

iSeed®
Nutrient Seed Coating
for Forage Grasses



Intelligent Solution

+ 30% establishment



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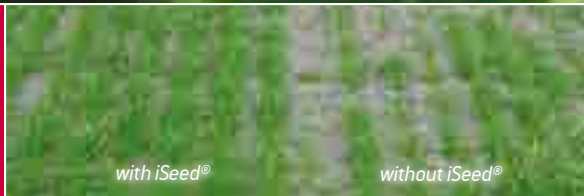
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with
iSeed®

without
iSeed®



DLF-TRIFOLIUM SEEDS & SCIENCE

DLF-TRIFOLIUM closely focuses on the demands of customers as well as on the latest trends in the grass seed and clover markets. Offering one of the world's largest research and breeding programmes in both turf and forage, DLF-TRIFOLIUM is working continually to improve the quality and reliability of all its varieties. To ensure these varieties meet the needs of the marketplace, they are tested in a worldwide trialling network to assess their adaptation to different environmental conditions and uses.

DLF-TRIFOLIUM is the world's largest producer and distributor of grass seed, with subsidiaries in Denmark, Sweden, Holland, Belgium, UK, France, Germany, Czech Republic, Russia, China, New Zealand, South America and the United States. From such a worldwide distribution network, customers can expect the best service and support.

iSeed®: the Intelligent Way of Improving Establishment

In today's world one of the demands to the farming industry is food production in an economically efficient way combined with a high degree of environmental responsibility. With iSeed® we offer a product that serves both interests.

The R&D department of DLF-TRIFOLIUM has for a long time been working on products that need lower inputs, and several years ago we began collaboration with the Yara fertiliser company. The aim was to combine the best grass seed genetics with all the nutrients needed by a seedling in a single coating, so as to improve the establishment of the plant but also reducing inputs at the same time. After substantial laboratory, greenhouse and user trials, iSeed® was developed and has subsequently been successfully launched in many European countries.



Strong
performance
above and
below ground

Feed per Seed

Grass seeds are small, contain very small amounts of nutrients and are often sown into cold soils with low availability of P (and N). Phosphorus is especially important as a pre-seeding application for rapid establishment. With iSeed®, every seed gets its own coating of nitrogen and phosphorus and utilises it efficiently for establishment.

What is iSeed®?

iSeed® is a patented seed coating with nutrients located around the seed, as a supplement to the seed's own reserves. iSeed® improves nutrient utilisation during the early stages of plant development and enhances the vigour of leaves as well as roots at a critical stage, ensuring a more successful start in life for the young grass plants.



Improved establishment and higher yield

Strong, early growth is important for uniform plant establishment, success in competing with weeds and overcoming stress. With iSeed® up to 30% more plants are established and 5-15% more dry matter can be expected in the 1st cut.

Improved fertiliser efficiency

Traditionally fertiliser can be applied in several ways, either broadcast, in bands, mixed with seed, in the seed row or as a seed coating. With iSeed® the uptake of nutrients is up to 4 times more efficient than standard seed-bed fertiliser – a clear benefit to the economy and the environment.

Enhanced nutrient uptake

The applied iSeed® coating contains both fast acting nitrogen and phosphorus, and slow release nitrogen, without harming the seeds. The nutrients in iSeed® are located exactly where they are needed. This enhances root and shoot development - not least when plants are under stress. It also means that weeds will have less access to nutrients and more competition from the grass crop.

iSeed® is easy to use

During the application process the weight of the seed is increased by 64% so that the coated seed contains 12.2 % N and 2.4% P (5.6 % P₂O₅) in total. The amount of N and P applied per hectare will depend on sowing rates. The larger seed weight ensures good soil contact, and normal sowing equipment can be used.

AMOUNTS

KG SEEDS/HA	KG ISEED®/HA	KG N/HA	KG P/HA
25	41	5,0	1,0
30	49	6,0	1,2
35	57	7,0	1,4

Amounts of nitrogen and phosphorus applied at different sowing rates of iSeed®.

Proven Effect in Practice

**Mervyn Roberts, Hendy, Pontllyfni,
Caernarfon, UK**

“The concept behind iSeed® was very attractive as we could save on input price and still expect a better establishment and higher plant population. To see the grass and clover seeds filling the gaps is very encouraging. We have overseeded with HF GrassMax mixtures for some time now and using iSeed® has allowed us to fine tune the process with great success. DLF’s innovation has once again benefited our grass production and we will certainly continue to use iSeed® mixtures.”

HF Seeds is a DLF-TRIFOLIUM forage brand in the UK.



**David Barton of Lupton Hall, Carnforth,
Cumbria, UK**

David decided that in the current economic climate, overseeding with iSeed® treated seed made good sense – not only did it keep costs to a minimum but sward quality has been greatly improved.



Proven Effect in Trials

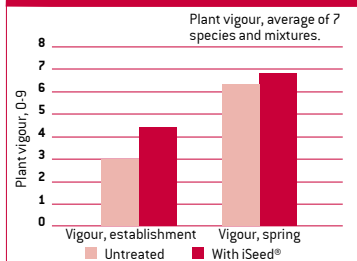
France: 50% better establishment vigour with iSeed®

1 tonne extra dry matter

Results from the DLF-TRIFOLIUM trial site near Rennes in Brittany, France, confirm that iSeed® can be of great value when grass fields are established in the autumn. Trials with ryegrass sown in autumn 2008 showed, after 3 weeks, 50% better establishment vigour in the plots where the seed was

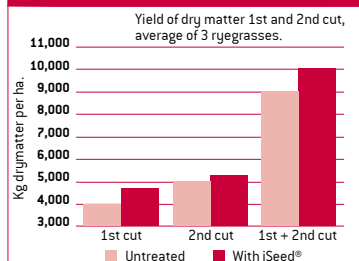
treated with iSeed®. In May 2009 the effect could be seen as 11% higher yield in 1st + 2nd cut. This corresponds to almost 1,000 kg extra dry matter per ha, and the field was clearly more dense and uniform.

50% IMPROVED ESTABLISHMENT VIGOUR



Trials 2008-09, at DLF-TRIFOLIUM, Rennes, France

11% HIGHER YIELD



Denmark: iSeed® benefits in a dry spring

In 2006 the conditions for spring sowing were not the best in Denmark. In a trial for establishing grass and clover in spring, the effect of iSeed® was positive when the field was not rolled immediately

after sowing. This means that the iSeed® coating can help to overcome the effect of insufficient contact between soil and seed in a dry period.

BETTER ESTABLISHMENT

	TRIAL SCORE*			YIELD PER HECTARE, 1ST CUT	
	GERMINATION	PLANT DEVELOPMENT	PLANT DISTRIBUTION	FEED UNITS	RELATIVE %
NORMAL SEED	4	6	7	2540	100
iSeed®	6	7	9	2750	108

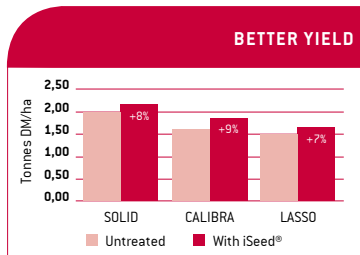
* 0-10, 0 = bad and uneven germination, slow plant development and uneven distribution of plants.

Trial with establishment of grass and clover, Denmark, 2006 (dry spring). Danish Agricultural Advisory Service.

UK: iSeed® Reduces the need for seedbed fertiliser

When sowing grass seed in spring it is normal to add seedbed fertiliser – most often a combination of nitrogen and phosphorous. With iSeed® this is not needed until after the initial establishment phase, according to trials carried out in England by DLF-TRIFOLIUM in 2006. Here iSeed® resulted in 7-9% more yield of dry matter compared to the normal untreated seed.

Normal fertiliser applications should begin after initial establishment and should be calculated based on soil index and crop requirements.



Yield of three varieties of ryegrass (Hybrid Ryegrass SOLID, Perennial Ryegrass CALIBRA and LASSO) with and without iSeed®. Trials at DLF-TRIFOLIUM, Hailes Farm, England 2006.



Proven Effect in Practice

Peter ten Haken, Test Station Cranendonck, Holland.

"In October 2007, quite late in the season, I reseeded one field on the farm with two strips of grass, one strip with iSeed® and one without. There was only a small difference between the two strips in the autumn. In spring 2009, however, significantly less amounts of weed appeared in the iSeed® strip. A larger amount of stronger and more vigorous plants were also seen in the iSeed® strip.

We did not measure yield directly but visually it seemed much better. The iSeed® strip is also doing very well in 2009. I think the differences would be much more significant if the circumstances were more unfavourable during sowing."



Johan Zebregts, Tilburg, Holland.

Johan Zebregts has a dairy farm with 100 cows each averaging approx. 9,400 l. milk. "Excellent forage is critical for this high production level. This is a good reason for checking my grassland every year and if necessary re-sow. Since the cows spend the whole year inside, we only mow our pastures and because of this the grass is more open. In 2008 I tried an iSeed® mixture. We sowed one field with two mixtures next to one another one with iSeed®, one without. The iSeed® strip had a faster establishment, resulting in a higher plant density. At the moment the iSeed® strip looks greener and healthier. I assume the iSeed® will give a better yield because of the higher plant density."





More Efficient Nutrient Utilisation

Phosphorus is especially important as a pre-seeding application for early establishment. When broadcasting fertiliser, the utilisation rate of phosphorus is generally between 5 and 10%. Band application can increase this to 10%, and placing the fertiliser in the seed row can lead to 15% utilisation. The most effective method is to place the fertiliser in a seed coating, where the utilisation rate will then be increased to 20%. Nutrient uptake is faster when the nutrients are applied in the soil and not broadcast, an advantage when overseeding.

Phosphorus is easily fixed in the soil into forms that are unavailable for plant uptake, so the closer the seed is to the nutrient, the better the utilisation rate. With iSeed®, the key nutrients are attached to the germinating seed and developing roots, thus nutrient uptake is quick and efficient. The roots and shoots grow rapidly and the seedlings become

strong and vigorous. This improves the use of all the available soil nutrients and decreases nutrient losses into the environment.

The amount of fertiliser that can be applied in traditional seed coatings is limited as there can be problems with phytotoxicity. The maximum levels that can be found commercially are typically between 1 and 2% N. Such low levels result in little or no effect. iSeed® is different and makes it possible to add more than 20% of nitrogen in the seed coating. By applying iSeed®, the fertiliser is in the right place at the right time and the coating also ensures better contact with the soil.

Using iSeed® means you can combine sowing and fertilising into one process whilst achieving an improved result.



ForageMax Overseeding System

Increase Sward Output by over 40%

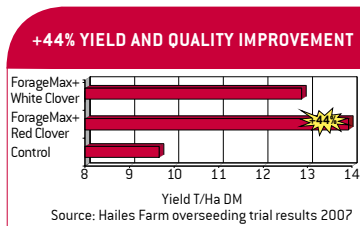
For many years grassland farmers have accepted that productivity will fall during the lifetime of a sward. This fall can be as much as 50% in terms of animal performance. Weed grasses play a major role in this as they affect yield but more importantly the quality of the grass. This problem cannot be controlled by chemical sprays, but with good grassland management which includes regular overseeding, young swards can be maintained in peak production for much longer than previously expected.



Before

After

- The ForageMax overseeding system promotes the method of routine scarifying and overseeding of young grassland to prevent premature ageing.
- The ForageMax overseeding system is based on preventing weed grass ingress that leads to rapid sward decline in later years.
- The ForageMax overseeding system works by annually topping up young swards with productive ryegrass and clover, therefore preventing weed grasses from developing within the sward.



iSeed® fertiliser coating ensures rapid establishment of strong plants that can compete more effectively with the existing sward.

Overseeding Guidelines

• Field Preparation

Remove all surplus grass growth by cutting or hard grazing. Scarify the area in opposite directions using the grass scarifying harrow.

• Sowing

Sow at the same time as scarifying with around 35-40kg/Ha of the appropriate iSeed® fertiliser coated overseeding mixture. Immediately after sowing, roll the field to consolidate the ground or apply dirty water or diluted slurry to ensure good seed to soil contact.

• Timing

Immediately after the last silage cut of the season or after a hard graze in the spring or autumn.

• Fertiliser

All establishment fertiliser requirements are contained within the iSeed® coating but if using uncoated seed avoid using nitrogen fertiliser for up to two weeks after sowing.

• Livestock re-introduction

After cutting wait until swards have fully recovered. After grazing keep stock on for 10-15 days then remove and allow swards to recover.

Dedication to bring out the very best in seed

iSeed® is fertiliser coated grass seed that offers a number of benefits, including faster establishment and a denser sward.

- iSeed® ensures efficient nutrient utilisation.
- iSeed® results in a higher forage yield.
- iSeed® saves you time and money.

This brochure explains the benefits of iSeed® and the research behind it.

DLF-TRIFOLIUM focuses on offering you the best products possible. We achieve this through a continuous process of research and development.

iSeed® for grass is exclusively marketed by DLF-TRIFOLIUM.

iSeed® technology is subject to patents and patent application by Yara International ASA. iSeed® is a registered trademark by Yara.



**DLF
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SEEDS & SCIENCE

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