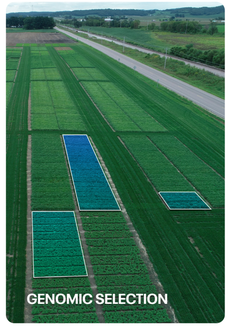
R&D DRIVES INNOVATION AT DLF

OUR TEAM OF RESEARCHERS ARE CONTINUOUSLY DEVELOPING NEW PRODUCTS AND IMPLEMENTING NEW TECHNOLOGIES THAT CONTRIBUTE TO A MORE SUSTAINABLE FUTURE FOR OUR CUSTOMERS AND PLANET.



GENOMIC SELECTION speeds up the detection of plant material with high potential for improvement. For over a decade, DLF researchers have aligned our observational data with the DNA of plant material to learn which parts of a plant genome control different traits. Once an association is established, we can calculate which plants will have the highest breeding value for a particular trait. As more and more data from breeding lines are applied to the underlying model, the value and precision of our selection criteria increases.

DLF researchers use aerial drones to collect **PRECISION DATA** for certain traits and utilize machine-learning models to precisely discern genetic differences in trial plots. Most of our harvesters are also equipped with near-infrared reflectance spectroscopy (NIRS), which provides real-time, point-of-cropping data on biological material composition and quality.

DLF developed the world's most advanced **ROOT-SCREENING** facility, RadiMax, in collaboration with Danish universities and breeding companies. The state-of-the-art system enables multispectral imaging of roots three meters into the soil while grasses above ground are subjected to varying degrees of stress through a controlled soil moisture gradient. Advanced root-screening helps us select plant varieties with improved drought tolerance, quicker establishment, better uptake of nutrients, and a greater storage capacity for carbon.

DLF alfalfa breeders work with the most diverse **ALFALFA GERMPLASM** in the industry. Our multiple genetic pools contain all the traits needed to create a world-class alfalfa seed product. Sophisticated data collection, analysis and selection methods allow us to make significant gains year after year for key traits like disease resistance, digestibility, standability, regrowth, persistency and forage yield.

MICROCLOVER is a truly sustainable solution for turf mixes. The unique small-leaved white clover produces its own nitrogen through a continuous process of roots dying and degenerating, and the accumulated nitrogen it produces is shared with surrounding plants. Microclover also has a special ability to grow between plants, which keeps turf dense and prevents weeds from establishing. Additionally, it tolerates a range of climatic and soil conditions and recovers quickly after severe stress.

NOVEL ENDOPHYTES have been widely used to help improve insect tolerance, stress tolerance and persistency in turfgrasses. With the help of molecular marker technology, our researchers can now identify endophytes that enhance forages and are safe for animals. They field test the inoculated host genotypes and confirm the absence of ergo-alkaloids through lab analysis and animal feeding studies.

Through plant breeding, screening and lab analysis, DLF researchers can select varieties with higher levels of digestible neutral detergent fiber (dNDF), which we refer to as **FIBER ENERGY**. Researchers target the wall of a plant cell, specifically cellulose and hemicellulose, because the other parts of a plant cell are nearly 100% digestible and thus offer very little room for improvement. The work has resulted in significant improvements to milk yield and livestock weight gain around the world. On average, DLF researchers estimate a 1% increase in cell wall digestibility results in an extra 0.25 liters of milk per cow per day and 24 more grams of live weight gain per day for livestock.

Crossing fescues with ryegrasses resulted in a new set of forage grasses called **FESTULOLIUMS** that utilize the best traits of each species. DLF is the global leader in festulolium R&D and specializes in two species, *Festulolium braunii* (meadow fescue crossed with Italian ryegrass) and *Festulolium pabulare* (tall fescue crossed with Italian ryegrass). Depending on the combination selected, end users benefit from a higher-yielding fescue with improved forage quality, or a higher-yielding ryegrass with improved persistency.

The advancement of **TETRAPLOID** perennial ryegrass (turf plants with twice the number of chromosomes) has resulted in deeper root systems that contain more energy reserves for rapid establishment, germination in cold soil temperatures, quicker recovery, and enhanced protection against drought and turf diseases.

DLF built a world-class creeping bentgrass breeding program - **SUPER BENTS™** by listening to and partnering with golf course superintendents. For decades, end user insight has guided our research, helping to ensure the traits we evaluate lead to significant improvements in bentgrass cultivars for greens and fairways. Our meticulous selection and testing program has produced the most advanced and environmentally friendly bentgrass varieties in the world.

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DLF NORTH AMERICA

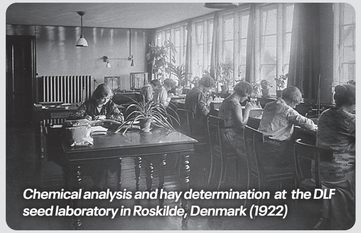
RESEARCH & DEVELOPMENT

GOOD SEED, GOOD HARVEST

The founding mission of DLF was to supply high-quality seeds for sustainable agricultural production. A hundred years later, our call to action remains the same: to develop seeds for a green future by ensuring greater quality and productivity in the field with fewer inputs.

DLF's first seed trial site was established on a 7-acre farm in Denmark in 1911. Plant breeding commenced shortly after a small barn was constructed on the property, and it's been the cornerstone of our company ever since.

Plant breeding involves evaluating, selecting and testing multiple generations of plant material to create new and better varieties. A new variety typically takes 7-10 years to develop, so researchers must always be looking to the future.



Chemical analysis and hay determination at the DLF seed laboratory in Roskilde, Denmark (1922)

SUSTAINABILITY IS ROOTED IN OUR WORK

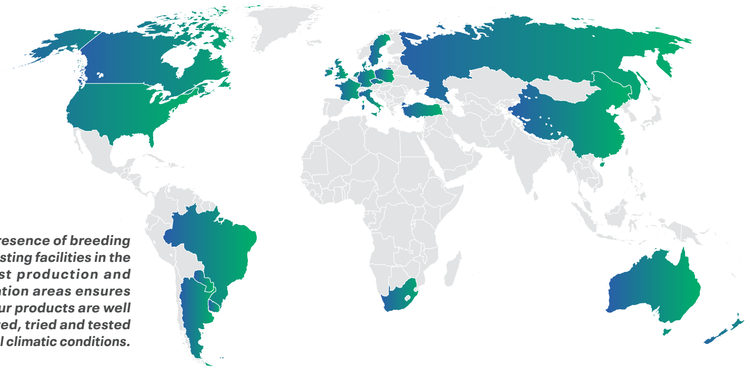
Amidst increasing pressure on agricultural production and green spaces, the imperative for sustainable solutions has never been more urgent. As climate extremes become more common, we must not only adapt but make meaningful contributions to reducing our environmental footprint.

With a globally integrated value chain, DLF is championing a sustainable path forward. From reducing global emissions to preserving ecosystems, advancing crop systems and promoting biodiversity, we are pioneering new approaches and driving positive change across the agricultural landscape through science.

GLOBAL R&D PLATFORM

More than 10% of DLF employees worldwide work in R&D. DLF has dozens of breeding and product development stations strategically positioned around the world. Our global presence allows us to react quickly to market needs, tailor products to local conditions, and stress-test our material globally to ensure performance.

DLF plants thousands of trial plots each year, in hundreds of different locations, to assess the performance of new varieties against competitor products and ones currently in the market. As part of the work, DLF collaborates with leading research institutions and uses the latest technologies in artificial intelligence, remote sensing and genetic analysis to make the traditional plant breeding process more efficient and precise.



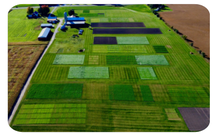
The presence of breeding and testing facilities in the largest production and utilization areas ensures that our products are well adjusted, tried and tested in local climatic conditions.

DLF R&D IN NORTH AMERICA

TOUCHET, WASHINGTON, USA

The Touchet Research Station is located in the Columbia River Basin and plays a critical role in alfalfa breeding as the principal site for all R&D seed production. Researchers breed dormant and semi-dormant alfalfa for biotic (nematodes, wilts, root rots, and aphids) and abiotic (drought and salt) stress tolerances. They also manage yield trials, nurseries, and disease and pest screenings.

PORT HOPE, ONTARIO, CANADA



The Port Hope Research Station comprises the most extensive private forage testing program in Canada. The replicated product development trials ensure only the best adapted varieties are advanced to commercial use. Ten distinct species of forage grasses and two species of legumes are evaluated for yield, winter hardiness, disease resistance and forage quality. This location also hosts turf grass and hybrid corn demonstration trials.

BERRY, KENTUCKY, USA

The Berry Research Station consists of 9,000 trial plots (8,000 turf and 1,000 forage). The hot and humid environment is optimal for evaluating disease tolerance, specifically gray leaf spot, brown patch and summer patch. The research team also collects data on forage yield and quality.

WEST SALEM, WISCONSIN, USA

The West Salem Research Station breeds and tests dormant alfalfa varieties in the heart of Midwest dairy production. Selection nurseries and yield trials are used to evaluate yield, forage quality, disease resistance and persistence of new alfalfa products. The facility also houses turf and forage trials, a pathology lab and several growth rooms where many disease isolates are maintained and evaluated for their ability to infect alfalfa varieties.

PHILOMATH, OREGON, USA

The Philomath Research Station is on the western edge of the Willamette Valley's main seed production area. Many cool-season grass species are bred at this location, including turf-type perennial ryegrass (diploid and tetraploid), tall fescue (turf and forage), annual ryegrass (turf and forage), orchardgrass, timothy, fine fescue (strong creeping and hard), red and white clover, crimson clover, daikon radish, and other cereals and cover crops. Researchers also conduct bentgrass and bluegrass trials, and evaluate secondary traits and tolerances (wear, drought, shade and salt).