



# NutriFibre

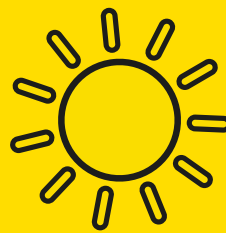
GRASS TECHNOLOGY, BY BARENBRUG

# Root to success

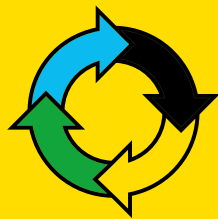
For production of high-quality grass silage



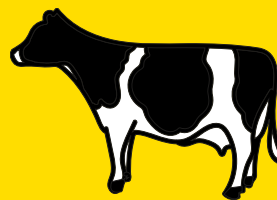
Highest  
protein yield



Climate  
resistant



Mineral  
efficient



Healthy  
cows

# The new grass technology

NutriFibre is the new grass technology for silage. The foundation of NutriFibre is soft-leaf tall fescue, a development stemming from the Royal Barenbrug Group's international breeding programme 'Grass for highly productive dairy cattle'. NutriFibre technology combines mineral efficiency, high protein production, digestible, effective fibre-rich cell walls and rooting intensity.

The interaction of these individual properties has a mutually enhancing effect that results in exceptionally high quality silage. This gives the specific combination a value worth more than the sum of its parts. The new grass technology based on soft-leaf tall fescue has been extensively trialled in a diverse range of conditions, soil types and different farm management systems.



Perennial  
ryegrass



NutriFibre

NutriFibre's roots can reach depths of more than 100 cm, compared with only 25 cm on average for perennial ryegrass

100 cm





# Root to success

For production of high-quality grass silage



**Highest  
protein yield**



**Climate  
resistant**



**Mineral  
efficient**



**Healthy  
cows**

NutriFibre is grass with a strong, impressive root system and nutritious, protein rich leaves. NutriFibre offers an advantage regarding the four points outlined below on the grasses traditionally grown by dairy farmers.

**Highest protein yield** NutriFibre is high-yielding and rich in protein

**Climate resistant** NutriFibre roots impressively deep

**Mineral efficient** NutriFibre uses minerals from deeper layers in the soil

**Healthy cows** NutriFibre provides effective fibre which stimulates rumination activity in cows

Grass seed mixes with NutriFibre provide today's farmers with optimal roughage. NutriFibre technology offers farmers a solution for their farm management under a wide variety of conditions. A huge number of dairy farmers in Europe have already chosen the benefits of NutriFibre and feed their cattle this grass to complete satisfaction.



# Highest protein yield



**NutriFibre delivers the highest total protein and energy production per hectare compared with all other grass species. This is why NutriFibre enables farmers to economise on the purchase of feed concentrates, thereby lowering the cost of your milk production.**

After sowing, NutriFibre puts a lot of energy into the development of its root system. This explains why NutriFibre has a slower start than other grasses in the first year. After developing a solid underground system, the grass yield is high. A three-year research project

demonstrates that NutriFibre yields 30% more dry matter and 30% more protein than perennial ryegrass (table 1). With proper grassland management the forage quality can be perfectly maintained for many years. NutriFibre has a long lifespan and will produce high yields for at least ten years with undiminished productivity.

## Higher milk production

Cows consume more feed if their ration contains NutriFibre. It also slows down the passage rate of the total ration through the cow. This enables more

efficient use of available nutrients, which in turn results in higher milk production (figure 1). Apart from increasing milk production, a healthy rumen also increases the milk's fat and protein content.

## Lower feed costs

Adding NutriFibre to rations lowers feed costs. In many cases the addition of effective fibre is essential. A 20% NutriFibre content in grass silage is the equivalent of one kilogram of wheat straw in the ration. By substituting NutriFibre for straw, cows can get by with

Fertilising	200 kg N/ha	400 kg N/ha
Protein yield		
Perennial ryegrass	2.0 tonne/ha	2.6 tonne/ha
NutriFibre	2.4 tonne/ha	2.9 tonne/ha

**Table 1:**  
Difference in protein yield between NutriFibre and perennial ryegrass

Source: Louis Bolk Instituut (NL), 2011





much less feed concentrates because NutriFibre contains sufficient energy and protein for excellent milk production. This results in a 30 euro cents cost reduction per cow per day. For a 100-cows dairy farm this means a saving of more than €10,000 per year.

#### When to sow

It is important to sow NutriFibre at the right time; this decision will have great impact on the results over the years. Because the soil temperature should be above 12 °C at the time of sowing, it is advisable to sow NutriFibre between March 1st and September 15th. Optimal results require proper soil cover, 50 kilograms of seed per hectare.

#### Weed control

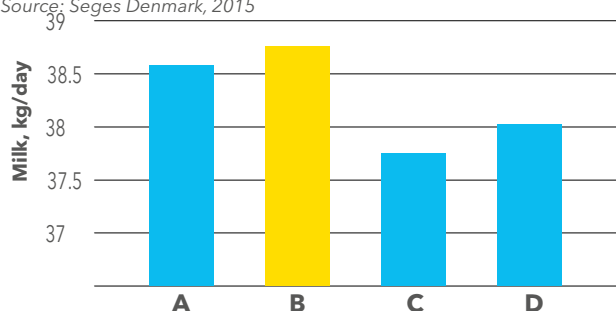
NutriFibre puts a lot of energy into the development of its root system. This explains why its above ground development is slower immediately after sowing. Controlling weeds at an early stage is important. As of the second season, the grasses will thrive and surpass the yield of all other species of grass.

#### Flexibility in cutting times

Cutting times are flexible because the quality of the feed value of NutriFibre decreases more slowly when the crop matures than, for example, with perennial ryegrass or festulolium. This makes farmers less dependent on the weather, providing a better guarantee for making successful silage.

**Figure 1:**  
High milk production with NutriFibre

Source: Seges Denmark, 2015



A = Perennial ryegrass - clover

B = 

C = Perennial ryegrass - hybrid ryegrass - clover

D = Festulolium - perennial ryegrass - clover



# Climate resistant



**Soft-leaf tall fescue (NutriFibre) is tolerant to long periods of drought. During dry periods the grass is able to absorb water from deeper layers in the soil. Trials performed with tall fescue reveal that the grass produces a whopping 47% more yield during the dry summer months. An additional advantage is that drought won't cause bare patches where weeds can take root.**

During an average summer, grass will suffer from a water shortage for three months. In the coming decades the probability of

dry, hot summers will increase. NutriFibre is highly tolerant to these periods of drought thanks to its deep rooting ability. Soil permitting, NutriFibre's roots can reach depths of more than 100 cm (figure 4). NutriFibre can survive these periods of drought thanks to its strong and long root system.

## Higher yields

Research performed by the University of Ghent in Belgium has revealed that in periods of drought soft-leaf tall fescue can produce higher yields than perennial ryegrass. Table 3 shows the yields obtained

in the three-year research project. Several periods of drought were registered over the duration of this trial. The results showed a significantly higher yield for soft-leaf tall fescue compared with perennial ryegrass. One of the conclusions drawn by this project was that soft-leaf tall fescue has a higher drought tolerance than perennial ryegrass. NutriFibre can therefore cope extremely well with periods of drought.

Year	2010	2011	2012
Perennial ryegrass	13.7	11.8	12.6
Soft-leaf tall fescue	15.5	14.4	17.0

**Table 2:** Difference in annual dry matter yield during specific years with long periods of drought (tonnes/ha).

Source: University of Ghent (Belgium), 2013





### Resistant to wet periods

During extremely wet periods, NutriFibre's long roots have a draining effect. This makes for excellent drainage on pastures planted with NutriFibre so the grass stays in a better condition. Thanks to NutriFibre's better capacity to survive periods of wet weather than perennial ryegrass, damage to the grass is limited.

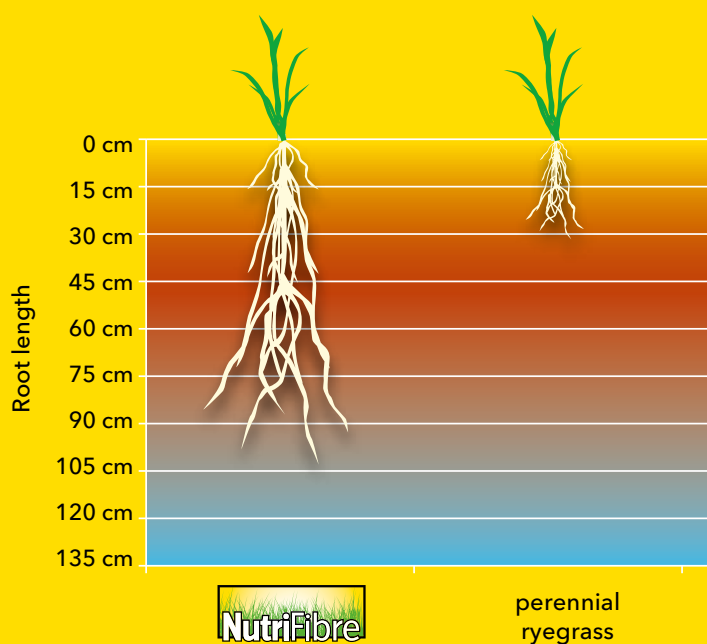


Figure 2:  
Difference in root length between NutriFibre and perennial ryegrass



# Mineral efficient

**NutriFibre's efficient use of nutrients guarantees a reduction in leaching. Because NutriFibre optimally utilises fertilisers, dairy farmers get more yield with the same level of fertilisation compared to other grasses.**

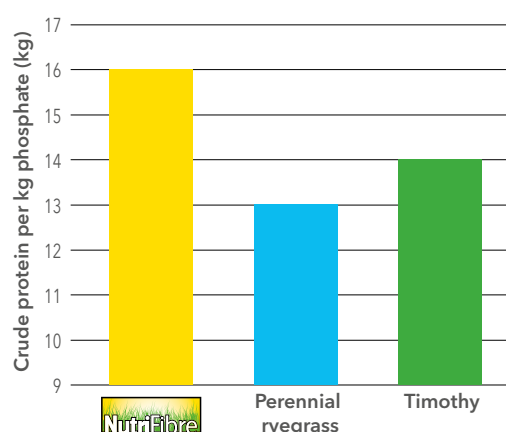
Soil permitting, NutriFibre's roots can reach depths of more than 100 cm, compared with only 25 cm on average for perennial ryegrass. This enables NutriFibre to utilise 96% of the nutrients contained in the soil (nitrogen, phosphate, potassium). and will produce high yields for at

least ten years with undiminished productivity.

## Best phosphate utilisation

Phosphate is attracting a lot of attention due to the expected worldwide phosphate shortage. This means that applications of phosphate will have to be utilised more efficiently.

NutriFibre offers the perfect solution, as its long roots allow the crop to intake 15% more phosphate. In addition, NutriFibre is able to utilise the phosphate present in deeper soil layers and convert this into extra growth. NutriFibre gives a higher protein yield per hectare compared with other grass varieties (figure 3).



**Figure 3:**  
Difference in crude protein production per kg of phosphate



### Nitrogen utilisation

Research from 2011 by the Louis Bolk Institute (NL) demonstrates that NutriFibre produces more high-protein grass per hectare than other grasses, with the same nitrogen input (table 3). NutriFibre enables you to economise on the purchase

of nitrogen or high-protein feed or concentrates after sowing. Controlling weeds at an early stage is important. As of the second season, the grasses will thrive and surpass the yield of all other species of grass.

**Table 3:**  
Difference in dry matter yield as a result of better mineral efficiency

Fertilising	200 kg N/ha	400 kg N/ha
	Dry matter yield	
Perennial ryegrass	10.3 tonne/ha	12.2 tonne/ha
NutriFibre	13.8 tonne/ha	14.3 tonne/ha

Source: Louis Bolk Institute (NL), 2011





# Healthy cows



**The effective fibre leaves of NutriFibre stimulate rumination activity in cows. Rumination is indispensable to healthy rumen activity. Healthy cows produce more milk.**

Rumen acidosis occurs at many dairy farms and often goes unnoticed. It mostly affects highly productive dairy cattle that is given too much high energy feed (sugars and starches). Rumen acidosis leads to disappointing milk production, milk with a lower protein and fat content and health issues such as low fertility and hoof problems. This, in turn, results in extra costs from €200 to €400 per cow\*.

## **The effective fibre is in the leaf**

Because NutriFibre's effective fibre is in its leaves, this grass does not depend on flowering for high fibre content. NutriFibre can be harvested before flowering, maintaining its effective fibre. After flowering, feed value decreases in all grasses.

## **Rumen fistulated cattle research**

Joint research by Nutreco and Barenbrug compared the rumination activity of rumen fistulated cows after consuming various varieties of grass. The research showed that with NutriFibre rumination increases, compared to varieties of grass low

in cell walls such as Italian and perennial ryegrass.

## **High digestibility from cell walls**

With NutriFibre, cows get a large part of the energy from the cell walls because NutriFibre's cell wall composition is more easily digestible than that of other grasses (figure 4). Cell walls can be built from three different components:

- Lignin = indigestible wood dust without feed value.
- Cellulose = dairy cows only digest one-third of the cellulose.
- Hemicellulose = breaks down in eight hours enabling cows to digest it completely.

*\*Source: University of Manitoba, Canada.*





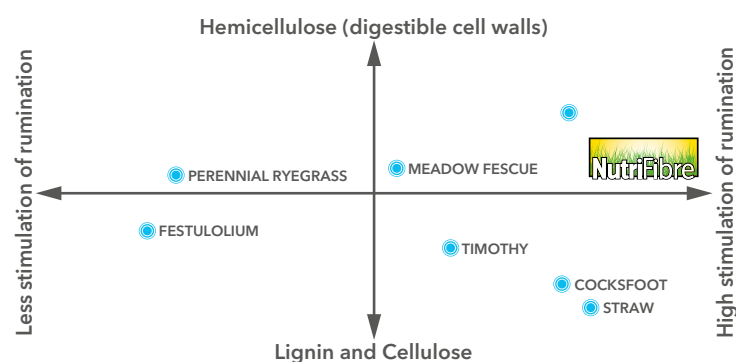
NutriFibre's cell walls consist mostly of hemicellulose. This explains the high feed value in combination with effective fibre. All other effective fibre products such as heading grass have a

lower digestible hemicellulose rate, causing a large part of the feed to fail to convert into milk.

### What is rumen acidosis?

During the fermentation of the feed that cows eat, fatty acids are released. Fatty acids cause a (temporary) decrease in rumen pH (acidity). The pH will restore itself once the fatty acids have been absorbed by the rumen wall. When cows eat too many fast degradable carbohydrates (sugars and starch), too many fatty acids are released, causing the rumen to malfunction. This is easily prevented by increasing the effective fibre in the feed ration to stimulate rumination. This intensive rumination increases the production of saliva, enabling the cows to produce bicarbonate themselves. This bicarbonate has a buffering effect in the rumen, preventing the fatty acids from lowering the pH too much. In this way effective fibre enhances rumen activity, thereby preventing rumen acidosis.

**Figure 4:**  
Difference between species in digestibility of cell walls and stimulation of rumen activity



Source: Louis Bolk Institute (NL), 2011



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**GreenSpirit•NutriFibre**  
NutriFibre technology inside



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