA.

To all farmers, we wish a productive planting and growing season. May the heavenly Father furnish you all with plenty of rain so that your labours are rewarded by a bountiful crop.

This month’s edition of The Corner Post was authored by Louw Steytler, Grain SA Chairman. For more information, send an email to pretoria@grainsa.co.za.

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