SEPTEMBER 2019

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GRAIN SA MAGAZINE FOR DEVELOPING FARMERS

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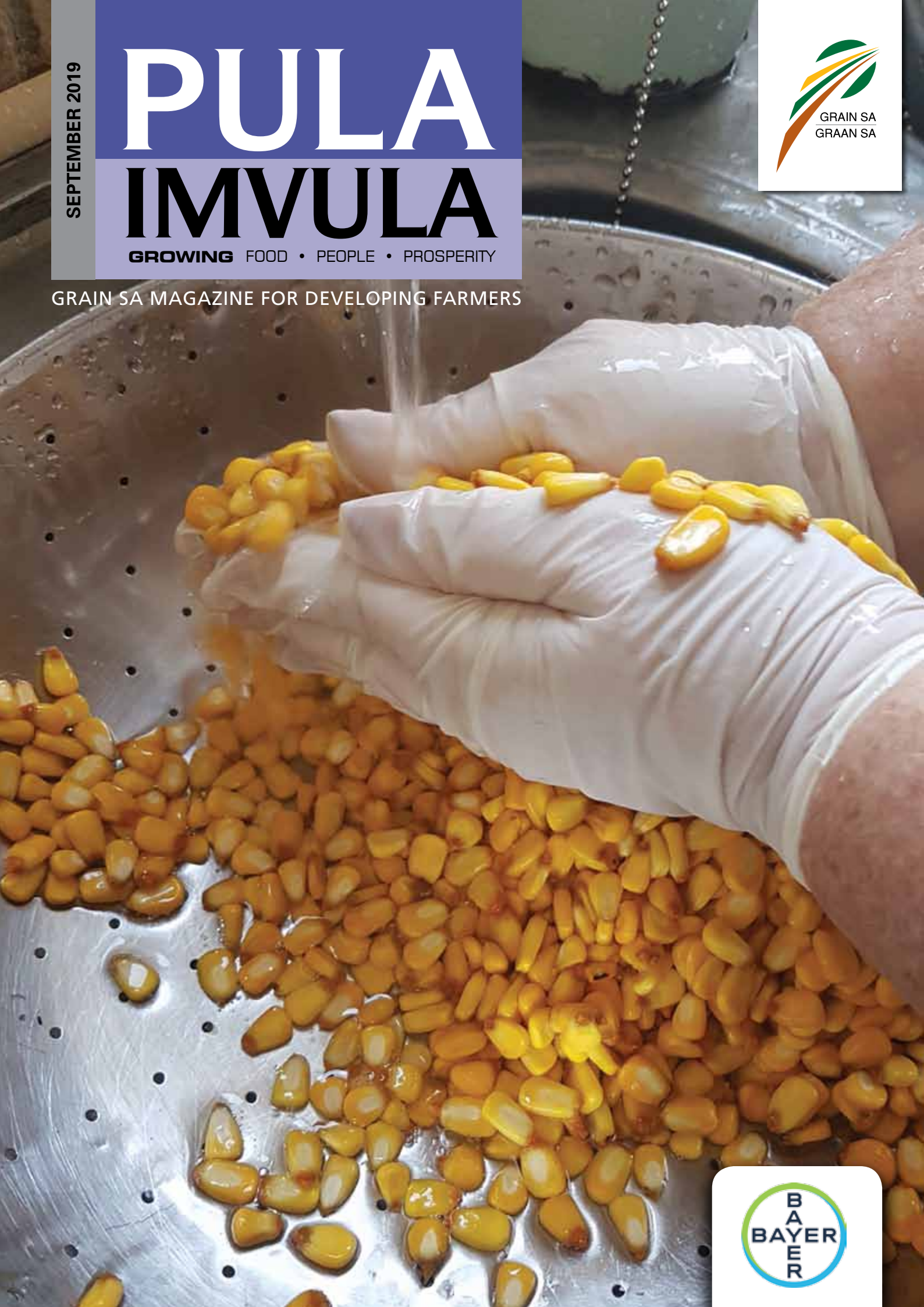

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PULA IMVULA

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A Word From...

Jerry Mthombothi

THE DEPARTMENT OF AGRICULTURE, GRAIN SA, INPUT SUPPLIERS AND OTHER ORGANISATIONS ARE TRAINING FARMERS TO FOLLOW THE CORRECT PRODUCTION PRACTICES. FARMERS ARE TRAINED IN SOIL MANAGEMENT, PEST AND DISEASE CONTROL, PRINCIPLES OF CONSERVATION AGRICULTURE AND MUCH MORE.

Farmers are given the skills as to how they should go about to produce good quality products and get high yields. The only problem that most farmers have is the lack of machinery such as rippers, planters and boom sprayers for example, in order to prepare their soil properly and have deep soils that will have good drainage, good soil structure and be able to hold water and nutrients.

The hiring of farm implements from local contractors becomes expensive for them and farmers end up taking short cuts by not doing a proper job. If a farmer wants to farm successfully he/she needs not take short cuts because that will result in getting low yields and not get the money back that they have put into the soil. In the past, it did happen farmers received assistance with mechanisation, but the problem was that those people who were given the responsibility to manage those tractors and other farm implements were not doing it correctly. Drivers were hired who were not qualified or not well trained to operate those tractors and not servicing the farm implements. The other problem was that those implements were benefiting only a few.

Nowadays the Department of Agriculture in Mpumalanga through the Land Care Programme, have managed to provide planters and boom sprayers to farmers to be managed by the various Grain SA study groups. They manage the usage of the implements and make sure that if there are some parts that are broken, they buy new spare parts and replace them. Each member contributes something so that the money can be used to hire tractors to pull those planters and boom sprayers and to pay the people operating the implements. Some progress has been observed on the farmer's arable lands as most farmers are no longer planting their crops by hand but are using those farm implements.

In order for initiatives such as these to be successful, strong partnerships are crucial to assist our farmers to get on their feet and to farm sustainably. We would like to encourage all farmers and role-players to work together as a team to find joint solutions to transform the industry. ■

NIXTAMALISATION
– adding value to your maize

GRAIN SA FARMER DEVELOPMENT ENCOURAGES FARMERS TO ADD VALUE TO THEIR GRAIN. ONE OF THE EXCITING METHODS WE ARE INTRODUCING FARMERS TO IN OUR TRAINING PROGRAMME IS CALLED NIXTAMALISATION.

Jenny Mathews, Pula Imvula contributor. Send an email to jenjonmat@gmail.com

Nixtamalisation is a special way of preparing maize, and other grains like sorghum, to enhance its nutritional value and make it more versatile for cooking and baking. The maize is soaked and cooked in an alkaline solution (lime water), washed and hulled (the outer covering of the maize is softened in the process and it can be washed off the maize).

This process is believed to remove as much as 90% - 97% of the aflatoxins from the maize. It is for this reason that it is believed to be a valuable method for farmers to learn to use. After washing the soaked grains thoroughly, the maize kernels now called **the nixtamal**, are ground, minced and processed with a little bit of water to form a maize dough called **masa** (**Photo 1a** and **1b**).

This masa dough can be used in many different ways, for example: Small portions of masa are formed into balls that are flattened into thin discs. These tortillas are baked on a hot plate or in an oven. By frying them, tortillas and tortilla strips can be further processed into tortilla chips (or similar products). Masa can also be used to prepare maize chips. The dough can also be combined with flour to make cakes, scones and flapjacks. The possibilities are in fact as endless as the imagination!

With respect to storage, masa can be dried and later remoistened for further processing. A dry masa flour can be produced from low-moisture nixtamal by fine grinding under dry conditions. Dry **masa flour** is often used in commercial tortilla production.

WHAT ARE THE BENEFITS OF NIXTAMILISATION?

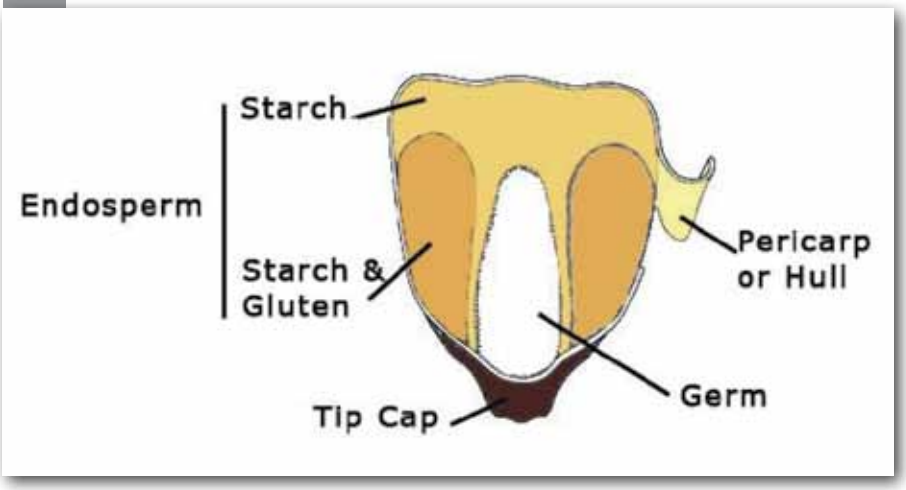
- It improves the flavour of the maize.
- Takes the outer husk off the corn.
- It increases nutritional values – making Niacin/ Vitamin B3/Tryptophan (the amino acid) available so as to prevent malnourishment – particularly pellagra.
- Phytic acid levels tend to be high in the maize. This limits the absorption of iron, zinc and calcium from the maize we eat and may lead to mineral deficiencies over time. The nixtamalisation process reduces phytic acid levels.
- This process increases both the calcium quality and the protein quality made available to the body.
- Mycotoxins are removed – the nixtamalisation process significantly reduces this – by as much as up to 90%. This traditional practice really has a huge impact in the nutritional status of the humble corn. Through it, we can take a very frugal food, and make it nutritionally superior.
- The starch granules are easier to digest.
- The maize is more easily ground.
- It makes it possible to make the maize into a dough known as masa.

This nixtamal can be used either cooked as whole kernels or ground to make masa (this sticky slightly wet mixture can be used in various ways).

> *Nixtamalisation is a special way of preparing maize, and other grains like sorghum, to enhance its nutritional value and make it more versatile for cooking and baking.*

This process can be finished in a food processor (**Photo 3a and 3b**). If it's not combining into a soft dough, you can some additional water, one to two tablespoons at a time. Eventually it will combine into a thick, dough-like substance. The batches can take about 4 to 5 minutes each in a food processor before a nice dough forms. If the dough is too wet, it is difficult to handle. Once you dry out the dough a bit, it's just a matter of flattening golf-ball sized rounds or using it whatever way you please. The mixture can also be dried and later pounded into a flour to be used in breads and baking.

1 ***The maize kernel.***



Maize kernels are ground, minced and processed to form masa dough.

Rinse the grain thoroughly in a colander.

Four to five minutes in a food processor produces a firm dough.

WHAT DOES THE PROCESS INVOLVE?

1. The maize kernels (any colour maize) are put in a pot.
   Note: This must not be an aluminium pot – only cast iron or stainless steel.

2. The maize is then completely covered with water.

3. For two litres water, you add two tablespoons of slaked lime (calcium hydroxide, which can be bought at pharmacies), which has already been dissolved in hot water.
   Note: Work responsibly with slaked lime. Make sure there is good ventilation, so the fumes are not inhaled. Do not place your hands in the lime water. Pour the soaked and steeped grain into a colander sieve (Photo 2**) and rinse well – stir with a wooden spoon or wear gloves when washing the lime off the kernels. Rinse the grains very thoroughly. Unprotected exposure to can cause severe skin irritation or lung damage. Slaked lime is caustic and must be used with care.**

4. The maize and water mixture are brought to the boil and boiled for about 10 to 15 minutes.
   Note: It is possible to overcook the maize. If you completely dissolve the outer layer of skin of the kernel, the corn will absorb water, the starch will get completely gelatinised, and the corn won't be any good for masa.

5. Then the pot is removed from the heat and allowed to cool overnight – or at least for eight hours.

6. The following morning, you will notice that the colour has changed, and the husks are loose. The next step is to pour the maize into a colander and wash the maize in fresh water all the while rubbing it through your hands to remove most of the husks.
   Note: It is in removing the pericarp (Figure 1**), of a maize kernel that this technology contributes to reduce aflatoxin fungal contamination levels in maize kernels by a significant percentage. It can be said that this nixtamalisation process contributes directly to food safety for consumers.**

7. Now this grain is called **nixtamal**. ■

SOIL ANALYSIS FOR THE SEASON AHEAD

THERE ARE MANY AREAS TO FOCUS ON WHEN GETTING YOUR FIELDS PREPARED FOR THE COMING SEASON. THIS TASK SHOULD START WELL IN ADVANCE TO GIVE YOU TIME TO PLAN EFFECTIVELY. WHEN THE COMBINE HARVESTERS PULL INTO THE WASH BAY AND THE LAST OF YOUR CROP IS DELIVERED OR STORED AWAY; THEN IT IS TIME TO START THINKING ABOUT THE SEASON AHEAD.

Gavin Mathews, Bachelors in environmental management. Send an email to gavmat@gmail.com

To remain competitive in an ever-changing environment the farmer needs to always be one step ahead. In this article I will focus on one of these areas: **Soil sampling**. Doing analysis of your soil is like reading a map and understanding which direction to head into. Results need to be received well in advance so that you have time to understand them and to follow their guidelines as precisely as possible.

It is hard to believe that there are still many farmers operating today that do not make use of this valuable tool. In my opinion; soil analysis should be the foundation upon which you build your farming business. Everything we do as farmers is in direct relation to the soil. The soil is from where our food and our livelihood come, which is why we need to take care of it as best we can. The soil is living, full of minerals, nutrients and bacteria which provide the crops that we plant the food they require to grow. If we keep taking and never replacing, then we will soon find that what we are doing is not sustainable.

All living things have various attributes and qualities. They also have different needs and requirements. Some living things will die out and perish if they are not sustained in the correct manner. The same goes for our soil! Achieving and maintaining appropriate levels of fertility, especially plant nutrient availability is extremely important if agricultural land is to remain capable of producing the food we need as a human population into the future. Soil analysis is a tool that we need to make use of to be able to ensure this.

HOW DO WE DO IT?

A soil analysis seeks to identify which nutrients are available to plants in the soil as well as which nutrients are lacking. Examples of these nutrients are elements such as phosphorus, potassium and magnesium. There are many of these nutrients and all of them play a vital role in sustaining our plants.

To do a soil analysis one needs to physically extract a sample of soil with the aid of a soil auger and analyse it in a laboratory. One cannot however take one sample from each field and take it as an accurate reflection. The soil is made up differently across a large area which is why we need to do grid sampling in order to better interpret the different zones of the land we are going to plant. For optimum yields one should do thorough sampling. Each grid that is sampled should be boxed and labelled accurately for easy interpretation on the results sheet. Once your samples are securely packaged and labelled you can send them to your closest laboratory for testing and analysis. Many fertilizer companies do provide this service at an extra cost.

HOW DO WE INTERPRET IT?

When you receive your printout of your soil results it can often be quite intimidating as it will look like another language of big words, numbers and figures that are impossible to read. Fortunately, there are people who are trained and educated in this field and will be able to give you a breakdown of the results and explain to you exactly what your soil needs and how much it needs. Most fertiliser representatives will also be able to give you guidelines based on the soil sample recommendations you receive.

The soil is from where our food and our livelihood come, which is why we need to take care of it as best we can.

WHAT ACTION DO WE TAKE?

In order to achieve the best yields possible, you should always strive to provide your plants with everything they need to grow. Of course, one always needs to keep budget in mind. Remember that you can rather build towards improving your soils over a period of time rather than trying to do it all in one year and going bankrupt in the process. As long as you are continually improving and achieving better results then you are heading in the right direction.

Once you have interpreted the soil sample results you need to decide which fertilizer products you wish to use in order to correct your soils as best possible. You then need to place your order with the fertiliser company well in advance to allow you time to apply it accurately with a spreader according to your grid requirements. Accurate calibration is essential to apply the correct amounts of fertiliser.

Maintaining and building the fertility of our agricultural soils is of paramount importance, not only for us today, but especially for the future generations that are to come. Soil analysis and its interpretation is an important management tool which can help us achieve sustainability. ■

GRAIN SA FARMER OF THE YEAR
– rewarding hard work and perseverance

THE YEARLY GRAIN SA FARMER OF THE YEAR COMPETITION IS A HIGHLIGHT FOR ALL FARMERS AND STAFF OF GRAIN SA. IT IS AN OPPORTUNITY FOR ALL FARMERS THAT ARE ACTIVE MEMBERS OF THE FARMER DEVELOPMENT PROGRAMME, WHETHER BIG OR SMALL, TO SHOWCASE THEIR HARD WORK AND DETERMINATION.

Liana Stroebel, Grain SA Provincial Co-ordinator, Western Cape. Send an email to liana@grainsa.co.za

These competition nominees represent the thousands of grain farmers in this programme who work hard every single day to provide for their families, farmers who are slowly building their businesses as well as those working towards building a sustainable commercial farming business.

As it is impossible to enter every deserving farmer, as there are so many, therefore these selected individuals act as examples of what can be achieved.

This competition entails that a handful of Subsistence, Smallholder, Potential New Era and New Era Commercial candidates from each province are nominated according to very strict criteria, after which each individual farmer is visited by a judging panel who intensively interviews the farmer on his/her production practices, financial management, record keeping, general progress, quality of their crops and much more. We can assure you that this not an easy competition by any means.

We are herewith very privileged to introduce you to the 2019 Farmer of the Year nominees:

NEW ERA COMMERCIAL NOMINEES

Stoffel Tawa Dhladhla

Area: Kestell, Free State
Co-ordinator: Johan Kriel

Paulus Mapota Mosia

Area: Edenville, Free State
Co-ordinator: Johan Kriel

Alfreda Stephanie Mars

Area: Moorreesburg, Western Cape
Co-ordinator: Liana Stroebel

Andries Isak van der Poll

Area: Riebeeck-Wes, Western Cape
Co-ordinator: Liana Stroebel

POTENTIAL NEW ERA NOMINEES

Sabatha Ewart Mthethwa

Area: Dannhauser, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

Elias Mtimkulu

Area: Harrismith, Free State
Co-ordinator: Johan Kriel

Thobani Goodwill Ntonga

Area: Cedarville, Alfred Ndzo/ Eastern Cape
Co-ordinator: Luke Collier

SMALLHOLDER FARMER NOMINEES

Bheki Isaia Mabuza

Area: Piet Retief, Louwsburg
Co-ordinator: Jurie Mentz

Joconia Mthethwa

Area: Piet Retief, Louwsburg
Co-ordinator: Jurie Mentz

Mfuneni Themba Mayisela

Area: Piet Retief, Louwsburg
Co-ordinator: Jurie Mentz

Zamokwakhe Nathaniel Khoza

Area: Bergville, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

Mkhombiseni Dumdumu Hlongwane

Area: Bergville, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

Mdumiseni Welcome Hadebe

Area: Winterton, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

SUBSISTENCE FARMER NOMINEES

Bonisiwe Berlinah Nhlengethwa

Area: Piet Retief, Louwsburg
Co-ordinator: Jurie Mentz

Phoma Duma

Area: Ixopo, Eastern Cape
Co-ordinator: Luke Collier

Mazonya Elijah Dhlamini

Area: Volksrust, Louwsburg
Co-ordinator: Jurie Mentz

Velile Madikizela

Area: Bizana, Eastern Cape
Co-ordinator: Luke Collier

Bavelile Sylvina Madlala

Area: Estcourt, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

Jabulani Emmanual Mazibuko

Area: Bergville, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

Amos Mfaniseni Kubeka

Area: Oshoek/ Carolina, Mpumalanga
Co-ordinator: Jerry Mthombothi

Ndinda Hezekia Mkhonza

Area: Hereford East, Ermelo/ Albert Lethuli
Co-ordinator: Jerry Mthombothi

Lena Samaria Msibi

Area: Badplaas, Gert Sibande
Co-ordinator: Jerry Mthombothi

Ester Phumelele Ngidi

Area: Dannhauser, Dundee/ KwaZulu-Natal
Co-ordinator: Graeme Engelbrecht

Management options for cover crops during September

COVER CROPS CAN PLAY A VITAL ROLE IN IMPROVING OUR CURRENT CROPPING SYSTEMS AND OPEN NEW AVENUES TO NOT ONLY IMPROVE THE BIODIVERSITY WITHIN OUR SYSTEMS, BUT ALSO OFFER NEW GRAZING OPPORTUNITIES.

Dr Johann Strauss, Directorate Plant Sciences, Research and Technology Development Western Cape Department of Agriculture. Send an email to johannst@elsenburg.com

BACKGROUND

It is important to know that soil is not only a medium that keeps plants upright, but a living breathing system that consists of chemical, physical and biological properties. The beauty of cover crops is that it can affect all three of these areas. The choice of crops for a cover crop mixture can help alleviate compaction without falling back on the plough. Single plant type cover crops can help suppress weeds. A good example is Saia oats. If the mixture is high in cereal crop content it can provide excellent cover of the soil during the long hot months and thus protect the soil from the harsh sun. The choice of crops in the mixture can also help to make certain nutrients that was locked into the soil more available to the next crop, which can lower the need for fertiliser in the following year. Including legumes in the cover crop can provide free nitrogen for the following crop.

There are three management options for your cover crops namely, mulching, haying or grazing. Each has advantages and disadvantages. In a study at Langgewens Research Farm it was shown that grazing and mulching the cover crop is more beneficial than haying the cover crop. More nutrients were available in the soil and left on top of the soil in the residue than where the cover crop was hayed. Nutritional analysis also showed that a multispecies cover crop can deliver a more balanced diet to animals, which might also have an effect on lowering the cost of supplemental feed.

MANAGEMENT OF THE COVER CROP

Unfortunately cover crop seed can be expensive and therefore the aim in managing the cover crop is to keep other input costs to a minimum, or nothing at all. In our research we plant the cover crop with no fertiliser at all, but one can add a little bit of fertiliser (less than 10 kg of nitrogen per ha) to serve as a kick start. We do not spray herbicides, insecticides or fungicides during the season. In September we terminate the cover crop to ensure than nothing set seed.

Photo 1 - 3: The three ways which cover crops can be managed.

2

Terminating a cover crop used as mulch

The choice of crops that make up the mixture will also play a role in your choice of the method you use to terminate the cover crop. If there are more cereal crop seed in the mixture, the easier it is to terminate with a crimping roller alone. If there is however a larger number of legumes such as vetch and clovers in the mixture, the crimping roller alone might not be as effective and then one can also add a contact herbicide application following the roller.

Terminating a cover crop used as hay

When using the cover crop as a hay crop it is important to cut the crop before seed set occurs. It ensures that we do not have a carryover of seed that can act as a weed in the following crop. Regrowth of plants following the haymaking process will not be vigorous enough to warrant the use of a crimping roller. In this case a contact herbicide will be more appropriate. Usually this option of cover crop use leaves very little cover on top of the soil at the end of the season. Cutting the hay, a little bit higher might solve this problem.

Terminating following grazing

The idea behind grazing cover crops is to recuperate some of the money invested in the planting of the cover crop by producing meat or milk. Depending on the climatic conditions in the season, a cover crop can be grazed more than once. The number of grazing opportunities will depend on the amount of regrowth that occurs. Larger number of animals for short periods of time is ideal. If you want to maximise your growth of the cover crop in the grazing system, a low topdressing might work well to enhance regrowth. Remember the ideal is to keep as much material left at the end of the season on top of the soil to protect it from the climate. Any regrowth at the end of the season can be terminated with a crimping roller or contact herbicide.

CONCLUSION

Cover crops can open new opportunities to farmers in a number of ways. We are currently working on a cover crop calculator to help with the crop type percentages within a cover crop mixture. Added to this will be a function to play around with the available species to make the cover crop as affordable as possible. ■


3

BARLEY SCENARIOS for 2019/2020

IN THIS ARTICLE WE LOOK AT DIFFERENT SCENARIOS FOR BARELY PRODUCTION, GIVEN INTENTIONS TO PLANT AND AVERAGE YIELD.

Ikageng Maluleke, Junior Economist, Grain SA. Send an email to Ikageng@grainsa.co.za

According to the Crop Estimates Committee (CEC), the expected area planted for barley production for 2019 is 118 500 hectares (**Table 1**), compared to 119 000 hectares, with a final crop of 421 500 tons in 2018.

Production is determined by area and yield; however, these two variables are contingent on weather. Considering the uncertainty brought by weather on intentions to plant, this article hypothesises different scenarios using the Crop Estimate's Committee area planted and average yield over the past three years as the baseline to determine production for 2019.

Table 2 has area planted on the x-axis with the crop intentions in the centre and yield on the y-axis. On the x-axis, we have 5% deviations from the intentions towards the left and the right, indicating that the final production could be 5%, 10% or 15% above or below the CEC intentions. On the y-axis, we have deviations above and below the average yield of 4 t/ha. Working from the centre of the table, if 118 500 hectares is planted and the yield is 4 t/ha, then production will be 474 000 tons.

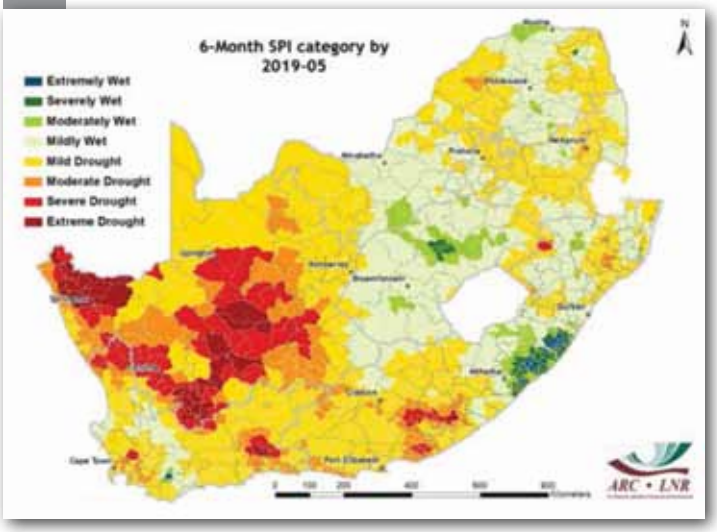
Going towards the left of the table, if 15% less is planted (100 725 hectares) and the yield remains at 4 t/ha then the production will be 402 900 tons. Working towards the right of the table, if 15% more is planted above the intentions, with the average yield of 4 t/ha, then production will be around 545 100 tons. This exercise can be done for all area planted and yield combinations.

WEATHER IN BARLEY GROWING REGIONS

Looking at the ARC's monthly standard precipitation index, severe drought over the far south-western parts of the Western Cape is visible on the longer time scales (24 and 36 months) as represented until end of May 2019, with signs of relief for the past twelve to six months.

Over the north-eastern parts of the country as well as parts of the central interior, improved conditions are visible over the past six months (**Figure 1**) after the improved rainfall over those areas during the late summer/early autumn of 2019. Total rainfall during May 2019 over parts of the western to central interior extending southwards to the western half of the Eastern Cape compare well with the historically wetter May months.

1 ***Standard precipitation index (SPI) in South Africa over six months (December 2018 - May 2019).***



Source: ARC, 2019

Over the south-western parts of the country, rainfall totals were similar to those of historically drier May months. Similar conditions are expected to prevail throughout the planting months. For crops that are under irrigation, it should be a reasonably good season, as dams across the country are at healthy levels.

1 ***Malting barley supply and demand 2019.***

CEC intentions to plant (ha)	118 500
Average yield (t/ha)	4,00
Carry-over stocks 2018/2019 (ton)	166 800
Total consumption (ton)	326 000
Pipeline stocks (± 1,5 months) (ton)	129 000

2 ***Analysis on barely production using area planted and yield.***

		Area planted (ha)						
		-15%	-10%	-5%	CEC INTENTIONS	5%	10%	15%
		100 725	106 650	112 575	**118 500**	124 425	130 350	136 275
Yield (t/ha)	2,34	235 697	249 561	263 426	277 290	291 155	305 019	318 884
	3,75	377 719	399 938	422 156	444 375	466 594	488 813	466 594
	4,00	402 900	426 600	450 300	**474 000**	497 700	521 400	545 100
	4,25	428 081	453 263	478 444	503 625	528 806	553 988	579 169

**Information as at 24 June 2019*

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THINK LIKE AN *ENTREPRENEUR*

IN GENERAL, WE HAVE EMPHASISED IN OUR ARTICLES THAT THE CHALLENGES FOR FARMING IN SOUTH AFRICA ARE BECOMING MORE AND MORE. OUR FARMERS ARE EXPERIENCING CHALLENGES WITH REGARDS TO THEIR FARMING BUSINESSES, WHETHER SMALL OR BIG, AT AN INCREASED LEVEL. WE EXPERIENCE MORE POLITICAL INSECURITY, MORE MARKETING CHALLENGES, MORE OF THE COST-PRICE SQUEEZE AND MORE OF THE CHANGING CLIMATE, TO NAME BUT A FEW CHALLENGES.

Marius Greyling, Pula Imvula contributor. Send an email to mariusg@mcgacc.co.za

Thus, in the business world of today, especially agriculture, the business environment is ever changing and shifting making survival very difficult.

DIVERSIFY

In previous articles we have emphasised the aspect to diversify your business to address these challenges. Investigate to diversify your business into a few enterprises aiming to increase your income and manage risks. The advantages of diversifying – improved cash-flow, spreading of risks, increasing of profit – outscores the disadvantages. If you do not consider diversifying your business, you will battle to survive as a farmer in South Africa. But, many of you will argue that your farm is too small to diversify. That may be true but there are other ways and means to diversify of which agritourism is but one.

Normally diversification entails a combination of farming enterprises that are not subject to the same risks. For instance, diversify into crops that have different growth periods and are not equally susceptible to drought. The addition of a livestock enterprise will have a great effect on lowering risk. But remember, the more diverse enterprises are, and an agritourism activity is just that, the more risks are countered.

A farmer will often think they do not have the capacity and resources (funds, property, staff or activities) to open their farms to visitors. However, a businessman will realise that you do not need five-star accommodation or complex activities to attract tourists. Concentrate on extraordinary and friendly service delivery and see to it that whatever you do is of a high standard.

> *Capitalising on agritourism opportunities can generate additional income and can become a lifeline for those struggling to keep their farming businesses profitable.*

AGRITOURISM

When considering an agritourism venture bear in mind that location will be a key factor in success. Easy and readily access to your property will be a great advantage. Thus, being close to a big town or city with better roads or close to main roads will enhance the possibility of success. In the *Farmer's Weekly* a while ago, there was an article of a wine farmer on a rather small wine farm who realised that to compete with the well-known brands of wine in the formal market will be very challenging. Because of a favourable location, close to the Cango Caves and Oudtshoorn which draws many a visitor, they ventured into a new on-farm agritourism business with a small restaurant and a wine-tasting facility serving their own brand of wines and beer. An old packing shed on the farm was turned into the restaurant and the tasting facility to reduce initial costs. Because of a unique product and excellent service, their main marketing is nowadays via social media and word of mouth.

Today's tourist wants to do something else – they are looking for 'different' experiences outside the urban environment. Tourists often also want to buy locally produced articles and goods. Capitalising on agritourism opportunities can generate additional income and can become a lifeline for those struggling to keep their farming businesses profitable.

> *Stop thinking how you can grow the profit of your farm; think how you can grow the profit of your business.*

Start small, for instance, start with a one-bedroom bed and breakfast facility and/or a small restaurant serving local traditional foods and/or a small shop especially selling local and self-made articles. Add some outdoor activities – cycle trails, horse rides, excursions on a donkey cart, ox wagon, tractor and trailer, opportunity to fish – to ensure a constant additional income. Expand according to demand.

Quite recently there was a documentary on TV regarding a gentleman from Kenya, who now resides in Cape Town, who started a business with old flippers. The flippers glued together are used to create colourful ornaments and toys. With this venture he also created jobs – he pays people to collect old flippers. This is just another example of thinking like a business person.

Of course, just as the rest of your business, this agritourism enterprise will also have to be managed properly by good planning, organisation, implementing and control of all the management areas. The one management area that will need a lot of attention is marketing. But here again for starters make use of social media at a very low cost. The trick with social media is to regularly update information and get visitors to participate in posts. Word of mouth also plays a significant role as advertisement.

CONCLUSION

The message of this article – stop thinking of yourselves as farmers, start to identify yourself as a business owner/manager, or in today's term an entrepreneur, and think and act like one. Stop thinking how you can grow the profit of your farm; think how you can grow the profit of your business. ■

The **WHO'S WHO** of soil health

'SOIL HEALTH' IS A VERY WIDELY USED TERM IN AGRICULTURE THESE DAYS. BOTH PRODUCERS AND SERVICE PROVIDERS HAVE BECOME INCREASINGLY SOIL HEALTH CONSCIOUS. SOIL HEALTH IS NOT ONLY AN IMPORTANT COMPONENT OF YOUR SOIL'S CURRENT PRODUCTIVITY BUT IS ALSO CRITICAL IN THE CONSERVATION OF OUR FOOD PRODUCING LAND (DI CELLO *ET AL*., 1997).

Dr Ronél Hendriks, chief scientific officer, ABM Africa. First published in SA Graan/Grain October 2018. Send an email to ronel@abm1st.com

SA Graan Grain

Behind the term soil health there is a very complex interaction between living and non-living elements in the soil environment. When these elements are in balance, there are synergistic interactions and relationships that promote better soil and plant health.

Imbalances in the components involved in soil health result in a disease promoting environment where plants are stressed, disease levels are high and soil productivity is low (Garbeva *et al*., 2004).

When we look at the microbial component of soil health, we are dealing with microbial communities or microbiomes. Overly simplified, we can refer to them as 'good' communities (promoting soil and plant health) and 'bad' communities (suppressing beneficial microbes and causing disease).

Interestingly, the bad communities (disease complexes) have a very specific function in the soil environment, i.e. to recycle plants with weak genetics as food for the soil microbiome. It is important to distinguish between the two microbiomes found in soil since each of them has a unique contribution to soil and plant health (**Table 1**).

BULK SOIL MICROBIOME

The bulk soil microbiome consists of communities of mostly free-living microbes, i.e. microbes not directly associated with plants. These microbes are all part of the soil food web. The soil food web, as presented in **Figure 1**, is a complex interaction of soil organisms (microbes, nematodes, insects, etc.) that each has a specific role in making nutrients available to the soil inhabitants and as a result has an impact on soil health.

Good soil health equals biodiversity. The extent of biodiversity has shown to be critical to the maintenance of soil health and quality. A large variety of microbial species results in a balanced and stable soil food web that is disease suppressive and plant growth promoting.

The opposite is an unbalanced food web where plant pathogens and parasitic nematode numbers are high due to the lack of natural enemies (bacterial and fungal feeders as well as predatory nematodes) (Garbeva *et al*., 2004; Wang *et al*., 2017a).

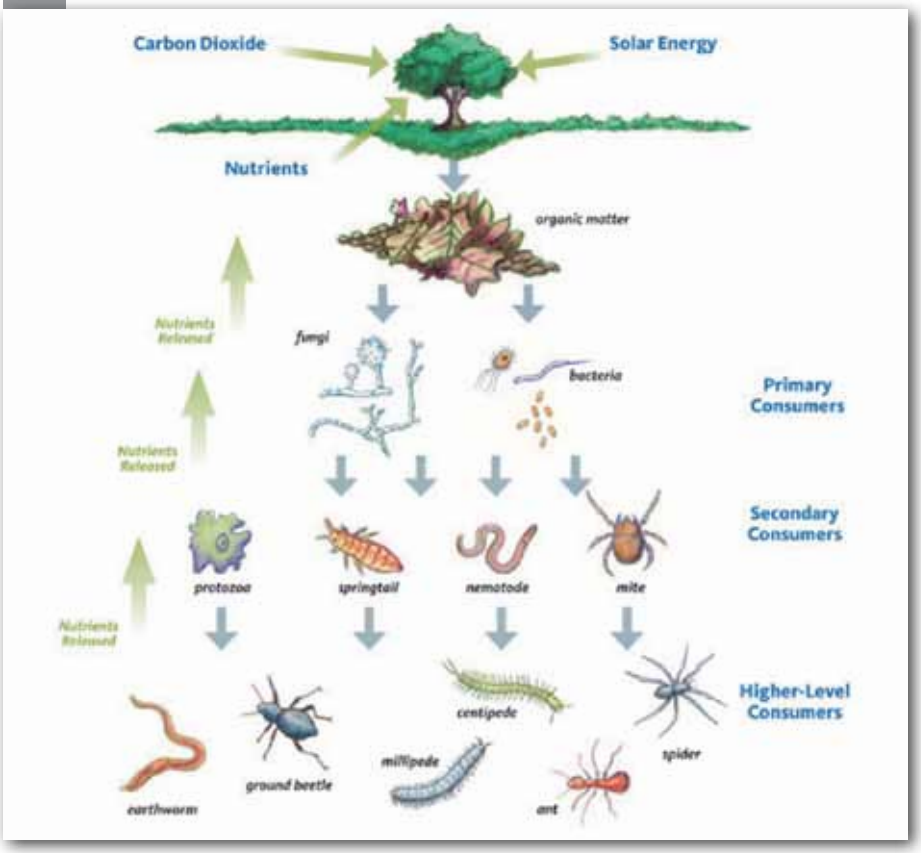
Factors to consider when the goal is to improve the microbial diversity in the soil are:

- Different soil environments select for different species and strains of a specific microbe. For example, mycorrhizae that live in the desert, will not grow in soil with higher clay content.
- Different soil management practices have different effects on the specific groups of the soil food web.
- Secretions from different plants stimulate growth of different microbial groups.
- Different organic soil amendments stimulate growth of different microbial groups.

THE RHIZOSPHERE MICROBIOME

Plant roots release a wide range of compounds into the surrounding soil, including ethylene, sugars, amino acids, organic acids, vitamins, polysaccharides and enzymes. These root exudates create unique

1 ***The soil food web is the community of organisms living in the soil all or part of their lives.***



Source: Wikimedia Commons

1 ***Comparison of the two microbiomes found in the soil.***

Bulk soil microbes	Rhizosphere microbes
Free living in soil (no direct interaction with plant)	Interaction/symbiosis with plant
Soil provides carbon and nutrients	Plant provides carbon and nutrients
Important role in soil = soil food web	Important role in plant nutrition = root development, enzyme and metabolite production
Important role in soil health = pathogen/disease suppression	Important role in plant health = antagonism + induced resistance

environments for the microbes living in close association with the roots, i.e. the rhizosphere.

A plant's rhizosphere is a microbial hot spot and is considered one of the most complex ecosystems on earth (Jones and Hinsinger, 2008; Hinsinger *et al.*, 2009; Raaijmakers *et al.*, 2009). The rhizosphere composition as well as microbiome of different crops, e.g. maize and soybean, differ significantly (Wang *et al.*, 2017b). Despite the diversity of microbes that is associated with the rhizosphere of different plants, one can distinguish between two main groups based on their relationship with the plant:

- Microbes that benefit from living (photosynthesising) plants.
- Microbes that benefit from dead (composting) plant material.

The first group of microbes obtains a major part of their carbon (sugar) from living, photosynthesising plants and as a result uses various mechanisms to keep plants healthy, stress-free and in an optimal state of photosynthesis. These microbes play an essential role in the viability, stress tolerance and productivity of a crop. Prominent members of the beneficial group are Bacillus, Trichoderma, Pseudomonas, Rhizobium, Azospirilium, Streptomyces, etc. (Mendes *et al.*, 2013).

> *Good soil health equals biodiversity. The extent of biodiversity has shown to be critical to the maintenance of soil health and quality.*

The second group of microbes that colonises the rhizosphere is microbes that obtain their carbon from dead plant material (cellulose). These microbial disease complexes target weak plants in order to recycle them as carbon for the soil food web. The 'famous five' that are part of this group are Fusarium, Phythium, Phytopthera, Rhizoctonia and plant parasitic nematodes (Whipps, 2001).

Healthy soil provides a good balance between beneficial microbes and pathogens. Unfortunately, most agricultural soils have high numbers of the pathogens and as a result plants are under constant attack when environmental or nutritional stresses surface.

In recent years, crop-specific, rhizosphere inoculums have provided a valuable tool in having a degree of control over who gets to the rhizosphere first. These inoculums consist of beneficial rhizosphere microbes that have the ability to establish in the rhizosphere (specifically the endo-rhizosphere) and form a synergistic relationship with each other as well as with the plant. When the bulk soil food web becomes healthier and more balanced, the effect of these inoculums becomes less prominent (Garbeva *et al.*, 2004).

SUMMARY

To summarise, the short-term strategy for improving plant health is to focus on the rhizosphere with crop-specific rhizosphere inoculums that can counter the imbalances between beneficial microbes and pathogen complexes. Soil health of the bulk soil on a specific farm and environment is a more complex long-term strategy that requires an individual plan based on the various factors involved.

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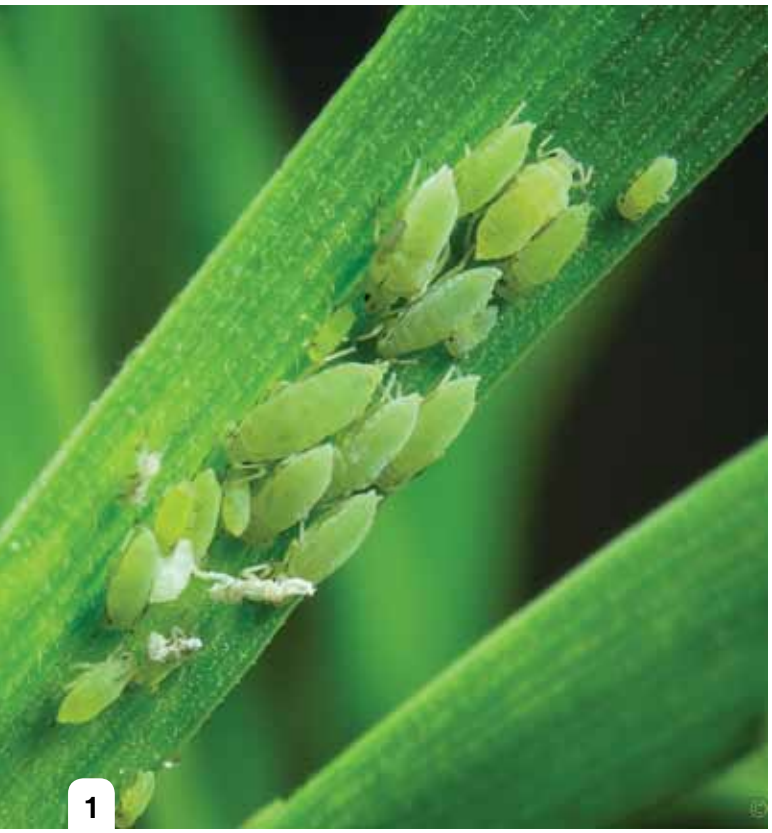
Towards more sustainable control of the RUSSIAN WHEAT APHID

FOLLOWING THE RELEASE OF THE FIRST RUSSIAN WHEAT APHID (RWA), *DIURAPHIS NOXIA* (**PHOTO 1**), RESISTANT CULTIVAR (TUGELA-DN) IN 1992, HOST PLANT RESISTANCE HAS BECOME THE BACKBONE OF RUSSIAN WHEAT APHID CONTROL UNDER DRY-LAND CONDITIONS IN THE SUMMER RAINFALL REGION. HOWEVER, SINCE THE ARRIVAL OF THE FIRST APHID BIO-TYPE, RWASA1 IN 1978, THREE SUBSEQUENT BIOTYPES, RWASA2, RWASA3 AND RWASA4, HAVE MADE THEIR UNWELCOME APPEARANCE.

The development of these aphid biotypes is not unexpected, as widespread deployment of host plant resistance implies evolutionary adaptation, fuelled by climate change and a higher selection pressure imposed upon the aphids by host plant resistance (i.e., survival of only those individuals that have the inherent ability to overcome the resistance).

To counteract such selection, indiscriminate mortality inflicted by natural enemies (predators, parasitoids and pathogens), is seen as a critical component in a host plant resistance x natural enemy-based control programme. Pathogens are disease-causing entities and include microbes such as fungi, viruses and bacteria; collectively referred to as entomopathogens.



1

Russian wheat aphid,* Diuraphis noxia *colony, clustered on a wheat leaf.
Photo: Kobus Dreyer, ARC-Small-Grain

Nokulunga Mzimela and Justin Hatting, ARC-Small Grain, Bethlehem. First published in SA Graan/Grain September 2018. Send an email to HattingJ@arc.agric.za

SA Graan Grain

As part of an integrated pest management (IPM) approach against Russian wheat aphid, ARC-Small Grain explored the combined use of host plant resistance and the insect-killing fungus (also referred to entomopathogenic fungus), *Beauveria bassiana*. These field trials resulted in about 65% fewer Russian wheat aphid in treated plots compared to controls.

In an attempt to further improve this level of efficacy, research was initiated on the combined use of *B. bassiana* with botanically based insecticides; potentially exploiting any synergy between the two biocontrol agents. Moreover, bio-insecticides are considered favourable alternatives to address chemical insecticide issues relating to human poisoning, residues, environmental pollution, insect resistance and negative effects on non-target organisms.

Pathogens are disease-causing entities and include microbes such as fungi, viruses and bacteria; collectively referred to as entomopathogens.

Notably, use of chemical pesticides may negatively affect human health and biodiversity as it is estimated that less than 0,1% of a sprayed pesticide actually reaches the target site; the rest ends up in the environment. Effective bio-insecticides can ensure a better quality of life as many employees on commercial farms are confronted by the risk of being exposed to sub-lethal doses of chemical insecticides.

During 1990, 15% of South Africa's entire economically active workforce (1,18 million people) were working on >62 000 South African farms, while 20% of farm workers involved in chemical applications were illiterate (implying poor or non-adherence to label warnings). In fact, in 2002, around 10 000 kl's of liquid insecticides were produced exclusively for crop protection, of which 43% consisted of highly toxic organophosphates.

Bio-insecticides of botanical origin have gained a great deal of interest, also being in direct support of organic agriculture. As pointed out in a recent review paper by Isman (2015), *'…globally, bio-pesticides could hold close to 20% of the pesticide market by 2025 and botanicals up to 7% of the market, based on 15% to 20% annual growth in sales'* (see *Pest Management Science* 2015; 71:1 587 - 1 590).

An important group of botanical insecticides is the so-called pyrethrums, made from the flowers, of mainly, the Dalmatian chrysanthemum, *Tanacetum cinerariifolium* (Asteraceae) (**Photo 2**). The derived insecticide (pyrethrin) is a mixture of six active components (pyrethrins I and II, cinerins I and II, and jasmolins I and II). Pyrethrum is the main botanical in use, capturing nearly 80% of the global botanical insecticide market and has been used for insect control for over 150 years.

Previously, the notion of integrating entomopathogenic fungi with chemical insecticides was discussed by the same authors of this article, in the September 2015 issue of *SA Graan/Grain* (page 42). However, although such combinations do show potential, expanded benefits can be derived through the combination of an entomopathogenic fungus with botanicals, creating a purely organic alternative.

In the USA, the product BotaniGard® MAXX, is one such product, formulated with *B. bassiana* strain GHA (0,06%) combined with pyrethrins (0,75%). However, research with an indigenous strain of this fungus was needed and subsequently initiated by ARC-Small Grain as part of an MSc study by the author, Nokulunga Mzimela.

Laboratory experiments showed compatibility between *B. bassiana* strain R444 and various concentrations of the pyrethrum-based insecticide, Pyrol™, a certified organic insecticide registered under Act 36 of 1947 (L7062), with active ingredients: Canola oil 89,5% and pyrethrins 0,5%. Interestingly, at a reduced concentration of 10%, Pyrol increased the sporulation intensity of the fungus and the combination was then further tested against the Russian wheat aphid, together with a chemical (Mospilan®), under glasshouse conditions. Mortality results are visually presented in **Graph 1**.

A synergistic effect was noted with *B. bassiana* R444 + 10% Pyrol, yielding a statistically similar level of control compared with the (full-dose) of Pyrol, alone. Likewise, when comparing the *B. bassiana* R444 + 10% Pyrol treatment to the solo 10% Pyrol treatment, efficacy was more than doubled. These results demonstrate good compatibility between the fungus and this botanical insecticide, with a clear additive effect in terms of aphid mortality.

Although so far tested only against Russian wheat aphid, such combinations may also prove effective against other aphid species like the oat aphid, *Rhopalosiphum padi*, an important vector of barley yellow dwarf virus in South Africa.

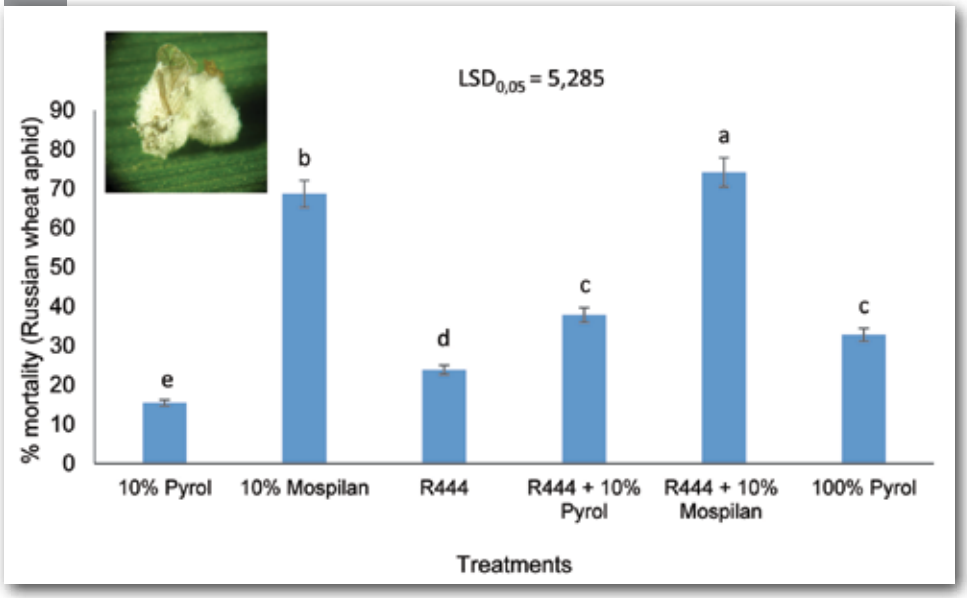
The notion of combining entomopathogenic fungi with a chemical or botanical insecticide as a 'two-in-one' tank mix, has been successfully employed against various insect pests to reduce the selection pressure brought about by the insecticide (some insects in a given population inherently resistant or less susceptible) and to avoid concurrent development of resistance in target pests.

Other benefits relate to lower volumes of chemical insecticides applied to the environment, less (human) exposure to harmful chemicals, during and after application, and lower or no residues on harvested commodities. ■

2

***Flower of the Dalmatian chrysanthemum,* Tanacetum cinerariifolium.**
Photo: KENPEI, https://commons.wikimedia.org/w/index.php?curid=2210117

1 ***Mortality of Russian wheat aphid,* Diuraphis noxia*, exposed to unformulated* Beauveria bassiana *strain R444, combined with a sub-lethal dose of pyrethrum and Mospilan insecticides, or as solo products. Bars with different letters, differed significantly at the 5% test level.***



TIPS AND PITFALLS
for the composition of producer-controlled businesses

IN THE ARTICLE *THE IMPORTANCE OF PRODUCER-CONTROLLED BUSINESSES* PUBLISHED IN THE JUNE 2018 EDITION OF SA GRAAN/GRAIN, READERS WERE INTRODUCED TO PRODUCER-CONTROLLED BUSINESSES. WHAT ARE THEY? HOW DO THEY WORK? WHAT ARE THE STRENGTHS OF SUCH A BUSINESS? PRACTICAL EXAMPLES OF SUCH BUSINESSES WERE ALSO LOOKED AT.

In this issue, group forming and the steps in order to start such a business are explained.

The evolution from the 'traditional' cooperative model to producer-controlled businesses happened at a fast pace. Producer-controlled businesses are any legal entity where producers still have ownership of their product, but work together to have more bargaining power in order to cut costs, share expertise and negotiate better prices. This type of approach allows producers to integrate into the value chain without losing ownership of their product.

OBSTACLES

The following obstacles have been identified in producer-controlled businesses:

Lize Morris, master's degree student at the University of the Free State; article written in collaboration with Grain SA. First published in SA Graan/Grain September 2018. Send an email to LMorris@fnb.co.za

- When a group does not involve its members, it is easy for input providers or buyers to give a better price to those one or two members and thus break up the group.
- When management is not transparent, and members start to doubt their credibility.
- The group should carry each other. If there is a producer who is struggling with an aspect of his business and it has an impact on the group, an expert should be lined up to help that member.
- When certain members do not pull their weight in the group.

POSITIVE ASPECTS

Positive aspects of the producer-controlled businesses include:

- A purchase group can buy their inputs on a 'tender' basis. It is also positive for input providers, because now they do not have to negotiate with

Grain SA/Sasol photo competition – Ben de Wet 2014

a group of producers individually, but with one representative of the group.

- Milk producers, for example, can appoint an animal nutritionist, veterinarian or quality control technician who work for them. They are then not at the mercy of someone they do not know or may not have the group's interest at heart.
- Producers can then do their own transport later on, or buy implements together and share them.
- Wheat producers can perhaps buy a dryer together, which can add value to their product.
- Financing can also be easier to obtain, because as a group the producers may be able to afford the debt.
- This enables the group to investigate BEE opportunities, which puts other funding within their reach.
- Entry into new markets through economies of scale.
- Improved cultivars and diversification of cultivars, because members' farms vary in location/climate and type of soil. They can also provide stability to their buyer throughout the year.

IN CONCLUSION

There are a large number of forms of producer-controlled businesses in every area. As explained, they do not always only consist of producers. These producer-controlled businesses have a competitive advantage in most cases, because they saw an opportunity early enough and took action.

It has to be a win-win situation for everyone and the risk should not come down only on the producer. It also does not have to exist for ever. Ensure that there is an exit strategy, so that you can grab the next opportunity when the current business has reached its goal.

STEPS TO START A BUSINESS

1 Identify a need to be addressed or an opportunity that can be seized. Break it down into whatever technology, expertise or funding is needed.

2 Identify members who can make a successful contribution. Look at what they can offer. These members do not have to farm themselves; they can be a lawyer, agricultural economist, agriculturist or nutritionist. Everyone should be able to fulfil their own role and these roles should be set out clearly in the constitution of the group.

3 Formulate a vision. It is a long-term objective for why a group should be formed – what should be achieved and over what period. It is always easier to have a midterm (three to five years) vision and a long-term (five to ten years) vision.

4 Decide on a legal entity. It can be a company where the above-mentioned members are directors owning shares. If the company needs financing, each director or member can sign surety in their personal capacity. It is important to determine what each member's contribution can be, so that all the pressure is not placed on one member.

Each member can also pay a 'membership fee' and get it back when the business is profitable.

5 The finances of such a group are invariably the most important. It needs to be transparent and should always be updated. It is not only important for the members, but also to the bank should financing be needed.

Financial institutions analyse the projections and base their level of affordability on that. In conjunction with that, they also investigate the jockey – their expertise and financial positions and the type of security available. The more information at their disposal, the better.

6 Rules and regulations should be stipulated for the group. Meetings should be kept formal. An agenda should be drawn up and sent out and minutes should also be kept for every meeting.

Voting rights should be given to the members. This can be determined according to the volumes delivered by each member or equal voting rights for each member.

Producer-controlled businesses are not always started by the most successful, or the most qualified producer. Studies have shown that the producers who are known in the community, who have integrity and can think entrepreneurial, will be the most successful in the forming of such a business. These types of characteristics bring out self-confidence and positivity in the community, which then make it easier for producers to 'buy in'. ■

WORDS OF WISDOM

If you are working on something exciting that you really care about, you don't have to be pushed. The vision pulls you.

~ STEVE JOBS

BT TECHNOLOGY in an insect-resistance management programme

THE USE OF *BT* TECHNOLOGY (YIELDGARD®) IN CROPS PROVIDES EFFECTIVE CONTROL AGAINST INSECTS IN MAIZE AND FORMS A MODERN, ENVIRONMENTALLY FRIENDLY BASIS FOR INTEGRATED PEST CONTROL. *BT* TECHNOLOGY HAS PLAYED A MAJOR ROLE IN CONTROLLING STALK BORERS IN SOUTH AFRICA THE PAST 20 YEARS AND THE USE OF THIS TECHNOLOGY HAS LARGELY ELIMINATED THE EXCESSIVE USE OF MORE DANGEROUS PESTICIDES.

Magda du Toit, Corporate Engagement and Communications Manager SA, Bayer.
Send an email to magda.dutoit@bayer.com

An insect-resistance management programme is crucial in integrated pest management. Such a management programme consists of the following components:

- Knowledge of pest biology and ecology.
- A record-keeping system of insecticides used in a field.
- Refuge areas where the susceptible insects can breed and thrive.
- Monitoring, recording and reporting of insects that may be resistant.
- The application of integrated pest management practices.
- Communication and training.

Part of insect-resistance management is stewardship, which means that users use the technology in such a way that it can be passed on to the future and the next-generation users in a sustainable way.

The planting of refuge areas forms part of the insect-resistance management programme and stewardship. The Bayer Technology User Guide (TUG) provides a concise source of technical information about Bayer's current portfolio of technology products and sets forth requirements and recommendations or Best Management Practices (BMP) for the use of these products.

WHAT IS A REFUGE AREA?

A refuge area is a section of the farm where only non-*Bt* maize is planted. Here, the stalk borers are never exposed to *Bt* technology. Selection pressure for *Bt* resistance is therefore insignificant and the individual stalk borers found in a refuge area are almost all susceptible to the control offered by the *Bt* technology. Its purpose is to provide a population of susceptible moths that can mate with the tolerant moths that survived on the YieldGard® maize cotton. This prevents the surviving moths from being able to mate with each other and that the offspring of the moths will be tolerant.

A key aspect of the successful implementation of a refuge area and an insect-resistance management programme, is the ongoing monitoring of stalk borer populations in the YieldGard® planting so that timely intervention can occur and insecticide can be applied as soon as it appears that the stalk borer populations are not adequately controlled.

OPTIONS AND REQUIREMENTS FOR REFUGE AREAS FOR MAIZE

Option A: Planting a 5% area with non-*Bt* maize that is not treated with an insecticide.

Option B: Planting a 20% area with non-*Bt* maize that may be sprayed with a non-*Bt* containing insecticide/biopesticide.

The non-*Bt* maize, i.e. the refuge area must:

- Have a similar maturity as the YieldGard® maize.
- Be planted within seven days from planting the YieldGard® maize.
- Be planted on the same farm and under the same growing conditions applicable for the YieldGard® maize, e.g. under irrigation.
- Every grower must plant his own refuge maize.
- A refuge strip area must be at least six rows wide and positioned so that some refuge areas are planted at the outside borders of the YieldGard® maize.
- The mixing of *Bt* maize seed and non-*Bt* maize seed is not allowed.
- No *Bt* plant may be situated more than 400 m away from a refuge maize plant.

Planting a refuge area calls for careful planning and guidelines, as set out in the technology agreement or available from your nearest seed representative, must be strictly adhered to. For more information, contact your Bayer representative or *customercare.sa@bayer.com* or *www.dekalb.co.za*. ■

Photo: Annemie Erasmus, ARC Grain Crops Institute, Potchefstroom

THE CORNER POST

GARETH ALCOCK

Mentor and mentees on a journey of discovery

THE WORLD IS CELEBRATING THE 50TH ANNIVERSARY OF THE FIRST MOON LANDING WHICH OCCURRED ON 20 JULY 1969. ALTHOUGH DISCOVERING THE SECRETS OF AN UNKNOWN DESTINATION WASN'T ALWAYS AN EASY UNDERTAKING, TECHNOLOGY HAS MADE IT EASY TO EXPLORE THE WORLD WITH THE CLICK OF A MOUSE. HENRY MILLER, AMERICAN AUTHOR SAID: 'ONE'S DESTINATION IS NEVER A PLACE, BUT A NEW WAY OF SEEING THINGS.'

Louise Kunz, Pula Imvula contributor. Send an email to louise@infoworks.biz

So, the mentors and mentees who participate in the Grain SA mentorship programme do not have to leave the country to see a new destination as this programme offers them a unique journey of discovery.

FINDING HIMSELF IN THE SERVICE OF OTHERS

Gareth Alcock falls under the Dundee office, but functions as mentor in the Estcourt and Bergville areas. He currently resides on the outskirts of Estcourt, where he has been growing vegetables under irrigation for the past three years, while his wife runs a free range chicken operation.

He grew up in a farming family in the Underberg region and says he gained all his farming knowledge from his dad. 'I used to tag along with him and participated in youth shows during the school holidays which I enjoyed a lot.' After his studies, he worked as a farm manager which further broadened his agricultural knowledge.

As personal growth is important to him, he decided to look for new opportunities, and heard via the grapevine about the Grain SA Mentorship Programme. Willie Kotzé, operations manager of the Farmer Development Programme, offered him more information. 'I decided that as I have the agricultural experience and knowledge and am fluent in Isizulu, I should give it a go. I am really enjoying being part of this programme,' Gareth shares.

This is his fourth season as mentor and he has not just taught, but also learned a lot. 'In the beginning I found it to be a steep learning curve, especially as far as minimum till practices were concerned as this was something new to me. On a more personal level, I moved from job to job quite a lot, until now. I used to consider myself a farmer, but have now discovered that I am perhaps more of a teacher as I am really enjoying the teaching aspect of the programme.'

To Gareth job satisfaction is important. 'To see that you are making a difference to quite a few people's lives is what keeps me going.' He has also seen a different mindset in the rural areas with negativity not being as prominent here as in other circles. 'To them, life is carrying on. Things aren't so bad; the country is not falling to pieces.'

CHANGING LIVES WITH NEW METHODS

He tries to see his 160 farmers at least once a month for individual visitations at their home or in the field. The group of farmers under his guidance have been divided into four study groups. Unfortunately there is never 100% attendance at the weekly morning meetings, so the one-on-one visits ensure that farmers are kept up to speed with what needs to be done.

The three areas where the programme has really had an impact in this area, are:

- Minimum tillage. 'At the onset of the programme, this was really a big paradigm shift for them to realise that you can plant without ploughing. Ploughing is a major expense for them, so the farmers are blown away that they can achieve higher yields without tilling.'
- Planting date. 'These farmers used to plant on a specific date, without taking into consideration that things are different year to year.' After witnessing the results, they now know that they can no longer do the same thing at the same time every year – that circumstances and the variety planted makes a difference to the planting date and that every year is different.
- Plant population.

They have also realised that by using better quality inputs and the correct quantities, they can quadruple their yield. With good rains the past season the high yield achieved in this area triggered a lack of storage.

Gareth is also working hard at changing the farmers' perspective about the programme. 'Most see it as a food security project. I try to explain that it is about growing them through better agricultural practices to expand their business.' Although higher yields are exciting, the one area where growth has been slow, is farmers expanding their farming operations by increasing their hectares. 'The majority of farmers stick to their 1 ha. I would love to see that they have a desire to get more land and grow their businesses.'

One area which remains a huge stumbling block is the farmers farming in the communal environment. 'With livestock being brought back for communal grazing on the 1st of June, maize has to be removed whether it is dry or not or they will lose their crop.' It is also not possible for farmers to combine their maize plots instead of harvesting by hand on communal land.

To Gareth stand out moments during his time as mentor all revolve around an increase in yield. Seeing farmers, who never thought they could produce more than 1 t/ha or 2 t/ha, producing up to 8 t/ha – sometimes more than commercial farmers in the area – makes being a mentor meaningful. 'It is wonderful seeing people's perception change and believing in what they do.' ■

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