

Martin 2^{Protek}[®]

Tall Fescue with Novel Endophyte



Martin 2^{Protek} is a new novel endophyte tall fescue, combining the proven genetics of Martin 2 forage tall fescue with the enhancement of the *Protek* endophyte. (Patent applied for: PCT International Application No. PCT/EP2013/067522)

Martin 2 is an early-medium forage tall fescue selected for the transition zone. Its pedigree includes several USA varieties including Mozark, the original Martin, Cajun, and three KY31 synthetics. Despite its southern breeding, it is adapted to the entire US tall fescue market. In addition, Martin 2 is marketed in South America, Australia and is on the registration list in Canada. Martin 2 continues to be available as an endophyte free variety and now also as a novel endophyte enhanced tall fescue.

Protek is a novel endophyte (*Neotyphodium coenophialum*) that does not produce detectable levels of harmful ergot alkaloids such as the toxin ergovaline.

Tall fescue plants inoculated with *Protek* endophyte show increased forage productivity compared to the non-inoculated plants of the same variety. In addition, *Protek* endophyte will defend the inoculated tall fescue plants against insects feeding on the tillers and leaves, resulting in reduced stress from insect damage. *Protek* endophyte inoculated plants have shown improved tolerance to environmental stresses such as heat and drought.

All these combined factors result in improved persistence of the inoculated tall fescue plants in environments where these stress factors are prevalent, i.e. the Transition Zone.

The Benefits of Martin 2^{Protek}

The value of replacing toxic KY31 pastures with novel endophyte tall fescue is well documented and includes, but is not limited to:

- Stocker calves – higher weight gain, smoother hair coat
- Cows – higher body scores, increased conception rate, shorter calving interval
- Bulls – higher semen quality

Uses of Martin 2^{Protek}

The palatability of Martin 2^{Protek} is better than average for tall fescue. Martin 2^{Protek} can be used for grazing, balage, dry hay and stockpiling. It is adapted across the entire tall fescue belt.

Animal Safety

Oregon State University conducted an animal safety study with grazing ewes measuring the effect of the *Protek* endophyte on performance and health. Included in the study with Martin 2^{Protek} was the endophyte free Martin 2 and KY31 with the toxic wild type endophyte. See sidebar on second page.

PLOIDY	Hexaploid (6N)
GROWTH HABIT	Perennial Bunch
ESTAB. RATE	10-14 days
NITROGEN REQ.	High 80-100 lbs/ac
ANEROBIC SOIL TOL.	Good
pH RANGE	4.7-8.5
MINIMUM RAINFALL	>20 inches
DRY MATTER YIELD	6-8 tons
REGROWTH	Excellent
PRIMARY UTILIZATION	Grazing, hay & stockpile
VEG REPRO TIL RATE	Moderate
ENDOPHYTE	Novel
SEEDING RATE	15-25 lbs/ac pure stand



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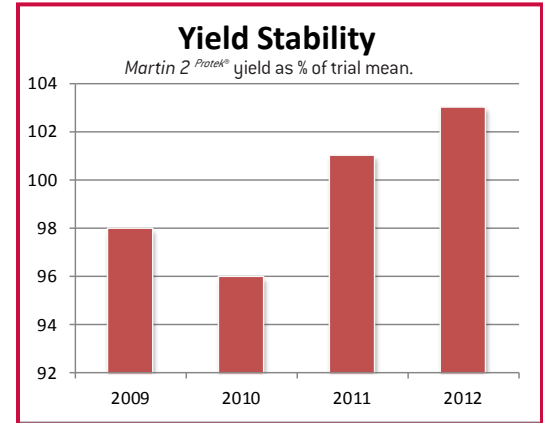


Tall Fescue Forage Yield Trial

S. Charlestown, Ohio (Sown 4/23/2008)

Yield Stability chart: *Martin 2^{Protek}* shows increased forage production in subsequent years compared to the trial mean, indicating the superior persistency due to *Protek*[®] endophyte inoculation.

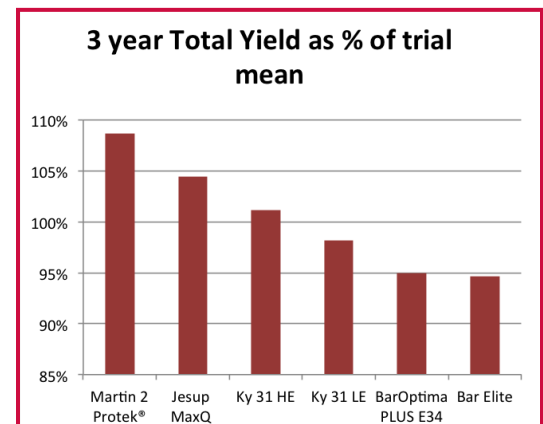
Variety	2009	2010	2011	2012	09-12 % Mean
<i>Martin 2^{Protek}</i>	4.17	4.73	4.75	5.81	19.68
Brutus	4.75	5.30	4.94	6.01	20.60
KY31 E-	4.54	5.12	4.67	5.49	19.58
Bronson	3.44	5.18	5.22	5.81	19.58
KY31 E+	4.12	4.67	4.61	5.49	19.24
Mean	4.24	4.95	4.71	5.66	19.55



Tall Fescue Forage Yield, Stand Rating

Mound Valley Unit, Kansas State University (Sown 2010)

Variety	2011 Yield (tons)	2012 Yield (tons)	2013 Yield (tons)	3-Year Total (tons)
<i>Martin 2^{Protek}</i>	4.86*	4.64*	5.65	15.15*
BarOptima Plus E34	4.33	3.80	5.11	13.24
Bar Elite	4.08	3.93	5.18	13.19
Jesup Max Q	4.56*	4.53*	5.47	14.56
KY31 E+	4.74*	4.01	5.35	14.10
KY31 E-	4.37	4.07	5.25	13.69
Average	4.36	4.18	5.40	13.94
LSD (0.5)	0.43	0.54	0.75	1.25



*Statistical top group

5 = Solid stand/ 1 = None

ANIMAL SAFETY

KY31 E+ was the only tall fescue that produced ergovaline, the primary alkaloid that causes fescue toxicosis. Lowered serum prolactin, an indicator of fescue toxicosis, was only measured in KY31 E+. *Martin 2^{Protek}* produced the same prolactin level as the endophyte free control.

Weight gain for *Martin 2^{Protek}* was equal to the weight gain of the endophyte free Martin 2. The weight gain for KY31 E+ was significantly less.

Oregon State University

Tall Fescue trial with grazing ewes

Variety	Weight Gain (kg-3yr. mean)	Post Prolactin (ng/ml 3 yr. mean)
KY31 E+	1.59 c	38.97 b
Martin 2	4.41 ab	294.36 a
<i>Martin 2^{Protek}</i>	4.71 a	273.20 a

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