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PULA IMVULA

GROWING FOOD • PEOPLE • PROSPERITY

PGP MAGAZINE FOR DEVELOPING FARMERS

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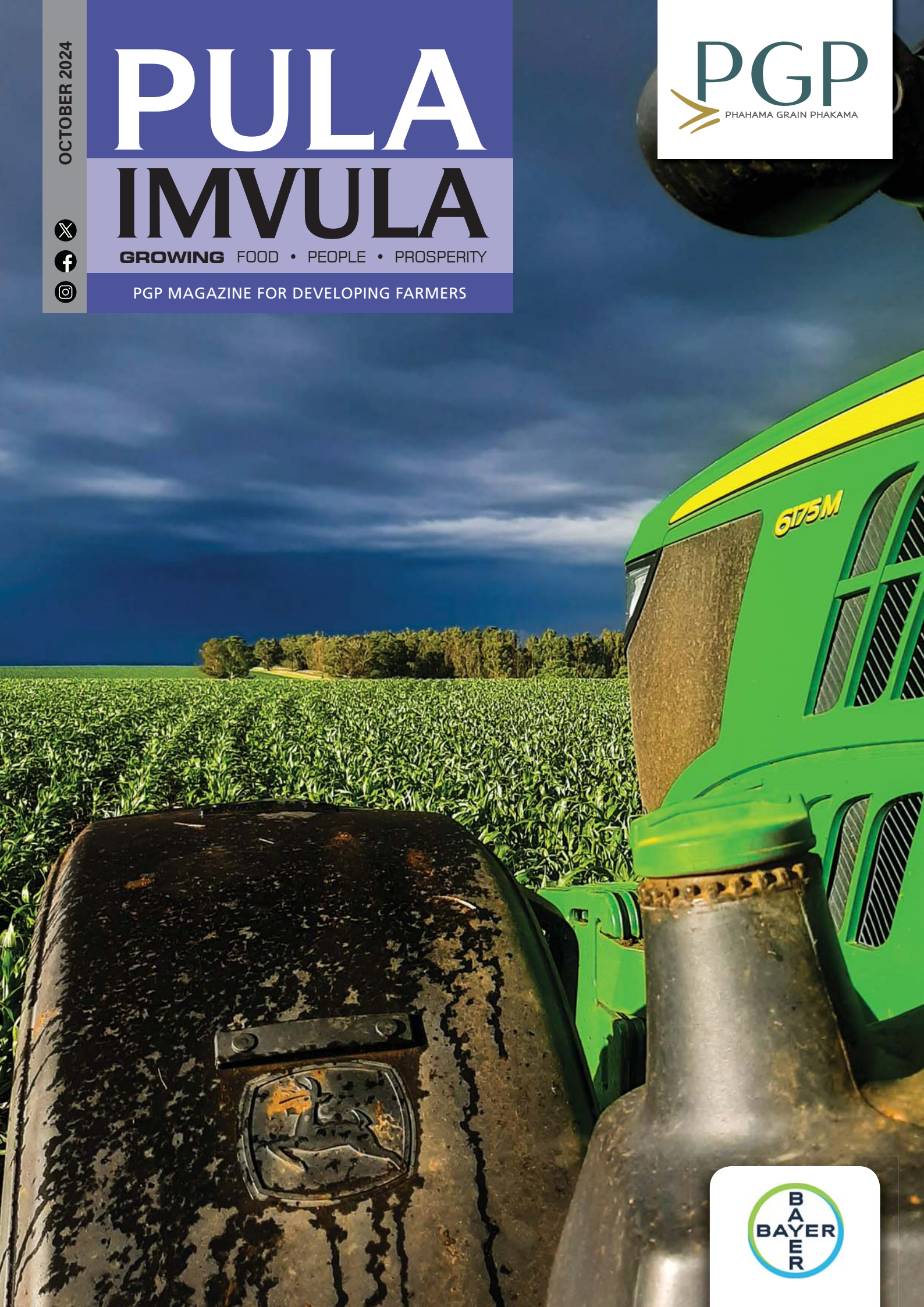

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PULA IMVULA

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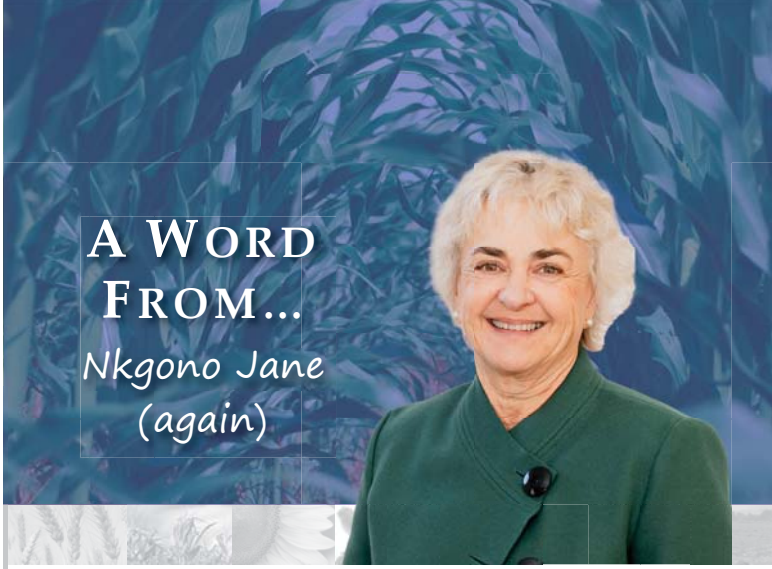


A Word From... Nkgono Jane (again)

I AM SO HAPPY TO BE BACK WITH YOU AND THIS WONDERFUL PROGRAMME. COMING BACK AFTER A WHILE HAS MADE ME REALISE HOW VERY IMPORTANT IT IS TO REMEMBER WHY THIS PROGRAMME EXISTS. IT IS TO HELP YOU, THE FARMER PRODUCING CEREALS, GRAINS AND OIL SEEDS, USING THE MOST MODERN PRODUCTION PRACTICES, TO USE THE LAND THAT YOU HAVE AVAILABLE, TO ENABLE YOU TO GENERATE AN INCOME.

The past few seasons have been tough. Covid-19 slowed everything down, and since then, the weather has been strange. Some areas have had too much rain, while others have experienced the worst drought ever. Strong winds have blown crops down. Severe frost and extreme heat have made farming difficult. However, as farmers, we are resilient and we always get up to plant another crop. This is what farmers do.

We are starting to service our study groups again. The visits have slowed down, but we know that it is important to meet with you so that we can establish a relationship of caring. We will be planting trials in some areas where we feel that our farmers need to see and experience other crops and different methods of doing things. The farmers' days will continue as the point where you can meet other role players in the field.

Training courses will continue – all aspects of farming from production to mechanisation, financial management and even succession planning. Who is going to take over your farm when you need to rest? If you can think of other topics that you would like to learn about, please let us know and we will do our best to assist you.

The Beyond Abundance project is going forward this year. Thanks to the South African Cultivar and Technology Agency (SACTA) and the Sasol Trust, we have been able to subsidise the inputs so that you can afford to plant your hectares. We hope to be able to expand this programme going forward.

The loan funding for certain farmers continues, although we need to work on new plans here. We are hoping to be able to have comprehensive insurance in the future so that when the weather is really bad, you can still get enough money to plant again in the following season.

From this month, October, we will only have *Pula Imvula* in English – this is to save costs as well as to enable other commodities to get involved (Read more on page 18).

A huge thank you to the donors who enable this programme to continue – Bayer, the Maize Trust, the Oil and Protein Seeds Development Trust, SACTA, Corteva, ABInbev and Grain SA members.

– Jane McPherson is the Phahama Grain Phakama advisor.

SOIL TILLAGE:
Do the right thing, RIGHT

PLANTS NEED TO TAKE UP SUFFICIENT WATER AND NUTRIENTS FROM THE SOIL TO GROW. THIS IS THE FUNCTION OF THE PLANT'S ROOTS. THEREFORE, ROOTS NEED TO BE STIMULATED FROM DAY ONE TO GROW OPTIMALLY. THE FARMER HAS TO OPTIMISE ROOT GROWTH CONDITIONS AND THE FIRST ASPECT TO PAY ATTENTION TO, IS TO OPTIMISE SOIL CONDITIONS FOR OPTIMAL ROOT GROWTH BY MEANS OF PROPER SOIL TILLAGE PRACTICES.

Taking into account the various objectives of soil tillage, the farmer must determine which of these objectives need to be achieved in his farming system. Of course it is connected to the farm's soil types! But first things first: Plan your tillage system in order to obtain your set goals effectively.

OBJECTIVES OF SOIL TILLAGE

Soil tillage creates a favourable structure in the topsoil

- **Soil aeration** is important for plant roots to thrive, as well as soil microbes. This is usually an issue in soils that are prone to crusting. As a rule, any soil disturbance alleviates the problem.
- Sandy soils are prone to **wind erosion** and making the soil surface rough by mechanical action, is one of the solutions. A tine implement is commonly used to achieve the objective (fitting into the conservation tillage concept), but also a mouldboard plough, which is opposed to conservation tillage.
- A **fine and firm seedbed** is essential for establishing an optimal plant population, because good seed-soil contact is needed for water uptake by the seed, which induces germination. Take care of too fine soil surfaces in sandy soils, because it may lead to wind erosion and seedling scorching.
- Rapid water infiltration is important to curb water run-off and associated soil erosion, but rather to get the rainwater into the soil to be used for crop production. A crumbly soil surface, without any compaction layers, is the objective to promote rainwater infiltration. Retaining as much as possible crop residues on the soil surface makes a significant contribution to rainwater infiltration.

Excessive crop residues may interfere with the planting process and therefore it may be necessary to incorporate some of the residues into the soil. Lime and fertiliser being spread should also be incorporated into the soil. To achieve these objectives, a disc harrow or off-set is commonly used.

Weeds can be controlled by either a cultivator or herbicides. A combination is recommended.

Root development

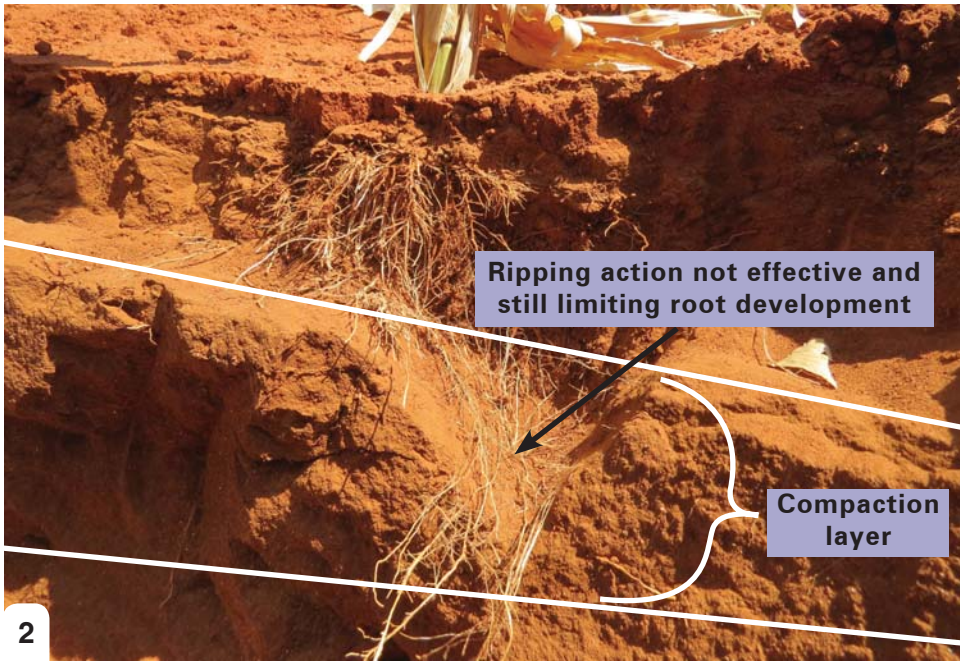
One of the major objectives of soil tillage is optimal root development. The topsoil must be free of compaction layers. Since tractor wheels are the main cause of soil compaction, there must not be any wheel compaction below the crop rows.

- Determine whether there are remains of wheel compaction in the soil profile. If present, determine at what depth it occurs – and even more important, at what depth does the compaction end, because that represents the depth of tillage of ripping needed. The correct way of determining this is by means of a penetrometer (**Photo 1**), which produces a graph of the soil strength, indicating the presence of a compaction layer and the depth of occurrence.
- Since compaction layers are very common in crop fields, it is a serious crop-limiting factor (**Photo 2**). It acts as a root developing barrier, which curbs deep root development. It consequently retards water and nutrient uptake in the subsoil, which leads to poor plant development and a poor yield.
- Crop roots grow at a rate of approximately 27 mm per day under optimal conditions. Maize roots reach a depth of 2 m and sunflower 1,8 m. When the rate of root growth is limited any time during the growing season, root development will not reach the optimal soil depth.

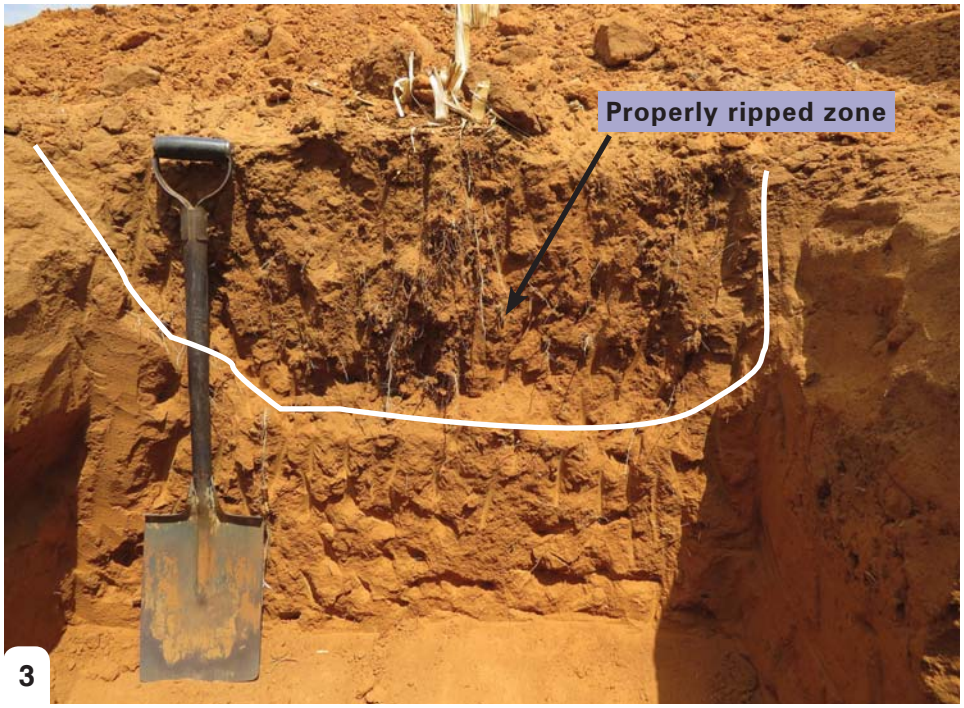
Initially the topsoil must be loose enough for the seedling to develop its roots in the topsoil. Approximately two weeks after emergence, the roots already begin to penetrate the subsoil. When reaching the tasselling stage, the roots will reach 1,8 m plus. A well-developed root system feeds and sustains a vigorous growing plant.

1

A soil scientist performing soil compaction tests by means of a penetrometer.



Compaction layers are very common in local crop fields and are a serious crop-limiting factor. An inefficient ripping action did not lift the compaction layer.



A profile pit indicating a well-developed root system after an efficient ripping action.

A vigorous growing plant fabricates lots of photosynthate in the leaves by means of photosynthesis. The plant then translocates the photosynthate to the roots as their nutrient need, after which the roots once again take up lots of water and nutrients for the plant. Therefore, the farmer must do everything in his ability to stimulate optimal root development, and this starts by means of proper and efficient soil tillage practices.

LIFTING COMPACTION LAYERS

Compaction must be lifted effectively. It is usually done by means of deep ripping, according to the desired depth as indicated by the results of the penetrometer survey. The working depth should be 100 mm deeper than the bottom end of the compaction layer.

Tine spacing is usually too wide, resulting in ripping some furrows in the compaction layer, and not lifting it properly (Photo 2). The tine spacing should be 70% of the tillage depth, with a maximum of 400 mm. Overestimating the efficiency of rippers is very common, as many rip actions are not effective in lifting compaction layers. Digging a profile pit in the ripped sone to control the efficiency of the ripping action is highly recommended (**Photo 3**).

Should the compaction layers occur within the top 200 mm of the soil and not any deeper, it can be alleviated by means of a mouldboard plough or a proper chisel plough action. It is very important to control the working depth of these actions, making sure that the desired working depth is actually reached.

SECONDARY TILLAGE ACTIONS

After the primary tillage action is done, secondary tillage actions will be needed. In the case where the primary tillage action was done directly after harvesting the previous crop, weeds will emerge after the first spring rain. Weed control must be done, by either spraying a herbicide or by means of a cultivator. Spraying, rather than a mechanical action, results in less tracks in the field and is preferred.

The next action is to prepare a seedbed free of any weeds. It is highly recommended that this action is done on the exact tracks of the planter tractor to follow. It will be necessary to fit markers on the cultivator right on the tractor's tracks, for the planter to follow these marked tracks. This practice is to prevent compacted tracks on areas where the crops will be planted.

The next action is planting on the marked tracks. Directly after planting, herbicides should be sprayed with the tractor once again driving on the established tracks. Perform the necessary actions to control weeds until the crop is too high for a tractor to pass.

CONCLUSION

It is important to determine the objectives you want to achieve with the tillage action. Determine the depth needed of the primary tillage, especially the presence of compaction layers, which may need deep ripping. Controlling whether the objectives are actually achieved, is equally important.

It is advisable to make use of a soil scientist or agronomist to determine the tillage actions needed, especially to identify compaction layers and the desired ripping depth. Also check the root development during the growing season to determine any other factors limiting it. ■

MARTIENS DU PLESSIS, SOIL SCIENTIST AND SOIL AND CROP CONSULTANT

Criteria for choosing the BEST HYBRID FOR YOUR FARM

ONE OF THE MOST IMPORTANT MANAGEMENT DECISIONS THAT FARMERS MAKE EVERY YEAR IS THE SELECTION OF A PACKAGE OF HYBRIDS TO PLANT. WHEN SELECTING A SUITABLE HYBRID PACKAGE, THE YIELD PERFORMANCE AND HEDGING OF RISKS ARE BOTH IMPORTANT CONSIDERATIONS. THIS IS COMPLEMENTED BY THE HYBRID'S AGRONOMIC CHARACTERISTICS AND DISEASE TOLERANCE ATTRIBUTES.

The criteria that a farmer sets for a hybrid will vary from farm to farm. Certain hybrid characteristics are important, regardless of where these hybrids are planted.

The following characteristics, not necessarily in order of importance, are key considerations in the decision-making process:

- Yield performance, stability and compensation ability.
- Hybrid package.
- Growing season length.
- Prolificacy – multi-eared or single-eared.
- Standability.
- Germination and vigour.
- Disease, insect tolerance and weed control.

Discussed in short below are the most desirable characteristics:

YIELD PERFORMANCE, STABILITY AND COMPENSATION ABILITY

The reliability of yield expectation from season to season is probably the most important aspect of the hybrid choice. Success depends on risk hedging and is determined by how accurately a hybrid's yield prediction can be made. The chance of success improves significantly if the hybrid choice is based on multi-season results across multiple locations.

Adaptability and stability are extremely important when choosing any hybrid. A hybrid that can deliver above-average returns under both favourable as well as adverse climate conditions will spread your risk. Choose hybrids that are stable over various environments and seasons, as it is difficult to predict the growing conditions of a coming season.

HYBRID PACKAGE

Despite the best efforts on the part of maize breeders, there is not one ideal hybrid. Therefore, a package of hybrids is recommended to spread the risk and increase the potential for the best yield under the prevailing circumstances. A hybrid package is constructed from various hybrids (different genetics, resistance properties, disease tolerances, etc.) and preferably with varying growing season lengths.

The yield and adaptability of a hybrid are the results of the interaction between a hybrid's genetics, the environmental factors and the management practices that are applied, for example:

- Planting date.
- Rainfall distribution.
- Stress factors e.g. drought stress, damage due to diseases, insects or hail.
- Crop rotation programme.
- Fertilisation, soil fertility and soil type.
- Cultivation practices.
- Weed control.

GROWING SEASON LENGTH

To ensure the best average yield, consider planting a package of hybrids with varying maturity. This reduces the probability that the entire crop will experience hot and dry conditions during the critical pollination period. This will be an advantage if planting is completed over a short period to fit in with the optimum planting window. If planting takes place over a long period, hybrids with different maturity groups are less important.

Under dryland conditions, hybrids in the earlier growth classes are generally better adapted in the eastern cooler and temperate regions with limited heat units and higher plant populations. In the warmer, drier western production regions, a combination of hybrids from medium to medium-early growing season are better adapted.

Single-eared hybrids with good standability are well suited for the high-potential production regions that require high plant populations.

Prolific or multi-eared hybrids are well adapted to low plant populations in areas with varying climatic conditions.

A package also offers the advantage that everything is not combine-ready at the same time. Early maturity hybrids also provide the opportunity to bank your money earlier. Under high input irrigation and double-cropping systems (high yield targets, water application and management input), the ultra-early hybrids are the best adapted.

PROLIFICACY: MULTI-EARED AND SINGLE-EARED HYBRIDS

The optimal plant population for various hybrids depends on several factors such as the environmental potential, type of ear and possible stress factors that may occur during the critical growth stages of the plant's development.

In general, hybrids that have ears which get smaller when the plant population is increased and larger if the population is reduced, are referred to as 'flex-ear' hybrids. Certain hybrids exhibit the ability to produce a constant ear size, regardless of the plant population, and are referred to as 'fixed-ear' hybrids.

Multi-eared hybrids

Hybrids that are well adapted to low plant populations generally have a robust plant type, sturdy stalks and big, hanging leaves. Commonly these hybrids correspondingly have a larger root mass. When these attributes are coupled with strong prolificacy, one would expect that this type of hybrid would be better adapted to varying climatic conditions such as these experienced in the western part of the maize production area.

These hybrids generally perform better under drought stress situations, since lower plant populations enable some buffering of water use during dry spells. They can, however, compensate under good production conditions by producing a second ear.

Single-eared hybrids

Single-eared hybrids with a fixed or semi-flex ear usually have more upright leaves, allowing better light penetration, reduced root mass and thinner, more woody stalks. Hybrids exhibiting these characteristics can generally be employed at high plant populations and can deliver excellent yields under high-potential conditions. These hybrids are generally better adapted to environments where water application or rainfall is more reliable.

STANDABILITY

Good standability facilitates effective combine harvesting. The primary causes of reduced standability are root and stem rot. If root and stem rot are noticed, it is advisable to combine infected fields early to limit losses by lodging of the plants, if drying facilities are available.

GERMINATION AND VIGOUR

Rapid germination and a strong seedling lay the foundation for a successful crop. Early vigour is particularly important on sandy soils, where wind damage to seedlings may occur. There are marked differences between hybrids with respect to early vigour.

DISEASE, INSECT TOLERANCE AND WEED CONTROL

By maintaining healthy leaves, the plant's factory can function more effectively, increasing the chance of good results. The risk profile of hybrids to important diseases is evaluated and plays an important role in area adaptability.

Leaf diseases caused by fungal infections are usually more prevalent in the high rainfall production regions – a fungicide spray programme can play an important role in protecting the yield potential. Bacterial diseases and vector-transmitted viral infections must be managed in other innovative and preventive ways.

The weed spectrum determines which herbicides should be applied, as well as the hybrids that can be planted. Hybrids with glyphosate tolerance provide broad-spectrum weed control. Keep in mind that tolerance to the harder herbicides (such as Sulfonylurea) differs between hybrids.

Read and adhere to herbicide prescriptions and check the tolerance of the hybrid against the planned herbicide programme.

SUMMARY

Here are some basic guidelines:

- Select hybrids that are proven performers based on multi-season data from multiple trials across a large, homogeneous area, and which take the yield performance, stability and adaptability into account.
- New hybrids should be phased in gradually.
- Select a package of hybrids with a variety of maturity or growth classes to spread the risk.
- Include early growing season hybrids in your package if early harvesting is important.
- Consider Bt-hybrids if plantings are going to be late in the season.
- Prolific hybrids should be considered in the dryland areas with a variable or challenging climate and will generally deliver stable yields.
- Single-eared hybrids are better adapted to high plant populations and higher potential conditions. ■

GRANT PRINGLE, AGRONOMY MANAGER, PANNAR SEED

CALIBRATING your planter MAXIMISES THE YIELD

EVERY PLANTER SHOULD BE CLEANED IN PREPARATION TO HEAD BACK TO THE FIELD EACH SEASON. HOWEVER, GETTING A PLANTER READY FOR OPTIMUM PLANTING IS MORE THAN JUST CLEANING. PLANTER CALIBRATION MUST BE DONE PROPERLY BEFORE PLANTING TO MAXIMISE THE YIELD.

A planting mistake can influence the final yield drastically. A too high or too low plant population will cost you money, so it is best to plant adequate seeds to ensure that the final plant stand is optimum for the desired yield. Obtaining an optimum yield depends on how you prepare and set your planter. Adjusting the planter to plant a specified number of seeds per metre or row is important in obtaining a proper stand.

A CHECKLIST FOR PLANTERS

Use the owner's manual extensively for calibration and check the following to ensure the best stand for your crops:

1. Ensure that the drive trains are not rusted or stiff.
2. Shaft bearings and sprocket bearings should be well lubricated and in good condition.
3. Chemical meters on the planter that are used for seed treatments must be cleaned and inspected.
4. Opener blades must not be worn.
5. Ensure that the sprocket teeth are not worn.
6. Make sure that the right tray has been selected for the specific seed size when using tray planters or vacuum planters with trays. The correct vacuum delivery for vacuum planters should be checked.
7. Finger-wheel planter dispensing mechanisms should be serviced and in perfect working condition.
8. If equipped, make sure the vacuum meter system is clean and seals are not worn to ensure proper metering.

In the field, dig to expose seeds in the row to make sure the planter is operating correctly. This may help to avoid an erratic stand after emergence. Confirm the desired seed depth and seed-to-soil contact.

During the planting season it is important to either store the planter inside overnight or to cover it to prevent moisture accumulation in the material storage hoppers.

SETTING A PLANTER FOR THE DESIRED PLANTING RATE

Suppose the desired maize stand is 40 000 plants per hectare. Assuming there will only be 90% of surviving, healthy plants, the planting rate (PR) can be calculated by the following equation:

PR = Plants per hectare desired/emergence percentage

PR = 40 000/0,90

PR = 44 444 seed/hectare

Seed per metre or row required for planting

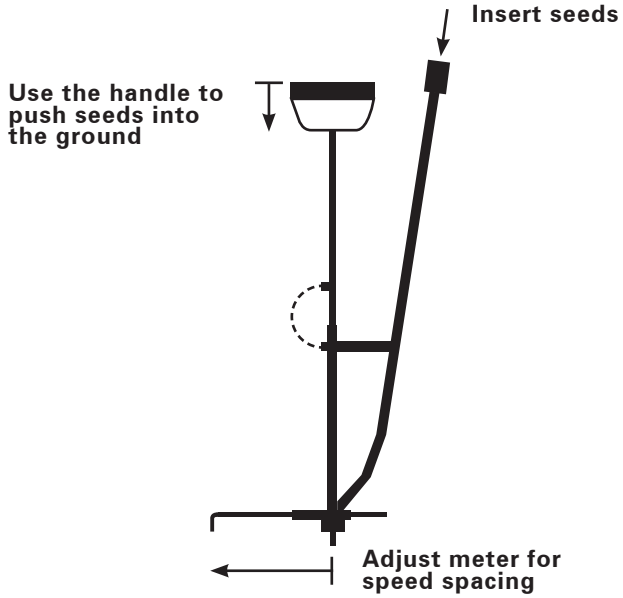
Convert the planting rate to reflect the row spacing in use. In this example, a 90 cm row spacing is used to do the calculations. One hectare is 100 m wide and 100 m long – or 10 000 m^2.

It is important to measure the distances between the pips.

The Farmer Development Programme offers an intensive training course on planter- and boom sprayer calibration.

If you open the row where seed has been planted, put the removed soil to the side. Make sure that the row marker is set correctly that the inter row distances are always the same.

1 *A hand-planter like this one can be used by small-scale farmers.*



To calculate the distance between the seeds:

1. Calculate the number of rows per 100 m. This is done by dividing 100 by the row in this example: 100 m ÷ 0,9 m = 111 rows.
2. Divide the planting rate (PR) with the number of rows, for example 44 444 (PR) ÷ 111 (rows per 100 m) = 400 pips per 100 m row.
3. Divide a 100 m row by the pips per 100 m to calculate the inter-plant spacing. Example: 100 ÷ 400 = 0,25 m apart.
4. This means that in 1 metre, 4 pips must be planted. Example: 1 ÷ 0,25 m = 4 pips per metre.

With this knowledge, the planter can be taken to the land to measure the plant density.

Seed dispensing can be done as follows:

1. Mark out a distance of 10 m in the field.
2. Set the plant depth so that the seed is placed on the soil.
3. Plant at the normal plant speed over the measured distance of 10 m.
4. Count the number of seeds delivered in a row over the distance of 10 m.
5. Divide 10 by the number of pips counted.
6. This gives you the interplant spacing.

If the plant population must be changed, change the gear combinations as indicated on the calibration table of the planter. If there are many double seed deliveries or seed is not delivered at all, make sure that the right tray has been selected for the seed size for tray and vacuum planters. The correct vacuum delivery for vacuum planters should be checked. Make sure finger-wheel planter dispensing mechanisms are working correctly.

Remember a mistake at planting cannot be corrected without re-planting, so make sure that everything is working correctly. Compare the number of bags of seed planted against the bags needed for the field on a regular basis. Check the planting distance regularly. ■

PIETMAN BOTHA, INDEPENDENT AGRICULTURAL CONSULTANT

CALIBRATE YOUR SPRAYER FOR EFFICIENT SPRAYING

SPRAYER CALIBRATION MUST BE DONE TO ENSURE THAT YOU ARE SPRAYING THE CORRECT AMOUNT OF LIQUID (WATER AND HERBICIDE) ON TO THE DESIRED AREA. FARMING IS ABOUT PROFIT, AND THE CORRECT APPLICATION OF HERBICIDE OR PESTICIDE WILL IMPROVE YOUR PROFIT.

A once-off calibration is not enough – you must calibrate it before the spraying season begins, and recalibrate it frequently throughout the spraying season. If you know the field size, compare the applied mixture with the mixture calculated to apply. For instance, if you spray 300 ℓ of water per hectare and the field is 10 ha, you should have applied 3 000 ℓ of water.

You only need a stopwatch or timer, which most cellphones have, a measuring jug (marked in ml) and a measuring tape.

START THE PROCESS

Although many methods can be used, the method described here is simple and requires only a few calculations. In principle you want to calculate how much water is sprayed per hectare. To do it, is very easy. Before you start, read your operation manual.

It is very important to clean your sprayer tank and the various filters and nozzles. Fill the tank with water and open the sprayer boom. Let the tractor run at the required revolutions/min (rpm) (e.g. 2 500 rpm). Engage the pump and let the sprayer spray. Make sure all the nozzles are the same type and colour and that the sprayer pressure is in line with what is needed for the nozzles.

A demonstration of effective sprayer during the calibration course.

Mgabiseleni Simon Dlamini receives guidance from the Louwsburg office on calibrating the spray.

METHOD

Measure a distance of 100 m on the farm road. Use the tape and place a dropper at the beginning and end of the 100 m.

- Fill the tank of the sprayer with clean water.
- Decide which gear will be used and at which rpm (e.g. fourth gear at 2 500 rpm). Remember it is difficult to drive a tractor with a sprayer accurately, so don't go too fast. First or second gear is fine.
- Using that gear and the correct rpm, measure the time that it takes for the tractor to cover the 100 m – for example, 60 seconds.
- Run the tractor in a stationary position, at the agreed 2 500 rpm, and check the spray cover that you are achieving on the ground.
- Set the pressure on the sprayer to give the desired effect (e.g. 3 bar).
- Using the same time that it took the tractor to cover the 100 m, engage the spray and measure the amount of water produced by catching the water delivered by one separate nozzle. Normally a few clean 2 ℓ milk bottles can be used to catch the water delivered by letting the nozzle spray into the bottle – for example, 1 200 ml/1,2 ℓ for 60 seconds.
- Use the amount of liquid produced by one nozzle (for example, 1 200 ml/1,2 ℓ) and multiply this with the number of nozzles (for example, twelve nozzles) so that you know how many litres you are spraying out over 100 m.
- With all the nozzles in this case: 28 x 1,2 ℓ = 33,6 ℓ.
- Measure the width of the boom (for example, 14 m). Now you know the width that you are spraying, and you know the amount of water you are spraying over that width over the 100 m. The area covered by the sprayer over the 100 m: 100 m x 14 m = 1 400 m^2.
- On this area, 33,6 ℓ of water is used. An area of 1 ha is equal to 10 000 m^2 (100 m x 100 m). The volume to be used on 1 ha will be 10 000/1 400 = 7,14 x 33,6 ℓ = 240 ℓ/ha.

Jerry Mthombothi, regional development manager from the Mbombela office, teaches farmers how to calibrate a knapsack sprayer.

- To make sure your calculation is correct: If your nozzles are 500 mm apart, take the delivery of one nozzle and multiply it with 200. In this case, 1,2 ℓ x 200 = 240 ℓ/ha, and this shows that the calculation is correct.

The label on the chemical container will indicate the amount of water required per hectare, as well as the number of litres of herbicide required per hectare.

> It is very important to clean your sprayer tank and the various filters and nozzles.

CALIBRATING A KNAPSACK SPRAYER

Source: PGP Farmer Development Training Manual

1. Using a measuring wheel or tape measure, measure 50 m.
2. Walk up and down the 50 m and measure the time it takes to cover the distance (50 m + 50 m = 100 m). Remember to walk at a steady pace, as you will have to keep up that speed. The faster you walk, the less liquid will be sprayed onto a particular area.
3. Spray liquid from the knapsack sprayer into a measuring jug for the same number of seconds that it took you to walk the 100 m. You will now know how much liquid you would have sprayed out onto the 100 m. Example: Suppose you sprayed 1,75 ℓ of water into the jug. You know then that you will use 1,75 ℓ of water for every 100 m walked.
4. It is now necessary to calculate the number of rows in 1 ha. As you know, 1 ha is 100 m by 100 m. Assuming the row width is 0,9 m, there are 111 rows in 1 ha.
5. If the liquid in the jug was 1,75 ℓ (step 3), you will use 1,75 ℓ on one row. There are 111 rows in 1 ha, which means to cover the whole hectare, you will need 111 x 1,75 ℓ of liquid = 194 ℓ/ha in total.
6. The chemical label will indicate the amount of the specific chemical, which should be applied per hectare or per 194 ℓ of water.
7. The chemical rate (per hectare) ÷ the number of litres used = the concentration of chemical per litre of water.

You now have the following options:

- Fill a container with 194 ℓ (a standard large drum is 200 ℓ) and pour in the chemicals required per hectare. Stir well and continue stirring regularly to avoid the chemicals settling. You can then use this premix to fill your knapsack or spray tank.
- If you are using several smaller water containers, for example 20 ℓ containers, or even if putting chemicals directly into the knapsack sprayer, multiply the concentration of the chemical per litre (step 7) by the number of litres that the container holds. ■

PIETMAN BOTHA, INDEPENDENT AGRICULTURAL CONSULTANT

PLANTING DATE IMPACTS YIELD POTENTIAL

GRAIN FARMERS MUST MAKE MANY IMPORTANT MANAGEMENT DECISIONS EVERY YEAR BEFORE EACH NEW SEASON. VERY OFTEN DECISIONS ARE MADE ACCORDING TO PREVAILING WEATHER AND SOIL CONDITIONS, OR THE NUMBER OF HECTARES TO BE PLANTED.

Two of the decisive decisions that have a major impact on the yield at the end of the season are cultivar selection and the planting time. An optimal planting date presents the whole crop with the best environmental conditions across its growth phases. This may eventually result in the highest yield due to favourable climatic conditions, with (hopefully) good rainfall, adequate sunlight and good temperatures. South Africa's unpredictable climate can make adhering to an optimal planting window complicated.

It is important to remember that planting dates are region-specific. However, farmers need to be informed and stay alert. If the conditions are not right, you need to have a plan of action for addressing fluctuations to the norms.

THE PLANTING WINDOW

Here are some guidelines for the different regions, weather conditions permitting.

MPUMALANGA


Late October to mid-December


November to late December


October to the beginning of November/ optimal planting date: 20 October and 20 November


Early to 25 November, not later

NORTH WEST


Mid-November to 24 December


Mid-November to 20 January


Mid-November to mid-December

 Maize  Sunflower  Soybeans  Groundnuts  Drybeans

FREE STATE


Mid-October to 20 November


20 November to 5 January


15 October to 10 November


10 December to 5 January

KWAZULU-NATAL


20 October to 25 November (dryland)


15 October to 15 November (dryland)


15 December to 20 January

EASTERN CAPE


1 November to 20 November/cut-off: 1 December


20 November to 20 December

- **Kokstad**


Mid-October to mid-November/cut-off: 10 December

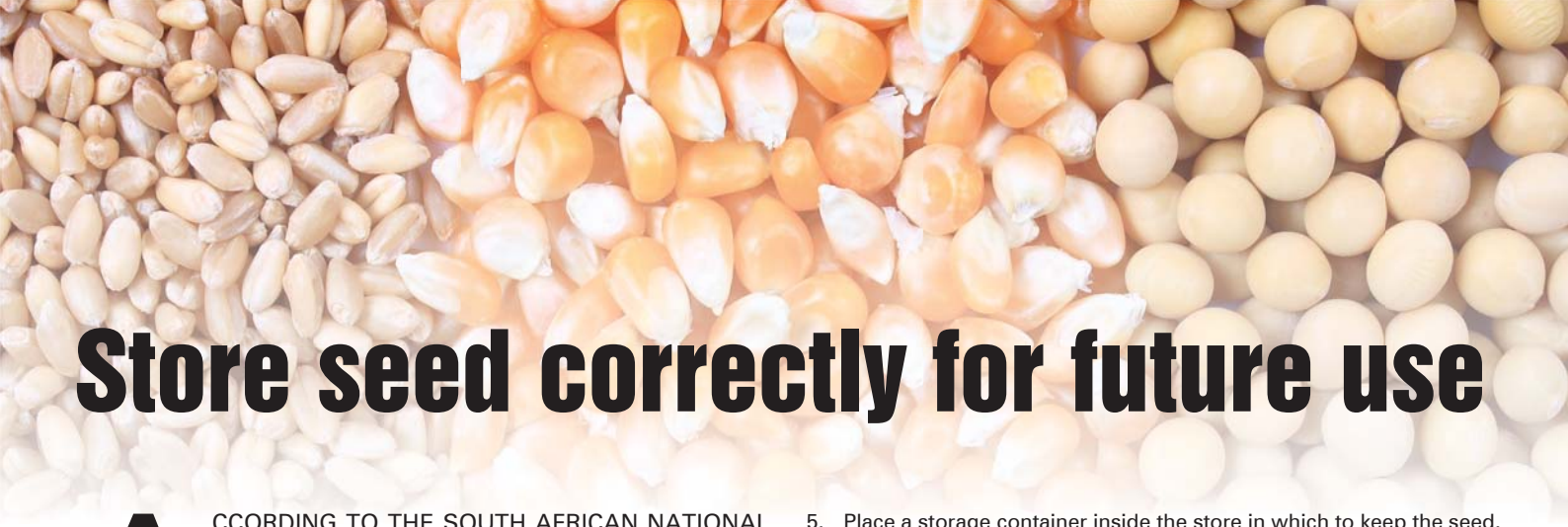

20 November to 20 December

- **Ixopo**


Mid-October to 20 December


20 October to 25 November/cut-off: 1 December ■

PULA EDITORIAL TEAM



Store seed correctly for future use

ACCORDING TO THE SOUTH AFRICAN NATIONAL SEED ORGANISATION (SANSOR), THE CONDITIONS UNDER WHICH SEED IS STORED ARE A DECISIVE FACTOR IN THE YIELD POTENTIAL OF THE SEED.

Factors that have an influence include:

Handling of seed: Do not throw down sacks with seed, as rough handling cause the seed to burst or be damaged. Internal damage is often only visible after germination, and leads to reduced vigour and yield.

Longevity: As seeds age, they gradually lose viability. Maize and sunflower seed can be stored for two to three seasons, while the seeds of crops like soybeans and groundnuts have a shorter life.

Moisture content: An increase in moisture content increases the deterioration of seed. Producers growing seed crops should dry the seed as soon as possible after the harvest and store it in sealed containers.

Storage conditions: Seed vigour deteriorates more quickly when storage conditions are not optimal. Seed degradation is caused by high temperatures and high seed moisture levels in particular – which can be caused by high relative humidity in the store.

Temperature: The storage life of seed increases as the temperature decreases. Seed should be stored at about 15 °C, but if possible rather in cold storage at approximately 4 °C.

STORAGE OF SEED ON FARMS

Here are a few useful tips on the storage of seed on farms:

1. The storage facility should have a solid floor.
2. Seed should be packed on pallets because of a high potential for floor contamination due to water or other materials that may leak.
3. Seed should preferably not be stacked higher than 2 metres, as the seed at the bottom can be damaged by pressure from above.
4. The store should be dry and cold.
5. Place a storage container inside the store in which to keep the seed.
6. Ensure that there is air flow to eliminate high temperatures and humidity.
7. Make sure that the roof does not leak to prevent possible germination and mould.
8. Inspect the seed regularly for the presence of insects, moths and weevils.

> An increase in moisture content increases the deterioration of seed.

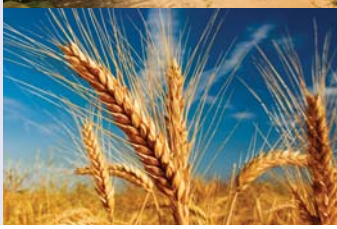
9. Protect the seed against rodents like rats. Liquid bait works the best in stores. Conduct regular inspections and supplement the bait when necessary.
10. Leave a space of at least 1 metre between the seed and other substances like chemicals or fertiliser. Also leave a space open between the seed and the sides of the storage facility to promote ventilation.
11. Keep the seed store free of dust and rubbish.
12. Do not remove labels from containers and keep seed from the same seed lots and varieties together.
13. Keep the seed labels until after the seed has been harvested so that it is easier to identify the problem if there is one.
14. If seed has been stored for a long period, have it tested by a registered seed-testing laboratory before it is planted. ■

KARINA MULLER, SA GRAAN/GRAIN EDITORIAL TEAM

WORDS OF WISDOM

Young people are the most critical asset on farms and with farmers' organisations. Investing in their development is essential for the future of agriculture.

~ KATI PARTANEN
agricultural expert and World Farmers' Organisation (WFO) board member from Finland



GUIDE TO DETECT ANIMAL DISEASES EARLY

WHEN IT COMES TO ANIMAL HEALTH, EARLY DETECTION IS ESSENTIAL FOR TIMELY INTERVENTION TO ENHANCE TREATMENT SUCCESS. EARLY DETECTION AND INTERVENTION CAN PREVENT MORE SERIOUS CONSEQUENCES. AFTER PRESENTING AS UNWELL, CATTLE MAY REQUIRE A CLINICAL EXAMINATION TO GET A DIAGNOSIS.

This guide will assist you to perform an examination of your cattle. It will guide you in identifying what symptoms need further investigation and immediate attention.

GENERAL

Pulse

The pulse of cattle is taken at a point at the bottom of the base of the tail. To take the pulse, you should measure it with the index and middle fingers of your hand. The normal rate is 40 to 80 beats per minute in an adult animal – but it is higher in a young animal.

Appearance

A healthy animal is alert and aware of its surroundings. The animal will also be active and keep up its head to see what is happening around it.

Signs that an animal is not feeling well are when it separates from the herd/group, is not interested in its surroundings and does not want to move around.

Movement

Healthy animals will walk easily and steadily, with its weight on all four feet and regular steps.

Irregular movement results from pain in the feet or limbs. An animal that doesn't stand up when you go near it, or that is lying down and doesn't stand up quickly, is not healthy.

Appetite

A healthy animal should eat and drink normally.

A loss of appetite that results in weight loss is an indication of illness.

Breathing

Breathing should be smooth and regular when resting. Remember that movement and hot weather can increase the breathing rate.

A sign that may indicate illness is irregular breathing – either too fast or too slow – as well as coughing.

Dung

The dung of a healthy animal will be firm but soft.

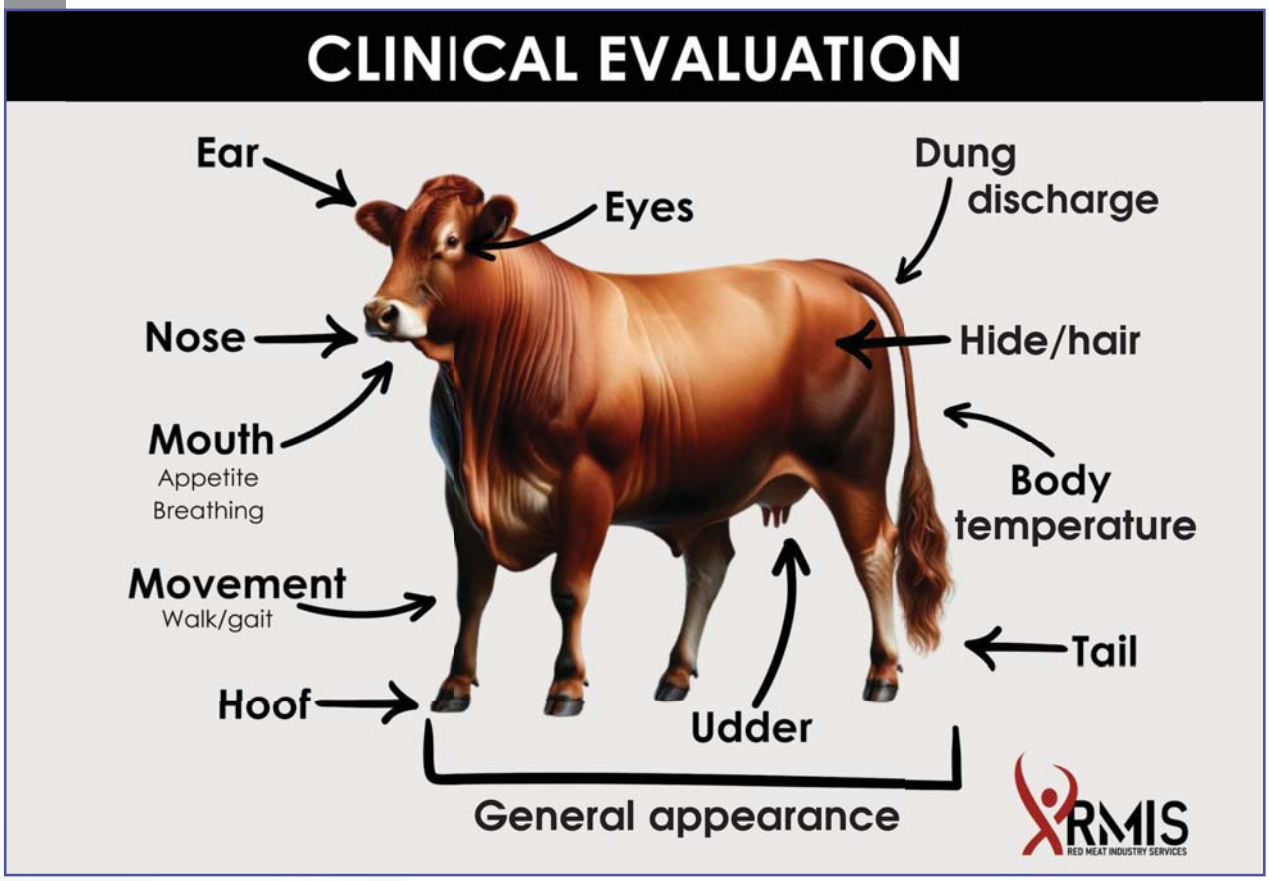
Very soft dung (diarrhoea) is a sign of illness. If the animal has constipation (difficulty in defecating), it is also a sign of poor health.

Temperature

The normal body temperature should be 38°C.

A body temperature that is higher than normal, is usually a sign of infection.

1 *Areas where diseases can be detected in cattle.*



Source: RMIS

Photo: Tiani Claassen

1 *External indications.*

Part of the body	Healthy	Sick
Eyes	Bright and alert	Sunken, swollen or bewildered eyes Discharge at the corners Pale/yellow inside eyelids
Ears	Upright ears with quick movements	Drooping ears Rubbing/scratching ears
Nose	Damp, with no nasal discharges	Dry nose – indicative of a high temperature Nasal discharge – indicative of respiratory infection
Mouth	There should be no saliva dripping from the mouth	Grinding teeth Excess saliva dripping from the mouth Swelling of lips Warts/sores Swollen jaw
Hair/coat	Smooth and shiny	Coat feels harsh and rough Untidy or dull hair Skin irritations
Udder	Healthy udder	Swollen and red udder Injuries to teats Blood or other matter in the milk Tick infested
Tail	Clean	Dirty – sign of diarrhoea
Hooves	Clean hooves without cracks	Cracked/injured hooves Check for abscesses Abnormal long hooves Swollen feet

INFORMATION PROVIDED BY THE RMIS

Spotlight on WEED MANAGEMENT

ON 26 JUNE, GRAIN SA HELD AN ENGAGING WEED SCIENCE DAY IN PRETORIA, BRINGING TOGETHER A DIVERSE GROUP OF PARTICIPANTS INCLUDING CHEMICAL INDUSTRY EXPERTS, RESEARCHERS, GOVERNMENT OFFICIALS AND FARMERS. THIS COLLABORATIVE GATHERING WAS DEDICATED TO TACKLING PRESSING WEED MANAGEMENT CHALLENGES THROUGH INNOVATIVE AND COOPERATIVE STRATEGIES.

Rising challenges concerning weeds loom over the grain industry, as weeds such as *Amaranthus*, *Lolium* and *Conyza* species are evolving, defying traditional control methods with increasing herbicide resistance. The goal of the Weed Science Day was to identify key areas of concern, assess current measures being taken and explore new strategies.

The day highlighted a growing challenge with herbicide resistance and underscored the need for the increased raising of awareness and continuous communication, as well as robust evaluation and monitoring. Alongside this, the current lack of capacity in weed science demands immediate intervention.

CURRENT WEED ISSUES FACING THE GRAIN INDUSTRY

In the summer grain region, the major challenge identified was the prevalence of *Amaranthus* and *Conyza*, which are suspected of developing resistance to herbicides such as glyphosate. A need was raised for more information on the distribution and occurrence of weed species in the summer grain region, and surveys can positively impact research priorities and initiatives.

An urgent need was highlighted for effective weed management strategies to keep farm productivity high and minimise economic losses from reduced crop yields and poor quality.

HERBICIDE RESISTANCE

There has been a global rise in unique cases of herbicide resistance and South Africa is no exception. The South African Herbicide Research Initiative (SAHRI) was established after the first detection of *Amaranthus palmeri* in South Africa and has since been screening for herbicide resistance in *A. palmeri* and *A. hybridus*.

SAHRI's screenings revealed that *A. hybridus* poses a significant threat to crop production due to increasing herbicide resistance build-up and its distribution across the country. In screening Palmer populations, varying glyphosate susceptibility was noted, as well as resistance to other chemicals – revealing no one-size-fits-all solution and emphasising the need for continuous monitoring.

In addition to SAHRI, researchers at the Agricultural Research Council and Stellenbosch University are conducting herbicide resistance monitoring. Diagnostic facilities and capacity are vital for identifying weeds and assessing herbicide resistance.

Efforts to combat herbicide resistance in South Africa's grain industry, particularly within the summer grain production area, are paramount for ensuring sustainable agricultural practices. A comprehensive understanding of weed ecology and biology is essential to develop effective management strategies that can mitigate this growing threat. The industry is urged to actively support scientific initiatives, as their backing is crucial for maintaining focus on priority research areas.

Conyza *spp in a no-till field.*
Photo: Dr Maryke Craven

MANAGEMENT STRATEGIES

Herbicides have long been regarded as the silver bullet for weed management, yet rising resistance to key active ingredients is undermining their viability. Moreover, the effective application of herbicides remains a challenge due to factors such as wind, timing and temperature.

An integrated weed management approach is essential for cost-effective management of the seed bank. This should include incorporating crop rotation, competitive crops, livestock, cover crops, row spacing and precision technologies.

Ultimately, it's crucial to accept that fields will never be completely weed-free. The focus should be on managing weed populations effectively and balancing the costs of control against the damage caused by weeds.

Future directions

Effective weed management is essential for achieving high yields and maintaining crop quality. Technological advancements in weed control have been instrumental in enhancing agricultural productivity over time.

While herbicides have traditionally been a straightforward and cost-efficient method for weed management, their effectiveness is declining as herbicide-resistant weeds become more prevalent. This highlights the urgent need for cost-effective and sustainable weed management strategies to control herbicide-resistant weed populations through diverse, integrated practices.

To get in touch with the research community for advice or resistance screening, contact:

- Lavinia Kisten: 083 273 0709/*lavinia@grainsa.co.za*
- Pfano Musetsho: 065 887 7946/*pfano@grainsa.co.za*

DR LAVINIA KISTEN (RESEARCH COORDINATOR INTERN) AND PFANO MUSETSHO (RESEARCH INTERN) FROM GRAIN SA

Corner Post

BY LOUISE KUNZ, ASSISTANT EDITOR

JAN (OUJAN) MASIU (63), WHO FARMS NEAR SENEKAL IN THE EASTERN FREE STATE, IS A FARMER WHO DOESN'T GIVE UP WHEN PROBLEMS ARISE. EVEN THOUGH CHALLENGES SUCH AS THE WEATHER, A SHORTAGE OF IMPLEMENTS AND THE MARGINAL SOIL MAY HAVE HAD AN IMPACT ON HIS FARMING SUCCESS, HE IS STILL DETERMINED TO BE A SUCCESSFUL FARMER.

The farm where his mother worked, helped Jan to develop from a 15-year-old teenager helping out on the farm to a hardworking, passionate farmer who farms with his whole heart. Today, he runs a mixed farming operation together with two of his sons, Bush and Vincent, on the farm Driekoppen – a 698 ha farm, which he secured in 2017 on a 30-year lease agreement from the Department of Agriculture, Land Reform and Rural Development (DALRRD).

Driekoppen is a mixed farming operation where maize, sunflower and soybeans are produced on marginal soil, with an average yield of 3,8 t/ha on maize and 1,8 t/ha on sunflower. Last season he planted 90 ha of maize, 30 ha of soybeans and 50 ha of sunflower. Like so many other farmers in this area, climatic conditions proved challenging this season.

'It was very difficult to see the damage caused by the drought and extreme temperatures,' he says. This season he hopes that he will at least be able to cover his production costs after the harvesting is done.

Although he had a lot of experience with dairy farming and cattle in his childhood, he became more interested in crop farming when he realised the importance of contributing to food security in the country. Thanks to neighbouring farmers, he heard about Grain SA and became part of the Farmer Development Programme (FDP), where he could obtain the necessary knowledge. Jan has high praise for the FDP team and says the input from this team has helped him grow as a farmer.

Jan believes that one is never too old to learn. 'I didn't complete my schooling, but now I continue learning to become a better farmer.' He is also not shy to ask for advice when he is unsure of what to do. 'Even a small-scale farmer may have some knowledge from which I can benefit.'

JAN'S STORY

WHO CONTRIBUTED TO YOUR SUCCESS?

Jacques Roux, the regional development manager, and before him Ntate Johan Kriel, who now works in the Western Free State, have both played a major role in developing me as a farmer. My neighbours and other farmers, the contractor who harvests and the study group members have helped me with advice when I needed it. And of course, my wife, Agnes, who is always at my side.

WHAT ARE YOUR DREAMS FOR YOUR FARMING FUTURE?

Improving the soil health at Driekoppen for the following season is important – then I can improve my yield and one day buy a harvester. Not having the necessary implements puts one at a disadvantage, so I would like to own a harvester as contractors often arrive late, which has an impact on the yield. If I have all the equipment, I can farm better.

ADVICE FOR YOUNG FARMERS?

You don't know everything, so listen to others and learn from them.

3 TOP TIPS

1. Look after your soil, and the soil will look after your crop.
2. Pay your debt before you spend money on yourself.
3. Be a hands-on farmer. A farmer who farms from afar, is not a farmer.

FARM FACTS

Farm: Driekoppen
Nearest town: Senekal
Region: Free State
Size: 698 ha – 315 ha of arable land where he plants, while the rest is used for grazing
Type of farming operation: Mixed – plants maize, sunflower and soybeans. Livestock – farms with Bonsmara cattle.

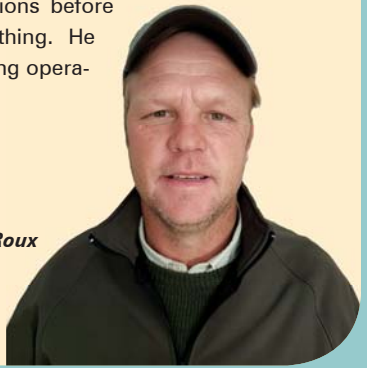
PGP'S CONTRIBUTION

- Joined Grain SA in 2017
- Study group: Senekal Study Group

Training courses completed:
Has completed a few courses including:

- Introduction to maize production
- Introduction to sunflower production
- Introduction to soybean production
- Calibration of planters and sprayers

A mentor's view:
Jacques Roux, regional development manager in the Eastern Free State, says Jan is a committed farmer who has a lot of support in the community. 'He is really keen to be a successful farmer, so he follows advice to the tee. When it comes to spending money, he thinks carefully about his options before he buys anything. He puts his farming operation first.'



Jacques Roux

A programme that is changing lives

Advancing agriculture through research

GRAIN SA IS AN ORGANISATION ESTABLISHED BY FARMERS FOR FARMERS, SERVING AS A VOICE AND SUPPORT FOR THE GRAIN AND OILSEED INDUSTRY. ITS GOAL IS TO HELP FARMERS ACHIEVE PROFITABILITY AND SUSTAINABILITY THROUGH ITS VARIOUS DEPARTMENTS, INCLUDING ECONOMICS, PHAHAMA GRAIN PHAKHAMA (FARMER DEVELOPMENT), COMMUNICATION AND RESEARCH.

The common thread across these departments is the focus on mining data and communicating it as usable information to the farmers. Research initiatives within Grain SA are coordinated through the following research portfolios known as consortia: Crop Improvement (CIC), Plant Health (PHC) and Climate Resilience (CRC). The consortium-based approach ensures that solutions to the pressing and complex problems that farmers face, are addressed and outcomes shared.

CIC was established to address South Africa's wheat production shortfall, as the country currently produces only 50% of its wheat needs.

PHC aims to enhance food security and competitiveness for South African grain and oilseed farmers by providing accurate pest and disease diagnostics. Additionally, the consortium develops effective management strategies to ensure that farmers can handle pest and disease threats and remain globally competitive.

CRC: Climate change and seasonal climate variation are quickly becoming real threats to the South African grain and oilseed industry. CRC supports agricultural resilience by conducting trials on maize, sorghum and soybean varieties to identify the best practices for sustainable and profitable production and to advise on the best cultivars for specific environments. Their annual evaluations provide essential data that helps farmers to make informed decisions and navigate climate variability with greater confidence.

CONCLUSION

Grain SA's research portfolios play a pivotal role in advancing the agricultural sector by providing farmers with the necessary knowledge and tools to enhance productivity and sustainability. By staying informed and involved with these initiatives, farmers can directly benefit from cutting-edge research and implement strategies that address current challenges such as climate resilience, crop improvement and plant health.

Meet Grain SA's research team:

Dr Godfrey Kgatle
(research coordinator)

Dr Lavinia Kisten
(research coordinator intern)

Pfano Musetsho
(research intern)

New chapter has dawned for PULA imvula

THIS magazine started in the early 2000s and was a black-and-white leaflet, available only in Setswana for developing farmers in North West. Since that time, it grew to a full-colour newsletter printed in seven languages (English, Afrikaans, Sesotho, Setswana, Sepedi, isiXhosa and isiZulu). Subsequently, due to cost constraints, Afrikaans and Sepedi were excluded, and more recently there were only three languages – English and two African editions (isiZulu with isiXhosa in alternate months, with Sesotho and Setswana in alternate months).

One of the driving factors of the high costs are the translations and layouts of the different languages. The translations also add a considerable length of time to the process of producing and disseminating the newsletter.

ENGLISH ONLY

Jane McPherson, PGP advisor, says that many things have changed in South Africa over the past 25 years. 'English has been widely used as the main language of communication.

'We have consulted with the farmers in the programme and the response has been positive in terms of accepting that *Pula* will from now on be available in English only. At the recent PGP board meeting, the matter was discussed, and the board is also comfortable to reduce the languages to only English.'

A LETTER FROM A TRANSLATOR

The Xhosa translator, sent this letter after being informed that the translators' services will no longer be needed:

Dear Pula Imvula team

I am writing this letter in tears of joy and sorrow. I have been a family member of *Pula Imvula* since its inception in 2005. I have enjoyed not only the healthy business relationship I have had with both Grain SA/PGP and Infoworks, but it was also a great pleasure and honour for me to be part of the Farmer Development Programme of our country. Thank you so much for this opportunity.

I feel bad that I failed to attend at least one NAMPO and also never had the opportunity to meet some of the isiXhosa-speaking farmers I have provided my services for.

My blessings and best wishes to all the people involved in PGP and the farmers of our country, particularly those who have not yet reached the new era commercial stage of farming.

With kind regards
Kholisa Podile

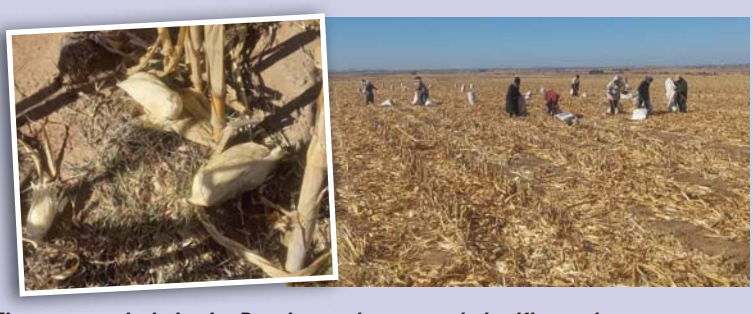
Planning ahead for the new season

THE Farmer Development Team has been busy visiting a total of 79 farms between 9 July and 7 August. In this time most of the farmers were working on their business plans and applications for loan funding for the coming season. They were also doing implement maintenance and soil corrections, getting ready for the new season.

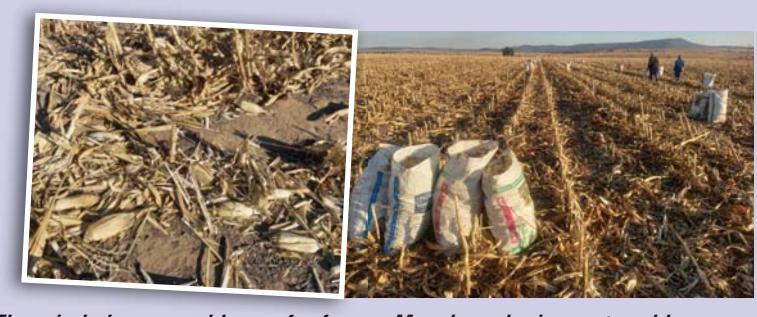
Here are some of the activities captured by the mentors and regional development managers that paint a picture of the highs and lows of farming.

Gua Abram Makhunga, who is mentored by Martin Botha from the Louwsburg office, helped his neighbour to harvest maize.

Phumzile Ngcobo, assistant regional manager at the Dundee office, visited Zanokuhle Nonkululeko Mabuza. Her maize had been harvested, dried, threshed and stored in maize bags, ready for delivery to a local mill.



The recent winds in the Dundee region caused significant damage to farmer JJ Ngwenya's maize crop. This added to his costs, as the cobs had to be picked up by hand.



The wind also caused havoc for farmer Masuku, who is mentored by Chris de Jager from the Dundee office. As the wind blew many cobs from the stalks, this farmer also had to collect the cobs by hand.

LEARNING FROM A FINALIST

A successful farmers' day was held at Ngodini (Ntababomvu) near Dundonald on 25 July. More than 70 farmers attended this day, which was hosted by Mfaniseni Khumalo, a finalist in the 2024 Subsistence Farmer of the Year (FoY) category. He addressed the farmers and shared with them the production practices he had followed, which helped him realise 7 t/ha of yellow maize.

Mfaniseni Khumalo in his maize field.

Jerry Mthombothi and Phumzile Ngcobo from the PGP team discussed the planting of maize. This included planting dates, soil preparation, plant population, fertilisation, chemical weed control using both pre- and post-emergence herbicides. Another topic discussed was the Beyond Abundance Project.

Apart from Grain SA's personnel, representatives from Bayer, the Department of Agriculture in Mpumalanga, Afgri Lothair Silo and FABI (University of Pretoria) were also present. A representative from the Department of Agriculture Disaster Management in Mpumalanga spoke to the farmers about the dangers of veld fires and the importance of fire breaks.

The good attendance at the Ngodini farmer's day shows that farmers are eager to learn.

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from the ground up

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