Forage Product Guide

2025-2026

BARENBRUG®

From tough conditions to unpredictable situations.

Grass has a lot to contend against. From droughts to diseases, grazing pressure to weed competition, the odds might seem stacked against you.
That's why we work so hard at producing the absolute best forage products for you and your livestock.

We work hard because we know you're out there getting important work done.

Central to the progress of Barenbrug USA is working with you to understand your changing needs and solving the challenges you face.

Long term development and breeding

Ongoing investment in new grass cultivars and products to improvements in the qualities of your forages.

In depth consulting and guidance

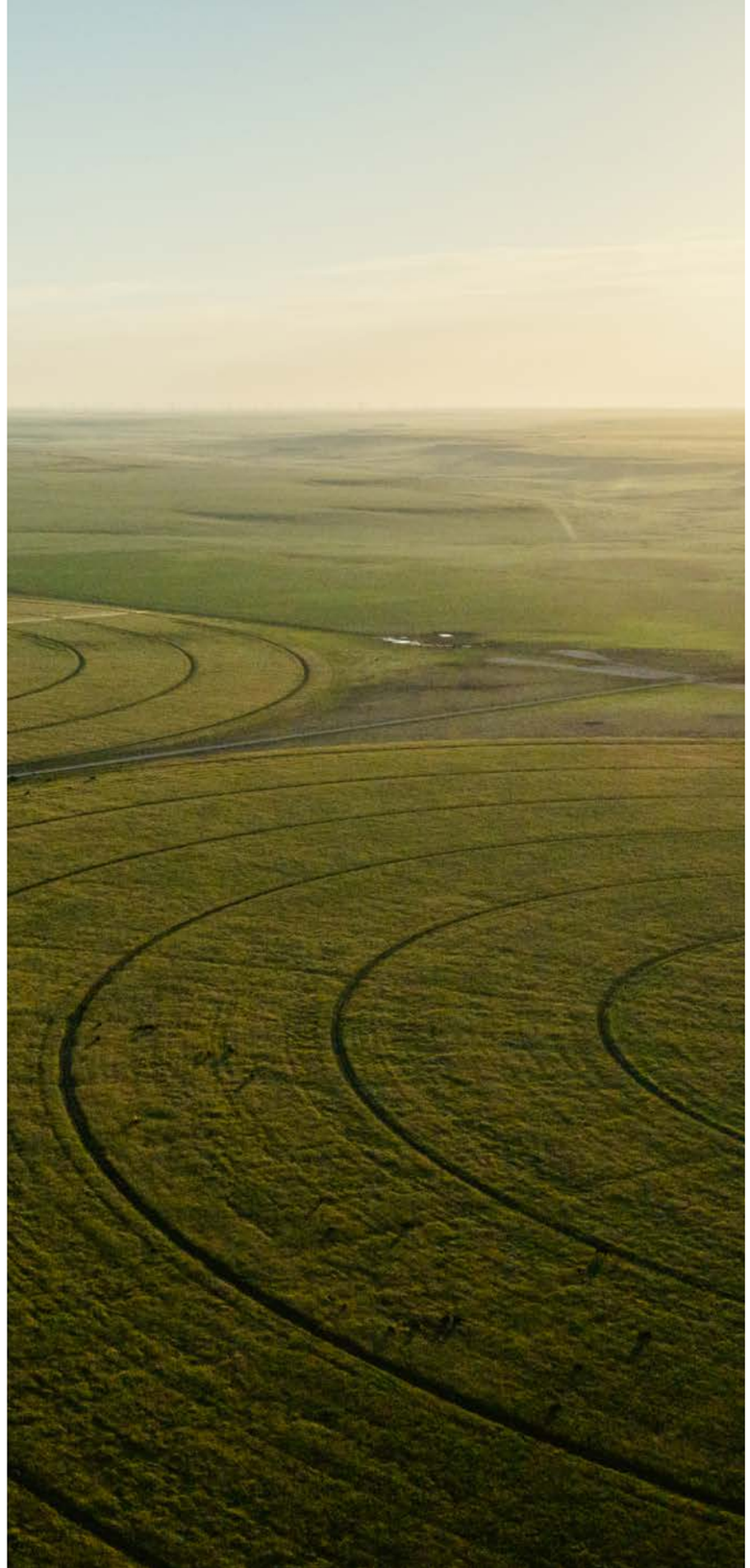
Collaboration in product design, development, and trialing enables you to experience the greatest possible success.

Continent-wide service and support

Field expertise and technical help is always available to help you find immediate solutions to your grass needs on site.

Before we were a company, we were a family.

Founded in 1904, Barenbrug continues to be family-owned and ran to this day. The development of new and innovative cultivars and varieties is in our roots. Through research and development, breeding, and working with farmers, ranchers, and you, we are able to develop specific seeds that meet your specific needs. In addition, we share our knowledge and experience to help you and your team excel at your craft.



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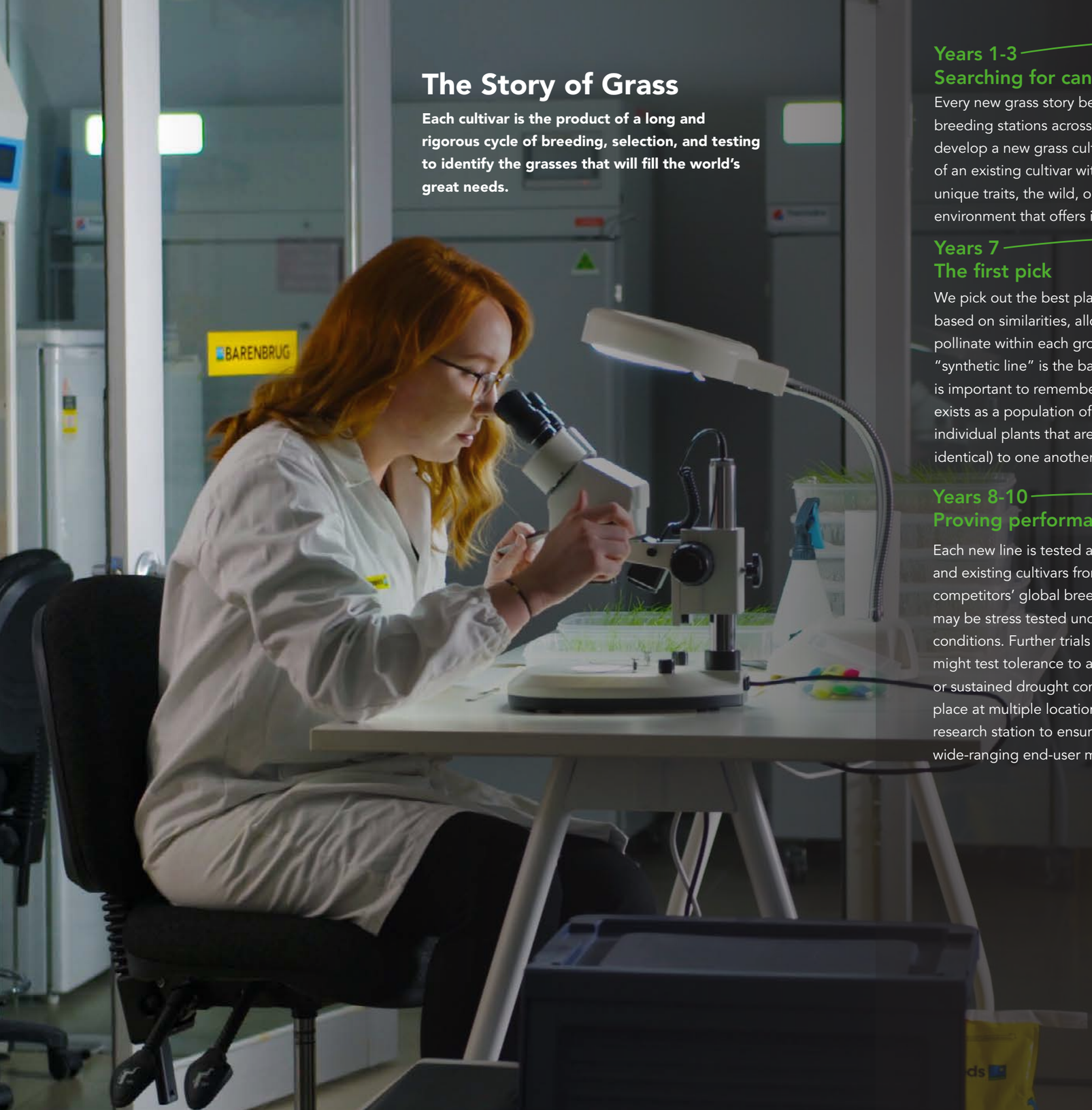
The Story of Grass

Each cultivar is the product of a long and rigorous cycle of breeding, selection, and testing to identify the grasses that will fill the world's great needs.



Years 1-3
Searching for candidates

Every new grass story begins at one of our breeding stations across North America. To develop a new grass cultivar, we cross plants of an existing cultivar with plants isolated from unique traits, the wild, or from a particular environment that offers interesting potential.

Years 4-6
Selection process

Once these crosses have been seeded, a detailed selection process identifies those with the strongest potential to perform. Individual, unmown plants in a large nursery are scrutinized for a broad range of characteristics, removing those with weaknesses to disease, heat, cold, etc. and selecting only the very best to continue on the journey.
We are looking for a range of characteristics that customers tell us matter most to them, such as disease resistance, climate tolerance, soil preference, and growth qualities. This three-year process may whittle down 10,000 plants to as few as a dozen or more.

Years 7
The first pick

We pick out the best plants and group them based on similarities, allowing them to cross-pollinate within each group. The resulting "synthetic line" is the basis for a new cultivar. It is important to remember that a cultivar always exists as a population of genetically different individual plants that are very similar (but not identical) to one another.

Years 8-10
Proving performance

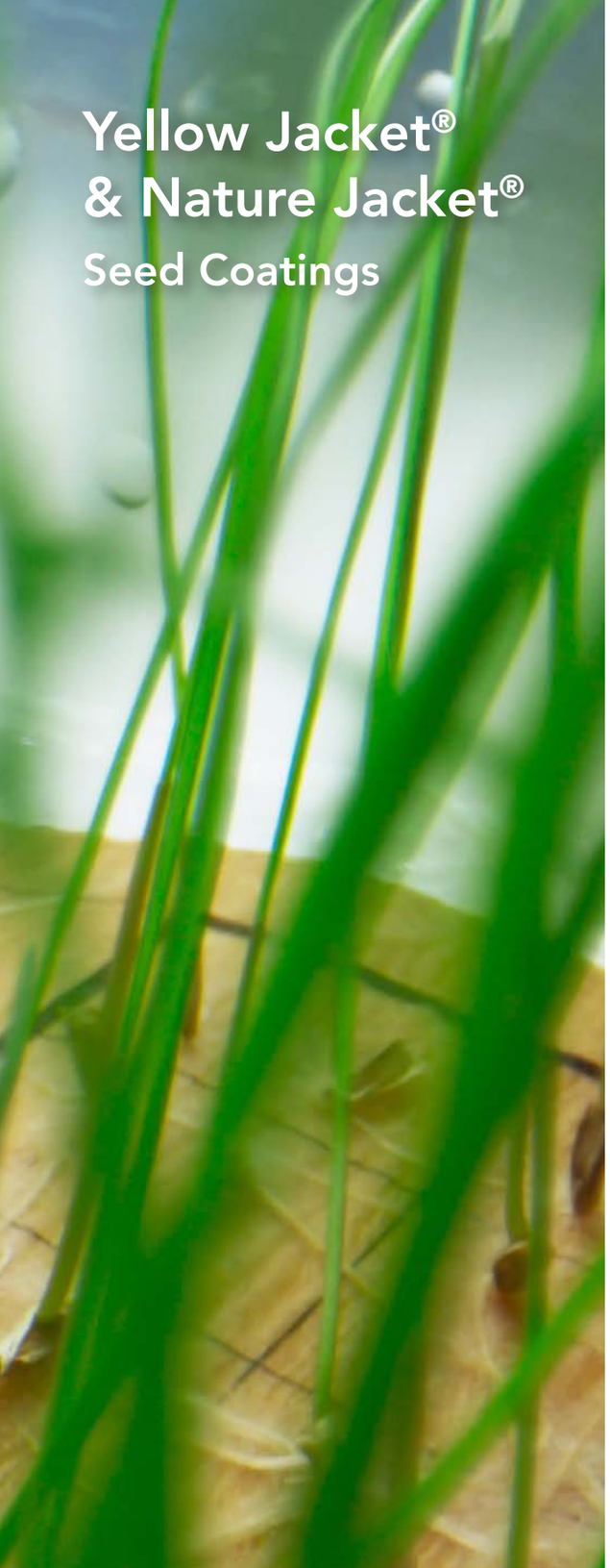
Each new line is tested against other elite lines and existing cultivars from Barenbrug's and competitors' global breeding programs. They may be stress tested under simulated stressful conditions. Further trials or laboratory testing might test tolerance to a particular disease or sustained drought conditions. This takes place at multiple locations, including our U.S. research station to ensure reliable results for wide-ranging end-user markets.

Years 11
Multiplication

The results of the performance tests indicate which lines should be multiplied to become new cultivars. Barenbrug product development teams decide on the line, based on performance data, and where it meets the range of needs of customers in our very different markets. The multiplication process is a costly one, creating the breeder's seed stock, which will become the foundation for commercial production.

Years 12-15
Final assessment

Each cultivar, based on its intended market, is submitted to official trials across the globe. In parallel, it is necessary for a cultivar to be examined under legislative protocols to ensure it is eligible for sale. Aspects such as distinction (different from existing material), uniformity (individuals within the population must be very similar) and stability (no reversion to parental wild-type) are scrutinized over a fixed period (typically three years or longer).



Yellow Jacket® & Nature Jacket®
Seed Coatings

Yellow Jacket® Enhanced Seed Coating

Better Forage with Less Input

Yellow Jacket is a proprietary seed coating containing a natural water-absorbent material made from corn starch.
This enhanced coating can hold up to 600 times its weight in water. Research at the University of New Mexico, North Carolina State University, and Texas A & M University proved conclusively that seed coated with Yellow Jacket established faster and required less water. Our products, from grasses to legumes, are available with our Yellow Jacket coating.

Discover what's inside Yellow Jacket enhanced seed coating:

- **Fungicide to protect from common seedling diseases**
- **Nutrient package for rapid establishment**
- **Inoculant to assist in fast germination**
- **Absorbent to reduce water inputs**

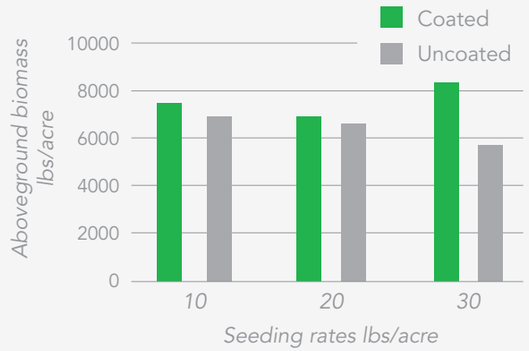
Yellow Jacket Advantage

600x With Yellow Jacket Coating, each seed can hold up to 600 times its weight in water.

30% With Yellow Jacket Coating, up to 30% less water is needed for establishment.

Yellow Jacket® Coated Tall Fescue

Under reduced irrigation, seed with our Yellow Jacket seed coating produced significantly more biomass per acre at three different seeding rates.



Coated *Uncoated*

Sample taken 60 days after seeding

Nature Jacket® Organic Seed Coating

The Proof is in the Coating

As consumer demands for organic products continue to rise, we recognize the need to deliver industry-leading organic seed technologies to the professional agriculture industry.
As a recognized leader in innovative grass seed coating, we have been providing the professional seed industry with quality coated seeds for over 14 years! Since this time, we have sold millions of pounds of enhanced seeds across the United States and now, for the first time, this same proven coating is available as a certified organic coating.

Nature Jacket Benefits

- OMRI approved
- Surrounds each seed with a natural, micronutrient rich environment, stimulating vigorous growth.
- Hygroscopic nature helps pull and hold moisture to the seed, aiding in germination

Pinpoint™ Forage Delivery System

Filling the Forage Gaps

"Hay is costing me 3 cents a pound to produce, and I have to haul it to the cattle. Brassicas are costing me less than a cent to plant, and the cattle harvest it. I can't afford NOT to plant it!"

Pinpoint is the cost-effective solution for seasonal feed supply challenges. This system increases profitability by lowering feed costs and reducing stress on your operation. Pinpoint products help producers achieve the goal of grazing 300+ days of the year.

Pinpoint Products Fill Forage Season Gaps

The Pinpoint family of products can provide a solution for timely forage needs. Even with ideal pasture and livestock management, periods of feed deficit still exist. Base forages have distinct growth curves that cannot meet the feed demand of grazing animals during every season of the year. Managers can plan for seasonal forage deficits. Pinpoint products can help fill these deficits. As an example below, a producer could utilize Mojo™ or Moxie™, and Barsica™ to fill the forage deficit that would be experienced during mid-summer and late fall if just BarOptima® +E34® were grown.

Production records regularly indicate that winter feed costs are the *single largest expense*. Keeping feeding costs low is key to a profitable operation.

Forage Delivery System

Over a wide region of the United States, cows average only seven months of grazing a year. Put another way, the average cattleman, from Mississippi to Wisconsin, utilizes supplemental feeds five months out of the year despite the differences in climate and grass bases. Pinpoint products will allow you to reduce your dependency on stored feed by increasing your grazing. In addition, with continued production, feed can be stockpiled for later winter months.

Bridging the Gaps

We know that as livestock producers, you have to manage feed demand and feed supply - no matter what class of livestock or level of grazing management. So we have developed Pinpoint, to bridge the forage gaps you experience every year. Because we know that winter feed costs are the single largest expense, and by keeping these costs low, your operation can be profitable.

Pinpoint Family of Products

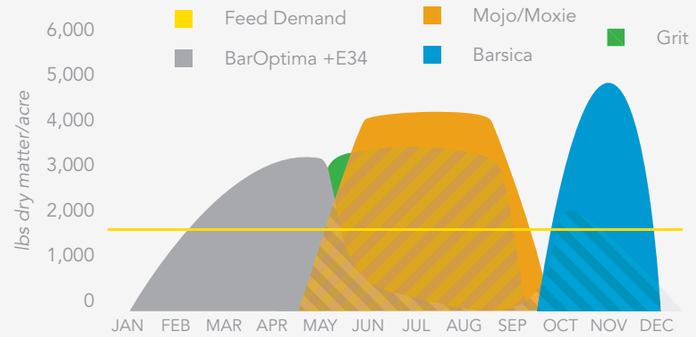
**ARG- Annual Ryegrass*
***IRG- Italian Ryegrass*

Monthly Savings Compared to Hay

With proper implementation, our Pinpoint Forage Delivery System is able to reduce your yearly feed costs and save you as much as ***$48.60 per cow or more!***

	Hay	Pinpoint Forage
Cost/pound	$0.02-$0.07	$0.1
Daily Consumption	24 lbs	24 lbs
Cost/Day/Cow	$0.54-$1.89	$0.27
Cost/Month/Cow	$16.20-$56.70	***$8.10***

To learn more, visit: ***www.barusa.com***



Talk with your local Barenbrug distributor to develop your own Pinpoint plan

NutriFiber®

The Highly Digestible, Effective Fiber for Dairy Rations

"NutriFiber grasses have been developed to have higher fiber digestibility than alfalfa, corn silage, and other grasses."

Today's high-producing dairy cows require both Non-Fiber Carbohydrate (NFC) and Neutral Detergent Fiber (NDF). Properly balancing NFC and NDF is critical for animal health and profitable production.

The NutriFiber Advantage

- *17% increase* in milk fat
- Supports high milk production
- Promote rumen health
- Reduce acidosis
- *25-40% increase* in digestible fiber
- Proven in university trials

To learn more, visit: ***www.barusa.com***

Higher digestibility & similar NDF

	NDF Range %	TTNDFd % of NDF
NutriFiber*	46-56	59.5
Other Grasses†	46-56	48.3

Forage samples submitted to Rock River Labs, Watertown, WI in 2012

*Values from 9 samples
†Values from 448 samples

Green Spirit cut in early October in Grantsburg, WI.

Balanced High Energy Rations

Rations frequently contain too much NFC and too little highly-digestible, physically-effective fiber. Unlike commonly utilized feedstuffs, NutriFiber is ideally composed to properly balance high energy rations for today's high-producing dairy cows. Forages like mature alfalfa and grasses are low in Neutral Detergent Fiber Digestibility (NDFd), and corn stalks or wheat straw will provide fiber but can limit feed intake due to slow passage rate.

Increase Milkfat and Maintain Milk Production

A study conducted at the University of Wisconsin replaced equal portions of corn silage and alfalfa silage with NutriFiber silage. The resulting treatment ration contained 2% more NDF and 2% less NFC of the ration dry matter. Small changes can produce big results! During the first period of the test, cows on the treatment diet produced milk with a 0.5% higher fat test. After 2 months, the treatment and control groups were switched with pronounced effects. Adding NutriFiber silage increased fat test by 0.35%, a clear demonstration of the value of NutriFiber products!

Improve Long Term Health

Acidosis is the most important nutritional problem that feedlots and dairies face daily. It is caused by a rapid production and absorption of acids from the rumen when cattle consume too much starch (primarily grain) or sugar in a short period of time. Acidosis causes cattle to be stressed. As long as cattle are finished on grain, acidosis will be an important problem. Feeding NutriFiber forages, with more digestible and physically-effective fiber than wheat straw, can help reduce acidosis and make your operation more profitable.

Fiber Guidelines for High-Producing Cows

	NFC % of DM	NDF % of DM	peNDF* % of NDF	TTNDFd % of NDF
Ration Guidelines	≤ 40	28 - 30	75	≥ 43

Feedstuffs Used to Add Fiber to Lower NFC

	NDF % of DM	TTNDFd % of NDF	NFC % of DM
Ration Guidelines	73	24	12
Corn Gluten Feed	35	51	31
Beet Pulp	46	70	36
Soy Hulls	60	75	18
NutriFiber Forages	40-50	45-60	18-25

Acronyms:

NDF	Neutral Detergent Fiber
NDFd	NDF Digestibility
TTNDFd	Total Tract NDFd
NFC	Non-fibrous Carbohydrate
peNDF	Physically Effective NDF

NutriFiber Family of Products

Get PLUS®
Forages with Beneficial Endophytes

"The initial thing I noticed was that the first time I turned cattle in on BarOptima +E34, the cows ate right down the rows. There was no doubt they were selecting it, even over the wheat!"

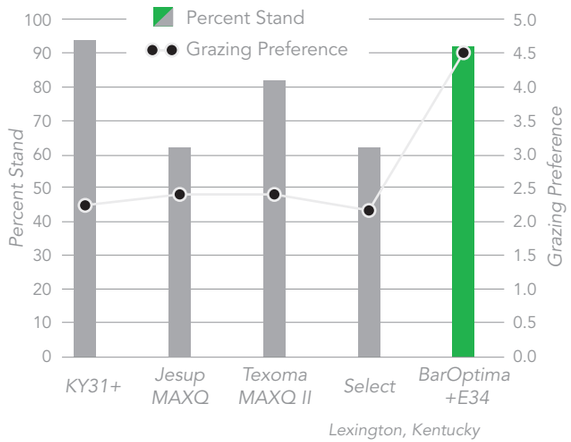
Traditionally, forage grasses have been defined by two traits: yield and persistence. We also place a strong emphasis on a third trait, *forage quality*, because *forage quality* directly affects animal performance and your profitability.

After many years of research, we were able to incorporate all three of these traits into select varieties. The technology bringing all of this together is E34 and NEA2, beneficial, non-toxic, fungal endophytes.

Get Plus Family of Products

The Percent of Original Stand Remaining after Four Years of Continuous Grazing

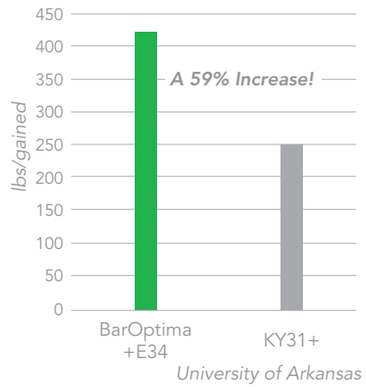
Tested over four years, BarOptima +E34 Soft Leaf Tall Fescue displayed significant persistence and was preferred by the cattle over the other present varieties.



Lexington, Kentucky

Total Live Weight Gain per Acre

Over the course of two years, the University of Arkansas tracked live weight gain per acre when fed BarOptima +E34 Soft Leaf Tall Fescue versus traditional Kentucky 31. They found BarOptima +E34 had a 59% greater increase in weight over K31.



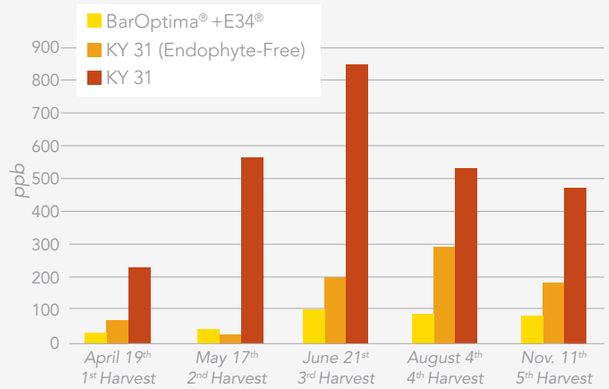
University of Arkansas

8 Year Old BarOptima +E34 field persisting

Beneficial Endophyte

Our researchers examined alkaloid profiles of numerous endophytes collected from around the world. These selected endophytes were inoculated into different seed germplasm. From this research, we were able to select two beneficial endophytes, "*E34*" & "*NEA2*".

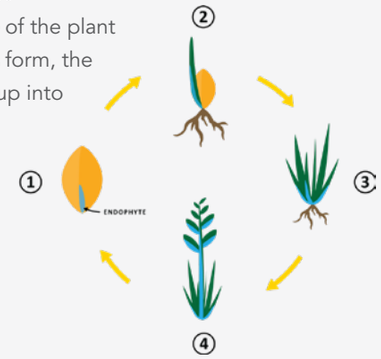
Average Ergovaline Levels Over all Plots for Each Variety at Each Harvest



Endophyte Life Cycle

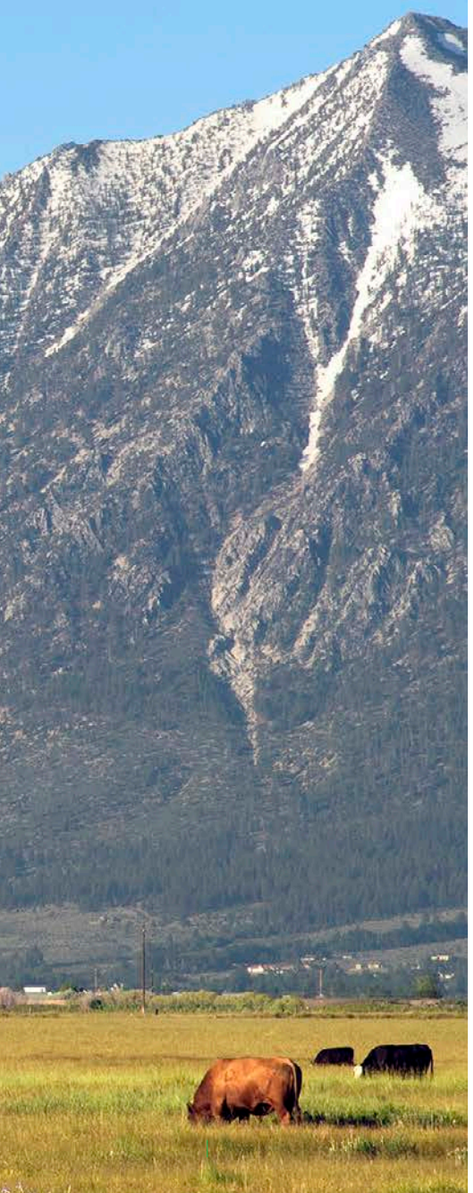
Plants with endophytes can only pass the endophyte through their seed. The endophyte is not passed from plant to plant in a pasture.

1. Endophyte is a fungus found in seed
2. As the seed germinates, the endophyte grows into the emerging shoot
3. It stays in the base of the plant
4. In spring, as stems form, the endophyte grows up into new seed



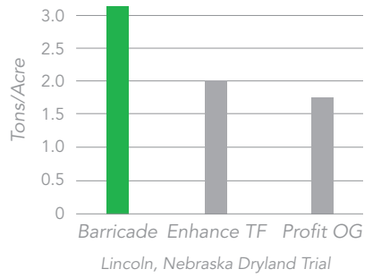
Range Shield™

The Dryland Seed Mixtures for your Pasture



We know rainfall across the United States is not consistent. This is why we developed Range Shield, a product line designed for new planting or interseeding into rangeland and dryland pastures in low rainfall areas. These ***Yellow Jacket Coated*** seed blends contain the latest varieties selected for germination, establishment, persistence, and drought tolerance all under low rainfall conditions.

Forage Dry Matter Yield
Over the course of three years in Lincoln, Nebraska, Barricaide consistently yielded more dry matter per acre than other varieties, averaging three tons per acre.



Lincoln, Nebraska Dryland Trial

Hamann Creeping Wheatgrass at Montana State University

Receiving no irrigation beyond rainfall in a year with below average precipitation and snowfall, Hamann produced a substantial amount of biomass.

Components of Range Shield Products Available for Purchase

Scan to download the Barenbrug Range Shield Management Guide

Range Shield Products

Increase Grazing
Extreme Drought Tolerance
Engineered for Dryland

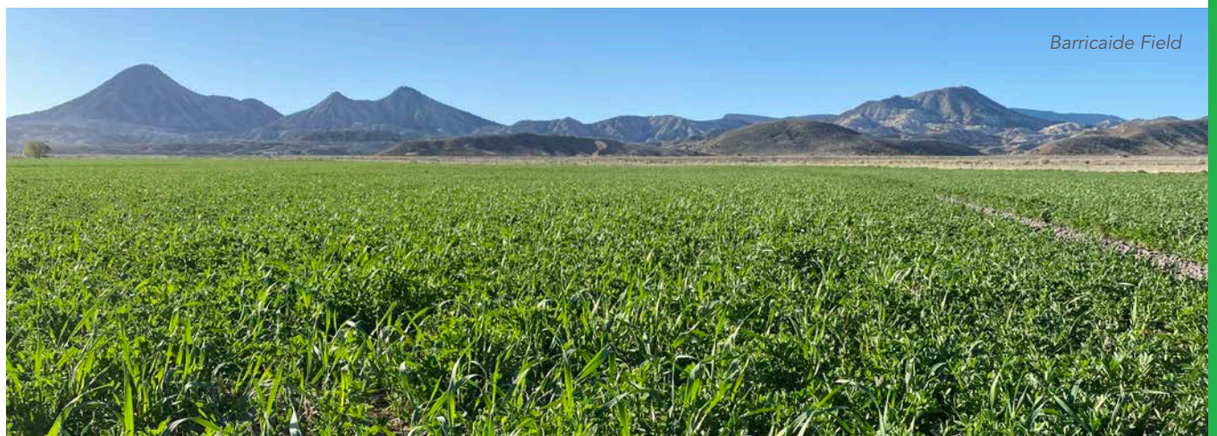
Stockaide™: *Dryland Mix for extremely low rainfall areas*
Stockaide is designed for new planting or inter-seeding into range and extreme dryland pastures in low rainfall areas (7-12"annual precipitation). Stockaide consists of the newly developed Hamann™ Creeping Wheatgrass and other premium varieties of Crested Wheatgrass, Siberian Wheatgrass, and Russian wildrye. Exclusive to Barenburg USA, Hamann™ Creeping Wheatgrass exhibits extreme drought tolerance and persistence.
Seeding Rate: 25-30lbs/acre

Drought Tolerant
High Producing
Reduces Feed Costs

Barricaide™: *Dryland Mix for low rainfall areas*
Barricaide is designed for new planting or interseeding into rangeland and dryland pastures with low rainfall (12-18" annual precipitation) and it also works in areas that have limited irrigation, such as spring runoff irrigation common in many areas. Barricaide consists of newly developed varieties of Arsenal™ Meadow Brome and Artillery™ Smooth Brome which were developed in collaboration with USDA-ARS, as well as new drought tolerant Armory™ Tall Fescue and Hamann™ Creeping Wheatgrass.
Seeding Rate: 25-30lbs/acre

Drought Tolerant
High Producing
Extend Grazing Season

Renegaide™: *Dryland Mix for low-mid rainfall areas*
Renegaide has been specially formulated for new planting or inter-seeding into range and dryland pastures in low-mid rainfall areas (18-30"annual precipitation) and also works in areas that have limited irrigation such as spring runoff irrigation. This mixture consists of newly developed varieties of ***Ammo™ Orchardgrass***, Arsenal™ Meadow Brome, Artillery™ Smooth Brome, the highly drought tolerant variety of Tall Fescue, Armory™, and Hamann™ Creeping Wheatgrass which were all developed in collaboration with USDA-ARS.
Seeding Rate: 25-30lbs/acre


Barricaide Field

Master Series™

Plant with Confidence

Our Master Series products are specially formulated to offer your animals the ideal mixture of forage species. These blends have been put together by our forage breeding specialists so when you plant Master Series products, you are able to plant with confidence.

The Get PLUS® Advantage

- Get more calves from the cows you already have
- Get more pounds of beef from the acres you already have
- Get heavier weaning weights

Rapid Establishment

Beneficial Endophyte

Improved Yields

StockMaster® Pro

This formulation contains a late maturing orchardgrass, our newly developed Armory™ continental tall fescue, and our two Get PLUS modern grasses, *BarOptima® +E34®* soft leaf tall fescue, and *Remington™ +NEA2™* perennial ryegrass. This multi-purpose mixture enables StockMaster Pro to be used in, and even under, less than ideal conditions. It is a perfect mixture for larger or smaller acreage fields that require a long lasting, high quality pasture and can also be used for hay fields after establishment. *Seeding Rate: 25-30lbs/acre*

Extremely Persistent

Beneficial Endophyte

Highly Palatable

Includes Clover

BeefMaster® Pro

A formulation of forage grasses and white clover that includes the two modern grasses from our Get PLUS system, *BarOptima +E34* and *Remington +NEA2*. Along with the added value of the beneficial endophytes, BeefMaster Pro's orchardgrass is a late maturing, winter hardy variety that maintains its productivity even under close grazing. The white clover allows for extra gains and benefits the stand by fixing nitrogen. This blend delivers highly productive, high energy forages, enabling rapid weight gains.
Seeding Rate: 25-30lbs/acre

High Fiber Digestibility

Beneficial Endophyte

Highly Palatable

DairyMaster® Pro

Formulated to provide a quality pasture ideal for all dairy applications, DairyMaster Pro contains the best of all species: high-energy meadow fescue, late-maturing orchardgrass, and two modern grasses, *BarOptima +E34* soft leaf tall fescue, and *Remington +NEA2* perennial ryegrass. It also contains coated red and white clover, which fixes nitrogen and improves protein and energy levels of the stand.
Seeding Rate: 25-30lbs/acre

Quick Dry Down

Drought Tolerant

High Yields

HayMaster® Pro

HayMaster Pro is formulated for either a straight grass hay field or for mixing with a legume crop to produce a high quality, high performing hay. The varieties in HayMaster Pro are selected for their quick, dry-down, ensuring the quality of your crop. To learn more talk with your local Barenbrug distributor. *Seeding Rate: 25-30lbs/acre*

Increased Durability

Comprehensive Mixture

Highly Palatable

HorseMaster® Pro

We understand that horses and cattle graze differently. With this in mind, we developed HorseMaster Pro, a mixture specifically formulated for horse pastures. This formulation contains late maturing orchardgrass, a newly developed endophyte free continental tall fescue, diploid perennial ryegrass, timothy, and Kentucky bluegrass. HorseMaster Pro mix is a comprehensive mixture for all horses, from broodmares to the studs.
Seeding Rate: 25-30lbs/acre

Highly Digestible

Improves Milk Production

Increase Protein

BrowseMaster® Pro

A seed mixture specifically formulated for browsing animals, BrowseMaster Pro has the optimal combination of browse, forbes, and grasses to improve their meat and milk production. Regionally adapted, this mixture is available for the transition zone and southern United States. BrowseMaster Pro is primarily composed of high-quality chicory, hybrid alfalfa, and red, and white clover. BrowseMaster Pro gives you a highly digestible stand packed with protein. *Seeding Rate: 25-30lbs/acre*

	Soft Leaf Tall Fescue	Perennial Ryegrass	Orchardgrass	Meadow Fescue	Kentucky Bluegrass	Timothy	Chicory	Alfalfa	Red Clover	White Clover
StockMaster Pro	☑ GETPLUS	☑ GETPLUS	☑							
BeefMaster Pro	☑ GETPLUS	☑ GETPLUS	☑							☑
DairyMaster Pro	☑ GETPLUS	☑ GETPLUS	☑	☑					☑	☑
HorseMaster Pro	☑	☑	☑		☑	☑				
BrowseMaster Pro	☑						☑	☑	☑	☑
HayMaster Pro	Regional blends of select grasses									

CoverGraze™

Your Cover Crop Solution

Cover crops are an important and useful tool to combat issues such as soil erosion, nutrient runoff, and moisture conservation. Multiple species are used for cover crops including brassicas, legumes, and grasses. Recently, there has been an increasing movement toward grazing cover crops as part of the rotation.

In addition to soil conservation and nutrient management, the nutritional values of most cover crops will meet the needs of grazing livestock. The ability to utilize annuals with grazing livestock allows longer rest periods for pastures, and the ability to grow more forage for longer grazing, reducing the amount of feed needed.

Increasing Soil Biological Activity

Utilizing livestock on a cropland field can also be advantageous for increasing biological activity due to the recycling of nutrients through the animal. The majority of nutrients that run through a ruminant animal are placed right back onto the ground from where they came!

We are proud to offer CoverGraze specific products for cover cropping. Not only are these products perfect for non-grazing cover crop systems, but they also offer superior forage production, digestibility, and quality for the grazing animal. If CoverGraze is in your cover crop plans, choose the products for performance that match your application.

CoverGraze Family of Products

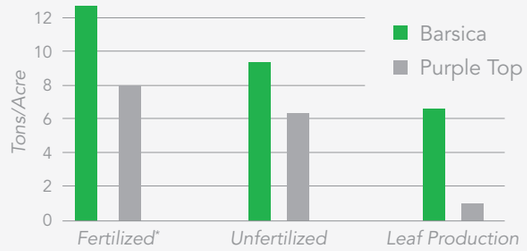
**ARG- Annual Ryegrass*

***IRG- Italian Ryegrass*

CoverGraze interseeded into Green Spirit, Southern Missouri

Performance that Pays

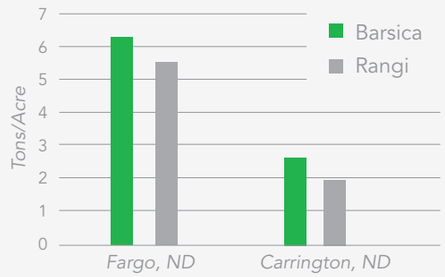
This figure shows how CoverGraze products perform significantly better than other varieties, with Barkant producing 540% more leaf material per acre than Purple Top!



**Ammonium Sulphate (21-0-0) at 300lbs./Acre; 60 days after planting*

Increased Tons per Acre

This figure shows dry matter yield tested at Fargo and Carrington, North Dakota in 2012. Barsica outperformed all other varieties and averaged 4.4 tons per acre.



North Dakota State University, 2012

Soft Leaf Tall Fescue

Beneficial Endophyte

Soft Leaf Tall Fescue

Extremely Persistent

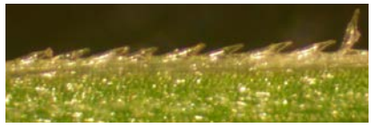
BarOptima® +E34®

A soft leaf tall fescue that contains the beneficial endophyte, E34, this revolutionary tall fescue has improved palatability with the soft leaf, all while eliminating toxicity and increasing animal productivity. As a soft leaf tall fescue, BarOptima +E34 contains three highly desirable traits: a high-quality forage, yield, and persistence. BarOptima +E34 is safe, sustainable, profitable, and proven for over 15 years. *Seeding Rate: 25lbs/acre*

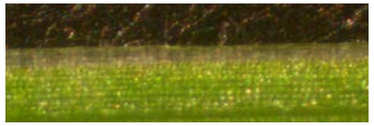
One Year Yield Results in Starkville, Mississippi

	5/30/18	7/19/18	Total
BarOptima +E34	3,392	672	4,064
Texoma MaxQ	3,264	530	3,794

Under the Microscope



Common Tall Fescue



Soft Leaf Tall Fescue

Soft Leaf Tall Fescue

Highly Digestible

Late Maturing

STF-43™

A premium blend of late maturing soft leaf tall fescues, STF-43 is composed of varieties that provide exceptional levels of dry matter and digestible fiber. As part of our NutriFiber® family of products, STF-43 promotes rumen health and productivity. STF-43 is also well suited for cutting systems and is an excellent selection for planting with alfalfa and other legumes. *Seeding Rate: 25lbs/acre*

Tall Fescue

Drought Tolerant

Endophyte Free

Rust Resistant

Armory™

The newest release of endophyte free, early maturing tall fescue, Armory was developed and extensively tested in the South-Central US and was selected for its exceptional drought and heat tolerance. Armory performs well under low input conditions and is a high yielding variety. It is the ideal choice over orchardgrass and other endophyte free tall fescues in the Southeast and transition zone where other products have poor persistence due to the harsh conditions. It is well suited for areas with 11-18 inches of rain, but is able to tolerate up to 60 inches. Armory performs well in the Southeast, Transition Zone and the Northwestern United States. *Seeding Rate: 25-30lbs/acre*

Meadow Fescue

Highly Digestible

Winter Hardy

Increase Milk Production

HDR™ Meadow Fescue

HDR (High yielding, Digestible, and disease Resistant) is a blend of late maturing meadow fescues that was developed so dairy and beef producers could provide high energy grass for their livestock. HDR varieties were selected for high yields, digestibility, and high energy. This blend thrives in the continental climate of North America that is characterized by very hot summers and very cold winters. HDR contains the most disease resistant meadow fescues varieties on the market. These varieties establish quickly, and are a great companion for alfalfa, red clover, and white clover.

Seeding Rate: 25lbs/acre

High Energy

Improve Butterfat

Widely Adapted

Milkway™ Meadow Fescue & Soft Leaf Tall Fescue Mixture

As a mixture of meadow fescue varieties and late maturing soft leaf tall fescues, Milkway performs well as a standalone hay crop or as an excellent companion with alfalfa. Combining high yielding meadow fescues with extremely digestible soft leaf tall fescues, Milkway provides exceptionally high NDFd and thus an improved rate of digestion, while the soft leaf tall fescues provide stable NDF and NDFd throughout the season. Milkway in a dairy TMR can improve milk production by 5% to 15% over traditional wheat straw diets. Milkway brings increased production and high quality forage to your hay and pasture fields. *Seeding Rate: 25lbs/acre*

BarOptima +E34, Stockton Missouri

Annual Ryegrass

High Dry Matter

Rust Resistant

Late Maturing

Jumbo™

A late maturing tetraploid annual ryegrass developed at the University of Florida, Jumbo exhibits superior rust resistance in varied environments. It has consistently performed well in forage trials throughout the annual ryegrass growing regions of the United States, as well as displaying vigorous growth habit, and high forage yields. This variety is well suited for mechanical harvesting (silage) as well as grazing. *Seeding Rate: 25-35lbs/acre*

Disease Resistant

Winter Hardy

High Dry Matter

Maximus™

A medium maturing tetraploid annual ryegrass, Maximus exhibits a vertical growth habit with large leaves making it ideally suited for mechanical harvesting. Maximus also exhibits good winter hardiness and rust resistance, making it suitable not only in the Gulf Coast states and California, but in the northern states as well. *Seeding Rate: 25-35lbs/acre*

Late Maturing

Winter Hardy

Increased Forage Quality

Hercules™

A late maturing tetraploid annual ryegrass, Hercules outperforms other popular cultivars in the transition zone where winter hardiness is critical. Hercules is very leafy, making it suitable for greenchop and grazing. If spring planted, it does not form seed until later in the season, providing you with better forage quality compared to other varieties. *Seeding Rate: 25-35lbs/acre*

Early Maturing

Deep-Rooting

Ribeye™

An early maturing diploid annual ryegrass, Ribeye is excellent for overseeding bermudagrass pastures in the southern United States. As a CoverGraze® product, Ribeye can be used as a deep-rooted cover crop, and overseeded into crop fields to provide winter feed for cattle. Earlier production allows for excellent grazing early, and Ribeye's earlier maturity allows for earlier termination prior to spring planting. *Seeding Rate: 25-35lbs/acre*

Italian Ryegrass

Superior Forage Quality

Multiple Manure Applications

Green Spirit®

As a perfect blend of diploid and tetraploid Italian ryegrasses, Green Spirit 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 the fall, this species usually has greater overall productivity than other cool season grasses. To ensure you receive true Italian cultivars instead of annual, Green Spirit offers the best genetic purity on the market. A true Italian ryegrass needs a period of cold temperatures to vernalize, and once vernalized, the plant can produce seed heads. Green Spirit is the perfect rotation crop for plow down or emergency feed. *Seeding Rate: 30-40lbs/acre*

Forage Quality of Green Spirit Compared to Conventional Rotational Options

	Protein % DM	NDF % DM	NDFd % DM	lbs milk/ton
Green Spirit® 25 Day Cut	21.7	43.9	77.0	3,615
Green Spirit® 35 Day Cut	16.9	46.8	71.7	3,468
Alfalfa	27.2	26.7	59.9	3,975
Soybean	18.9	36.6	55.4	3,697
Corn Silage	7.0	48.3	59.9	3,249
LSD	0.4	1.5	1.9	46

University of Wisconsin, Arlington Research Station

"The dairy quality feed produced by Green Spirit is significant to our dairy nutrition program. We have seen better water retention and an increase in soil organic matter following Green Spirit"

Perennial Ryegrass

Extremely Persistent

Beneficial Endophyte

High Yields

Disease Resistant

Remington™ +NEA2™

We combined our proven tetraploid perennial ryegrass with the beneficial endophyte, NEA2, to bring you a high yielding, high quality ryegrass sharing many attributes of diploid types. We selected Remington for its sward density, high yields, heat tolerance, excellent disease resistance, and improved winter tolerance compared to traditional cultivars. Remington produces longer into the summer months and is well suited for grazing and high moisture cutting systems. Its exceptional palatability promotes high dry matter intake, while simultaneously providing extremely nutritious and digestible forage. The addition of the NEA2 beneficial endophyte expands this area of adaptation, allowing Remington +NEA2 to persist in regions where perennial ryegrasses typically die out due to summer stress. *Seeding Rate: 25-30lbs/acre*

High Yields

Disease Resistance

Improved Winter Survival

Extremely Persistent

Remington™

Remington™ is a high yielding, high quality tetraploid ryegrass that shares many attributes of a diploid type. Remington was selected in the U.S. for its sward density, high yields, and excellent disease resistance. Remington has improved winter tolerance compared to traditional cultivars. It exhibits improved tolerance to heat and produces longer into the summer. Remington is suited to grazing and high-moisture cutting systems. Its exceptional palatability and digestibility promote high dry matter intake in a grazing situation. *Seeding Rate: 25-30lbs/acre*

High Yielding

Increased Palatability

Disease Resistant

BG®-24T

A blend of early and intermediate maturing diploid and tetraploid perennial ryegrass varieties, BG-24T provides additional heat and cold tolerance with better disease resistance. It can perform in areas of extreme environmental conditions such as the cooler regions of the United States. Under high summer temperatures, these varieties will perform better than later maturing varieties. The diploid perennial ryegrass varieties provide stand density, whereas the tetraploids improve the overall palatability and productivity of the grass field. BG-24T is fast germinating and has strong seedling vigor, leading to high yields and high palatability. *Seeding Rate: 25-30lbs/acre*

Perennial Ryegrass (cont.)

Fast Establishment

High Yielding

Disease Resistant

BG®-34

A blend of intermediate and late maturing, diploid perennial ryegrass varieties, BG-34 was developed for high yields, exceptional palatability, rapid establishment, excellent re-growth, and nutritive value with long leaves and short stems. BG-34 is the standard of high-quality pastures and hay fields throughout the northern United States, and brings with it excellent winter hardiness, disease resistance, and traffic tolerance. *Seeding Rate: 25-30lbs/acre*

Timothy

Winter Hardy

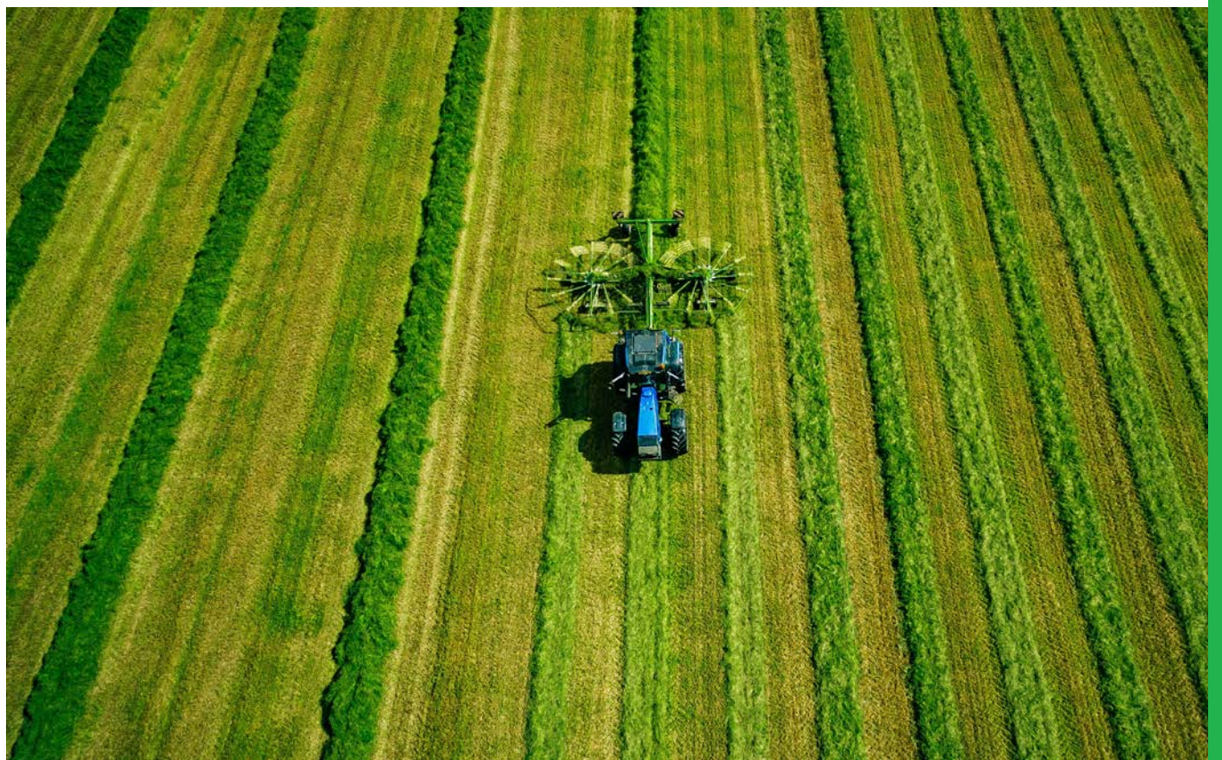
Improved Grazing Tolerance

Intermediate Maturing

Barfleo™

An intermediate maturing timothy, Barfleo has excellent spring production and is well suited for dry hay production. With improved grazing tolerance, winter hardiness, and exceptional performance in horse grazing trials, Barfleo is the perfect choice for pastures in the high mountain regions and in areas with snow cover. Barfleo is an excellent choice for the export hay market.

Seeding Rate: 10-15lbs/acre



Orchardgrass

Drought Tolerant

Disease Resistant

Winter Hardy

HLR™ Orchardgrass

As a blend of Barenbrug's elite intermediate to late maturing orchardgrass varieties, HLR's varieties have been selected for ***high leaf-to-stem ratio***, meaning more leaves for improved digestibility and energy, with fewer stems that reduce the palatability of your pasture. These varieties have been selected for rust and foliar disease tolerance, drought tolerance, and winter hardiness. The intermediate to late heading varieties in HLR are ideal for interplanting with alfalfa as well as for pasture and pure grass hay. *Seeding Rate: 10-15lbs/acre*

Early-Medium Maturity

Persistent

High Yielding

Ammo™

Ammo is an early-medium maturing orchardgrass developed by the USDA-ARS in Oklahoma. Ammo was developed for adaptation to severe environmental stress conditions and as a result, is well adapted to the Southern Plains region and other common orchardgrass areas. Ammo can be utilized in areas of heat and drought and other stresses that normally inhibit orchardgrass production. Ammo is best utilized in grazing situations but can also be used as pure orchardgrass hay/haylage. It has also been trialed in the upper Midwest and has exhibited good winterhardiness as well.

Drilled Seeding Rate: 10-12 lbs/acre Broadcast Seeding Rate: 12-15 lbs/acre

Bromegrass

Drought Tolerant

Low Fertility

Cold Tolerance

Artillery™

An early maturing smooth brome that is rhizomatous, very productive, and extremely drought tolerant. Artillery was selected for high stress conditions that include no irrigation with low nitrogen input in the south-central United States. It performs well in the colder temperatures of the northern regions of North America. Artillery does well at 12-18 inches of precipitation.

Seeding Rate: 15-20lbs/acre

Drought Tolerant

Early Spring Growth

Winter Hardy

Arsenal™

A meadow brome with drought tolerance and high yields even-at 18" of precipitation. Arsenal exhibits rapid establishment with early spring growth. It possesses high nutritional quality and exceptional winter hardiness for the cold Northern regions of North America. Arsenal does not require a high fertilization rate in the dryland areas. *Seeding Rate: 20-25lbs/acre*

High Nutrient Absorption

Heat Tolerant

Increased Growing Season

Matua™

Matua is a widely adapted prairie brome grass that thrives in grazing under irrigation in the southern United States, allowing for a long growing season. Matua is a palatable, heat tolerant, high quality forage that performs great as a grass companion in hay fields in the northern regions of North America. Matua is able to absorb high levels of nutrients and is an excellent choice in a wastewater management system. *Seeding Rate: 25-35lbs/acre*

Cold Tolerant

High Yielding

Rapid Establishment

Hakari™

Hakari Alaska brome is late maturing and is considered the "Matua" for the colder climates of North America. Hakari establishes fast and quickly regrows, providing you a grass that is not only high yielding, but also high quality. A great companion for alfalfa and other grasses, Hakari exhibits tall, upright growth, and is sparsely tillering and erect rather than creeping. Hakari is a great choice for hay as it dries quickly and is not susceptible to smut.

Seeding Rate: 25-35lbs/acre

Bermudagrass

Quick Establishment

Early Production

Decreased Costs

Grit™

New to the Barenbrug portfolio, Grit brings a combination of superior varieties and is further enhanced with our Yellow Jacket Seed Coating. With quick establishment and early production, Grit will bring added profitability to your acres. Seeded bermudagrass possesses several advantages compared to cuttings or sprigs:

- Early Production
- Multiple Cuttings
- Decreased Costs
- Increased Ease of Use

Seeding Rate: 12-15lbs/acre

Grit bermudagrass in Tennessee

Forage Crabgrass

Drought Tolerant

Easy to Establish

High Yielding

Mojo™

Mojo is our coated improved crabgrass that works like magic during the hot dry months and now includes Impact, a variety released from the Noble Research Institute for forage livestock producers needing a later-maturing cultivar than Red River. Crabgrass is a high quality, high yielding, summer annual forage that is excellent for grazing and haying. Mojo produces a highly digestible forage (up to 73% NDFd) and high crude protein content (25-30% early season; 15-20% mid-summer; 10% late season). Mojo produces excellent average daily gains, and it is an ideal summer annual forage crop following winter annuals. Mojo works well as a cover crop, displays good reseeding ability, and is drought tolerant. Mojo's area of adaptation extends from the northern regions of the southern and eastern United States to the Gulf and Atlantic coasts.

Seeding Rate: 5-8lbs/acre

Maturity Difference: Red River v. Impact

Mojo now contains Impact™ (far right), a variety released from the Noble Research Institute that heads out 14+ days later than Red River (Far Left).

Ardmore, OK 2012. Plots sown on the same day

Teff Grass

Drought Tolerant

Highly Palatable

Increased Yield

Moxie™

Moxie is a coated blend of warm season annual Teff grasses. Moxie can be harvested multiple times during the summer growing season as dry hay. After the first cutting, it can also be used for pasture within a good rotation. Moxie's fast growth allows for excellent forage quality and high yield during a relatively short growing season. This makes it a great option for livestock and hay producers. Moxie also is an excellent cover crop and is drought tolerant.

Seeding Rate: 8-10lbs/acre

Forage Brassicas

Highly Palatable
Extended Grazing
Deep Rooted

Barsica™: *Forage Rape*
A forage rape suitable for either grazing by livestock or cutting and feeding, Barsica possesses high energy and has high digestible crude protein (up to 30% in the leaves). Barsica is a tall, leafy variety with high yields and is resistant to lodging and powdery mildew, making it highly palatable. *Seeding Rate: 3-5lbs/acre*

High Energy Feed
Multiple Harvests
Increased Dry Matter

Barkant™: *Forage Turnip*
An improved diploid forage turnip, Barkant has a purple tankard root with 50% of the bulb on top of the ground. Barkant has good tolerance to bolting and, under a correct grazing management system, it can provide multiple harvests with up to 4-6 tons/acre of dry matter production in 60-90 days. It has high bulb yield with excellent top growth. The high sugar content in Barkant provides winter hardiness and increased palatability. It is also suitable for stockpiling or strip grazing with sheep and cattle. *Seeding Rate: 3-5lbs/acre*

Rapid Re-Growth
High Yielding
Exceptional Plant Vigor

T-Raptor™: *Hybrid Brassica*
An early maturing hybrid brassica, T-Raptor is a cross between a forage turnip and a forage rape with 50-70 day crop duration. It exhibits a leafy growth habit (higher leaf-to-bulb ratio) and is well suited for grazing. Under ideal management, T-Raptor can be grazed once a month. It is an excellent late summer feed source, and a good supplement for late summer periods when cool season forage grasses slow in production. T-Raptor can be sown in spring to be grazed through summer or sown in late summer to be grazed through early winter. *Seeding Rate: 3-5lbs/acre*

Forage Chicory

Drought Tolerant
Deep Rooting
Highly Palatable

Forb Feast™: *Forage Chicory*
Forb Feast is a reduced bolting blend, meaning high feed value for your animals. It has impressive leafiness and is an excellent source of digestible energy, protein, and minerals. In addition, chicory has been shown to have key anti-parasitic properties in small ruminants. Forb Feast has deep taproots that lend persistence and production in extreme heat and moisture, Forb Feast also displays good winter hardiness. Forb Feast is ideal as a component in a mixture with both warm and cool season grasses and legumes and is adapted for everything from the northern to southern United States. *Seeding Rate: 3-5lbs/acre*

Red Clover

Quick Dry-Down
Fixes Nitrogen
Fast Establishment

Freedom!™
Freedom! was selected from the University of Kentucky for increased dry matter production paired with faster drying, Freedom! has finer stems and less pubescence (hairs) on the stem which gives it the unique characteristic and ability of faster water evaporation. Due to this faster evaporation, Freedom! is ideal for hay production because it will dry down faster, reducing the loss of quality. The decreased amount of pubescence also reduces the amount of dust within the hay. Freedom! is also suited for grazing and silage.
Seeding Rate: 8-12lbs/acre

Mildew Resistant
Increased Persistence
Winter Hardy

Freedom! MR™
Freedom! MR has all the benefits of Freedom! with the added benefit of increased mildew resistance (MR). Mildew can be an issue in the upper-transition zone, midwestern, and northeastern United States. Freedom! MR is well adapted to grazing and silage and displays improved winter hardiness and persistence. *Seeding Rate: 8-12lbs/acre*

Drought Tolerant
Fixes Nitrogen
Large Leaves

Barduro™ A mid-dormancy red clover, Barduro was developed at the University of Florida for high resistance to root knot nematode. It is also drought and heat tolerant, and clearly displayed this during three years of drought trials in the southeastern United States where no other red clover survived. Barduro is competitive in stands of fescue, orchardgrass, and bermudagrass, making it an excellent choice for overseeding pastures. *Seeding Rate: 8-12lbs/acre*

White Clover

Large Leaves

Winter Hardy

Fixes Nitrogen

Alice™

A large-leaf intermediate white clover that grows to medium height, Alice exhibits tremendous nitrogen-fixing capacity, benefiting its companion forage varieties. Alice is persistent and winter hardy, making it the perfect companion for pastures in the northern United States and Canada. It also has greater stolon density, allowing for more persistence under intense grazing and traffic.

Seeding Rate: 3-5lbs/acre

High Yields

Increased Grazing Tolerance

RegalGraze™

RegalGraze is a large-leaf ladino clover developed at the University of Georgia. Trials at UGA showed that it has superior forage yield with more grazing tolerance other ladino clovers. RegalGraze can be planted or seeded as a component of a pasture mixture with perennial grasses, or overseeded into established grass stands. It has no anti-quality cyanogenic glucosides, unlike some other white clovers.

Seeding Rate: 3-5lbs/acre

Berseem Clover

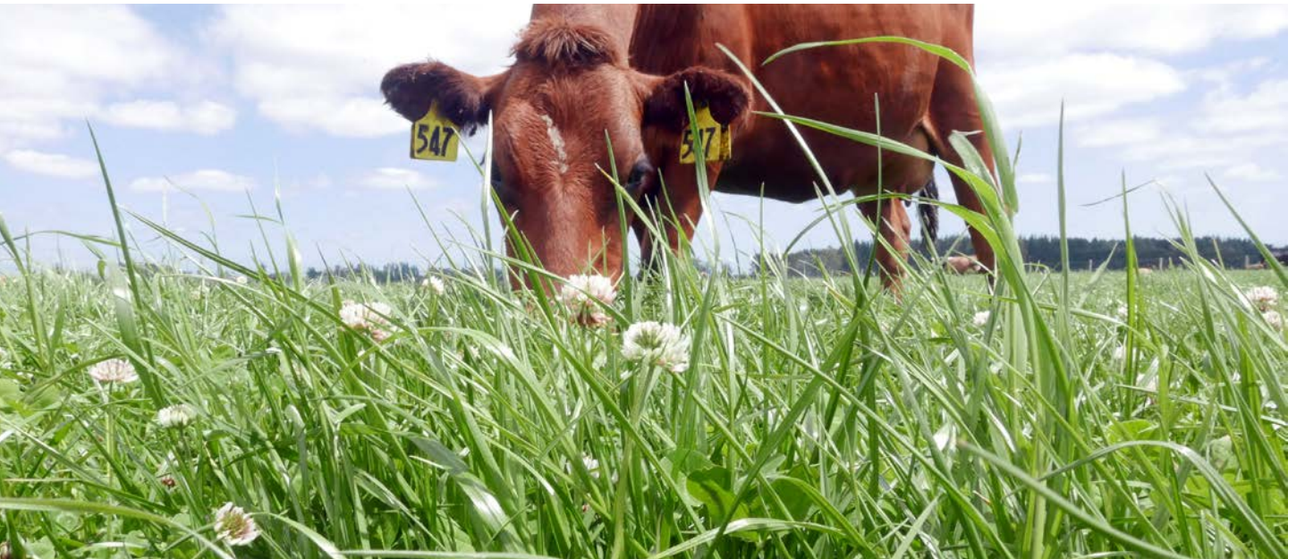
Increased Production

Fixes Nitrogen

Faster Growth

Super 10™

With early forage production, Super 10 has remarkable potential for providing a high quality, low bloat forage, that also improves your soil conditions. It works great as a green manure crop because of its fast growth characteristics and capacity to fix nitrogen in the soil, benefiting the following crop. *Seeding Rate: 8-12lbs/acre*



Notes

Varieties Utilized in Blends & Mixtures

Orchardgrass
Dactylis glomerata

BARLEGRO™
Barlegro is the latest release from Barenbrug's breeding program and is a very late maturing orchardgrass. In preliminary trials, it has shown very good winter hardiness and forage yield. Barlegro is extremely leafy and highly suited for interplanting with alfalfa.

INTENSIV™
Intensiv is a late maturing orchardgrass. It is winter hardy and has excellent disease tolerance (fusarium and leaf spot), making it quite persistent. Intensiv has a high leaf-to-stem ratio and the hay produced from Intensiv has excellent digestibility. With a late heading and high dry matter yields, Intensiv is highly suited for planting with alfalfa in mixed stands.

BARAULA™
A late maturing orchardgrass, Baraula is a high yielding variety with a high leaf-to-stem ratio, high palatability and digestibility. With its late maturity, Baraula is the orchardgrass of choice to grow with alfalfa, for either a new planting or to extend the life of an existing field.

AMMO™
The newest release of Orchardgrass, Ammo is an early maturing variety that stands up to summer stress. Tested in the South Central US, Ammo was selected for its increased drought tolerance and its adaptation to the dryland of the American West. Suited for areas that receive 18"-30" of annual precipitation.

Bromegrass
Bromus sp.

ARTILLERY™ *Bromus inermis*
Artillery is an early maturing smooth brome that is rhizomatous and very productive. It is exceptionally drought tolerant and was selected in high stress conditions that included no-irrigation with low nitrogen input in the south central US. Artillery does well at 12-18 inches of precipitation. It is a southern type cultivar that performs well in colder temps of the northern US.

ARSENAL™ *Bromus biebersteinii*
Arsenal is a meadow brome with drought tolerance and high yields even with 18 inches of precipitation. It establishes rapidly with early spring growth and has high nutritional quality. It is exceptionally winter hardy for those cold areas of the northern US. Arsenal does not need a high fertilization rate in the dryland areas.

Crabgrass
Digitaria sp.

IMPACT™
Impact is the newest late maturing annual crabgrass. Developed by the Noble Research Institute in Ardmore, OK, Impact is widely adapted and establishes easy. It is 10-14 days later, which improves forage quality and allows for later grazing days into the late summer months. Producers can achieve higher ADG during the summer months grazing Impact.

Tall Fescue
Festuca arundinacea

BARIANE™
Bariane is a soft leaf tall fescue with extremely high palatability and digestibility. Bariane is very late maturing, making it highly suitable for planting with alfalfa. It matures at the same time alfalfa is ready to cut in summer. Planting Bariane with alfalfa results in higher tonnage and the hay produced is ideal for dairies due to its easily digestible fiber and high energy.

BARELITE™
BarElite was selected in the US after multiple screening trials. It has a unique combination of high forage yield and impressive digestibility. BarElite is highly suited for producers who seek to produce and utilize high RFQ value forages.

ARMORY™
The newest release of endophyte free, continental, early maturing tall fescue, Armory was tested in the South Central US and selected for its exceptional drought and heat tolerance. It performs well under low nitrogen input conditions and possesses excellent forage quality. It is the best choice over orchardgrass in the transition zone where orchardgrass has poor persistence. It is well suited for areas with 11-18 inches of rain, but is able to tolerate up to 60 inches. Armory performs well in Southeastern United States.

BARFLEXA
Barflexa is the newest soft-leafed variety in the Barenbrug lineup. It has very good ratings in animal preference and palatability. Its late maturity makes it an excellent fit for inclusion into Barenbrug's STF-43 soft leaf tall fescue blend. With Barflexa/STF-43's late maturity, it makes this an excellent choice to plant with alfalfa for higher tonnage, high energy, and higher digestible fiber.

Varieties Utilized in Blends & Mixtures

Perennial Ryegrass
Lolium perenne

MARA™
Mara is the standard for winter-hardy perennial ryegrass. Mara is a very high yielding, extremely grazing tolerant, and persistent variety. It performs well from the transition zone with its hot, dry summers to upper Midwest with its extremely harsh winters. Mara is a component of BG-24T and BG-34.

BARSPRINTER™
Barsprinter is a diploid intermediate perennial ryegrass that was commercialized after superb performance in screening trials throughout the US. Barsprinter has very good winter hardiness along with excellent rust tolerance. It is noteworthy for stand density and is earlier heading.

Meadow Fescue
Festuca pratensis

DRIFTLESS®
Driftless is the newest release of intermediate maturing meadow fescue. It is winter-hardy, disease resistant, high yielding, and has friendly endophytes. Driftless is high in TTNDFd and NDF over the standard meadow fescues, which makes it part of the NutriFiber family of products.

PRADEL™
Pradel is an impressive, high-yielding meadow fescue. It is late-maturing and exhibits excellent winter-hardiness. Pradel produces a taller, denser sward than traditional meadow fescue. Pradel excels under cool, moist conditions, and tolerates wet soils. Pradel will also tolerate the hot, dry conditions of mid-summer. Pradel is highly palatable and highly nutritious. It is ideal for grazing or cutting and with its rapid establishment is a great selection for overseeding.

Italian Ryegrass
Lolium multiflorum

BARPRISMA™
A diploid Italian ryegrass, Barprisma strengthens the Barenbrug tradition of breeding varieties that typically do not head out in the summer after sowing in spring. Barprisma was selected for improved rust resistance, lower lodging, winter hardiness, high dry matter yield, digestibility, and drought tolerance.

Italian Ryegrass, cont.
Lolium multiflorum

BAREXTRA™
Barextra is a late heading tetraploid Italian ryegrass. Barextra has shown impressive performance in university trials throughout the Midwest. It is a high yielding, winter-hardy tetraploid variety with superior rust resistance. It is more persistent than other Italian ryegrasses, making it suitable for both mechanical harvesting and grazing.

BARMULTRA II™
A very leafy tetraploid Italian ryegrass with good winter hardiness, Barmultra II has outstanding initial growth and excellent regrowth after cutting. Barmultra II is extremely rust resistant and offers high dry matter yields.

Characteristics

	Scientific Name	Establishment	Minimum Precipitation	Drought Tolerance	Winter Hardiness
Alaska Brome	Bromus sitchensis	Fast	16″	Moderate	High
Alfalfa	Medicago sativa	Medium	17″	High	Moderate
Annual Ryegrass	Lolium multiflorum	Fast	14″	Moderate	Low
Bermudagrass	Cynodon dactylon	Medium	18″	High	Moderate
Chicory	Cichorium intybus	Medium	16″	High	Moderate
Crabgrass	Digitaria sanguinalis	Medium	18″	High	None
Italian Ryegrass	Lolium multiforum	Fast	14″	Moderate	Moderate
Kentucky Bluegrass	Poa pratensis	Slow	18″	Low	High
Meadow Brome	Bromus biebersteinii	Fast	14″	High	High
Meadow Fescue	Festuca pratensis	Fast	20″	Moderate	High
Orchardgrass	Dactylis glomerata	Slow	16″	Moderate	High
Perennial Ryegrass	Lolium perenne	Fast	20″	Low	Moderate
Prairie Brome	Bromus catharticus	Fast	14″	Moderate	Low
Rape	Brassica napus	Fast	12″	Moderate	Low
Red Clover	Trifoloum pratense	Medium	19″	Moderate	High
Smooth Brome	Bromus inermis	Fast	14″	High	High
Tall Fescue	Festuca arundinacea	Medium	16″	High	High
Teff	Eragrostis tef	Fast	18″	High	None
Timothy	Phleum pratense	Slow	22″	Low	High
Turnip	Brassica rapa	Fast	12″	Moderate	Low
White Clover	Trifolium repens	Medium	19″	Moderate	Moderate

Characteristics (cont.)

	Persistence	Yield	Digestibility	Palatability	Seeding Rate	Seed/Lb.
Alaska Brome	Moderate	Moderate	High	High	35 lbs/acre	70,000
Alfalfa	Moderate	High	Moderate	Moderate	15-20lbs/acre	200,000
Annual Ryegrass	Low	High	High	High	30lbs/acre	225,000
Bermudagrass	Moderate	High	High	Moderate	10-12lbs/acre	1,800,000
Chicory	Moderate	Moderate	High	Moderate	1-2lbs/acre	426,000
Crabgrass	Low	High	Moderate	High	5-8lbs/acre	825,000
Italian Ryegrass	Moderate	High	High	High	35lbs/acre	190,000
Kentucky Bluegrass	High	Low	Moderate	Moderate	5lbs/acre	2,177,000
Meadow Brome	Moderate	High	High	High	20-25lbs/acre	87,000
Meadow Fescue	Moderate	Moderate	High	High	25lbs/acre	277,000
Orchardgrass	High	High	Moderate	Moderate	10-12lbs/acre	654,000
Perennial Ryegrass	Moderate	Moderate	High	High	25lbs/acre	277,000
Prairie Brome	Low	High	High	High	35lbs/acre	70,000
Rape	Low	Moderate	High	High	3-5lbs/acre	157,000
Red Clover	Moderate	High	Moderate	Moderate	15-20lbs/acre	272,000
Smooth Brome	High	Moderate	High	High	15-20lbs/acre	136,000
Tall Fescue	High	High	Moderate	Moderate	25lbs/acre	277,000
Teff	Low	High	High	High	8-10lbs/acre	1,300,000
Timothy	Moderate	Moderate	High	High	10-15lbs/acre	1,300,000
Turnip	Low	Moderate	High	High	3-5lbs/acre	200,000
White Clover	Moderate	Low	High	High	2-3lbs/acre	800,000

Forage Analysis Glossary

ADF:	Acid Detergent Fiber; the fraction of the feedstuffs not soluble by acid detergent; roughly comparable to a crude fiber plus lignin.
Carbohydrate:	Organic substances containing C, H, and O, with H and O present in the same proportions as in water.
CP:	Crude Protein; the total ammoniacal nitrogen X 6.25, based on the fact that feed protein contains 16 percent nitrogen; many nonprotein nitrogen compounds may be included.
DM:	Dry Matter; the portion of a feed or tissue remaining after water is removed by drying in an oven.
Kcal:	Kilocalorie; 1,000 calories.
Lignin:	A biologically unavailable polymer that is a major structural component of the cell walls of plants.
Mcal:	Mega calorie; 1,000 kcal or 1 million calories.
ME:	Metabolized Energy; digestible energy minus the energy of the urine and combustible gases from the gastrointestinal tract.
NDF:	Neutral Detergent Fiber; the fraction containing mostly cell wall constituents of low biological availability.
NE:	Net Energy; metabolizable energy minus the heat increment.
NEl:	Net Energy for lactation.
NEp:	Net Energy for production.
NEm:	Net Energy for maintenance.
NFE:	Nitrogen Free Extract; consists primarily of readily available carbohydrates such as sugars and starches.
NPN:	Non-protein Nitrogen; any one of a group of N-containing compounds that are not true proteins that can be precipitated to form a solution. Ammonia and urea are examples.
RFQ:	Relative Forage Quality; relative forage value including digestible fiber.
RFV:	Relative Feed Value; the estimated digestibility calculated from the estimations of ADF and NDF.
TDN:	Total Digestible Nutrients; values that indicate the relative energy value of a feed for an animal.
TMR:	Total Mixed Ration; the practice of weighing and blending all feedstuffs into a complex nutritional ration.
NDFd:	Neutral Detergent Fiber Digestibility.
TTNDFd:	Total Tract Neutral Detergent Fiber Digestibility.

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