# Table of Contents

## Passion for Grass

### Innovations

- R&D and Innovations ........................................... 06
- Innovations - NutriFibre ..................................... 08
- Innovations - Prota Plus .................................... 10
- Innovations - Yellow Jacket ................................. 12
- Innovations - Proterra Maize ............................... 13

### Products

- Grassland .......................................................... 14
- Temporary grassland Green Spirit mixtures .......... 16
- Permanent grassland Green Spirit mixtures .......... 18
- Clover blends .................................................... 21

- Lucerne ................................................................ 22
- Artémis, Alexis, Alpha, Bardine .......................... 24
- Verdon, Dorine .................................................... 25

- Sorghum .............................................................. 26
- Barsudan, Lussi ................................................. 29
- Sweet Creek, BMR-333, Tonga ......................... 30

- Green manure grasses ........................................ 32
- Proterra Maize, Proterra Cereals ....................... 34
- Intermezzo, SoilCover ......................................... 35

- Horse paddock & pasture .................................... 36
- Horse Master, Horse Master Hay ....................... 39

### Varieties

- Grass varieties ................................................... 40
  Varieties per species, descriptions

- Clover varieties .................................................. 50
  Varieties per species, descriptions

- Other forage and green manure varieties ............ 56
  Varieties per species, descriptions

- Consulting and sales ......................................... 62
We are the global leader in seeds for turf grass, 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 & 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.

Passion for Grass

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. We have achieved our position in the grass seed market not just by putting our craftsmanship into practice; it is a role that we have built up and cultivated over the years. The basis for our success is captured in five core values: Innovation, Partnership, International, Quality and Marketing.
R&D and innovations

Grass is a wonderfully versatile and adaptable plant, offering an enormous diversity of over 8,000 species. Barenbrug takes only a small proportion of these to carefully select and cross them in order to develop improved commercial varieties of particular species. Barenbrug runs breeding programmes for grasses and forage legumes at 10 breeding stations worldwide. Local testing of varieties and mixtures is extremely important. For that reason, Barenbrug Research runs over 29 testing locations all over Europe (see map at page 6). This makes our products locally adapted and reliable.

Grass has a tendency to make the best of even the most difficult conditions. However, specific selection and breeding for differing climatic conditions produces grasses that are supremely able to exploit their environment. The results are extremely successful cultivars which can cope with seasonal variations, both within and between seasons. The main traits where our products are selected on are: forage yield, feed quality, persistency, sward density, winter-hardiness, disease resistance and drought-tolerance. Other characteristics as lodging resistance, growth pattern, palatability and traffic tolerance are taken into account as well. After a long and intensive evaluation a new cultivar can be launched after approx. 15 years.

As the real ‘consumer’ of our grasses and legumes are animals, many trials are conducted with live animals (cows, sheep, horses). Grass varieties at Barenbrug Research trial locations are tested under grazing, to observe their palatability, survival and adaptability to real farm situations. Also feed quality (ie. digestibility, protein, energy, fibre, minerals etc.) of all grass and legume varieties is evaluated both in simulated situations (laboratory) as by live animals.

The use of animal evaluation in forage breeding and development is essential to select the highest quality products which exactly suits the need of our customers.
R&D and innovations

NutriFibre
Finally; effective fibre and feed value in one

The success factor of NutriFibre by Barenbrug is its combination of effective fibre and feed value. NutriFibre is based on soft-leaf tall fescue.

Traditional tall fescue offers a combination of high long-term yield, hard leaves and a low feed value. Barenbrug has now succeeded in considerably improving both the palatability and feed value of this species, thus creating a softleaf tall fescue. This makes NutriFibre silage the perfect source of forage for the modern dairy farm.

CRUDE PROTEIN AND DIGESTIBLE CELL WALLS

<table>
<thead>
<tr>
<th>Perennial ryegrass</th>
<th>Meadow fescue</th>
<th>Soft-leaf tall fescue</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUGAR</td>
<td></td>
<td>RUMEN ACTIVITY</td>
</tr>
<tr>
<td>Festuclatum</td>
<td></td>
<td>Timothy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cocksfoot</td>
</tr>
</tbody>
</table>

LIGNIN AND CELLULOSE

Up to 20 % more crude protein

NutriFibre’s deep roots also make for additional utilisation of nutrients in the soil. This leads to higher nitrogen efficiency and protein utilisation. Various trials carried out have shown that tall fescue contains up to 20 % more crude protein than other species. In fact, soft-leaf tall fescue yields more protein even when less fertiliser is applied, as shown in the following table.

<table>
<thead>
<tr>
<th>GRASS SPECIES</th>
<th>DRY MATTER YIELD IN TONS/HA</th>
<th>CRUDE PROTEIN YIELD IN KG/HA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial ryegrass</td>
<td>10.3</td>
<td>12.2</td>
</tr>
<tr>
<td>Cocksfoot</td>
<td>13.2</td>
<td>14.2</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>13.8</td>
<td>14.3</td>
</tr>
</tbody>
</table>

SOURCE
Louis Bolk Institute, 2011

Up to 30 % more yield

Tall fescue establishes slowly because it invests a lot of energy in the development of its root system in the first year. But after that first year, tall fescue produces 25 - 30 % more mass than perennial ryegrass, corresponding to around €750,— more profit per hectare per year.

During prolonged drought the advantage is even more significant more; the long roots of NutriFibre are able to absorb water from deeper layers in the soil so that the grass will continue to grow. Scientific research shows significant more energy and protein yield with NutriFibre compared to other species. (Source: Cougnon, M., 2013. Potential in mixed sward and breeding of tall fescue. Gent University, Belgium.)

Forage with effective fibre for healthy cattle

Healthy cattle are the first matter of importance. The NutriFibre technology ensures that the silage offers cattle more effective fibre. Trials carried out with rumen fistulated cattle showed that silage containing NutriFibre promotes rumen activity and therefore prevents rumen acidosis. This approach therefore ensures that cattle remain healthier and perform better.

NutriFibre's deep roots also make for additional utilisation of nutrients in the soil. This leads to higher nitrogen efficiency and protein utilisation. Various trials carried out have shown that tall fescue contains up to 20 % more crude protein than other species. In fact, soft-leaf tall fescue yields more protein even when less fertiliser is applied, as shown in the following table.

SOURCES
Louis Bolk Institute, 2011

Minimal rumen acidosis with NutriFibre

Rumen acidosis occurs at 60 % of all high-productive dairy farms. The pH in the rumen of animals affected by rumen acidosis is too low, causing the rumen flora to malfunction. This results in disappointing milk production, low protein and fat contents and problems concerning fertility and claw health. Research into the effects of different grass species on the rumen of fistulated cattle show that soft-leaf tall fescue offers a combination of effective fibre with additional rumen activity and digestible cell walls, so that the feed value is also high.

Resistant to drought

It is only really worthwhile harvesting a high tonnage over a period of several years, if the grass has the required persistency. NutriFibre’s deep roots extract water from lower soil levels, while also better utilising soil nutrients and fertilizers. NutriFibre’s deep rooting (up to a depth of 105 cm) is a great benefit in this regard. Simply compare it with perennial ryegrass, whose root formation is concentrated in the upper 10 cm of soil (see picture).

Mineral efficiency

Soft-leaf tall fescue utilises more of the nitrogen contained in the soil than perennial ryegrass. It can therefore yield up to 450 kg of crude protein more per hectare on the same amount of fertilizer.

SOURCE
Louis Bolk Institute, 2011

Detailed information at www.barenbrug.biz/nutrifibre
That’s what farmers need to prevent high feed costs. Concentrate feed is very expensive, so there is a need to increase on-farm protein production.

For this reason Barenbrug has launched a new concept: Prota Plus. Prota Plus is a seed mixture for short-term protein production. This combination of the best ryegrasses and annual clovers provides a high quality feed for dairy cows.

High feed value
Concentrate prices are sky-high at the moment. Prices of cereals and soybean meal have increased over 150% in recent years and are not likely to fall. Buying in additional protein is a huge cost factor, especially for farms which feed a lot of corn silage. Feeding more high quality grass silage is one part of the solution, but more can be done.

This situation prompted Barenbrug to come up with other solutions to get more home-grown protein sources. Legumes can play an important role in this, as they are a natural nitrogen supplier. Fast-growing annual clover can be particularly important on farms which grow winter forage crops. These legumes boost nitrogen levels in the crop and more importantly, protein levels in the silage. However, it’s not always easy to achieve the optimal combination of grasses and clovers. Barenbrug has tested a lot of different combinations and mixtures of grass and legumes in different areas in developing Prota Plus.

Feed analysis from the silage proved that the feed value, and especially digestible protein, increases substantially. Silage from Prota Plus compared to pure ryegrass:

- + 5 - 15 % energy (MJ ME)
- + 30 - 50 % digestible protein.

Composition*
Prota Plus is a high-quality mixture containing top varieties of annual ryegrasses combined with annual clovers like Persian, Crimson and Berseem clover. The exact composition is based on the specific area and management system. Prota Plus has been developed by Barenbrug Research after internal trials and field-tested in many different regions.

* The exact composition is based on the local conditions and management system, such as climate, soil condition, sowing period, cutting frequency and silage or grazing use. For example: in mixtures for autumn sowing a higher content of Westerwold ryegrass is applied. Or: in dry areas Crimson clover is the best performing type and therefore the main clover species in the mix.
**Protective Polymer Matrix - unique Rhizobium strain**

A new, unique Rhizobium strain was developed by Barenbrug for this product through the extensive selection of many strains under a wide range of conditions. The new strain has demonstrated perfect survival capabilities under tough conditions. This ultimately ensures that more vigorous Rhizobia are present in the soil. Extensive research and field trials at Barenbrug Research have shown that lucerne seeds with Yellow Jacket - Rhizobium coating benefit forage production, especially under tough conditions.

**Sowing can be done in different ways:**

- With a special grass-sowing unit on the maize sowing machine, sowing directly with maize.
- With a grass sowing machine or harrow/sowing unit in the week before or after maize has been sown.

**Extensive trials by independent institutes** prove that Proterra Maize is tolerant to many herbicide treatments. Weeds and weed grasses can be tackled, whereas the green manure crop will survive. The herbicide slows down the growth of Proterra Maize, the main advantage of which is that it doesn’t compete with maize. Ask your local supplier for the recommended herbicide mixes to use on Proterra Maize.

* Gent University, Belgium, 2014.
* Knowledge Centre for Agriculture, Denmark, 2014.

**Green manure grass for undersowing in maize**

Improves soil fertility and structure by intensive rooting

During summer Proterra Maize develops slowly under the maize crop. The strong grasses tolerate shade and are drought-resistant. Shortly before the maize is ready to harvest its growth increases, as more light penetrates through the maize crop.

Directly after harvesting the maize, a well-established green manure grass covers the field. Proterra Maize produces roots up to 90 cm deep, which is excellent for soil structure. It produces a lot of organic matter which is ideal for soil fertility. Proterra Maize prevents leaching of nutrients and forms a perfect green manure for the following crop.

Contains specially selected grasses

The grass species and varieties used in Proterra Maize are specially selected for developing under a cover crop without competing with the maize. They grow well but slowly under the shade of the large maize plants. During periods when the maize needs all its energy for starch formation, the growth of Proterra Maize is temporarily restricted to avoid competition.

Sown directly or shortly after maize

It is important to sow Proterra Maize directly or shortly (within 7 days) after sowing maize. At this time the soil usually contains enough moisture. By sowing in the same period, the Proterra Maize will be well-established at the time of herbicide treatment. If it is sown too late there’s a risk of failure due to drought.

**R&D and innovations**

Yellow Jacket

Guaranteed top yields for lucerne with Yellow Jacket enhanced seed coating

Yellow Jacket - Rhizobium coating is Barenbrug’s enhanced seed coating for lucerne. Using new technology, high levels of effective Rhizobia are embedded in a protective polymer matrix. Together with a nutrient booster containing all essential minerals and trace elements, this product is designed to improve establishment and increase forage production. All of our lucerne varieties are available with Yellow Jacket seed coating.

Reasons for using Yellow Jacket - Rhizobium coating:

- A ready-made product saves labour, reduces risks.
- Unique Rhizobium strain.
- Improved establishment under difficult conditions.
- Better use of available water and soil moisture.
- Increased disease resistance.
- Improved nitrogen fixation.
- Increased forage and protein yield.

All of our lucerne varieties are available with Yellow Jacket seed coating.

Detailed information at www.barenbrug.biz/yellowjacket

Proterra Maize

Green manure grass for undersowing in maize

Detailed information at www.barenbrug.biz/grass_under_maize
From an economic point of view, grassland plays a significant role on every dairy farm. Dairy herds are growing, as is milk production per cow, which is why farmers are constantly looking for ways to improve the efficiency of their grassland. A balanced feed ration is required. That is why high-performance grassland is essential for long-term profitability. Pastures that produce a massive amount of grass annually are the key to success.

Grassland can be combined with clovers in order to stimulate yield with moderate/low fertilization levels. As clovers fix nitrogen from the air, they are the ‘natural’ fertilizer for many grasslands. Red and white clover improve protein yields of both grazing and silage fields.

The value of Green Spirit grassland
Trials by official institutes and experience on working farms have shown that the varieties used in the Green Spirit mixtures produce at least 5% more total feed value per hectare than common seed mixtures. This results into 600 - 700 kg dry matter per hectare more, which in practice means enough extra energy and protein available to provide an additional 1,000 kg milk per hectare. With current milk prices a farm can earn €350,— per hectare more every year from Barenbrug’s Green Spirit products.

Exclusive distribution
Green Spirit is distributed all over Europe by exclusive Barenbrug dealers.

Green Spirit
Massive grass production, better palatability

Green Spirit is our line of grass and clover mixtures for high-yielding farms and offers solutions for the modern farmer. There is a Green Spirit mixture to suit each type of grassland and farm management system available, which provides a massive high quality forage yield, better palatability and improves animal health.

Maximizing returns from grass
Green Spirit mixtures contain a well-balanced composition of Barenbrug’s top varieties, so the farmer can get the very best out of grass. These mixtures provide durable and high quality pastures which guarantee a high protein content and high levels of energy and effective fibre in both fresh grass and silage. This maximizes the returns from grass.

Green Spirit product line with grass and clover mixtures for high-yielding farms

<table>
<thead>
<tr>
<th>Temporary grassland (1 - 3 years)</th>
<th>Utilization (years)</th>
<th>Grazing</th>
<th>Silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Spirit Production 1</td>
<td>The ideal solution for short-term forage</td>
<td>1</td>
<td>✓</td>
</tr>
<tr>
<td>Green Spirit Production 2</td>
<td>Massive forage yielder for intensive farming</td>
<td>2</td>
<td>✓</td>
</tr>
<tr>
<td>Green Spirit Production 3</td>
<td>15 - 20 % more high quality grass</td>
<td>3</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Prota Plus</td>
<td>More protein from your own land</td>
<td>1</td>
<td>✓ ✓ ✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permanent grassland (4 years and more)</th>
<th>Utilization (years)</th>
<th>Grazing</th>
<th>Silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Spirit Grazing</td>
<td>Delicious fresh grass from pasture</td>
<td>4+</td>
<td>✓</td>
</tr>
<tr>
<td>Green Spirit Silage</td>
<td>Silage with the highest feed value</td>
<td>4+</td>
<td>✓</td>
</tr>
<tr>
<td>Green Spirit NutriFibre</td>
<td>Effective fibre and feed value in one</td>
<td>4+</td>
<td>✓</td>
</tr>
<tr>
<td>Green Spirit Biogas</td>
<td>For the maximal biogas yield per hectare</td>
<td>4+</td>
<td>✓</td>
</tr>
<tr>
<td>Green Spirit Overseeding</td>
<td>The grassland renovator</td>
<td>4+</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Green Spirit Lucerne-Grass</td>
<td>High energy grass x high protein lucerne</td>
<td>4+</td>
<td>✓ ✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clover mixtures</th>
<th>Utilization (years)</th>
<th>Grazing</th>
<th>Silage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartet</td>
<td>White clover blend</td>
<td>4+</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Duet</td>
<td>Red and white clover blend</td>
<td>3 - 4</td>
<td>✓</td>
</tr>
</tbody>
</table>
## Temporary grassland

### Production 1

**The ideal solution for short-term forage**

**Silage**
- Silage
- Grazing

- Suitable for 6 - 12 months production.
- Can be used for 1-cut systems as well.
- Ideal for double-cropping.
- Extremely high-yielding.
- Based on varieties with superb standability.
- Leafy grass for maximal digestibility and feed value.
- Efficient utilization of slurry, manure and fertilizers.
- Very resistant to diseases such as crown rust.

**Composition**:  
- Westerwold ryegrass - tetraploid 50 %
- Italian ryegrass - tetraploid 50 %

### Production 2

**Massive forage yielder for intensive farming**

**Silage**
- Silage
- Grazing

- Grass for maximum use of 2 years in mild climates.
- 1-year forage for continental and Nordic climates.
- Perfect intercrop on farms with intensive crop rotation.
- Yields 35 % more than permanent grassland.
- Gives excellent silage for high-performance dairy cows.
- Contains diploid Italian ryegrass for better regrowth and award persistency.
- Improves soil organic matter and soil structure.

**Composition**:  
- Italian ryegrass - tetraploid 50 %
- Italian ryegrass - diploid 50 %

### Production 3

**15 - 20 % more high quality grass**

**Silage**
- Silage
- Grazing

- Grass mix for 2 - 3 year production period.
- Excellent for fast crop rotation on many farms.
- Shows good tolerance to (rotational) grazing.
- Contains ‘perennial type’ hybrid ryegrass varieties.
- Yields 15 - 20 % more than permanent grass leys.
- Superb digestibility high sugar and protein content.
- Faster regrowth, low aftermath heading.
- Very efficient use of nutrients from fertilizers.

**Composition**:  
- Hybrid ryegrass - diploid 30 %
- Hybrid ryegrass - tetraploid 30 %
- Perennial ryegrass - diploid 20 %
- Perennial ryegrass - tetraploid 20 %

---

### Specifications

**Production 1**

- Seed rate: 35 - 45 kg/ha  
- Sowing period: Mild climates - autumn/spring, Continental/Nordic climates - spring/summer  
- Sowing depth: 1.0 - 2.0 cm  
- Packaging: 15 kg bags

**Production 2**

- Seed rate: 40 - 50 kg/ha  
- Sowing period: Mild climates - autumn/spring, Continental/Nordic climates - spring/summer  
- Sowing depth: 1.0 - 2.0 cm  
- Packaging: 15 kg bags

**Production 3**

- Seed rate: 45 - 55 kg/ha  
- Sowing period: Mild climates - autumn/spring, Continental/Nordic climates - spring/summer  
- Sowing depth: 1.0 - 2.0 cm  
- Packaging: 15 kg bags

### More protein from your own land

**Prota Plus**

**Silage**
- Silage
- Grazing

- Grass/clover-mixture for 6 - 12 months production.
- Contains very fast developing clover species.
- For silage, fresh feeding or rotational grazing.
- Contains 30 - 50 % more digestible protein, equivalent to 700 kg soybean meal per hectare.
- Excellent feed value and energy content (+ 5 - 15 % MJ).
- Can yield up to 20 % more, especially at lower fertilizer rates.
- Deep rooting clovers improve soil structure and fertility.

**Composition**:  
- Italian/Westerwold ryegrass 50 - 70 %
- Crimson/Berseem/Persian clover 50 - 30 %

---

* Variety selection based on local conditions.
**Permanent grassland**

**Grazing**

Delicious fresh grass from pasture

- Silage
- Grazing

- Gives the highest milk production from fresh grass.
- Late heading varieties for the best grass quality.
- Highest disease resistance for maximal intake.
- Fast regrowth, production peak within 3 weeks.
- Long and stable growth curve and grass supply.
- Forms a dense and persistent sward.

**Silage with the highest feed value**

- For grassland which is used for silage.
- Suitable for hay or haylage production as well.
- Mix of the best varieties for maximal feed value.
- Gives high digestibility and protein content of silage.
- Saves the farmer on concentrate costs.
- Yields maximal in 30 - 40 day growth periods.
- Durable and long-term persistent.

**Composition***:

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>O</th>
<th>C</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial ryegrass</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Timothy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Meadow fescue</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cocksfoot</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Can be combined with clover blend Quartet or Duet.

**Specifications**

- Sowing rate: 35 - 40 kg/ha
- Sowing depth: 1.0 - 1.5 cm
- Packaging: 15 kg bags

**Legenda**

- n nordic climate
- o Eastern - continental climate
- c oceanic climate
- M Mediterranean climate

- ✔ = Standard
- ✓ = Additional option

www.barenbrug.biz/greenspirit_grazing

---

**Silage**

- Can be combined with clover blend Quartet.

**NutriFibre**

Effective fibre and feed value in one

- Special mixture based on the NutriFibre technology.
- Massive forage, energy and protein for more milk.
- Rich in effective fibre for healthy cattle.
- Up to 30 % more yield than regular grasslands.
- Efficient utilisation of soil nutrients.
- Deep rooting gives excellent drought resistance.

**Composition***:

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>O</th>
<th>C</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall fescue</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Timothy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Can be combined with clover blend Duet.

**Specifications**

- Sowing rate: 40 - 45 kg/ha
- Sowing depth: 1.0 - 1.5 cm
- Packaging: 15 kg bags

**Biogas**

For the maximum biogas yield per hectare

- Contains grasses with the highest biogas potential.
- Composition based on intensive methane batch-trials.
- Great flexibility in harvest window.
- Can be cut 2 - 6 times per year.
- Non-lodging grass types, easy to process.
- Adapted to high levels of fermenter substrate.
- Ideal for 2 till 5 production years.

**Composition***:

Green Spirit Biogas 100 %

www.barenbrug.biz/greenspirit_nutrifibre

---

**Legenda**

- ✔ = Standard
- ✓ = Additional option

**NutriFibre**

Efficient fibre and feed value in one

- Special mixture based on the NutriFibre technology.
- Massive forage, energy and protein for more milk.
- Rich in effective fibre for healthy cattle.
- Up to 30 % more yield than regular grasslands.
- Efficient utilisation of soil nutrients.
- Deep rooting gives excellent drought resistance.

**Specifications**

- Sowing rate: 45 - 50 kg/ha
- Sowing depth: 1.0 - 1.5 cm
- Packaging: 15 kg bags

**Biogas**

For the maximum biogas yield per hectare

- Contains grasses with the highest biogas potential.
- Composition based on intensive methane batch-trials.
- Great flexibility in harvest window.
- Can be cut 2 - 6 times per year.
- Non-lodging grass types, easy to process.
- Adapted to high levels of fermenter substrate.
- Ideal for 2 till 5 production years.

**Composition***:

Green Spirit Biogas 100 %

www.barenbrug.biz/greenspirit_biogas
**Permanent grassland**

The grassland renovator

- Silage
- Grazing

- Special product for overseeing existing grasslands.
- Selected for fast establishment at low temperatures.
- Can be used in early spring or late autumn.
- For both grazing as silage purposes.
- Excellent germination and establishment.
- Improves yield and feed value of grasslands.

**Composition**:

| Perennial ryegrass | ✓ | ✓ | ✓ | ✓ |
| Hybrid ryegrass | ✓ | ✓ | ✓ | ✓ |
| Timothy | ✓ | ✓ | ✓ |
| Tall fescue | ✓ | ✓ | ✓ | ✓ |
| Meadow Fescue | ✓ | ✓ | ✓ |

Can be combined with clover blend Quartet or Duet.

**Specifications**

- Sowing rate: 20 - 25 kg/ha (overseeding)
- Sowing depth: 1.0 - 1.5 cm
- Packaging: 15 kg bags

www.barenbrug.biz/greenspirit_overseeding

---

**Lucerne-Grass**

High energy grass x high protein lucerne

- Better alternative than pure lucerne.
- Good sward balance between grasses and lucerne.
- Grasses that grow in the same rhythm as lucerne.
- More reliable option for new fields in dry areas.
- Sugar from grass increases silage quality.
- Fast developing after sowing.
- Lowers weed pressure.
- Increase yield and persistency.

**Composition**:

| Lucerne | ✓ | ✓ | ✓ | ✓ |
| Tall fescue | ✓ | ✓ | ✓ | ✓ |
| Cocksfoot | ✓ | ✓ | ✓ | ✓ |
| Perennial ryegrass | ✓ | ✓ | ✓ | ✓ |

Can be combined with clover blend Quartet or Duet.

**Specifications**

- Sowing rate: 30 - 35 kg/ha
- Sowing depth: 0.5 - 1.0 cm
- Packaging: 15 kg bags

www.barenbrug.biz/greenspirit_lucerne-grass

---

**Quartet**

White clover blend

- Great adaptation to diverse grassland management.
- Four clover varieties to combine strengths.
- Stimulates high yields at low fertilization level.
- Improves palatability and digestibility.
- Can fix up to 150 kg Nitrogen from the air.
- Increases soil life and fertility.

**Composition**:

- White clover - large-leaved 25 %
- White clover - medium/large-leaved 50 %
- White clover - small-leaved 25 %

**Specifications**

- Add 3 - 5 kg/ha to the grass mixture
- Sowing depth: 0.5 - 1.0 cm • Seed into warm soil

www.barenbrug.biz/quartet

---

**Duet**

Red and white clover blend

- Extremely high yielding at low fertilization levels.
- To be mixed with Green Spirit Silage.
- Red clover produces maximally in first 2 - 3 years.
- White clover takes over and gives persistency.
- Better resistance to traffic than pure red clover.
- Fast developing.
- Can fix up to 250 kg Nitrogen from the air.
- For protein-rich silage.

**Composition**:

- Red clover 70 %
- White clover - large-leaved 30 %

**Specifications**

- Add 8 - 10 kg/ha to the grass mixture
- Sowing depth: 0.5 - 1.0 cm • Seed into warm soil

www.barenbrug.biz/duet

---

**Legenda**

- N Nordic climate
- O Eastern - continental climate
- C Oceanic climate
- M Mediterranean climate
- ✓ Standard
- ✓ Additional option
- ✓ Variety selection based on local conditions.

---

**Red and white clover blend**

- Great adaptation to diverse grassland management.
- Four clover varieties to combine strengths.
- Stimulates high yields at low fertilization level.
- Improves palatability and digestibility.
- Can fix up to 150 kg Nitrogen from the air.
- Increases soil life and fertility.

**Composition**:

| Red clover | 70 % |
| White clover - large-leaved | 30 % |

**Specifications**

- Add 3 - 5 kg/ha to the grass mixture
- Sowing depth: 0.5 - 1.0 cm • Seed into warm soil

www.barenbrug.biz/red-white-clover-blend

---

**White clover blend**

Great adaptation to diverse grassland management.
- Four clover varieties to combine strengths.
- Stimulates high yields at low fertilization level.
- Improves palatability and digestibility.
- Can fix up to 150 kg Nitrogen from the air.
- Increases soil life and fertility.

**Composition**:

| White clover - large-leaved | 25 % |
| White clover - medium/large-leaved | 50 % |
| White clover - small-leaved | 25 % |

**Specifications**

- Add 8 - 10 kg/ha to the grass mixture
- Sowing depth: 0.5 - 1.0 cm • Seed into warm soil

www.barenbrug.biz/white-clover-blend

---

**Can be combined with clover blend Quartet or Duet.**
The main goal of Barenbrug’s lucerne breeding programme is to obtain the maximum farm benefits from lucerne. Our programme is running in northern France (Flemish types), southern France (Mediterranean types), Romania (continental types) and Australia (non-dormant types). This gives Barenbrug varieties unique adaptability to different circumstances. Our breeders focus on forage quality and yield. Key elements are digestibility, protein content, disease and nematode resistance, dry matter yield and persistency.

What distinguishes Barenbrug varieties from local ‘ecotypes’ is their leafiness and stem flexibility. This higher leaf/stem ratio gives a higher protein and energy content. In addition, the plant flexibility protects against leaf loss during harvesting. This leads to more high quality silage/hay and maximum animal production per hectare.

All our varieties are officially listed in the countries where we distribute our seeds. Many Barenbrug varieties are top-ranked in highly rated trials such as the French ‘Liste A’, the Swiss ‘Liste der Empfohlende Sorten’ and the list from the Polish ‘Caboru’. This confirms the high quality we stand for. Quality also implies seed quality. This means that Barenbrug lucerne seeds have excellent germination rates and are free from harmful weeds such as Cuscuta (dodder). Seed quality of this level is unfortunately not always very common in international trade. Barenbrug guarantees to deliver quality seeds according to the highest standards.

Excellent feed value
As the main forage on many farms, lucerne plays an essential role in animal nutrition. Highly palatable lucerne with excellent feed value will always result in higher forage intake, boosting milk production and growth. Increased forage intake will allow farms to save on (expensive) concentrate use. This will reduce production costs and give higher farm benefits. Selection based on feed value is a theme which runs throughout the Barenbrug breeding programme. Continuous screening for parameters like digestibility, crude protein, NDF and dNDF has resulted in varieties with exceptional feed value. This uniqueness of Barenbrug products has been confirmed by many official trials and independent studies all over the world.

Guaranteed top yields for lucerne with Yellow Jacket enhanced seed coating
Yellow Jacket - Rhizobium coating is Barenbrug’s enhanced seed coating for lucerne. Using new technology, high levels of effective Rhizobia are embedded in a protective polymer matrix. Together with a nutrient booster containing all essential minerals and trace elements, this product is designed to improve establishment and increase forage production.

Dormancy classification

<table>
<thead>
<tr>
<th>Flemish type</th>
<th>dormancy class 2.0 - 5.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-non-dormant type</td>
<td>dormancy class 5.5 - 7.5</td>
</tr>
<tr>
<td>Non-dormant type</td>
<td>dormancy class 7.5 - 10.0</td>
</tr>
</tbody>
</table>

Flemish varieties are mainly used in maritime climates and in (harsh) continental climates with cold winters, e.g. northern Europe, western Europe, eastern Europe, Russian Federation, central Turkey, Kazakhstan, etc.

Semi-non-dormant varieties are used in the transition zones between arid or warm (Mediterranean) climates and maritime or mild continental climates, from northern Spain to the Black Sea.

Non-dormant varieties are used in warm or arid areas where no winter exists and temperatures remain above zero degrees Celsius, e.g. Mediterranean area, northern Africa, Middle East, etc.
**Lucerne**

**Dorine**
- Fast regrowing Mediterranean type
- Dormancy class 6.4.
- Widely adapted to the Mediterranean areas.
- Suitable for frequent cutting systems (6 - 7/year).
- Fast regrowth after cutting.
- Specially selected for resistance to lodging.
- Good overall disease resistance and persistency.
- Officially listed in France.

**Artémis**
- Highest yielding
- Flemish type
  - Semi-non-dormant type
  - Non-dormant type
- Dormancy class 4.5.
- Rated as No. 1 variety on the French ‘Liste A’.
- Tolerant to early cutting, resulting in very high feed value.
- Excellent yielder, in intensive cutting systems.
- Outstanding disease and pest resistance.
- Extremely persistent, especially in dry and cold areas.
- Officially listed in France and Switzerland.

**Alexis**
- Healthy type for short crop rotations
- Flemish type
  - Semi-non-dormant type
  - Non-dormant type
- Dormancy class 5.0.
- Good resistance to lodging and diseases.
- Officially listed in France and Croatia.

**Verdor**
- Top performer in southern Europe
- Flemish type
  - Semi-non-dormant type
  - Non-dormant type
- Dormancy class 8.0.
- Excellent adaptation to the Mediterranean area.
- Guarantees yield from early spring to late autumn.
- Erect growing type, non-lodging.
- Tolerant to light salinity.
- Has outperformed common varieties in official trials: better persistency, disease resistance and yield.
- Officially listed in France, Turkey and Spain.

**Alpha**
- Quality lucerne for the dairy farmer
- Flemish type
  - Semi-non-dormant type
  - Non-dormant type
- Dormancy class 4.9.
- All-round type.
- Leafy variety with fine stems.
- Excellent persistency and yield.
- Very high protein level, resistant to lodging even after heavy cuts.
- Outstanding winter-hardiness.
- Officially listed in Austria, Czech Republic, France, Poland, Germany and Belarus.

**Bardine**
- Extremely winter-hardy and drought-tolerant
- Flemish type
  - Semi-non-dormant type
  - Non-dormant type
- Dormancy class 5.0.
- Very high-yielding, especially in summer and autumn.
- Its deep rooting makes forage production easy in dry areas.
- Extremely winter-hardy.
- Rated as one of the top varieties for persistency.
- High in protein and digestible fibres.
- Officially listed in France and Romania.

**Variety characteristics**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Type</th>
<th>Dormancy class</th>
<th>Yield</th>
<th>Persistency</th>
<th>Feed quality</th>
<th>Nematode resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artemis</td>
<td>Flemish</td>
<td>4.5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Alpha</td>
<td>Flemish</td>
<td>4.9</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Alexis</td>
<td>Flemish</td>
<td>5.0</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bardine</td>
<td>Flemish</td>
<td>5.0</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Dorine</td>
<td>Semi-non-dormant</td>
<td>6.4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Verdor</td>
<td>Non-dormant</td>
<td>8.0</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

**Specifications:**
- Seed rate: 25 - 30 kg
- Packaging: 25 kg bags
- Available with Yellow Jacket seed coating

**NEW**

**NEW**

**NEW**

**NEW**

**NEW**

**NEW**

**NEW**

**NEW**

**NEW**

**NEW**
**Sorghum**

**Feed quality**
All ruminant animals find sorghum silage very palatable. Silage from leafy sorghum plants leads to increased forage intake. It can be excellently fed (or grazed) as fresh green fodder if it’s offered in the right growth stage.

The inclusion of the Brown Midrib (BMR) gene into modern sorghum varieties had lowered the lignin content by 40 - 60 %. This has led to a tremendous increase in digestibility, due to a higher sugar and hemi-cellulose content. Many forage and feeding trials have shown that BMR-sorghums have comparable or even superior digestibility to maize. As sorghum is higher in protein, these BMR-types show an improved feed value compared to maize.

**Average forage quality BMR-sorghum versus maize (range within silage analyses)**

<table>
<thead>
<tr>
<th></th>
<th>BMR sorghum</th>
<th>Maize</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>28 - 30</td>
<td>32 - 34</td>
</tr>
<tr>
<td>Sugar (g/kg DM)</td>
<td>110 - 200</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Starch (g/kg DM)</td>
<td>60 - 280</td>
<td>320 - 350</td>
</tr>
<tr>
<td>Crude protein</td>
<td>110 - 120</td>
<td>60 - 80</td>
</tr>
<tr>
<td>NDF digestibility</td>
<td>52 - 55</td>
<td>52 - 55</td>
</tr>
</tbody>
</table>

**Different sorghum types**
Sorghum is a genus of grasses with different species, one of which is raised for grain and many of which are used as fodder plants, either cultivated or as part of pasture. Barenbrug offers 4 types of Sorghum.

<table>
<thead>
<tr>
<th>Sorghum Type</th>
<th>Crossbreed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudan grass (Forage)</td>
<td>Sudanese x Sudanese</td>
</tr>
<tr>
<td>Hybrid sorghum (Forage)</td>
<td>Sudanese x Bicolor</td>
</tr>
<tr>
<td>Sweet sorghum (Forage)</td>
<td>Bicolor x Bicolor</td>
</tr>
<tr>
<td>Grain sorghum (Grain)</td>
<td>Bicolor x Bicolor</td>
</tr>
</tbody>
</table>

Sorghum is an annual tropical forage, suited to regions in southern Europe. Different types can be distinguished within this species, from multi-cut sudan grass to single-cut forage hybrids. In recent years, Barenbrug has established a wide portfolio in conjunction with different breeders. The best varieties have been selected through intensive trials in southern France and local testing in Spain, Portugal and Greece.

Sorghum is a better alternative to maize in areas with severe draught and moderate soil quality. Sorghum utilizes approx. 30 % less water and 50 % less nutrients compared to maize. Therefore it is cheaper to grow and more reliable in many areas. As sorghum should be planted 2 - 3 weeks later than maize, it allows for an additional grass harvest in spring.

**Different sorghum types**

- **Sudangrass (Forage)**: Sudanese x Sudanese
- **Hybrid sorghum (Forage)**: Sudanese x Bicolor
- **Sweet sorghum (Forage)**: Bicolor x Bicolor
- **Grain sorghum (Grain)**: Bicolor x Bicolor
## THE DIFFERENT SORGHUM TYPES

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>POACEAE (TRUE GRASSES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBFAMILY</td>
<td>SORGHUM</td>
</tr>
<tr>
<td>SPECIES</td>
<td>SORGHUM BICOLOR</td>
</tr>
</tbody>
</table>

### Features

<table>
<thead>
<tr>
<th>Type</th>
<th>Background</th>
<th>Features</th>
<th>Products</th>
<th>Purpose</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudangrass</td>
<td>Sudanese x Sudanese</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Barsudan</td>
<td>Multi-cut (grazing/silage/hay)</td>
<td>✓</td>
</tr>
<tr>
<td>Hybrid sorghum</td>
<td>Sudanese x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Lussi, Sweet Creek, BMR-333</td>
<td>One-cut (silage)</td>
<td>✓</td>
</tr>
<tr>
<td>Sweet sorghum</td>
<td>Bicolor x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Tonga</td>
<td>One-cut (silage)</td>
<td>✓</td>
</tr>
<tr>
<td>Grain sorghum</td>
<td>Bicolor x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td></td>
<td>Grain harvest</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Specifications

- **Barsudan**
  - Sudan grass hybrid.
  - Multi-purpose type.
  - Fine stems, excellent for hay or wrapped bales.
  - Forms tillers, makes a dense field.
  - Perfect regrowth after cutting.
  - Very high drought resistance.
  - Suitable for grazing.
  - High sugar content.
  - Sowing period: May - June (soil temperature > 14°C)
  - Seed rate: 10 - 12 kg/ha • Row distance: 10 - 25 cm, sowing depth 2 cm • Can be utilized from plant height of 40 - 50 cm onwards • To be harvested 2 to 3 times per year

- **Lussi**
  - Very fast development and growth.
  - High yield at 1st cut.
  - Large, vigorous plants with wide leaves.
  - Can be used for grazing and silage.
  - Later heading than sudan grass.
  - High forage quality.
  - Sowing period: May - June (soil temperature > 14°C)
  - Seed rate: 25 kg/ha • Row distance: 20 - 30 cm, sowing depth 2 - 3 cm • Can be utilized from plant height of 60 - 70 cm onwards • To be harvested 2 to 3 times per year

---

**THE DIFFERENT SORGHUM TYPES**

**FAMILY** POACEAE (TRUE GRASSES)

**SUBFAMILY** SORGHUM

**SPECIES** SORGHUM BICOLOR

<table>
<thead>
<tr>
<th>Type</th>
<th>Background</th>
<th>Features</th>
<th>Products</th>
<th>Purpose</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudangrass</td>
<td>Sudanese x Sudanese</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Barsudan</td>
<td>Multi-cut (grazing/silage/hay)</td>
<td>✓</td>
</tr>
<tr>
<td>Hybrid sorghum</td>
<td>Sudanese x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Lussi, Sweet Creek, BMR-333</td>
<td>One-cut (silage)</td>
<td>✓</td>
</tr>
<tr>
<td>Sweet sorghum</td>
<td>Bicolor x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Tonga</td>
<td>One-cut (silage)</td>
<td>✓</td>
</tr>
<tr>
<td>Grain sorghum</td>
<td>Bicolor x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td></td>
<td>Grain harvest</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Specifications

- **Barsudan**
  - Sudan grass hybrid.
  - Multi-purpose type.
  - Fine stems, excellent for hay or wrapped bales.
  - Forms tillers, makes a dense field.
  - Perfect regrowth after cutting.
  - Very high drought resistance.
  - Suitable for grazing.
  - High sugar content.
  - Sowing period: May - June (soil temperature > 14°C)
  - Seed rate: 10 - 12 kg/ha • Row distance: 10 - 25 cm, sowing depth 2 cm • Can be utilized from plant height of 40 - 50 cm onwards • To be harvested 2 to 3 times per year

- **Lussi**
  - Very fast development and growth.
  - High yield at 1st cut.
  - Large, vigorous plants with wide leaves.
  - Can be used for grazing and silage.
  - Later heading than sudan grass.
  - High forage quality.
  - Sowing period: May - June (soil temperature > 14°C)
  - Seed rate: 25 kg/ha • Row distance: 20 - 30 cm, sowing depth 2 - 3 cm • Can be utilized from plant height of 60 - 70 cm onwards • To be harvested 2 to 3 times per year

---

**THE DIFFERENT SORGHUM TYPES**

**FAMILY** POACEAE (TRUE GRASSES)

**SUBFAMILY** SORGHUM

**SPECIES** SORGHUM BICOLOR

<table>
<thead>
<tr>
<th>Type</th>
<th>Background</th>
<th>Features</th>
<th>Products</th>
<th>Purpose</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudangrass</td>
<td>Sudanese x Sudanese</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Barsudan</td>
<td>Multi-cut (grazing/silage/hay)</td>
<td>✓</td>
</tr>
<tr>
<td>Hybrid sorghum</td>
<td>Sudanese x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Lussi, Sweet Creek, BMR-333</td>
<td>One-cut (silage)</td>
<td>✓</td>
</tr>
<tr>
<td>Sweet sorghum</td>
<td>Bicolor x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td>Tonga</td>
<td>One-cut (silage)</td>
<td>✓</td>
</tr>
<tr>
<td>Grain sorghum</td>
<td>Bicolor x Bicolor</td>
<td>Single-cut, Multi-cut, BMR, High sugar</td>
<td></td>
<td>Grain harvest</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Specifications

- **Barsudan**
  - Sudan grass hybrid.
  - Multi-purpose type.
  - Fine stems, excellent for hay or wrapped bales.
  - Forms tillers, makes a dense field.
  - Perfect regrowth after cutting.
  - Very high drought resistance.
  - Suitable for grazing.
  - High sugar content.
  - Sowing period: May - June (soil temperature > 14°C)
  - Seed rate: 10 - 12 kg/ha • Row distance: 10 - 25 cm, sowing depth 2 cm • Can be utilized from plant height of 40 - 50 cm onwards • To be harvested 2 to 3 times per year

- **Lussi**
  - Very fast development and growth.
  - High yield at 1st cut.
  - Large, vigorous plants with wide leaves.
  - Can be used for grazing and silage.
  - Later heading than sudan grass.
  - High forage quality.
  - Sowing period: May - June (soil temperature > 14°C)
  - Seed rate: 25 kg/ha • Row distance: 20 - 30 cm, sowing depth 2 - 3 cm • Can be utilized from plant height of 60 - 70 cm onwards • To be harvested 2 to 3 times per year
**Sweet Creek**

- **Sudan x bicolor**
- **Single-cut**
- **Multi-cut**
- **BMR**
- **High sugar**

- Extremely high yielding sudan grass hybrid.
- Early and fast development, with high yield at 1st cut.
- Fine stemmed, forms many tillers.
- Can be used for multi-purpose: grazing, silage and hay.
- High sugar content.

**Specifications**
- Sowing period: May - June (soil temperature > 14°C)
- Seed rate: 25 kg/ha
- Row distance: 30 - 35 cm
- Can be utilized from plant height of 60 - 70 cm onwards
- To be harvested 2 to 3 times per year

[www.barenbrug.biz/sweet_creek](http://www.barenbrug.biz/sweet_creek)

---

**BMR-333**

- **Sudan x bicolor**
- **Single-cut**
- **Multi-cut**
- **BMR**
- **High sugar**

- Excellent standability.
- Very good heat and drought tolerance.
- High yielding, utilizes 40% less water than maize.
- BMR-type: high digestibility, comparable with maize.
- Fast establishing, protects against weed infestation.
- To be used as silage, harvested in autumn.

**Specifications**
- Sowing period: May - June (soil temperature > 14°C)
- Seed rate: one unit (220,000 seeds) per hectare
- Row distance: 40 - 50 cm, sowing depth 2 - 3 cm
- Growth period: 120 - 150 days

[www.barenbrug.biz/bmr-333](http://www.barenbrug.biz/bmr-333)

---

**Tonga**

- **Bicolor x bicolor**
- **Single-cut**
- **Multi-cut**
- **BMR**
- **High sugar**

- Forage hybrid.
- Very consistent and homogenous variety.
- Moderate plant height, perfect resistance to lodging.
- Outstanding digestibility (BMR 6) and sugar content.
- Male-sterile type, no grain formation when grown alone.
- Much better alternative to maize on dry and marginal soils.

**Specifications**
- Sowing period: May - June (soil temperature > 14°C)
- Seed rate: one unit (220,000 seeds) per hectare
- Row distance: 40 - 50 cm, sowing depth 2 - 3 cm
- Can be utilized from plant height of 60 - 70 cm onwards
- To be harvested 2 to 5 times per year

[www.barenbrug.biz/tonga](http://www.barenbrug.biz/tonga)
Grasses are highly valued as green manure crop, primarily because they form extensive root systems. This enables them to supply large quantities of organic matter to the soil, while their roots simultaneously improve soil structure. And even if green manure grasses are harvested for forage, large quantities of well-distributed organic matter will remain in the soil.

As grasses emerge quickly, they form a dense ground cover and it is not necessary to control weeds with herbicides. This makes it possible to use grasses under diverse conditions and for various crops. In addition, several green manure grasses can be used to provide extra forage.

Controlling nematodes
Grasses play a separate role when it comes to controlling nematodes. Green manure grasses may cause some nematode populations to decrease, whereas in contrast other nematodes may multiply substantially under grass. So it is very important to know what types of nematodes occur in a particular plot before using a green manure grasses. There are also differences between individual grass species with respect to the multiplication of nematodes, e.g. Italian ryegrass and perennial ryegrass.

Portfolio

<table>
<thead>
<tr>
<th>Preceding crop/cover crop</th>
<th>Green manure product</th>
<th>Sown into...</th>
<th>Sowing period</th>
<th>Full-developed green manure crop</th>
<th>Suitable as forage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>Proterra Maize</td>
<td>Cover crop</td>
<td>Spring</td>
<td>Directly after maize harvest</td>
<td>No</td>
</tr>
<tr>
<td>Winter-cereals</td>
<td>Proterra Cereals</td>
<td>Cover crop</td>
<td>Late autumn/winter</td>
<td>Directly after cereal harvest</td>
<td>No</td>
</tr>
<tr>
<td>Cereals, potatoes, vegetables, maize</td>
<td>Intermezzo</td>
<td>After harvest (cover crop)</td>
<td>Spring - autumn</td>
<td>Late autumn - early spring</td>
<td>Yes</td>
</tr>
<tr>
<td>Maize</td>
<td>SoilCover</td>
<td>After harvest</td>
<td>Autumn</td>
<td>Early spring</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Green manure grasses

Proterra Maize

Sown after harvest
- Provides a well-established green manure crop after maize harvest.
- Contains specially selected grasses.

Can be sown directly or shortly after maize.
- Develops well, but slowly, under shade.
- Tolerant to several herbicides.
- Improves soil fertility and soil structure by intensive rooting.

Composition:
Proterra Maize 100 %

Specifications
- Sowing rate: 15 - 20 kg/ha • Sowing period: directly with maize or within 7 days after sowing maize (spring) • Suitable all over Europe on all common soil types

Detailed information at www.barenbrug.biz/proterra_maize

Proterra Cereals

Sown after harvest
- Can be sown directly with/into an established cereal crop.
- Doesn’t compete with cereals.
- No seed head formation.
- Leaves a catch crop directly after cereal harvest.
- Saves time and labour during harvest time.
- Produces lots of soil organic matter.
- Improves soil structure and soil fertility.
- Prevents mineral leaching after cereal harvest.

Composition:
Proterra Cereals 100 %

Specifications
- Sowing rate: 15 - 20 kg/ha • Sowing period: directly with winter cereals (September - December) • in established cereal crop during winter (December - February) • Suitable all over Europe on all common soil types

Detailed information at www.barenbrug.biz/proterra_cereals

Intermezzo

Sown after harvest
- Ideal for sowing after cereals, vegetables or maize.
- Can be sown into cover crop: cereals (spring) or maize (at 40 cm plant height).
- Fast-establishing, late-heading.
- Produces more roots and soil organic matter than rye.
- Suitable as forage crop.

Composition:
Italian ryegrass varieties 100 %

Specifications
- Sowing rate: 20 - 25 kg/ha • Sowing period: September - November (min. 6 weeks before expected night frost) • Suitable all over Europe on all common soil types

Detailed information at www.barenbrug.biz/intermezzo

SoilCover

Sown after harvest
- Selected for low soil temperatures.
- Ideal for use after late (maize) harvest.
- Fast-establishing, fast-developing.
- Efficient mineral and nutrient fixing in the soil.
- Deep-rooting, improves soil structure.
- Suitable as forage crop.

Composition:
Westerwold ryegrass 50 %
Italian ryegrass 50 %
Selected varieties which germinate at low temperatures

Specifications
- Sowing rate: 20 - 25 kg/ha • Sowing period: September - November (min. 6 weeks before expected night frost) • Suitable all over Europe on all common soil types

Detailed information at www.barenbrug.biz/soilcover

For undersowing in maize

For undersowing in winter cereals

For undersowing in cover crop
Every horse owner wants what’s best for his horse. That includes a pasture in which a horse can safely sprint around and which contains grass that is healthy for the horse. Unfortunately, many horses actually graze in pastures containing cattle grass or in pastures with a lot of bare patches, with all the adverse consequences that that involves.

Horses love it

Innovative
Most grass seed mixtures are traditionally intended for use by cattle. However, cows’ requirements with respect to grass are quite different from those of horses. Grass intended for cows contains a lot of energy and sugars. That’s unhealthy for horses, which require roughage with a high effective fibre content. Horse Master is an innovative grass seed mixture yielding roughage that is ideal for horses’ rations. The varieties contained in Horse Master are moreover extremely strong, making for a sward that is resistant to sprints around the pasture.

Varied in Horse Master
All the grass varieties contained in Horse Master are recommended in several variety lists. This gives Horse Master users a quality guarantee. The varieties have all been individually evaluated to assess their specific characteristics with respect to use by horses. They provide the energy and effective fibre that horses need. Horse Master grass also has a low growth point, i.e. the point from which the grass plant regrows after it has been grazed or cut, and it is deep-rooted to ensure a strong horse pasture.

Sustainable
Massive underground networks of long roots make Horse Master a sustainable grass seed mixture. The long roots enable the grass plants to take up moisture and minerals from deep down in the soil. A Horse Master pasture will not have to be irrigated much in dry periods. Horse Master pastures will last for at least ten years, subject to good agricultural use.

Low fructan content
A low fructan concentration in grass reduces the risk of laminitis. Fructan is a carbohydrate (a type of sugar) that is produced by grass plants under the influence of sunlight. Grass plants produce particularly large amounts of fructan when nights are cold and sunlight is intense.

Horse paddock & pasture

Detailed information at www.barenbrug.biz/horsesloveit
Fructan content (%) of grass - spring

Horse Master varieties

Typical cattle grass

Fructan content (%) of grass - summer/autumn

Horse paddock & pasture

Optimum health of your horses

Horse Master

Grass for hay or haylage

Horse Master Hay

Low fructan to avoid laminitis

Fructan is currently regarded as one of the main causes of laminitis. It is only partly digested in the small intestine, resulting in high sugar levels in the hind gut that disturb the bacterial balance in the intestines. This leads to the formation of toxic substances that may cause laminitis.

Specific varieties for low fructan

Barenbrug has done a lot of research into the fructan (sugar) contents of different grasses. Some grass species are known for their low fructan contents, but even within a species, some varieties contain more fructan than others. The varieties in Horse Master contain an impressive 50% less fructan than varieties of grass intended for cattle and sheep.

Barenbrug analyses the fructan contents of more than 70 grass varieties a year. The following graph shows you the great differences in the fructan contents of different varieties.

The varieties in Horse Master contain an average less than half of the fructan that is to be found in cattle grass varieties.

Barenbrug analyses the fructan contents of more than 70 grass varieties a year. The following graph shows you the great differences in the fructan contents of different varieties.

The varieties in Horse Master contain an average less than half of the fructan that is to be found in cattle grass varieties.
For more than 100 years Barenbrug has excelled in plant breeding throughout the world in widely varied climatic zones. Our wide range of varieties and our expertise enable us to provide you with adapted forage grasses suited to any location and grassland management system. In this chapter you will find an overview of the forage portfolio marketed by Barenbrug Holland. The most important species are described, as well as the varieties involved.

## Grass varieties

<table>
<thead>
<tr>
<th>Grass variety</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perennial ryegrass</strong></td>
<td><em>Lolium perenne</em> Most important and widely used forage grass.</td>
</tr>
<tr>
<td><strong>Hybrid ryegrass</strong></td>
<td><em>Lolium x hybridum</em> Intermediate between perennial and Italian ryegrass.</td>
</tr>
<tr>
<td><strong>Italian ryegrass</strong></td>
<td><em>Lolium multiflorum</em> Provides excellent quality forage for up to two years.</td>
</tr>
<tr>
<td><strong>Westerwold ryegrass</strong></td>
<td><em>Lolium multiflorum Westerwoldicum</em> A fast growing annual species.</td>
</tr>
<tr>
<td><strong>Tall fescue</strong></td>
<td><em>Festuca arundinacea</em> A deep-rooting, very adaptable species which grows well in dry or wet conditions.</td>
</tr>
<tr>
<td><strong>Meadow fescue</strong></td>
<td><em>Festuca pratensis</em> Winter-hardy and nutritious.</td>
</tr>
<tr>
<td><strong>Timothy</strong></td>
<td><em>Phleum pratense</em> Palatable and superior winter hardiness.</td>
</tr>
<tr>
<td><strong>Cocksfoot</strong></td>
<td><em>Dactylis glomerata</em> Extremely drought tolerant.</td>
</tr>
<tr>
<td><strong>Creeping red fescue</strong></td>
<td><em>Festuca rubra rubra</em> Niche species used for extensive pastures.</td>
</tr>
<tr>
<td><strong>Bromus</strong></td>
<td><em>Bromus subsp.</em> A species often used in continental regions.</td>
</tr>
<tr>
<td><strong>Teff</strong></td>
<td><em>Eragrostis tef</em> A warm-season annual grass which can be harvested multiple times during the growing season.</td>
</tr>
</tbody>
</table>

Detailed information at [www.barenbrug.biz/forage_grass_varieties](http://www.barenbrug.biz/forage_grass_varieties)
Perennial ryegrass (Lolium perenne)

Perennial ryegrass is clearly one of the most important and widely used forage grasses, exhibiting rapid establishment, good tillering ability, an excellent response to nitrogen and high acceptability to animals. Perennial ryegrass is more digestible than other species at equivalent growth stages, thus increasing digestible dry matter production.

Highlighted new varieties:

BARTASJA
Modern early tetraploid, suitable for continental climates. Extreme winter-hardy and drought-tolerant. This new generation from our breeding station in Romania is a revolution for farms in eastern and central Europe.

FINTONA
New tetraploid variety with great performance in UK and Ireland. Fintona is a very active spring grower, suitable for early grazing or high yielding silage mixtures.

BARCAMPO
Outclassed all other candidavars in official trials in Germany and Denmark on yield, ground cover, disease resistance and winter-hardiness. Also recommended for use on heavy (peaty) soils. Barcampo is the ‘living proof’ that Barenbrug’s modern tetraploids set a new standard for the next decade.

BARGIZMO
Allround variety which was recently listed in Germany. Selected in many areas with extreme conditions, with harsh winters and high disease pressure. This persistent variety should be part of every long-term grass ley.

BARSILLO
Modern early tetraploid, suitable for continental climates. Has very little stem formation and therefore increased digestibility and protein content. Ideal for high-yielding dairy farms.

BARKAMAZ
Late tetraploid for continental climates. Extremely high yielding type for 2 - 3 production years in southern and western Europe. Very leafy type which gives high forage quality in intensive cutting systems.

Barforma
Intermediate early tetraploid

Intermediate heading

Bargizmo 2n 4 4 5 4 ✔ ✔
Mara 2n 5 4 3 5 ✔ ✔
Barcampo 4n 5 4 5 5 ✔
Dunloe 4n 5 3 4 5 ✔
Barfamos 4n 4 4 5 5 ✔
Seagoe 4n 5 3 4 3 ✔

Late heading

Barforma
Tyrella
Drumbo
Claryre
Barmero
Barfilp
Barmaxima
Barpasto
Barsintro
Dromara
Novan
Barbbazem
Melatorium
Melverde

Varieties characteristics

<table>
<thead>
<tr>
<th>Yield at 1st cut</th>
<th>Frost hardiness</th>
<th>Crown rust resistance</th>
<th>Persistency</th>
<th>Mode</th>
<th>Ocean</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early heading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronsyn 2n</td>
<td>5 4 5 3 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosetta 2n</td>
<td>5 5 3 3 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bargala 4n</td>
<td>5 3 3 4 ✔ ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barfamos 4n</td>
<td>5 4 3 5 ✔ ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fintona 4n</td>
<td>5 3 4 3 ✔ ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate heading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bargizmo 2n</td>
<td>4 4 5 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mara 2n</td>
<td>5 4 3 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barcampo 4n</td>
<td>5 4 5 5 ✔ ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunloe 4n</td>
<td>5 3 4 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barfamos 4n</td>
<td>4 4 5 5 ✔ ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seagoe 4n</td>
<td>5 3 4 3 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late heading</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barforma 4n</td>
<td>3 5 5 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyrella 2n</td>
<td>4 4 3 3 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drumbo 2n</td>
<td>3 4 4 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claryre 3n</td>
<td>3 5 4 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barmero 2n</td>
<td>4 5 5 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barfilp 2n</td>
<td>3 5 5 5 ✔ ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barmaxima 4n</td>
<td>4 4 4 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barpasto 4n</td>
<td>4 4 5 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barsintro 4n</td>
<td>4 3 4 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dromara 4n</td>
<td>5 3 5 3 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novan 4n</td>
<td>4 3 4 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barbbazem 4n</td>
<td>4 4 3 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melatorium 4n</td>
<td>4 4 5 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melverde 4n</td>
<td>3 4 5 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Grass varieties

Hybrid ryegrass (Lolium x Hybridum)

Varieties of hybrid ryegrass are obtained by crossing perennial and Italian ryegrass. As a result three types of hybrid ryegrass can be distinguished. The Italian types have an erect growth habit and produce good spring growth, whereas the perennial types form a denser sward and have later spring growth. Intermediate types also exist.

Highlighted new varieties:

BARSILLO
Intermediate early tetraploid

BARFAMOS
Modern early tetraploid, suitable for continental climates. Extremely high yielding type for 2 - 3 production years in southern and western Europe. Very leafy type which gives high forage quality in intensive cutting systems.

BARVITRA
Extremely high-yielding type for 2 - 3 production years in southern and western Europe. Very leafy type which gives high forage quality in intensive cutting systems.

Barforma
Intermediate early tetraploid

Intermediate heading

Bargizmo 2n 4 4 5 4 ✔ ✔
Mara 2n 5 4 3 5 ✔ ✔
Barcampo 4n 5 4 5 5 ✔ ✔
Dunloe 4n 5 3 4 5 ✔ ✔
Barfamos 4n 4 4 5 5 ✔ ✔
Seagoe 4n 5 3 4 3 ✔ ✔

Late heading

Barforma
Tyrella
Drumbo
Claryre
Barmero
Barfilp
Barmaxima
Barpasto
Barsintro
Dromara
Novan
Barbbazem
Melatorium
Melverde

Varieties characteristics

<table>
<thead>
<tr>
<th>Type</th>
<th>Persistency</th>
<th>Crown rust resistance</th>
<th>Mode</th>
<th>Ocean</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early tetraploid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barsillo 2n</td>
<td>Intermediate</td>
<td>5 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sabella 2n</td>
<td>Perennial</td>
<td>5 3 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barsenna 2n</td>
<td>Italian</td>
<td>4 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trojan 2n</td>
<td>Perennial</td>
<td>3 4 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barvitra 4n</td>
<td>Italian</td>
<td>3 5 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belleek 4n</td>
<td>Perennial</td>
<td>5 2 ✔ ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Detailed information at www.barenbrug.biz/forage_grass_varieties
Grass varieties

Italian ryegrass (Lolium multiflorum)

Italian ryegrass provides excellent quality forage for up to two years, depending on climate and available moisture. Due to its quick regrowth, very early development in spring and prolonged growing period in autumn, this species usually has greater overall productivity than perennial ryegrass.

Highlighted new varieties:

BARTRENTO
Recently listed in Germany (the best in its class) and recommended for temporary grasslands. Shows outstanding disease resistance and reasonable winter survival in western and central Europe.

BARULTIMA
Highest yielding tetraploid variety in trials in Italy and France. Late-heading for better silage quality. Perfect companion for Westerwold ryegrass to increase yield at 2nd/3rd cut in short-term leys.

Westerwold ryegrass (Lolium multiflorum Westerwoldicum)

Westerwold ryegrass is a rapidly establishing annual species (or biannual if sown in autumn) which gives high productivity in the season of sowing (if seeded early and adequate moisture is available). This species is useful for spring sowing or sowing immediately after maize or cereal harvest in autumn or when high yields are required within 3 - 6 months of sowing.

Tall fescue (Festuca arundinacea)

Tall fescue is a deep-rooting, very adaptable species which grows well in dry or wet conditions. It is also winter-hardy and persistent. Tall fescue grows early in the spring and has the potential for high dry-matter production with nitrogen fertilization. Tall fescue produces about 30% more dry matter compared with perennial ryegrass.

Highlighted new varieties:

BARDOUX
New 'NutriFibre' type which is listed in Germany and France. Shows improved yield and persistency in many areas, from western Europe to Russia. Soft-leaved with excellent palatability.
**Meadow fescue** *(Festuca pratensis)*

This species grows best under cool, moist conditions and tolerates wet and occasionally flooded soils. Once established, it also performs well under drier conditions for making hay or silage. On good soils, meadow fescue surpasses perennial ryegrass in summer production. It has better winter-hardiness than perennial ryegrass.

**Timothy** *(Phleum pratense)*

Palatability and superior winter-hardiness are timothy’s most important features. It does very well on wet, peaty and heavy textured soils. This species is rather slow to establish and summer-production is often limited.

**Cocksfoot** *(Dactylis glomerata)*

Cocksfoot is valuable on light textured soils in dry areas due to its outstanding drought tolerance. Most varieties have good winter hardness, although this may be somewhat limited in the year of sowing. The species is rather slow to establish but persistency is good under hay, silage, and proper grazing management. Cocksfoot is particularly renowned for its good summer production.

**Creeping red fescue** *(Festuca rubra rubra)*

Well-suited to dry and hot areas because of its good drought and heat tolerance. Festuca rubra rubra is very persistent and has good winter-hardiness. The species performs relatively well under low fertility conditions but is less palatable and less digestible than other forage grasses.

**BaraIka**

Developed in continental areas. Has proven great persistency and winter-hardiness. High-yielding, especially in silage systems. The perfect choice for continental climates with sufficient rainfall during summer.

**Adremo**

Has shown an excellent tolerance to heat and drought. Developed in southern Europe and a leading variety on the French recommended list. Best suited for silage and hay production.

**BarLEGro**

Very late-heading variety which was developed in continental climates. Officially listed in Germany, Switzerland and Romania. Its high and reliable yield ensures forage year after year.

**BarustIc**

All-round variety and important component of Horse Master. Forms a dense sward and has shown excellent winter-hardiness, drought tolerance and persistency.

---

**Varied characteristics**

<table>
<thead>
<tr>
<th>Varieties characteristics</th>
<th>Very late-heading</th>
<th>Suitability for grazing</th>
<th>Disease resistance</th>
<th>Persistency</th>
<th>Nordic</th>
<th>Oceanic</th>
<th>Continental</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pradel</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Cosmonaut</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Barvital</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Baraika</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

---

**Varied characteristics**

<table>
<thead>
<tr>
<th>Varieties characteristics</th>
<th>Very late-heading</th>
<th>Suitability for grazing</th>
<th>Disease resistance</th>
<th>Persistency</th>
<th>Nordic</th>
<th>Oceanic</th>
<th>Continental</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensiv</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Buridana</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Barvite</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Barlegro</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Adremo</td>
<td>3</td>
<td>3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

---

**Varied characteristics**

<table>
<thead>
<tr>
<th>Varieties characteristics</th>
<th>Very late-heading</th>
<th>Suitability for grazing</th>
<th>Disease resistance</th>
<th>Persistency</th>
<th>Nordic</th>
<th>Oceanic</th>
<th>Continental</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barpenta</td>
<td>✔</td>
<td>4</td>
<td>5</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Barmidi</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Barfleo</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Tuukka</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Topa</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
### Grass varieties

**Bromus** *(Bromus subsps)*

Bromus is a natural species in many parts of the world and can be divided in several sub-species. Alaska brome *(Bromus sitchensis)* is a winterhardy type which produces large amounts of forage. Pasture brome *(Bromus valdivianus)* is a drought tolerant species for quality summer feed production.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HAKARI</strong></td>
<td>Alaska brome variety suitable for dry areas with severe winters. It is an erect-growing leafy type with outstanding spring regrowth and summer production. Suitable for hay production and grazing, ideally combined with legumes.</td>
</tr>
<tr>
<td><strong>BARENO</strong></td>
<td>Fine leaved pasture brome particularly suitable for grazing. Bareno is used for permanent grasslands in extremely dry areas. Forms a dense sward and is very persistent.</td>
</tr>
</tbody>
</table>

**Teff** *(Eragrostis tef)*

Teff is a warm-season annual grass which can be harvested multiple times during the growing season as hay or silage, or grazed. It can be sown in spring and under high temperatures it develops quickly and grows well in dry summers. As a fast-growing crop, teff produces high yields during a relatively short growing season. Teff is fine-stemmed and therefore palatable to animals. Excellent for horse hay. Its forage quality is comparable with timothy.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIFFANY</strong></td>
<td>This well-known variety is best used for quality hay production. Tiffany is easy to grow and a reliable option in many hot and dry areas.</td>
</tr>
</tbody>
</table>

Detailed information at [www.barenbrug.biz/forage_grass_varieties](http://www.barenbrug.biz/forage_grass_varieties)
Several clover species are extensively cultivated as forage crops. The most widely cultivated clovers are white and red clover. Besides that, there is an increased interest in fast growing annual clovers. Clover, either sown in monoculture or in combination with grass, has long been appreciated, for several reasons:

• Palatable to and nutritious for livestock.
• Fixes nitrogen, reducing the need for synthetic fertilizers.
• Grows in a wide range of soils and climates.
• Appropriate for either grazing, silage or hay.
• Improves soil fertility and structure.

White clover
*Trifolium repens*

- The best legume for perennial pastures where moisture and medium to high fertility prevail. Winter-hardy and frost-tolerant. Easy to establish, produces a network of stolons and a dense ground cover.

Red clover
*Trifolium pratense*

- Tap-rooted, drought-tolerant legume that provides high quality feed. Not as winter-active as white clover, may live for 1 - 3 years in pasture swards.

Annual clovers

- Annual legume, ideally suited to areas with winter forage production and or dry summer conditions. The plant has better winter growth than white clover and can persist through self-pollination and reseeding. Commonly used in oversow situations as it is easy to establish.

Detailed information at www.barenbrug.biz/clover_varieties
**White clover (Trifolium repens)**

White clover is a perennial legume which spreads by branching stolons through the sward. It has the ability to produce its own nitrogen through a symbiotic process with rhizobium bacteria in the root nodules. White clover is mainly used in grazing leys for its high nutritive value (protein and minerals).

**Highlighted new varieties:**

**CALIMERO**
Large-leaved variety which has shown good performance in western and central Europe. Was recently listed in Germany. Can be used for both cutting and grazing systems. Especially good for ground cover and persistency.

**KATY**
Variety suitable for oceanic climates. One of the most persistent in its category. Katy is a very good companion in grass mixtures and shows consistent growth throughout the year.

**BEAUMONT**
This Ladino-clover was selected in the Swiss mountains and recently listed on the Swiss recommended list. It is the highest yielding Ladino-type in its class and especially highly rated for its persistency. Excellent for permanent grassland without any risk of HCN-accumulation.

---

**Red clover (Trifolium pratense)**

This herbage legume is often used in grass mixtures for a predominantly cutting regime. As a legume, it is very much appreciated for its nitrogen fixing ability and therefore for its nutritional value as a forage. The main drawback is its limited persistency, which ranges from 1 - 3 years depending on type, variety and environmental conditions.

**Highlighted new varieties:**

**DISCOVERY**
Variety from France with good adaptation in western Europe. Very fast-developing and high-yielding. Perfect choice for temporary grassland.

---

**Varieties characteristics**

<table>
<thead>
<tr>
<th>Leaf Size</th>
<th>Suitability for grazing</th>
<th>Suitability for silage</th>
<th>Persistency</th>
<th>Nordic</th>
<th>Continental</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nordic</td>
<td>L</td>
<td>3</td>
<td>3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Oceanic</td>
<td>L</td>
<td>3</td>
<td>3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Continental</td>
<td>M</td>
<td>5</td>
<td>4</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Mediterranean</td>
<td>L</td>
<td>4</td>
<td>4</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

* Ladino-type
Annual clovers offer a range of grazing, hay and silage options with multiple benefits including nitrogen fixation, weed control rotations and disease breaks. The addition of annual clovers to grass or hay mixes can increase feed quality, protein content of feed and provide nitrogen for grass or cereal growth.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Clover species</th>
<th>Latin name</th>
<th>Soil pH</th>
<th>Drought tolerance</th>
<th>Establishment</th>
<th>Earliness growth/flowering</th>
<th>Growth habit</th>
<th>Regrowing ability (1 - 5)</th>
<th>Yield (1 - 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elite II</td>
<td>Berseem</td>
<td>Trifolium alexandrinum</td>
<td>Neutral to alkaline</td>
<td>Moderate</td>
<td>Very fast</td>
<td>Late</td>
<td>Erect</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Nitro Plus</td>
<td>Persian</td>
<td>Trifolium resupinatum</td>
<td>Neutral to alkaline</td>
<td>High</td>
<td>Fast</td>
<td>Intermediate</td>
<td>Erect</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Lighting</td>
<td>Persian</td>
<td>Trifolium resupinatum</td>
<td>Neutral to alkaline</td>
<td>Moderate</td>
<td>Fast</td>
<td>Late</td>
<td>Erect</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Laser</td>
<td>Persian</td>
<td>Trifolium resupinatum</td>
<td>Neutral to alkaline</td>
<td>Moderate</td>
<td>Fast</td>
<td>Late</td>
<td>Erect</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Blaza</td>
<td>Crimson</td>
<td>Trifolium incarnatum</td>
<td>Slightly acidic to neutral</td>
<td>Very high</td>
<td>Very fast</td>
<td>Intermediate</td>
<td>Erect</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Cefalu</td>
<td>Arrowleaf</td>
<td>Trifolium vesiculosum</td>
<td>Acidic to neutral</td>
<td>Very high</td>
<td>Slow</td>
<td>Late</td>
<td>Semi-erect</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Zulu II</td>
<td>Arrowleaf</td>
<td>Trifolium vesiculosum</td>
<td>Acidic to neutral</td>
<td>High</td>
<td>Slow</td>
<td>Intermediate</td>
<td>Semi-erect</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Boltia</td>
<td>Balansa</td>
<td>Trifolium michelanium</td>
<td>Slightly acidic to neutral</td>
<td>Very high</td>
<td>Moderate</td>
<td>Late</td>
<td>Prostrate</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Frontier</td>
<td>Balansa</td>
<td>Trifolium michelanium</td>
<td>Slightly acidic to neutral</td>
<td>Very high</td>
<td>Moderate</td>
<td>Early</td>
<td>Prostrate</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Detailed information at www.barenbrug.biz/clover_varieties
**Other forage and green manure crops**

Besides grass, lucerne and clover products Barenbrug offers a wide range of other forage crops and varieties. Different farm-specific situations can demand different solutions. For examples, legumes like vetches and peas can provide a protein-rich annual fodder. Stubble turnips and forage rape give a short-term solution to prolong the growth season, especially on grazing farms. Other crops like fodder beet, birdsfoot trefoil, plantain and chicory all have their other specific beneficial feature. The Barenbrug range of these forage crops has been carefully selected to provide a broad choice to suit differing climates and growing conditions.

A fruitful investment

Green manure crops ensure a good soil condition. For a start, they supply large quantities of organic matter, which is important for a good structure and fertility of the soil. Organic matter is decomposed all the year round. So new organic matter has to be added to the soil to increase its concentration or keep it at the required level.

Higher yields

Green manure crops have a positive effect on soil structure, making it possible to till the soil at an earlier stage. The soil will also be able to retain moisture better, while leaching of residual nitrogen will be prevented. This results in higher yields of the main crop. Potatoes in particular respond favourably to green manure crops, with potentially 5 % higher yields. Yields of sugarbeet and wheat may also increase. A green manure crop will moreover imply a lower optimum nitrogen dose, and therefore lower cultivation costs.

Control of nematodes

Resistant green manure crops reduce nematode populations in the soil. Sugarbeet nematodes in particular can be effectively controlled with a green manure crop. When grown as the main crop, sugarbeets produce higher yields when nematode-resistant white mustard or fodder radish is used as a green manure crop.

Fixing of minerals

Green manure crops fix important nutrients such as nitrogen and potassium in plant stems, leaves and roots, precluding the risk of them being leached in autumn and winter. Especially grasses that bolt late fix minerals over long periods. A well-developed green manure crop will yield 80 - 100 kg of nitrogen per hectare.

---

**Other forage crops**

<table>
<thead>
<tr>
<th>Annual crop</th>
<th>Perennial crop</th>
<th>Compacts for grass mixtures</th>
<th>Suitable for grazing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vetch</td>
<td>✔</td>
<td>✔</td>
<td>✔️</td>
</tr>
<tr>
<td>Pea</td>
<td>✔</td>
<td>✔️</td>
<td>✔</td>
</tr>
<tr>
<td>Forage rape</td>
<td>✔</td>
<td>✔️</td>
<td>✔</td>
</tr>
<tr>
<td>Stubble turnip</td>
<td>✔</td>
<td>✔️</td>
<td>✔</td>
</tr>
<tr>
<td>Chicory</td>
<td>✔</td>
<td>✔️</td>
<td>✔</td>
</tr>
<tr>
<td>Plantain</td>
<td>✔</td>
<td>✔️</td>
<td>✔</td>
</tr>
<tr>
<td>Fodder beet</td>
<td>✔</td>
<td>✔️</td>
<td>✔</td>
</tr>
<tr>
<td>Birdsfoot trefoil</td>
<td>✔</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

(✔️) depending on the variety

**Other green manure crops**

Detailed information at www.barenbrug.biz/other_crops

---

BARENBRUG
**Common vetch** *(Vicia sativa)*

Vetch can be used for green manuring and for annual protein-rich forage production. It provides good soil structure and weed control due to its rapid germination and development. Vetch can be grown on all soil types but requires a moderate pH-value on sandy soils. It is susceptible to drought just after sowing which may harm its establishment.

**NITRA**
Extremely fast-emerging spring-type vetch, well adapted to growth during short days, thus providing considerably better and extended autumn production than other varieties. Contains high protein level.

**Forage Pea** *(Pisum sativum)*

This special type of pea is used for the production of palatable roughage often in combination with oats or barley which provide high quality forage rich in protein. Forage pea contains high levels of protein.

**BAR PROTIN**
This concept combines a silage pea with a perennial Green Spirit mixture. The selected pea variety is semi-leafless which allows undersown grass to develop slowly. After harvesting the Bar Protin in summer, a dense and productive grass sward remains. Bar Protin provides a cheap and excellent forage.

**RIF**
Coloured flowering variety producing high fresh yields. Very leafy variety with aggressive growth habit. Combines well with other crops (cereals) but is not recommended as cover crop for grasses. Rif has remarkably small seeds.

**Stubble turnip** *(Brassica rapa)*

Stubble turnip is an excellent catch crop which can produce palatable, high quality forage. It can be sown in spring or summer and ensures forage availability in less than 3 months. It provides autumn and winter feed for buffer-feeding cows or for finishing lambs. Stubble turnips provide a means of lowering winter feed costs.

**BARKANT**
A proven and reliable Barenbrug-bred variety that is high-yielding and very nutritious. Its high proportion of leaves compared to other turnips guarantees a sufficient forage supply for many farming systems.

**Commander**
Commander is a very persistent chicory, providing great year round growth, improved root rot resistance and excellent grazing characteristics.

**Plantain** *(Plantago)*

Plantain is a mineral rich perennial grazing herb that is high in protein (up to 23%). It is fast-establishing and will be productive and persistent over a wide range of soils and climatic conditions because it has both a tap root and a fibrous root system. It adapts well to drier regions, less fertile soils, low pH, and heavy clay soils.

**ENDURANCE**
Broad-leaved type. Very late heading (25 days later than Tonic) which makes it easy to manage. Endurance has a large tap root and persists well in drought conditions and low-fertile soils.

**forage rape** *(Brassica napus ssp. biennis)*

Forage rape is suitable for either grazing by livestock or cutting and feeding. In general, the taller varieties develop more stems but, by way of compensation, the leaves remain cleaner. Forage rape is also used as a green manure crop because of its high and speedy production of dry matter both above and below ground level. It shows good tolerance to night frost and has a rapid initial growth rate.

**BARCO LI**
Medium tall, very leafy variety with high yield of digestible matter. Provides a short term solution, very suitable for grazing.

**Detailed information at www.barenbrug.biz/other_crops**
**Other forage crops**

**Fodder beet** (*Beta vulgaris*)
Fodder beets are particularly productive and are the highest yielding crop grown under temperate climates. Yields of 50 - 75 tons of fresh roots per ha are common. The main use of fodder beets is ruminant feeding, though they can also be fed to pigs. They are also a potential crop for biofuel production.

**KYROS**
A modern variety with monogerm seeds, which eliminates the need for thinning. Kyros produces very evenly sized beets and is resistant to plant heading during season. Its excellent yield makes it a good choice for farmers who want maximal energy yield per hectare.

**Birdsfoot trefoil** (*Lotus corniculatus*)
Birdsfoot trefoil is a perennial forage legume that adapts well to production on poorly drained, low-pH soils which are not suitable for alfalfa production. The species is resistant to Phytophthora root rot and numerous alfalfa insects. The plant does not cause bloat in animals. Trefoil has usually been used in grazing systems.

**LEO**
Variety which is well adapted to low quality soils. Gives a long growth season with a consistent yield. Suitable for grazing pastures for cows or sheep.

**LOTAR**
Was developed in continental climates. Has excellent winter-hardiness and drought tolerance. Therefore very persistent. Perfect choice for perennial pastures in more extensive farming systems.

**Other green manure crops**

**Fodder radish** (*Raphanus sativus oleiferous*)
Fodder radish is a non-turnip-forming type of radish. Late-heading varieties are preferred to avoid flowering. This low-growing ground cover crop with fast establishment is considered to be a good green manuring crop, even under late sowing. A further key benefit is its resistance to nematodes, in particular the beet eelworms *Heterodera schachtii* and *Heterodera trifolii*.

**MAXIMUS**
This variety provides outstanding fast ground cover and is late-heading. This makes it highly resistant to beet cyst nematodes (min. 90 % reduction) and eelworms. Maximus produces very few turnips. An excellent green manure crop in rotation plans with sugar beets, potatoes or maize.

**White mustard** (*Sinapis alba*)
White mustard is an excellent green manuring crop and can be sown very late in the autumn. It grows very quickly providing good ground cover. Mustard is unpalatable to stock and is very susceptible to frost. Modern varieties have very high nematode resistance (*BCA*-resistance).

**SMASH**
Forms a short, strong plant; easy to cultivate with a firm root system. Very fast developing and provides perfect ground cover. Smash has very high resistance to beet cyst nematodes (70 - 90 % reduction) and is a non-host plant to many eelworms and nematode species.

**Phacelia** (*Phacelia tanacetifolia*)
Fast growing, hairy green manuring species also suitable for set aside. Phacelia germinates very quickly, even in dry soils. It produces weak plants and is rather susceptible to frost. The purple flowers of Phacelia are very attractive to bees.

**PROFA**
Variety with quick establishment after sowing and excellent ground cover. It has high above-ground biomass production. Profa can be used as monoculture or in green manuring seed mixtures.

**Detailed information at www.barenbrug.biz/other_crops**
Consulting and sales

Our main regional sales distributors provide specialist knowledge regarding the various applications for our extensive range of quality products.

Barenbrug Holland
P.O. Box 1338
6501 BH Nijmegen
The Netherlands
Tel: +31 (0)24 3488100
Fax: +31 (0)24 3488189
export@barenbrug.nl
www.barenbrug.biz

Sales
Christiaan Arends
Head of Sales & Marketing
Tel: +31 (0)24 3488122
carends@barenbrug.nl

Jan van Winden
Head of Procurement & International Trade
Tel: +31 (0)24 3488134
jvanwinden@barenbrug.nl

Martin Dekker
Export manager
Tel: +31 (0)24 3488135
mdekker@barenbrug.nl

Johan Mourik
Export manager
Tel: +31 (0)24 3488124
jmourik@barenbrug.nl

Robert Vanzeebroek
Export manager
Tel: +33 (0)608 306766
rvanjezeebroek@barenbrug.nl

Lex van der Weerd
Export manager
Tel: +31 (0)24 3488138
lvdweerd@barenbrug.nl

Product Management
Rien Louwes
Product manager
Tel: +31 (0)24 3488129
rlouwes@barenbrug.nl

Sales support
Hannie de Boer
Tel: +31 (0)24 3488185
export@barenbrug.nl

Griet Decavele
Tel: +31 (0)24 3488117
export@barenbrug.nl

For these countries please contact the local sales team

Barenbrug Poland
15 Sowia Street
62-080 Tarnowo, Podgorne
Poland
Tel: +48 (0)61 816 4132
Fax: +48 (0)61 814 6305
info@barenbrug.pl
www.barenbrug.pl

Barenbrug Russia
Svobody Street 29
125362 Moscow
Russia
Tel: +7 (0)495 661 35 24
info@barenbrug.ru
www.barenbrug.ru

Barenbrug Belgium
Hogenakkerhoekstraat 19
B-9150 Kruibeke
Belgium
Tel: +32 (0)3 219 19 47
Fax: 00 32 3 219 39 27
sales@barenbrug.be
www.barenbrug.be