



2023 **YOUR** PRODUCT CATALOGUE



PANNAR®

*Together we farm
for your future™*

PICTURED

*Farmer: Skimps (Clinton) Knight
embracing his daughter Paige
Farm: Ashleigh Farm
Area: Highflats, KwaZulu-Natal
Pannar Rep: Andrew du Plessis*

"On any given day, you're more than just a farmer. You're also a vet, botanist, mechanic, accountant, marketing expert and high stakes risk manager – not to mention family member and friend."

Nick Goble, Pannar Seed Business Manager



Dear Pannar Customer

You may have noticed that last year Pannar made a slight but significant change to our tagline, from **"together we farm for THE future"** to **"YOUR future"**. We believe it better demonstrates our focus on our farmers' success and sustainability.

Farmers are an asset of great value and play a vital role in the prosperity of our country. When we sit down to a delicious meal, it is easy to perceive the role they play in our lives, but on closer inspection, farmers provide more than just sustenance.

The very life and vitality of South Africa's rural areas are closely linked to the presence of the farming sector, which employs and provides income to thousands of people living in these areas. Farming has a dramatic, positive effect on rural economies. What is more, agriculture influences our economy on an extremely broad base. It safeguards our food security, strengthens our national economy, has a positive effect on education, training and the development of entrepreneurial potential, while supplying jobs directly and indirectly to a large percentage of our population. In these many ways, farming ultimately contributes to the stability and sustainability of our rural areas and towns.

At a national level, although agriculture's contribution to GDP (gross domestic product) is approximately 2.5%, the value chain associated with our farming industry is vast and makes a huge contribution to our country's prosperity.

It all comes down to YOU - the farmer.

You need to demonstrate enthusiasm, dedication, persistence, resilience and hard work, regardless of what nature and life throw at you. You proudly cultivate the soil, grow crops, and raise livestock to provide work and food for millions. On any given day, you're more than just a farmer. You're also a vet, botanist, mechanic, accountant, marketing expert and high stakes risk manager - not to mention family member and friend. You're a respected businessperson, and esteemed individual in your community, lovingly preserving the environment for our future generations.

That's why, at Pannar we are steadfast in our commitment to you, the farmer.

Pannar is committed to bringing you the best in field performance and service. The excellent products featured in this catalogue are developed through the most innovative breeding techniques in the world, adapted and widely tested for local success.

As always though, there is no substitute for boots on farms, as we continue striving to earn your trust by offering the personalised service and value-adding programmes that you need on your farm to help maximise your yields and profitability.

Thank you for allowing us the opportunity to apply not only our products, but our accumulated knowledge and technological know-how to your fields again this year.

Thank you for your continued support.

Nick Goble

Pannar Seed Business Manager

Our Agronomic Support – How Do We Add Value?	02
Panacea® Ultimate Seed and Crop Health Solution	03
Maize	
PowerCore™ Trait Technology	05
Maize Hybrid Selection	07
Maize Hybrid Package	09
Maize and Sunflower Seed Spacing Guide	14
Management of Genetically Modified Maize Hybrids	15
Plant the Correct Refuge Area for Maize	21
Other Crops	
Sunflower	22
Soybeans	26
Dry Beans	28
Wheat	30
Grain Sorghum	34
Forage Crops	35
Contact Us	37
Trademark Information	40

MAKE EACH KERNEL COUNT ON **YOUR** FARM WITH **OUR** SKILLED AGRONOMISTS

Pannar's agronomy team boasts a century of collective experience in seed technology, agro-chemicals, mechanisation, soil science, marketing, markets and more. Our broad crop portfolio and geographic footprint means that our team has multi-crop experience across the varied microclimates in South Africa. Take advantage of their accurate, customised advice that maximises your unique cropping mix (rotation), cropping intensity and management preferences.

HOW DO WE ADD VALUE?

Our Agronomy Team

Pannar's cultivars are developed from leading, diverse sources of genetics and best express their full genetic potential under good management practices. That is why our skilled agronomists are here to help you choose the right seed for your fields.

Their objective, technical recommendations are based on data from scientific trials and aims to ensure that your crop performance lives up to or even exceeds your expectations, so use their expertise and service to your benefit. Honest, reliable, involved and knowledgeable, they offer a complete seed line-up and management guidelines to ensure sound crop production and risk mitigation whilst protecting the environment and preserving our natural resources for our future.

Trust our agronomists to help you identify environmental risks and devise methods of reducing these risks to boost your efficiency and set you up for success.

Our Agronomic Research Initiatives

The Panagri® practical farming research and the Panacea® complete seed and crop protection initiatives are outlined below:

The **Panagri®** practical farming research initiative seeks to provide farmers with practical advice on how to optimise all the disciplines that play key roles in progressive crop production, including fertilisation practices, cultivar selection, optimal plant population, crop rotation, tillage and use of agricultural chemicals.

Panacea® seed and crop protection is the label under which Pannar develops seed treatment programmes for optimal germination, plant population and seedling protection as

well as first-class advice for the identification and control of diseases and pests that occur on farmers' crops from time-to-time. This includes fungicide and insecticide spray programmes, which offer guidelines for the control of such outbreaks (including chemical control of stalk borer on conventional and glyphosate tolerant hybrids).

Pannar Online Resources

In early 2023 Pannar will be rolling out a refresh of our **pannar.com** website and **Sprout®** mobile app with increased personalisation tools for farmers. We have a wealth of agronomic information and we're going to help you find what you're looking for and introduce you to products and services you never knew you needed! It will make searching for technical information online even more streamlined and insightful.



Grow360 Coming Soon

For the past few years, Pannar has been developing a digital platform to enable farmers to collect farm data, visualise it and analyse it to extract meaningful insights that help them make more informed decisions to achieve better yields and overall profitability. We're currently testing its powerful query capabilities on real farm datasets and we're excited to bring you this new innovation in 2023.

GROW360



PANACEA® seed and crop protection. Innovative crop pre-plant care and crop protection offers a complete risk management package.		
GUIDANCE	SEED TREATMENT	FUNGICIDE AND INSECTICIDE SPRAY PROGRAMMES
Astute application of knowledge.	Precautionary crop protection (seed treatment presentations: fungicide, insecticide and polymers).	Fungicide spray programme.
Crop protection: disease diagnosis, advice and guidance.		Insecticide spray programme.



PANAGRI® practical farming research. Research for progressive crop production.
GUIDANCE
Production management guidelines specific to each production region.
Precision placement of cultivars. Interaction between yield potential, growth class, prolificacy, plant population, and cultivar type.

PANACEA® ULTIMATE SEED AND CROP HEALTH SOLUTION – PLANT THE SEEDS OF SUCCESS ON YOUR FARM AND KEEP THEM PROTECTED

PANACEA® SEED TREATMENT

A Mark of Assurance in Seed Treatments

High yield potentials start with a uniform and healthy plant population. The Panacea® seed treatment package protects your seed and seedlings from a variety of early-season insects, soil- and seed-borne diseases for a great head start. Panacea® seed treatments are designed, verified and proven to work with Pannar® brand genetics, giving farmers a higher level of confidence in their seed treatment options.

Designed for Our Genetics

You've invested in outstanding Pannar® brand genetics for your field. We've invested in protecting their performance potential.

Panacea® seed treatments address:

- Plantability;
- Cold tolerance;
- Plant population establishment;
- Singulation; and
- Early vigour.

We evaluate hundreds of product concept combinations to develop the right seed treatment formulations for our genetic line-up. Each year, we validate those combinations in labs, greenhouses and on farmers' fields. Our seed treatment development process relies on 30 000 research plot evaluations annually.



Verified on Our Genetics

Panacea® seed treatments capitalise on over 100 years of crop protection know-how and an understanding of what farmers need and how they farm. Our seed treatment combinations are carefully evaluated at the Corteva Agriscience Centre of Seed Applied Technologies (C-SAT) - an all-in-one facility that's part laboratory, testing centre and seed treatment plant.

Here, seed treatments are reviewed using our exclusive six-step PASSER process:

- P** **Plantability:** Maximising seed flow and planting precision
- A** **Application:** Refining processes to work across seed properties (size, shape, hybrid/cultivar) and environmental conditions
- S** **Seed safety:** Ensuring treatments don't adversely affect seed germination
- S** **Stewardship:** Minimising potential adverse effects on people and the environment
- E** **Efficacy:** Evaluating protection and vigour, to confirm the seed treatment performs as expected, even in challenging environments
- R** **Regulatory:** Meeting regulations and guidelines

Only seed treatments that excel in this rigorous process earn the Panacea® mark of assurance.

Scan the code for more information on these exceptional Pannar products



Proven in the Field with Our Genetics

Through our Field Test Network, our treated seed is evaluated by farmers. It goes into the ground using real planters, under real conditions.

On-farm testing is combined with our large-scale IMPACT™ testing programme, where we conduct more than 60 000 plot evaluations each year. This testing ensures that Panacea® seed treatments work no matter which Pannar® brand hybrids or cultivars you plant.

Our extensive evaluation process also means that seed treatments which earn the Panacea® mark of assurance fit with responsible farming practices, minimising exposure to off-target species and the environment and helping farmers reduce the amount of active ingredient they need to apply to their fields.

To learn more about Panacea® seed treatments and options available to protect your seed this season, speak to your Pannar sales representative.



Fungicide and Insecticide Spray Programmes

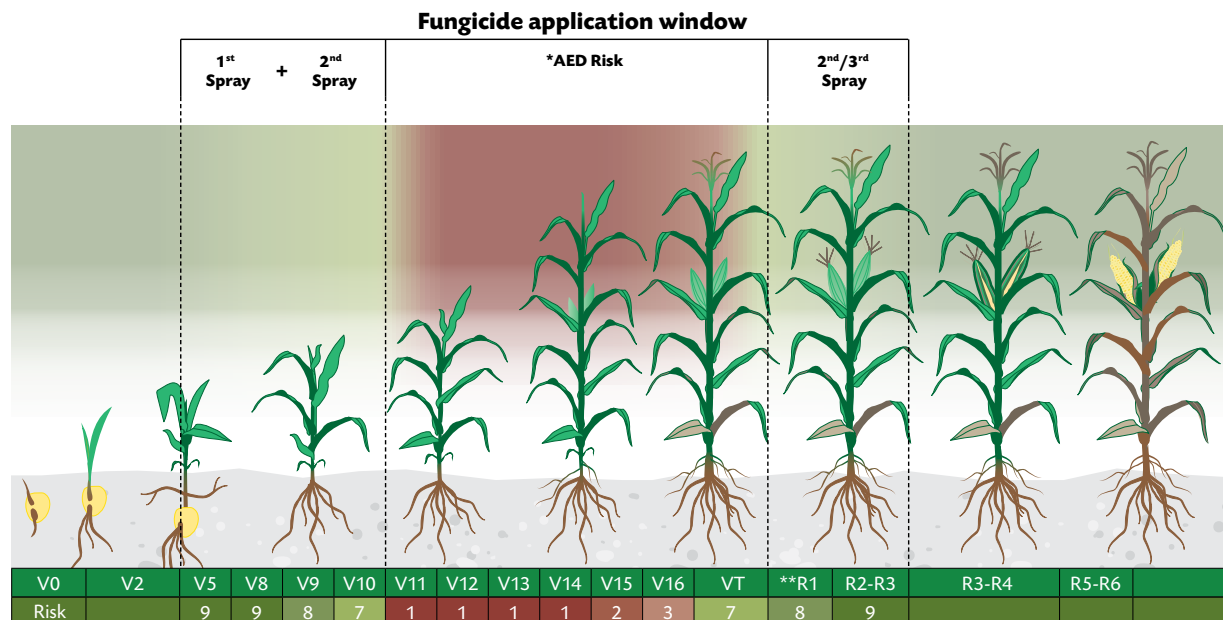
Under the auspices of the **Panacea®** programme, Pannar recommends fungicide and insecticide spray programmes that enable the farmer to benefit from the results of Pannar's on-farm trial results to ultimately protect crop yield potential and/or quality.

Certain hybrids have demonstrated significant yield improvement when treated with an appropriate fungicide spray programme, particularly in high disease pressure situations. Depending on the hybrid selected, the season and environment, spray programmes comprising one, two, or more fungicide applications can deliver economic yield benefits and improved agronomic performance. Speak to your Pannar sales representative to learn about which hybrid and environment combinations are likely to show a strong reaction to the application of fungicides.

With regards to insect control, Pannar recommends the implementation of an Integrated Pest Management (IPM) strategy. These practices include elements such as crop rotation, cultural and biological control tactics (including Bt-protected maize traits), pest scouting and the use of appropriate pest thresholds when implementing insecticide application.



Fungicide Spray Programme



*AED risk especially high if stress factors occur ±V10–VT, including the use of additional surfactants or mixtures.
(9 = Low Risk, 1 = High Risk). **R1 (pollination period) – it is critical to avoid any form of stress.

Time of Application (Timing is very important)	Two (2) Spray Programme (Medium risk areas and hybrids)	Three (3) Spray Programme (High risk areas and hybrids)
FIRST APPLICATION Spray 5-8 leaf stage (Preferably with a self-propelled or tractor rig for good coverage)	Strobilurin/ Triazole Combination Fungicide ¹	Strobilurin/ Triazole Combination Fungicide ¹
SECOND APPLICATION 21-28 days later ³ (Ground or aerial application)	Triazole or Triazole/ Carbendazim Fungicide ²	Triazole or Triazole/ Carbendazim Fungicide ² OR Strobilurin/Triazole Combination Fungicide ¹
THIRD APPLICATION IF REQUIRED Shortly after flowering (Ground or aerial application)		Triazole or Triazole/ Carbendazim Fungicide ²

¹ Examples of products in this group include Acanto® Plus (Corteva Agriscience), Amistar Top® (Syngenta), Abacus® or Abacus® Advance (BASF), Nativo® (Bayer).

² Examples of products in this group include Artea® (Syngenta), Duett® or Duett® Ultra (BASF), Zantara® (Bayer), Miravis Neo (Syngenta).

³ Try to avoid spraying during the V10-VT growth stages, which are high risk for *Arrested Ear Development (AED) as well as flowering (pollination problems).

Important: Refer to the label for rates and instructions. Use only as indicated on the label.

NOTE: Important to rotate products as per spray programme and not to continue using the same product throughout the season. This is to prevent the build-up of resistance in the pathogen to a fungicide. (FRAC = Fungicide Resistance Action Committee. The purpose of FRAC is to provide fungicide resistance management guidelines to prolong the effectiveness of "at risk" fungicides and to limit crop losses should resistance occur).

POWER UP

your crop's resistance with PowerCore™ trait technology



Put the power back in your hands in the fight against key above-ground pests with PowerCore™ technology - a high-performing, insect-resistant seed trait that effectively helps to protect crops from destructive above-ground lepidopteran pests, such as the Maize Stalk Borer and Spotted Maize Stem Borer.

The PowerCore™ trait comprises three different *Bacillus thuringiensis* (Bt) -proteins, each targeting insects differently and thereby helping to prolong the durability of the technology. PowerCore™ technology also confers herbicide resistance to glyphosate herbicides. Its unique combination of three Bt-proteins with glyphosate tolerance give it excellent control of pests and weeds. This exceptional trait technology is now available in six new maize hybrids with excellent top-end yield potential.

Yellow Maize Hybrids with PowerCore™ Technology	White Maize Hybrids with PowerCore™ Technology
PAN 3P-924PW (NEW)	PAN 3P-973PW (NEW)
PAN 4P-928PW (NEW)	PAN 5P-985PW (NEW)
PAN 5P-902PW	PAN 5P-991PW (NEW)
PAN 5P-990PW (NEW)	

"As we focus on providing advanced maize seed traits that help our farmers create new opportunities to manage their business profitably, we are excited by the new opportunity that PowerCore™ brings to meet the needs of our customers",
says Nick Goble, Pannar Seed Business Manager.

Speak to a Pannar expert today, to help determine which maize hybrid seed with PowerCore™ technology best suits your farm for the 2023 growing season!

POWER THROUGH

the challenges and protect your crops with PowerCore™ trait technology

INSECT SPECTRUM

Maize in Africa is attacked by many lepidopteran pests. These pests cause severe damage to maize and crop loss varies depending on the time and level of stem borer infestation.

Maize Stalk Borer (*Busseola fusca*) is the most injurious of maize stem borer in South Africa and occurs at altitudes ranging from sea level to 2 000 m above sea level. It is widespread throughout the maize production triangle of the country.



Spotted Maize Stem Borer (*Chilo partellus*) is a stem boring insect that is a serious threat to maize as well as millet and sorghum. These stem borer caterpillars damage crops by boring or tunnelling inside their plant stems.



Corteva Agriscience Trait Stewardship

Stewardship is a life cycle approach to product management. It is the responsible way to manage our technologies and plant products, from their discovery and development, to their use and eventual discontinuation. Corteva Agriscience is committed to bringing new technologies to the marketplace in a responsible manner and promotes the practices of responsible Insect Resistance Management (IRM), Herbicide Resistance Management, and Grain Marketing decisions, to ensure crop options.

Technology Use Agreement

As a trait developer, Corteva Agriscience helps to ensure that biotech trait technologies are grown and marketed in a manner that meets all regulatory requirements in South Africa. Growers must sign a Technology Use Agreement (TUA) before obtaining, planting, or growing seed products containing biotech trait technologies. A TUA must be signed annually, as it is valid for one (1) year only.

Product Use Guides

Stewardship is achieved by adherence to the TUA, Product Use Guides, and Product Labels. The Product Use Guides set forth the requirements for growing Corteva seed products containing trait technologies. These requirements include adhering to applicable IRM and Herbicide Resistant Management practices. Compliance with the terms in the Product Use Guides and the TUA delays the development of insect resistance to incorporated plant protection technologies and helps to maintain the long-term durability of these technologies. It is essential to maintaining growers' access to and use of trait technologies.

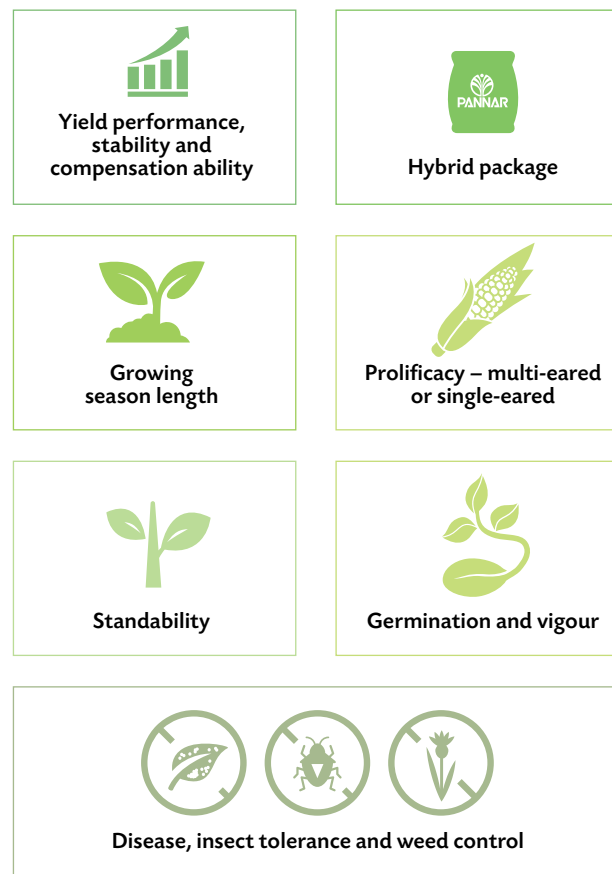
PowerCore™ multi-event technology developed by Corteva Agriscience and Monsanto. **PowerCore™** is a trademark of Monsanto Technology LLC.

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MAIZE HYBRID SELECTION

One of the most important and difficult management decisions that farmers make every year is the selection of a package of hybrids to plant. When selecting a suitable hybrid package, **yield performance** and **hedging of risk** 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 those hybrids are planted. The following characteristics, not necessarily in order of importance, are key considerations in the decision-making process:



The most desirable characteristics are discussed in short:



Yield Performance, Stability and Compensation Ability:

Reliability of yield expectation from season to season is probably the most important aspect of 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 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 no 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 is the result 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; and
- Weed control.



Growing Season Length:

To ensure the best average yield, consider planting hybrids of 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 is less important.

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

Optimal plant population for various hybrids depends on several factors; 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 with ears that 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 those 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 is 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 lays 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 may 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.

In summary, 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 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; and
- Single-eared hybrids are better adapted to high plant populations and higher potential conditions.

MAIZE HYBRID PACKAGE




Pannar's maize package comprises various growth classes and includes conventional, stalk borer resistant, glyphosate tolerant and stacked gene hybrids. These hybrids are recommended for grain and silage production, as well as for maize foggage.



PICTURED
Farmer: Gerrie Jansen van Rensburg
Farm: De Vereeniging
Area: Ermelo, Mpumalanga
Pannar Rep: Anina Snyman

Estimated Relative Maturity (Days)	Yellow Hybrid Package	White Hybrid Package
113	PAN 3A-124 PAN 3R-524R PAN 3P-924PW (NEW)	
114	PAN 4A-128 PAN 4R-528R PAN 4P-928PW (NEW)	PAN 3A-173 PAN 3R-573R PAN 3P-973PW (NEW)
116	PAN 4A-132 (NEW) PAN 4R-838BR	
118	PAN 4A-156	
119	PAN 5P-902PW PAN 5A-190 PAN 5R-590R PAN 5P-990PW (NEW)	
124		PAN 4A-111 PAN 4B-411B PAN 4R-511R PAN 4R-811BR PAN 5A-163 (NEW) PAN 5R-563R (NEW) PAN 5R-575R
125	PAN 5A-166	PAN 5285 PAN 5685R PAN 5R-785BR PAN 5P-985PW (NEW)
126	PAN 5A-182 PAN 5R-582R	PAN 5A-291 PAN 5B-491B PAN 5R-591R PAN 5R-891BR PAN 5P-991PW (NEW) PAN 5R-555R (NEW)
127		PAN 5R-547R PAN 6R-879BR

YELLOW MAIZE HYBRIDS – AGRONOMIC CHARACTERISTICS

Hybrid Platform	Estimated Relative Maturity (Days)	Available Versions		Technology	Key Strengths
					<div></div>
PAN 3A-124	113	Base	PAN 3A-124		This platform is the quickest in the Pannar ultra early range and produces an attractive grain type that dries down rapidly. It has maintained excellent high yield potential and stability over seasons, making it the market-leading irrigation platform. It is also suitable for high potential dryland production. Typical ultra early hybrids with an upright leaf growth habit that can be planted at higher plant populations, maintaining excellent standability. The platform features a semi-flex ear type, which is advantageous under high potential conditions. In higher disease pressure environments a preventative fungicide programme is recommended. PAN 3P-924PW with PowerCore™ technology provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control.
		R	PAN 3R-524R	ROUNDUP READY® MAIZE 2	
		PW	PAN 3P-924PW (NEW)	POWERCORE™	
PAN 4A-128	114	Base	PAN 4A-128		These early growth class hybrids have excellent top-end yield potential. They should be considered for high potential lands where they will be afforded the opportunity to reach their full potential. Particularly well suited to the eastern production areas, this agronomically well-balanced platform has good standability and will handle higher plant populations very comfortably. In higher disease pressure environments a preventative fungicide programme is recommended. PAN 4P-928PW with PowerCore™ technology provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control.
		R	PAN 4R-528R	ROUNDUP READY® MAIZE 2	
		PW	PAN 4P-928PW (NEW)	POWERCORE™	
PAN 4A-132	116	Base	PAN 4A-132 (NEW)		This new hybrid with a robust disease profile and strong yield stability across different yield potentials, has performed with distinction in product testing trials. PAN 4A-132 also brings strong prolificacy back to the early growth class. Initial indications point to this product becoming a major hybrid in the market!
PAN 4R-838BR	116	BR	PAN 4R-838BR	ROUNDUP READY® MAIZE 2YIELDGARD® MAIZE 2	Although initially ear-marked for the eastern market, this hybrid has also shown significant adaption to the western regions. It has performed well under a wide range of plant populations and yield potentials. Strong emergence and seedling vigour gives this hybrid an early advantage. In environments where Common Rust is prevalent, a preventative fungicide spray is advised for this otherwise well-balanced hybrid.
PAN 4A-156	118	Base	PAN 4A-156		PAN 4A-156 has good general disease tolerance and is a top performer in KwaZulu-Natal and in the moist high potential environments of the east. With its larger plant type and strong stay-green leaves, it makes an excellent quick silage hybrid.
PAN 5P-902PW	119	PW	PAN 5P-902PW	POWERCORE™	A recently developed hybrid in the medium early growth class with PowerCore™ technology that provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control. This hybrid has low ear insertion and good stalk strength and performs well in the eastern Highveld. It has excellent grain quality with good hectolitre mass.
PAN 5R-590R	119	Base	PAN 5A-190		These hybrids are widely adapted with stable performance across all production areas. A very good choice for silage in the eastern production areas. These hybrids have excellent early vigour, and have good standability. A very healthy plant with good general disease tolerance especially to Diplodia and Common Rust. They show reasonable prolificacy at low plant populations. PAN 5P-990PW with PowerCore™ technology provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control.
		R	PAN 5R-590R	ROUNDUP READY® MAIZE 2	
		PW	PAN 5P-990PW (NEW)	POWERCORE™	
PAN 5A-166	125	Base	PAN 5A-166		A hybrid in the medium early season growth class with well-balanced agronomics that has consistently delivered strong performance over years of testing. Good overall leaf disease tolerance and prolificacy afford this hybrid wide adaptability. It has also shown an impressive top-end yield in high potential conditions.
PAN 5A-182	126	Base	PAN 5A-182		These reliable hybrids maintain good performance and stability at all yield potential levels and have excellent leaf disease tolerance. Widely adapted for all production areas, and proven yield leaders in the eastern Highveld. This platform produces excellent quality flinty grain with good hectolitre mass and a golden yellow colour, very popular with merchants.
		R	PAN 5R-582R	ROUNDUP READY® MAIZE 2	

Drying Rate, Prolificacy, Standability and Emergence		
Good	Average	Weak

Tillering and Disease Risk			
Low	Average	High	Unknown

✗ No	✓ Yes	◆ Unknown
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Flowering and Physiological Maturity		General Characteristics						Disease Risk						Management Recommendations					
Days to 50% Tassel	Days to Physiological Maturity	Ear Type	Drying Rate	Tillering	Prolificacy	Standability	Seedling Vigour	Northern Corn Leaf Blight (NCLB)	Grey Leaf Spot (GLS)	Common Rust	Phaeosphaeria Leaf Spot	Diplodia Ear Rot	Cob and Tassel Smut	Sulfonylurea Sensitivity	Suitable for Full Irrigation	Suitable for Supplementary Irrigation	Suitable for High Population Pressure	Irrigation Plant Population per ha ('000)	Dryland Plant Population per ha ('000)
53-75	104-143	Semi-flex												✗	✓	✓	✓	80-100	40-70
57-78	110-150	Fixed												✗	✓	✓	✓	65-80	40-70
60-79	108-150	Fixed												◆	◆	◆	✓	65-80	40-70
60-79	108-150	Fixed												✗	✗	✓	✗	65	30-65
60-79	110-150	Fixed												✗	✗	✓	✗	50-70	40-70
61-80	115-155	Fixed												◆	✗	✓	✓	55-80	35-60
61-80	115-155	Fixed												✗	✗	✓	✗	50-65	25-50
63-81	120-160	Semi-flex												✗	✗	✓	✗	50-55	25-45
63-81	120-160	Semi-flex												✗	✓	✓	✗	50-55	25-45

Hybrid Package Composition

The formidable yellow maize package of ultra early, early, medium early and medium hybrids offers a good long-term risk-mitigating strategy.

This season, Pannar introduces three new maize hybrids with the latest **PowerCore™** trait technology: PAN 3P-924PW, PAN 4P-928PW and PAN 5P-990PW.

PowerCore™ technology incorporates three different *Bacillus thuringiensis* (Bt) -proteins, for extensive control of targeted above-ground insects. The unique combination of Bt-proteins contained in **PowerCore™** technology offers improved Insect Resistant Management (IRM) against major maize pests, while its glyphosate tolerance brings a proven, convenient weed control benefit to farmers.

PAN 3P-924PW is the quickest maize hybrid with the latest **PowerCore™** trait technology in the Pannar range. It boasts quick dry-down and an attractive grain type.

PAN 4P-928PW has excellent top-end yield potential and handles higher plant populations very comfortably.




PAN 5P-990PW is widely adapted with stable performance across all production areas. It has excellent early vigour and good standability.

The season's new introductions are concluded with PAN 4A-132; an entirely new platform with strong yield stability across different yield potentials. It is highly prolific with a robust disease profile.

NB! The management of possible insect resistance to the Bt-gene is legally binding. The planting of a refuge according to regulations is required where any Bt-hybrids are used (B, BR, or PW). Refer to the schematic guidelines on page 21.



WHITE MAIZE HYBRIDS – AGRONOMIC CHARACTERISTICS

Hybrid Platform	Estimated Relative Maturity (Days)	Available Versions	Technology	Key Strengths
				  
PAN 3A-173	114	Base PAN 3A-173 R PAN 3R-573R PW PAN 3P-973PW (NEW)	ROUNDUP READY [®] MAIZE 2 POWERCORE [™]	This platform has a typical ultra early plant-type with upright leaves and good standability. Well suited to both irrigation and high potential dryland. Under lower plant populations these hybrids tend to be mildly prolific. The plants produce a high ratio of grain to stover. They are well-adapted to high plant populations and have good general disease tolerance and grain quality. PAN 3P-973PW with PowerCore [™] technology provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control.
PAN 4A-111	124	Base PAN 4A-111 Bt PAN 4B-411B R PAN 4R-511R BR PAN 4R-811BR	YIELDGARD [®] MAIZE 2 ROUNDUP READY [®] MAIZE 2 ROUNDUP READY [®] MAIZE 2 YIELDGARD [®] MAIZE 2	This mature platform has a rock-solid track record of yield performance. In the eastern production areas it is the go-to platform under high potential conditions. It handles various plant populations well. These hybrids are characterised by good general disease tolerance, standability, hectolitre mass, grain and milling quality. Performance can be more variable under hot, dry conditions.
PAN 5A-163	124	Base PAN 5A-163 (NEW) R PAN 5R-563R (NEW)	ROUNDUP READY [®] MAIZE 2	A new hybrid platform ear-marked as a stablemate for the PAN 4A-111 platform. This platform has good overall leaf disease tolerance and improved yield stability, particularly on moderate potential fields. It has good grain quality and will show prolificacy at lower plant populations.
PAN 5R-575R	124	R PAN 5R-575R	ROUNDUP READY [®] MAIZE 2	Exhibits good standability with fair prolificacy. Good performance, especially on the sandy soils of the North Western Free State. Complements PAN 5R-591R and can be planted as a refuge where PAN 5R-891BR and PAN 5P-991PW are grown. Impressive hectolitre mass.
PAN 5285	125	Base PAN 5285 R PAN 5685R BR PAN 5R-785BR PW PAN 5P-985PW (NEW)	ROUNDUP READY [®] MAIZE 2 ROUNDUP READY [®] MAIZE 2 YIELDGARD [®] MAIZE 2 POWERCORE [™]	Maintains consistently good performance in the Agricultural Research Council (ARC) national trials for the western production areas. Stable performance over seasons. Widely adapted and has good yield potential especially on soils with a clay content of >10% in the topsoil. These hybrids have an attractive plant type, are agronomically well-balanced and show good tolerance to Cob and Tassel Smut and NCLB. PAN 5P-985PW with PowerCore [™] technology provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control.
PAN 5A-291	126	Base PAN 5A-291 Bt PAN 5B-491B R PAN 5R-591R BR PAN 5R-891BR PW PAN 5P-991PW (NEW)	YIELDGARD [®] MAIZE 2 ROUNDUP READY [®] MAIZE 2 ROUNDUP READY [®] MAIZE 2 YIELDGARD [®] MAIZE 2 POWERCORE [™]	This platform is highly prolific and exhibits strong seedling vigour and early plant establishment. Widely adapted and maintains good stable performance at different yield potential levels. Very good performance on high potential soils in the western production areas with a clay content of <10% in the topsoil. PAN 5B-491B was the top performer in the ARC trials in the western areas for the 2021/22 season. PAN 5B-491B and PAN 5R-891BR have the additional advantage of second-generation stalk borer protection. PAN 5P-991PW with PowerCore [™] technology provides broad spectrum protection against above-ground lepidopteran pests, stacked with glyphosate herbicide-tolerant technology for premium insect and weed control.
PAN 5R-555R	126	R PAN 5R-555R (NEW)	ROUNDUP READY [®] MAIZE 2	An exciting new hybrid platform for the western production areas. This hybrid has good standability and an excellent prolificacy index, yet tends not to produce too many tillers. Good germination with strong seedling vigour makes it the best choice on the sandy soils of the North Western Free State. It also has good overall leaf disease tolerance.
PAN 5R-547R	127	R PAN 5R-547R	ROUNDUP READY [®] MAIZE 2	This hybrid falls into the medium early growth class and has very good standability. It is well-adapted to the sandy soils of the North Western Free State and North West region. This is a hybrid with exceptional yield potential. It does have a tendency to tiller, but not excessively so.
PAN 6R-879BR	127	BR PAN 6R-879BR	ROUNDUP READY [®] MAIZE 2 YIELDGARD [®] MAIZE 2	A stable performer well-adapted to the high potential soils of the western region. Due to moderate prolificacy, plant at a 10-20% higher plant population than normal. It has a flex ear type meaning that it has the ability to increase its ear size under optimal growing conditions. This hybrid has upright leaves and excellent standability. Exhibits good tolerance to NCLB.
SC 701	130#	Base SC 701		With its large cob, big tasty kernels and exceptional shelf-life, SC 701 is the undisputed leader in the green and roasting mealie industry in South Africa. This is the hybrid of choice for green mealie farmers, traders and hawkers. It is also suitable for producing baby corn. As it falls in the medium late growth class, SC 701 dries down slowly. It is also an excellent silage cultivar. SC 701 has good tolerance to MSV; farmers are advised to take preventative measures against GLS.

Not recommended for grain production.

Drying Rate, Prolificacy, Standability and Emergence		
Good	Average	Weak

Tillering and Disease Risk			
Low	Average	High	Unknown

✗ No	✓ Yes	◆ Unknown
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Flowering and Physiological Maturity		General Characteristics						Disease Risk						Management Recommendations					
Days to 50% Tassel	Days to Physiological Maturity	Ear Type	Drying Rate	Tillering	Prolificacy	Standability	Seedling Vigour	Northern Corn Leaf Blight (NCLB)	Grey Leaf Spot (GLS)	Common Rust	Phaeosphaeria Leaf Spot	Diplodia Ear Rot	Cob and Tassel Smut	Sulfonyleurea Sensitivity	Suitable for Full Irrigation	Suitable for Supplementary Irrigation	Suitable for High Population Pressure	Irrigation Plant Population per ha ('000)	Dryland Plant Population per ha ('000)
56-76	105-145	Fixed												✗	✓	✓	✓	80-100	45-70
58-79	115-148	Semi-flex												✗	✓	✓	✗	55	35-55
58-79	115-148	Semi-flex												◆	✗	✓	✗	50	25-45
63-81	120-160	Semi-flex												✓	✓	✓	✗	55-60	16-45
60-80	116-150	Semi-flex												✓	✗	✓	✗	55	16-45
63-81	120-160	Semi-flex												✓	✗	✓	✗	55	16-45
61-80	116-150	Semi-flex												✓	✗	✓	✗	35-40	16-45
61-80	116-150	Semi-flex												✓	✓	✓	✗	55-60	16-45
60-80	120-160	Flex												✓	✗	✓	✗	55	18-45
65-87	127-170	Fixed												✓	✓	✓	✗	30	22-30

Hybrid Package Composition

The Pannar white maize hybrid package is distinguished by its exceptional performance, adaptability and stability for good risk management.

This season, Pannar introduces our first white maize hybrids with **PowerCore™** trait technology: PAN 3P-973PW, PAN 5P-985PW and PAN 5P-991PW offer improved Insect Resistance Management (IRM) against Maize Stalk Borer (*Busseola fusca*) and Spotted Maize Stem Borer (*Chilo partellus*), with the added benefit of proven, convenient weed control.

PAN 3P-973PW is the new stacked gene offering in the PAN 3A-173 platform. Its typical ultra early plant-type with upright leaves and good standability means it is well-adapted to high plant populations. It has good general disease tolerance and grain quality.

PAN 5P-985PW is the new introduction in the PAN 5285 platform with **PowerCore™** trait technology. The widely adapted platform maintains stable performance over seasons and has particularly good yield potential on soils with a clay content of >10% in the topsoil.

PAN 5P-991PW completes the PAN 5A-291 platform with **PowerCore™** trait technology. This platform is highly prolific and exhibits strong seedling vigour and early plant establishment. Widely adapted and maintains good stable performance at different yield potential levels.

PAN 5A-163 is an entirely new platform. Flanked by its glyphosate tolerant stablemate PAN 5R-563R, they offer good overall leaf disease tolerance and improved yield stability, particularly on moderate potential fields. The platform has good grain quality and will show prolificacy at lower plant populations.

PAN 5R-555R rounds out this season's new introductions. It's an exciting new hybrid platform for the western production areas. This hybrid has good standability and an excellent prolificacy index, yet tends not to produce too many tillers. Good germination with strong seedling vigour makes it the best choice on the sandy soils of the North Western Free State.

NB! The management of possible insect resistance to the Bt-gene is legally binding. The planting of a refuge according to regulations is required where any Bt-hybrids are used (B, BR, or PW). Refer to the schematic guidelines on page 21.

MAIZE AND SUNFLOWER SEED SPACING GUIDE

Row Width (cm)	45 cm		76 cm		91 cm		120 cm	
Plant population per ha	Seeds per metre	Distance between Seeds (cm)	Seeds per metre	Distance between Seeds (cm)	Seeds per metre	Distance between Seeds (cm)	Seeds per metre	Distance between Seeds (cm)
90 000	4.1	24.7	6.8	14.7	8.2	12.2	10.8	9.3
80 000	3.6	27.8	6.1	16.4	7.3	13.7	9.6	10.4
70 000	3.2	31.7	5.3	18.8	6.4	15.7	8.4	11.9
60 000	2.7	37.0	4.6	21.9	5.5	18.3	7.2	13.9
50 000	2.3	44.4	3.8	26.3	4.6	22.0	6.0	16.7
45 000	2.0	49.4	3.4	29.2	4.1	24.2	5.4	18.5
40 000	1.8	55.6	3.0	32.9	3.6	27.5	4.8	20.8
35 000	1.6	63.5	2.7	37.6	3.2	31.4	4.2	23.8
30 000	1.4	74.1	2.3	43.9	2.7	36.6	3.6	27.8
27 500	1.2	80.8	2.1	47.8	2.5	40.0	3.3	30.3
25 000	1.1	88.9	1.9	52.6	2.3	44.0	3.0	33.3
22 500	1.0	98.8	1.7	58.5	2.0	48.8	2.7	37.0
20 000			1.5	65.8	1.8	54.9	2.4	41.7
18 000			1.4	73.1	1.6	61.1	2.2	46.3
15 000			1.1	87.7	1.4	73.3	1.8	55.6
12 000					1.1	91.6	1.4	69.4
10 000							1.2	83.3

Row Width (cm)	152 cm or 90 x 213 cm		180 cm		210 cm		230 cm	
Plant population per ha	Seeds per metre	Distance between Seeds (cm)	Seeds per metre	Distance between Seeds (cm)	Seeds per metre	Distance between Seeds (cm)	Seeds per metre	Distance between Seeds (cm)
90 000	13.7	7.3	16.2	6.2	18.9	5.3	20.7	4.8
80 000	12.2	8.2	14.4	6.9	16.8	6.0	18.4	5.4
70 000	10.6	9.4	12.6	7.9	14.7	6.8	16.1	6.2
60 000	9.1	11.0	10.8	9.3	12.6	7.9	13.8	7.2
50 000	7.6	13.2	9.0	11.1	10.5	9.5	11.5	8.7
45 000	6.8	14.6	8.1	12.3	9.5	10.6	10.4	9.7
40 000	6.1	16.4	7.2	13.9	8.4	11.9	9.2	10.9
35 000	5.3	18.8	6.3	15.9	7.4	13.6	8.1	12.4
30 000	4.6	21.9	5.4	18.5	6.3	15.9	6.9	14.5
27 500	4.2	23.9	5.0	20.2	5.8	17.3	6.3	15.8
25 000	3.8	26.3	4.5	22.2	5.3	19.0	5.8	17.4
22 500	3.4	29.2	4.1	24.7	4.7	21.2	5.2	19.3
20 000	3.0	32.9	3.6	27.8	4.2	23.8	4.6	21.7
18 000	2.7	36.5	3.2	30.9	3.8	26.5	4.1	24.2
15 000	2.3	43.9	2.7	37.0	3.2	31.7	3.5	29.0
12 000	1.8	54.8	2.2	46.3	2.5	39.7	2.8	36.2
10 000	1.5	65.8	1.8	55.6	2.1	47.6	2.3	43.5

MANAGEMENT OF GENETICALLY MODIFIED **MAIZE** HYBRIDS

Insect and weed control are two critical aspects in crop production. Biotech crops with insect protection against stalk borers and tolerance against specific herbicide applications (including glyphosate), offer great benefits to farmers.

Grain producers may only cultivate hybrids containing any of the Genetically Modified (GM) traits if they have signed a valid Technology Use Agreement (TUA) and Product Stewardship Agreement, thereby accepting the strict conditions and responsibilities regarding the planting and cultivation of biotech seed. Farmers are required to acquaint themselves with the GMO user guidelines as outlined in the agreement and are expected to adhere to the requirements regarding the planting of suitable refuge areas in the case of Bt-hybrids as well as the prescribed herbicide dosage and time of application for glyphosate tolerant hybrids, as it is mandatory.

For decades, multiple agricultural systems have co-existed successfully around the world, from production through to supply chains. Over time, best practices to facilitate these different agricultural systems have been developed and continually improved upon to ensure that high-purity and high-quality seed and grain are available to support trade from various agricultural systems. One example of such co-existence is the production of similar commodities in close proximity such as maize, sweetcorn and popcorn. Co-existence strategies should meet market requirements using science-based industry standards and management practices and should be flexible to facilitate options and choices for growers and the food and feed supply chain. This flexibility should also include the ability for co-existence strategies to be modified as changes in products, markets or practices occur.

The ongoing success of co-existence strategies is dependent upon co-operation, communication, flexibility, and mutual respect for each cropping system, and among growers using these various systems. Over the years, growers have adapted to changes and innovations in agriculture by using new farm management practices, new technologies, and other appropriate practices. It is incumbent upon a grower who is cultivating a crop to satisfy a particular market, to implement best practices to





PICTURED
Farmer: Zuko Qokela (Brookside Farm beneficiary)
Farm: Brookside Farming, Harry Gwala Agri
Area: Kokstad, KwaZulu-Natal
Pannar Rep: Andrew du Plessis

satisfy those marketing standards. By seeking to satisfy that market, the grower inherently agrees to use the appropriate practices to ensure the integrity and marketability of their crop in the market in which they seek to sell it. This is true, regardless of the particular market being served, whether it is maize, sweetcorn, organically produced maize, or conventionally produced maize. In each of these cases, the grower is producing a crop supported by a special market price and therefore assumes responsibility for meeting any applicable market specifications to receive the applicable premium price from that market. Even though the responsibility rests with the grower producing the crop for a particular market, it is each grower's responsibility to communicate with, and be aware of the planting intentions of their neighbours to gauge the need for any appropriate best management practices.

Glyphosate Tolerant Hybrids

Pannar® brand hybrids with glyphosate tolerance are designated by the letters R, BR or PW in the seed product code.

Best Practices for Managing Herbicide Tolerant Crops:

IMPORTANT – READ BEFORE PLANTING

If you have any questions after reviewing this information, please contact your authorised Pannar sales representative or agronomist.

What is Herbicide Tolerant Seed Technology?

Crops with traits for herbicide tolerance allow farmers to apply herbicides to their crops that they would otherwise be unable to utilise without causing death or unacceptable injury to that crop. For example, glyphosate herbicide tolerant maize crops can tolerate glyphosate herbicide application when applied at recommended rates. However, glyphosate application will kill non-glyphosate herbicide tolerant Pannar® brand maize or varieties.

Importance of Managing Herbicide Tolerant Crops and Weed Resistance to Herbicides

Properly managing herbicide tolerant crop technology is important to preserve the effectiveness and value of the tolerant crop seed and its corresponding herbicides in the future. Growers utilising herbicide programmes that include herbicide tolerant crops can do so on an annual basis provided the technology is managed effectively.

Best Practices:

- The use of herbicide tolerant crops does not limit the grower to the use of a single herbicide mode-of-action. Conventional herbicides can and should still be part of the grower's overall weed management system.
- Limit the number of applications of a single herbicide or herbicides from the same mode-of-action family within a single growing season.
- Apply herbicides at product recommended rates and at the recommended stage of weed growth, as stated on the product label(s).
- For problematic or resistant weeds, use mixtures or sequential treatments as per product label(s) for an effective, alternative control of target weeds.
- Use alternative weed management practices such as crop rotation, mechanical cultivation, delayed planting, and weed-free crop seed.
- Clean equipment before moving between fields to minimise the dispersion of weed seed.
- Scout fields after herbicide application to detect weed escapes or shifts. If a potentially resistant weed or weed population has been detected, use available control methods to avoid seed dispersion in the field.

Manage Volunteer Herbicide Tolerant Crops

The seed of some crops can escape harvest, germinate the following year, and become "volunteer" weeds in a rotational crop. This can happen regardless of whether the crop seed was herbicide tolerant or not. Many tools are available for managing herbicide tolerant volunteers, but advanced planning is advised to provide the greatest flexibility and success.

The best strategies for managing herbicide tolerant volunteers are crop rotation and rotation of herbicides. The proper adjustment of harvesting equipment, cultivation and tillage management will also help to reduce volunteer plants from previous crops. Plan at least a year ahead when planting a herbicide tolerant crop, to make sure you have a weed management plan in place that will control any herbicide tolerant volunteers, using alternative herbicide mode-of-action families and/or tillage for the next crop.

Hybrids with glyphosate tolerance offer the following benefits:

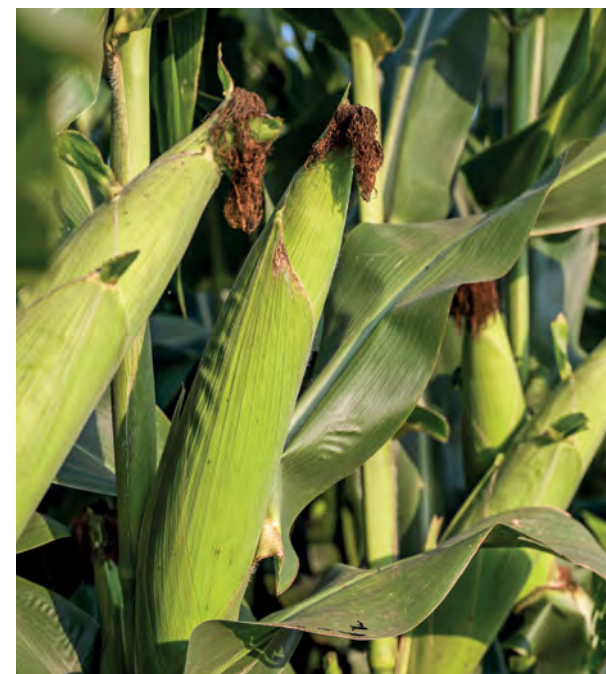
- Broad spectrum weed control;
- Excellent crop safety;
- Conservation cultivating practices;
- Herbicide application flexibility; and
- Ease of management, as glyphosate has no residual effect on the soil and is environmentally friendly.

Pannar markets maize hybrids with the glyphosate tolerance gene under licence from Bayer (Monsanto) (maize with the **Roundup Ready® Maize 2** trait). Only **Roundup PowerMAX® (L7769)** herbicide is recommended by the registration holder for post-emergence use on maize with the **Roundup Ready® Maize 2** trait.

Glyphosate herbicide may be applied in combination with certain residual pre-emergence and post-emergence herbicides, independently or as tank mixtures. This provides additional flexibility and better weed control. Please consult your Pannar or chemical representative for guidelines regarding the safe and optimal use of the glyphosate tolerant cultivars.

Management Guidelines:

- Broadcast (over the top) glyphosate herbicide application should only take place from the **GROUND CRACKING STAGE UP TO THE V8 STAGE** of the maize plant (as recommended on the pesticide label). The V8 stage is reached when the first plants in the field have eight leaves, with visible collars around the main stem. The actual number of visible leaves may be more. Do not make broadcast applications if mechanical crop damage will occur due to the passage of the spray rig.
- **BROADCAST APPLICATION AFTER THE V8 STAGE MAY RESULT IN YIELD LOSS OR DELAYED MATURITY.** For best results, use flat fan or twin jet nozzles that are suitable for low water volume deliveries.
- Where sequential applications are necessary to control specific weed species (e.g. *Cyperus esculentus*), the second application should not occur within 10 days of the first application. If by this time the maize is beyond the V8 stage, a post directed application (see following page) will be necessary.





- Directed glyphosate applications between the rows can be made after the V8 stage where row spacing permits the passage of the application equipment without causing mechanical damage to the maize crop.

IMPORTANCE OF MANAGING HERBICIDE TOLERANT CROPS AND WEED RESISTANCE TO HERBICIDES

Proper management of herbicide tolerant crop technology is important to preserve the effectiveness and value of the tolerant crop seed and its corresponding herbicides for future use. If you have any questions regarding the stewardship of glyphosate herbicide use and possible weed resistance, please contact your Pannar sales representative or agronomist.

Roundup Ready® and Roundup PowerMAX® are registered trademarks used under licence from Monsanto Company.

ALWAYS READ AND FOLLOW PESTICIDE LABEL

DIRECTIONS. Roundup Ready® crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup® brand agricultural herbicides. Roundup® brand agricultural herbicides will kill crops that are not tolerant to glyphosate.

ALWAYS USE ACCORDING TO LABEL RECOMMENDATIONS.

- Roundup PowerMAX® contains Glyphosate (Caution)
- Reg. No. L7769 • Act No. 36 of 1947

Stalk Borer Insect Protection Hybrids

Pannar® brand hybrids with stalk borer insect protection traits are designated by the letters B, BR or PW in the seed product code.

The stalk borer insect protection traits in the Pannar biotech hybrids offer protection against first and second instar stalk borers, thus affording the crop the opportunity to develop to its full potential. The insect protection traits (Bt-genes) will only control small, immature larvae and not late stage larvae.

Insect Resistance Management (IRM) Strategy

The purpose of the IRM strategy is the protection of the Bt-technology so as to extend its shelf-life and ensure its long-term usability. The IRM strategy comprises the following elements and is legally binding:

- There are always some individual stalk borers that are naturally tolerant or may become resistant to the Bt-proteins. Producers must follow a strict IRM strategy to ensure that these insects remain sporadic in the population.

- The best way to prevent the tolerant or resistant individuals from increasing in numbers is to combine effective control with Bt-maize in maize fields, with a surrounding or nearby “refuge” area.

- A “refuge” is an area planted with non-Bt-maize and where non-Bt-based insecticides are used. In this area, maize stalk borers that are susceptible to the Bt-protein can feed and breed freely. These susceptible stalk borers can in turn breed with any of the few surviving naturally tolerant stalk borer individuals.

- If a susceptible stalk borer breeds with a tolerant one, the offspring thereof will be controlled by the Bt-technology. This prevents the genes conferring Bt-resistance from being passed on to the next generation of the pest species. In this way, producers can preserve the efficacy of the Bt-technology.

- Maize refuge options include hybrids without the stalk borer insect trait (non-Bt-technology): Pannar® brand hybrids with **Roundup Ready® Maize 2** technology (herbicide tolerant only plants), and conventional maize plants.

The refuge is also important if farmers encounter problems of any sort with Bt-plantings. Continuous monitoring of maize plantings and stalk borer populations is important. Regular inspection will enable farmers to intervene and apply insecticides timeously if it appears that the stalk borer population is not being adequately controlled by the Bt-technology.

“The representative is required to advise the farmer to ensure on-farm compliance with the refuge planting provisions.”

PICTURED
Farmer: Louis Randell
Farm: Vlakfontein Farm,
Die Ou Waenhuis Boerdery
Area: Ermelo, Mpumalanga
Pannar Area Manager: Joe Payne





Options for the Refuge:

The farmer may select one of the following options to plant a refuge:

OPTION A: 5% non-Bt-maize refuge that may not be treated with an insecticide. In practice, this means that for every 95 hectares of stalk borer resistant maize, the farmer must plant five hectares of non-Bt-maize (i.e. maize without any Bt-genes). This non-Bt-maize may not be treated with any insecticide registered for control of maize stalk borers.

OPTION B: 20% non-Bt-maize refuge that may be sprayed (if economic thresholds are met) with a non-Bt-protein-containing insecticide/biopesticide. In practice, this means that for every 80 hectares of stalk borer resistant maize, the farmer must plant 20 hectares of non-Bt-maize (i.e. maize without any Bt-genes).

In addition to selecting either an Option A or B refuge, the grower must also adhere to certain important requirements when planting the refuge.

Refuge of non-Bt-maize (refer page 21):

- The non-Bt-maize (i.e. refuge) must –
 - have a similar maturity to the Bt-maize;
 - be planted within seven days of planting the Bt-maize;
 - be planted on the same farm as the Bt-maize (not more than 400 m away); and
 - be planted under the same cultivation techniques and growing conditions (e.g. under irrigation) as the Bt-maize.
- Every farmer must plant their own maize refuge (i.e. neighbouring farmers' non-Bt-maize lands will not serve as refuge).
- Refuge "strip" areas must be at least six rows wide with no crossover of Bt- and non-Bt rows.
- Refuge areas must be positioned in such a manner that some refuge is planted on the outside borders of the Bt-maize.
- Mixing of Bt-maize seed and non-Bt-maize (refuge-in-a-bag) seed is not permissible at any given point.

- Refuge maize must be planted in such a manner that no Bt-plant is more than 400 m away from a refuge maize plant.
- Farmers must regularly monitor and inspect their **MON89034** and **PowerCore™** Bt-crops for insect damage and immediately contact their seed representative or agent if stalk borer infestation is observed.

Compliance with the IRM strategy and particularly with the refuge requirements will be monitored as follows:

- On-farm compliance monitoring by either an independent third party or Pannar contractor; and
- General compliance monitoring at individual seed company level during farmer visits.

The representative is required to advise the farmer to ensure on-farm compliance with the refuge planting provisions. It is expected that a farmer must clearly mark the Bt-maize and non-Bt-maize so it is easy to identify the area planted. It is of the utmost importance that the necessary technology stewardship requirements are observed. In instances where farmers do not comply with these requirements, it will be viewed in a very serious light.

Detailed guidelines for Bt-maize production are available from your Pannar representative.

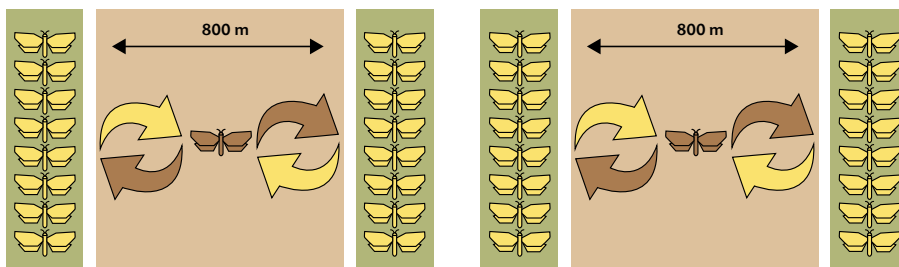




Plant the Correct Refuge Area for Bt-Maize

STEP 1: Choose the best option for your farm.

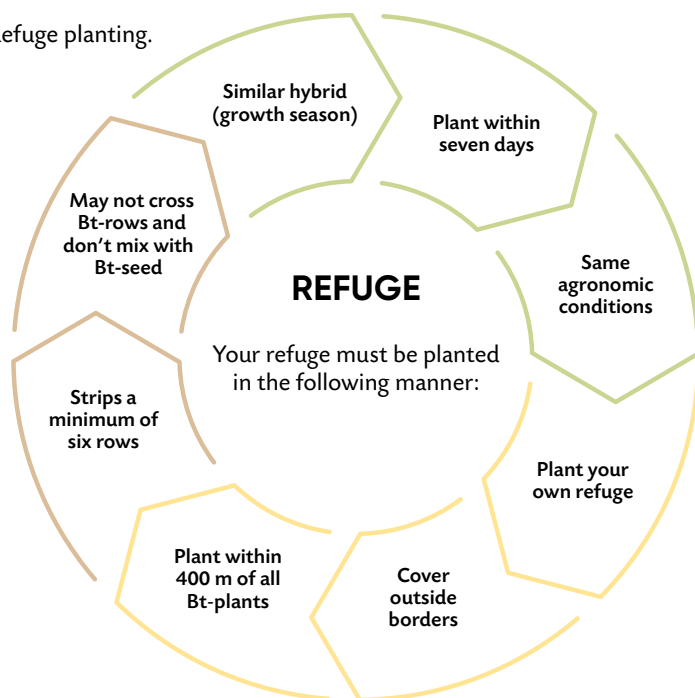
OPTION A: 5% non-Bt-maize refuge that may not be treated with an insecticide.

OPTION B: 20% non-Bt-maize refuge that may be sprayed (if economic thresholds are met) with a non-Bt-protein-containing insecticide/biopesticide.



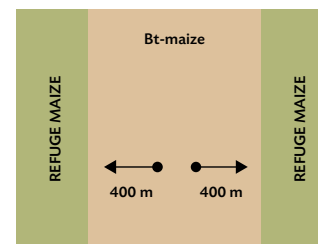
 = Bt-resistant individual
 = Bt-susceptible individuals

STEP 2: Refuge planting.

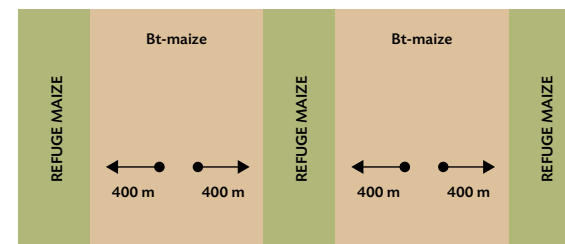


Correct Layout of the Refuge Area

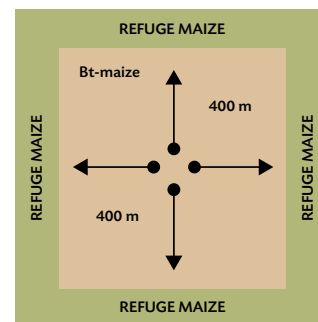
BLOCK POSITIONING



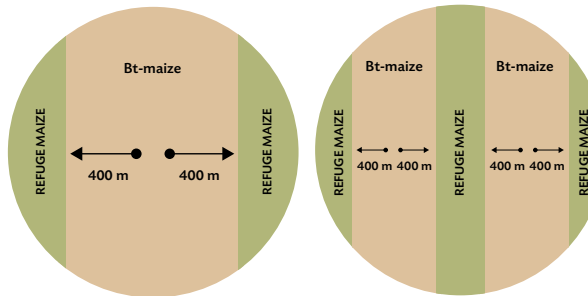
STRIP POSITIONING



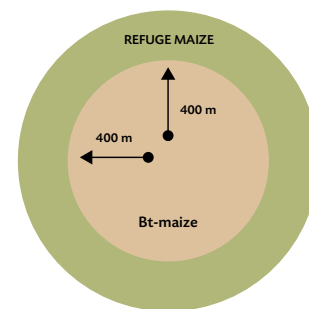
PERIMETER POSITIONING



PIVOT POSITIONING



BORDERING OF PIVOT



Pivot Size		Minimum number of rows required per row width in m (5% refuge)					
Radius (m)	ha	0.60 m	0.75 m	0.91 m	1.00 m	1.20 m	1.50 m
178	10	8	6	6	6	6	6
252	20	11	9	7	6	6	6
309	30	13	10	9	8	7	6
357	40	15	12	10	9	8	6
*399	50	17	13	11	10	8	7
*437	60	18	15	12	11	9	7
*472	70	20	16	13	12	10	8
*505	80	21	17	14	13	11	9
*535	90	23	18	15	14	11	9
*564	100	24	19	16	14	12	10
*592	110	25	20	16	15	12	10
*618	120	26	21	17	16	13	10

* User must also plant at least six rows in the centre of the pivot, in addition to the rows on the outside.

THESE TOP PERFORMERS DESERVE THEIR MOMENT IN THE SUN ON YOUR FARM

Plant the sunflower stable that tops the ARC national trials, year after year, and harness some of the leading genetics available on the market. Suitable for your preferred production system – from conventional to Pannar® brand sunflower hybrids with the **Clearfield® Plus** trait, as well as a hybrid high in oleic acid, Pannar delivers hybrids that are widely adapted, maintain excellent yield potential and offer exceptional stability under varying conditions. We also bring you options to stagger your flowering season to help you manage the risk of Sclerotinia infection.

The Pannar® brand sunflower hybrid package performs well in all sunflower production regions of South Africa, with four hybrids in the top ten of the 2021/2022 ARC national trials. Planting a hybrid package is recommended to strategically manage disease and drought stress. It is also recommended that farmers stagger their planting dates for enhanced risk management.

Clearfield® Plus Production System

Pannar markets a range of Pannar® brand sunflowers with the **Clearfield® Plus** trait that compete head-to-head with the conventional hybrids, providing an alternative choice for weed control and crop rotation. **Euro-Lightning® Plus** provides effective post-emergence control of a variety of broadleaf weeds and grasses. Pannar® brand hybrids with the **Clearfield® Plus** trait (suffix CLP) are only registered for the use of **Euro-Lightning® Plus** herbicide (Reg. No. L10316)! Pannar does not support the use of any other post-emergent herbicide on our CLP hybrids that has not been tested or proven in official qualification trials. The inherent herbicide resistance is a natural mutation; the hybrids are not genetically modified, and all sunflower hybrids are GMO-free.



Clearfield® Plus Stewardship Guidelines

- Always grow Pannar® brand sunflowers with the **Clearfield® Plus** trait in a three-year rotation with other crops (i.e. non-**Clearfield® Plus** wheat/maize/sunflowers):
 - Breaks the cycle of continuous sunflower production and allows use of alternate mode-of-action herbicides and tillage; and
 - Promotes good agronomics by reducing disease and insect pressure in sunflowers.
- Use alternate (non-ALS) mode-of-action herbicides with activity on sunflowers in the rotational crop (i.e. growth regulator or photosynthesis inhibitor):
 - Reduces the selection pressure from continuous dependence on the ALS-inhibiting acetolactate synthase herbicide; and
 - Provides alternate mode-of-action to control volunteer sunflowers with the **Clearfield® Plus** trait and other ALS resistant weeds present.
- Limit the sole reliance on ALS herbicides to no more than two out of four years in the same field:
 - Where applicable, use sequential or tank mix partner herbicides with multiple modes-of-action on target weed species in the sunflower crop and in rotational crops.
- Do not plant sunflowers with the **Clearfield® Plus** trait on fields with a history of heavy wild sunflower infestation:
 - Reduces the threat of outcrossing of sunflowers with the **Clearfield® Plus** trait with wild sunflowers.
- Control wild sunflowers in areas adjacent to sunflower fields with the **Clearfield® Plus** trait (road ditches, field borders and fence rows) through the use of non-ALS herbicides and/or mowing prior to seed set:
 - Minimises the potential of cross-pollination of wild-type sunflowers with sunflowers with the **Clearfield® Plus** trait; and
 - Promotes good sanitation practices by eliminating vectors for insects and disease.
- Control emerged wild sunflowers prior to planting sunflowers with the **Clearfield® Plus** trait with non-ALS burndown herbicides (no-till/min-till) or tillage (conventional-till):
 - Reduces reliance on ALS herbicides for controlling the spread of wild sunflowers; and
 - Eliminates any emerged, naturally occurring biotype that may be resistant to ALS-inhibiting herbicides.

Clearfield® Plus and Euro-Lightning® Plus are registered trademarks of BASF.

Always follow grain marketing, stewardship practices and herbicide label directions. Clearfield® Plus sunflower hybrids are tolerant to Euro-Lightning® Plus herbicide and this is indicated by the letters "CLP" in the seed product code. Other crops, including conventional sunflower hybrids that do not contain the Clearfield® Plus trait or have confirmed imazapyr tolerance will be severely damaged if unregistered imazapyr-based herbicides are applied.

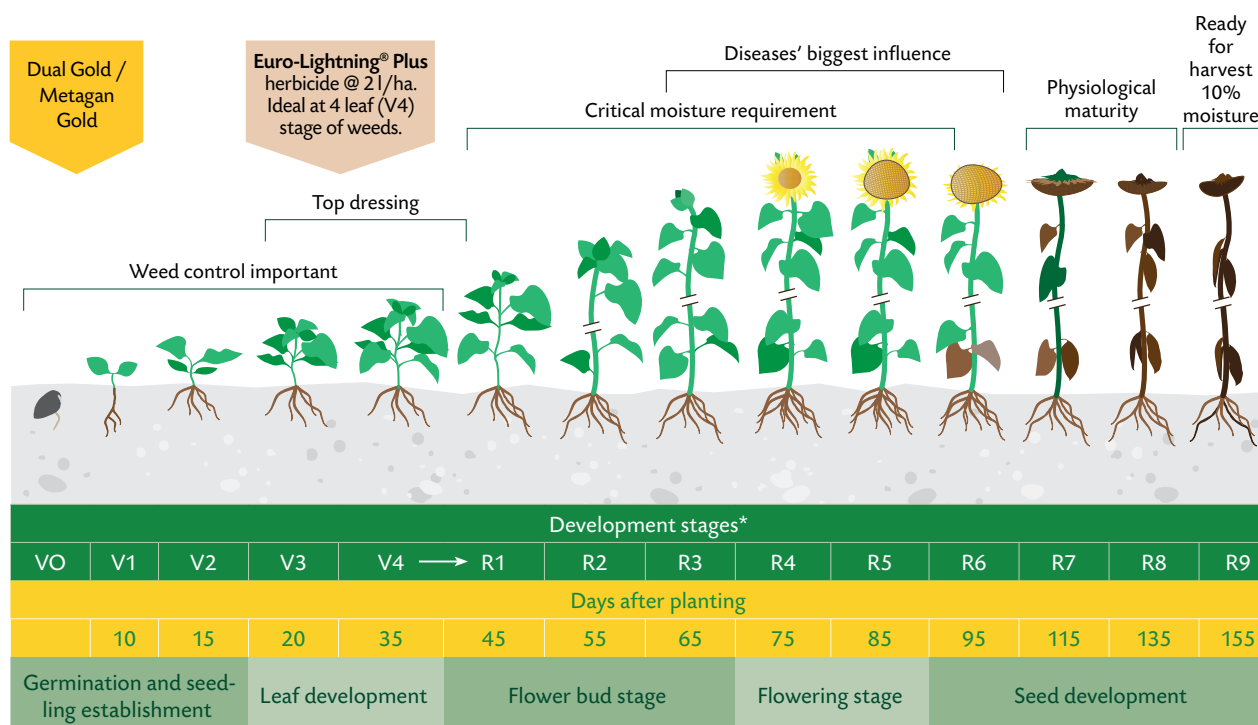
Clearfield® Plus Herbicide Programme

- For successful control, apply at the two to six leaf stage of weeds.
- Prior to the use of **Euro-Lightning® Plus**, spray tanks, booms and nozzles must be thoroughly cleaned and decontaminated of all previous spray residues.
- Poor water quality: Only use an ammonium sulphate that does not contain any other components such as added acidifiers or acidifying systems, humic or fulvic acids, additional adjuvants, wetters, stickers, spreaders or conditioning agents, etc.
- Soil application: 150-250 litres (l) water/hectare (ha).

Euro-Lightning® Plus Herbicide at 2 l/ha

Subsequent Crops	Waiting Period
Pannar® brand sunflowers with the Clearfield® Plus trait	NONE
Wheat	4 months
Maize (all maize-producing areas including irrigation), dry beans and soybeans	9 months
All other crops	20 months

Valid only if the correct amount of **Euro-Lightning® Plus** herbicide is applied and a minimum of 350 mm rain falls.



* Planting date/climate may influence development.

DIRECTIONS FOR USE: USE ONLY AS DIRECTED

General Information:

- Clearfield® Plus** is an internationally registered trademark belonging to BASF and appears in a registered logo including the words "Clearfield® Plus Production System".
- The "Clearfield® Plus Production System" is a combination of agronomically advanced seeds (natural selection) and custom designed herbicides. The **Clearfield® Plus** name and logo link the seed and herbicide together. These plants are not GMOs.
- The mode of action of **Euro-Lightning® Plus** involves the uptake by the plant foliage, which is followed by translocation to the growth points. After **Euro-Lightning® Plus** application, susceptible weeds may show yellowing and weed growth will stop. Susceptible weeds stop growing and either die or are not competitive with the crop.
- Euro-Lightning® Plus** must only be applied to **Clearfield® Plus** sunflower hybrids after the 2-leaf stage of the crop (ideally at 4 leaves). However, do not apply when the leaf canopy of the crop is too large as this could intercept the spray and prevent the herbicide from reaching the targeted weeds.
- Application should be completed by 32 days after planting.
- The weeds must be between the 2- and 6-leaf stage at application and must be actively growing. They should not be under stress (e.g. drought, waterlogged or nutrient imbalances) during application, as this can limit the uptake and translocation of the product, resulting in poor weed control.
- Adequate soil moisture is important for optimum **Euro-Lightning® Plus** activity.
- In regions where water quality is known to be poor, a flowable (50%) high quality ammonium sulphate, at a 2% dilution can be used to ameliorate the water before adding **Euro-Lightning® Plus**.
- Ensure thorough coverage and wetting of the weeds.
- If needed, a suitable, registered pre- or post-emergent graminicide can be applied prior to, or following the application of **Euro-Lightning® Plus**. **Euro-Lightning® Plus** should never be applied in a tank mix with any other herbicide. Always refer to the applicable product label and apply in the directed manner.

SUNFLOWER HYBRIDS - AGRONOMIC CHARACTERISTICS

Hybrid	Technology	Relative Maturity*						Description	General Characteristics						
		Growing Season	Days to 50% Flowering*	HU to 50% Flowering*	Days to Physiological Maturity*	HU to Physiological Maturity*	Days to Harvest*		Yield Probability			Emergence	Drydown	Average Oil Content	Self Fertility
									1.5 t/ha Yield Potential	2.5 t/ha Yield Potential	3.5 t/ha Yield Potential				
PAN 7100	Conventional	Medium Late	66	780	114	1 180	150-155	Maintains top performance in the ARC national trials. A full season three-way cross with good stability and adaptability. Good yield potential and excellent oil content. Recommended as part of the main planting for all sunflower production regions.	5	6	7	8	7	41%	9
PAN 7090 (NEW)	Conventional	Medium Late	67	790	115	1 190	150-155	This new three-way cross conventional hybrid has consistently delivered top performance in Pannar P3 trials, demonstrating good yield potential, oil content, stability and adaptability. Recommended as part of the main planting for all sunflower production regions.	7	6	6	8	7	42%	9
PAN 7080	Conventional	Medium Late	68	795	116	1 200	150-155	This hybrid has been one of the top performers in the Pannar and ARC national trials over the past ten years. It has excellent yield potential, has maintained a phenomenal performance record and is well-adapted to all production regions with exceptional stability under varying conditions. A very popular hybrid in the Pannar range. Recommended for all sunflower production regions. The hybrid performs extremely well on the high potential sandy soils of the western production region.	4	6	8	9	9	40%	9
PAN 7102CLP	Clearfield® Plus	Medium	64	760	112	1 160	145-150	This single cross hybrid contains the Clearfield® Plus trait, with the benefit of an alternative choice for weed control. In terms of yield potential and stability, it competes on an equal footing with the conventional hybrids. This hybrid is based on PAN 7049 genetics. PAN 7102CLP is slightly quicker than the other medium late hybrids. When planted in a package with other hybrids, its earlier flowering date helps manage the risk of Sclerotinia infection.	4	6	8	9	9	42%	9
PAN 7160CLP	Clearfield® Plus	Medium Late	69	800	116	1 200	150-155	This three-way cross has consistently delivered top performance in the ARC national trials since its introduction to the market. It has extremely good yield potential and reliability at all yield levels. It is renowned for performance and stability. It contains the Clearfield® Plus trait, with the benefit of an alternative choice for weed control. Based on PAN 7100 genetics, it has the same yield potential and stability as the conventional hybrids.	8	8	8	6	7	40%	9
PAN 7180CLP	Clearfield® Plus	Medium Late	70	810	118	1 210	150-155	Based on the genetics of the well-known PAN 7080, but with the benefit of an alternative choice for weed control provided by the Clearfield® Plus trait. It has excellent yield potential, has maintained a phenomenal performance record, and is well-adapted to all production regions with exceptional stability under varying conditions.	5	7	8	8	9	39%	9
PAN 7158HO	High Oleic Acid	Medium Late	68	790	116	1 190	150-155	A medium late season hybrid, well-adapted to all sunflower production regions. Very uniform plant type. Oleic content of 80%, producing a healthier type of oil. The hybrid is based on the genetic model of PAN 7080 and is competitive with the conventional range of hybrids.	5	5	5	9	9	41%	9

General Characteristics								Disease Risk								Management Recommendations		
Plant Height	Stem Curvature	Neck Strength	Stalk Strength	Root Strength	Standability	Uniformity	Test Weight	Rust Tolerance	Alternaria	Charcoal Rot	Root Sclerotinia	Head Sclerotinia	Phomopsis	Midge Score#	Downy Mildew†	Supplementary Irrigation	Supplementary Irrigation Plant Population per ha ('000)	Dryland Plant Population per ha ('000)
7	6	7	8	8	8	7	7	5	5	5	5	5	5	5	5	9	60	35-55
7	6	7	8	8	8	7	7	5	5	5	5	5	5	5	5	9	60	35-55
6	7	8	8	8	8	9	8	5	3	5	5	5	5	5	5	3	◆	35-55
5	7	8	8	8	8	9	8	5	5	5	5	5	5	5	5	9	60	35-55
5	6	7	8	8	8	7	7	5	5	5	5	5	5	5	5	9	60	35-55
5	7	8	8	8	8	9	8	5	7	5	5	5	5	5	5	7	60	35-55
6	7	8	8	8	8	9	8	5	5	5	5	5	5	5	5	7	60	35-55



***RELATIVE MATURITY**
Varies according to planting date and temperatures during the growing season.

Yield, Characteristics and Management Ratings		
9 = Excellent	1 = Poor	◆ = Not Recommended

Disease Risk Ratings	
9-8 = Highly Tolerant	7-6 = Tolerant
5-4 = Moderately Tolerant	3-1 = Susceptible

Plant Height		
Short stature is desirable	9 = Short (150 cm)	1 = Tall (210 cm)

Stem Curvature		
9 = Erect	8 = Semi-erect (preferred)	7 = Semi-pendulous (preferred)
6 = Pendulous	5 = Fully Pendulous	

#MIDGE SCORE
To our knowledge, there are no fully tolerant hybrids in this industry. However, differences exist in the ability to tolerate insect pressure. These scores reflect those differences. Heavy midge pressure can cause extensive damage to any hybrid.

†DOWNY MILDEW RACE TOLERANT
Indicates Downy Mildew tolerance to the races identified.

HIGH PERFORMERS THAT WILL KEEP YOU AND THE BEAN COUNTERS HAPPY

Offering a profitable combination of yield potential and exceptional agronomic characteristics, Pannar's cultivars demonstrate stability over different yield potentials, production areas and seasons. We provide a full range of maturity classes covering almost all planting dates and densities.

PICTURED
Farmer: Egon and his son Tyson Zunckel
Farm: Rustenberg
Area: Bergville, KwaZulu-Natal
Pannar Rep: Dawid le Roux



Farming for the future means building your farming operation on a long-term vision and objectives that will keep you in business for generations. The versatile Pannar® brand soybean package has unparalleled stability at different yield potential levels and over different production regions. It is a proven and safe choice.

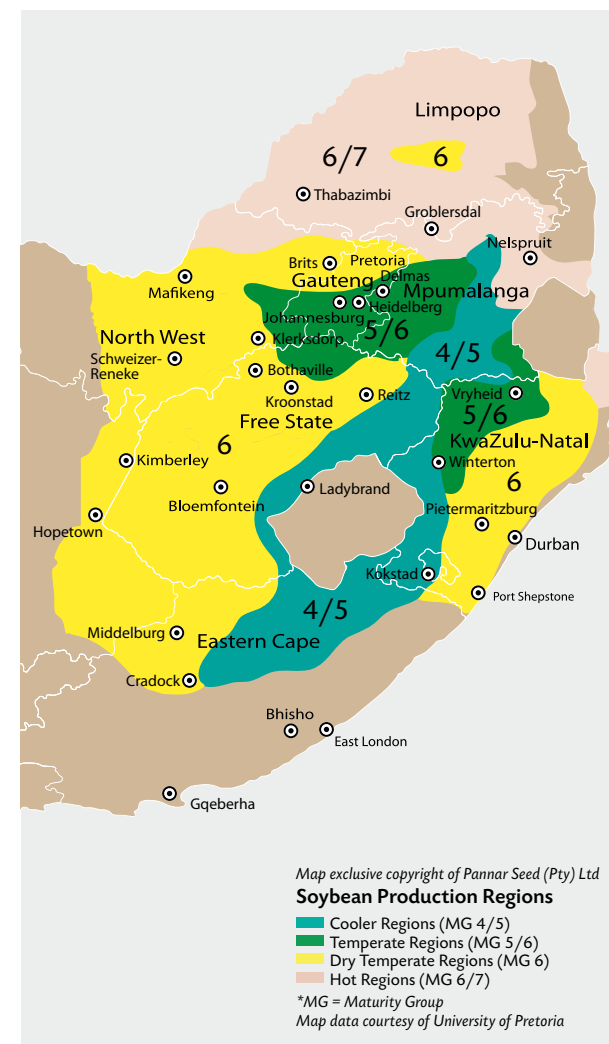
A good rotation programme in your cropping system is one of the practices that will sustain your farming business for the future. Soybeans offer many advantages as a rotation crop, particularly in combination with maize in the medium and high potential areas. Pannar's soybean package is versatile and should give you the best chance to succeed.

Pannar has access to the very best commercial soybean cultivars, either locally bred or accessed from around the world. Pannar's policy is to release the best varieties possible into the South African market, regardless of where they originate. You can always be certain that if a cultivar appears in our range, it has already been thoroughly tested by the most comprehensive evaluation programme in the country.

Pannar has managed to contain the cultivar package to eight exceptional products, offering a full range of maturity classes that will cover almost all planting date/production area combinations.

All Pannar cultivars are tested using the rhizobial strain WB74 nodule-forming bacterial inoculant. All yield data is generated using this strain, which means that if a farmer chooses to use a different strain of rhizobium, the yield information and cultivar recommendations provided may be irrelevant.

Always follow grain marketing, stewardship practices and pesticide label directions. Varieties that are glyphosate tolerant (including those designated by the letter "R" in the product code) contain genes that confer tolerance to glyphosate herbicides. Glyphosate herbicides will kill crops that are not tolerant to glyphosate.



SOYBEAN CULTIVARS – AGRONOMIC CHARACTERISTICS

Glyphosate
Tolerant

Cultivar	Technology	Maturity Group (MG)		Relative Number of Days to 50% Flowering*	Relative Number of Days to Harvest Maturity*	Description	Plant and Seed Characteristics						Recommended Plant Population	
							Standability	Shattering Resistance	Growth Type	Pubescence	Flower Colour	Hilum	Early Planting ('000)	Late Planting Date or Narrow Row Widths ('000)
		Early: MG 4.5-5.4 Medium: MG 5.5-6.4 Late: MG 6.5-7.4		Temperate Areas Mid-November Planting Date	Temperate Areas Mid-November Planting Date									
PAN 1502R (NEW)	Glyphosate Tolerant	Early	5.2	61	133	PAN 1502R is a consistent performer in a segment of the market that is notorious for unstable performance. It is a great support variety for PAN 1532R.	8	9	Indeterminate	Tawny	Purple	Brown	300	450
PAN 1532R	Glyphosate Tolerant	Early	5.3	60	132	Very good, stable performance across all production areas. An excellent irrigation cultivar. First choice for wheat/soybean rotation. Upright plant type, well-adapted to high plant populations and narrow inter-row spacing. Very good standability and harvests easily.	9	9	Indeterminate	Grey	Purple	Buff	350	550
PAN 1507R (NEW)	Glyphosate Tolerant	Medium	5.5	62	135	An agronomically sound variety in the medium growth class, excelling in the cooler environments.	8	9	Indeterminate	Grey	Purple	Imperfect Black	300	450
PAN 1521R	Glyphosate Tolerant	Medium	5.7	61	137	If we need to single out a cultivar for preferential planting it is PAN 1521R. Unmatched yield potential and stability (yield probability) over different yield potentials, production areas and seasons. Equally well-suited to cool, temperate and hot regions. This cultivar has a characteristically strong and deeply developed root system, which comes into its own in the water table soils of the western production regions. A winning combination of yield and agronomic characteristics.	9	9	Indeterminate	Grey	Purple	Imperfect Black	300	450
PAN 1555R	Glyphosate Tolerant	Medium	5.7	63	138	A cultivar with high yield potential and good stability across all production areas and seasons. An excellent teammate for PAN 1521R. This variety can withstand sub-optimal conditions better than most, and should be part of your cultivar package particularly where you expect tough soil or climate conditions.	8	9	Indeterminate	Tawny	Purple	Brown	300	450
PAN 1586R (NEW)	Glyphosate Tolerant	Medium	5.9	62	139	A vigorous variety, well-suited to the temperate production areas, particularly under tough conditions.	7	9	Indeterminate	Grey	Purple	Imperfect Black	300	400
PAN 1588R	Glyphosate Tolerant	Medium	5.9	64	139	PAN 1588R is a medium maturity cultivar that fits in well with PAN 1521R and PAN 1555R. It is indeterminate with a high yield potential and produces similar results to PAN 1521R. It demonstrates good stability at different yield potential levels, production areas and over different seasons. PAN 1588R can be planted with peace of mind and performs well in dry, hot years. It is an excellent choice for all soybean production areas.	8	9	Indeterminate	Grey	Purple	Imperfect Black	300	450
PAN 1644R	Glyphosate Tolerant	Late	6.7	63	142	The yield leader. It is a good choice for all the temperate production areas and for cultivation under irrigation. The cultivar's strong root system makes it very suitable for the water table soils in the western production areas.	7	8	Indeterminate	Grey	Purple	Imperfect Black	300	380

Ratings	
9 = Excellent	1 = Poor

Disease Ratings			
9-8 = Highly Tolerant	7-6 = Tolerant	5-4 = Moderately Tolerant	3-1 = Susceptible

* Varies according to planting date and temperatures during the growing season.

IT'S TIME WE SPILL THE BEANS ON WHAT THIS PACKAGE CAN DO FOR YOU

It's no secret – our red speckled bean package offers excellent quality attributes and superior cooking characteristics that make them the top choice in the market. Their exceptional multi-season trial performance demonstrates yield stability and wide area adaptability, while our small white canning beans are market leaders offering excellent yield potential and robust disease profiles. Choose Pannar for great on-farm performance and complete peace of mind.



DRY BEAN CULTIVARS - AGRONOMIC CHARACTERISTICS

Cultivar	Bean Type	Relative Maturity		Planting Date		Description
		Number of Days to 50% Flowering*	Number of Days to Harvest*	Cool Areas	Temperate Areas	
PAN 123	Small White Canning	50-60	100-120	Nov/Dec	Dec/mid-Jan	The first choice in small white canning beans in South Africa. Accepted by all major canning companies. Good yield potential and Rust tolerance makes for a widely adapted cultivar.
PAN 9141	Small White Canning	50-60	100-120	Nov/Dec	Dec/mid-Jan	Has similar agronomic qualities to PAN 123, but with improved Anthracnose tolerance. Has been selected to have a more uniform grain size to improve canning grade.
PAN 148	Red Speckled	50-60	100-120	Nov/Dec	Dec/mid-Jan	The most popular cultivar in the Pannar® brand dry bean package. An integral player in dry bean production in South Africa. Maintains excellent performance in multi-season national strip trials in Mpumalanga and the Eastern Free State. Responds well to fungicide spray in the high humidity environments.
PAN 9216	Red Speckled	50-60	100-120	Nov/Dec	Dec/mid-Jan	Good performance in statistical and strip trials. Potential for direct mechanical harvesting with a combine harvester. Important agronomic traits: indeterminate growth habit; excellent standability; large seeded. Good bean quality attributes and superior cooking characteristics make this variety the consumers' first choice in red speckled bean varieties. Usually ready to harvest about 7-10 days earlier than the other cultivars, with the advantage of delivering good quality beans to the market earlier. Unique red flower makes it recognisable anywhere in the world. Excellent general disease tolerance, including Rust, ALS, root rots and BCMV tolerance.
PAN 9292	Red Speckled	50-60	100-120	Nov/Dec	Dec/mid-Jan	PAN 9292 is especially well suited to the North West production regions. It displays good general disease tolerance, wide area adaptability and increased yield stability. Grain quality attributes are good. The smaller, rounder bean reduces potential for mechanical damage during harvest. The good all-round disease tolerance makes it an excellent choice for both small-scale producers and large commercial farmers.

* Varies according to planting date and temperatures during the growing season.

Dry bean farmers are specialists and it will remain this way for years to come, even if mechanisation of harvesting reduces the risk factor. The Pannar® brand has been at the forefront of the drive to mechanise dry bean production and has been focusing on the transfer of technology to assist farmers in mechanising their harvesting process. Progress is, however, slow in both cultivar development and improvement in cultural practices that will facilitate mechanisation.

Bean quality attributes are important in our selection process. For canning beans, culinary quality comes before any other attribute in the selection process. For the red speckled beans, perceived quality is somewhat more subjective and a selection index that includes quality

attributes (size, colour, discolouration) combined with agronomic attributes (yield, upright growth, disease resistance) is used to select cultivars for commercialisation. Despite the complexity of breeding for quality and yield, Pannar has made important improvements on both fronts. Whilst new cultivars are slow to reach the market for a multitude of reasons, the mechanism that delivers the new cultivars to your farm gate is healthy.

Sustainability in production not only relies on innovative cultivar deployment, but also on producer commitment to the crop. The national crop needs to be consistent, and when it grows, to grow in a sustainable way. Massive swings in seasonal production are not good for the industry and preventing these fluctuations requires commitment

from producers to add beans into their long-term rotation strategies, regardless of the bean price at planting.

Small White Canning Beans

A winning combination of exceptional yield, disease tolerance and bean quality attributes.

Red Speckled Beans

A top-performing, red speckled bean package that offers exceptional yield performance and stability. The package provides a cultivar for all production systems, from the high input, mechanised operation to the low input, subsistence setup.

Management Recommendations					Plant and Seed Characteristics					Disease Tolerance				Recommended Planting Rate		
Regional Adaptation					Direct Harvest	Standability	Shattering Resistance	Growth Type	Seed Size: Seeds/kg	Angular Leaf Spot (ALS)	Rust	Bean Common Mosaic Virus (BCMV)	Anthraxnose	90 cm Rows x 7.5 cm (148 000 seeds/ha)	90 cm Rows x 5 cm (222 000 seeds/ha)	75 cm Rows x 7.5 cm (178 000 seeds/ha)
North West	Mpumalanga	Eastern Free State	KwaZulu-Natal	Smallholder										kg/ha		
✓	✓✓	✓✓	☑	☑	No	Good	Good	Determinate	4 300	Resistant	Resistant	Resistant	Moderate	34	52	41
✓	✓✓	✓✓	☑	☑	No	Good	Good	Determinate	4 200	Resistant	Resistant	Resistant	Resistant	35	53	42
✓✓	✓✓	✓✓	✗	✓	No	Moderate	Good	Indeterminate	2 400	Susceptible	Moderate	Resistant	Susceptible	62	93	74
✓✓	✓✓	✓✓	✓✓	✓	Perhaps	Good	Good	Indeterminate	1 900	Resistant	Moderate	Resistant	Moderate	78	117	94
✓	✓	✓✓	✓✓	✓✓	Perhaps	Good	Good	Indeterminate	2 380	Resistant	Moderate	Resistant	Resistant	62	93	75

✗ Not recommended ✓ Recommended ✓✓ Highly Recommended ☑ Only Under Contract

PLANT THE WHEAT TO BEAT AND REAP SUCCESS ON **YOUR** FARM

Pannar's unbeatable package of high yield potential and widely adapted wheat cultivars will give you the performance you need on your farm. With their strong seedling vigour and good straw strength, standability, stooling capacity and grading characteristics, you can rely on their success.

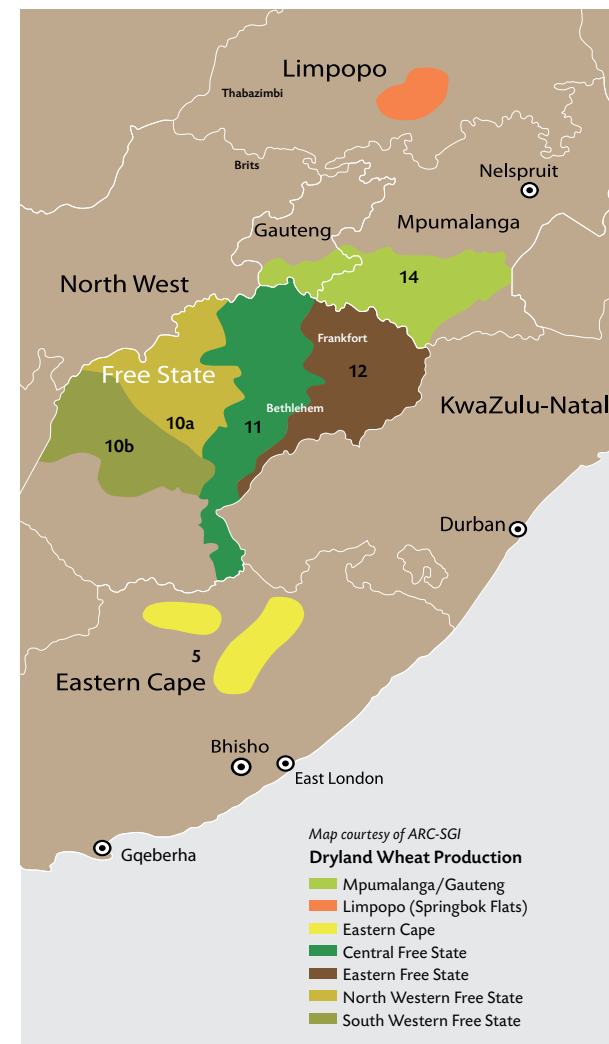
PICTURED
 Farmer: Leon and his son Sven Rohrs
 Farm: Lissadel Family Trust
 Area: Winterton, KwaZulu-Natal
 Pannar Rep: Dawid le Roux



The Pannar® brand wheat package has made a major contribution to local wheat production. The breeding programme focuses on improving the yield potential of wheat production in South Africa, as well as the development of cultivars with new sources of tolerance to Russian Wheat Aphid and Rust.

Wheat cultivars classified as tolerant to Rust and Russian Wheat Aphid must, as with susceptible cultivars, still be monitored for the occurrence of these pests, since new races/biotypes that have the ability to overcome the tolerance may develop. Factors such as disease pressure, appearance of symptoms at the seedling stage and prevailing climatic conditions may also affect the effectiveness or expression of tolerance.

Our options for dryland and irrigation will meet your preferred planting dates and seeding rates. Pannar's dryland package consists of true winter and intermediate wheat cultivars, while the irrigation package boasts high potential spring type irrigation cultivars divided into four growing period classes: early, medium early, medium and medium late.



WHEAT CULTIVARS – OPTIMUM PLANTING DATE AND SEEDING RATE RECOMMENDATIONS

Dryland

Region 10a North Western Free State

Cultivar	Planting Date	Seeding Rate kg/ha
PAN 3111	21/4 – 20/5	15-20
PAN 3161	7/5 – 10/6	15-20
PAN 3373	15/5 – 20/6	15-20

Region 10b South Western Free State

Cultivar	Planting Date	Seeding Rate kg/ha
PAN 3111	21/4 – 15/5	15-20
PAN 3161	7/5 – 31/5	15-20
PAN 3373	15/5 – 10/6	15-20

Region 11 Central Free State

Cultivar	Planting Date	Seeding Rate kg/ha
PAN 3111	24/4 – 31/5	15-20
PAN 3161	1/5 – 15/6	15-20
PAN 3373	20/5 – 30/6	15-20

Region 12 Eastern Free State

Cultivar	Planting Date	Seeding Rate kg/ha
PAN 3111	1/6 – 30/6	15-30
PAN 3161	1/6 – 20/7	15-30
PAN 3373	20/6 – 15/8	15-30

Irrigation*

Cooler Central Irrigation Areas (Lower Vaal and Orange River Areas)

Cultivar	Planting Date	Seeding Rate kg/ha	Plants/m ²
PAN 3497	1/6 – 20/7	60-90	120-210
PAN 3400	10/6 – 31/7	60-90	120-210

Warmer Irrigation Areas (Limpopo)

Cultivar	Planting Date	Seeding Rate kg/ha	Plants/m ²
PAN 3497	25/4 – 25/6	65-90	130-210
PAN 3400	15/5 – 15/7	65-90	130-210

Eastern Highveld

Cultivar	Planting Date	Seeding Rate kg/ha	Plants/m ²
PAN 3497	25/6 – 25/7	60-90	120-210
PAN 3400	1/7 – 5/8	60-90	120-210

KwaZulu-Natal

Cultivar	Planting Date	Seeding Rate kg/ha	Plants/m ²
PAN 3497	1/6 – 30/6	65-90	130-210
PAN 3400	5/6 – 10/7	65-90	130-210



WHEAT CULTIVARS – AGRONOMIC CHARACTERISTICS

*Planting date/climate may influence data. †Suited to supplementary irrigation.

**Data obtained from ARC-SGI. #Biotype info: PAN 3161 is resistant to RWASA 1 and 2.

***Screened for reaction to prevailing pathotypes.

Cultivar	Cold Requirement Classification	Adaptation	Relative Maturity	Days to 50% Flowering*		Days to Physiological Maturity*		Days to Harvest* (<15% moisture)		Description
				Warmer	Cooler	Warmer	Cooler	Warmer	Cooler	
PAN 3111	True Winter Type	Dryland Free State	Late	152	140	189	176	199	186	Exceptionally wide area adaptability with top performance in the ARC national trials. High yield potential, good aluminium tolerance and excellent standability provided by its shorter straw length. It has a high cold requirement and is more suited to early plantings.
PAN 3161#	True Winter Type	Dryland Free State	Medium Late	149	135	186	173	196	183	Good yield potential and wide area adaptability, exceptionally strong seedling vigour and shorter straw length providing excellent standability. Russian Wheat Aphid tolerance and good aluminium tolerance.
PAN 3373	Intermediate Type	Dryland Free State	Early	138	128	180	170	190	175	PAN 3373 is suited for production in the western and eastern Free State dryland production areas. PAN 3373 replaces PAN 3368 as the flagship intermediate type. This cultivar is ideal for use in supplementary irrigation practices due to its shorter growth period and excellent standability combined with robustness and class-leading tillering capability.
PAN 3497	Spring Type	Irrigation	Medium Late	101	111	151	161	161	171	The medium late grower PAN 3497 is the number one choice for early plantings. It has an excellent yield potential at early plantings and achieves top performance over multiple seasons nationally. It has good tillering capacity, grading characteristics and tolerance to Stripe Rust. The cultivar is susceptible to Leaf Rust.
PAN 3400	Spring Type	Irrigation	Medium Early	94	104	144	154	154	164	A top performer in the medium early growing period class and a good choice for planting at medium to late planting dates. Its shorter straw makes PAN 3400 suitable for higher seeding rates as required by later planting dates to compensate for the reduced stooling capacity as temperatures rise later in the season. Irrespective of its growing period, PAN 3400 competes favourably yield-wise. PAN 3400 is tolerant to Stripe Rust and moderately susceptible to Leaf Rust.

◆ Insufficient Data

Yield, Characteristics and Management Ratings	
9 = Excellent	1 = Poor

Pest and Disease Tolerance Ratings			
9-8 = Highly Tolerant	7-6 = Tolerant	5-4 = Moderately Tolerant	3-1 = Susceptible

Yield Potential and Adaptability						Plant Characteristics								Pest and Disease Tolerance					Management Recommendations
Western Cape	Eastern Free State	Central Free State	North Western Free State	South Western Free State	Irrigation	Standability	Hectolitre Mass	Pre-harvest Sprouting Tolerance**	Aluminium Tolerance**	Coleoptile Length	Plant Height	Tillering	Straw Yield	Fusarium Head Blight	Rusian Wheat Aphid Tolerance	Leaf Rust***	Stem Rust***	Yellow Rust***	Suitable for double cropping under Irrigation
1	8	8	8	8	5 [†]	8	8	5	9	6	5	9	7	1	1	4	8	7	1
1	8	8	8	8	5 [†]	8	6	3	9	5	4	9	6	1	9	5	8	7	1
1	8	8	8	8	6 [†]	8	8	3	◆	5	4	9	6	1	◆	8	8	8	5 [†]
1	1	1	1	1	9	7	7	6	2	2	7	6	5	3	1	3	5	8	9
1	1	1	1	1	9	8	7	4	2	2	4	5	5	2	1	5	5	8	9

MORE THAN A GRAIN OF CONFIDENCE – THIS SOLID PACKAGE IS ALL THE REASSURANCE YOU NEED

Harness the capabilities of an agronomically sound package that offers excellent yield potential, wide adaptation and good stability across various environments with Pannar's grain sorghum package. We also offer you the choice of both sweet and bitter options, with good malt quality.

Pannar® brand hybrids are the backbone of grain sorghum production in South Africa. The sorghum breeding programme has been running since 1978 and is one of the oldest in the world. We source our germplasm from a broad pool of diverse genetics and then test it rigorously in our local evaluation programme to ensure it suits local growing conditions. The Pannar® brand grain sorghum package maintains an excellent record of performance.



GRAIN SORGHUM HYBRIDS – AGRONOMIC CHARACTERISTICS

Ratings	
9 = Excellent	1 = Poor

Hybrid	Growing Season Class		Description	Plant Characteristics									Positioning and Adaptability			Seed Size (seeds/kg)	
	Days to 50% Flowering*	Days to Harvest*		Seedling Vigour	Standability	Head Exertion	Plant Height (cm)	Uniformity	Threshability	Grain Colour	Grading	Head Smut	Heavy Clay Soils	Irrigation	Dryland	Class 1	Class 2
PAN 8816	76-79	135-142	Excellent yield potential and stability. Very uniform growth habit and good standability. Attractive plant type. Large-seeded grain, high bushel weight and good threshability. Classified GM; good malt quality. Good general leaf disease tolerance. Good Head Smut tolerance. Plant where Head Smut problems have occurred in the past. Open head (panicle) facilitates spraying.	Good	8	Good	112-117	8	8	Red	GM	8	✓	✓	✓	25 500	34 000
PAN 8625	79-82	140-145	Outstanding yield performance and agronomic characteristics. Widely adapted. Bitter grain type; classified GH. Good malt quality. Medium plant height with good standability. Good tolerance to Head Smut.	Good	8	Intermediate	120-130	7	6	Brown	GH	7	✓	✓	✓	26 500	33 600

* Varies according to planting date and temperatures during the growing season.

YOUR FODDER FLOW SOLUTION RIGHT THROUGHOUT THE YEAR

Pannar's forage crops offer high productivity, carrying capacity and palatability for a range of livestock production systems – from beef and dairy cattle to sheep production as well as finishing off weaners and lambs.

Pannar is a leader in the certified pasture seed industry and is synonymous with quality. We have a wealth of expertise in planted pasture and a wide range of versatile cultivars to meet your unique needs. Pannar's forage crops are thoroughly tested under local growing conditions for high carrying capacity and palatability for sustainable animal production. Pannar complies with the regulations for genetic and physical quality set by the Seed Certification Scheme.



TEMPERATE AND WINTER FORAGE CROPS – AGRONOMIC CHARACTERISTICS

Crop	Variety	Type	Description	Planting Tips			
				Planting Rate Rows (kg/ha)	Planting Rate Broadcast (kg/ha)	Water Application	Planting Time
Annual Ryegrass	SUKARI	Italian Diploid	Pastures for milk, fat lamb production and finishing weaners. Establish under irrigation and use during autumn, winter and spring. SUKARI is a Diploid Italian ryegrass that lasts exceptionally long through the summer and in some cases, even until autumn. High dry matter and sugar content. Outstanding high midwinter production. Italian types can be established in early autumn (February/March) or alternatively early spring after the major frosts (August/September), in which case it should provide pasture for about 15 months.	20-25	25-30	Irrigation	Feb-Apr/ Aug-Sept
Annual Ryegrass	ZOOM	Westerwold Tetraploid	A 100% Tetraploid Westerwold type for maximum ryegrass yields in midwinter up to the end of October. Westerwold types should be planted in early autumn (February/March) and utilised from April/May until October/December.	30-35	35	Irrigation	Feb-Apr
Perennial Ryegrass	BASE	Tetraploid	A Tetraploid perennial ryegrass. Excellent dry matter production with very good persistence and midsummer production. Handles grazing pressure particularly well for a ryegrass. Excellent pasture when planted as a mixture with clover. Perennial ryegrass types are not strongly perennial and have to be re-established every three to four years..	25-35	30-35	Irrigation	Feb-Apr/ Aug-Sept
Japanese Radish	ENDURANCE	Root Crop	ENDURANCE is a unique, late flowering, soft leaved fodder radish. It usually produces good-quality root and leaf material right through to the end of August. In some areas production can extend into September. Dry matter is highly digestible. For cattle, best pulled or ploughed out and fed whole. It is usually not cold or frost sensitive. Requires approximately 350 mm rainfall over the four-month growing period.	2-3.5	NA*	Supplementary Irrigation/ Dryland	Dec-Jan/Feb
Oats	LE TUCANA	Intermediate Type	LE TUCANA produces excellent autumn and winter forage. It is a top forage oats cultivar, with excellent autumn and winter production. Very palatable, high yielding and exhibits good cold tolerance.	40-50	50-70	Supplementary Irrigation/ Dryland	Feb-Mar
Oats	MAJORIS	Spring Type	MAJORIS is a medium season white oats cultivar and was selected for quick production that is characteristic of spring types. It has an excellent yield potential, Rust and cold tolerance. A good choice for silage production.	40-50	50-70	Supplementary Irrigation/ Dryland	Feb-Mar
Triticale	PAN 248	Intermediate Type	PAN 248 is a relatively quick Triticale type that is ideally suited to green feed production on shallow, marginal soils. Suitable for providing grazing in the late autumn and winter months. Also suitable for silage in the winter rainfall areas.	35-45	60-80	Supplementary Irrigation/ Dryland	Feb-Apr
Triticale	PAN 299	True Winter Type	PAN 299 is a true winter type Triticale with a very good stooling ability. This cultivar is particularly suitable for use in the late winter and spring months. PAN 299 develops slowly initially and is ready for grazing after 12-13 weeks. Triticale is more cold tolerant than oats.	35-45	60-80	Supplementary Irrigation/ Dryland	Feb-Apr
Stooling Rye	SOROM	Spring Type	A quick, spring type stooling rye also suitable for late plantings in June, July and even the beginning of August when the demand for forage is high. High yield potential. Not as palatable as oats, but more cold tolerant.	30-50	40-60	Supplementary Irrigation/ Dryland	Mar-Apr

* Not applicable.



PICTURED
Farmer: Murray Turner
Farm: Ringstead
Area: Underberg, KwaZulu-Natal
Pannar Rep: Andrew du Plessis

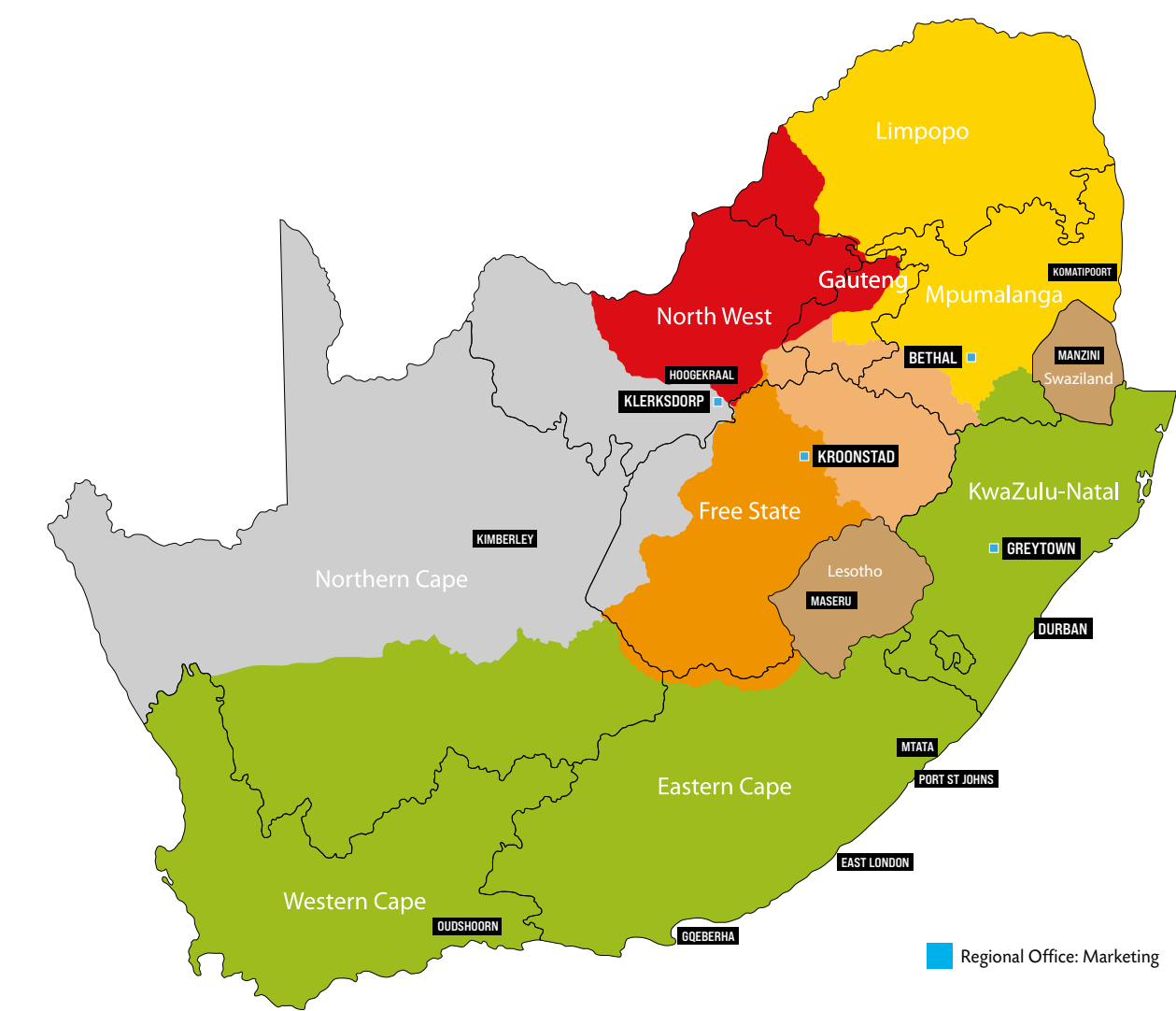
SUMMER FORAGE CROPS – AGRONOMIC CHARACTERISTICS

Crop	Variety	Type	Description	Planting Tips			
				Planting Rate Rows (kg/ha)	Planting Rate Broadcast (kg/ha)	Water Application	Planting Time
Forage Sorghum	PAN 868	Late Flowering Sorghum x Sudan Hybrid	This hybrid has the best yield potential in the package. The high yield potential of PAN 868 comes into its own when it is allowed to grow out once to 75-100 cm and then used as grazing, or in a green chop system (cut and carry), whereafter it is allowed to grow out to be ensiled or used as foggage in early winter (May/June). It flowers at about 130 days, which means that it stays in the vegetative stage for an extended period of time and produces an abundance of good-quality, palatable leaves and stems. The sucrose content of the hybrid is high (± 15 Brix). It has very good drought and leaf disease tolerance. The standability is excellent for a hybrid that grows up to 2.8 m tall.	<600 mm: 4-6 >600 mm: 7-15	<600 mm: 12-15 >600 mm: 15-20	Supplementary Irrigation/ Dryland	Oct-Jan
Forage Sorghum	PAN 888	Normal Sorghum x Sudan Hybrid	The forage sorghum with the best regrowth capacity in the package. Use it in a grazing system where it is utilised two to three times as grazing or for green chop purposes. Graze when the forage reaches a height of approximately 75-100 cm; graze it to a height of no less than 25 cm for good regrowth. Flowering date is approximately 75-80 days. Widely adapted with the best drought tolerance in the package.	<600 mm: 4-6 >600 mm: 7-15	<600 mm: 12-15 >600 mm: 15-20	Supplementary Irrigation/ Dryland	Oct-Jan
Forage Sorghum	SILAGE KING	Grain Sorghum x Sorgo Hybrid	A sweet sorghum plant type with bitter grain. The plant remains very palatable after maturity and frosting. Pre-eminently suitable for foggage or silage. It produces competitive yields and is a cheaper alternative to other well-known sweet sorghum types. Flowering date is approximately 78 days.	<600 mm: 4-6 >600 mm: 7-15	<600 mm: 12-15 >600 mm: 15-20	Supplementary Irrigation/ Dryland	Oct-Jan
Lucerne	PAN 4770	Intermediate Dormancy	PAN 4770 is an intermediate dormancy Class 7 and very robust variety, suitable for hay production or grazing. Relatively thin stems that retain their bottommost leaves well. High yield potential.	<700 mm: 5 700-900 mm: 5-12 Irrigation: 12-15	20-25 (Irrigation Only)	Dryland/ Supplementary Irrigation/ Full Irrigation	Cool Areas: Feb-Apr Warm Areas: Mar-Jun
Lucerne	PAN 4992	Strong Non-dormant	PAN 4992 is a highly winter active, high yielding Class 9 variety, especially suited for hay production. Exceptional seedling vigour, very leafy and has an upright growth habit.	700-900 mm: 5-12 Irrigation: 12-15	20-25 (Irrigation Only)	Supplementary Irrigation/ Full Irrigation	Cool Areas: Feb-Apr Warm Areas: Mar-Jun

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RSA REGIONAL MAP












RSA REGIONAL OFFICES











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Soybeans

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PICTURED
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