PULA IMVULA

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NKGONO JANE SAYS...

IN THIS ISSUE...

The month of December is always a very special and happy time for most people as the schools and universities are on holiday and many people take their annual leave at this time. The wheat farmers in the Western Cape are also most likely to be having a well-earned rest. This is not the case for the summer crop farmers – for them it is the busiest time of year.

The planting of soybeans will have been completed, maize will be completed this month, but the planting of sunflowers and dry beans will be ongoing. These farmers cannot take leave in December. Hopefully you will have experienced good rains which not only make the crop grow, but also the weeds. It is crucial that you keep scouting your land for signs of weeds, pests and diseases. The sooner you identify a problem, the sooner you can fix it!

The Jobs Fund project has been approved and we have 17 mentors out in the field helping those 1 700 subsistence farmers to plant their maize and dry beans. This is a very exciting project and we hope that this project will enable a large number of small farmers to use the land that they have available. We have designed this project in such a way that the farmers pay a higher percentage of the inputs each year so that by year five they are carrying the full production costs. We all know that getting grants is like receiving a gift, but it is not sustainable to get grants forever. We must help farmers to be sustainable and profitable without the help of grants. Farming is a business (however small) and each farmer must continue to farm without grants. Grants are just a 'hand up' to get you on your feet.

We are fortunate in South Africa to have a long and warm summer (and usually with rain) – we must make use of this productive season. We are able to plant many crops – both for own use as well as for the market. Please be sure to be using all the land that you have to produce food. We have a responsibility towards those who cannot access land to grow food – we must feed ourselves and others.

I wish you all a Blessed Christmas Season – enjoy the time that you have with friends and family. We trust that 2016 will be a Happy Year for everyone – remember that the harder you work the luckier you might get!

Nurture your maize from germination to harvest

Inspect your crop regularly and take action early.

December is always a busy time of year for a maize farmer. There is always a rush to get the crop in before Christmas and the festive period, especially in a year when the rains arrive late. This rush should however not translate into neglect and sloppy work practice.

Always take the utmost care when putting your crop in the ground. Be sure to be precise and diligent in everything you do to make sure you achieve the best possible yields when the crop is harvested.

Planning is a crucial aspect of crop farming and the key to success is to be well prepared for whatever challenges may arise, leading up to and during the planting season. I believe that there are three primary goals that a farmer should set before the planting season and another three after the plants are in the ground and growing.

Goals before planting

Prepare all equipment

In farming, much revolves around the weather; therefore it is crucial to always be prepared to jump into action when the conditions are ideal. Get the planters out and run through them with a fine tooth comb. Make sure that all sprockets and chains are oiled and all bearings are working and greased. Clean out all debris from the seed and fertiliser bins and make sure that planter plates are in place and working. This attention could save you vital time when things get busy. Also make sure that all other equipment relating to the planting operation is in order especially your boom spray. Clean the filters, check the pump, check the nozzles and flush the tank.

> *"The best fertiliser a farmer can sew onto his crops is his footprint in the land.*

Order your input materials

There is nothing more frustrating than having ideal conditions to plant, but no seed, fertiliser or chemicals to plant with. Be sure to order early and have everything ready and waiting in the shed. By doing this you can also take advantage of early season specials.

Weed control is of the utmost importance to ensure a good crop.

Order your inputs early.

> *If enough attention and care is given to what you put into the soil then what you take out of it will be bountiful.*

Have a game plan

Prepare beforehand where you will start to plant and what crops you will plant in which lands. If you can plan this aspect well you could also make a big saving on diesel costs.

Goals after planting

Emergence

Do not just plant the land and leave it be. Make sure that you return soon afterwards to make sure that the crop has emerged successfully. If not you may still have time to do something about it such as re-planting or assisting emergence with a "duisendpoot" implement.

Weed control

It is vital to reduce competition for moisture as best as possible. If your lands are overridden by weeds then your crop will be starved of moisture and will not yield to its full potential. Make sure that you have an effective chemical or mechanical weed control program in place after planting.

Inspection

Once the crop is growing nicely and everything looks great do not make the mistake of sitting idle. As a farmer you always need to be continually monitoring and inspecting your crops to make sure that there is nothing of concern such as disease, fungus or insect damage. With these cases, early detection is vital so that you can stop the problem in its tracks before it does huge yield loss damage.

Conclusion

As a farmer you need to nurture your crop from germination to harvest. If enough attention and care is given to what you put into the soil then what you take out of it will be bountiful. There is an old saying which states: "The best fertiliser a farmer can sew onto his crops is his footprint in the land."

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

RECORD KEEPING:
A necessity or just nonsense?

Thus far in our series of articles regarding management, record keeping has always been indicated as part and parcel of the management of all aspects of a farming business. When we refer to record keeping it includes all types of record keeping such as production records, financial records, labour records and mechanical records.

It is an undisputed fact that one cannot manage without information. Thus, information of actual events needs to be gathered, measured and recorded. The events must be measured and recorded in a format that will make it easy for the farmer to use, whether you do it manually or use a computerised system. In farming this process is known as **record keeping.** How many hectares were planted? What fertiliser and what type have been used? And so forth.

By now all should be familiar with the expression **– IF YOU DO NOT MEASURE, YOU CANNOT MANAGE.** How can you fertilise your crops properly if you do not know what the pH of your soil is? If you do not know that the calving percentage of your herd of beef cattle is only 60%, what are you going to manage to improve the calving percentage? These are events that need to be recorded. The same applies to, for instance, to the yield of your crops, milk production, production of wool, growth rate of your broiler chickens or whatever. To measure and record is the most basic requirement and necessity to any management of any farming business.

However, in today's modern farming environment there is an ever increasing pressure to produce more quality products using fewer resources such as soil, water, labour, and so on. So called sustainable farming because of an ever increasing population worldwide and climate changes and the ever increasing cost-prize squeeze. To be sustainable and deliver quality products imply that you must farm profitable over the long term. To achieve this you must improve your business from year to year.

To improve their businesses, farmers are more and more using advanced technology and equipment. However, if you do not keep proper records new technology and equipment will be to no avail. How will you know whether the money you spend on advanced equipment is worthwhile if you do not what the production per hectare of your maize crop or wheat crop is? One can state that the commencement for the use of advanced technology and equipment is proper record keeping.

A further step in the advancement of the management of a farming business is to apply precision farming by using even more advanced technology and equipment. The description precision is derived from the word precise – simply meaning you do something as precisely as you can. Again the question can be asked: How do you know your application of precision farming is successful if you do not measure what you are doing and what you are achieving? Therefore the first step to apply precision farming is record keeping.

> *If you do not measure, you cannot manage.*

As already mentioned, the modern consumer, more and more, demands quality products. Products that look nice, good, fresh, healthy and attractive, have a good nutritional value and taste good and come from an eco friendly environment.

In a previous article we mentioned that the market is a tough guy. He wants quality products to supply to his clients/consumers. If you supply him with quality products, he will respond with better prices. To supply quality products also starts with proper record keeping – what have you done and when to produce quality products.

Also keep in mind that this market guy is getting tougher by the day because of pressure from consumers regarding environmentally friendly and healthier production processes. As a result traceability is a reality.

Traceability being a mechanism to keep track of the route that any product takes from the farm to the consumer's plate. This means when a consumer buys a product, he/she can ascertain where the product has been produced and what/where the farming practices and health regime used, and make an informed choice to buy the product or not. Thus again how can you provide all the needed information if you do not keep proper records? The traceability of food products is growing in importance across the world and opens up more marketing possibilities for farmers. It will also assist in combating the spread of diseases.

Thus, to conclude, whether you are a subsistence farmer, emerging farmer or a commercial farmer and/or whether you farm on a smallholding, a plot, a small farm or a big farm, to be sustainable you must keep proper records. Financially wise it is necessary that the management of the production processes on a farm need to improve every year to remain successful. Do you want to be successful? Your choice. Do remember – if you do not measure, you cannot manage.

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

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Post-emergence weed control

Weeds compete with maize plants for sunlight, nutrients and water particularly during the first 3 - 5 weeks after the plants have emerged so it is important to control the weeds before they get too tall and vigorous.

Late season weed infestations do not negatively impact the yield nearly as much as early weed competition does. Weed control in your maize fields is a very important management practice. All primary and secondary tillage operations help to prepare a weed-free seedbed however this article is turning the spotlight on post-emergence weed control.

Once a field has been planted, it is important to attend to the weeds which are likely to compete with the young seedlings. Fortunately there are several options available for post-emergence weed control in maize but there are a few important details which must be clear before any spray program is embarked upon. It is always a good idea to consult the chemical company's representatives or other experts for their advice as a great deal of science lies behind the use and application of herbicides. Before consulting the experts however, the farm manager must know a few details.

Know your seed cultivar

It is important to know which variety of maize was planted in the field, for example if the seed is Roundup Ready® or not. If the seed is not a special herbicide resistant/tolerant cultivar, then you have to be careful not to use Roundup or a similar product containing the active ingredient glyphosate because that will obliterate your crop overnight.

Know the problem weeds

It is necessary to be well informed on the particular types of weeds growing as this informs the selection of herbicide and helps the experts to advise you. It also helps to determine the timing of the post-emergence spraying. Most herbicide control needs to take place before the weeds are too tall but there are some herbicides which will provide control for much taller weeds as well.

Know the stage of development of the maize plants

Another factor to take into consideration is the height of the maize plants. Many herbicides have limits to maximum height, maximum leaf stages or developmental stage of the maize plant listed as herbicides can cause the plants damage which in turn will affect the end yields.

Know your soil

When herbicides are applied, it is important to understand that soil status can influence their effectiveness. Once the herbicide has been sprayed it is in effect suspended in a "soil solution" and the properties of the soil including soil texture, levels of organic matter and pH will affect the availability and activity of the herbicides. The rates for soil-applied herbicides in the chemical weed control tables on the labels are calculated for medium textures (loamy) soils with organic matter levels of 3% - 4%.

Soil texture refers to the percentage of sand, silt and clay in the oil. Clay particles are negatively charged and have a large surface area. Soils high in clay (heavy soils) have the capacity to adsorb or "hold hostage" the herbicides applied, so generally it is necessary to apply higher herbicide rates than for loamy or sandy soils to be sure the weeds take up enough herbicide.

Know your organic matter status

Organic matter also affects the adsorptive capacity of soils. Plant and animal residues which have not decomposed well will limit the performance of the herbicide while well-decayed organic humus is of great value. Herbicide rates of application need to be adjusted according to the soil organic matter.

Know the soil pH

Soil pH can also affect the availability if the herbicides. Soils with low pH levels can also hold the herbicide hostage so that it is unavailable for uptake by the weeds. Soil pH in no-till fields must be carefully monitored and it is often a good idea to check the pH in the top inch of the soil profile in fields that have been no-tilled for some time. A standard soil sample analysis may give a different result to the surface soil which is where the herbicide must do its work.

Know your water and its pH levels

Water quality and water pH has a significant effect on the effectiveness of your herbicides. The water used in your spray tank must be clean with no dirt particles in it, for example, water drawn from a running stream is not good. Silt and organic matter suspended in the water reduces the activity of the herbicides. Hard water, i.e. the water has excess magnesium and calcium (alkaline) ions, can cause the glyphosate and other ingredients in the herbicide to form a chemical reaction which forms insoluble salts. This is difficult to identify but will negatively impact the efficiency of the herbicide. The ideal solution is to have your water tested for quality and pH and then to seek expert advice on how to manage the process.

Another recipe for disaster would be to first add the chemical mixes into the tank before the water! There must ALWAYS be at least half the mix of water in the tank before any glyphosate or 24D is added. Add each ingredient into the water and mix thoroughly before adding the next one. You want to make sure that you get an evenly mixed solution with no lumps or gelling which could occur if an incorrect mixing procedure is followed.

There is no doubt that post-emergence herbicides are a very useful tool for controlling weeds and ensuring the best yield possible but it must be a well-informed process guided by experts and managed very carefully on the farm.

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

Unpacking the various forms of land ownership

South Africa's land ownership has taken various forms since the Dutch East India Company established the Cape Colony in 1652. The property laws that govern the ownership of land changed from this beginning and became heavily influenced by English property law and principles as the British slowly assumed control from 1795 to 1806 in the Cape Colony. Britain was pronounced the owner of the Cape Colony at the Congress of Vienna in 1815.

This event led to the descendants of the early Dutch settlers moving into the interior of South Africa and interacting with the black tribes of South Africa. This intrusion lead to wars over territory but also many forms of co-operative and mutually beneficial use of land and land sharing arrangements within the traditional forms of tribal laws governing the use and access to land in various tribal land areas at that time.

The discovery of diamonds in 1867 and gold in 1886 led to the British South Africa Company being given a Royal Charter to further seek out and exploit other suitable mining areas in South Africa. As would be expected the conflicts over land became more intense as the rich mineral wealth of South Africa was discovered.

The battle of land rights between all the role-players in South Africa is too complex to go into with this article. In brief after the "Boer War" ended in 1901, the rapid changes of land possession and ownership of many settlers from many nationalities and the land controlled by original black tribes of South Africa caused an almost permanent disruption of any "fair" or "entitled" or historic right to the land previous held by the role-players mentioned.

In 1910 the Union of South Africa "united" the post Boer War and Afrikaans communities but excluded black, Indian and coloured South Africans from political involvement. The Land Act of 1913 reserved 92% of South Africa's territories for whites and only 8% for blacks. This area was enlarged to about 13,6% by the Native and Land act of 1936. There were further numerous amendments to each act promulgated as well as acts governing the Homelands.

The election of the ANC government in 1994, with Mr Nelson Mandela, as president, started the deconstruction through legislation of the "unfair" and inequitable distribution of land ownership prior to 1994.

We can fast forward to the 1997 White Paper on Land Policy which was set up to achieve the main objectives of redressing the apartheid era, nurture national reconciliation and stability to support economic growth, to improve welfare and to relieve poverty. The new constitution supports the regulation and protection of property, mandates the reform of land law, and gives equal recognition to common and customary law principles.

The various land reform and redistribution programmes that have been instituted are described in brief below.

Land tenure

The change in government policies in terms of land ownership also had to address the problem of legal access or the right to use land for individual and group substance level farming activities and to group, family or single owner/managers who wanted to farm on a commercial scale.

These concepts have resulted in a number of land tenure arrangements in the grain farming sector which has helped in facilitating the access to the practical use of land for agricultural purposes.

Communal land

The former homeland areas cover 13% of South Africa which is in the region of 18 million ha (only a portion of this is arable land however). This land is owned by the government but managed through the tribal authority. Much of this system of tenure is to be seen in Mpumalanga, KwaZulu-Natal and the Eastern Cape. This system of tenure is usually characterised by a "permission to occupy" document which at this stage does not have any legal status although it is common in the former homeland areas. Many farmers in these areas will refer to this as "own land" although technically it is not own land.

Commonage land

Farm land that is owned by a local municipality is known as Commonage land. It is land that should be available to the local community for farming purposes. In South Africa there are two different types of commonage land – that which was owned by the municipality before

1994 (which can be leased to anyone, and that which was purchased after 1994 which should be hired to PDI individuals in an attempt to give more land access to town dwellers. Urban dwellers who want to use the commonage land should approach the local municipality for a lease agreement (maximum length of the agreement is 9 years and 11 months).

Own land

This land is owned by the individual or legal entity (Sole Proprietor, Partnership, Property Trust, CC, Cooperative, Pty Ltd Company to name a few examples). The owner of the land in this case has a title deed to the property.

Land Reform Programmes

Settlement Land Acquisition Grant (SLAG)

This was the first form of land reform that was introduced after 1994. In this system, each household could access a grant of R15 000 from the Department of Land Affairs for the purpose of acquiring agricultural land. Unfortunately in order to reach the purchase price of the farm, many unrelated families were often grouped into one legal entity and the farm was bought for them altogether.

Land Redistribution for Agricultural Development (LRAD)

This system of land reform was introduced after SLAG and was an improvement as the grant was for individual members of a household (R25 000 per person for all members over 18). This resulted in many family groups being registered in a Trust and gaining title to land.

Proactive Land Acquisition System (PLAS)

Currently no land that is bought for redistribution is being transferred to the ownership of the beneficiaries – it is being leased to the beneficiaries for a period (which is currently a period of five years). This system is supposed to give a potential beneficiary an opportunity to use the land and learn the skills of farming. If the beneficiary is successful during this period then he/she will get an extended lease agreement of 30 years.

Leased land

Within the above examples of each different system various forms of short or long term leases further complicate the agreements or arrangements entered into between individual farmers or groups between private and government owned properties. In many instances there is a backlog, which the government is trying to address, of actually issuing titles to various parcels of land to groups or individuals.

Conclusion

Make sure that you understand the terms of any agreement or arrangement entered into for the use of land for agricultural purposes whether as an individual or as a group. Have all the arrangements written and signed by the role-players involved.

Article submitted by a retired farmer.

Pula Imvula's Quote of the Month

"Humility does not mean thinking less of yourself than of other people, nor does it mean having a low opinion of your own gifts. It means freedom from thinking about yourself at all".

~ William Temple

The decision making process during harvesting

During a recent conference on conservation agriculture in the Western Cape, a visiting Australian farmer, Tom Robinson, made the statement that the success of a harvest starts with how the farmer handles the residue during the previous year's harvest.

This is very sound advice and a strategy that has been followed in the long-term crop rotation trials of the Western Cape Department of Agriculture at the Langgewens Research Farm.

Several factors play a part in the decision making process during harvesting. These factors include the type of farming system being followed, the harvesting protocol, what type of seeder is used on-farm, weed control and the animal factor.

Let us begin with the type of farming system that is implemented on the farm. Conventional or conservation agriculture practices will have different ways of dealing with the wheat residue. In conventional farming practices, all residue will be incorporated into the soil, before the next crop is sown, by the different tillage practices done within this system. It is certainly the easiest way of dealing with your residues, but unfortunately not a sustainable practice with huge amounts of carbon being lost in the form of CO_2 during the tillage actions and with that the degradation due to a loss in soil structure. The process leaves the soil bare without any protection against the elements such as rain and wind, which leads to excessive loss of topsoil through erosion, both by water and wind. Conservation agriculture has the opposite in mind, with the retention of residue on top of the soil to prevent erosion, forming a protective layer against the elements. It keeps the soil cooler in summer, which helps protect the important microbial life in the soil.

The next factor to play a role is how the wheat is harvested. The type of front you use on your combine will determine if the crop is harvested while lying in windrows or standing up. With harvesting the windrowed crop, this method is mostly used in the southern Cape and in some areas of the Swartland with high wind conditions. The residues are often left in concentrated strips on the harvested field, with the areas in-between left relatively bare. Even harvesting a standing crop could leave areas nearly devoid of residue cover. The ideal is to have a spreader and/or chopper at the back


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Photo 1: The ideal is to have a spreader and or chopper at the back of the combine to spread the residue evenly across the harvested field.
Photo 2: The thicker the residue mat on top of the soil, the easier it is to suppress weed germination and growth of summer weeds.
Photo 3: Combine spreading chaff evenly.

of the combine to spread the residue evenly across the harvested field. The concentration of the chaff part of the residue could cause germination problems when the new crop is established the following season. Some farmers spread the material by dragging old tyres at the back of a tractor.

The type of seeder used on the farm will also play an important role in the management of residues following harvest. Currently most farmers in the Western Cape are making use of no-till tine-seeders, which makes it possible to handle crop residues during the seeding process. It also gives the farmer the added advantage to spray pre-emergent herbicide in front of the seeder at planting. The row spacing on these seeders varies between 250 mm and 300 mm in order to handle the residue, otherwise residue can bunch up between the tines and cause poor germination of the crop. The disadvantage of these seeders is that it cannot handle high volumes of residue and therefore the amount of material left on the field before seeding the new crop needs to be decreased by either using it as feed for animals or baling some of the material as hay. With conservation agriculture, aiming to keep as much residues as possible, it might be worth converting to a disk seeder when the amount of material on the soil becomes too much to handle. Single or double disc seeders cuts though the material without disturbing the layer left on top of the soil, whereas a tine-seeder has to be dragged through it. Some local farmers are currently converting to these seeders. There is a school of thought that states that the soil needs to be conditioned (making it easier to plant into) with a tine-seeder for a number of years before switching to a disc-seeder. There is however another school that feels it does not matter which type of seeder you start with.

One of the most important factors in post-harvest management is the control of weeds. The thicker the residue mat on top of the soil is, the easier it is to suppress weed germination and growth of summer weeds. If too little residue is left on the field it becomes necessary to spray the weeds with the appropriate herbicide to lower the seedbank.

The last factor we are going to discuss is the part animals play following harvest – that is if you have animals on the farm. Sheep and cattle can be grazed on the remaining residue following harvest to pick up any wheat kernels or ears that were spilt during the harvesting process and by letting the animals graze the fields during summer, it can help lowering the amount of residue left before the new production season starts. It is important though not to let them consume all the residue, since that will leave soil open to erosion, loss of stored moisture through evaporation and high soil temperatures that kills all soil life. The animals also play a part in controlling weeds, which is an added benefit to the farmer.

> *Remember to manage the residue optimally on your farm to ensure that it makes your production easier and contributes to the sustainability of your farming practice.*

Remember to manage the residue optimally on your farm to ensure that it makes your production easier and contributes to the sustainability of your farming practice.

Article submitted by Dr Johann Strauss, Scientist: Sustainable cropping systems, Directorate Plant Science, Western Cape Department of Agriculture. For more information, send an email to johannst@elsenburg.com.

Irrigated wheat production
– an intensive system requires intensive management

The dry land wheat farmers in the Western Cape have had a very dry year with major moisture stress damage to the crops while the summer drought continues in the summer crop production areas.

The rainfall required on a growing crop or to boost soil moisture for the next crop is totally out of the hands of these farmers. They can only react to the prevailing climatic conditions with good or bad rainfall seasons being unpredictable.

Irrigated wheat farmers on national water schemes or with their own source of dependable stored water on the other hand are able to control and manage all the important aspects or production factors required to maximise yields and thus, net income.

Production estimates and price review

Sagis

The final production estimates by Sagis for winter cereal production shows that wheat production of 1,635,400 tons (1,635 million tons) from 482,150 hectares is expected. (The Sagis website can be accessed for detailed information on the organisation as well as the current and past national summer and winter crop production predicted and actually realised.)

The above production indicates an average of 3,39 tons of wheat per hectare. These estimates include the areas planted to irrigated wheat which would increase the average shown. Dry land wheat yields in general average about 2,5 t/ha while irrigated wheat yields average around 5 t/ha. The total area planted to wheat in the Free State has increased from 69,500 hectares to about 80,000 hectares or a 15% increase on the previous season. This increase suggests that the wheat price has increased to a level which has encouraged an increase in the area planted to wheat. The area taken up nationally under irrigated wheat, of about 133,000 hectares, makes up about 21% of the total area but contributes 41% to the total production realised.

As South Africa is a net importer of wheat it is important that we maximise the yields achieved per hectare of wheat under irrigation to save foreign exchange.

Safex prices

The Safex future prices for bread milling wheat range from R4 163 for October 2015 to R4 371 for July 2016. Please refer to the Safex agriculture commodities site for the detailed information. The silo differentials are also shown in detail for each registered silo in South Africa including the rates prevailing for the Western Cape. It is important to subtract the differential rate shown from the Safex price to arrive at an estimate for the “in pocket” price for the wheat produced on your farm. The values range from R85,00 per ton for the Battery silo to R550,00 for Malmesbury and reflect the transport costs incurred to critical silo reference points. This implies a net farmer price realised from R4 078,00 per ton to R3 613,00. The actual price realised will make a large difference to your net margin per hectare which should be evaluated by doing a very detailed gross margin analysis for your irrigated wheat crop.

A detailed analysis of the soil fertility on a per hectare basis should be undertaken.

Maximising resources for maximum profit

When examining the factors that contribute to the maximum yields within an irrigated wheat enterprise each aspect must be analysed from past physical and financial performance records of previous wheat crops so that any shortcomings be identified and corrected. Some of the main factors to consider in detail are considered below, keeping in mind the maxim that an intensive production system requires intensive management.

Irrigated wheat yields possible

In a study completed by the personnel of the ARC at Bethlehem grain yield, hectolitre mass, protein content and falling number of the cultivars planted in the cooler central irrigation areas in 2014 were measured and compared in the ongoing cultivar evaluation programme. The cultivars measured included Buffels, Duzi, Krokodil, and several PAN cultivars, Sabie and several SST’s. The average yield measured was 8,36 t/ha with a range of 7,27 to 9,01 t/ha.

Irrigation farmers in the Orania and Jacobsdal areas have realised yields of over 10,00 t/ha from season to season over the last few years. In some cases wheat was doubled cropped after maize or planted after a crop of beans or other summer crop.

Burning of the previous maize crop took place in some cases and a fallow period after summer crops occurred before the wheat crop. The results however prove that even with intensive double cropping a 10 ton yield is achievable either after maize or a legume crop in the rotation.

Irrigated wheat in Orania.

Routine maintenance of an irrigation system is imperative.

These farmers have improved yields from 6,5 t/ha over many years to the high yields being currently achieved. If your yields are in the lower band then a critical examination of each production aspect should indicate where the first steps can be taken to boost yields.

If we consider an improvement from 8,36 tons to a yield of 10 tons, the extra income at a net wheat price of R3,800 would be R 6,232 per hectare. On a 60 hectare centre pivot an additional R373,920 would be generated. A 1,64 ton improvement over your current production average at whatever this might be will generate a significant income.

Other factors to consider

Soils

The proven genetic production potential can be achieved by critically examining your soil profile and the soil water relationships under your control such as soil depth, soil texture, soil structure, presence of a compacted upper layer or deeper restrictive layer such as shale or calcite deposits. Each land under irrigation should be plotted on a per hectare basis with the above variables in mind so that lower potential areas within a 60 hectare pivot can be improved or eliminated. Compaction can be a major cause of lower yields and must be eliminated.

Soil fertility

A detailed analysis of the soil fertility on a per hectare basis should be undertaken with samples taken in the top 150 cm to 160 cm and the layer below this. Severe soil acidity in the different sectors can be measured and then corrected. To achieve a 10 ton yield the pH, phosphate status and balance of magnesium to calcium to potassium ratios must be at optimum recommendations. The correct type and amount of lime must be applied on a per hectare basis.

Seed

The best cultivars for your area should be planted correctly with accurate seeding rates and seed spacing. Use the best planters available for precision placement and seed spacing.

Fertilisation

Adequate phosphate levels must exist to reach high yield levels and a minimum of 20 kg - 25 kg of nitrogen per ton of yield should be applied. A 10 ton yield would require a budget of between 200 kg and 250 kg of total nitrogen applied in four or five applications through the centre pivot during the growing season.

Irrigation systems

Your centre pivot or irrigation system must be very well maintained and tested for even distribution of water through the irrigable area. Droplet size should be tested and assessed especially if you experience wind in your area. Pivots should be scheduled to run at the correct times to take advantage of the lowest electricity tariffs prevailing.

Monitoring systems

It is wise to install the latest electronic monitoring systems that can give you constant live information on the moisture levels at various points in the soil profile so that under or over watering does not take place. A high wheat yield can only be achieved if the crop receives enough moisture before and after flowering. In most cases, if you start with a soil profile at planting below field capacity you will never catch up during the relatively short production cycle.

Harvesting

Modern combines equipped with GPS monitoring systems should be used so that the differences in yields in various sectors can be measured and analysed. The yield indicators can be used to look at soil profiles, soil fertility and possible variations in the water applied so that corrective action can be taken to further improve yield in the next planting.

Conclusion

Every possible facet of your management practices for improved irrigated wheat yields should be critically examined so that the expected targets can be realised.

Article submitted by a retired farmer.

WEEDS IN THE WINTER RAINFALL AREA

Ryegrass

RYEGRASS	
Scientific name:	*Lolium spesies (Lolium multiflorum, L. perenne, L. rigidum, L. temulentum)*
Afrikaans name:	*Raaigras, roggras (eenjarige raaigras, Italiaanse raaigras, meerjarige raaigras, Switserse of Wimmera raaigras, drabok)*
English name:	Ryegrass (annual ryegrass, Italian ryegrass, Perennial ryegrass, Rigid ryegrass, Darnel)

Ryegrass (*Lolium spp.*) is the main grass weed in the winter rainfall area of South Africa. The ryegrass complex comprises four *Lolium* species and hybrids of the species. These species are *Lolium multiflorum* (Italian ryegrass or annual ryegrass), *L. rigidum* (annual ryegrass or Wimmera ryegrass), *L. temulentum* (darnel) and *L. perenne* (perennial ryegrass).

In time this species crossbred so freely with one another that a specific species can seldom be identified where it occurs as a weed in nature, and the complex is therefore described only as Lolium spp.

Because of the great genetic variation in the plant complex, many different forms also occur, but in general ryegrass can mostly be recognised by the leaf blade, which is bright to dark green, epilose and shiny on the upper surface, with a paler, duller green on the lower surface.

The inflorescence is also a very characteristic spike of up to 30 cm long, with sessile spikelets in pits on alternating sides of the axis. All these different species and hybrids have a tussock-like habit and are annual to perennial and up to 1 m tall.

The tussock can be large and robust with many stalks (like the Italian ryegrass types) or sparse with few stalks (plants that are more closely related to the weed types). Leaf sheaths are mostly pale, round on the right-hand side, with a ligule that is membrane-like and up to 2,5 mm in length. Seeds vary a lot – from small, light seeds roughly 3 mm long and 1 mm wide up to approximately 6 mm long and 2 mm wide.

Occurrence and distribution

Ryegrass is widely distributed in South Africa, but in the winter rainfall area it is the main weed in crops during the growing season, and in vineyards and orchards it is also one of the main weeds.

What makes ryegrass a particularly tough weed is the fact that it tends to develop resistance to herbicides.

Ryegrass seedling.

That is also why it is regarded as the number 1 resistant weed worldwide. Different factors contribute to this, but the genetic variation that occurs in the species complex is probably the main factor. In addition to the winter rainfall area, ryegrass also poses many problems in irrigation areas in the Northern Cape.

The major swing to no or minimum tillage over the past few decades fits the ryegrass biology like a glove and the small seeds that were in the past buried too deeply by tillage to establish as seedlings now lie on or in very shallow soil and conditions for establishment are optimal.

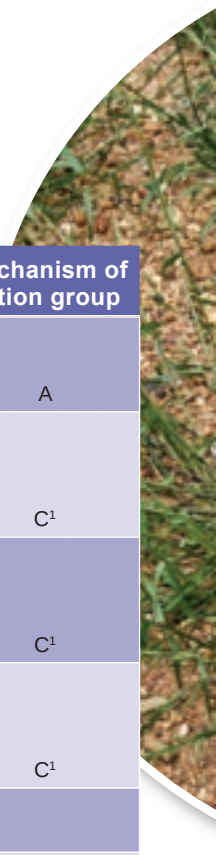
Young ryegrass seedling – note the shiny upper leaf surface. *Photo: Hannes Schoeman – Monsanto*

Because annual ryegrass was earlier also planted widely as grazing in the Southern Cape, it causes major problems these days. It has also

Table 1: Herbicides registered for controlling ryegrass.

Active ingredient	Formulation	Crops for which registered	Time of application	Resistance status	Mechanism of action group
atrazine[1]	900 grams per kilogram	Canola	Pre and postemergence of crop and weed – only in triazine-resistant (TT) canola cultivars	Possibly[2]	C[1]
chlorsulfuron	750 grams per kilogram	Barley, oats, wheat	Postemergence of weed – repression only if applied before two-leaf stage	Yes	B
clethodim	120 gram per liter	Lucerne, seed beds	Postemergence in lucerne, pre-sowing for clean seedbed	Yes	A
clodinafop-propargyl	240 gram per liter	Wheat	Postemergence when grasses are at the two to four-leaf stage	Yes	A
cycloxydim	100 gram per liter	Clovers, lupins, lucerne and legume pastures and medics	Postemergence when grass grows actively	Yes	A
diclofop-methyl	378 gram per liter	Peas, barley, wheat, korog	Postemergence before grasses reach five-leaf stage	Yes	A
fluazifop-P-butyl	125 gram per liter	Clovers, lucerne and legume pastures, medics	Postemergence on actively growing grasses	Yes	A
	150 gram per liter	Lucerne and legume pastures			
glufosinate-ammonium	200 gram per liter	All crops	Pre-sowing	Yes	H
glyphosate	360/450/480/510 gram per liter	Most agricultural situations	Pre-sowing	Yes	G
	680/700/710 gram per kilogram				
haloxyfop-R methyl ester	108 gram per liter	Canola, lupins, lucerne and legume pastures, medics, seradella	Postemergence, when grass is between two- and six-leaf stage	Yes	A
imazamox	40 gram per liter	Canola Clovers, lucerne and legume pastures, medics	Postemergence – apply before grasses are bigger than 100 mm to 200 mm. Only in Clearfield canola cultivars	Yes	B
iodosulfuron-methyl-sodlum/mefenpyr-diethyl	50/150 gram per kilogram	Barley, wheat	Postemergence when grasses are at the two to four-leaf stage	Yes	B
ilodosulfuron-methyl-sodium/mesosulfuron methyl/mefenpyr-diethyl	30/30/90 gram per kilogram	Wheat	Postemergence when grasses are at the two to four-leaf stage	Yes	B
metazachlor	500 gram per liter	Canola	Pre-emergence of weed – apply as full cover within five days after last tillage	No	K[3]
metsulfuron-methyl/ thifensulfuron-methyl	68/680 gram per kilogram	Barley, oats, wheat	Postemergence – repression of ryegrass only	Yes	B
paraquat	200 gram per liter	All crops	Pre-sowing	Yes	D
paraquat/diquat	120.80 gram per liter	All crops	Pre-sowing	Yes	D
pinoxaden	45 gram per liter	Wheat, barley	Postemergence on actively growing grasses	Yes	A
propaquizafop	100 gram per liter	Canola, clovers, lupins, lucerne and legume pastures and medics	Postemergence on actively growing grasses	Yes	A
propyzamide	500 gram per kilogram	Canola, lucerne and legume pastures	Pre- to postemergence of ryegrass. Apply before five-leaf stage of ryegrass	No[3]	K[1]
prosulfocarb	800 gram per liter	Wheat	Pre-emergence. Only in tank mixtures with trifluralin or triasulfuron	No	N
pyroxasulfone	850 gram per kilogram	Wheat	Pre-emergence	No	K[3]

Weeds in the winter rainfall area
Ryegrass



Active ingredient	Formulation	Crops for which registered	Time of application	Resistance status	Mechanism of action group
quizalofop-P-tefuryl	40 gram per liter	Canola, lucerne and legume pasture, medics	Postemergence only on actively growing grass at the two to four-leaf stage	Yes	A
simazine	500 gram per liter	Canola, lupins	Pre-emergence of weed. Apply directly to plant and only to triazine-resistant (TT) canola cultivars	Possibly	C[1]
simazine/ terbuthylazine	213/287 gram per liter	Canola	Pre-emergence in tank mixture with metazachlor – only to triazine-resistant (TT) canola cultivars	Possibly	C[1]
simazine/ terbuthylazine	450/450 gram per kilogram	Canola	Pre-emergence in tank mixture with metazachlor – ONLY to triazine-resistant (TT) canola cultivars	Possibly	C[1]
tepraloxydim	50 gram per liter	Canola	Postemergence. Apply to actively growing grasses	Yes	
tralkoxydim	100 gram per liter	Barley, wheat	Postemergence – apply at the two to four-leaf stage	Yes	A
triallate	480 gram per liter	Wheat	Pre-emergence	No	N
triasulfuron	750 gram per kilogram	Barley, oats, wheat	Pre-emergence – only repression	Yes	B
trifluralin	330 gram per liter	Barley, canola, wheat	Pre-sowing. Only to triazine-resistant (TT) canola cultivars if mixed with simazine	Possibly	K[1]
trifluralin	480 gram per liter	Barley, canola, wheat	Pre-plant	Possibly	K[1]

[1] To prevent confusion, the English names for the active ingredients are mentioned here.

[2] Where resistance status is indicated as possible, cases have been observed where the herbicide concerned was not successful, but resistance has not been proven beyond doubt.

[3] No resistance to propyzamide has been observed in South Africa yet, but where too much propyzamide is applied in too quick succession, the breakdown of the product in the soil by microbes is accelerated due to population explosions of the microbes concerned and the eventual effect is poor control, like in the case of resistance developing.

NB – Always consult the label of the herbicide to ascertain the correct dosage and application method – make sure that mechanism of action groups is alternated, and not the active ingredients.

been observed that certain ryegrass biotypes do not germinate mainly at the beginning of the season like before, but germination now occurs throughout the season. This has implications for the weed control programmes that are followed.

Control

Chemical control

The list of herbicides registered for ryegrass and mentioned in the publication, A guide for the chemical control of weeds in South Africa, distinguishes between the different species as they appear on the labels of the herbicides, but **Table 1** contains a list of all herbicides that are registered for any species.

It is assumed that a herbicide that is effective against one species will also be effective against the other species and hybrids, provided no resistance has developed against it. A few herbicides and applications have been added that were registered after the guide was published, as have some non-selective herbicides that do not specify which weed species are controlled, but that are effective against ryegrass if there is no resistance.

It is essential for producers and/or chemical manufacturing and marketing companies to try and determine what the resistance status of ryegrass in a field is before applying herbicides. If there is no resistance against a specific herbicide, care should be taken that the herbicide is applied under good spraying conditions and that the correct dosage is applied to weeds not bigger than the four-leaf stage.

> *What makes ryegrass a particularly tough weed is the fact that it tends to develop resistance to herbicides.*

Too high and too low dosages cause high selection pressure for target site and non-

Typical mature ryegrass plants.

The spike inflorescence of ryegrass. *Photo: Hannes Schoeman – Monsanto*

> *Too high and too low dosages cause high selection pressure for target site and non-target site resistance respectively.*

target site resistance respectively. Alternate the use of an effective herbicide as regularly as possible with other herbicides with a different action (in other words in a different action group).

Table 1 indicates against which herbicides registered for controlling ryegrass resistance has already been proven or suspected.

Alternative controls

It is vital that not only chemical methods be used to control ryegrass. As was mentioned above, the small ryegrass seeds are sensitive to being buried deeply and turn-plough tillage can take as much as 90% of rye grass seeds out of the system.

However, ploughing is very harmful to various soil properties and in a field that is heavily infested with resistant ryegrass the populations can be reduced just as effectively by working in green or brown fertiliser during the season or making hay with oats or any other suitable hay crop.

For more methods to manage resistance, refer to the pamphlet on sustainable crop production in the presence of herbicide resistance that should be available from any of the chemical manufacturing or marketing companies.

Acknowledgements and references

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The list of registered herbicides was obtained from the publication: A guide to the chemical control of weeds in South Africa: A CropLife South Africa Compendium. Order from info@cropsolutions.co.za; or 011 079 4199.

Information was also obtained from the book Onkruide in gewasse en tuine in Suidelike Afrika, which can be obtained from the ARC-Grain Crops Institute, Private Bag X1251, Potchefstroom, 2520. Contact Mary James at 018 299 6253 or JamesM@arc.agric.za.

The book Probleemplante en indringeronkruide van Suid-Afrika by Clive Bromilow was also consulted and is available from most bookstores, or consult the publisher's website at www.briza.co.za.

The pamphlet Volhoubare gewasproduksie in die teenwoordigheid van onkruiddoderweerstand is obtainable in PDF format from the writer of this article at pjp@sun.ac.za. It is also available in English on the CropLife SA website (http://www.croplife.co.za/).

Ryegrass seed.

Article submitted by PJ Pieterse, Department of Agronomics, Stellenbosch University, for SA Graan/Grain June 2014. For more information, send an email to PJP@sun.ac.za.

Integrated crop and pasture-based livestock production systems

This article highlights a specific pasture crop species that can play an imperative role in CA-based crop-pasture rotations. Besides improving the physical, chemical, hydrological and biological properties of the soil, such species, including annual or perennial cover crops, can successfully be used as animal feed.

Livestock production systems are in many ways dependant on the utilisation of pasture species, in this case as a pasture ley crop, and can therefore become an integral component of CA-based crop-pasture rotations. It is imperative however to identify a pasture species fulfilling the requirements of a dual purpose crop, i.e. for livestock fodder and soil restoration.

This article focuses on an annual pasture crop commonly used in a short, one summer season rotation as a cover crop, either succeeding a winter annual species cover crop with green manuring properties or being succeeded by the latter crop mentioned.

Pennisetum glaucum *(Pearl millet/babala)*

Annual fodder cops are sometimes classified as expensive, because of the annual seedbed preparation and establishment. The higher production and palatability of newer Pearl millet cultivars might oppose this statement. Gerber et al. (2006) and Robertson et al. (2009) reported that the production, palatability and quality of newer annual summer cultivars make it popular crops for intensive animal production systems.

Agro-ecological distribution

Pearl millet was introduced in the 1850s as forage used in the Gulf Coast states. It originated in central Africa and is also found in the drier tropics and parts of India. In South Africa, Pearl millet is produced in the Free State, Limpopo and KwaZulu-Natal. Common cultivars used locally include Milkstar, Hypearl millet, common babala, Nutrifeed and Speedfeed.

This species is known to grow in areas with a rainfall of anything between 200 mm - 1 400 mm, but more often in areas receiving 250 mm - 750 mm of rain per year.

Even though this species is often known for its drought resistance, a uniformly distributed rainfall during the growing season is desired. With regards to too much rain during the reproductive stage of the plant, crop failure is most likely possible.

Pearl millet in flower.

Pearl millet is sensitive to low temperatures especially at critical physiological growth stages such as seedling and reproductive (flowering) stages. High temperatures are needed for the grain of this species to mature. When seeded, Pearl millet germinates well at soil temperatures of 18°C - 29°C and emergence can occur in two to six days in favourable climatic conditions. Planting in cooler soils can cause problems with reduced emergence and greater competition from weeds.

Pearl millet grows best in light, well-drained loamy soils. This species has the ability to tolerate poor and infertile soils. It does not necessarily grow well on clay soils that are prone to waterlogging. It also has the ability to tolerate acidic (pH 4 - 5) subsoils that have high aluminium contents.

Management and utilisation

Pearl millet does not have any difficulty with establishment. It is common practice to either sow this species in a broadcast fashion or plant it in rows. Planting in rows is recommended for areas that receive less than 700 mm of rain. Recommended seeding rates for rows (0,9 m): 5 kg/ha - 15 kg/ha, 15 kg/ha - 25 kg/ha for broadcasting and as high as 30 kg/ha under irrigation.

As Pearl millet is adapted to a variety of soils, it is important to ensure a moderate level of phosphorus (P) and potassium (K) for good production. Top dressing with nitrogen (N) (± 40 kg - 70 kg N/ha) taking rainfall and growth stage into account, can result in great yields of good quality.

In a high rainfall season (± 1 200 mm/year) Pearl millet can produce as much as 12,9 tons/ha when it is defoliated frequently (every four weeks). The highest producers under these conditions were Milkstar, Speedfeed, Hypearl millet and even common babala.

The regrowth distribution during a wet growing season differs between cultivars. Milkstar and common babala grow faster in December and January than in February and March (early season cultivars).

Speedfeed and Nutrifeed do not have specific production peaks; however a gradual decline in production over time (full-season cultivars) is expected. Hypearl millet starts slow, but production peaks late February and March (late season cultivar). Pearl millet grown out to the soft dough stage can be cut for hay, ensiled or grown out for foggage.

Planted in November, Nutrifeed has the highest production, followed by Hypearl millet. If planted in December it has been shown that Nutrifeed and Speedfeed has the highest production, while Milkstar and Speedfeed did the best when planted in January.

In a lower rainfall season (± 750 mm) the Pearl millet production values varied between 4,3 tons/ha - 5,6 tons/ha, if defoliated monthly. There was no significant difference in production between different cultivars and planting dates. During this season, Milkstar and Hypearl millet were the early production cultivars, while Nutrifeed and common babala will have a slower start, with a production peak in February/March. Speedfeed peaked in the middle of the growing season (end of January). Robertson, Botha and Gerber (2009) reported a production of 8,4 tons/ha for Hypearl millet tested on the Outeniqua Experimental farm (Western Cape), with a long term average rainfall of 728 mm/year.

When planted in November for silage purposes, Hypearl millet and Nutrifeed has shown that the highest DM production potential to be ensiled (more than 30 tons/ha) can be achieved, followed by Speedfeed and common babala (more than 17 tons/ha). However, it is noted that cultivars such as Nutrifeed and Speedfeed can have better DM potential for silage (more than 14 tons/ha) when planted in December.

Planted as late as January, Speedfeed and Milkstar can produce more than 13 tons/ha for ensiling. Under these conditions the same cultivars can be used as foggage.

Management challenges

Fast growing annual pasture species such as Pearl millet, can have a few management challenges. Often it is seen that the peak growth rate of this species can result in the pasture growing faster than the speed at which animals can graze and a sudden decrease in palatability and quality is expected, resulting in a higher percentage of plant material being selectively grazed.

The secondary effect of a too tall stand of Pearl millet is a much slower regrowth rate once defoliated. There also exists the risk of nitrate poisoning as a result of too high N applications under sub-optimal growing conditions. The pest control in millet production will entail dealing with stinkbug, nematodes, chinch bug and birds.

Soil conservation and health benefits

A seasonal rotation cover crop such as Pearl millet can play an imperative role in improving soil structure, water infiltration and root penetration.

Additional benefits include reduced soil crusting, soil erosion, runoff and nutrient leaching. This species can also provide an affordable on-site management option to enhance the inherent soil organic matter through an extremely vigorous root system and secondly, it is a suitable option to dry out very wet soils that are regularly irrigated either in winter or summer.

Animal production aspects

From an animal production perspective, the forage quality that can be obtained from good management of Pearl Millet is a crude protein (CP) content of between 9% - 13% (unfertilised soils) and 13% - 24% (fertilised soils), all depending on nitrogen fertilisation in conjunction with sufficient moisture.

Total digestible nutrients of 60% - 70% and a dry matter digestibility of 80% - 85% can be achieved. A grazing capacity of 1 - 1,5 LSUs/ha is possible.

Increased crop diversification with babala

Babala is well-suited to be used as an annual cover crop in a crop rotation system due to its strong root system and high biomass production. There are many ways to insert babala as a cover crop into a crop rotation to increase the diversity.

It can be established in a pure stand or in a mixture with other (cover) crops or as a full-season crop to maximise its beneficial properties. Babala can be used for a short period of time in the spring before the cash crop, or later in the fall after a main crop has been harvested.

In South Africa, where crop rotations are mostly very tight, it is often easier to insert a fall cover crop after the harvest of a short-season cash crop or silage; provided there is enough time, nutrients and soil water for it to establish before early fall frosts.

In certain situations an annual cold season legume (or mixture) could be planted directly after termination of the cover crop, such as grazing vetch (*Vicia villosa*), oats and radish, followed by a cash crop.

After killing the cover crop, weeds in the fallow must be controlled to conserve soil water to maximise the benefit of the cover crop. A suitable no-till planter should be used to plant the grain crops directly into the residues of the cover crop, without any other cultivation practice disturbing the soil.

Normal integrated fertiliser (based on soil fertility levels and yield targets), weed and pest control practices should be followed. During the transformation phase after newly established CA grain fields (e.g. during the first few years), a 30% increase in N-fertilisers is recommended on maize, due to the immobilisation of N in the soil. Thereafter the availability of N to the plant should be assessed through an appropriate analysis, and fertiliser application should be adjusted accordingly.

Babala should preferably be flattened with a knife-roller at silking or flowering stage before it produces viable seeds which could become a weed. Herbicides could also be applied when necessary to kill regrowth quickly. The cover crop residues remain on the soil surface providing cover that limits erosion, enhance water infiltration and reduces their rate of mineralisation.

Conclusion

Pearl millet is an annual summer grass that is well-adapted to well-drained areas and grows well on poor and infertile soils, as well as highly fertile soils. It can either be used for hay, silage, foggage or can be grazed too. Because of this species' high nutritive value, it is a recommended species to provide high quality

Integrated crop and pasture-based livestock production systems

Pearl millet at grazing height.

pasture without significant amounts of fertiliser needed, especially if it is being planted in crop rotation with crops that receive high levels of fertiliser and irrigation.

This species provides the opportunity to remove excess levels of nutrients in the soil as well as drying out extremely wet soils. Very few anti-quality factors occur within this species, however nitrate poisoning is a potential threat in well-fertilised pasture stands, but unlike sorghum, Pearl millet is safe for horses.

Important characteristics of new cultivars are:

- The cultivars do not contain prussic acid, implying it can be grazed heavily under various environmental and soil conditions without problems. The ideal pasture for sheep, cattle and horses.
- Its rapid regrowth rate and high forage quality makes this an ideal pasture crop for direct grazing, for finishing lambs and weaners or as a dairy pasture.
- It should be utilised when the plant reaches a height of 300 mm - 500 mm for optimum quality and energy content.
- Rotational grazing ensures good production and should not be grazed at a height lower than 150 mm - 200 mm in order to ensure rapid regrowth.
- Due to its high leaf content, good hay can be made.

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Recommendations for SOYBEAN PLANT ESTABLISHMENT

Soybeans have a smaller plant than most other grain crops and therefore have a smaller leaf area. A higher population is planted in order to intercept the maximum amount of sunlight.

The ability of soybeans to branch out and produce more pods if there is enough room (phenotypic plasticity) explains the minor reaction soybeans display to different plant establishments. At a high plant establishment soy plants will branch little, grow straight up and bear pods high above the ground. With a decrease in plant population, the inner-row space plants increases and the plant produces more lateral branches and pods.

With very low plant populations some of the lateral branches and pods will be borne close to the ground. Although yield is retained, some of the lateral branches will lodge and bear pods on the ground, which reduces the harvestable yield.

Recommendations for establishment

Recommendations for soybean establishment differ considerably and are complex due to the variation with respect to row widths, tillage practices and planting date differences. In normal spring plantings in October, maximum yields are obtained with 25 to 50 plants per square metre. In practice, the ideal establishment for 0,5 m rows is 14 to 18 seeds per metre, for 0,76 m rows it is 22 to 26 seeds per metre, for 0,91 m rows it is 24 to 28 seeds per metre and for 1,52 m rows 28 to 32 seeds per metre.

Adjustments in plant population must be made on the basis of the interaction between the production potential of the field, phenotypic plasticity and lodging of the cultivar on the basis of the proposed planting date. With early plant dates cultivars that tend to lodge or produce more lateral branches can be planted in a lower population. This is not the case for a late planting date. Soybeans that are planted early in fields with a high potential tend to grow very lushly. In such a case the plant population can be reduced.

The above points to final plant populations of 180 000 to 400 000 plants per hectare. The higher populations in narrower rows are a result of more space in the rows and the interplant competition being less, which reduces the risk of thin stems and lodging.

Early planting dates

Early planting dates in the cooler eastern production area have a very beneficial effect on yield, but this is accompanied by greater risk. This period is characterised by regular cold fronts that cause the soil temperature to drop considerably. This exposes the seed to fungi for longer in the cold, wet conditions, which can lead to seedling wilting. If you have to plant in these conditions, the plant population should be increased by 15% to 25% to make provision for establishment losses, particularly with no-till systems.

If the planting date has to be postponed to late November and December due to weather conditions, the vegetative development is limited considerably. The smaller plants have less room to produce sufficient pods and tend not to close up the space between the rows. The plants then cannot utilise all the sunlight. To compensate for this, the plant density must be increased by 40% to 60%. A better option would be to accommodate the high plant establishment in narrower rows.

Plant population

Accurate plant densities must be based on seed quantities per hectare and not on seed mass. Seed is sold according to weight, which makes it difficult to calculate seed requirements. The labels on the seed package are supposed to indicate the number of seeds per kilogram. This can then be used as a basis for calculating the relative quantity of seeds required.

Most planter tables that are used for calibration also use relative data and the plant population should then be regarded as estimated. The only way in which planters can be calibrated accurately is to count the number of seeds that are placed over a specific distance by the planter.

Seed size

The seed sizes of different cultivars vary considerably. They will probably vary between 5 000 and 8 000 seeds per kilogram. Some cultivars tend to produce bigger seeds more than others, but the influence of environmental conditions during the grain-filling period have the biggest effect.

If drought or any other stress factor is experienced during the grain-filling period, the seeds will be smaller than normal. A good blossom period that leads to a lot of pods can also result in smaller seeds. The reverse can also be true. Very small seeds will not have an effect on the yield of the crop, provided the germination of the seed occurs correctly. It is not uncommon to get a large variation in seed sizes in one production unit. Planters that use volumetric seed measurement must be calibrated regularly – particularly if you change cultivars.

Damage to seeds

The number of seeds that survive is always smaller than that planted. Some seeds simply will not germinate. Diseases, insects and other factors damage the seeds even before they germinate. After emergence some seedlings will be damaged by herbicides, equipment, insects, rodents, diseases and other factors. Seed is also damaged when treated with vaccines.

To compensate for the losses, more seed should be planted than the intended final plant establishment. The total loss can amount to 40%, depending on the practices that are followed. For practical reasons the figure of 20% should be used in calculations.

The following formula can be used to calculate the plant population:

Plant population = (expected plant establishment)/(germination percentage x expected survival)

Expected plant establishment
= final establishment that should be in the field (240 000)

Germination percentage
= read this on the package label (90%)

Expected survival = unknown but 80% is commonly used for soybeans

Plant population
= 240 000 / (0,9 x 0,8)
= 333 333 seeds per hectare.

Article submitted by Nico Barnard: Research Agronomist, Pannar Seed. For more information, send an email to Nico.barnard@pannar.co.za.

Grain SA interviews...

Michael Mbalo

Michael Ngayibeki Mbalo is a young, energetic and passionate farmer from Mthatha, who is very eager to learn and practise the skills he has received from the Grain SA Farmer Development Programme.

Where and on how many hectares are you farming? What do you farm with?

I am a communal farmer in Mthatha in the Baziya Administrative Area in the OR Tambo District Municipality. This season I produced 7 hectares of maize and 1 hectare of potatoes. In total I own 14 hectares, where I plant maize, beans and potatoes. I also farm with sheep and beef cattle.

What motivates/ inspires you?

The Grain SA Study Group members motivate me. After I opted for a voluntary package from the gold mine in Marikana, where I was employed, I approached the Grain SA Mthatha office and received advice on the purchase of machinery and implements for agricultural farming.

Describe your strengths and weakness

I am still young with a lot of farming energy and passion and still very eager to learn and practise training skills and advice obtained.

What was your crop yield when you started farming? What are your respective yields now?

When I started farming, I produced 2,5 t/ha, now I am a Grain SA advanced farmer producing 4 t/ha.

What do you think was the main contributor to your progress and success?

I attribute my progress and success to the Grain SA Farmer Development Programme that provided me with training courses, advice, study group services, practical demonstrations and farmer days. I also always have Pula Imvula at hand for reference and this contributed to my progress. The above training and assistance helped me increase my yield.

What training have you received to date and what training would you still like to do?

I have completed the Introduction to Maize Production course, Tractor Maintenance course and Setting of Implements course. I would also like to do a course on Farm Management for Profit as well as receive training in welding, grinding and spray painting.

Where do you see yourself in five years time?

In five years time I want to have 30 hectres of maize and be producing more than 5 t/ha.

What advice do you have for young aspiring farmers?

To the young farmers out there, I would like to advise and encourage them to group themselves and form a youth co-operative. They should rather till the land for earing and stop committing crime. They should know that farming is a business that creates jobs.

Article submitted by Lawrence Luthango, Development Co-ordinator of the Grain SA Farmer Development Programme, Mthata. For more information, send an email to lawrence@grainsa.co.za.

The Corner Post

LABIOUS MANOTO
Farming should be about ensuring food security

The winner of the 2008 Grain SA Developing Farmer of the Year award, Labious Manoto, feels strongly about the role of politics in agriculture. “It is through politics that agriculture is suffering. I wish politicians would realise that farmers are the ones providing food,” he says. Labious dreams of a country where politics play no role in agriculture so that all farmers, who are passionate about farming, can focus on one collective goal: Producing food to ensure food security in our country.

This farmer from the North West Province mentions that his love for farming comes from his parents, Paul and Francina Manoto, who were subsistence farmers. “I was raised by a farmer to become a farmer,” he adds. His initial trade as a builder for the former Bophuthatswana government was short-lived and he started farming in 1976 at Lombaardslaagte, Gelukspan and Deelpan. Currently he farms in the Lusthof district near Lichtenburg on 500 hectares of own land where he grows maize and sunflower and also farms with cattle and sheep. He proudly mentions that this land has been bought and registered on his name. Apart from his own land, he also farms on 480 hectares of communal land at Lombaardslaagte. To ensure a future for his children, he would like to buy more land and expand his livestock division.

He realises that farming is not an easy career choice. “Nothing happens without hard work. Circumstances beyond our control contribute to difficulties, which make it imperative for farmers to be flexible,” he describes his view of farming. Philip and Andrew, Labious’s two sons, have joined their father in this farming enterprise to learn firsthand what agriculture is all about. This father of five mentions that he is currently not serving on any committees, nor is he actively involved in organised agriculture as his sons are not yet ready to manage the farm without his expertise and input.

During the evaluating process in 2008 the panel of judges described him as an experienced, hard-working farmer whose tractors and implements are well looked after. He wants to make sure that all these principles are developed in his two successors by the time he hands over the reigns to the next generation. His three daughters have chosen careers in the fields of teaching, banking and medical services. Violet, his supportive wife, sadly passed away in 2014.

The award he received in 2008 was an incentive to work harder and to give his all to his own farming operation. It further encouraged him to keep abreast of technological and agricultural development to ensure sustainable farming. He believes that setting a good example is the way to entice young people to become interested in choosing farming as a career. Share the real facts about agriculture – it is no good sketching a picture of it being all moonlight and roses. This will help eliminate those who are not born farmers.

For emerging farmers Labious has the following advice:

> *“It is through politics that agriculture is suffering. I wish politicians would realise that farmers are the ones providing food.*

- Farming is a calling. You need passion to farm.
- You have to be prepared to work long hours for little money as farming conditions are mostly such that the profit margin is initially really small.
- You have to build your farming enterprise as you would any other business. Start small and grow.
- Learn from other more experienced farmers and never think you know it all.
- Join study groups like those of Grain SA.

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

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