

**Not All Endophytes Are Created Equal**

The most widely grown forage tall fescue in the United States is Kentucky 31, a cultivar released in 1942. The reason for its popularity is its stubborn persistence under extreme climatic conditions. The persistence of Kentucky 31 is attributed to the alkaloids produced by a fungal endophyte that grows within the plant. Unfortunately, some of these alkaloids are toxic to livestock and cause deleterious effects on animal performance such as elevated body temperature, decreased weight gains, lameness, lower pregnancy rates and reduced milk production. Such livestock disorders are commonly referred to as "fescue toxicosis". Kentucky 31 causes "fescue toxicosis".

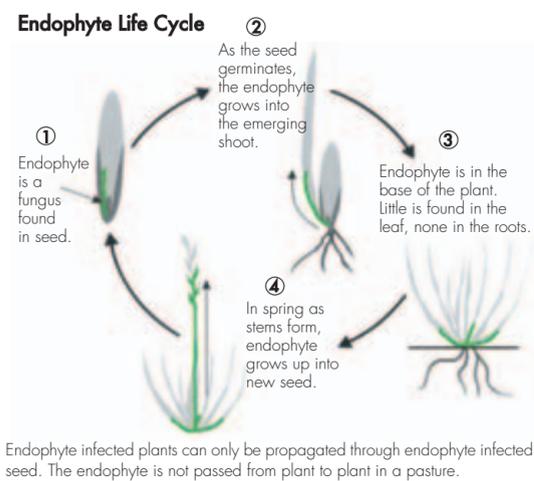
Barenbrug USA researchers examined alkaloid profiles of numerous fescues with endophytes that were collected from around the world. They isolated many endophytes from fescues which lacked alkaloids known to be toxic to livestock. These selected endophytes were inoculated into different soft-leaf tall fescue germplasm. The inoculated fescues were evaluated for their alkaloid profiles and endophyte stability. From this research, Barenbrug was able to pick a beneficial endophyte, coded "E34". Plants inoculated with E34 were hybridized with other elite germplasm and used to develop the experimental variety 'BAR FA 'BE9301A'. This variety has been tested in numerous cutting and grazing trials (Table 4). It has higher forage yields compared to Kentucky 31 and is just as stubbornly persistent. Research shows E34 makes 'BAR FA 'BE9301A' significantly more persistent under grazing than endophyte-free tall fescue.



Table 4.

	Forage Yield (Dry Matter tons/acre) <sup>1</sup>	
	Maturity	3 yr. Total
<b>BarOptima PLUS E34</b>	<b>43.5</b>	<b>10.6</b>
<b>Kentucky 31</b>	51.0	9.4
<b>Bull</b>	57.0	8.8
<b>Select</b>	54.5	8.6
<b>Bronson</b>	56.0	7.6
<b>LSD (0.05)</b>	3.5	1.7

Maturity Rating on May 6, 2008;  
 Scale: 37=Flag leaf emergence, 45=boot swollen,  
 50=Beginning of inflorescence emergence, 58=complete  
 emergence of inflorescence, 62=beginning of pollen shed.  
<sup>1</sup>University of Kentucky, Lexington, KY



**Why choose BarOptima PLUS E34 over Kentucky 31?**

**BarOptima PLUS E34**

*(Beneficial Endophyte)*

- Safe for Cattle
- Persistent
- Healthy reproduction
- Reduced vet costs
- Stress-free pasture management
- Increased intake
- High digestibility
- Late heading
- Increased average daily gain
- Profitable use of resources

**QUALITY SEED = INCREASED RETURN**

**Kentucky 31**

*(Harmful Endophyte)*

- Fescue toxicosis
- Persistent
- Impaired reproduction
- Increased vet visits
- More labor/management
- Reduced Intake
- Low digestibility
- Early heading
- Reduced average daily gain
- Economic Loss

**INFERIOR SEED = HIGH COST**

**BarOptima **PLUS** E34**  
 BENEFICIAL ENDOPHYTE TALL FESCUE

**BarOptima PLUS E34 planting requires advance planning; an investment well worth your time.**

**Below are two proven methods to transition to better pastures:**

**Method 1: Spray - Wait - Spray**

- Prevent seed head formation in the toxic tall fescue pasture in the spring. Swath and windrow or flail any heads that emerge.
- Spray the toxic tall fescue with glyphosate-based herbicide (1.4 lbs. a.i./acre) at 4 to 6 weeks prior to sowing.
- A second glyphosate application should be done just prior (one day) to sowing. The sowing operation should preferably be timed just prior to expected rainfall (if no irrigation is available).
- Ideal sowing time is Sept 1<sup>st</sup> to Sept 15<sup>th</sup>, depending on moisture availability.
- Drill BarOptima PLUS E34 seed at 25 lbs. per acre. The sowing depth should be about ¼ inch.
- No-till seeding is ideal, at a narrow row spacing (6 inches or less).
- Apply 100 lbs. per acre of 20-20-20 starter fertilizer.

**Method 2: Spray - Smother - Spray**

- Spray the toxic tall fescue pasture with glyphosate-based herbicide (1.4 lbs. a.i./acre) in the spring.
- Plant an aggressive summer annual forage crop adaptable to your region such as pearl millet or sorghum.
- Graze the crop through the summer.
- In late summer or early fall spray another application of glyphosate-based herbicide.
- Drill BarOptima PLUS E34 seed at 25 lbs. per acre. The sowing depth should be about ¼ inch.
- No-till seeding is ideal, at a narrow row spacing (6 inches or less).
- Apply 100 lbs. per acre of 20-20-20 starter fertilizer.

**Buy your BarOptima PLUS E34 here:**



**Great in Grass®**  
 www.barusa.com

**BarOptima **PLUS** E34™**  
 BENEFICIAL ENDOPHYTE TALL FESCUE

**Safe  
 Sustainable  
 Profitable**



## What is BarOptima PLUS E34?

BarOptima PLUS E34 is the next generation forage tall fescue. It is a **high energy** and **high yielding** variety, which is bred in association with the revolutionary **beneficial endophyte E34**.

Traditionally, forage grasses have been defined by two traits: yield and persistence. Barenbrug also places a strong emphasis on a third trait, forage quality. After all, forage quality has a direct effect on animal performance and ultimately on your profits.

Barenbrug has a long tradition of developing high quality forage products. After many years of research, Barenbrug has incorporated all three of these traits (yield, persistence and forage quality) in one product, BarOptima PLUS E34. The technology that brings this all together is E34, a beneficial fungal endophyte that was discovered by the Barenbrug Worldwide Research Team. It was inoculated into Barenbrug elite soft-leaf tall fescue germplasm, which was used to breed the variety BarOptima PLUS E34.



BarOptima PLUS E34 represents Barenbrug's commitment to the livestock industry and a program of Total Forage Quality (TFQ).

BarOptima PLUS E34 has multiple advantages over Kentucky 31 and other tall fescues. These advantages are best characterized by the words Safe, Sustainable and Profitable. To assure these advantages are delivered to our producers, maintaining seed quality is the highest priority for Barenbrug.

Barenbrug has strict guidelines to assure proper endophyte levels and the highest seed quality. **Quality control** measures have been defined and implemented as part of our commitment to our customers. These guidelines are designed to regulate seed production, seed harvesting and cleaning. Endophyte is monitored at various stages in the seed production fields while seed harvesting and cleaning parameters prevent contamination from toxic endophyte seed. Beneficial endophyte is a perishable product; extensive research has been undertaken to study the effect of storage conditions on endophyte viability. Proper storage and packaging guidelines assure a quality product is delivered to the farm or ranch. Beneficial endophyte quality and viability assure safety, sustainability and profitability for all.

### PALATABILITY

Barenbrug is legendary for introducing and continually bringing soft-leaf Tall fescue germplasm to the market. BarOptima PLUS E34 is no exception. Soft leaves make the pasture more **palatable** to cattle, which increases intake and delivers higher energy than rough-leaf tall fescue. Our unmatched forage quality parameters lead to improved weight gain and milk production.



### Great For Beef

BarOptima PLUS E34 is the perfect tool for beef producers to be successful. It is suitable for large cattle ranches and small producers in different parts of the country. Whether you graze, feed hay or stockpile, BarOptima PLUS E34 is your grass for beef production.

## SAFE

Animals grazing on BarOptima PLUS E34 do not get fescue toxicity and are much healthier than cattle grazing on infected Kentucky 31. These healthy cattle have normal body temperatures and will spend more time (Graph 1) in the field grazing than unhealthy cattle grazing on infected Kentucky 31 pastures. The unhealthy cattle are spending valuable time standing idle in shade or cooling in water. More grazing time corresponds to better weight gains. A low level of prolactin in blood serum is associated with fescue toxicity. Blood analysis indicates that animals grazing on BarOptima PLUS E34 have significantly higher levels of prolactin than animals grazing on Kentucky 31. (University of Arkansas)

## SUSTAINABLE

There are many endophyte-free tall fescues on the market which are not harmful to cattle, but under extreme growing conditions such as drought and heat, they generally do not persist under grazing (Graph 2). There may be endophyte-free varieties that survive, but they will require a cost prohibitive level of management to achieve the desired level of production. BarOptima PLUS E34 will persist and provide premium feed in these drought prone and hot environments.

Kentucky 31 is persistent in extreme conditions, but its harmful alkaloids can cause low reproductive rates and inhibit milk production in beef cows, thus reducing the weaning weights of calves. Supplemental feed can be required to counteract these effects, but can substantially increase input costs. BarOptima PLUS E34 will persist in extreme conditions, improve reproductive rates, increase the weaning weights of nursing calves and reduce supplemental feed costs.

## PROFITABLE

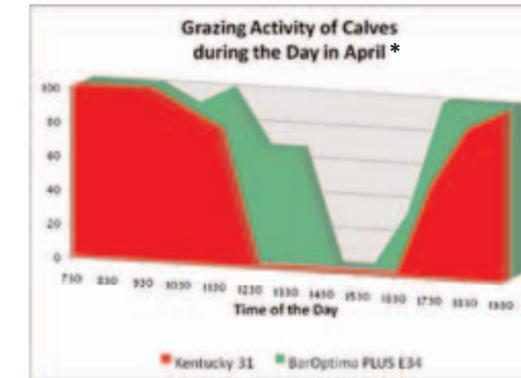
Cattle feeding on BarOptima PLUS E34 pastures are healthier due to its beneficial endophyte, thus reducing health related costs. They graze longer and have more intake than cattle on Kentucky 31 pastures (Graph 3). The soft leaves of BarOptima PLUS E34 improve the palatability and grazing preference of the pasture (Table 1). Higher energy due to better fiber digestibility of forage makes BarOptima PLUS E34 the ultimate choice for pastures on progressive cattle ranches (Table 2).

All of these positive characteristics result in greater average daily gains (45%) for cattle grazing on BarOptima PLUS E34 pastures. Total body weight gain per acre on BarOptima PLUS E34 is 1.6 times more than on Kentucky 31 pastures (Table 3).

### Great For Dairies

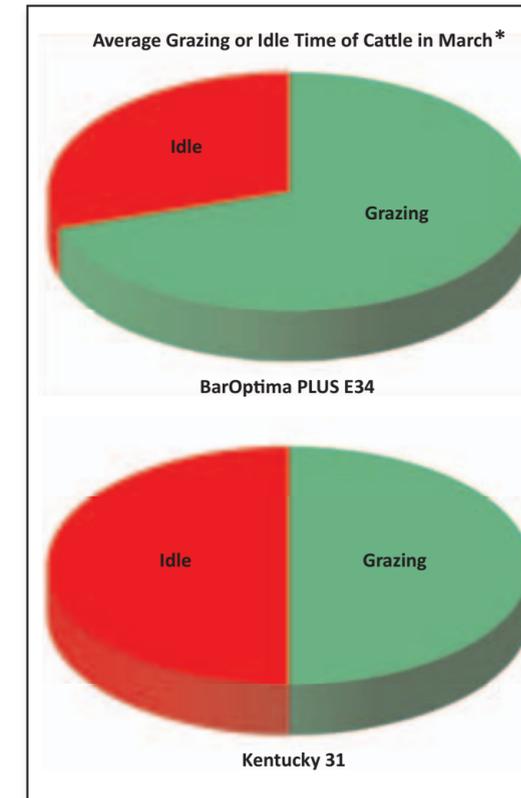
BarOptima PLUS E34 is very beneficial to grazing-based dairies. Persistent, high-energy BarOptima PLUS E34 pastures are ideal for dairies in the transition zone and other harsh climates. BarOptima PLUS E34 is late heading (Table 4) thus maintaining the pasture quality into late spring.

Graph 1.



Calves on BarOptima PLUS E34 graze for a longer period during the day whereas calves on Kentucky 31 stop grazing and loose productivity.

Graph 3.



Graph 2.

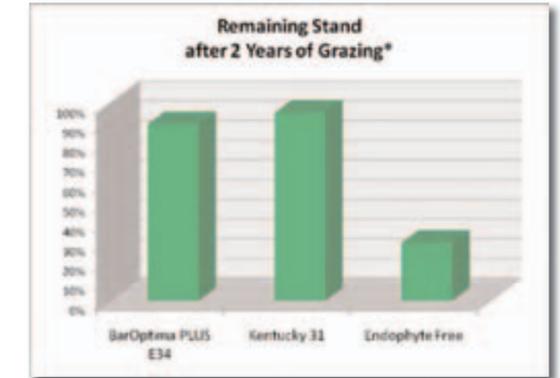


Table 1.

	Grazing Preference**	
	May 19, 2007	May 16, 2008
BarOptima PLUS E34	4.5	5.8
Kentucky 31	3.0	3.2
Select	2.3	2.8
LSD (0.05)	0.9	1.0

Scale= 1-9, 9=all forage grazed

Table 2.

	Fiber Digestibility***
	NDF Digestibility (%)
BarOptima PLUS E34	48.9
Barolex	48.9
Barcarella	46.7
Siene	46.4
Kentucky 31	44.9
Fawn	39.3
LSD (0.05)	2.8

Measurements taken from April 28, 2006 cutting

Table 3.

	Performance of Steers on two different Pastures*	
	Kentucky 31	BarOptima PLUS E34
Total Body Weight Gain, lbs	172	279
Average Daily Gain, lbs	1.3	1.8
Grazing Days/acre	215	224
Total Body Weight Gain/acre, lbs264		419

Average of 2 years: grazing period January-May/June

\*Southwest Research & Extension Center, University of Arkansas, Hope, AR  
 \*\*University of Kentucky, Lexington, KY  
 \*\*\* Tall fescue forage trial, Crossville, AL