We are a global leader in seeds for turf and forage grass and legumes. With our international focus, we offer local sustainable solutions with added value to end-users around the world. We offer continuity to our customers, suppliers and shareholders while creating an inspiring and rewarding environment for our employees. As an innovative family owned company we focus on research and development and the successful marketing of innovative products. We aim to further strengthen our position in existing markets and use this strong foundation to enter new markets.

We are the Royal Barenbrug Group.
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We specialize in plant breeding, seed production and the international marketing of seeds for turf, forage grass and legumes. Founded in 1904, our company stands for top quality that is appreciated by customers both large and small, throughout the world. We have a passion for grass that we share with our customers and growers; this is something that four generations of the Barenbrug family have shared through to the present day. Our position in the grass-seed market has been achieved not just by putting our craftsmanship into practice. It is a role that we have built up and cultivated assiduously over the years. We would never have come this far without the long-term relationships with our customers and seed growers, or without our alliances with key universities and institutes. We would never have made it this far without a continuous focus on innovation, quality and solutions for local markets. And definitely not without the loyalty, efforts and knowledge of all our own dedicated people.
The basis for our success is captured in the four key core values listed above.

**INTERNATIONAL**: A lot of time has gone by since that very first international publication. Over that hundred-year period, we managed to exceed even our most ambitious objectives, including access to the world grass-seed market, with the best partners in R&D, seed production and sales & marketing. We have great confidence in the excellent research that is carried out within our international network of subsidiaries and research facilities in all the important climatic zones.

**Think global, act local**
We are certainly one of the most innovative companies in our field. Because we exchange knowledge and new ideas throughout the world, we can offer tailored solutions in highly specific, localized cases. This means not only that we are the best partner for our customers, but also that we can offer a challenging platform for partners in technological developments, in existing markets as well as in developing regions.
QUALITY: Today’s highly demanding world makes the need for quality obvious. That is why we focus exclusively on the very best. But don’t just take our word for it, we’re happy to let the figures speak for themselves. Our brand name stands out in the recommended variety lists across the world. So it is not so surprising that Barenbrug products are used and recommended so often. From livestock farmers to park and garden managers. From golf course and sports field owners to football championship organizers throughout the world, everyone is convinced of our exceptional high quality. Barenbrug never goes for anything less than gold, just like the top sportsmen who rely on our grass pitches.

INNOVATION: The knowledge that the world’s population will grow to nine billion within a few decades puts a heavy responsibility on any company that is involved – be it directly or indirectly – in food production, water consumption and CO2 emissions. It is a responsibility that we will not evade; instead, we will respond to this demand and make a significant contribution. We do not see innovation as a green “gloss” that we are putting on the mission statement. Instead, it is one of the things that keep us afloat. It has become fundamental to everything we do.

The effect that grass species can have on global problems, both now and in the future, is greater than you might think. The right genetics and the right technology allow us to make a significant contribution to improving public health in general, through the best dairy and meat products and reductions in global Co2 emissions. More directly, we improve farmers’ productivity by reducing the consumption of water, fertilizers and pesticides. This is our contribution to a better world for the generations that will follow us.

PARTNERSHIP: Our company would never have become anything like as big as it is without strategic alliances with partners in R&D, grass-seed production and sales & marketing. We have built on our passion for grass, together.

• Throughout the world, we work with developers, universities and institutes to get the very best out of genetics and seed technologies.
• We offer a stable and reliable source of income for the best grass-seed producers in the world, through long-term relationships that are based on mutual trust.
• In more than 90 countries, we cooperate with local professionals in service, marketing and sales, aiming to provide the best applications of top-quality products for the customers.

Royal Honour
Our work was “crowned” in 2004, when Barenbrug reached its one hundredth anniversary and received the designation Royal on behalf of Queen Beatrix of the Netherlands for the unique and leading position that the company had built up over the preceding century. Since then, we have been recognized as The Royal Barenbrug Group.

BARENBRUG SOUTH AFRICA

The Royal Barenbrug Group, a family-owned multinational grass seed company, has launched a new subsidiary in South Africa in 2011. The Group now has subsidiaries in all six continents, in line with its global company strategy. Barenbrug South Africa will focus on local testing, seed production, and marketing & sales of innovative turf, forage grasses, legumes and other fodder crops in the Southern Africa region. The wide product range, which includes temperate and tropical grasses, offers sustainable solutions with added value for dairy, beef and sheep farmers as well as for sport venues, golf courses and other amenities. Barenbrug South Africa will supply ALL pasture seed and other rotational crops to South African farmers.
Pasture Grasses
Perennial Temperate Grasses

Temperate (cool season, C3) perennial grasses have been evaluated and grown in South Africa for quite 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. Recommended sowing rate is between 18 and 25kg/ha. Perennial ryegrass is highly digestible for all classes of ruminant animals.

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.

<table>
<thead>
<tr>
<th>Seasonal Summary</th>
<th>DO</th>
<th>DON'T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>Spray weeds. Apply N.</td>
<td>Pug your Trojan - have strategies in place to avoid damage.</td>
</tr>
<tr>
<td>Spring</td>
<td>Maintain consistent residuals - your new Trojan will grow rapidly and needs frequent grazing. Take care grazing in wet periods.</td>
<td>Let your pastures get too long. Make hay or heavy silage crops in the first season.</td>
</tr>
<tr>
<td>Summer</td>
<td>Have strategies in place if the weather turns dry. Look after Trojan - sacrifice your poor paddocks first.</td>
<td>Overgraze. Restock your Trojan too early - let it recover and build its reserves.</td>
</tr>
</tbody>
</table>

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.
### Persistence

<table>
<thead>
<tr>
<th>ENTRY</th>
<th>RYEGRASS GROUND COVER (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrow AR1</td>
<td>78 a</td>
</tr>
<tr>
<td>Trojan NEA2</td>
<td>78 a</td>
</tr>
<tr>
<td>One50 AR1</td>
<td>78 a</td>
</tr>
<tr>
<td>Alto AR1</td>
<td>78 a</td>
</tr>
<tr>
<td>Revolution AR1</td>
<td>76 a</td>
</tr>
<tr>
<td>Matrix SE</td>
<td>76 a</td>
</tr>
<tr>
<td>Bealey NEA2</td>
<td>76 a</td>
</tr>
<tr>
<td>Commando AR1</td>
<td>76 a</td>
</tr>
<tr>
<td>Extreme AR37</td>
<td>76 a</td>
</tr>
<tr>
<td>Bronsyn AR1</td>
<td>75 a</td>
</tr>
<tr>
<td>Banquet II Endo5</td>
<td>75 ab</td>
</tr>
<tr>
<td>Extreme AR1</td>
<td>74 ab</td>
</tr>
<tr>
<td>Extreme AR6</td>
<td>65 b</td>
</tr>
</tbody>
</table>

### Plant Pulling

<table>
<thead>
<tr>
<th>ENTRY</th>
<th>PULLING SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bealey NEA2</td>
<td>8.0 a</td>
</tr>
<tr>
<td>One50 AR1</td>
<td>7.6 ab</td>
</tr>
<tr>
<td>Bronsyn AR1</td>
<td>7.6 ab</td>
</tr>
<tr>
<td>Trojan NEA2</td>
<td>7.3 ac</td>
</tr>
<tr>
<td>Revolution AR1</td>
<td>7.0 bd</td>
</tr>
<tr>
<td>Arrow AR1</td>
<td>6.9 bd</td>
</tr>
<tr>
<td>Alto AR1</td>
<td>6.9 bd</td>
</tr>
<tr>
<td>Impact SE</td>
<td>6.9 cd</td>
</tr>
<tr>
<td>Banquet II Endo5</td>
<td>6.4 d</td>
</tr>
<tr>
<td>Matrix SE</td>
<td>6.4 d</td>
</tr>
<tr>
<td>Revolution AR1</td>
<td>5.3 e</td>
</tr>
<tr>
<td>Extreme AR37</td>
<td>5.2 e</td>
</tr>
<tr>
<td>Extreme AR1</td>
<td>4.9 e</td>
</tr>
</tbody>
</table>

Plant pulling is scored on a 1-9 basis, where 9 = no plant pulling.

### Aftermath Heading

<table>
<thead>
<tr>
<th>ENTRY</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trojan NEA2</td>
<td>7.2 a</td>
</tr>
<tr>
<td>Quartet SE</td>
<td>7.2 ab</td>
</tr>
<tr>
<td>Bealey NEA2</td>
<td>7.0 ac</td>
</tr>
<tr>
<td>One50 AR1</td>
<td>6.4 ac</td>
</tr>
<tr>
<td>Extreme AR37</td>
<td>6.2 ac</td>
</tr>
<tr>
<td>Extreme AR1</td>
<td>6.2 ac</td>
</tr>
<tr>
<td>Revolution AR1</td>
<td>6.1 ac</td>
</tr>
<tr>
<td>Bronsyn AR1</td>
<td>6.1 ac</td>
</tr>
<tr>
<td>Matrix SE</td>
<td>6.0 ac</td>
</tr>
<tr>
<td>Impact SE</td>
<td>5.9 bc</td>
</tr>
<tr>
<td>Commando WE</td>
<td>5.7 bc</td>
</tr>
<tr>
<td>Alto AR1</td>
<td>5.6 bc</td>
</tr>
<tr>
<td>Banquet II Endo5</td>
<td>5.6 bc</td>
</tr>
<tr>
<td>Arrow AR1</td>
<td>5.3 c</td>
</tr>
</tbody>
</table>

### Barenbrug Perennial Ryegrass Classification

<table>
<thead>
<tr>
<th>Trojan</th>
<th>Bealey</th>
<th>Arrow</th>
<th>Bronsyn</th>
</tr>
</thead>
<tbody>
<tr>
<td>All systems</td>
<td>Maximum performance</td>
<td>Solid performers</td>
<td>Proven</td>
</tr>
<tr>
<td>Persistence, growth, quality feed</td>
<td>High utilization</td>
<td>Combine well in pasture mixes</td>
<td>Suitable for undersowing</td>
</tr>
<tr>
<td>Summer and winter yield</td>
<td>Tetraploids don’t suit everyone</td>
<td>High feed value</td>
<td>Competitive price</td>
</tr>
<tr>
<td>Intensive farming</td>
<td>Intensive farming</td>
<td>Intensive/extensive farming</td>
<td>Intensive/extensive farming</td>
</tr>
</tbody>
</table>
**ARROW**
Perennial Ryegrass

Start your season earlier.

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

Breeding History
Arrow was bred by Agriseeds, by crossing elite NZ & Spanish ryegrass material.

Resultant plants were selected for:
- **High drymatter yield**
- **Improved early season growth**
- **Total yield**
- **Persistence**

High Yield
Arrow delivers high levels of winter & 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
Arrow has a flowering date of +7 days. This gives a good balance of improved late spring quality & increased early-season growth.

**Bealey**
Perennial Ryegrass

A good feed for longer
Bealey tetraploid perennial ryegrass boosts animal performance by combining the key elements of high feed quality, palatability, high yield and excellent seasonal growth.

High palatability & late heading
Bealey has the high palatability of a tetraploid. It is more upright than diploid cultivars, allowing good clover content, boosting animal performance. Bealey’s very late heading improves spring feed quality.

Getting the best from Bealey
Due to its high palatability, to get the best from Bealey avoid continual hard grazing and/or prolonged set stocking through dry periods. In wet winter conditions avoid treading or pugging damage by cattle.
PERENNIAL TEMperate GRASSES

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 (Festuca arundinacea)

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.
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.

<table>
<thead>
<tr>
<th>Fescue Characteristics</th>
<th>Maturity</th>
<th>Palatability</th>
<th>Digestibility</th>
<th>Winter Hardiness</th>
<th>Suitability for grazing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barolex</td>
<td>Very soft leaf</td>
<td>****</td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td>Baroptima</td>
<td>Soft leaf</td>
<td>****</td>
<td>****</td>
<td>****</td>
<td>***</td>
</tr>
<tr>
<td>Bariane</td>
<td>Soft leaf</td>
<td>*****</td>
<td>****</td>
<td>*****</td>
<td>****</td>
</tr>
<tr>
<td>BarElite</td>
<td>Soft leaf</td>
<td>*****</td>
<td>****</td>
<td>*****</td>
<td>****</td>
</tr>
<tr>
<td>Barcarella</td>
<td>Rough leaf</td>
<td>***</td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
<tr>
<td>Kentucky-31</td>
<td>Rough leaf</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>***</td>
</tr>
<tr>
<td>Fawn</td>
<td>Very rough leaf</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>
**Cocksfoot (Dactylis glomerata)**

**Adremo and Cristobal**

Adremo, a highly palatable cockfoot variety, is the latest release in South Africa with exceptional dry matter results in trials in the Southern Cape and KwaZulu-Natal.

Cristobal 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 cockfoot were kept low in a mix, because cockfoot can dominate pastures, reducing clover levels and digestibility. New fine leaved cockfoot cultivars 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 cocksoots become clumpy or stemmy they are unpalatable to stock. In grazing trials, where cocksoot has been kept short and leafy, animal performance is reasonably good. Maintaining good legume content in cocksoot pastures will improve animal performance.

**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

**Fertiliser**

Cocksfoot responds well to nitrogen fertiliser, generally at higher response.

---

**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 aquatica)

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. Phalaris has excellent seedling vigour, which makes it a variety to establish quickly and easily. 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**: 3-5 kg/ha (Pure) 2-3 kg/ha (Mixes)

**NEW** 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-tolreant 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.

- **Sowing Rate**: 3-5kg/ha (Pure) 1-3kg/ha (Mixes)

**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: Trojan or Bealey |
| Year 2: Hybrid |
| Year 3: Hybrid |
Shogun is no ordinary hybrid ryegrass

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.

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**NEW 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 25 - 27kg/ha

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**Table: Shogun vs. Hybrid**

<table>
<thead>
<tr>
<th>Annual</th>
<th>Italian</th>
<th>Hybrid (Short rotation)</th>
<th>Long rotation</th>
<th>Perennial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shogun</td>
<td>replaces some Italian. Giving similar winter growth, plus better persistence &amp; black beetle control.</td>
<td>Shogun</td>
<td>replaces some long rotation. Giving similar persistence, with higher winter &amp; total DM yield.</td>
<td></td>
</tr>
</tbody>
</table>
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:
Tetraploid cultivars: Barextra, Barmultra II

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: Barextra, 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
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. Use a sowing rate of 20 - 25kg/ha. 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

**Stock Type:** Dairy, Sheep, Beef

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.

**Tabu key features:**
- Very fast establishment
- Very high DM yield
- Diploid Italian - very persistent
- Very dense cover

**Sowing rate:**
- Drilling at 18 - 20kg/ha
- Broadcast at 20 - 25kg/ha
**Westerwold Ryegrass**  
*(Lolium multiflorum)*

**NEW** Hogan Tetraploid Annual Ryegrass

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.

**Ribeye Diploid Annual Ryegrass**

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

**Maximus Tetraploid Annual Ryegrass**

- Excellent for overseeding and mechanical harvesting
- High Yields
- Very High Quality
- Early Production
- Winter-hardy
- Good Rust Resistance

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**Ribeye features and benefits**

<table>
<thead>
<tr>
<th><strong>Plant Features</strong></th>
<th><strong>Forage Benefits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploid</td>
<td>Aggressive tillering</td>
</tr>
<tr>
<td>Cold tolerant</td>
<td>Winter survival</td>
</tr>
<tr>
<td>Rust resistant</td>
<td>Improved quality</td>
</tr>
<tr>
<td>Earlier production</td>
<td>Earlier grazing</td>
</tr>
<tr>
<td></td>
<td>Reduced stress</td>
</tr>
</tbody>
</table>

**Maximus features and benefits**

<table>
<thead>
<tr>
<th><strong>Plant Features</strong></th>
<th><strong>Forage Benefits</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetraploid</td>
<td>Higher yields</td>
</tr>
<tr>
<td>Earlier production</td>
<td>Earlier availability</td>
</tr>
<tr>
<td>High sugar content</td>
<td>Palatable</td>
</tr>
<tr>
<td>Large leaves</td>
<td>Increased intake</td>
</tr>
<tr>
<td>Rust resistant</td>
<td>Excellent quality</td>
</tr>
</tbody>
</table>
Archie is a tetraploid annual ryegrass for quick nutritious feed over a 6-8 month period. Ideal for use between maize and other summer crops. Archie’s rapid establishment and winter growth make it ideally suited for use as a winter crop. For feed into late spring and summer, we recommend Tabu Italian ryegrass.

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
Establishment

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

**Basic steps for successful establishment**

- Do a soil analysis before planting
- Take climatic conditions in 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”
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
- Lucern
- 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!
Great in Pasture
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 possessing 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**
- Mulato II (Hybrid)
- Marandu
- Panicum Maximum
- Mombasa
Brachiaria Hybrid – Mulato II
(*B. ruziziensis x B. decumbens x B. brizantha*)

- 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.

*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.

*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.

Brachiaria Brizantha - 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 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. Leaves 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

Mombasa
- 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
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.

Rhodes Grass
Smutsfinger Grass
Blue Buffalo Grass
Bottle Brush Grass
Weeping Love Grass
White Buffalo Grass
Kikuyu
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
- Katambora Rhodes grass: 8 kg/ha in rows, 12 kg/ha broadcast
- Do not plant/cover seed deeper than 25 mm

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

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 intervals, but quality decreases
- 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

Smutsfinger Grass (Digitaria eriantha)

Requirements and uses
- Areas with rainfall higher than 500 mm
- Well adapted to medium and low potential soils
- Successfull 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
Subtropical Grasses

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
• 3-6kg/ha
• Rolling action essential

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

Utilisation
• 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

Soil preparation
Two important points:
• 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.

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

Seed mixtures
• Smuts finger 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: Smuts finger, Rhodes grass, Panicum maximum en Anthephora pubescens (Botle brush grass) 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
• 3-6kg/ha
• Rolling action essential

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

Utilisation
• 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

Bottle Brush Grass (Antephora pubescens)

Requirements and uses
• Widely adapted to 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

Establishment
• October – December
• Desirable to establish as late as March – due to reliable rainfall early autumn
• Seeds are woolly – pelletisation needed
• Broadcast or drilling
• 5-9kg/ha

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

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 dependant on the fertility of the soils
• Low fertility = poor quality
• N the key to high, good quality fodder production
• Guide: 5t/ha requires 100kgN/ha
Establishment
- Use Tef with Eragrostis where weeds are a problem – early cut essential
- 2-6 kg/ha
- 4-6kg Tef

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
- Do not cut more hay than the available implements can handle.
- 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*)

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 earley autumn
- Recommended not later than February
- Sensitive to weed competition

Sowing density
- In rows: 1-2 kg/ha
- Broadcast: 6-8 kg/ha
- Irrigation: 8-10 kg/ha

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 height to low

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 Rye grass (Lolium multiflorum) or less commonly, Oats (Avena sativa), Brassica (Brassica spp) or White Clover (Trifolium repens). A smooth transition from the summer kikuyu phase to the winter forage at both the establishment and heading of the annual forage is essential. The recommended seeding rate for kikuyu is 2-5kg/ha of pure seed, which should be planted in a well prepared field under favourable conditions of adequate moisture and soil fertility.
ANNUAL SUMMER GRASSES

Forage Sorghum
Babala
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.
Forage Sorghum

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
- Genetic Type: Sweet Sorghum by Sweet Sorghum
- Planting Time: Spring to Summer
- Soil Temp. at planting: 16°C and rising
- Planting Rate (kg/ha):
  - Marginal Dryland: 4 to 7
  - Good Dryland: 8 to 12
- Irrigation: 15 to 25
- 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
Babala *(Pennisetum glaucum)*

- 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 basic (alkaline) soils. It prefers dry or moist soil and can tolerate drought.
- **Sowing rates:**
  - Dry land: 12.5 - 18kg/ha
  - Irrigation: 20 - 25kg/ha

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.
**NEW** 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

The most widely grown teff variety in the U.S.

**SA Brown**

- Average rainfall: 500 mm +
- 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 type – from sand to clay
- Fertilizer applications will have effect on dry matter production
- **Sowing rates:** 10-15 kg/ha in your lighter soils and up to 25 kg/ha in your heavy soils

**Teff Management**

Firm seed bed at planting is absolutely critical. Seeding depth should not exceed 1 cm. 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 10 cm. 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
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
Serradella
Biserullia
Annual Clovers
  Arrow Leaf
  Balansa
  Crimson
  Persian
  Subterraneum
Perennial Clovers
  White Clover
  Red Clover
  Strawberry Clover
Vetch
Lucerne
Lespedeza
Faba Beans
Lupines
Forage Peas
Birdsfoot Trefoil
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.

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Lupines
Forage Peas
Birdsfoot Trefoil
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
Serradella
Biserullia
Annual Clovers
  Arrow Leaf
  Balansa
  Crimson
  Persian
  Subterraneum
Perennial Clovers
  White Clover
  Red Clover
  Strawberry Clover
Vetch
Lucerne
Lespedeza
Faba Beans
Lupines
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- 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.

Persistor

Persistor is a spineless Polymorpha medic with a relatively high percentage of soft seed compared to Santiago. It has high herbage and seed production. Developed to extend the role of annual medics, particularly in phase pastures, where higher levels of soft seed will result in more densely regenerating second year pastures. Persistor is suited to farming systems with either a long-term or short-term phase. Persistor can provide a sound base for pasture with a broader range of maturity, pest and pathogen tolerances, and hard seededness. This allows for the pasture to respond to various environmental fluctuations, and management practices.

Characteristics
- Mid-maturing variety
- Flowering 90-95 days in regions with an average 350 mm rainfall
- Grows well on alkaline to slightly acid soil

Seeding Rate
- Dryland: 4-10kg/ha
- High rainfall/Irrigation: 10-14 kg/ha

Santiago
- Early to mid Maturing
- Adaptable variety which grows on wide range of soils
- Very hard seeded (91%)
- Outclassed by Scimitar
- Sowing rate: 4-10kg/ha (Pure) 1-4kg/ha (Mixes)
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
• **Sowing rate**: 4-10kg/ha (Pure), 1-4kg/ha (Mixes)

Parabinga
• Early maturing – up to 88 days to flowering
• Very high levels of hard seed
• **Sowing rate**: 4-10kg/ha (Pure), 1-4kg/ha (Mixes)

Paraggio
• Mid maturing variety – about 98 days to flowering
• Adaptable variety with good early vigour
• **Sowing rate**: 4-10kg/ha (Pure), 1-4kg/ha (Mixes)

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%)
**Sowing rate**: Pure stand 5-12kg/ha
**Sowing rate**: Mixed 2-5kg/ha

### Medic Cultivars

<table>
<thead>
<tr>
<th>Type</th>
<th>Cultivar</th>
<th>Soil pH</th>
<th>Rainfall</th>
<th>Hard seeded rating</th>
<th>Insect tolerance</th>
<th>Days to flower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymorpha</td>
<td>Persistor</td>
<td>Neutral-acid</td>
<td>350-450</td>
<td>7</td>
<td>High</td>
<td>85-95</td>
</tr>
<tr>
<td>Polymorpha</td>
<td>Scimitar</td>
<td>Moderate-acid-alkaline</td>
<td>350-450</td>
<td>8</td>
<td>Mid-high</td>
<td>80-90</td>
</tr>
<tr>
<td>Polymorpha</td>
<td>Santiago</td>
<td>Moderate-acid-alkaline</td>
<td>325-425</td>
<td>10</td>
<td>Susceptible</td>
<td>80-85</td>
</tr>
<tr>
<td>Truncatula</td>
<td>Jester</td>
<td>Neutral-alkaline</td>
<td>350-500</td>
<td>9</td>
<td>High</td>
<td>110</td>
</tr>
<tr>
<td>Truncatula</td>
<td>Parabinga</td>
<td>Neutral-alkaline</td>
<td>250-350</td>
<td>8</td>
<td>Mid-high</td>
<td>80-88</td>
</tr>
<tr>
<td>Truncatula</td>
<td>Paraggio</td>
<td>Neutral-alkaline</td>
<td>350-450</td>
<td>8</td>
<td>Mid-high</td>
<td>95-100</td>
</tr>
</tbody>
</table>
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. Up to now, there has been a recommendation for equal quantities of seed of both species to be included in sowing mixtures. The intended result of this is that pink serradella dominates for 2-3 years and then declines in incidence to be replaced by the yellow serradella as its seeds soften and germinate. However, with the development of cultivars of pink serradella with a good level of hard seededness, yellow serradella may be less important. 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.

<table>
<thead>
<tr>
<th>Type</th>
<th>Cultivar</th>
<th>Soil pH</th>
<th>Rainfall requirements (mm)</th>
<th>Hard seeded rating</th>
<th>Insect tolerance</th>
<th>Days to flower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pink</td>
<td>Emena</td>
<td>Acid-Neutral</td>
<td>300</td>
<td>1</td>
<td>High</td>
<td>90</td>
</tr>
<tr>
<td>Yellow</td>
<td>Santorini</td>
<td>Acid-Alkaline</td>
<td>300</td>
<td>10</td>
<td>High</td>
<td>100-110</td>
</tr>
</tbody>
</table>

Hard Seeded Rating: 1 = Few to no hard seeds
Soil quality: Alkaline = pH8.5; Neutral = pH6.5; Moderate acid = pH5.0; Acid = pH 4.5
Biserulla (Biserulla pelecinus)

Biserulla is a deep rooted, hard seeded, aerial seeding, self regenerating annual pasture legume. It will grow on a wide range of soil pH (from 4 to 8) and textures. Biserrula produces good quality forage in terms of dry matter digestibility, metabolisable energy and crude protein. It show good early vigour in regenerating stands. Biserrula is a very productive, good quality and persistent annual pasture legume. It has the capacity for high seed yields and will tolerate heavy constant grazing. Its deep rooted nature (2 metres) enables it to stay green 2 to 4 weeks longer than sub clover. There have been numerous reports of plants staying green during summer. About 50% of seeds will survive ingestion by sheep, allowing the seed reserves to be maintained at high levels with summer grazing.

Casbah Biserulla

- Maturity - Early/mid
- pH CaCl2 - 4.0 to 8.5
- Min Rainfall (mm) - 300
- Seeding rate (kg/ha) - 5-10

Annual Clovers

Arrowleaf Clover (Trifolium vesiculsum)

- An annual clover
- Upright in its growth habit
- A low bloat risk
- Suited to a range of soil types providing they are well drained and pH 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 slow to establish. Arrowleaf clover is very sensitive to being sown too deep (10mm)

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. 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 bank of seed. This is critical during its first year for regeneration in future seasons.
<table>
<thead>
<tr>
<th><strong>Frontier</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Early maturing approx 100 days to flowering</td>
<td></td>
</tr>
<tr>
<td>• Tolerates water logging and mild soil salinity</td>
<td></td>
</tr>
<tr>
<td>• Tolerates a wide range of broadleaf herbicides</td>
<td></td>
</tr>
<tr>
<td>• High winter/spring dry matter production and nitrogen fixation</td>
<td></td>
</tr>
<tr>
<td>• Excellent regeneration from hard seed</td>
<td></td>
</tr>
<tr>
<td>• Recovers strongly from heavy grazing</td>
<td></td>
</tr>
<tr>
<td>• <strong>Sowing rate</strong>: 2-6kg/ha (Pure) 1-2kg/ha (Mixes)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Paradana</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Annual regenerating clover</td>
<td></td>
</tr>
<tr>
<td>• Mid season maturity – approx 120 days to flowering</td>
<td></td>
</tr>
<tr>
<td>• Tolerates water logging and mild soil salinity</td>
<td></td>
</tr>
<tr>
<td>• <strong>Sowing rate</strong>: 2-6kg/ha (Pure) 1-2kg/ha (Mixes)</td>
<td></td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th><strong>Blaza</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Soft Seeded</td>
<td></td>
</tr>
<tr>
<td>• Mid season maturity – approx 122 days to flowering</td>
<td></td>
</tr>
<tr>
<td>• Shows good early vigour &amp; winter production</td>
<td></td>
</tr>
<tr>
<td>• Excellent pioneering plant, especially on acid soils</td>
<td></td>
</tr>
<tr>
<td>• Adapted to a large range of soil types, grows well in light soils</td>
<td></td>
</tr>
<tr>
<td>• Suitable for grazing fodder and green manure</td>
<td></td>
</tr>
<tr>
<td>• Provides large red flowers through spring</td>
<td></td>
</tr>
<tr>
<td>• <strong>Sowing rate</strong>: 8-10kg/ha (Pure) 1-4kg/ha (Mixes)</td>
<td></td>
</tr>
</tbody>
</table>

**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
Subterranean Clover (*Trifolium subterraneum*)

- 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

**Antas**

**Key Features**
- Mid-late season maturity - 134 days to flowering
- A superior replacement for Clare
- Higher level of hard seed offering better persistence over Clare
- Widely adapted to including slightly acid to alkaline soils
- Produces large leaves and is more of a forage type
- Offers excellent winter and spring herbage production

**Key Benefits**
Amazing seedling vigour and winter growth gives Antas excellent production throughout the year. Antas offers excellent winter and late season herbage production making it an ideal choice for grazing. It produces very large leaves which makes it attractive to stock and provides improved levels of digestability.

**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

**Sowing rate:**
- 4-6kg/ha (Pure)
- 6-10kg/ha (Irrig)
- 2-4kg/ha (Mixes)

**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

**Sowing rate:**
- 4-6kg/ha (Pure) 6-10kg/ha (Irrig) 2-5kg/ha (Mixes)

**Woogenellup**

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

**Sowing rate:**
- 6-10kg/ha (Pure)
- 10-15kg/ha (Irrig)
- 2-6kg/ha (Mixes)
### 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.

### Kotare White Clover

Kotare is a large leaved very high yielding white clover for dairy and beef grazing systems. Kotare has shown very high total yields in trial, with excellent summer and autumn yielding ability. The stolon growing point density of Kotare is high for a large leaved clover. More growing points gives clovers better recovery from damage caused by insects or pugging. When damaged, clover can regenerate from each growing point.

### Annual Clover Cultivars

<table>
<thead>
<tr>
<th>Type</th>
<th>Cultivar</th>
<th>Soil pH</th>
<th>Rainfall Requirements</th>
<th>Hardseeded Rating</th>
<th>Insect tolerance</th>
<th>Days to flower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrow Leaf Clover</td>
<td>Zulu II</td>
<td>Moderate acid</td>
<td>400 - 575 mm</td>
<td>10</td>
<td>Low</td>
<td>125 - 130</td>
</tr>
<tr>
<td>Balansa Clover</td>
<td>Paradana Frontier</td>
<td>Moderate acid</td>
<td>450 - 550 mm / 350 - 450 mm</td>
<td>10</td>
<td>High</td>
<td>115 - 120 / 100</td>
</tr>
<tr>
<td>Crimson Clover</td>
<td>Blaza</td>
<td>Moderate acid</td>
<td>550 - 750 mm</td>
<td>3</td>
<td>High</td>
<td>120 - 125</td>
</tr>
<tr>
<td>Persian Clover</td>
<td>Lightning Shaftal</td>
<td>Moderate acid</td>
<td>450 - 650 mm / 650 - 800 mm</td>
<td>3</td>
<td>Low</td>
<td>145 / 160</td>
</tr>
<tr>
<td>Subterranean Clover</td>
<td>Antas Woogenellup</td>
<td>Moderate acid</td>
<td>450 - 750 mm</td>
<td>3</td>
<td>Low</td>
<td>130</td>
</tr>
</tbody>
</table>

Hard Seeded Rating: 1 = Few to no hard seeds 10 = 90% hard seeds

Soil type: Alkaline = pH8.5; Neutral = pH6.5; Moderate acid = pH5.0; Acid = pH 4.5
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: 6-8kg/ha (Pure) 2-3kg/ha (Mixes).
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 bermudagrass, 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
- 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!

Freedom! - Premium Red Clover

Freedom! - so named because of its freedom from pubescence (non-glandular hairs) - is one of the latest red clovers developed exclusively for Barenbrug USA. Research indicates the attributes of Freedom! make it ideal for hay production. With less pubescence than typical red clovers, Freedom! promotes faster drying in the field and reduces the chance for loss of quality due to untimely rainfall. In addition, less pubescence also reduces the dustiness of hay, thus improving air quality. Freedom! is also well adapted for grazing and silage.

• Low pubescence and reduced dustiness
• Faster drying with impressive yields
• High forage quality – palatable and nutritious
• Improved winter-hardiness and persistence
• Fixes nitrogen – reduces fertilizer costs
• Performs best in moderately to well-drained soils
• Optimum pH for production is 6.0 to 7.6; however, it performs better than Lucerne in wet, acidic soils (pH 5.5-6.5)
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, overseeding 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. Sown in the 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.

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.

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

**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
- **Sowing rate**: 1-2kg/ha (Pure), 2-4kg/ha (Irrig), 1kg/ha (Mixes)
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.
Grazing Vetch

- Variety: 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
- Improved 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
- Sowing rate: 25-35kg/ha (Pure); 10-15kg/ha (Cereal Mixes)

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

Purple Vetch

- Variety: Popany
- Purple vetch - Soft Seeded
- Rainfall: 450mm-600mm+
- pH: 5.0-8.0
- Most Soil Types
- Sowing rate: 25-35kg/ha (Pure); 10-15kg/ha (Cereal Mixes)
- 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. Grass species are sometimes planted with winter dormant lucerne cultivars to reduce the invasion of weeds in late autumn and winter, when the lucerne plants are dormant.
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 - 4 year + option
- **Sowing rate:** 18-25kg/ha

**Pegasis Lucerne**

- Highly winter active  Dormancy 9
- Prostrate crown providing better ground cover
- Can persist well in low rainfall environments
- Suited to medium term rotations (4-5 years). Shown 13% improved plant persistence over 3 years compared to Cuff 101
- Very large leafed cultivar which demonstrates good retention
- Low crowns help protect against animal or cutting damage
- **Sowing rate:** 18-25kg/ha

**NEW** 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. It is been bred specifically to perform well in both dry land and irrigated systems.

- High yielding
- Multipurpose
- Excellent persistence
- Strong pest and disease resistance
- Good grazing tolerance
- Improved performance in cold, wet environments

**Recommended sowing rates:**
Dry land: 4 to 10 kg/ha; Irrigation: 15 to 20 kg/ha
**L70 Lucerne**

L70 is a new release to the Australian domestic market having been a successful export replacement for Aurora. With significant amounts of L70 now in production in Australia, it allows us to introduce this exciting new Aurora replacement to global producers.

L70 exhibits excellent forage traits and good disease profile consistent with all of the Seed Distributors’ premium range Lucernes.

These attributes combined with superior plant genetics makes L70 an excellent new Lucerne option over Aurora. This gives Australian farmers higher returns and extra confidence with the Establishment Guarantee Program that older Lucerne varieties cannot offer or compete against.

- **Winter Activity:** 7
- **Min Rainfall (mm):** 350

**Recommended sowing rates:**
- Dry land: 4 to 10 kg/ha
- Irrigation: 15 to 20 kg/ha

**Insect and disease tolerance**

<table>
<thead>
<tr>
<th>Spotted Aphid</th>
<th>Blue Aphid</th>
<th>Pea Aphid</th>
<th>Phytophthora</th>
<th>Anthracnose</th>
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<tr>
<td>HR</td>
<td>HR</td>
<td>R</td>
<td>HR</td>
<td>MR</td>
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HR = Highly resistant, R = resistant, MR = moderate resistant, S = susceptible

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**SA Standard**

SA Standard was preferred over the small amount of other available cultivars because of its high grazing tolerance, drought resistance 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.

**Recommended sowing rates:**
- Dry land: 4 to 10 kg/ha; Irrigation: 15 to 20 kg/ha

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**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 at the rate of 15kg/ha in mid-spring. 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.
Faba Bean (Vicia faba)

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 roots need to be inoculated with the appropriate strains of rhizobia (Rhizobium leguminosarum), 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 rates vary from 130 - 150kg/ha.

Lupines (Bitter and Sweet)

Narrow Leaf Lupines (Lupinus angustifolius)

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.

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
Arvika Forage Peas
(Pisum sativum)

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

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 enrich the soil with air nitrogen and is ideal for crop rotation.

Agronomical traits
• Sowing time:
  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.
• Sowing quantities:
  Pure stand: 100 – 120kg/ha
  In mixtures: 25 – 35kg/ha

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

Birdsfoot Trefoil (Lotus corniculatis)

Lotus corniculatus 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 giving time to build up reserves before first grazing

Great companion crop for temperate grasses
Sowing rate: 2-4kg/ha (in mixes); 6-8kg/ha (monoculture)
**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

**Ebony Cowpea (Vigna Unguiculata)**

Ebony cowpea is an annual summer legume, ideal for high quality summer forage for sheep and cattle, providing multiple grazing opportunities throughout the growing season. Ebony 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 en 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 soils); 25-30kg/ha (fertile soils)
**B1 Burgundy Bean**  
*(Macroptilium Bracteatum)*

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
- Suits a wide range of soils (sandy loam to heavy clays; pH 4.5 - 8)
- Excellent N – fixation
- Good drought tolerance (min 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 (monoculture); 2-3kg/ha (mixes)

**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 is 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 swards)
Herbs and Brassicas
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, rape, kale, and swedes - 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. 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-flavors in milk by preventing brassica consumption two hours before milking. Others prefer to only feed rapes to lactating dairy animals plus adequate grass roughages. 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.
Commander Chicory

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 should be sown at 5-6kg/ha with legumes such Lucerne or at 1-2kg/ha as part of a grass clover mix. Chicory requires a well prepared seed bed and soil temperatures of greater than 10ºC 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
Barkant Forage Turnip

- Vigorous white turnip
- 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 trampling and polluting. It is also important not to overfeed the cattle when they are allowed to graze the turnips at first. Extreme high dry matter 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 at 3-5kg/ha. 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.
Mammoth Purple Top Turnip

Widely adapted, older variety, hard flesh turnip, high yielding, suited to sheep/beef in drier turnip areas.

- 12-14 weeks to maturity
- 1-2 kg/ha sowing rate
- Most widely used variety
- Produces a large round bulb

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.

Ideal in mixtures with other Brassicas

Japanese Radish (Raphanus sativus)

Fodder radish (Raphanus sativus), more 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 would require supplementary irrigation. It can be effectively 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
- Sowing rate: 2-4kg/ha
- Shows good reaction to phosphate an potassium fertilizer
- Excellent rotational crop with maize
- Can be used as stand over feed for the winter

Fills the feed gap.
Interval Rape

- 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 kg/ha

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Fills the feed gap
Caledonian Kale

• Tall, high yielding kale
• Good quality – soft stems
• Caledonian high stem ME for a tall kale.
• Winter hardy
• Club root tolerance

Using Caledonian
Sowing date: Nov - Dec
Graze: May - Aug
Maturity date: 150 220 days
Typical yield: 12-16 t DM/ha
ME: 11-12 MJ/kgDM
Sowing rate: 5 kg/ha

Fodder Beet

• 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, sheep and deer 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. Brassicas like kale have lower establishment costs, and can be sown on more diverse land classes. **If you’re new to fodder beet, seek advice from your retailer well before sowing.**

Impressive yield & quality

Exceptional high yields
Fodder Beet Types

It’s important to choose the correct fodder beet variety for your feed requirements and intended use (grazing, lifting or both). Good starting points for this decision are bulb DM content, and whether the crop is only intended to be lifted.

Fodder beet can be largely divided into three groups based on these factors:

**Low bulb DM% (12-15%)**
Lower yield potential, usually with a high % of bulb above ground (50%+). Only suited to grazing.

**Medium-high bulb DM% (16-20%)**
Higher yield potential than low DM % types, and can be grazed. e.g. Robbos. Some can also be successfully lifted or grazed e.g. Ribondo. Bulbs are generally 43-50% above ground.

**Lifting types**
Bulbs sit lower in the ground, generally not suitable for grazing. Very high DM % types (e.g. Blizzard) are best for maximum yield potential and increased storage life.

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.

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** Robbos

Robbos has very good leaf keeping ability through autumn, winter and early spring. This is important because the leaf comprises 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

**NEW** Ribondo

Ribondo is a true mono germ with very even bulb shape and size and erect leaves, so it is ideal for lifting or grazing. The even height of bulbs above ground means little bulb is wasted when leaves are chopped off in the mechanical harvesting process.

- **Best feeding method:** Grazing and lifting (dual purpose)
- **Bulb DM content** Medium-high (18-20%)
- **Sowing rate:** 80,000 seeds/ha if grazing; 100,000/ha if lifting

**NEW** Blizzard

Blizzard is a white skinned lifting fodder beet with high DM content (20-22%). It can produce very high DM yields, and should be used when maximum yield/ha is sought from a lifted crop. Because of its high DM content, Blizzard will store longer in a windrow than lower DM types when leaves are removed.

- **Best feeding method:** Lifting only (specialist lifting type)
- **Bulb DM content** Very high (20-22%)
- **Sowing rate:** 100,000 seeds/ha

**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. A second non residual weed spray (e.g. glyphosate) can then be applied just prior to sowing.
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 higher than drilling
- Seed to soil contact important
- Consolidation – rolling very important!
- Plant population critical to yield

Fertility – Overview
- Brassicas remove high levels of nutrient
- 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
- Respond 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 pasture
- Kale & rape > than bulb crops
- Aim to have soil at max 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 of: (ET, rain, irrigation)
- Start early – hard to catch up

Weeds
- Have significant effect on yield
- Weed free seed bed ideal for establishment
- Pre-emergent sprays – rainfall for activation

- Post emergent 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 - allow time to adjust, reduce rate of intake
- Shift fences at least daily 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
Grains and Cereals
Saia Oats
Forage Oats
Forage Barley
Triticale
Rye

Cereal grains are a versatile crop that can be harvested for forage or grain. Cereal grains can be an excellent source of forage for dairy cows. You can expect quality forage similar to that of other cool season grasses.

Cereal grains can provide a variety of feedstuffs for your animals. Cereal grain 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 world's oldest cover crops. Planted specifically for its high production of biomass both above and below the soil, it is vitally important in increasing 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. Sowing rates should not exceed 60kg/ha.

**BarSai - New Saia Oat**

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 at seeding rates of 80 – 100kg/ha.

**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 and sowing rates of 60kg/ha should not be exceeded.
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 (Triticeosecale)

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. Depending on seed size the seeding rate should be 75-120kg/ha.

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
• 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 than 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

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 and at a sowing rate of 50kg/ha.
Cover Crops
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 neighboring 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

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
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

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

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

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
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

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 1 m 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
- Sub Clover
- Fescue
- Paspalum
- Birdsfoot Trefoil

Potential cover crop problems

The use of cover crops is not without some potential problems. Many annual cover crops must be mowed before they produce viable seeds which could become a weed. 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.
Cover crops with the option to graze
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.

Utilizing 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.
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
  - Overshadow effect
  - Aggressive growth habit
- Soil improvement can be a added benefit through root crops and legumes.
- Products for this purpose:
  - Oats, White Mustard, Fodder Radish, Vetch, Canola (winter rainfall area)
  - Forage Sorghum, Babala, Teff, Cowpeas, Sunn Hemp, Burgundy Bean, Saia Oats (summer rainfall area)
- Example of a mix:
  - 10kg BarSaia + 2kg Tajuna Radish + 10kg Haymaker Vetch + 2kg Sito Mustard

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, Burgundy Beans, Velvet Beans, Soya Beans, Sunn Hemp, Fodder Radish, Forage Sorghum (nitrogen retention) (summer rainfall area)
- Example of a mix
  - 10kg Bargrazer Forage Sorghum + 10kg Ebony Cowpeas + 4kg Dolichos Lablab + 2kg Tajuna Fodder Radish

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:
  - Fodder Radish, Faba Beans, Forage peas, White Mustard, Vetch, Oats (winter rainfall area)
  - Fodder Radish, Turnips, Beets, Sunflower, Forage Sorghum, Sunn Hemp, Dolichos Lablab, Chicory (summer rainfall area)
- Example of a mix:
  - 3kg Tajuna Fodder Radish + 10kg Arvika Forage Peas + 2kg Sito White Mustard + 25kg Outback Oats
Fibre

- The main purpose is to produce the maximum dry matter quantity 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, Stooling Rye, Oats, Rye, Forage Barley (winter rainfall area)
  - Forage Sorghum, Babala, Teff, Sunflower, Buckwheat, Rhodes Grass (summer rainfall area)
- Example of a mix:
  - 6kg Bargrazer Forage Sorghum + 5kg Babala + 4kg Sunflower + 4kg Buckwheat

Protein Boost

- Main purpose is to have a high protein forage source.
- Single species can be used but multi-specie combinations have 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, Stooling Rye, Vetch, Lupines, Forage Peas, Fodder Radish (winter rainfall area)
  - Jap Radish, Turnips, Kale, Cow Peas, Burgundy Beans, Forage Sorghum, Chicory (summer rainfall area)
- Example of a mix:
  - 50kg US2014 Triticale + 10kg Haymaker Vetch + 20kg Bitter Lupines
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

New concepts from Barenbrug

A full range of Turf Grass species are available
Pasture Summary
# Pasture Crop Summary

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Probable</th>
<th>Possible</th>
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### Pasture Crop Summary

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<tr>
<td>Tall Fescue</td>
<td>Festuca arundinaceae</td>
<td>bc</td>
<td></td>
<td>xy</td>
</tr>
<tr>
<td>Perennial Ryegrass</td>
<td>Lolium perenne</td>
<td>abc</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

**Soil Type**
- a: Sandy
- b: Loamy
- c: Clay

**Utilisation**
- x: Grazing
- y: Foggage
- z: Hay
We are a global leader in seeds for turf and forage grass and legumes. With our international focus, we offer local sustainable solutions with added value to end-users around the world. We offer continuity to our customers, suppliers and shareholders while creating an inspiring and rewarding environment for our employees. As an innovative family owned company we focus on research and development and the successful marketing of innovative products. We aim to further strengthen our position in existing markets and use this strong foundation to enter new markets.

We are the Royal Barenbrug Group.

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