

NUTRIENT RECYCLING

Green Spirit is a very effective user of soil nutrients. It is an agronomically sound forage crop for recycling effluent water from confinement animal operations. Cool season grasses are particularly effective in phosphorus uptake when compared to warm season grasses such as silage corn. In the northern US, spring planted Green Spirit is a very high energy forage and may be utilized for grazing or high-moisture cutting systems into late fall. Fall planted Green Spirit provides nutrient recycling in late fall/early winter and also earlier in the spring compared to warm season forages. It can then be rotated to hybrid sorghum-sudan in early summer to provide year around nutrient uptake. For this application Green Spirit should be sown at 30 - 35 lbs/acre.

NURSE/COVER CROP

At low planting rates (3 lbs/acre) Green Spirit is ideal as a nurse or cover crop for perennial forage crops such as alfalfa. It provides higher yields and better quality forage compared to oats. Green Spirit can be no-tilled (25 lbs/acre) into alfalfa stands that are winter damaged or killed to provide emergency forage for the season. Green Spirit will rapidly establish and provide forage in as little as six weeks.

WINTER GRAZING & FINISHING GRASS FED BEEF

In areas where small grains are used for winter grazing, mixtures with highly palatable Green Spirit will improve the yield and

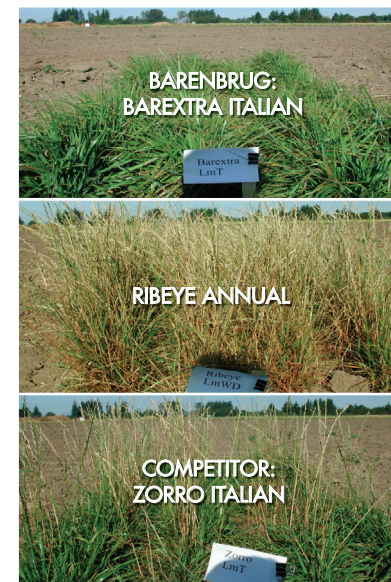
quality of these fields. Green Spirit shows quick regrowth after grazing and can be planted with cereals such as triticale to extend the grazing season. Green Spirit should be mixed at 10 - 25% by weight with triticale.

Green Spirit is the perfect choice for grass finishing grass-fed beef. The high sugar content of Green Spirit creates a high Net Energy Gain (NEg) for the animal. This is crucial because any energy not used for maintenance will be stored as small fat deposits. These deposits, referred to as marbling, are what determine the grade of the beef. Marbling also has a direct impact on the flavor and texture of the beef. In order for a cut to be labeled as USDA Prime there must be abundant marbling. Green Spirit can be established in pastures in spring (30 - 35 lbs/acre) for finishing beef in summer.

QUALITY ASSURANCE AND GENETIC PURITY

A large percentage of the entire world's supply of ryegrass is grown in one place – the Willamette Valley. Located in Northwest Oregon, this valley runs north to south for more than a hundred miles from where the Columbia River meets Portland to just past Eugene. At its widest point, this long, broad valley spans sixty miles. In this valley, several hundred thousand acres of grass seed are grown. A majority of this production is ryegrass. Producing so much of the same plant in one specific region creates some interesting challenges. Pollen contamination is a real concern. The seed may look the same after it is harvested, but its genetic purity may be questionable.

Barenbrug has the strictest guidelines for the genetic purity of Italian ryegrass. Many steps are taken to insure that our Green Spirit Italian ryegrass is not contaminated with annual ryegrass. Barenbrug pays a premium to find growers who have clean fields, free of annual ryegrass contamination. Additionally, our research department conducts multiple "grow-outs" to determine the genetic purity of various fields. A grow-out is a planting of seeds to test certain characteristics. Though this process is laborious and expensive, it insures that when you see the Barenbrug yellow bag you can trust that you are buying the best quality seed on the market.



Spring planted "grow-outs." Ribeye is annual so seed heads should be expected. Both BarExtra and Zorro are Italian ryegrasses. However, Zorro, a competitor's variety, has annual contamination.

GREEN SPIRIT ITALIAN RYEGRASS BLEND

Adaptation – Climate: Green Spirit is suited for all planting zones. In the northern United States it can be used as a spring-planted annual crop. In the transition zone it performs as a biannual forage crop. In the southern United States it is suited as an annual crop for winter production in mono-stands or in mixtures with winter cereals. Green Spirit performs well in the western United States with supplemental irrigation.

Adaptation – Soils: Green Spirit is adapted to a wide range of soil conditions – it performs in heavy clay soils and light sandy soils.

Seeding Rate:

Planted as grazing/cutting crop	35 - 40 lbs/acre
Planted as a nurse crop	<5 lbs/acre
No-Till into winter-killed alfalfa	25 lbs/acre

Establishment: Green Spirit may be planted in the fall or spring. We recommend drilling Green Spirit for best results. Prior to planting, apply 100lbs of a 20:20:20 fertilizer. For fall planting, plant immediately after harvest to improve establishment and graze or cut prior to winter in order to thicken the stand and promote winter survival. For spring planting, plant early in the spring. Green Spirit may be planted via full-cultivation, no-till drill or broadcast seeding. When planting as a nurse crop for a perennial or interplanting into an existing alfalfa stand,

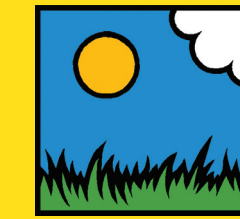


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broadcast or drill in a manner to stagger the placement of the Italian seed with the other crop. Plant no deeper than 1/4 inch.

Management: For highest forage quality, maintain in a vegetative state. For grazing systems, graze at 6 - 8 inches down to 3 - 4 inches and for cutting systems, harvest at 12 - 18 inches. Green Spirit responds well to nitrogen fertilization; we recommend applying 40 units of nitrogen following each cutting.

Buy your Green Spirit at the following location:



- Excellent Forage Quality
- High Dry Matter Production
- Great Component in Your TMR

EXCELLENT QUALITY AND YIELD

Green Spirit is a unique blend of diploid and tetraploid Italian ryegrass varieties. Combining tetraploid and diploid varieties maximizes the advantages each has to offer. Our tetraploid varieties provide high dry matter production, disease resistance to crown rust and improved palatability. Our diploid varieties are added for better persistence under grazing and improved traffic tolerance. These varieties also have improved dry matter production and winter hardiness compared to older cultivars. In regions with moderate climates, Green Spirit will be a biannual forage.



Green Spirit produces impressive forage yields of exceptional high quality feed.

The varieties used in Green Spirit require prolonged periods of cold weather for vernalization. Once vernalized the plant has the ability to produce seed heads which result in the loss of forage quality. Inferior products that imitate Green Spirit vernalize with much shorter periods of cold, producing seed heads soon after planting when spring night time temperatures drop.

ITALIAN RYEGRASS VERSUS ANNUAL RYEGRASS: *When Quality and Yield Matter*

GREEN SPIRIT ITALIAN RYEGRASS

Spring Planted

- ▣ High dry matter production
- ▣ No seed head production
- ▣ Very high forage quality
- ▣ Produces forage until late fall
- ▣ Over-winters and produces forage in the following spring and early summer in the transition zone and Northeast

Fall Planted

- ▣ Better winter hardiness
- ▣ Late heading in spring
- ▣ Maintains better forage quality
- ▣ Better regrowth after cutting

ANNUAL RYEGRASS

Spring Planted

- ▣ High dry matter production
- ▣ Seed head production in late spring and subsequent cuttings
- ▣ Reduced forage quality
- ▣ Only produces forage until mid-summer, stops growing after mid-summer and does not over-winter.

Fall Planted

- ▣ Less winter hardiness
- ▣ Early heading in the spring
- ▣ Reduced forage quality
- ▣ Slow regrowth after cutting

As a High Energy Ration Component in the TMR

Green Spirit is ideal as silage or green chop for high producing dairy cows. It produces impressive forage yields of exceptional high quality feed (8 to 9 tons of DM per acre, see Table 1). The forage value of Green Spirit is higher than that of corn while maintaining similar DM yields. Green Spirit creates great economic advantages for producers. Green Spirit has a high energy value and is an excellent source of digestible fiber (NDFd of 72% to 77%, see Table 4). In a TMR, Green Spirit is the perfect forage for lactating dairy cows. Green Spirit is also a high forage value alternative to triticale for green chop.



Green Spirit is ideal as silage or green chop for high producing dairy cows.

In the Rotation: Corn Silage, Soybeans, Alfalfa ... and Green Spirit

There are two major reasons why farmers have been reluctant to include grasses into their rotation. One is that they are skeptical of what grasses can yield – both in terms of quantity and quality. And two, farmers are afraid that planting grass will depress their corn silage yields the following year.

Knowing this, Barenbrug organized trials which specifically examined whether these two concerns had any merit. Two questions were asked:

- 1) Can the quality and yield of an Italian ryegrass called Green Spirit compete with conventional rotation crops such as corn silage and alfalfa?
- 2) Will planting Green Spirit depress corn silage yields on the same ground the following year?

Dr. Dan Undersander conducted the investigation at the University of Wisconsin, Arlington Research Station. The study was extensive and after two years of gathering data *the results are impressive.*

The yield results are displayed in Table 1 and 2. Green Spirit not only significantly out yields both alfalfa and soybeans, but it even comes close to yielding the same as corn silage. But what does it do to the rotation? In the study, every crop was rotated out and followed by corn silage. As you would expect, the worst corn silage yields were on ground that was planted to corn silage the previous year. But here is the surprising result: The highest yields of corn silage were on ground that was planted to Green Spirit the previous year. There was no yield

depression, in fact there was actually a slight yield boost when compared to the legumes.

Now what about quality – because high yields mean little if the feed value is low? Tables 3 and 4 display the quality results. To the farmer who is used to dealing with unimproved, everyday grasses, these results will also be surprising. Notice how comparable the protein levels are between Green Spirit and the conventional legumes. Protein levels can be very high in well bred and well managed grasses. Now look at the fiber content. Don't just look at total fiber – but examine NDFd, which is fiber digestibility. Here Green Spirit gives the rumen exactly what it needs. In terms of pounds of milk per ton of feed, Green Spirit both ties and out-yields corn silage in the two years of data. Add in the health cost savings from including more quality fiber into the diet, and now profits are being maximized!

Forage Quality of Green Spirit Italian Ryegrass Compared to Conventional Rotational Options

TABLE 3 2007				
Forage Crop	Forage Quality Parameters (Average)			
	Protein (% DM)	NDF (%DM)	NDFd (%NDF)	lbs milk/ton
Green Spirit Italian Ryegrass - 25 Day cut	23.8	45.7	73.3	3,370
Green Spirit Italian Ryegrass - 35 Day cut	22.4	47.4	73.7	3,410
Alfalfa	24.1	33.2	49.4	3,252
Soybean	—	—	—	—
Corn Silage	7.0	46.8	53.8	3,309
L.S.D (0.05)	0.6	0.8	1.6	59

TABLE 4 2008				
Forage Crop	Forage Quality Parameters (Average)			
	Protein (% DM)	NDF (%DM)	NDFd (%NDF)	lbs milk/ton
Green Spirit Italian Ryegrass - 25 Day cut	21.7	43.9	77.0	3,615
Green Spirit Italian Ryegrass - 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	3,597
Corn Silage	7.0	48.3	59.9	3,249
L.S.D (0.05)	0.4	1.5	1.9	46

University of Wisconsin, Arlington Research Station.

Effect of Green Spirit Italian Ryegrass on Next Year's Corn Silage Yield Compared to Conventional Rotation Options

TABLE 1 2007 to 2008	Tons DM/Acre	
	Yield	Corn Silage Yield
Forage Crop	2007	2008
Green Spirit Italian Ryegrass - 25 Day cut	9.1	9.1
Green Spirit Italian Ryegrass - 35 Day cut	8.6	8.6
Alfalfa	5.0	8.7
Soybean	—	8.6
Corn Silage	10.0	7.6
L.S.D (0.05)	0.1	0.8

TABLE 2 2008 to 2009	Tons DM/Acre	
	Yield	Corn Silage Yield
Forage Crop	2008	2009
Green Spirit Italian Ryegrass - 25 Day cut	8.1	10.2
Green Spirit Italian Ryegrass - 35 Day cut	8.7	10.2
Alfalfa	4.5	9.3
Soybean	3.8	8.8
Corn Silage	10.5	7.8
L.S.D (0.05)	0.3	0.2

University of Wisconsin, Arlington Research Station.



The forage value of Green Spirit is higher than that of corn while maintaining similar DM yields. Green Spirit creates great economic advantages for producers.