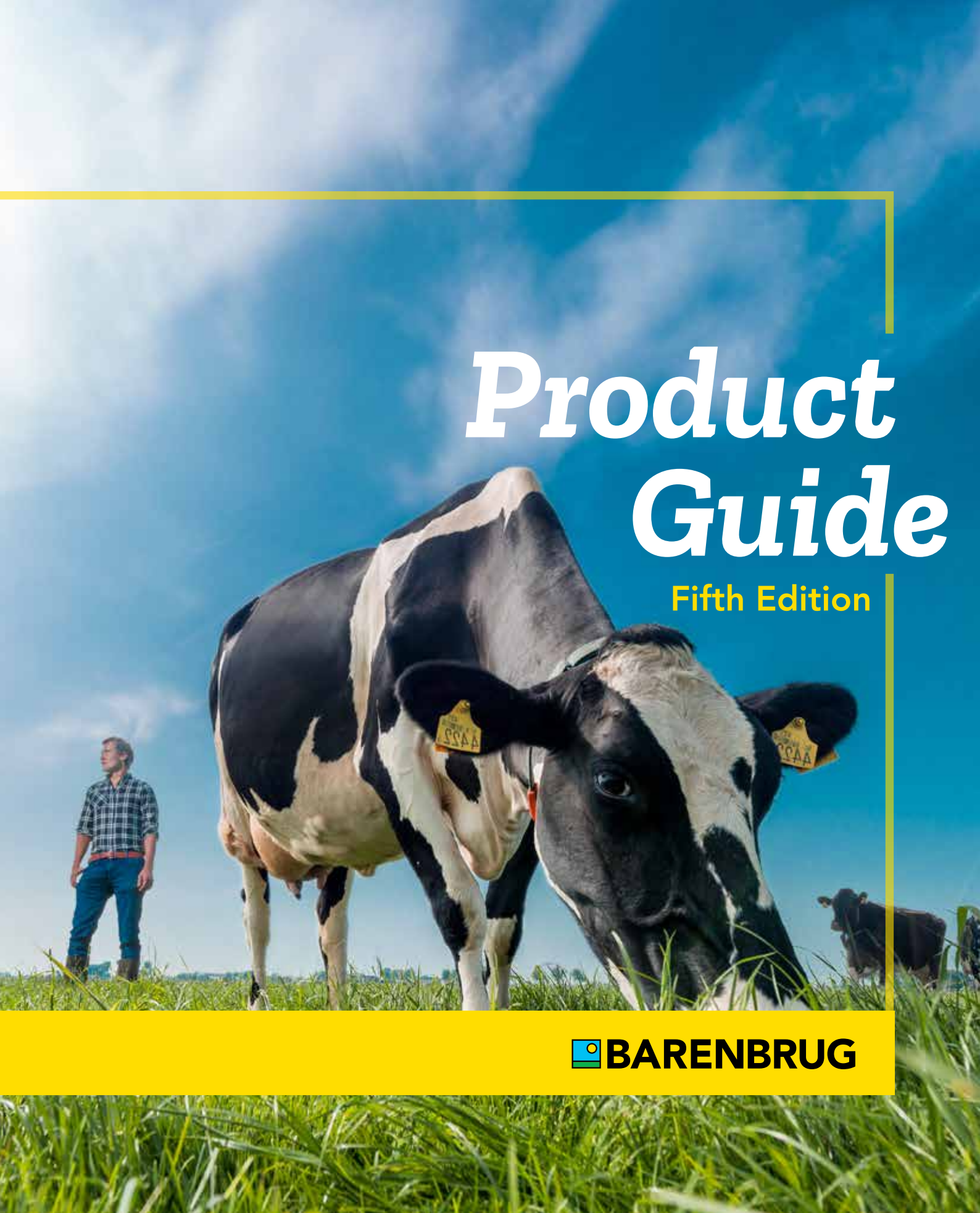

Product Guide

Fifth Edition

BARENBRUG

We will be the partner of choice for innovative and sustainable forage and turf solutions, by sharing our global expertise with our customers locally.
We put the customer at the heart of our business, making the Barenbrug experience outstanding at every level.

That is our commitment, our yellow promise.

BARENBRUG

Make Life Beautiful

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BARENBRUG

'I can hardly believe the extra yield compared with last year.'

Overview

Royal Barenbrug

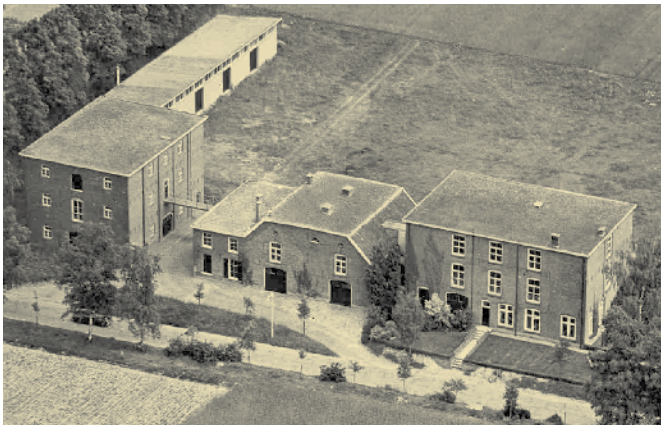
A world of possibilities–that's what Joseph Barenbrug pictured when he saw grass. He initiated the development of varieties for different purposes that is still ongoing today. These varieties are suitable for a wide range of climates. Tasty and healthy forages with high nutritional value for cattle, fine leaved and attractive green grass for parks and gardens, slow-growing grass for lawns, strong grass for sports pitches and recreation. If you can imagine it, we can create it!

Customers first

Helping customers deal with all kinds of challenges was Joseph's mission. Frank and Bastiaan continue that tradition as the fourth generation. Today, the Barenbrug Group is the leading worldwide creator of turf and forage solutions. A family business to the core. Thanks to Joseph, Joop and Bert we can serve you with 114 years of experience!

Royal

In 2004, Barenbrug was granted the 'Royal predicate', a distinction awarded only to companies with extreme prestige and importance in their field, that have existed for more than a hundred years, have sustainable management, and an excellent reputation. We are proud of our royal distinction.



'Dad always put people first. People make the difference.'

A fighter pilot and a veterinarian, that was what Bastiaan and Frank wanted to be when they were kids. But life has its own agenda… They became Members of the Board at Barenbrug. Directors, just like their dad. Entrepreneurial, dedicated, family men... this is Bastiaan and Frank. Frank: 'Working with my brother is the best thing in the world.'

Global Footprint

Farmers, children, home owners, football players–no matter who you are, and no matter what continent you are on, you deserve the best foundation. Healthy beef cattle in Argentina, happy tourists in Central Park, New York and successful golfers at St Andrews or Pebble Beach: our presence on six continents enables us to think globally and act locally. North or south, drought, wet or cold…
We provide fields of production and joy!

In the past 100 years, we have seen a gazillion soils. From enchanting city gardens to exhilarating sports fields. From strong Dutch dikes to endless cattle pastures in Brazil and New Zealand. Different worlds with different demands. So many needs, so many solutions!

Sharing knowledge, creating solutions

We have research facilities in all the important climate zones. We are at your service on six continents with 18 branch offices and 22 research and development locations in more than 20 countries. Our R&D experts connect and exchange insights to create the exact solution you need. Our presence on the African continent creates a valuable source of tropical grass varieties all over the world. It also means that dairy producing countries like the Netherlands and New Zealand can benefit from each other's insights on nutrient boosting forage. Healthy cattle, happy farmers!

Integrated approach

Our secret? We match excellent breeding and research with the skills of strong partners in the field. The result: the latest scientific insights are integrated thanks to the advice of professionals with intimate knowledge of your business and region. Whether you are involved in agriculture, sports or recreation, we encourage you to bring out the best in yourself. To give you a competitive advantage, we never stop learning. We organise internal training for our staff and have set up the Barenbrug academy to train external partners.
All this serves to offer you the best foundation.

6 continents

15 languages

800 employees

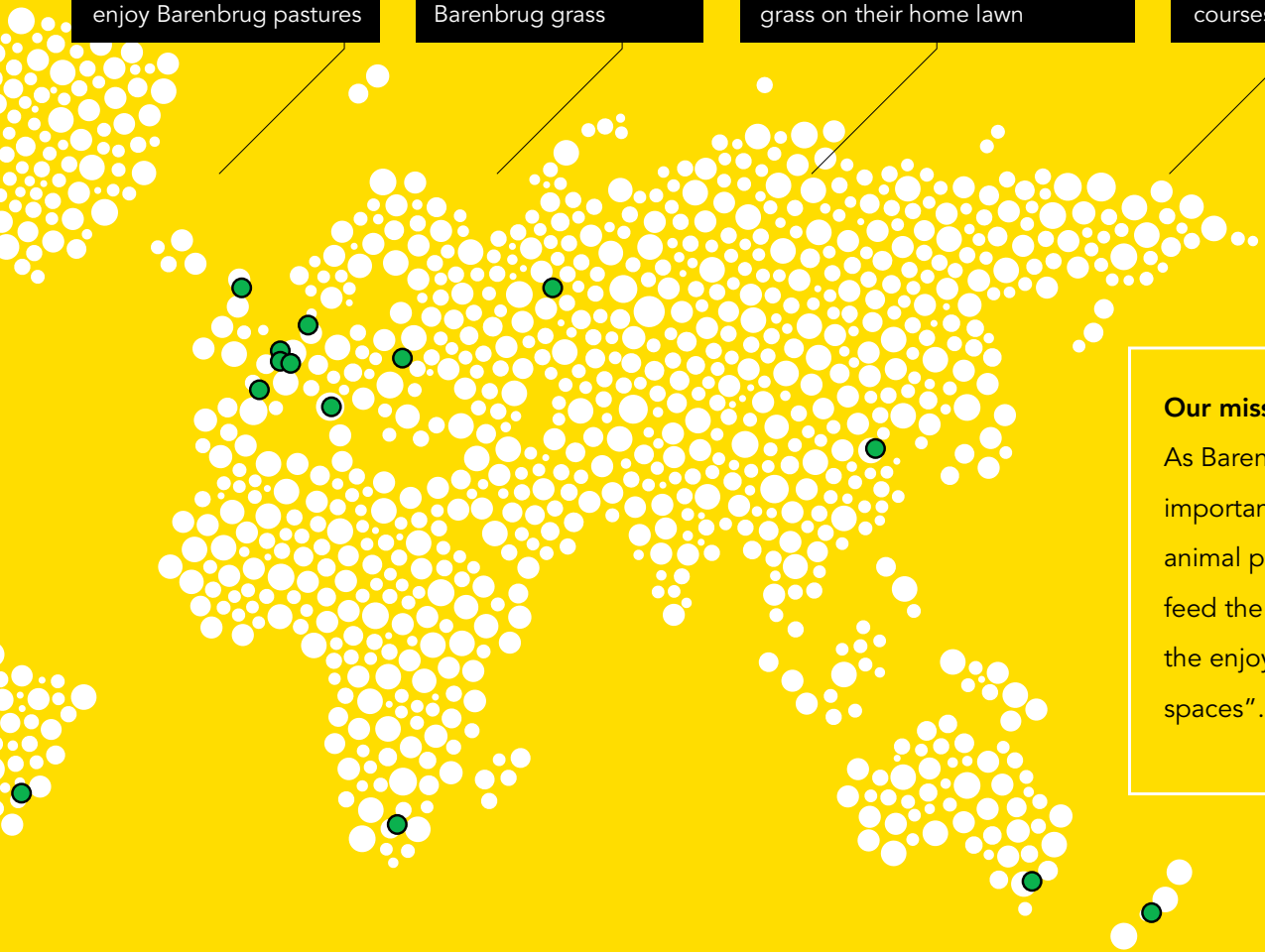
20 countries

2,100,000
Beef steers in Argentina enjoy Barenbrug pastures

More than 14,440,000
Sheep in Australia enjoy Barenbrug grass

18,000,000
People in the US enjoy Barenbrug grass on their home lawn

1,928,000
Golfers in the UK play on courses with Barenbrug grass



Our mission

As Barenbrug we have an important mission: "Increase animal productivity to help feed the world and enhance the enjoyment of green spaces".

Tailored answers

Keeping forage growing during a period of drought in Argentina and Australia, helping grass recover quickly after a punishing football match in Russia or boosting it by applying the right coating technology for year-round green golf courses in France... Do you need a tailored solution in a highly specific case? Just tell us.

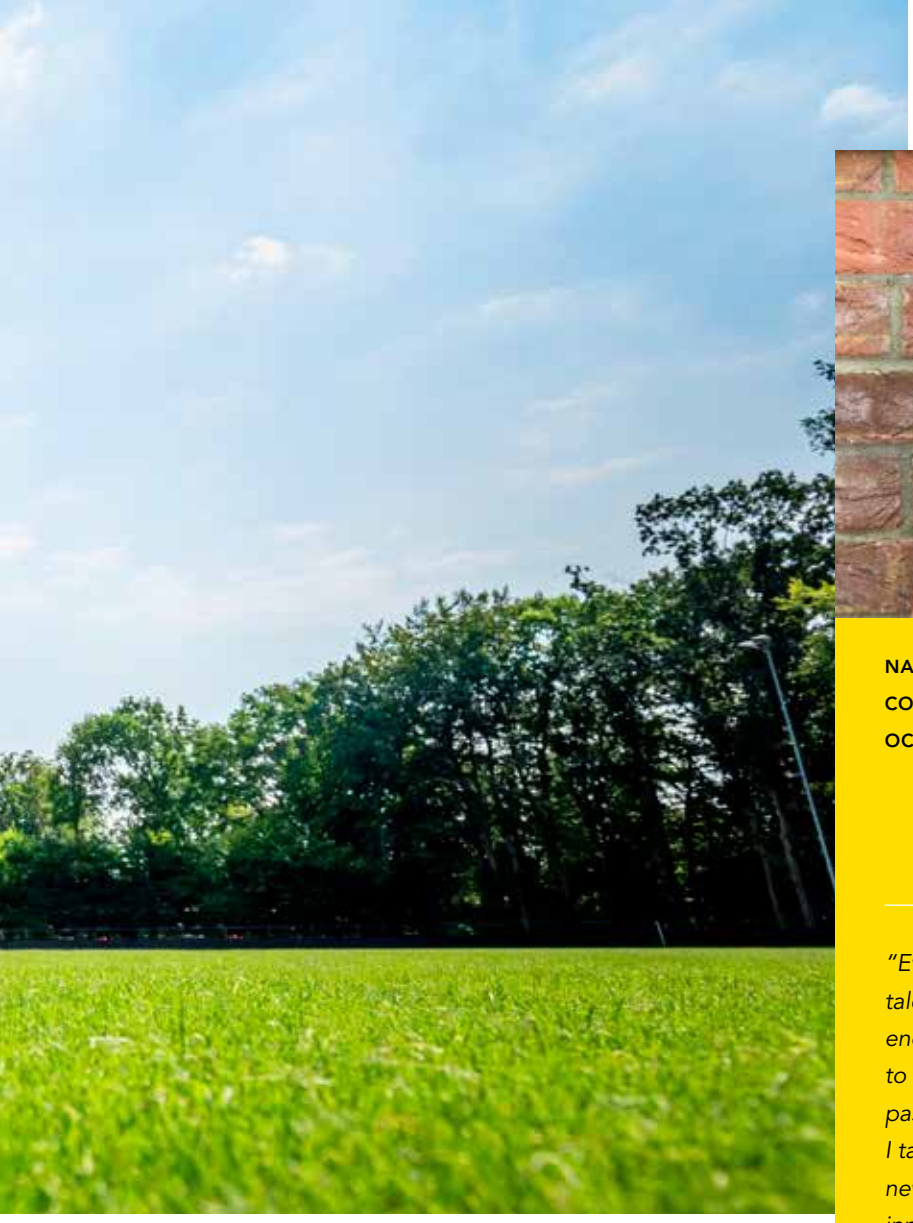
Fostering innovation

How can we help you take the next step? What are your needs? In this ever-changing world with its constantly shifting demands, Barenbrug wants you to be the best. That is why we invest in new technologies, new partnerships and innovation. We are thrilled by bold ideas!

Finding new ways, discovering the unknown: our experts travel the world to seek new solutions for your challenges of tomorrow. We love to see children play, farmers smile and athletes sweat. Every day, more than 110 R&D experts get up in the morning with one goal: to offer you a foundation for opportunities.

Think global, act local

Our worldwide R&D organisation enables us to think globally and act locally. Present on six continents in the main climate regions of the planet, we provide



NAME Johanna McCloskey
COUNTRY United Kingdom
OCCUPATION Managing Director Avoncrop Amenity Products Ltd Winkfield, Berkshire

"Every Saturday I coach my team of talented teenagers. I love coaching and energising the team to embrace playing to the best of their abilities and with a passionate team-spirit. As a distributor, I take pride in being well-informed of new product technologies, promoting innovations and offering our clients exactly what they need. Football players need the best foundation to work their magic."

knowledge and innovative solutions for local applications and climate conditions. Do you need nutritious grass for your herd? Sturdy grass for exciting sports matches? Or inviting grass for your city parks? We can help. Well-known Barenbrug innovations are: RPR self-repairing ryegrass, Mow Saver, NutriFibre, SOS Super Over Seeding and Yellow Jacket seed enhancement. Innovative interventions that work. Let's create the solution you need!

So many needs, so many solutions

Seed enhancement, endophytes, inoculants, hybrid breeding, sensor technologies… We leave no stone unturned when it comes to serving you. Whether you are involved in agriculture, sports or recreation, we encourage you to bring out the best in yourself. So jump on that tractor, swing that golf club, and relax. We give you the foundation for success.

Feeding the future

Sustainability is more than just a word to us. Barenbrug believes true gain lies in sustainable management and responsible decisions. The key to a prosperous future? Long-term commitment!

How can we reduce energy use, help feed the world, bring out the best in our people and make a difference to the less fortunate of this world? These questions are top of mind for us as we do business. By offering sustainable turf and forage solutions we strive to make the world a better place.

Resources

Imagine the sun beating down on the land, insects ruining the harvest, cold weather preventing the grass from recovering in time for the golf season, ten billion people to feed while fossil fuels are running out. This is where we love to step in. Responsible management of our scarce resources requires greater efficiency. The good news? Grass offers more solutions than you might think. This is why we invent products that reduce the use of water, fertilisers and energy. Sustainable answers for compelling issues.

Circular use

As a facilitator of sustainable solutions, we cherish the world around us. Even the smallest choices can have an immense impact. This is why we take a circular approach to paper use and invest in sustainable machines to save water. In the US, we are one of the first largest seed companies to generate green energy with our state of the art solar panels.

Future proof

To make responsible decisions for generations to come, we consult our Young Professional Advisory Committee. Our young employees advise the board on important topics like health, safety, innovation, global trends and HR management. Everything that matters to the following generations. Fresh ideas, new perspectives, sustainable goals: together, we develop sustainable strategies for happy employees, happy users and our beautiful world.

Helping with hands

Some things are priceless, like the smiles on people's faces. Barenbrug teams volunteer in a wide range of projects. From school supplies for school children in South Africa to cooking for homeless people in the United States. Our Helping with Hands Foundation is a beating heart in our company. Together, we make the world a better place.
Make Life Beautiful.

NAME Tim van Noord
COUNTRY Hellouw, The Netherlands
OCCUPATION Dairy farmer

"Producing more milk using my own grass is one of my challenges. It provides appetising forage that keeps my wonderful herd healthy."

"It's my way of contributing to greater sustainability in the dairy and food sectors."

See it. Solve it.

We love to see farmers enjoying their work, kids playing on soft grass, and cows eating nutritious forage. This is why we offer the best turf and forage solutions. Because our customers deserve the best foundation–a foundation for opportunities!

At Barenbrug, service starts with listening to you. Your challenges are our challenges. If you show us your needs and share your ambitions, we'll create the solution together.

Long-term partnerships

Teamwork is our key to success. Together with our customers, research partners and distribution partners, we can achieve more. Because we know the whole is always greater than the sum of its parts. Because unique contributions allow us to excel, we invest in long-term partnerships. Did you know some of our customers have been with us for more than 50 years?

We keep learning

We step into your world so that we can meet your needs. What do your animals need? How can we help you create a stunning atmosphere on your golf course? What can you do to repair the turf for the next football match? To offer you the best, we recruit the best. At Barenbrug, we constantly invest in the heart of our company: people. And we never stop learning. Our specialists travel the world to exchange knowledge and experience between themselves and with our customers. Barenbrug employees, independent consultants, advisers, contractors, farmers, field managers: together we take our knowledge to another level. Because people make the difference. How can we help you?

NAME Joel Reagan
COUNTRY Oregon, United States
OCCUPATION Professional Forage Product Manager at Barenbrug

"Drought, excessive rain, disease pressure, are just a few issues farmers and ranchers are subject to. All types of weather, and elements come with the job. Farming and ranching is hard work, when the day is done it is something to be proud of. Productive producers provide the consumers with the best and top quality products. When the producers are benefiting from the great technologies like Pinpoint and Nutrifiber, that I was able to share with them, it makes my job even sweeter. Sharing of these solutions and technologies with our customers, makes their work and lives easier."

Pasture Grasses

BARENBRUG

Perennial Temperate Grasses

Perennial Ryegrass
Soft Leaf Tall Fescue
Cocksfoot
Brome Grass
Phalaris

Temperate (cool season, C3) perennial grasses have been evaluated and grown in South Africa for quit some time now. Perennial ryegrass, tall fescue, phalaris and cocksfoot are the major pasture grasses used in temperate regions of the world. In South Africa their use has unfortunately been limited by unsuitable soils, dry summers and incorrect grazing practices.

Temperate grasses have demonstrated high winter and spring growth rates in South Africa and with correct management have high nutritive value. Summer-active temperate grasses can provide out-of-season green feed.

They are mostly suited to permanent pasture/irrigation systems in the medium to high rainfall zones and are best grown on relatively fertile soils that have moisture at depth in summer. Most species require some form of rotational grazing to persist.

Perennial Ryegrass *(Lolium perenne)*

Perennial ryegrass is a cool season perennial grass used in cool, temperate climates throughout the world. It has many worthy attributes and is considered the best overall pasture grass for many areas. The inflorescence is a spike with alternately arranged spikelet's attached edgewise directly to the central axis. Leaves of perennial ryegrass are folded in the bud. Blades are bright green, prominently ridged on the upper surface, and sharply taper-pointed. Lower surfaces are smooth, glossy, and hairless. Leaf margins are slightly rough to the touch. Ryegrasses, in general, grow best on fertile, well-drained soils but perennial ryegrass can tolerate wet soils better than some other grasses. It also does not generally tolerate drought or extended periods of extreme temperatures well. Perennial ryegrass will do well in fertile summer-irrigated or sub-irrigated soils. It is not very persistent or productive on lower fertility summer-dry soils. Perennial ryegrass establishes rapidly, has a long growing season, is high yielding under good environmental conditions and proper fertilization, contains high quality nutrients, recovers well after grazing, tolerates traffic, and is valuable as hay, silage, and pasture. It is often used in mixtures with white and red clover. Perennial ryegrass is highly digestible for all classes of ruminant animals.

Sowing rate:

- 20 - 25kg/ha (pure); 15-18kg/ha (mixtures)

Tyson NEW

Tyson is a very early-flowering, diploid perennial ryegrass, with tremendous early spring growth and excellent overall yield. With a -7 day heading date, it is the earliest heading perennial ryegrass on the market. Tyson is a terrific fit for most systems, where additional dry matter available earlier in the spring means more feed available for milk and meat production. Capturing this advantage in your farm system will translate into more milk production, and higher lamb and beef weights.

Tyson has excellent total DM yield, similar to Trojan ryegrass, but it's in early spring that it really shines with 18% more yield than other perennial ryegrasses. This is extremely valuable for several reasons:

- Start your season earlier with less supplements
- Early lamb drafts usually fetch better prices
- Extra feed is freed up for other stock

Provides more pasture for lambing and calving

Tyson's outstanding early spring growth helps overcome feed deficits typically associated with this period and is ideal for early lambing and calving farm systems.

Optimises spring productivity

Tyson is particularly suited to farm systems that need to maximise spring pasture and animal growth before the possible arrival of drier conditions.

Tyson is the standout paddock

Features

- Very early heading date (-7 days)
- Outstanding early spring growth
- Very high annual DM yield

Breeding

Tyson has been bred from our best early season perennial ryegrasses, Meridian and Arrow. Meridian was a very early cultivar we released a number of years ago with exceptional early spring yield. The improvement we have achieved with Tyson is to capture the best of this, and combine it with the best of Arrow. This gives both exceptional early spring growth and very good year-round total yield.

Viscount NEW

Viscount has been a standout tetraploid perennial ryegrass in Barenbrug Agriseeds plant breeding programme, with more early spring growth and better total yield than Bealey. Add to this improved rust resistance and better summer feed quality too. The biggest gain with Viscount is in its early spring growth, through calving or lambing when feed is most valuable. For dairy farmers extra grass at this time of year has been of great value too.

Three reasons to sow Viscount perennial ryegrass:

1.More feed when you need it.
Viscount has a flowering date of +19 days (6 days earlier than Bealey). It has very good total DM yield but importantly has improved early spring growth – a time when feed is of the highest value in pastoral systems.

2. Animals love it.
Viscount has all the features animals love in a pasture;

- the excellent palatability of a tetraploid
- upright growth for ease of harvest
- high quality with reduced aftermath heading and improved rust tolerance
- clover friendly

3. Excellent companion variety.
Viscount performs extremely well in mixtures with red- and white clover, as well as diploid perennial ryegrasses like Trojan and Arrow.

Viscount - the next stage in pasture development!

Governor NEW

Governor combines genetics from two of Barenbrug Agriseeds' most popular previous cultivars to set a new standard for AR37 perennial ryegrass persistence. With outstanding survival and excellent DM yield on the shoulders of the season, Governor delivers feed when it's needed most.

Genetic legacy
Agriseeds has produced a number of superior ryegrass cultivars over the years and two of them – Bronsyn and Tolosa - have been crossed and selected to create this new cultivar. The persistence of Bronsyn, with the high DM yield and palatability of Tolosa, make Governor ideal for dairy, sheep and beef systems.

Persistent
Governor has shown outstanding survival through drought and high insect pressure under grazing on farm trials across the country. Fine, densely tillered and diploid, it will become the premium AR37 cultivar of choice for persistence.

Seasonal growth
A key feature is Governor's ability to grow more DM on the shoulders of the season, in early spring and autumn, when it is most needed.

All rounder
With a +5 days heading date, low aftermath heading (similar to Alto) and better rust resistance than its parents, Governor is a reliable, persistent all-rounder.

Trojan

Trojan simplifies your choice. It provides a balance of features previously unseen in a perennial ryegrass: exceptional DM yield across all seasons; excellent persistence; high feed quality, and good resistance to rust and plant pulling. Trojan is medium-fine leaved and densely tillered. It is intermediate in type between Alto (fine leaved and densely tillered) and the more upright medium leaved Arrow.

Persistence: The persistence of Trojan has been excellent in trials in New Zealand and South Africa.

Exceptional winter growth: Trojan sets a new standard of performance in high cool season growth, during winter and early spring, with excellent summer and autumn yield.

Feed quality: Trojan is late heading (+16 days) with a low level of aftermath heading, giving it better feed quality in late spring and summer.

System fit:
Dairy
Beef
Sheep

Arrow

High performance perennial with winter and early spring growth.
Medium-late flowering.
Good quality- reduced aftermath heading and good clover compatibility.

Plants were selected for:
High drymatter yield
Improved early season growth
Exceptional persistence

High Yield
Arrow delivers high levels of winter and early spring growth.
Allows farmers to start their season earlier by offering more feed when it is essential. Ideal for early calving or early lamb finishing systems.

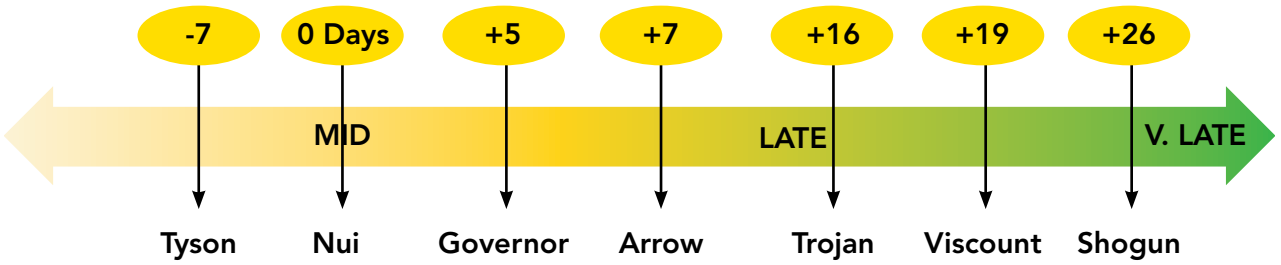
Medium-late Flowering
This gives a good balance of improved late spring quality & increased early-season growth.

Start your season earlier.

Barenbrug Perennial Ryegrass Classification

Tyson (D)	Viscount (T)	Governor (D)	Trojan (D)	Arrow (D)
All systems - Arrow replacement	Maximum performance - Bealey replacement	All rounder	All systems	All systems
High yields, very persistent	Combine well with Hybrid ryegrass	High seasonal yields, very persistent	Persistence, growth, quality feed	Combine well in mixtures. Very persistent.
Early spring quality feed	Spring and summer yield	Early Spring plus Autumn	Summer and winter yield	High feed quality
Intensive/extensive farming	Intensive farming	Intensive/extensive farming	Intensive farming	Intensive/extensive farming

Flowering Dates



Seasonal Summary

	DO	DON'T
Winter	Spray weeds.	Pug your ryegrass - have strategies in place to avoid damage.
Spring	Maintain consistent residuals - your new ryegrass will grow rapidly and needs frequent grazing. Take care grazing in wet periods.	Let your pastures get too long. Make hay or heavy silage crops in the first season.
Summer	Have strategies in place if the weather turns dry. Look after ryegrass - sacrifice your poor paddocks first.	Overgraze/restock your ryegrass too early - let it recover and build it's reserves.

Soft Leaf Tall Fescue *(Festuca arundinaceae)*

Tall fescue is a widely adapted cool season grass. In the transition zone, tall fescue is used extensively due to its superior summer production. Now there is a new generation of tall fescue available. They are soft-leafed tall fescues.

Palatability

Palatability is hard to measure, but we do know a few things. In a sheep grazing trial conducted in France, Bariane and Barolex were the only two varieties the animals preferred. Sheep would eat the Bariane and Barolex into the ground and waited for hours before starting to graze 'rough-leafed' varieties like Kentucky-31.

Improved rust resistance

Rust is another fungus that can attack fescue and other species. Rust is completely harmless to livestock, yet it affects palatability of the plants. Through plant breeding, the newer soft-leafed tall fescues are more rust resistant. Besides palatability, rust also affects dry matter production.

Palatability of the Soft Leaf Tall Fescue

NutriFibre, technology for the best forage from your own land

Finally, effective fibre and feed value combined in a single product.

Barenbrug offers you this possibility with its NutriFibre: the required effective fibre and feed value combined in a single product, enabling you to harvest large quantities of forage with sufficient energy for highly productive dairy cattle. The forage is rich in protein, resulting in a high concentration of protein in the milk. Barenbrug uses the benefits of its Nutrifibre technology in its grass mixtures.

The success factor of Barenbrug's NutriFibre is its combination of effective fibre and feed value. NutriFibre is based on soft-leaf tall fescue, which ensures optimum rumen activity. It also has a high feed value, boosting the production of milk with high fat and protein levels. A distinctive feature of soft-leaf tall fescue is its long roots, with which moisture and minerals from deeper soil levels can be utilized effectively. The long roots of NutriFibre are able to absorb water from deeper layers in the soil, making the grass well resistant to drought.

Soft Leaf Tall Fescue

- **Late maturing**
- **Softer leaves**
- **More palatable**
- **Better rust resistance**
- **Winter-hardy**

Later heading date

Varieties with later heading dates are much easier to manage. They will produce less and later seed heads in the spring, allowing for a longer grazing/harvest window. Later maturing varieties also show less re-heading in the season. Barcel and Barolex are considered late maturing varieties, while Bariane is the latest maturing tall fescue available on the market today. Bariane produces seed heads more than 10 days later then most other varieties.

Bariane & Baroptima

Establishment and Management

In order to maximize the benefits of these soft-leafed fescues, they should be managed well. The recommended seeding rate is 25kg/ha in a well-prepared seedbed. Brillion seeders or broadcasting the seed followed by a cult packer works best. If a regular drill is used, we suggest planting bi-directional. This means crossing the field twice, at an angle.

Soft-leafed tall fescues are very well suited for intensive grazing, as well as cutting for hay or grass-silage. When planted for grazing, planting together with white clover is recommended (4-6kg/ha). White clover produces nitrogen, increases DM production and increases forage quality. Ideal in mixtures with perennial ryegrass, cocksfoot, phalaris, brome, perennial clovers and lucerne.

Baroptima

Fescue Characteristics

		Maturity	Palatability	Digestibility	Winter Hardness	Suitability for grazing
Barolax	Very soft leaf	****	*****	*****	****	*****
Baroptima	Soft leaf	****	****	*****	***	*****
Bariane	Soft leaf	*****	*****	*****	*****	****
BarElite	Soft leaf	****	*****	*****	****	****
Barcarella	Rough leaf	***	****	****	****	**
Kentucky-31	Rough leaf	**	**	**	***	*
Fawn	Very rough leaf	*	*	*	**	*

Cocksfoot *(Dactylis glomerata)*

Adremo

The leading cocksfoot in forage yield

- Late heading cocksfoot.
- Constant high forage production throughout season.
- Especially suitable for hay production.
- Excellent persistency.
- Very resistant to cold and drought.

Adremo, a highly palatable cocksfoot variety, is the latest release in South Africa with exceptional dry matter results in trials in the Southern Cape and KwaZulu-Natal. Cocksfoot is a very persistent perennial grass that tolerates summer dry conditions, moderate soil fertility, insect attack and continual set stocking. Cocksfoot is used to enhance the growth and persistence of permanent pastures in summer dry areas. It also adds variety to the stock diet. Traditionally seeding rates of cocksfoot were kept low in a mix, because cocksfoot can dominate pastures, reducing clover levels and digestibility. New fine leaved cocksfoot cultivars like Adremo are much more compatible with ryegrass, giving better long term pastures. Cocksfoot is moderately slow to establish and has lower digestibility than most other grasses. Cocksfoot has limited winter growth but good summer growth.

Sowing rate

Cocksfoot is most commonly sown at 4-6 kg/ha as a component of a ryegrass based seed mix. It can be sown at a higher rate of 10-15 kg/ha as a specialist pasture, particularly in dry conditions where other grasses struggle to persist.

Grazing management

Cocksfoot should be kept short and leafy through the spring to maintain feed value. If traditional cocksfoots become clumpy or stemmy they are unpalatable to stock. In grazing trials, where cocksfoot has been kept short and leafy, animal performance is reasonably good. Maintaining good legume content in cocksfoot pastures will improve animal performance.

Prairie Grass *(Bromus catharticus)*

Bareno Brome

Growing Bareno

Bareno pasture brome is a standout persistent pasture for summer dry free-draining soils. In these situations it is more persistent than perennial ryegrass, is palatable, high yielding and legume-friendly. Bareno can be rotationally grazed or set stocked with better late spring quality and summer growth.

Bareno is slower to establish than ryegrass. If you spend a little extra time on correct sowing and early management, you'll be rewarded with good dry matter results. Cultivation ensures a fine, well compacted, weed-free seedbed to allow correct seed depth and soil moisture retention for fast germination. Direct drilling has proven to be very successful.

Bareno is best sown when soil temperatures are above 12°C, during late summer or early autumn. This gives plants time to adequately establish before winter. Its establishment is much slower in cool conditions. Sow seed shallow, at 10 - 20 mm.

Bareno should not be overgrazed in its first year to allow plants to fully establish. Bareno can set seed quickly so growth needs to be kept under control in late spring. Post-grazing covers of 3-4 cm will ensure persistence and regrowth through summer. Remember the plant's reserves in grasses are above the ground (not in the roots).

- **Sowing rate**: 20 - 25kg/ha

Phalaris *(Phalaris acquatica)*

Phalaris has excellent seedling vigour, which makes it a grass that is quick and easy to establish. This is very important for easier management of the stand should there be a high level of weed competition. Once established, Phalaris will be able to handle periods of waterlogging.

An advantage of Phalaris is its ability to grow in acidic conditions and will extend the range of pasture species to help combat soil degradation. The deep rooted nature of Phalaris draws nutrients back up to the top of the soil where they can be used and either prevent or slow down the onset of acidification. Another major benefit from the plants deep roots system is that it makes Phalaris very persistent under drought conditions.

- **Rainfall**: 500mm+
- **pH**: 4.5-8.5
- **Soil Type**: adapted to a wide range of soil types
- **Sowing Rate**: 3-6 kg/ha (Pure) 2-3 kg/ha (Mixes)

Advanced AT

Advanced AT (Phalaris aquatica) is a semi erect, winter active variety which forms thick, dense tufts of wide blue/green leaves that are very palatable to sheep and cattle. It has a low level of summer dormancy so it can respond and take advantage of any summer rainfall should it occur. Advanced AT is morphologically similar to the winter active cultivar Holdfast, but was selected for its superior performance in shallow, strongly acidic and infertile soils which have layers in the top 50cm of pH<4.2 measured in CaCl2.

Nutrient solution studies have shown that Advanced AT is the most Al-tolerant of all the Australian bred phalaris cultivars. Field studies show a particular advantage in establishment on strongly acid soils in years with a dry spring. Advanced AT strong seedling vigour makes it a variety that is easy to establish quickly. This is very important for stand management should there be a high level of weed competition. Once established, Advanced AT will be able to handle periods of waterlogging. The biggest advantage of Advanced AT's is its ability to grow in more highly acidic conditions and lower quality soil compared to other phalaris varieties currently available. Advanced AT will extend the range of pasture species available, to help combat soil degradation.

Holdfast GT

Holdfast GT (Phalaris aquatica) is a semi erect, winter active variety which forms thick, dense tufts of wide blue/green leaves that are very palatable to sheep and cattle. It has a low level of summer dormancy, so it can respond and take advantage of any summer rainfall should it occur.

Holdfast GT key features:

- Grazing tolerant winter active phalaris
- Holdfast GT exhibits excellent seedling vigour to aid successful establishment
- Selected for long term persistence under grazing (both set stocking and rotational grazing)
- Increased productivity over the life of the stand
- Lower levels of stagger causing alkaloids
- Its ability to grow in acidic conditions increases it's area of adaptation

Key features:

- Winter active phalaris with superior establishment and root penetration on acid soils, especially in tougher seasons
- Will tolerate pH as low as CaCl2 3.9 and Al of 20-50%, providing better production and persistence on these soils than other Phalaris varieties, Cocksfoots and Perennial Ryegrass
- Higher 2nd year Dry Matter yield than Holdfast on acid soils
- Suited to rotational grazing and improved fertility, regardless of soil acidity

Hybrid Ryegrass

Hybrid ryegrasses (Lolium x boucheanum Kunth), also known as 'short rotation' ryegrasses, are generally produced by plant breeders crossing Italian or annual ryegrass with perennial ryegrass. Hybrid ryegrasses fall between Italian and long rotation ryegrasses in growth and persistence. Hybrid ryegrass gives better winter production than perennial or long rotation ryegrass, and in summer wet areas, most cultivars will persist for up to 2 years. In summer dry environments hybrids generally last for 1 - 2 years.

- **Perennial x Italian**
- **Winter growth = many Italian ryegrasses**
- **Out-yields most perennials during Summer & Autumn**
- **Persistence outstanding for a hybrid**

Using a Hybrid

Pure sward or undersowing

Year 1: Viscount or Tyson
Year 2: Hybrid
Year 3: Hybrid

BARENBRUG

Hybrid Ryegrass *(Lolium x boucheanum)*

Shogun

Key benefits from Shogun for increased pasture renewal:

Exceptional DM yield

Over a 12 month period, Shogun has the highest DM yields of any ryegrass we've tested. It produces more than most perennial ryegrasses in summer and autumn, and in winter and early spring its growth is comparable to an Italian. This level of feed supply frees up more paddocks for renewal. The extra profitability Shogun can generate also helps fund investment in increased pasture renewal.

Fast establishment

Shogun's fast establishment is comparable to that of an Italian ryegrass. This allows paddocks resown with Shogun to be brought back into the grazing rotation more quickly than those renewed with perennial or other hybrid ryegrasses. Less down time means larger areas of pasture can be renewed without compromising production.

Ideal for undersowing

Shogun is ideal for undersowing (drilling seed into pasture without a herbicide spray). This is a key technique for reviving larger areas of pasture on some farms.

Winter growth with flexibility

Traditionally, annual or Italian ryegrass cultivars have been used to achieve extra cool season pasture growth but the extent of their use is limited by their persistence. Shogun however provides similar levels of winter growth with the flexibility of a longer-lasting pasture, with typical persistence of two years. Shogun also has the flexibility of being sown in a range of mixes (e.g. alone, with white clover, red clover, chicory) as the situation requires.

Management

Key to get best persistence out of tetraploids, including Shogun, is pasture management in two areas:
During extended dry periods don't overgraze as their palatability makes them more susceptible to being overgrazed.
During periods of wet weather the more open habit of tetraploids makes them more susceptible to pugging damage with cattle.

Sowing rate:

- Drilling at 20 - 22kg/ha
- Broadcast at 25 - 27kg/ha

Barsenna

Barsenna is a new diploid variety from Barenbrug's breeding program in Southern-France. This variety is especially suitable for Mediterranean areas, because it's winter-active growth habit will give a long growth season. Barsenna can be used in high productive, intensive mixtures with perennial ryegrass, tall fescue and clovers. Ideal to drill into existing pasture.

Winter active for intensive use:

- Species Lolium hybridum
- Diploid hybrid ryegrass
- High productive variety
- With its winter growth suitable for areas with very mild winters

Sowing rate:

- Drilling at 20 - 22kg/ha
- Broadcast at 25kg/ha

Annual	Italian	Hybrid(Short rotation)	Long rotation	Perennial
		Shogun		
Shogun replaces some Italian. Giving similar winter growth, plus better persistence & black beetle control.	←		→	Shogun replaces some long rotation. Giving similar persistence, with higher winter & total DM yield.

Shogun is no ordinary hybrid ryegrass

Annual Temperate Grasses

Italian Ryegrass

Autumn planting / Feb. – Apr.

Produce early winter feed, but grows less active during coldest months. Best DM production during Spring. Seed production stimulated by a cold period (winter). Growth stops during November/December.

Diploid cultivars: Tabu, Tabu+
Tetraploid cultivars: Barmultra II

Italian Ryegrass

Spring planting / Aug. – Sept.

Flowering and seed production only after about 15 months. DM production usually high during Spring, Autumn, and the next Spring.

Diploid cultivars: Tabu, Tabu+
Tetraploid cultivars: Barmultra II

Westerwold Ryegrass

Autumn planting / Feb. – Apr.

Long photoperiodic day lengths stimulates flowering and seed production – normally around October. This result in a decrease in DM production and less palatable pasture. Good production during Autumn and early Winter.

Diploid cultivars: Ribeye
Tetraploid cultivars: Maximus, Hogan

BARENBRUG

Italian Ryegrass *(Lolium multiflorum)*

Barmultra II

After 50 years of fame the good old variety Barmultra has been replaced by Barmultra II. Barmultra II offers better dry matter yields, better disease resistance and better persistency.

Barmultra II is very suitable for both autumn- and spring sowing and can be used for seasonal production or bi-annual forage production. Barmultra II can be grown on all types of soil with good water supply. Peaty soils and soils with high groundwater tables are less suitable.

Characteristics of Barmultra II:

- Fast germination and establishment
- Quick soil coverage
- Less weed problems

Growth features:

- Extended green mass production
- Fast spring development after winter
- Broad leaves
- Very good frost tolerance in springtime
- Dense growth resulting in less invasion of weeds
- Fast regrowth after each cut

Tabu+ NEW

Tabu+ is nutritious, has explosive establishment speed, exceptional winter and early spring growth and produces high year round growth. Tabu+ is suitable as a winter crop, or for under sowing into run out pasture to boost winter-spring growth. In dense pastures spraying before drilling is recommended.

Stock Type: Dairy, Sheep, Beef

Sowing rate:

- Drilling at 18 - 20kg/ha
- Broadcast at 20 - 25kg/ha

Barmultra II

Pasture in KwaZulu-Natal

Tabu key features:

- Very fast establishment
- Very high DM yield
- Diploid Italian - very persistent
- Very dense cover

Westerwold Ryegrass *(Lolium multiflorum)*

Hogan NEW

Hogan sets a new standard for Westerwold annual ryegrass.
Tetraploid annual ryegrass

- Very fast establishment
- High DM yield start to finish
- High value feed
- Proven performance
- Medium – long rotation grass
- Top ranking Westerwold ryegrass in South Africa

High value

Hogan establishes rapidly and produces high DM yield and ME/ha.

Fast establishment

Hogan is a tetraploid ryegrass bred for rapid establishment to provide fast feed in autumn, critical for farm systems particularly following dry summers.

Sowing rate:

- Drilling at 20 - 32kg/ha
- Broadcast at 25 - 27kg/ha

Ribeye

Ribeye is an earlier producing, earlier maturing, and winter-hardy diploid variety that has proven itself in yield, quality and grazing tolerance. The forage quality of Ribeye is excellent both in nutritive value and low rust infection. Ribeye has also been given high marks for winter-hardiness in cold injury ratings. Ribeye has performed exceptionally well in Cedara trials with high dry matter yields and aggressive regrowth.

- Excellent for overseeding
- High forage production
- Withstands high grazing pressure
- Excellent forage quality
- Rust resistant & cold tolerant

Sowing rate:

- Drilling at 18 - 20kg/ha
- Broadcast at 21 - 25kg/ha

Ribeye pasture in KwaZulu-Natal

Sheep and cattle grazing on Maximus near Vryburg

Maximus

- Tetraploid annual ryegrass
- Excellent for overseeding and mechanical harvesting
- High yields
- Very high quality
- Early production
- Winter-hardy
- Good rust resistance

Sowing rate:

- Drilling at 20 - 22kg/ha
- Broadcast at 25 - 27kg/ha

Management of Annual Grasses

Annual ryegrass is normally planted from March through May. The recommended seeding rate is 20-25 kg/ha in a well-prepared seedbed. The ideal sowing depth is 2cm. Broadcasting and no-till are two of the most popular planting methods.

Once established, grazing the pasture should commence at a four leaf stage. Rotational grazing will provide the best yield results, however, ryegrass will tolerate close and continuous grazing. Ryegrass responds to Nitrogen and is tolerant of moderate soil acidity. In high rainfall areas, high production can be expected throughout the winter. To increase winter forage availability, annual ryegrass can be planted with a companion, such as a small grain crop or forage turnip.

Management of Temperate Grasses

For sustainable food/forage production…

You must be able to produce food/forage that is compliant with the following criteria:

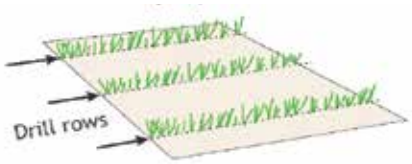
- High dry matter (DM) production • High quality • High DM intake • High palatability

Pasture Management

Goal: Get as much ME/ha directly into animals.

How: Improve what currently grows (quality and quantity). Eating more of it (utilisation).

Pre-sowing

	Sowing Method	
	Cultivate and roller-drill	**Spray-drill**
Soil High fertility, drainage, compaction **Seedbed** Kill existing plants **Seed** Choose persistent species Use highly stoloniferous clovers **Method** Choose sowing method for high ground cover	 • Spreads seed across ground = weed control • Better clover establishment	 • Space for weeds between rows • Best with drill with narrow row spacing or double drill

Pasture Conditioning Scoring

Rank	Description	Pasture	Suggested action
5	Whole paddock has dense sward of desired grasses and clovers.		No action required. Would be happy if whole farm in this state.
4	Parts of the paddock show signs of low level damage, less vigorous grasses.		Check fertility. Apply Summer N to encourage tillering. Paddock probably OK for coming season.
3	Majority of paddock has low level damage, weeds, and less vigorous grasses.		Apply Summer N. Undersow in the Autumn with perennial ryegrass containing appropriate endophyte.
2	Parts of the paddock have severe damage. A lot of weeds and bare ground.		Either: 1. Sow into Summer crop this Spring and sow in perennial pasture in Autumn; or 2. This Spring oversow chicory with fertiliser; or 3. Undersow paddocks with chicory, and plan to renew in following 6-12 months.
1	Entire paddock severly damaged.		Sow into Summer crop this Spring and plan to sow in perennial pasture in the Autumn.

Basic steps for establishment

Aim: for strong, healthy plants prior to summer. Sow early – time to establish before winter

Do a soil analysis before planting.

Take climatic conditions into consideration. For example: wind if you broadcast seed.

Sowing depth has a huge impact on establishment.

Rolling action after plant is very important.

Be aware of insects and the damage it can cause to seedlings.

Use a herbicide program to control weeds effectively.

Growth Management

Persistence – First Graze

- Administer pull test
- 4 - 6 weeks after planting - early Autumn
- Stock must graze pasture as quickly as possible to approximately 8 cm (imitate mower action). This will stimulate plant regrowth. Only possible in multi camp systems.

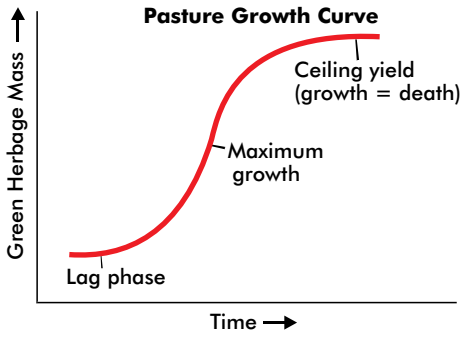
Persistence - Summer Management

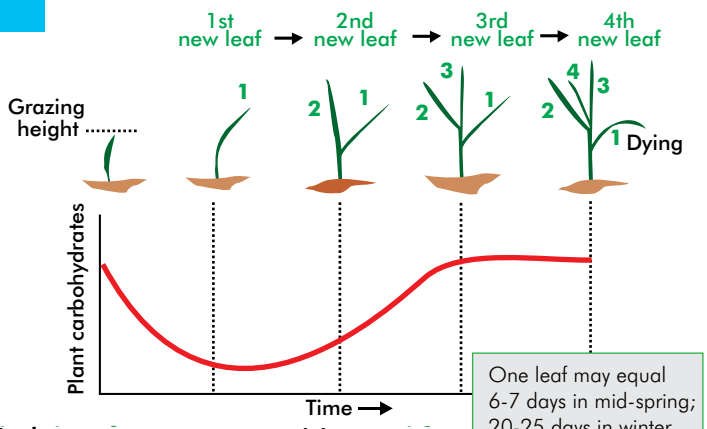
- Assist pasture growth - leave 4 - 5 cm + residuals (plant reserves in base of tillers, lowers soil temp, shades summer grasses), nitrogen, irrigation
- Don't over graze (especially new pasture)
  - feed supplements, long rotation (ration cows), destock
- Other:
  - good soil fertility; allow to gain cover before grazing after dry

Persistence - Winter Management

- Avoid pugging – sacrifice paddock, holding area
- Tetraploids especially
- Manage pugging damage immediately
- Soil fertility - growing more = fertilize more
- Leave "reasonable" residuals - plant reserves in base of tillers, "takes grass to grow grass"

Graze at right time - avoid lag phase and build up of dead material





Need to monitor pasture. If you don't monitor it, how can you manage it!

Feed quality

Quality - Pre-sowing

- Choose appropriate species/variety
- Consider: Tetraploid ryegrass
- Take note of flowering date

Quality - Management

- Limit grass seeding in spring – graze at right time
- Residuals - graze to 1500 kgDM/ha – 4-5 cm
- Aim for high clover – avoid shading, pH

High Utilisation

- The condition a pasture's in at grazing is a result of how it was left after the last grazing
- Graze to consistent residual

Pasture species for quality and persistence:

White Clover
Chicory
Plantain
Lucerne
Red Clover
Perennial Ryegrass
Short Term Ryegrass
Tall Fescue
Bromus
Cocksfoot

Pasture is: Low cost. Profitable. Environmentally friendly – animals eat it themselves.

But it's: Variable in supply. Doesn't keep. Loses quality when seeding. Paddocks tend to deteriorate over time.

It needs: Grazed at the right time. Grazed to the correct residual. Monitored (feed wedge). Pasture renewal programme.

Do all this and you: Maximise the amount of ME/ha eaten by the animals….which is highly profitable!

Tropical Grasses

Brachiaria

- Mulato II (Hybrid)
- Marandu

Panicum maximum

- Mombaca

Tropical pasture grasses cover a wide range of species. The environments in which they are grown include the wet tropics and the semi-arid tropics. Most of the species are perennials and are characterized by processing the efficient C4 photosynthesis pathway. They are primarily used by grazing animals for meat, milk, or fibre production. Tropical grasses offer high water use, high production and improved sustainability outcomes. They have the potential to produce large amounts of plant dry matter in a growing season, provided that they have adequate soil water and nutrients.

Brachiaria Hybrid *(B.ruziziensis x B. decumbens x B.brizantha)*

Mulato II

Mulato II is a three-way hybrid (Brachiaria ruziziensis x B. decumbens x B. brizantha). It is the result of three generations of crosses and screening carried out by CIAT's tropical forages project.

Mulato II is the second Brachiaria hybrid developed by CIAT. Being an apomictic hybrid, it is genetically stable and does not segregate or divide from one generation to the next.

- Well-adapted to acid and neutral soils of moderate to low fertility
- Tolerates high soil aluminium levels
- Very persistent, even under seasonally dry conditions
- Productive, capable of sustaining high stocking rates and grazing pressures
- High nutritional value for ruminants
- Maintains green leaf of relatively high nutritional value into seasonally dry periods
- Responds well to nitrogen fertiliser

Permanent pasture suited to beef and dairy production, particularly when nitrogen-fertilised or grown with well-adapted companion legumes. Suited to hay production.

Utilization

Mulato II produces a very high leaf dry matter percentage and has primarily been used for grazing beef cattle. The vigorous and prostrate-type growth during the summer makes rotational grazing recommended for Mulato II pastures. Rotational grazing facilitates the adjustment of optimum stocking rate and control of grazing stubble height. The target stubble height for grazing Mulato II should be 15-25cm. With respect to nutritive value, Mulato II generally has CP of 11-16% and TDN of 55-60%. Although Mulato II has not typically been used as a conserved forage by producers, its vigorous growth and superior nutritive value compared to bahiagrass make it a very attractive option for hay and haylage.

Sowing/planting rates in mixtures

8-12 kg/ha for seed or hay production. Likely to be sown as the only grass in a pasture. If companion grasses are used, adjust the sowing rate to total 4 - 6 kg/ha. Do not adjust for legumes.

Mulato II

Sowing time

To avoid slow establishment associated with cool soils: sow during summer months in the sub-tropics and elevated tropics; spring/summer in tropical coastal areas. Plants will often establish from previously dormant seed over the summer growing period.

Drought Tolerance

Mulato II has an extensive root system which allows it to tolerate drought and enables it to have rapid regrowth at the onset of the wet season. Its pubescent leaves allow it to efficiently use moisture deposited on the leaves by the evening dew until late the next morning. It is the ability of Mulato II to maintain green leafy dry matter during the dry season (85% leaf ratio) that makes it outstanding dry season forage.

(Brachiaria)

Marandu

- Permanent pasture for grazing and cutting for fresh feed
- B. brizantha intergrades with Brachiaria decumbens and the species may be difficult to distinguish. The main differences is in growth habit with B. brizantha more tufted and B. decumbens more decumbent and forming a denser cover
- Good persistence under grazing
- More compatible with legumes than some other Brachiaria spp
- Tall type, are well suited to cutting
- High seed production potential
- Best adapted to the humid and sub-humid tropic areas
- B. brizantha is a warm-season grass. Leafs are frost-sensitive but the plants survive slight frost
- Seed should be broadcast at 5-10 kg/ha onto a well-prepared seedbed and then lightly harrowed and rolled

Marandu

Panicum maximum

Mombaca

- Tufted perennial with deep root system
- Low resistance to drought and water logging
- Requires fertile soils
- Rotational grazing recommended
- It produces between 12% and 14% crude protein
- It is recommended for milk production and intensive fattening
- Has production potential of 14 to 16 ton dry matter

Panicum maximum cv. Mombaca is characterized by its high nutritional content and it responds very well to intense fertilization. It is greatly used as a forage grass by beef producers. Mombaca is highly recommended for intense grazing systems and is a good alternation for pasture diversification with Brachiaria Marandu. It requires fertile soils and is not recommended to be planted on slopes.

Grazing Management

Can be either rotationally grazed or set stocked. Some farmers also prefer cut-and-carry. Graze/cut every 40-45 days in the wet season and 60-70days in cool season. Preferred grazing height between 10 and 15 cm.

Establishment

Can be either planted in rows at 6-8kg/ha, or broadcasted at 8-10kg/ Ha. Plant the seed no more than 1-2cm under the soil surface.

Mombaca

Subtropical Grasses

- Rhodes Grass
- Smutsfinger Grass
- Blue Buffalo Grass
- Bottle Brush Grass
- Weeping Love Grass
- White Buffalo Grass
- Small Buffalo Grass
- Kikuyu
- Bermuda Grass
- Paspalum

Subtropical (warm season, C4) perennial grasses are traditionally grown in summer rainfall environments. However, they can be successfully grown in the Mediterranean environments due to a combination of drought tolerance and the mild winter conditions in coastal districts. Well adapted species can survive extended dry periods and resume growth rapidly after summer-autumn rainfall. They can increase production on poor sandy soils and provide year-round groundcover to minimise the loss of topsoil as a result of strong winds. The feed quality depends on grazing management and nitrogen fertilisation, while most species require some form of rotational grazing to persist. Most of the species are tufted grasses and perform well in mixtures with other species with similar growth habits.

BARENBRUG

Rhodes Grass *(Chloris gayana)*

Requirements and uses

- Not considered a high quality grass but is suited where ease of establishment is more important than good high quality production
- Good seed production, easy establishment, creeping growth habit
- Areas with relative low rainfall
- Adapted to most soil types
- pH-level of 5,5-7,0 (KCl)
- Utilized more for grazing than for hay

Establishment

- October/November or February/March
- Do not plant/cover seed deeper than 25 mm

Varieties

Katambora: A diploid, tufted grass. Leafy, densely growing, with long, relatively thin stolon's. Selected for drought tolerance and very rapid growth rates. Establishes and covers rapidly and persists well, even at low fertility. Katambora has high seed yield ability and is classified as a Nematode resistant type.

Sowing rate:

- 5-10kg/ha (uncoated); 12-20kg/ha (coated)

Tolgar: Tolgar is the first multi-use Rhodes Grass cultivar to be bred for amenity, revegetation and soil conservation purposes, as well as first class forage and hay production, maintaining drought tolerance but exhibiting an aggressive creeping growth habit rather than being erect. Tolgar* has fine textured vegetative growth which is very palatable and is later flowering, giving it the ability to out-yield all other varieties of Rhodes Grass in the market, while being much more salt tolerant.

Soil preparation

- Early preparation helps retain moisture
- Seedbed: clean, even, free of weeds and well rolled
- Many failures occur when seedbeds are too loose and powdery
- Rolling before and after sowing ensures good establishment
- Rhodes grass can be sown on dry soils where the soil is inclined to form a hard crust after rolling
- Subsequent rain will wet the seed for germination
- A light shower of rain followed by long dry period could result in poor establishment

Smutsfinger Grass *(Digitaria eriantha)*

Digitaria

Smutsfinger Grass

Requirements and uses

- Areas with rainfall higher than 500 mm
- Well adapted to medium and low potential soils
- Successful on soils with high clay content, but cannot withstand waterlogging
- Mainly a pasture grass – utilized from mid summer and later
- It is a sweet grass and keeps its palatability until late in winter – even after being killed by frost
- Excellent as fodder
- Good quality silage if its chopped fine enough
- Invasion of Eragrostis can pose a problem for the lifespan of Smutsfinger grass

Establishment

- November, January and February best sowing months
- Stop 8 weeks before the first frost is expected
- Where weeds are not a serious problem, you can sow during September/ October

Varieties

Irene: A diploid, tufted perennial with high palatability. Well adapted to most well drained soils and grows well in mixtures with Rhodes grass. Difficulties in seed production.

Tiptop: A diploid, tufted perennial, selected from 'Irene' by ARC for seed quality, homogeneity of growth form (upright), early flowering, better leaf:stem ratio and rust resistance. It tolerates very cold winters and grows well on shallow, stony soils.

Utilization

- Protein content can be very depending on the age of the plant, the season and amount of N applied
- Heavy grazing later in the season (especially February to May) can result in poor production in the following season
- DM production increases with longer cutting intervals than with shorter

Soil preparation

- Soil surface must be dry. Germination will take place with first rains.
- The subsoil must be wet. This will benefit if dry weather is experienced after germination.
- The protein content and the digestibility also decreases with longer intervals, but the total protein/ha will be higher as an effect of the higher DM production

Utilization

- Does not like heavy grazing
- Prefer long rest periods
- Should be grazed before piping for highest crude protein
- Used in summer – CP about 10%
- Used in winter – CP about 8%
- Withdraw animals after December for winter usage

Sowing rate:

- 3-7kg/ha (uncoated); 12-20kg/ha (coated)

Seed mixtures

- Smutsfinger grass with Rhodes grass is 2 kg Rhodes + 4 kg Smutsfinger per ha
- Works well with lucerne (in rows), bloating still a possibility
- Four grass mix: Smutsfinger, Rhodes grass, Panicum maximum en Anthephora pubescens 1 kg each per ha for uncoated seed

Blue Buffalo Grass *(Cenchrus ciliaris)*

Benefits

- Adapted to warm, low rainfall areas in SA
- Relative good drought resistance – rhizomes to produce more tillers
- Widely adapted to soils – except light sand
- Prefer alcaline soils
- Deep roots - 1 500 mm
- Normally for cattle – also sheep, horses, hay making

Establishment

- November, February and March
- Rolling action essential

Varieties

Gayanda: Fine, medium-short, tufted, non-rhizomatous type, to 90 cm tall (commonly 30-60 cm), mid-season flowering, suitable for light to medium textured soils. Has very good stock acceptance and characterised by its dense tillers.

Molopo: From North West Province, South Africa. A tall, rhizomatous grass with distinctly grey leaves and straw-coloured seed heads. Cold tolerant and grows longer into the cool season. Well adapted to heavier soils. Good seed production if adequately N fertilised.

Soil preparation

- Reacts favourably when soils are loosened before the summer rains
- Heavy soils that cracks during winter needs less loosening than lighter soils
- Cultivation should not be done in winter – can lead to dying off of grass

Sowing rate

- 5-10kg/ha (uncoated); 12-20kg/ha (coated)

Utilization

- Grazing normally starts in November – grass 300 mm high
- Best if grass is lightly grazed or completely eaten down
- If not, the result would be a mix of new leaves and old stalks - unpalatable
- Very quick rotation or relative long grazing period
- Beginning of summer – grass grows faster – difficult to implement grazing systems
- Recommended to make hay or be rested for winter
- End of winter – all old material to be removed
- Keep as leafy as possible

Blue Buffalo Grass

Blue Buffalo Grass

Bottle Brush Grass *(Antephora pubescens)*

Requirements and uses

- Widely adapted to most soils and climates
- Tolerates heat, flourishes on sandy soils in areas with a rainfall of 350 mm and more
- Most important advantages – it is relatively easily established, very palatable to animals, less sensitive to low soil fertility
- Makes outstanding fodder
- Excellent drought tolerant

Variety

Wollie: Originates from Swartruggens, North West Province, South Africa. Selected from a commercial seed field of the "common" variety for a more uniform growth habit.

Establishment

- October – December
- Desirable to establish as late as March – due to reliable rainfall early Autumn
- Seeds are woolly – pelletisation needed
- Broadcast or drilling

Sowing rate:

- 3-5kg/ha (uncoated); 12-20kg/ha (coated)

Production potential

- Good utilisation potential compensates for relative low production potential
- Its potential – low cost grass for dry areas
- Achieves economic animal production at a semi extensive level

Utilisation

- Strict rotational grazing due to high palatability
- Alternatively – leave it during its growing season for utilisation during winter and early spring

Bottle Brush Grass

Weeping Lovegrass *(Eragrostis curvula)*

Requirements and uses

- Mostly dryland in SA
- Widely adapted – prefer sandy soils
- Performs best in areas with 650 mm rain/anum
- Where frost occurs, grass dies back. Grows again early spring
- Eragrostis curvula fares best as a hay crop
- Quality is dependent on the fertility of the soils
- Low fertility = poor quality
- N the key to high, good quality fodder production

Weeping Lovegrass

Varieties

Ermelo: Ermelo is the most popular variety being used in South Africa, especially in the colder summer rainfall areas. It can survive severe frost and will grow on almost any soil, even on sandy soils with a low pH. Preference to higher rainfall areas (600mm and more), but does not adapt well to wet, waterlogged soils.

Weeping Lovegrass

Establishment
- Use Teff with Eragrostis where weeds are a problem – early cut essential
- 4-6kg Teff

Sowing rate
- 5-8kg/ha (uncoated); 8-12kg/ha (coated)

Soil preparation
- Fine, firm seedbed, free of weeds – Eragrostis curvula seed is very small
- Seedbed should be rolled before and after sowing
- October to December – weed free area

Utilization as hay
- Ensure high protein content – cut before it flowers
- For higher DM – cut later – not later than early flowering
- Hay cannot be cut before November
- Leaf stage: highest CP, digestibility and intake

Utilization as grazing
- Best early in season
- Quality and quantity decreases later in season

Buffalo Grass *(Panicum maximum)*

Gatton is a Panicum that is characterised by summer dominance and requires a rainfall usually in excess of 600 - 1 000 mm per year. It does not tolerate very wet conditions or poor soil fertility, but can tolerate acidity to a certain extend. It should not be grazed or cut below 30 cm for persistence and maximum yield.

Requirements and uses
- Does not thrive on very sandy soils or on heavily structured soils
- Can withstand frost
- Minimum of 500 mm rain required
- Has better late season production than Smutsfinger
- As fodder more palatable than Smutsfinger grass

Establishment
- Sowing time: Late summer or early autumn
- Recommended not later than February
- Sensitive to weed competition

Varieties Gatton

Panicum maximum

Buffalo Grass

Sowing rate
- 3-8kg/ha (uncoated); 8-15kg/ha (coated)

Utilization
- Heavy grazing can have great negative effect on Panicum compared to other grasses – restore more reserves in roots
- Allow to grow out well after heavy grazing to maintain excellent production
- Do not graze heavily before the winter
- Not suitable for sheep – grazing habit to low

Small Buffalo Grass *(Panicum coloratum)*

Panicum coloratum is a species of grass known by common names like Small Buffalo grass or Klein grass. It is a perennial tufted grass which usually has rhizomes. The firm, usually erect stems grow up to 1.4 meters tall. The leaf blades are 10 to 30 centimetres long and they are usually a green to a waxy blue-green colour. This grass is used as a pasture grass and/or to make hay. It produces a large amount of forage for animals. It does well in hot climates as well as colder climates.

Strengths

- Well adapted to heavy, self-mulching, black clay soils
- Tolerant of temporary waterlogging and flooding
- Tolerant of drought
- Tolerant of moderate soil salinity
- Very persistent once established
- Cold tolerant and drought resistant
- High forage quality
- Lower N-requirement than Panicum maximum

Establishment

Seed can be broadcasted on the surface or sown in rows at a sowing depth of 1-2 cm. Rolling after sowing improves establishment. Rolling before sowing to compact the seedbed can also be valuable in heavier soils, which have less tendency to crust if rolled prior to broadcasting and lightly covering the seed with harrows. Panicum coloratum is generally slow to establish, competing relatively poorly with weeds and other pasture species during early growth. In warmer environments, early or late wet season sowing is therefore preferred, to avoid competition from vigorous mid-season weed growth. In cooler subtropical environments where early sowings may encounter competition from spring weeds, it is best to sow when there is the greatest probability of experiencing several consecutive days of rainy weather.

Sowing rate

- 3-6kg/ha (uncoated); 6-10kg/ha (coated)

Utilization

Mostly used as grazed pasture, but larger types are suitable for cut-and-carry. Makes good hay and silage. Stoloniferous types are ideal for erosion control. Grows well with legumes and other grasses, but may be selectively grazed if associated with less palatable species. Its palatability declines as it matures, as with most subtropical grasses.

Panicum coloratum

Kikuyu *(Pennisetum clandestinum)*

Kikuyu grass is an aggressive and vigorous perennial that spreads by surface and underground stolons. The plant normally forms a dense mat of stolons and stems. The soft stems grow relatively upright and produce a high number of leaves relative to other grasses. Kikuyu is capable of high summer growth but milk production can be limited by its relatively low quality. Thus, to maximise production per cow and per hectare, it is essential to maximise the quality of the pasture consumed by the cows. Grazing at the 4.5 leaf stage provides the highest proportion of leaf and the highest quality grass for cow consumption. Grazing past this stage increases the stem growth and that stem fraction accumulates with each grazing. To provide winter-spring forage kikuyu is commonly oversown each autumn with annual Ryegrass or less commonly, Oats, Brassica or White Clover. A smooth transition from the summer kikuyu phase to the winter forage at both the establishment and heading of the annual forage is essential. It should be planted in a well prepared field under favourable conditions of adequate moisture and soil fertility.

Sowing rate

- 2-5kg/ha (uncoated); 5-10kg/ha (coated)

Bermuda Grass *(Cynodon dactylon)*

Predominantly used in permanent pastures for grazing or cut-and-carry, but can also provide useful stand over or deferred feed. It is valuable for soil conservation as a turf.

Strengths

- Widely adapted to soils and climate
- Palatable
- High nutritive value when young
- Excellent ground cover for soil conservation
- Tolerant of heavy grazing
- Makes useful hay and silage
- Tolerant of salinity
- Tolerant of flooding

Establishment

Seed is best sown onto a very well prepared, fine, weed-free seedbed and rolled in. Seedlings usually root down quickly. Grows on a wide range of soils, but best in relatively fertile, well-drained soils. Adapted over a broad range of soil pH (4.5-8.5), but grows best when the pH is above 5.5. Cynodon also have good tolerance to saline soils.

Sowing rate

- 8-12kg/ha (uncoated); 20kg/ha (coated)

Utilization

Extremely tolerant of heavy grazing, but more productive if correctly managed. Regular grazing and nitrogen fertilisation are necessary to maintain quality. It is very palatable if kept short in growth and fertilized. A stubble height of 5-10 cm under grazing or cutting gives good regrowth and maintains sward density. Renovate by ploughing or discing when sod-bound.

Bahia Grass *(Paspalum notatum)*

Requirements and uses

One of the earliest species adopted for permanent sown pastures. Also suitable for hay and silage, but should be cut before flowering to avoid hay being spoiled by presence of ergot- infected seed heads. Once established, provides good stable ground cover to combat erosion, particularly that caused by water movement.

Cynodon dactylon

Paspalum

Establishment

Grows best on deep, moist, fertile, sandy loams and clays usually of alluvial or basaltic origin. Such soils are subject to compaction under intensive grazing. It has little tolerance of salinity, but is very tolerant of poor drainage. It can be sown at any time from spring to late summer, although best sown just before the expected rainy season since germination and establishment can be slow.

Sowing rate

- 8-12kg/ha (uncoated); 20kg/ha (coated)

Soil preparation

Seeds should be drilled or broadcasted into a well-prepared, fine, weed-free seedbed. It should preferably be placed less than 1.5 cm deep.

Strengths

- Palatability when young
- Ability to withstand heavy grazing and trampling
- Legume compatibility

Annual Summer Grasses

Sweet Sorghum
Forage Sorghum
Pearl Millet
Teff

Cool-season grasses produce ample forage in the spring and fall, but high temperatures and short-term drought stress often limit growth during the summer months. Therefore, there is a need for additional grazing, hay or green-chop during July and August. Warm-season annual grasses can fill this gap with relatively high quality forage when properly managed. Advantages to using summer-annual grasses include fast germination and emergence, rapid growth, high productivity, and flexibility of utilization. Warm-season grasses can be grazed as needed and excess growth can be harvested as hay or silage. Major disadvantages include the high cost of annual establishment and the increased risk of stand failure due to variable rainfall in late spring and early summer.

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Sweet Sorghum *(Sorghum vulgare)*

Barsweet

- Sweet sorghum x sweet sorghum hybrid
- Suitable for grazing and hay making
- Excellent for silage
- Leafy with excellent palatability
- Excellent standover feed for late grazing into autumn and winter
- Late flowering reduces ergot risk
- Can be grazed all summer

Key Features

- Planting Time: Spring to Summer
- Early Grazing: Very Good
- Stand Over: Excellent
- Hay Making: Good
- Green Chop: Excellent
- Silage – Pit: Excellent
- Silage – Plastic Wrap: Excellent

General Comments

- Best planting time when soil temperatures rises above 16°C
- Planting dept: 20 – 40mm
- Roll the area after seeding/planting – this ensures good seed and soil contact
- Fertilize according to soil analysis
- First graze/cut when plants reaches a height of 750 – 1000mm
- Graze down to a height no less than 200-250mm
- Take Prussic acid precautions when forage sorghums is grazed
- Forage sorghum is not suitable for horses

Sowing rate

- 4-7kg/ha (marginal dryland)
- 8-12kg/ha (good dryland)
- Irrigation: 15-25

Barsweet

Barsweet(left) compared to another Sweet Sorghum

Ideal for baling

Forage Sorghum *(Sorghum spp.)*

Bargrazer

- Standard forage sorghum
- Needs seasonal rainfall of >500 mm
- Good quality grazing (cows can start graze at 75-90 cm, sheep at 50cm)
- Ideal for making hay – cut before stems get to thick
- Plant October to December – soil temperature must be16°C and rising
- 3 to 4 cuts are possible if done at 75-90 cm
- Widely adapted – does well on sandy-, loam-, and clay soils
- Does not tolerate waterlogging
- Positive reaction to N application
- Do not graze when plants show signs of wilting

Sowing rate

- 20-25kg/ha (irrigation); 12.5-18kg/ha (dryland)

Bargrazer

Hybrid Millet *(Hybrid Pennisetum)*

Pearler NEW

Pearler is a high quality forage that can provide livestock productivity in summer similar to that from oats in winter. It has digestibility and protein levels similar to oats, ryegrass and Dolichos.

Variety Management / Agronomy

Grazing Management - Pearler poses no risk of prussic acid poisoning, therefore it can be grazed at a much earlier stage than forage sorghum. For best results graze early - as soon as the plants are not easily pulled out of the ground. There may not appear to be a lot of feed at this stage, but due to quick regrowth and high tillering ability, feed supply is good. Early grazing will maximise protein and energy content, boosting animal productivity.
High stocking rates - Pearler's quick regrowth and lack of prussic acid means it can be grazed heavily for long periods.
Soil & paddock selection - Although Pearler can produce exceptional livestock productivity, it does require suitable soil and management conditions to achieve this. Being a forage pennisetum, a good well-drained soil is required and a soil temperature of 18°C or more. Because Pearler has small seed (60,000 to 80,000 seeds/kg) it is important to plant into a well-prepared seed bed where good soil to seed contact can be achieved.

Sowing rate

- 8-15kg/ha (irrigation); 4-8kg/ha (dryland)

Pearler

Your solution for HIGH quality FEED

Pearl Millet *(Pennisetum glaucum)*

Babala

- Standard cultivar: Common
- Rainfall requirements: >400 mm
- Plant October to December/January
- Babala is easy to establish and grows fast. Ideal to fill gaps in any fodder flow.
- Can either be grazed or used for silage. For best quality graze at a height no longer than 500mm.
- No Prussic acid precautions needed
- Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: acid, neutral and alkaline soils. It prefers dry or moist soil and can tolerate drought.

Sowing rate

- 25kg/ha (irrigation); 15-20kg/ha (dryland)

Babala

Teff *(Eragrostis Teff)*

Teff is a self-pollinated, warm season annual grass which can be harvested multiple times during the growing season as dry hay, silage or pasture. As a fast-growing crop, Teff combines excellent forage quality with high yield during a relatively short growing season.

Teff

Tiffany

Tiffany Teff grass is a fine stemmed annual grass that has large crowns and numerous tillers with a shallow, massive fibrous root system and a uniform plant height at harvest maturity.

- Multiple harvests during the season
- Excellent forage quality compared to other C4 grasses
- A very palatable "soft" forage for livestock
- No prussic acid concerns
- First crop in 45-55 days and 28-35 days between subsequent cuts
- A very palatable "soft" forage for livestock
- No prussic acid concerns

Breeding Background

Tiffany Teff grass was one of the very best forage producers in a USA breeding program. Based on this criteria it was selected and trailed in SA with great success.

Special Features

Seasonal yield can range from 5 - 15 tons of dry hay per hectare depending upon growing conditions and the number of seasonal cuttings. It's a cost-effective crop that requires minimal pest or weed control.

Management Keys

Plant from late spring/early summer. Seed into a firm seed bed with a seeding depth of no deeper than 0.6cm. Cut before heading for best forage quality and leave a minimum of 10cm stubble.

Teff grass is a fast-growing, high-yielding crop with competitive forage quality, adapted to all across South Africa for dairy, beef or horses.

Sowing rates

- Dryland 8-12 kg/ha
- Irrigation 20 - 25 kg/ha

Tiffany

Tiffany Teff

SA Brown

- Average rainfall: >500mm
- Excellent for hay production – especially in the higher rainfall areas
- Can be used for grazing. Should be grazed at an early stage to improve palatability
- Also very effective as green manure crop and to suppress natural weeds
- Plant from October to December
- Widely adapted to soil types – from sand to clay
- Fertilizer applications will have effect on dry matter production

Sowing rates

- Dryland 8-12 kg/ha
- Irrigation 20 - 25 kg/ha

Teff bales

Teff Management

Firm seed bed at planting is absolutely critical. Seeding depth should not exceed 1cm. Soil temperatures at planting should be at least 16° C and warming. Teff will not tolerate a frost. Planting dates should be well beyond historic first spring frost date. Teff grows best when air and soil temperature are warm. Early spring plantings during cool periods may result in slow growth and crop stunting. Optimal cutting stubble height is 10cm. Multiple cut systems may require split applications of nitrogen for maximum production. Delaying harvest until heading may adversely affect the production of subsequent cuts and total seasonal yield.

Legumes

BARENBRUG

Legumes

- **Medics**
- **Serradella**
- **Annual Clovers**
  - Arrowleaf
  - Balansa
  - Crimson
  - Persian
  - Subterraneum
- **Perennial Clovers**
  - White Clover
  - Red Clover
  - Strawberry Clover
- **Vetch**
- **Lucerne**
- **Lespedeza**
- **Faba Beans**
- **Lupines**
- **Forage Peas**
- **Birdsfoot Trefoil**
- **Sweet Clover**
- **Sunn Hemp**
- **Cowpea**
- **Burgundy Beans**
- **Dolichos Beans**

Legumes drive pasture production by producing nitrogen. They must be carefully inoculated to ensure success. Adequate pasture nutrition is important for maintaining the dominance of improved species in a pasture. Nitrogen is one of the most important elements of pasture nutrition. Protein levels and the digestibility of pastures are improved by legumes, resulting in improved livestock performance.

Points to consider about your paddock when choosing a suitable legume:

- Rainfall or irrigation
- Soil depth and profile
- pH - alkaline or acid
- Longevity of the pasture/legume
- Grazing systems
- Harvesting plans

Medics (*Medicago spp.*)

Medics grow best during the warmer conditions of autumn and spring, but a wet autumn will give a good bulk of feed for winter. This free-seeding annual legume is a low-growing species, prostrate but not rooting from the nodes. Barrel medics flower in spring after a 'vernalisation' period of cold weather, producing small, yellow flowers that give rise to a spiral burr containing 6-10 seeds. The burr has straight spines, and can be combed from wool.

Medics are adapted to a Mediterranean climate with dry summers. They survive wet summers in the subtropics because of their hard seed, but with enough softening to allow regeneration in autumn. In permanent pastures, medics suffer from competition in autumn from the summer growth of grasses. Reducing this by heavy grazing in autumn, summer drought or by cultivation improves seed germination.

Sowing rate

- 10-15kg/ha (pure); 1-4kg/ha (mixtures)

Scimitar

- Early-mid maturing
- Early to mid season – approx 90 days to flowering
- Erect growth habit with high herbage and seed production
- Maturity is 7 days later than Santiago
- Adaptable variety which grows on wide range of soils
- High percentage of soft seed (24%) – Santiago (8.5%)
- Increased salinity tolerance over other medics
- Better water logging tolerance

Santiago

- Early to mid maturing
- Adaptable variety which grows on wide range of soils
- Very hard seeded (91%)
- Outclassed by Scimitar

Medic pasture in Western Cape

Medic roots

Medic pods (Truncatula)

Parabinga

- Early maturing – up to 88 days to flowering
- Very high levels of hard seed

Paraggio

- Mid maturing variety – about 98 days to flowering
- Adaptable variety with good early vigour

Jester

Key Features

- Hard seeded barrel medic
- Mid season (110 days to flowering)
- Similar maturity to Paraggio
- Jemalong hybrid with improved performance
- Vastly improved aphid resistance
- Retains distinctive leaf blotch of Jemalong
- Regenerates well after cropping phase of 1-3 years

Soil type: Sandy loam to clay loam
Soil pH: (CaCl2) 5.7 - 8.5
Rainfall range: 350 - 550mm
Maturity: Mid
Days to flowering: 110
Hard seed level: High (90%)

Medics

Medic Cultivars

Type	Cultivar	Soil pH	Rainfall	Hard seeding rating	Insect tolerance	Days to flower
Polymorpha	Scimitar	Moderate acid-alkaline	350-450	8	Mid-high	80-90
Polymorpha	Santiago	Moderate acid-alkaline	325-425	10	Susceptible	80-85
Truncatula	Jester	Neutral-alkaline	350-550	9	High	105-110
Truncatula	Parabinga	Neutral-alkaline	250-350	8	Mid-high	80-88
Truncatula	Paraggio	Neutral-alkaline	350-450	8	Mid-high	95-100

Serradella Yellow *(Ornithopus compressus)* and Pink *(O. Sativus)*

Serradella is adapted to deep, well drained, sandy soils with low pH and low fertility levels. It is particularly tolerant of low phosphorous levels. It will also tolerate moderate to severe aluminium and manganese levels, both of which reduce the productivity and persistence of other legumes such as white and sub clover and lucerne. Serradella has a deep root system that allows it to continue growing actively during the early to mid summer periods, after other annual legumes have finished their growth cycle. It has relatively good resistance to insect and disease attack.

Yellow serradella is characterised by having a very high percentage of hard seeds, prostrate growth habit and yellow flowers. Cultivars of pink serradella, which have been available in the past, have been relatively soft seeded. Pink serradella has an erect growth habit and pink flowers.

Both are annuals that germinate in autumn/early winter and produce during winter, spring and early summer. Both serradellas are non-bloating and contain condensed tannins. These tannins protect protein in the rumen, which increases protein absorption and digestive efficiency in ruminants.

Yellow Serradella pods

Pink Serradella pods

Pink Serradella

Serradella Cultivars

Type	Cultivar	Soil pH	Rainfall requirements (mm)	Hard seeding rating	Insect tolerance	Days to flower
Pink	Emena	Acid-Neutral	300	1	High	90
Yellow	Santorini	Acid-Alkaline	300	10	High	100-110

Hard Seeded Rating: 1 = Few to no hard seeds
Soil quality: Alkaline = pH8.5; Neutral = pH6.5; Moderate acid = pH5.0; Acid = pH4.5

Annual Clovers

Arrowleaf Clover *(Trifolium vesiculsum)*

- Upright in its growth habit
- A low bloat risk
- Suited to a range of soil types providing they are well drained and have a pH of 5.0 to 7.0
- Very sensitive to red-legged earth mite attacks as a seedling
- Intolerant of water logging
- Very slow to establish with little winter growth
- The seed should be sown in autumn into a well prepared, weed free seedbed
- The seed is small and seedlings are slow to establish. Arrowleaf clover is very sensitive to being sown too deep (10mm)

Sowing rate

- 8-10kg/ha (pure); 2-4kg/ha (mixtures)

Arrowleaf Clover

Balansa Clover *(Trifolium michelianum)*

Balansa clover is well adapted to most soils in the pH 5.2 to 8.0 range, but not deep sands. It is highly tolerant to water logging and has tolerance of mild salinity. It is an effective substitute for sub clover in the right conditions. Balansa is very hard seeded which is useful with cropping phases and harsh summers. Grazing the pasture during summer and autumn will help soften the seed and improve germination. Take care not to overgraze perennial species in the pasture. Balansa clover is semi erect in its growth habit and has proved very satisfactory as a monoculture or as a companion with short term grasses.

Balansa clover is well adapted to most soils in the pH 5.2 to 8.0 range, but not It is highly suited to hay production. It is an aerial seeder, so deferring grazing during flowering and seed set is necessary to create a good seed bank. This is critical during its first year for regeneration in future seasons.

Sowing rate

- 5-6kg/ha (pure); 1-2kg/ha (mixtures)

Balansa Clover

Frontier

- Early maturing approx 100 days to flowering
- Tolerates water logging and mild soil salinity
- Tolerates a wide range of broadleaf herbicides
- High winter/spring dry matter production and nitrogen fixation
- Excellent regeneration from hard seed
- Recovers strongly from heavy grazing

Paradana

- Annual regenerating clover
- Mid season maturity – approx 120 days to flowering
- Tolerates water logging and mild soil salinity

Crimson Clover *(Trifolium incarnatum)*

Crimson clover is an introduced winter annual and herbaceous legume. The leaves and stems of crimson clover resemble those of red clover, but the leaves are round-tipped with more hair on the stems and leaves. Seedlings grow rapidly from the crown forming a rosette.

Sowing rate

- 10-15kg/ha (pure); 1-4kg/ha (mixtures)

Blaza

- Soft Seeded
- Mid season maturity – approx 122 days to flowering
- Shows good early vigour & winter production
- Excellent pioneering plant, especially on acid soils
- Adapted to a large range of soil types, grows well in light soils
- Suitable for grazing fodder and green manure
- Provides large red flowers through spring

Crimson Clover

Persian Clover *(Trifolium resupinatum)*

- An annual clover (capacity for self regeneration varies)
- Intolerant of acid and sandy soils
- A bloat risk
- Low oestrogen
- Slow to cure as hay. Roller conditioning may be advantageous
- Persian clover's very small seeds require a fine, weed free seed bed and should be sown no deeper than 10mm
- Very susceptible to attack by red-legged earth mite and lucerne flea

Sowing rate

- 6-10kg/ha (pure); 2-5kg/ha (mixtures)

Persian Clover near Kokstad

Lightning

- Soft seeded
- Mid season maturity – about 145 days to flowering
- Vigorous, erect to semi-erect annual clover
- Establishes quickly from a later sowing
- Tolerates waterlogging and mild soil salinity
- Forage / fodder cropping / annual mixes
- Can be sown with oats or tetraploid ryegrass

Shaftal

- Soft seeded
- Late season maturity – about 160 days to flowering
- Historically known as Shaftal clover
- Vigorous erect growth but susceptible to rust
- An improved alternative is Lightning

Subterranean Clover *(Trifolium subterraneun)*

- Annual and dependent on seed for the following years growth
- Very drought tolerant
- Shallow rooted so can't utilise deeper soil moisture
- Susceptible to red-legged earth mite and lucerne flea damage
- Poorly tolerant of water logging
- A potential weed in cropping systems
- Highly productive in spring but no summer production
- Not suited for spring sowing

Sowing rate

- 10-15kg/ha (pure); 2-6kg/ha (mixtures)

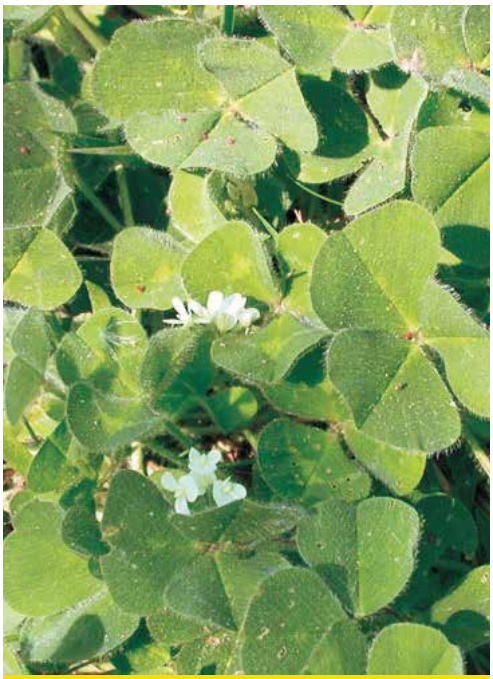
Woogenellup

- Black seeded subterranean clover
- Mid season maturity -130 days to flowering
- Susceptible to Clover Scorch and Root Rots

Campeda

Key Features

- Midseason maturity – 123 days to flowering (AUS)
- Superior winter vigour, higher production and disease tolerance over Woogenellup



Subterranean Clover *(Trifolium subterraneun)*

- Has a better ability to utilize background rhizobium than all other Sub Clovers
- High hard seed levels (29%)
- High seed yield resulting in excellent regeneration
- Approximately 2 weeks earlier flowering than Goulburn although Campeda can vary flowering to match season
- Alternative for Seaton Park

Key Benefits

- Known for its leafiness and forming a dense sward, this variety produces dry matter quickly in the autumn and provides excellent winter vigour and late season productivity.
- The high hard seed levels, increased persistence, production and superior seed yield make Campeda an ideal replacement for Goulburn and Woogenellup.
- The ability of Campeda to better utilize background rhizobia in the soil ensures best possible nitrogen fixation to assist growth and crops following pasture phase.

Dalkeith

Key Features

- Early season maturity – 97 days to flowering (AUS)
- Good early root growth and establishment
- Good hard seed levels
- Demonstrates good persistence

Dalkeith belongs to the Trifolium subterraneum ssp. Subterraneum family and demonstrates a prostrate to semi-erect growth habit. It persists well on various soil types and has early maturity, requiring a minimum growing season of four months. It has a high hard seed level, which in combination with its early maturity, makes it well suited to low rainfall cropping rotations. Dalkeith has taken up well in the 350 to 600mm rainfall zones. It will be able to provide good early herbage production in low rainfall zones. Care must be taken with new sown pastures so as not to overgraze too early, as plants can be pulled from the ground.

Subterranean Clover *(Trifolium subterraneun)*

Annual Clover Cultivars

Type	Cultivar	Soil pH	Rainfall requirements	Hard seeding rating	Insect tolerance	Days to flower
Arrowleaf Clover	Zulu II	Moderate Acid-Alkaline	400-575mm	10	Low	125-130
Balansa Clover	Paradana Frontier	Moderate Acid-Alkaline	450-550mm 350-450mm	10	High	115-120 100
Crimson Clover	Blaza	Moderate Acid-Alkaline	550-750mm	3	High	120-125
Persian Clover	Lightning Shaftal	Moderate Acid-Alkaline	450-650mm 650-800mm	3	Low	145 160
Subterranean Clover	Woogenellup Campeda Dalkeith	Moderate Acid-Alkaline	450-750mm	3	Low	130

Hard Seeded Rating: 1 = Few to no hard seeds; 10 = 90%hard seeds;
Soil quality: Alkaline = pH8.5; Neutral = pH6.5; Moderate acid = pH5.0; Acid = pH4.5

Perennial Clovers

White Clover *(Trifolium repens)*

A perennial, capable of very high production (mainly spring, autumn) if fertility is high and moisture is adequate. Very suited to irrigation. Poor drought tolerance and of little use in low rainfall areas. However, a small amount is often added to pasture mixes in these drier areas in the hope it will survive in damp spots. White clover can also behave as an annual in drier areas, regenerating from seed when conditions are favourable. White clover uses stolons (stems running across the surface of the ground) to expand the size of plants and put down new roots.

Sowing rate

- 6-10kg/ha (pure); 2-4kg/ha (mixtures)

Storm White Clover

- Flowering: Mid Maturity
- A tall plant type that can aggressively compete in a mixed sward with ryegrass
- Storm has excellent seedling vigour and is quick to establish
- Excellent all season growth with very high yield potential across all seasons
- The stolen density of Storm is high compared to other large leaf types
- Storm has shown persistence under cutting and remains dense

Product fit

High performance, high output systems in the irrigation and higher rainfall regions – suited to use where other white clovers are used. May not be suited to very tight grazing under sheep.

Haifa White Clover

- Widely adapted to soils
- Large leaved, upright perennial clover
- Good persistence under high stocking rates
- Performs well in moderate and subtropical regions
- Excellent heat tolerance and seeding ability

White Clover and Ryegrass mix

White Clover

White Clover

Red Clover *(Trifolium pratense)*

Red clover is an upright, short-lived perennial. It has a strong tap-root that allows it to use subsoil moisture in summer better than white clover. It doesn't tolerate dry conditions or drought, or poorly drained soils. Red clover provides extra feed in late spring and summer in high rainfall areas, irrigated pastures or on naturally summer-moist soils that are well drained. May be sown in pure swards as a specialist crop for hay, silage or grazing. Rotational grazing will promote plant longevity and persistence. Most cultivars do not persist beyond 2 to 3 years.

Sowing rate

- 8-12kg/ha (pure); 3-6kg/ha (mixtures)

Barduro Red Clover

Heat and drought tolerant Red Clover

Barduro is a persistent red clover named for its hardiness and durability. It is extremely drought and heat tolerant, making it a perfect choice for dry or sloped pastures. Barduro has proved competitive in stands of fescue and bermuda grass, making it an excellent choice for overseeding pastures. It has a high yield potential, making Barduro an excellent choice for hay production. Due to its persistent nature and durability, Barduro is also well-suited for grazing.

Key features

- Large leaves and rapid establishment
- Drought and heat tolerant
- High yields

Barduro

- Nematode resistance
- Excellent forage quality; palatable and nutritious
- Red clovers out produce crimson and arrowleaf clovers
- Fixes nitrogen, reducing fertilization costs
- Most widely adapted red clover on the market today!

Kenland Red Clover

Kenland red clover is a tall growing, short-lived, perennial legume with erect, leafy stems and pinkish-purple to magenta-red flower heads. When used as a cover crop, it improves the texture and fertility of the soil. It can also be used for hay, silage, over-seeding to fill in bare spots in pastures and fields or in a two to three year crop rotation plan where you are allowing an area to lie fallow. When sown in Autumn, growth is slow through the winter, but it begins growing quickly as spring arrives. Kenland tolerates most soil types from loam to clay and exhibits resistance to a number of fungal infections.

Kenland Red Clover

Strawberry Clover *(Trifolium fragiferum)*

A long lived, prostrate, perennial clover that tolerates poorly drained, moderately alkaline and saline soil. These are conditions in which white, red and subterranean clovers either grow poorly or do not persist. Strawberry clover is most productive on heavy neutral to alkaline soils of reasonable fertility. In other conditions it may compare poorly with the other clovers. Continuous grazing that reduces competition from grasses favours strawberry clover. It spreads by both seed and stolons. Stolons are stems spreading across the surface of the ground that can put down roots, establishing new crowns. Also ideal as a cover crop in mixtures with other perennial clovers.

Strawberry Clover

Strengths

- High nutritive value and productive through spring and summer
- Very grazing-tolerant and persistent
- Drought and water-logging tolerant; tolerant of salinity

Sowing rate

- 1-3kg/ha (pure); 1kg/ha (mixtures)

Palestine

- Hard Seeded Strawberry Clover
- Most Soil Types
- Prostrate growing perennial clover with vigorous spring/summer growth
- Good production in winter and early spring
- Withstands water logging and saline conditions

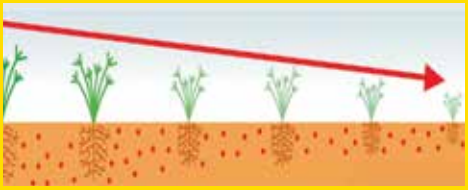
Strawberry Clover

Perennial Clover Cultivars

Type	Cultivar	Soil pH	Rainfall requirements	Hard seeding rating	Insect tolerance	Days to flower
White Clover	Kotare Storm Haifu	Moderate Acid-Alkaline	700-800mm+	3	High	-
Red Clover	Barduro Kenland	Moderate Acid-Alkaline	650-750mm+	3	High	-
Strawberry Clover	Palestine	Moderate Acid-Alkaline	500-700mm	10	High	150-165

Hard Seeded Rating: 1 = Few to no hard seeds; 10 = 90%hard seeds;
Soil quality: Alkaline = pH8.5; Neutral = pH6.5; Moderate acid = pH5.0; Acid = pH4.5

Benefits of clover legumes in grass



Grass only pastures

Available soil nitrogen

Declining pasture DM and available soil nitrogen
Declining soil fertility with long term grazing
Declining paddock protein over time with a sharp decline during drought and winter months
Reduced carrying capacity and liveweight gains over time

Grass and legume pasture

Sustained pasture DM and available soil nitrogen
Legumes provide increased paddock protein and maintains protein in drier and/or colder months
Pasture will sustain higher stocking rates and/or liveweight gains

Vetch *(Vicia sativa)*

Common vetches are an annual pasture/forage/grain legume, extremely palatable at all growth stages, from early green shoots, as dry matter/hay or silage through to seedpods and seeds over summer. It has very high feed values for animals as green plants and dry matter as well as grain. Vetches have the ability to offer substantial improvements in soil fertility, structure and organic matter as well as offering a weed and disease break for cereals in a crop rotation. Vetch fixes atmospheric nitrogen in the soil; this is beneficial for subsequent cereal crops in both yield and quality. Growing vetch in crop rotations as a pasture or hay can be a very good strategy for controlling resistant grass weeds, because they will be grazed or cut before grasses have formed or set seeds and it provides a disease break from cereal diseases.

Vetch

Sowing rate

- 20-25kg/ha (pure); 10-15kg/ha (mixtures)

Grazing Vetch (*Vicia villosa*)

Haymaker

- Has greater total dry matter production than Namoi
- Very hard seeded (80-90%) for improved persistence
- Better adapted to light soils than other Vetches
- Similar in maturity to Capello (124) days
- More winter growth than Namoi
- Offers a disease break in cropping rotations
- Suitable for grazing, hay & green manuring
- Highly efficient nitrogen fixation
- Resistance to Spot, Rust and Ascochyta

Mature plants form a dense canopy providing strong weed suppression. Haymaker is ideal as a break crop and is well suited for hay production or as a green manure crop to improve soil health.

Vetch

Purple Vetch (*Vicia americana*)

Popany

- Purple vetch - Soft Seeded
- Rainfall: 450mm-600mm+
- pH: 5.0-8.0
- Most Soil Types
- Late maturing variety
- Suitable for grazing, hay or green manure
- Mostly grown as a mixture with cereals for hay

Lucerne (*Medicago sativa*)

Lucerne is a perennial with a woody crown and an erect growth habit. It is suited to fertile, deep, well drained, neutral to alkaline soils. Its long tap root can access moisture deep in the soil profile, providing extraordinary summer growth and drought tolerance. Careful management, including grazing control and weed and pest control, is usually required for a stand of lucerne to persist. Lucerne is mostly used as a perennial hay or fodder crop. It provides high quality forage that is readily saleable as hay or useable as a high protein addition to livestock diets. Because of the high value of the lucerne forage and its excellent summer production, lucerne is very suited to irrigation. Lucerne may be grown as part of a mixed pasture sward but the conditions must suit lucerne. Rotational grazing is usually necessary to ensure survival.

Lucerne

Sowing rate

- 18-25kg/ha (irrigation); 4-10kg/ha (dryland)

Winter Active Lucerne

Winter active lucernes are the most versatile, providing good growth into late autumn and holding their quality longer than highly winter active varieties. Best suited to medium-term mixed farming situations that require grazing tolerance and the ability to make reasonable quality hay. They are ideal for irrigated or dryland production and are useful as a pure stand or as a perennial legume component in pasture blends for regions with 450-650mm winter dominant rainfall. These lucernes also make excellent permanent summer forage crops in the high rainfall dairy regions because they provide feed over a longer period than summer brassicas without the same insect problems.

BAR 7

BAR 7

BAR 7 (Sardi7 Series 2) is the next generation winter active lucerne. It is even more versatile, broadly adapted and persistent than the Sardi 7, offering a greater performance in cold, wet environments where lucerne can struggle. It is been bred specifically to perform well in both dry land and irrigated systems. It offers superior performance where persistent, high-producing lucerne stands are required and in grazing situations where winter produced feed can be utilised.

BAR 7

Key features

- High yielding
- Multipurpose
- Excellent persistence
- Strong pest and disease resistance
- Good grazing tolerance
- Improved performance in cold, wet environments
- Well suited to grazing and hay production with a broad crown and high leaf to stem ratio
- Better sustainabilty than other 7 dormancy lucerne (5-8 years)

BAR 7 is the next generation winter active dormancy lucerne, its more versatile, more adaptable and more sustainable than other dormancy 7 varieties in the market today.

Highly Winter Active Lucerne

Highly winter active lucernes are bred for late autumn/early winter sowing and have excellent seedling vigour for undersowing. They have a more upright crown, erect growth habit and are well suited to a 2 - 4 year cropping rotation system in 300 - 500mm rainfall zones under permanent irrigation. They provide maximum growth from winter dominant growing season rainfall. Some of the newer Australian-bred varieties in this group have increased grazing tolerance because they were selected from and developed for broadacre grazing systems.

BAR 10

BAR 10 (Sardi 10 Series II) benefits from excellent winter growth and is a leader in grazing tolerance for a highly winter active lucerne. During its development, the breeder was successful in focusing on improving the very popular Sardi10. The greatest emphasis was on increasing forage production and quality, pest and disease resistance, persistence and grazing tolerance. A key physical feature is the greatly improved leaflet density down the length of each stem.

- Highly winter active-rating of 10
- Suited to cropping rotations, pasture mixes and year round hay production systems
- Improved forage production and persistence over Sardi 10
- High winter growth and a leader in grazing tolerance for a highly winter active lucerne
- Very good seedling vigour
- Highly productive 3 - 5 year + option

BAR 10

BAR 10

SA Standard

SA Standard was preferred over the small amount of other available cultivars because of its high grazing tolerance, drought tolerance and high tolerance to root and crown diseases.

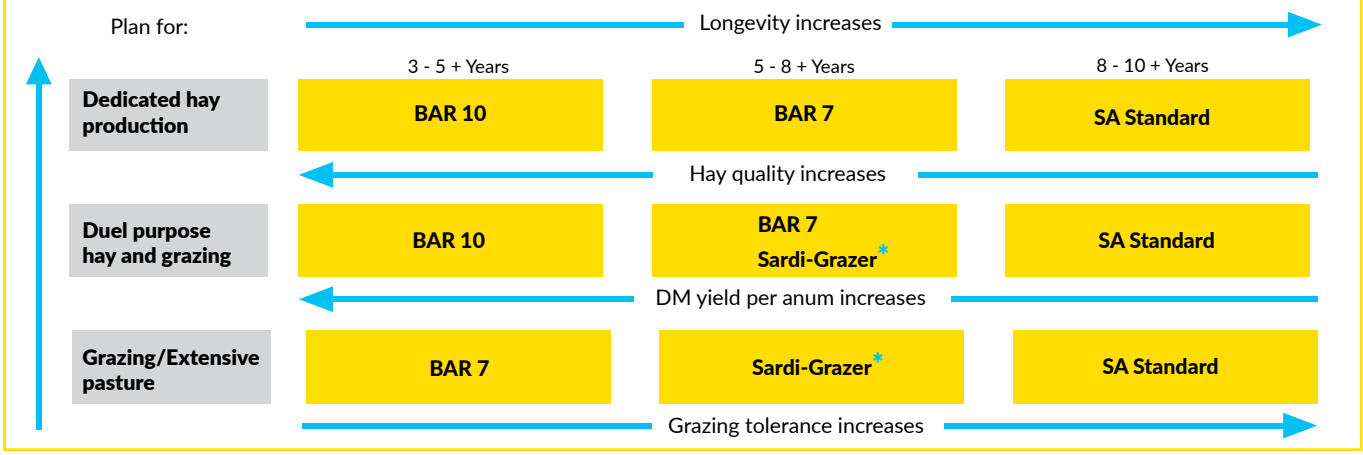
SA Standard unfortunately has low tolerance against lucerne aphids, namely blue alfalfa aphid, pea aphid and spotted alfalfa aphid.

SA Standard has a subterranean crown, and it is formed 4 to 7 cm under ground level and side shoots form from the crown. It is the crown that gives it a higher tolerance to grazing than most other lucerne cultivars as the crown is protected against damage.

SA Standard has a live expectancy of up to 12 years on dry lands and up to 15 years under irrigation.

SA Standaard

Select the most suitable variety for your need



*Experimental variety still under evaluation

Sowing Rates

Annual rainfall	Marginal dryland (350 - 450mm)	Dryland (450 - 600mm)	Favourable dryland (600 - 800mm)	High rainfall/irrigated (800mm+/irrigated)
kg/ha	4 - 6	6 - 8	10 - 12	15 - 25

Utilization

As pasture mix

When sowing lucerne in southern regions as a pasture mix, establish it with a low vigour grass such as a winter active fescue, phalaris or a winter cocksfoot. It may be better to establish the lucerne first and introduce the companion varieties a season or two later, especially for producers unfamiliar with lucerne management.

Undersowing in cereals

Whilst it is not considered best practice, if undersowing lucerne with a cereal grain crop, cut the cereal rate back to 35 - 40% to ensure a good lucerne stand is maintained. Expect lower cereal yields as a consequence. In these instances, 2,4-DB is a good herbicide option amongst others.

Cutting

Cutting lucerne needs to be done at or a bit before 10% flowering, but note the height of new shoots at the base of the crop, and ensure that they are not damaged as they will be the next crop (best method of assessing cutting timing). Conditioner rollers are useful for quick drying. Double conditioning has been used. Re-cutting depends on seasonality, climate and dormancy.

Dormancy	Days (potential interval under ideal summer growing conditions)
Winter dormant	30 - 34 days
Winter active	27 - 30 days
Highly winter active	25 days

Poor man's Lucerne (*Sericea lespedeza*)

Sericea lespedeza is a drought-tolerant, non-bloating perennial legume; it is resistant to diseases and is rarely attacked by insects; and mature plants are quite competitive with grasses. It is much more tolerant of soil acidity than most other legumes and is also very tolerant of low fertility. Forage yields of sericea are good, and forage quality is better than most warm season perennial grasses.

It is a surprisingly economical forage crop to grow due to the fact that it does not require any nitrogen fertilizer, It has also been well documented that sericea is an excellent soil builder. Lespedeza will grow on almost any soil. It does well on sandy and loam-type soils. Sericea is a deep-rooted perennial that also does well on shallow soils with drainage restrictions. Lespedeza will tolerate lower pH (more acid) soils than clover. Sericea lespedeza is normally planted in mid-summer.

This plant has poor seedling vigor and thus is normally planted in pure stands. However, where adapted, a cool season perennial grass such as tall fescue can be drilled into established sericea with high probability of obtaining a mixed sericea/grass stand. It is imperative to inoculate seed, since this bacterial culture enables the lespedeza plant to make its own nitrogen. Use a strain of inoculum recommended for lespedeza. Properly inoculated lespedeza will need no nitrogen application. The earlier the planting date the better.

Poorman's lucerne

Sowing rate

- 15-25kg/ha (pure)

Faba Bean (*Vicia faba*)

Fiesta

The Faba bean plant is tall (may grow to over 1m under optimum conditions), erect and multi-stemmed from basal branches. It has a well-developed taproot which produces an extensive fibrous root system. Plants can flower profusely and flowering may last for up to 5 weeks, depending on soil moisture and air temperature. However, as few as 10-20% of flowers produce pods as flowers require cross-pollination.

Faba bean is best suited to well-structured soils in medium to higher rainfall districts. They tolerate some waterlogging, compete well with a range of weeds and are relatively easy to harvest. Pods containing two to three seeds form from about 20cm above ground level and continue to nearly the top of the plant. A distinctive feature of the crop is that it turns black at maturity.

Faba Bean

Faba bean roots need to be inoculated with the appropriate strains of rhizobia (Rhizobium leguminsarium), which will infect the plants root and stimulates root nodule development. This occurs when the faba beans are being grown in the field for the first time or where they have not been grown for along time. As a legume they fix nitrogen in the soil.

Faba beans are used primarily as a cover crop. Faba beans can also be used for silage and in production for seed.

Sowing rate

- 130-150kg/ha (pure)

Faba Bean

Lupines (*Lupinus angustifolius*)

Narrow Leaf Lupines

Sweet lupines are used as a supplement in poultry, ostrich, dairy, beef, horse, sheep and goat rations. It contains approximately 32% protein and 10% oil and has an energy value of approximately 11 megajoules per kg. Sweet lupines are especially sensitive to high temperatures during flowering and pod formation and are therefore planted during winter. Because legumes such as lupines release nitrogen to the soil, one can expect large yields of crops such as grains if these are planted in soil that was planted to lupines the previous season. Lupine prefers full sun and grows best in sandy soils with a slightly acidic pH.

Sweet Lupines

Narrow Leaf Sweet and Bitter Lupines

- Sweet lupines are characterized by its white florescence
- Bitter lupines are characterized by its blue/purple florescence
- Best suited to winter rainfall areas
- Prefer sandy soils
- Does not tolerate water logging
- Mainly cultivated for seed production
- Ideal as a cover crop or for green manure
- Bitter lupines are more vegetative than sweet lupines
- Not recommended for grazing
- Must be inoculated for effective nitrogen fixing

Sowing rate

- 50-70kg/ha (pure)

Bitter Lupines

Forage Peas (*Pisum sativum*)

Arvika

Arvika is suitable for producing fresh fodder, hay, and can also be used as a cover crop or green manure. High protein content ensures good feeding quality in most fodder systems. Arvika also enriches the soil with nitrogen harvested from the air and is ideal for crop rotation.

Ideal sowing time would be from end of April to mid June – moisture depending. Forage Peas can be susceptible to leaf and stem diseases with early establishments.

Arvika Forage Peas

Sowing rate

- 100-120kg/ha (pure); 25-35kg/ha (mixtures)

Key features

- Grows well with most forage cereals like oats, triticale and barley
- Rapid establishment
- Adaptable to most soil types – well drained
- Medium-late flowering variety
- High quality forage
- Very palatable
- Good resistance to diseases

Forage Peas is an important component of autumn and winter forage mixtures with cereals.

Arvika Forage Peas - exceptional nodulation

Birdsfoot Trefoil (*Lotus corniculatis*)

Lotus corniculatis is high quality, non-bloating legume adapted to acid and waterlogged soils. Birdsfoot trefoil is most successful in areas where white clover is unable to perenniate due to an extended summer drought and Lucerne is unable to be productive due to low soil pH and/or winter waterlogging. It is used primarily in combination with cocksfoot on acid soils and can be used with phalaris/fescues in waterlogged soils. It is cold and frost tolerant and require a rainfall of 600mm. Birdsfoot can be cut or grazed and will spread if it is allowed to set seed.

Key features

- Perennial legume that fixes nitrogen and increase the quality of the pasture
- Ability to flourish under conditions where other legumes are unsuccessful
- Seedling establishment is slow and it should be given time to build up reserves before first grazing
- Great companion crop for temperate grasses

Sowing rate

- 6-10kg/ha (pure); 2-4kg/ha (mixtures)

Birdsfoot Trefoil

Sweet Clover (*Melilotus alba*)

Requirements and uses

Melilotus alba is a legume sometimes grown for forage. It is well adapted to a wide range of soils, but not acidic soils. Sweet Clover is tolerant of alkaline and saline soils. It is characterised by a rapid growth rate, but slower rate after defoliation, as well as an upright growth habit. Sweet clover is intolerant of shade.

Establishment

Well-cultivated, uniform and firm seed bed required for good results. Seed usually drilled or broadcasted directly after conventional seedbed cultivations. Optimum sowing depth is 15-20 mm with a firm soil cover.

Sowing rate

- 9-12kg/ha (pure); 4-5kg/ha (mixtures)

Utilization

High nutritive value at vegetative stage of growth when grazed, at pre-flowering stage for silage, and at early-flowering stage for hay. It is favoured for honey production and for its nitrogen fixing ability in preparing agricultural soil for future crops.

Sweet Clover

Sunn Hemp (*Crotalaria juncea L.*)

- Do you want a cover crop that will increase organic matter, provide nitrogen, grow in low fertility sandy soils, and does not harbor nematodes?
- Sunn hemp, because of its rapid growth and relatively short growing season requirement, can be an excellent alternative.
- It grows best on well-drained soils with a pH from 5 to 7.5.
- Sunn hemp has been used extensively as a soil improvement or green manure crop in the tropics because of its ability to produce large amounts of biomass in as little as 60 to 90 days. Because of this, it has the potential to build organic matter levels and sequester carbon. Also, as a legume it can fix large amounts of nitrogen.
- Used as a cover crop, sunn hemp can improve soil properties, reduce soil erosion, conserve soil water, and recycle plant nutrients.
- Suited to the warm summer rainfall areas (or irrigation).
- Plant as soon as soil temperatures are higher than 16°C (October – November).

Sowing rate

- 40-50kg/ha (pure)

Sunn Hemp

Sunn Hemp

Cowpea (*Vigna Unguiculata*)

Cowpea is an annual summer legume, ideal for high quality summer forage for sheep and cattle, providing multiple grazing opportunities throughout the growing season. Cowpea is a fast growing and versatile legume providing good grazing, silage and hay options for producers.

Key features

- High quality forage for summer finishing feed
- Bred as a superior, more prostate, forage type
- Prostate growth habit withstands harder grazing and provides multiple grazing opportunities
- Improved stem and root rot resistance
- Great source of N-fixation in summer rotation
- Nil prussic acid poisoning issues
- Can be used as a companion crop with millets and forage sorghums
- Excellent soil improvement as green manure crop

Sowing rate

- 15-20kg/ha (marginal soil); 25-30kg/ha (fertile soil)

Varieties

Dr. Saunders

Bets Wit

Cowpea

Burgundy Bean (*Macroptilium bracteatum*)

B1 Burgundy

B1 Burgundy is a perennial legume of the Siratro family. Suitable for grazing and hay production, it displays good drought and grazing tolerance. B1 burgundy establishes easily and perform well in combination with subtropical grasses.

Key features

- Highly palatable, non-bloating summer perennial
- Suites a wide range of soils (sandy loam to heavy clays; pH 4,5 -8)
- Excellent nitrogen fixation
- Good drought tolerance (minimum rainfall of 400mm)
- Strong seeding regeneration under good management
- Produces high quality hay
- Suitable as ley legume in rotation systems

Sowing rate

- 8-10kg/ha (pure); 2-3kg/ha (mixtures)

B1 Burgundy Bean

Dolichos (*Lablab purpureus*)

Lablab is one of the most ancient crops among cultivated plants. It is a late-maturing, vigorous, herbaceous annual or short-lived perennial legume. It has a twining growth habit, primarily used as a forage or fodder crop. It is suited for areas with 650mm average rainfall, although it very drought tolerant once established. Well drained soils are essential for good growth, being highly susceptible to waterlogging. Lablab can be sown in mixtures with millet and forage sorghums. In pure swards it generally produces 6-10ton/ha of herbage.

Key features

- High forage quality
- Generally higher producing than cowpeas
- Can be utilized by grazing or hay
- Restores soil fertility as a cover crop (green manure)
- Good insect and disease resistance
- Poor frost tolerance

Sowing rate

- 15-30kg/ha (pure)

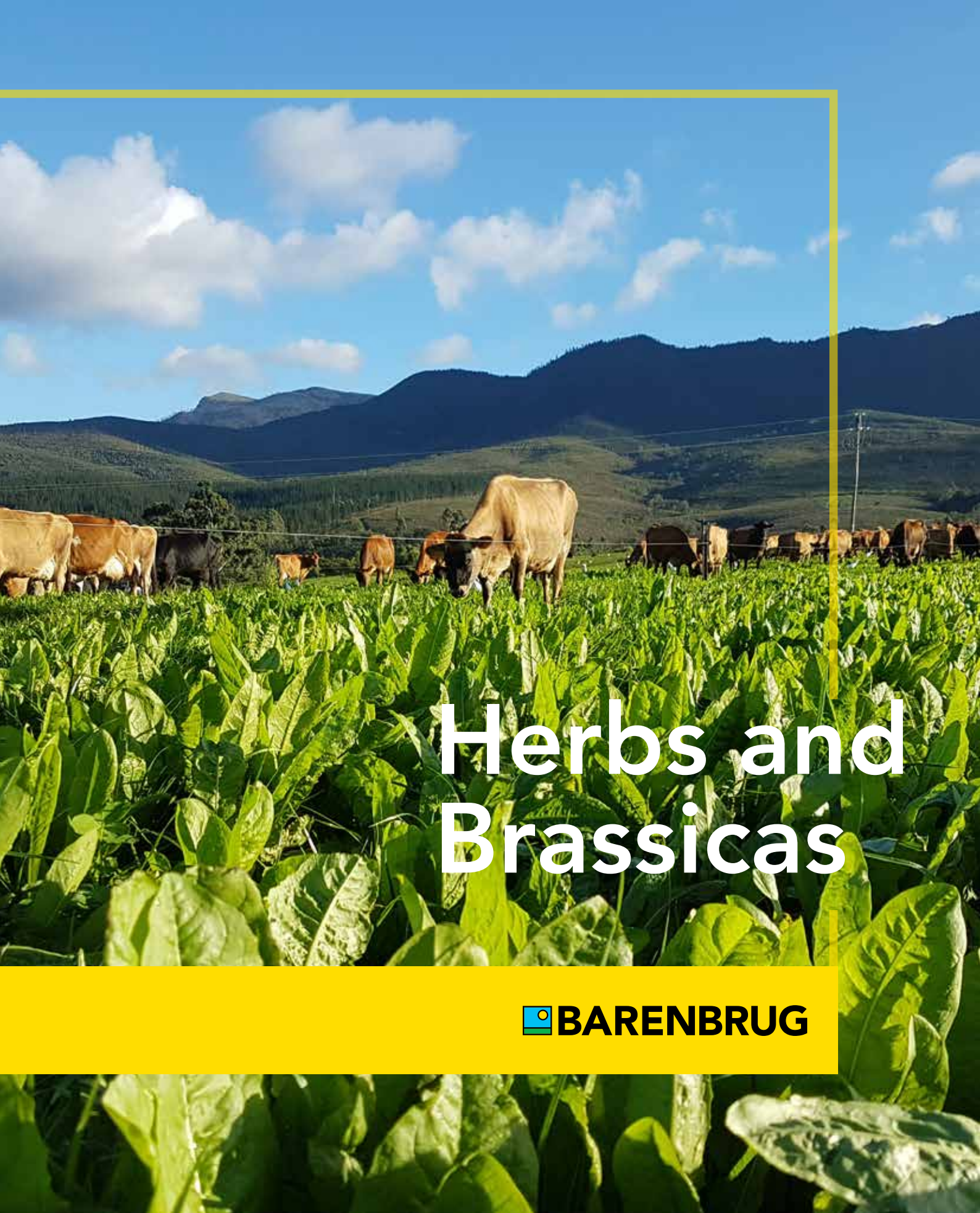
Varieties

Highworth
Rongai

B1 Burgundy Bean

Dolichos

BARENBRUG



Herbs and Brassicas

BARENBRUG

Herbs and Brassicas

Chicory

Plantain

Phacelia

Mustards

Turnips

Radish

Rape

Fodder Beet

Forage brassicas are high quality, high yielding, fast growing crops that are particularly suitable for grazing by livestock. Both tops (stems plus leaves) and roots (bulbs) can be grazed and are very nutritious. All members of the brassica family - turnips and rape - produce forage of exceptionally high (often 85-95%) digestibility. While brassicas have been successfully used for centuries all over the world for livestock feed, the following precautions should be noted. Brassicas are very high in crude protein and energy, but extremely low in fiber. Their low fiber content results in rumen action similar to when concentrates are fed; thus the need for proper roughage supplementation is important.

Brassicas therefore should never comprise more than two-thirds of the forage portion of livestock diets with the remainder provided by grass hay or stockpiled pasture. Likewise all brassicas contain low levels of glucosinolate compounds. Again, adequate grass forage supplementation seems to prevent them from causing animal health problems. Excessive fertilization of both nitrogen and potassium should be avoided. Most dairymen have avoided off-flavours in milk by preventing brassica consumption two hours before milking. Others prefer to only feed rapes to lactating dairy animals plus adequate grass roughage.

Brassicas offer a means for producers to produce high quality forage either during the critical summer period of slowed pasture growth and/or to extend grazing into the late fall-early winter period.

Chicory (*Cichorium intybus*)

Commander

Commander is a winter active chicory, providing great year round growth, improved root rot resistance and excellent grazing.

Chicory is a persistent leafy herb lasting 2-3 years with a large tap root. It performs best in fertile, free draining soils in regions of greater than 550mm rainfall. Chicory requires a well prepared seed bed and soil temperatures of greater than 10°C for successful establishment.

As broadleaf weeds can be difficult to control in chicory stands, the paddock should be free of broadleaf weeds prior to sowing and a pre-emergent herbicide should be used. Chicory should be rotationally grazed on a 4-6 week rotation and will require added nitrogen for maximum performance.

- High quality forage option for dairy, beef and sheep
- Leafy and erect growth habit for easier grazing
- Performs all year round including winter
- Fast establishment and regrowth after grazing
- Excellent drought tolerance and root rot resistance
- Resistant to diamond-back moth & cabbage butterfly
- Low crown gives good persistence over 2 to 3 years

Combined Lucerne and Chicory Pasture

- Chicory may contribute to weed control by providing good ground cover
- Lucerne and Chicory have complementary growth habits
- Lucerne is a legume providing nitrogen back into the soil
- Chicory is a leafy, deep rooted perennial herb using nitrogen
- Chicory in the pasture may help reduce worm burden and red gut in animals

Sowing rate

- 6-8kg/ha (pure); 1-2kg/ha (mixtures)

Commander Chicory, Lucerne and Fescue

Commander Chicory/Grass mix

Commander Chicory and Red Clover

Plantain (*Plantago*) NEW

Captain

Captain is a narrow-leaved, winter active type plantain. Persistence trialling has shown Captain performs well as a component of a perennial pasture for the first 3 years. Captain has a very erect growth habit with narrow leaves, complementary to the growth habit of ryegrass and clovers, very adaptable to multi-specie pastures.

Key features

- Winter active plantain variety
- Narrow leaved erect growth habit
- Overall DM yield similar to Tonic
- Suited to both dairy and S&B systems
- Great compatibility with ryegrass

Sowing rate

- 8-10kg/ha (pure); 2-3kg/ha (mixtures)

Plantain

Phacelia (*Tanacetifolia*) NEW

Phacelia is a cover crop and bee forage, rated among the top 20 honey producing flowers. It is comparable to buckwheat in many ways. Buckwheat germinates more rapidly, especially at higher temperatures, and phacelia is more tolerant of cold and drought. It grows well in dry soil. Phacelia has rapid establishment and is quick to flower (6-8 weeks) and flowers for 8-10 weeks. It reduces soil erosion and improves soil structure.

Utilization

- Use as a fall/winter catch crop/mulch. Produces abundant biomass and does a good job of catching excess Ca and nitrates before they leach into the ground water. Winter kills @ -7 degree Celsius. Appropriate when it will be followed by a vigorous cash crop, like potatoes, in early spring.
- Ideal for catch crop for oilseed rotations (non host for club root disease).
- Intercrop option with maize and sugar beet (some data shows phacelia to reduce population of the sugar beet nematode, Heterodera schachtii).
- Cover crop in vineyards and apple orchards (beneficial insects).
- Forage option in COVERGRAZE mixtures.

Primary purpose: Attracting pollinators and predators of pest insects!

Phacelia

Sowing rate:

- 5-7kg/ha (pure); 1-2kg/ha (mixtures)

White Mustard (*Sinapus alba*)

Sito

Sito White Mustard has an extremely fast growth which forms a dense canopy to choke out weeds. The deep root system does a great job of recycling nutrients that may have leached past the root zone of crop plants as well. As with all brassicas, Sito is high in Sulphur, which can become available to the subsequent crop when the mustard is incorporated into the soil. It works extremely well as a nematode suppressor and as a natural bio-fumigant. Use in rotation with most grains and vegetables.

Key features

- Helps to suppress weeds and act as a ground cover
- The tap root can grow very deep, helping break up soil and scavenge for nutrients
- Works great as a bio fumigant and suppresses verticillium in potatoes
- Produces more biomass than Brown Mustard

Sowing rate

- 8-10kg/ha (pure); 1-3kg/ha (mixtures)

Sito

Brown Mustard (*Brassica juncea*)

Seeds should be sown in very early spring for spring use and in the autumn for winter use. Brown mustard requires a good sandy loamy soil, with adequate N; P; K; S to ensure rapid establishment. This crop should not follow other Brassica crops in rotation. For disease control, it is best grown once every 3–4 years.

Key features

- Natural bio-fumigant of root-knot nematode
- Reduces soil crusting
- Improves soil infiltration
- Increases organic matter and the subsequent increase in beneficial microflora and microfauna
- Reduces effects of bacterial wilt on successive vegetable crops

Sowing rate

- 7-12kg/ha (pure)

Brown Mustard

Forage Turnip (*Brassica rapa*)

Barkant

- Good leaf & root yield
- Ideal for grazing
- High-energy feed
- High sugar & dry-matter content
- Multiple harvest potential

Within the Brassicas family, turnips are the quickest specie to establish. Barkant Turnip also has the potential of being grazed multiple times. The first grazing however, will be the most important one. Both sheep and cattle can graze turnips. It is important not to graze too large of an area at once. Strip-grazing prevents both yield and quality losses due to tramping and polluting. It is also important not to overfeed the cattle when they are allowed to graze the turnips at first. Extreme high intake of Turnips (and other Brassicas) can cause health problems. Therefore, cattle should be allowed to adjust to the change of diet. Supplementing with other forages with less protein and sugars will also prevent problems.

Planting and establishment

Barkant requires good soil drainage and a pH between 5.3 and 7.5. Seed should be planted in a firm, moist, seedbed. Barkant can be broadcasted or drilled. It is very important not to plant the seed too deep. Brassicas should be planted no longer than 2 consecutive years to prevent disease and pest problems. Ideally planted from October to November.

Barkant

Turnip Bulbs

Sowing rate:

- 5-6kg/ha (pure); 1-2kg/ha (mixtures)

Fills the summer feed gap

Forage Turnip (*Brassica rapa*)

Mammoth Purple Top

Widely adapted, older variety, hard flesh turnip, high yielding, suited to sheep/beef in drier turnip areas. Both leaf and bulbs are utilised by grazing animals. The turnip bulb is a large storage organ that develops in the first year. Regrowth is possible from a light first grazing if the leaf growing points attached to the bulb are not damaged.

- 12-14 weeks to maturity
- Most widely used variety
- Produces a large round bulb
- Winter-type forage turnip

Sowing rate

- 2-5kg/ha (increased leaf production, medium to large bulb size); 1-2kg/ha (increased bulb size).

Mammoth Purple Top

Radish (*Raphanus sativus*)

Establishment

Make sure you clear the area of weeds before soil preparation, especially the perennial weeds. A fine seedbed is essential before you broadcast/drill the seeds. Planting depth should not exceed 2cm. Keep the soil moist to help with germination. Autumn plantings are recommended for best results. It can be sown as fodder/green manure crop during autumn and spring.

Utilization

Fodder Radish is one of the main components in our Covergraze systems due to its versatility. It has the ability to produce high quality spring feed, but also has all the benefits of a green manure cover crop. The green manure should be cut down before flowering when the stems are nice and soft as they decompose quicker, retain more beneficial nutrients and are easier to incorporate into the soil.

Radish breaks through hard, compacted soil layers that have broken many a gardeners back. It mechanically opens up channels for water and roots to penetrate. Softening soils is not the only reason to use Radish as a cover between fall and spring crops. It's deep roots recycle last year's nitrogen, catching it before it leaches out. Because Radish decomposes so quickly in areas where it naturally dies, that nitrogen is released for the next season's use.

Sowing rate

- 5-7kg/ha (pure); 1-2kg/ha (mixtures)

Ideal in mixtures with other Brassicas

Tajuna

Japanese Radish (*Raphanus sativus*)

Nooitgedacht

Fodder radish (Raphanus sativus), commonly known as Japanese radish, is useful as a late autumn / early winter feed in the cooler eastern areas of South Africa. It may be used in the drier western areas, but may require supplementary irrigation. It can be used as a fodder bank or source to supplement temperate and/or tropical pastures.

- Very good cold and drought tolerance
- Best suited for sandy and loam soils
- Time of establishment: Normally January/February
- Can be planted in December in the cooler Eastern areas
- Shows good reaction to phosphate an potassium fertilizer
- Excellent rotational crop with maize
- Can be used as stand over feed for the winter

Japanese Radish

Fodder Radish (*Raphanus sativus*)

Tajuna

Tajuna is a very quick growing green manure crop that can be used as quality feed as well. It has the ability to draw up nutrients from the subsoil and also penetrate compacted soils with its strong deep rooting tap root. Fodder radish also produces large amounts of foliage which when incorporated into the top layer of soil adds lots of leafy organic matter and helps improve its moisture-holding capacity, fertility and soil structure. Fodder Radish is also thought to contain chemicals that help suppress nematodes e.g. cyst nematodes which attack potatoes. It is part of the Brassica family and should be treated as such for crop rotation purposes.

Tajuna Fodder Radish

Drilling Radish (*Raphanus sativus*)

Daikon

Daikon Radish has the ability to produce a large taproot and penetrate compacted soil layers in an effort to increases soil aeration, water infiltration, decrease compaction and provide increased rooting depth opportunities to successive crops. These type of tillage roots do their work right where it's needed – in the soil. They till and aerate to improve soil structure as they grow. When they die, roots add organic matter to the soil in massive amounts, with minimal loss and no digging from us.

Considering the cash crop that will be planted next is the first step in developing an effective cover crop management plan. Tillage radish are best suited to proceed summer crops. Ideally the following cash crop will be no-tilled into the terminated tillage radish.

Drilling Radish

Forage Rape
(*Brassica napus var. napus*)
Interval

- Tall type
- High quality feed
- Good regrowth – 2 grazings possible
- Flexible – summer or winter crop
- Good drought tolerance
- Winter hardy

Using Interval

Sowing date: Oct - Nov / Jan - Mar
Maturity date: 90 -120 days
Typical yield: Summer: 7-10 t DM/ha
Winter: 4-6 t DM/ha
ME: 10-11 MJ/kgDM

Sowing rate

- 4-5kg/ha (pure); 1-2kg/ha (mixtures)

Interval after grazing

Fills the summer feed gap

Fodder Beet (*Beta Vulgaris*)

- High yield potential (20 t DM/ha+), so you need less land to winter the same number of animals
- High ME value (12-13 MJ ME/kg DM) and utilisation (typically 90%), for improved animal performance.
- Relatively low cost (c/kg DM) at high yields
- Unaffected by most brassica diseases
- Versatility

Fodder beet has a number of features which can benefit dairy, beef and sheep farmers. Whether grazed or lifted and fed out on pasture, the potential yield, feed value, utilisation and economics of this crop stack up well in many different farm systems.

Fodder beet demands good management to reach its potential, and care must be taken with animal feeding. **If you're new to fodder beet, seek advice from your retailer well before sowing.**

Fodder Beets - Exceptional high yields

Beet Varieties

Robbos

Robbos has very good leaf keeping ability through autumn, winter and early spring. This is important because the leaf comprises of a high percentage of the crop's protein.

- Best feeding method: Grazing (but can be lifted)
- Bulb DM content Medium (16-18%)
- **Sowing rate**: 80,000 seeds/ha

Fodder Beets

System Fit

Thanks to its ability to grow a large volume of high quality, high utilisation feed that can be used from autumn to spring, fodder beet suits several different farm systems. Its high yield potential also frees up land for other uses, which is a major plus. Alternatively you can increase daily allowances for improved live weight gains. This crop provides flexible winter grazing and can also be used to extend dairy cow lactation by either grazing or lifting and feeding to stock on pasture. Successful grazing entails correct stock transition.

Tip: Fodder beet is highly sensitive to soil residues from commonly used agricultural chemicals. Before planting, check paddock history for chemicals used in the past two years, and confirm their withholding.

'Stale seedbed' preparation is recommended, i.e. spray paddock(s) out with glyphosate, ideally 6 weeks before planting. Paddocks can then be ploughed to remove existing plant material, and ensure no compaction issues. Cultivate to produce a fine, firm seedbed. Consult a chemical agent regarding wheat sprays for just prior to sowing.

System Fit

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Robbos													
Dairy	Precision planting							Extended lactation, early winter		Winter feeding fodder		Add to spring pastures	
Cattle/Sheep	Precision planting							High ME feeding for weight gain or maintenance from autumn to spring					

Maturity	Once herbicide withdrawals have been done. 170 + days to maximum yield
Typical yielding	18 -24 tons DM/ha on average. 25 tons DM/ha+ possible with sufficient summer moisture and soil fertility
Seeding rate	80 000 seeds/ha pastures. 100 000 seeds/ha lifting fodder beet to maximum yield

Transition Phase

This information is a summary only. Seek further advice if you are new to grazing fodder beet.

Rumen acidosis

Rumen acidosis is the primary animal health risk when grazing fodder beet, and is caused by animals eating diets high in water soluble carbohydrates (WSC) or starch, i.e. fodder beet, too quickly. Clinical symptoms include: scouring, dehydration, bloating, laminitis, rumenitis, milk fever, limited cud chewing, and in severe cases, sudden death. Often clinical signs of rumen acidosis are limited. Poor animal performance in the first 14-21 days could be a warning, as well as animals hanging back from the crop, or kicking at their stomachs. Manage this risk by transitioning stock onto fodder beet carefully, and avoiding any sudden increases in daily allowances.

Measuring crop yield

Knowing your yield is essential before grazing to ensure correct daily DM allowance and overall animal performance. Fodder beet yield is very difficult to estimate! For an accurate assessment at least 8 separate yield measurements are required per paddock, including DM % analysis. For transition, assess crop yield at the area where livestock will start grazing, because correct crop allocation is paramount during this time.

Planning ahead

The method in which the crop will be fed should determine planting layout. Generally stock should graze parallel to the rows to make feed allocation easier. Ensure good access for stock and enough room for the entire mob to get on the crop, without over-allocating their feed. This can be a challenge in very high yielding crops during early transition.

One option is to plant a green feed crop in a headland (e.g. 6 m wide) parallel to the rows of fodder beet. Alternatively, you could lift the fodder beet in the headland, and feed to animals at a low level to start their transition. Both these options help ensure enough space for stock to get access to the crop.

Fodder beet in the diet

Daily allocation of fodder beet depends on stock class, age, desired LWG and amount of crop available. After transitioning, best practice is to continue feeding ≥30% of the animals' diet as high quality supplement to minimise potential health issues. However, experienced farmers are successfully operating systems at higher feeding levels. High utilisation rates (e.g. 90%) can be achieved even with high crop allocation levels, as the feed quality of the whole plant is high.

Fodder Beet

Robbos

Low levels of fodder beet in the diet are sometimes used for maintenance feeding, or when fodder beet does not meet stock nutritional needs. Lactating dairy cows, for example, should receive no more than 5 kg DM/cow/day, due to low protein levels in fodder beet.

Transition in practice

Mixed aged dairy cows, R2 heifers & steers To avoid rumen acidosis, start by allocating 1 kg DM/day/head on day 1, and gradually increase the amount of fodder beet offered by 1 kg DM every 2 days until the desired allocation is reached. This will take 14-21 days depending on the final fodder beet allocation (e.g. 9-10 kg DM/hd for MA cows, 6-8 kg DM/hd for R2 heifers).

At the start of transition a high proportion of supplement will be required, and this will decrease as fodder beet intake increases. Supplement should be fed 3 hours before fodder beet to ensure good gut fill. This will slow the rate of fodder beet intake and minimise gorging. Monitor stock closely throughout transition. Ensure animals eat everything allocated to them, and do not let a bank of uneaten bulbs accumulate during transition.

Supplement

Fodder beet is relatively low in fibre (NDF) and crude protein (CP), and high in water soluble carbohydrate (WSC). Animals can thus require more fibre and protein in their diet than when they're eating brassicas, depending on stock type, age and weight gain expectations.

The best supplement for stock on fodder beet is good quality maize or pasture silage, because it contains both fibre and CP. Straw and cereal silage have low CP content, particularly for young growing animals.

Robbos

Sowing Date

Sowing date is location and season dependent, but early October to late November is generally recommended, once soil temperature is consistently above 10°C. Sowing too early (< 10°C) can result in uneven germination, making spray timings difficult, as well as risking vernalisation where the plants bolt to flower in late summer. Later sowings shorten the growing season, reducing yield potential.

New SUGAR BEETS currently under trial.

Qualtiy Features				
	DM%	**CP%**	**NDF%**	**WSC g/kg DM**
FB average	14 - 20	9 - 14	11 - 16	500 - 700
FB leaves	10 - 15	19 - 23	30	100 - 120
FB bulb (low DM variety)	10 -15	8 - 11	13 - 15	500 - 650
FB bulb (med-high DM variety)	16 - 20	8 - 11	13 - 15	500 - 700

Brassica Management

Seedbed

- Aim: fine, firm, and moist seedbed
- Control weeds – cultivation, pre-emergent spray
- Bury turf & past crop residues

Sowing

- Depth – 1 - 1.5cm
- Broadcast sowing rate is higher than drilling
- Seed to soil contact is important
- Consolidation – rolling is very important
- Plant population is critical to yield

Fertility – Overview

- Brassicas remove high levels of nutrients
- Every crop is different – fertilise based on expected crop yield and base fertility level
- Often "poor" paddocks – lift base levels for new pasture
- Do a soil test!

Fertility – In Fertility

- Responds strongly to N – drives production
- P critical for establishment – relatively immobile so down-the-spout gives best response
- Boron – mainly bulb crops, avoid seed burn
- pH – preferably over 5.6

Dry land production

- Can extract water from greater depth than pastures
- Kale & rape > than bulb crops
- Aim to have soil at the maximum moisture capacity at sowing
- Sow early when more rain/less evaporation, or fallow to sow later

Irrigation

- Don't let soil exceed refill point
- Small & frequent better
- Leave capacity for rain
- Monitor – probe or running balance: (ET, rain, irrigation)
- Start early – hard to catch up

Weeds

- Have significant effect on yield
- Weed free seed bed ideal for establishment
- Pre-emergents sprays – rainfall for activation
- Post emergents sprays – spray when weeds are small
- Healthy fast growing crop can out compete weeds

Pests

- Can cause major damage – especially at establishment
- Check every few days around establishment (springtails), then weekly
- Insecticides can be applied as a spray after emergence, or as a seed treatment

Grazing Management

- Takes approx 4-6 weeks for rumen bacteria to adjust
- Introduce crops slowly – build intake over 10 days
- Brassicas are easy to consume quickly, so don't allow hungry animals access to large amounts - gorging
- Feed fiber before giving access to brassica
- Frosted crops can cause bloat & cold forage cause decrease in body temp & an increase in energy requirement
- Provide plenty of water – lack of water = lower intake
- Nitrate poisoning due to late N application - allow time to adjust, reduce rate of intake
- Shift fences at least once a day for less trampling/wastage, long thin faces

Crop Measuring

- If you don't measure it – how can you manage it?
- Yield (kgDM/ha) = average fresh weight/m2 (kg) x (DM%100) x 10,000
- DM% = dry weight (g) / wet weight (g) x 100

Agronomy Crops

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Forage barley

Agronomy Crops

- Canola
- Cereal Crops
- Saia Oats
- Forage Oats
- Forage Barley
- Triticale
- Forage Rye
- Rye

Agronomy is the application of plant and soil science to crop production. As a science it considers how to grow crops effectively and profitably while conserving natural resources and protecting the environment. Agronomy emphasizes staple food crops, such as maize, beans, wheat and oil seeds like canola which are produced on a large scale and represent the foundation of our human food supply. Forage plants and hay crops are also considered agronomic crops and are the feed base for the ruminant livestock industry on pastures and rangeland.

Canola

Canola is a winter crop that requires relatively cool, moist conditions for the best results, particularly during the flowering, pod-development and seed-setting stages. Canola can be cultivated in South Africa in virtually all the areas where wheat is cultivated, but it does not produce the same results everywhere. It is mainly used as a rotational crop with wheat, especially with the advantage of herbicide resistant varieties.

Benefits of a crop rotation system are:

- Reduces diseases
- More effective weed control
- Improved root system (biological ploughing action)

Sowing rate

- 2-3kg/ha (pure)

Canola (*Brassica Napas*)
Hyola 559 TT

- Hybrid Triazine Tolerant variety
- Released in 2015
- Plant Maturity: Medium
- Days to physiological maturity: 160 – 164
- Blackleg rating: Resistant
- Oil potential very high
- Seedling plant vigour
- Plant height: Medium
- Plant flowering uniformity: Excellent
- Plant stand ability: Excellent

Hyola 559 TT has shown to be one of the most adapted and popular Triazine tolerant varieties across the Western and Southern Cape areas of South Africa. It is characterised by high yield and high blackleg resistance.

Canola (*Brassica Napas*)
Hyola 650 TT

- Herbicide tolerance: Triazine tolerant
- Oil potential: 6
- Blackleg rating (bare seed): R
- Blackleg group: ABD
- Plant biomass: 7
- Days to 50% flowering: 100-110
- Windrowing maturity: Mid-late

Canola

Hyola 559 TT Canola on the right

- Plant height: Medium
- Lodging resistance: 8
- Shatter tolerance: 8
- Hectolitre weight: 8
- Adapted yield areas: 2.00-4.00 t/ha

Ratings: 1 = Poor 9 = excellent

Hyola 650TT has been developed using related genetics involving Hybridising Thumper TT with a longer maturing higher yield potential, such that it shows great adaptability to growing regions where growers can achieve canola yields between 2t/ha to 4.0t/ha. Growers are rethinking on herbicide technology performance because despite the known TT inherent yield penalty, some of the new TT Hybrids with their improved breeding and genetics are yielding just as well and in some cases even better than other technologies such as Clearfield and Roundup Ready.

New Hyola 580 CT coming soon

Cereal Crops

Cereal crops are versatile crops that can be harvested for forage or grain. Cereal crops can be an excellent source of forage for dairy cows. You can expect quality forage similar to that of other cool season grasses. Cereal crops can provide a variety of feedstuffs for your animals. Cereal crop selection will be based on your climate and personal preference. The type of feed harvested will be dependent on your feed needs from a quantity and quality perspective. Don't forget cereal grains also make great companion crops and cover crops.

Saia Oats (*Avena strigosa*)

Black Oats or Saia Oats is one of the worlds oldest cover crops. Planted specifically for its high biomass production both above and below the soil, it is vitally important to increase the organic and carbon content of your soil. Best planted April/May and interplanting of vetch will produce some of the largest volumes of biomass that can be used as a green manure, mulch or as feedstock. Due to its high tillering ability it also serves as an excellent weed suppressor. It has a long growing season with very good disease resistance. Saia is a hardy oats that is well adapted to sandy soils.

Saia Oats

BarSaia

Sowing rate

- 50-60kg/ha (pure)

Forage Oats (*Avena sativa*)

Forage oats is a winter forage crop and is very popular due to its ability to produce good-quality feed when most pastures are dormant. Many farmers rely on oats to fatten livestock during the period from autumn to early spring. It is a fast establishing autumn-winter growing fodder crop with high feeding value and a high leaf to stem ratio. It is most popular for silage, hay or grain production, but can be used for grazing as well. The ideal sowing time is March to May.

Sowing rate

- 50-60kg/ha (pure)

Outback Oats

Outback Oats

- Medium height, erect specialist hay and grazing oat
- Mid - late maturity
- High forage quality and total yield
- Dark green broad leaves
- More rapid establishment, shows excellent seedling vigour
- Better moisture stress tolerance
- Ideal for hay production and grazing
- Suited to a wider range of soils
- Excellent frost resistance
- Fantastic late sown option to provide high quality feed through winter with a late spring/early summer maturity

Forage Barley (*Hordeum vulgare*)

Barley is an annual cereal that is often used in semiarid areas because it is more drought resistant than other cereals. Barley has a fibrous root system. Barley does not do well in humid areas where there are many disease problems. Overall, barley is a crop that is best adapted to cooler, drier areas. For best quality feed and good regrowth potential crops should be cut or grazed at 30-40 cm height. After each cut the crop should be fertilized to ensure good quality regrowth. It is widely used as a livestock feed.

Sowing rate

- 60kg/ha (pure)

Moby Forage Barley

Moby Forage Barley

Moby is an early maturing, 6 row, white seeded awnless barley with excellent winter growth and rapid establishment. Leaf size varies according to environmental conditions and is more comparable with oat varieties than traditional barley types. Moby will tolerate multiple grazings until the production of the first node. Being winter active, Moby offers an extended sowing window compared to forage oats from mid autumn to mid winter.

- Developed for high vegetative dry matter production
- Very fast establishing variety
- Exhibits good cold tolerance compared with other barleys
- Excellent winter growth

Triticale (*Triticosecale*)

It has been developed to incorporate the high yield potential and quality of wheat and the adaptability of rye and is adapted to a wide range of soil types and environments. Triticale has an aggressive root system that binds light soils better than wheat, barley or oats. It is primarily an energy source having moderate protein content with high starch and other carbohydrates, giving it high energy content.

Sowing rate

- 120-140kg/ha (pure)

US 2014 Triticale

Multi end-use cultivar suitable as:

- Cover crop in vineyards to enhance moisture retention and weed control;
- Grazing during first 40 days after emergence;
- Silage production towards milky dough stage; and
- Grain production for animal feed

US 2014 Triticale

- Excellent biotic tolerance, including Stem rust; Leaf rust; Powdery mildew and Aphid damage
- Dark green broad leaves
- Reduced fertilizer need while maintaining high protein levels in combination with above average starch content
- Excellent adaptation to the whole of the Western Cape production area
- Long season grower that maximises available moisture
- Easier harvesting then older generation triticale cultivars
- Medium height (typically 110 – 120cm)
- Above average hectolitre mass (75kg/hl) when compared to older generation triticale cultivars
- Lower seeding rate required while maintaining excellent biomass

Forage Rye (*Secale cereale*)

Barpower

- Can be used for grazing, hay, silage as well as a grain feed
- Barpower has a more prostrate growth habit
- Densely tillered and very leafy
- Very quick to establish
- Do not plant too early, especially in warmer areas (April – Mei)
- Planting can start in March in cooler areas
- Early grazing will result in very good regrowth (30-35cm)
- Proved to be highly palatable in grazing trials
- Rotational grazing for best results
- The grain is of great value to ruminants and has a crude protein of 10-13%
- Often used as a nurse crop with early established ryegrass to increase total dry matter content
- Offers farmers greater flexibility with fodder flow
- Ideal in "COVERGRAZE" mixtures
- Drought tolerant

Sowing rate

- 50-60kg/ha (irrigation); 25-40kg/ha (dryland)

Barpower

Rye (*Secale cereale*)

Secale cereale is the hardiest grain and is grown the world over, for human and livestock consumption. It grows well in many climates and soils, and is frequently used as a rotation crop. It is tolerant of poor soils, high latitudes and altitudes. Rye is mainly used in making bread, but when fed to livestock, it is generally mixed with other grains. It also serves as grain cover crop. The recommended sowing time is April to May.

Sowing rate

- 50kg/ha (pure)

Barpower

Cover Crops

BARENBRUG

Permanent cover crop

Cover Crops

Cover crop options

Cover crop for specific purposes

Potential cover crop problems

A cover crop is a crop planted primarily to manage soil fertility, soil quality, water, weeds, pests, diseases, biodiversity and wildlife in an agroecosystem (Lu et al. 2000), an ecological system managed and largely shaped by humans across a range of intensities to produce food, feed, or fiber.

Cover crops are of interest in sustainable agriculture as many of them improve the sustainability of agroecosystem attributes and may also indirectly improve qualities of neighbouring natural ecosystems. Farmers choose to grow and manage specific cover crop types based on their own needs and goals, influenced by the biological, environmental, social, cultural, and economic factors of the food system in which farmers operate (Snapp et al. 2005).

Cover crop options

Monoculture cover crops

Options:

- Cereals (oats, triticale, rye, barley)
- Legumes (serradella, lupines, vetch, medics, clovers, lucerne)
- Brassicas (white mustard, bladrammenas, canola, fodder radish)
- Annual Grass (sorghum, babala, teff)

Mixtures of cover crops

Sandy soils:

- Cereals: Triticale, Rye, Saia oats
- Legumes: Lupines, Serradella, Sunn Hemp
- Annual Grass: Babala

Loam to clay soils:

- Cereals: Triticale, Oats, Barley, Stooling Rye
- Legumes: Vetch, Medics, Clovers, Cowpeas, Dolichos Beans
- Annual Grasses: Forage Sorghum
- Brassicas: White Mustard, Fodder Radish

Permanent cover crops

- Dwarf Fescue
- Creeping Red Fescue
- Turf type Ryegrass (optional)
- Paspalum

Monoculture cover crop

Mixtures of cover crops

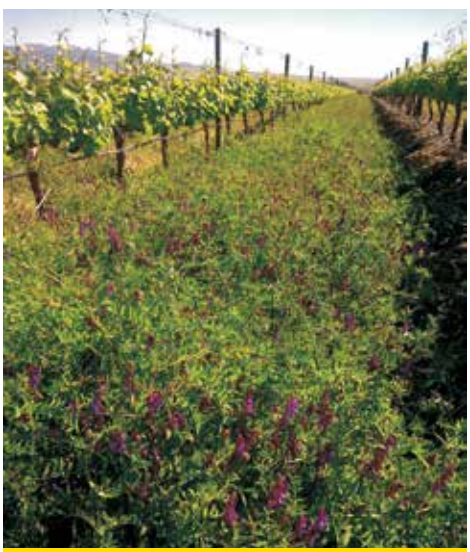
Cover crops for specific purposes

Since cover crops have different functions, it is important to determine what the crop is expected to do. Is the intent to add organic matter to the soil? To add nitrogen to the cropping system? To stimulate soil biological activity? To protect the soil during the winter months?

Cover crops for weed suppression

Several cover crops are considered "smother" crops because they are used to control or suppress weeds. Crops that give the best results are those that are quick to germinate, provide rapid ground cover and form thick canopies.

- Vetch
- Saia Oats
- White Mustard
- Teff
- B1 Burgundy Beans
- Phacelia



Vetch

Cover crops for mulches

The properties of the cover crop residues are very important as they have a direct influence on the outcome of organic matter decomposition (humification and mineralization) and other plant nutrition dynamics. Young and succulent green manure crops with a low C:N ratio will feed soil micro-organisms, while a mature, fibrous green manure crop such as cereal straw will form stable organic matter but provide little stimulation of soil biological activity.

- Saia Oats
- Rye
- Triticale
- Rhodes Gras
- Panicum Maximum
- B1 Burgundy Beans
- Dolichos Beans
- Forage Sorghum
- Phacelia

Nitrogen fixing cover crops

Legumes such as lupines, clover, vetches and cow peas that can fix atmospheric nitrogen, are also able to supply nitrogen to subsequent crops. When sources of manure or compost are not readily available, legume crops can be inserted into a crop rotation to supply nitrogen to the cash crops.

Nitrogen fixing legume crops must be inoculated with rhizobium bacteria at planting. Legume crops require specific strains of fresh or well preserved inoculants. Inoculation is particularly important if the legume crop was never grown previously on the site.

- Lupins
- Vetch
- Medics
- Serradella
- Clovers
- Faba Beans
- Velvet Beans
- Soya Beans
- Cowpeas
- B1 Burgundy Beans
- Sunn Hemp
- Dolichos Lablab

Phacelia

Nitrogen fixing cover crops

Low maintenance cover crops

Turf type grasses are popular cover crops used in orchards due to the low maintenance of the plant. These grasses usually forms a uniform surface that provides good ground cover as well as weed suppression. Although the idea is to help with soil erosion, water logging, weeds and good ground cover, the popularity remains the fact that it is a very persistent cover crop with low maintenance.

- Dwarf Fescue
- Creeping Red Fescue
- Paspalum
- White Clovers
- Strawberry Clover

Low maintenance cover crops

Bio fumigation cover crops

To interrupt pest life cycles, it is important to select cover crops of a different family than that of the future cash crop so that they do not harbour pests that can negatively impact the cash crop. Cover crops may also attract beneficial organisms that prey upon or parasitize pest species.

- White Mustard
- Bladrammenas
- Saia Oats
- Brassica juncea
- Sunn Hemp
- Rhodes Grass

Bio fumigation cover crops

Decorative cover crops

The right cover crop can even look decorative among other ornamental plants. The show from crimson clover, its blossoms clustered tightly on upright stalks like strawberry popsicles, is so spectacular that you would hardly suspect that it was improving the soil.

- Crimson Clover
- Sunflower
- Phacelia

Decorative cover crops

Cover crops for water logged areas

Faba bean tolerates water logging better than other grain legumes such as field peas and lupines. It also tolerates acid soil types better than other grain legumes.

The Faba bean plant is tall (may grow to over 1m under optimum conditions), erect and multi-stemmed from basal branches. It has a well-developed taproot which produces an extensive fibrous root system. Plants can flower profusely and flowering may last for up to 5 weeks, depending on soil moisture and air temperature.

- Faba Beans
- Fescue
- Paspalum
- Birdsfoot Trefoil
- Phacelia
- Strawberry Clover
- Balansa Clover

Potential cover crop problems

The use of cover crops are not without some potential problems. Many annual cover crops must be mowed before they produce viable seeds which could become weeds. Some cover crops have allelopathic properties that can have detrimental effects on the cash crops that follow. Large amounts of cover crop residues can cause significant problems during seeding of the next crop. Precision seeders are particularly sensitive to seedbed conditions with excessive crop residues. Nitrogen can be tied up during decomposition of incorporated fibrous plant material to the detriment of the cash crop. Poorly selected cover crops can attract, stimulate or harbour pests that can negatively impact the following cash crop.

COVERGRAZE

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COVERGRAZE

Weed suppression

N-fixation

Soil improvement

Fibre

Protein Boost

Cover Crops are an important and useful tool to combat issues such as soil erosion, nutrient runoff and moisture conservation. Multiple species are used for cover cropping including brassicas, legumes, cereals and grasses. Recently there has been an increasing movement toward grazing cover crops as part of the rotation. In addition to soil conservation and nutrient management, the nutritional values of most cover crops will meet the needs of grazing livestock. The ability to utilize annuals with grazing livestock allows longer rests periods for pastures, and also the ability to grow more forage and graze longer, reducing the amount of feed needed.

Grazing livestock on a cropland field can also be advantageous for increasing biological activity through the recycling of nutrients through the animal as the majority of the nutrients that run through a ruminant animal are placed right back onto the ground from where they came.

Barenbrug is proud to offer COVERGRAZE specific products for cover cropping. Not only are these products perfect for non-grazing cover crop systems, they offer superior forage production, digestibility and quality for the grazing animal. If COVERGRAZE is in your cover crop plans, chose these products for performance that matches your needs.

Introduction

COVERGRAZE is a tool to simplify the use of cover crops as an option for grazing. Usually we would look at cover crops as a sustainable way of farming, but with no additional income. Now, with COVERGRAZE, you can make better species selection for direct incorporation into the soil, cutting for composting, and/or quality grazing with high stocking rates for added value. COVERGRAZE allows you to select species to address your needs and you can benefit from this with either mono culture or a mixture of species.

COVERGRAZE is an opportunity to introduce plant diversity to your soils that will increase microbial diversity, improve organic matter and natural aeration, with the added advantage of the option to graze.

COVERGRAZE

Weed suppression

- The main purpose is to suppress weeds in a natural way.
- Species that are suitable for this purpose must have the following abilities:
  - Smothering effect
  - Overshadowing effect
  - Aggressive growth habit
- Soil improvement can be an added benefit through root crops and legumes.
- Products for this purpose:
  - Oats, White Mustard, Fodder Radish, Vetch, Phacelia (winter rainfall area)
  - Forage Sorghum, Babala, Teff, Cowpeas, Sunn Hemp, Fodder Radish, Saia Oats (summer rainfall area)
- Example of a mixture:
  - 10kg BarSaia + 2kg Tajuna Radish + 10kg Haymaker Vetch + 1kg Sito Mustard

Weed suppression

Nitrogen fixation

- The main purpose is soil improvement through nitrogen fixation.
- Root development will greatly contribute to soil aeration.
- Legumes will primarily be used for their ability to fix nitrogen.
- Make sure you use applicable inoculants.
- Products for this purpose:
  - Faba beans, Forage peas, Vetch, Arrowleaf Clover, Medics, Fodder Radish, Forage Barley (nitrogen retention) (winter rainfall area)
  - Cowpeas, Dolichos Lablab, Sunn Hemp, Fodder Radish, Forage Sorghum (nitrogen retention) (summer rainfall area)
- Example of a mixture:
  -10kg Bargrazer Forage Sorghum + 10kg Ebony Cowpeas + 4kg Dolichos Lablab + 1kg Turnip

Nitrogen fixation

Soil improvement

- The main purpose is to improve soil structure.
- Factors to address will be soil aeration, organic matter, soil microbe activity and nutrient fixation.
- Root development is crucial with regards to depth, speed of development and spreading ability.
- Nitrogen fixation will/can also be a beneficial factor.
- Products for this purpose:
  - Diakon Radish, Faba Beans, Forage peas, White Mustard, Vetch, Oats (winter rainfall area)
  - Diakon Radish, Turnips, Beets, Forage Sorghum, Sunn Hemp, Dolichos Lablab (summer rainfall area)
- Example of a mixture:
  - 2kg Tajuna Fodder Radish + 10kg Arvika Forage Peas + 1kg Sito White Mustard + 25kg Outback Oats

Soil Improvement

Fibre

- The main purpose is to produce the maximum amount dry matter with high fibre content.
- Species considered in a mixture must preferably have similar growing seasons.
- High fibre content usually indicates a longer growing season.
- High fibre content in plant material usually takes longer to disintegrate.
- High fibre content usually results in lower animal intake.
- Products for this purpose:
  - Lupines, Faba Beans, Vetch, Forage Rye, Oats, Rye, Forage Barley (winter rainfall area)
  - Forage Sorghum, Babala, Teff, Hybrid Millet, Dolichos Lablab, Fodder Radish (summer rainfall area)
- Example of a mixture:
  - 8kg Bargrazer Forage Sorghum + 5kg Babala + 6kg Dolichos Lablab

Fibre

Handy Tip: Focus on species that has the ability to accumulate maximum fibre in a short period of time. Cereals like forage rye, Saia oats or even tef should be considered as a base for the mix to a point where it does not suppress the additional species. A 70:30 ratio should not be exceeded.

Protein Boost

- Main purpose is to have a high protein forage source.
- Single species can be used but multi-specie combinations has proved to suppress weeds better due to various growth patterns.
- Inclusion of legume species for higher protein content also benefit the soil through nitrogen fixation.
- Can also be used as hay or silage.
- Products for this purpose:
  - Triticale, Oats, Forage Rye, Vetch, Lupines, Forage Peas, Fodder Radish (winter rainfall area)
  - Jap Radish, Turnips, Cow Peas, Forage Sorghum, Chicory, Hybrid Millet (summer rainfall area)
- Example of a mixture:
  - 50kg US2014 Triticale + 10kg Haymaker Vetch + 20kg Bitter Lupines

Protein Boost

Soil Aeration

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Turf Grasses

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Turf Grasses

Turf grass species for SA conditions

Warm season grasses

- Kikuyu
- Cynodon
- Paspalum notatum (Bahia)
- Dichondra Wonderlawn

Cool season grasses

- Perennial rye grass (turf-type)
- Annual rye grass (turf-type)
- Tall fescue (turf-type)
- Fine fescues – includes:
  Creeping Red Fescue
  Chewings Fescue
- Blue grasses – includes:
  Creeping Bent grass
  Colonial / Highland Bent

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YELLOWJACKET® ENHANCED SEED COATING

RPR™ REGENERATING *Perennial Ryegrass*

A full range of Turf Grass species are available

Pasture Summary

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Pasture Crop Summary

Annual Winter Pastures		ton/ha Yield	
Common Name	Botanical Name	Probable	Possible
Annual Rye Grass	Lolium multiflorum	12	20
Fodder Radish	Raphanus sativus	5	10
Rye	Secale cereale	5	7
Oats	Avena sativa	4	6
Triticale	Triticale spp.	5	7
Lucerne	Medicago sativa	15	20
Clover	Trifolium spp.	4	8
Arrowleaf Clover	Trifolium vesiculosum	4	10
Other Forage Legumes		**ton/ha Yield**	
Pink Serradella	Ornithopus sativus	4	10
Subterranean Clover	Trifolium subterraneum	4	8
Cow Peas	Vigna unguiculata	3	6
Dolichos	LAB LAB PURPUREUS	3	8
Vetch	Vicia dasycarpa		
Perennial Summer Pastures		**ton/ha Yield**	
Blue Buffalo Grass	Cenchrus cilliaris	7	15
Bottle Brush Grass	Anthephora pubescens	5	9
Smuts Finger Grass	Digitaria eriantha	7	15
Rhodes Grass	Chloris gayana	6	12
Eragrostis	Eragrostis curvula	8	15
Buffalo Grass	Panicum maximum	8	20
Kikuyu	Pennisetum clandestinum	10	20
Annual Summer Forage Pastures		**ton/ha Yield**	
Babala	Pennisetum glaucum	8	17
Forage Sorghum	Sorghum spp.	8	15
Teff	Eragrostis tef	4	8
All Season Pastures		**ton/ha Yield**	
Tall Fescue	Festuca arundinaceae	12	18
Cocksfoot	Dactylis glomerata	10	14
Perennial Ryegrass	Lolium perenne	10	14

Crude Protein	Fibre	Rain	kg/ha Seed		Plant
%		mm	Rows	Broadcast	Probable
18-25	25-30	900	15	25	March
18-28	13-14	650	3	5	Jan-Feb
17-20	20-25	700	25	60	March
17-20	20-25	700	25	60	March
17-20	25-30	800	25	60	March
18-25	28-32	700	10	20	March
18-25	20-25	800		2-6	March
		700		12	March
Crude Protein	**Fibre**	**Rain**	**kg/ha Seed**		**Plant**
17-20		700		25	March
12-15		500		20	Mrt-April
17-20		600	20	50	Oct-Nov
17-20		600	20	50	Oct-Nov
		600		25	March
Crude Protein	**Fibre**	**Rain**	**kg/ha Seed**		**Plant**
4-12	27-41	400	3-5	5-7	Sept-Feb
4-12	33-43	400	3-5	5-7	Sept-Feb
4-12	30-40	600	3-5	5-7	Sept-Feb
4-12	30-40	600	3-5	5-7	Sept-Feb
4-12	30-40	650	2-3	5-7	Sept-Feb
4-12		600	4-6	6-8	Sept-Feb
4-12	17-32	700	3	6	Sept-Feb
Crude Protein	**Fibre**	**Rain**	**kg/ha Seed**		**Plant**
4-12	28-35	500	8	20	Oct-Nov
4-12	28-35	500	12	25	Oct-Nov
17-20	27-30	600		15	Oct-Nov
Crude Protein	**Fibre**	**Rain**	**kg/ha Seed**		**Plant**
18-22	25-30	800	15	25	March
18-22	25-30	800	15	25	March
18-22	25-30	900	15	25	March

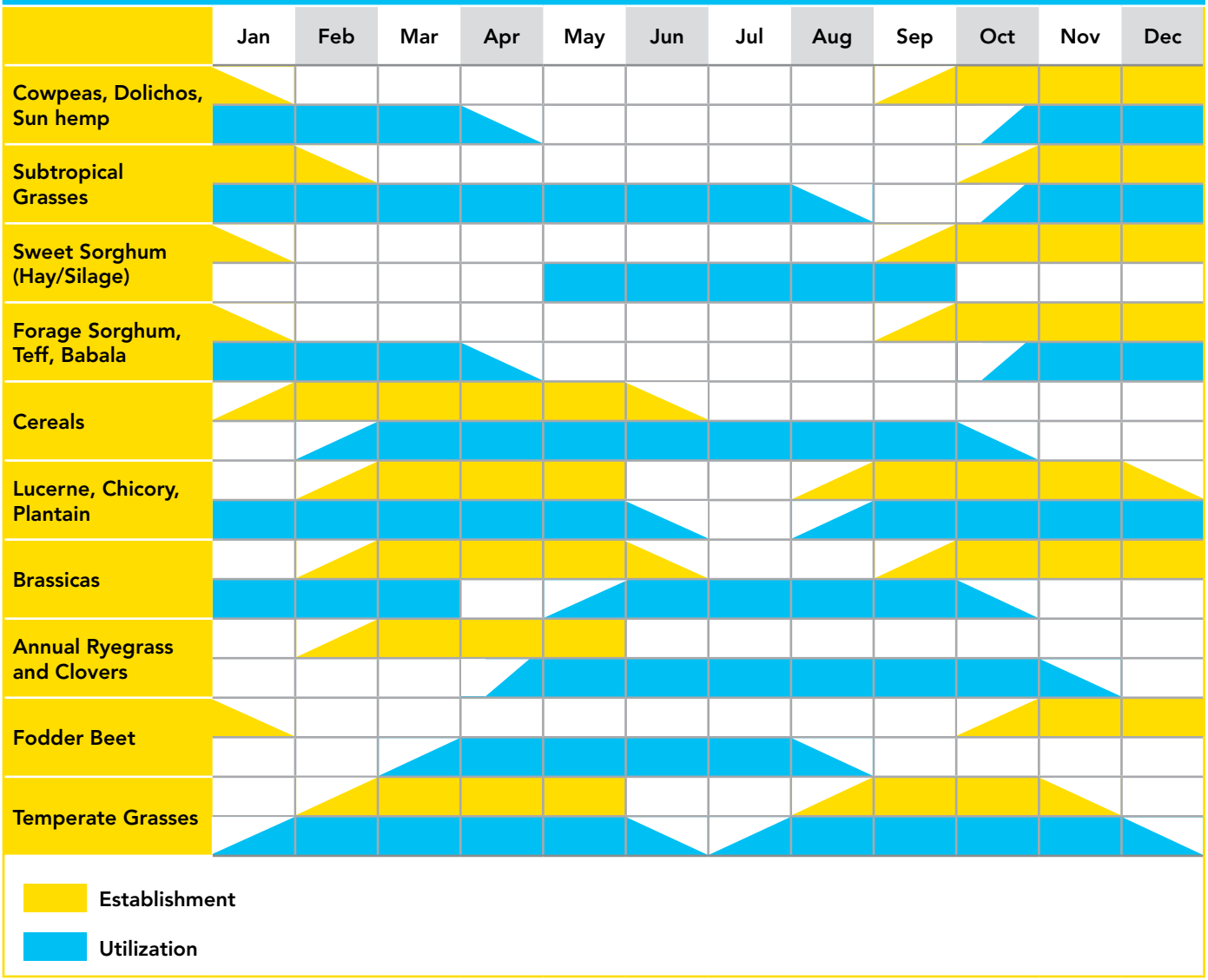
Guidelines for Fodder Flow Planning

Common Name	Botanical Name	Soil Type	Life Span	Utilisation
			Year	
Blue Buffalo Grass	Cenchrus cilliaris	abc	14	xz
Bottle Brush Grass	Anthephora pubescens	abc	8	xy
Smuts Finger Grass	Digitaria eriantha	abc	8	xy
Buffalo Grass	Panicum maximum	abc	8	xyz
Annual Rye Grass	Lolium multiforum	abc	1	x
Fodder Radish	Raphanus sativus	abc	1	x
Rye	Secale cereale	abc	1	x
Oats	Avena sativa	abc	1	x
Triticale	Triticale spp.	abc	1	x
Lucerne	Medicago sativa	abc	7	xz
Rhodes Grass	Chloris gayana	abc	4	xyz
Eragrostis	Eragrostis curvula	abc	8	xz
Forage Sorgum	Sorghum spp.	abc	1	xyz
Babala	Pennisetum glaucum	abc	1	xz
Teff	Eragrostis tef	ab	1	xz
Tall Fescue	Festuca arundinaceae	bc		xy
Perennial Rye Grass	Lolium perenne	abc		x

Utilisation
x - Grazing y - Foggage z - Hay

Soil Type
a - Sandy b - Loamy c - Clay

Guidelines for Fodder Flow Planning



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