

# Grass Breeding to Improve Fiber Quality

PRO-DAIRY Program  
Winter Forage Meetings  
January 31<sup>st</sup> – February 2<sup>nd</sup> 2017

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Forage Product Manager  
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## Ruminants RULE!

We eat plants



so you don't HAVE to!

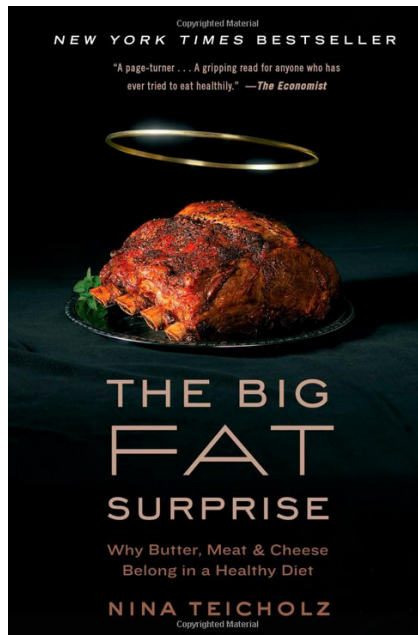
Twitter @GrassBased  
Facebook - Grass Based Health



I can turn grass into heavy whipping cream.



Twitter @GrassBased  
Facebook - Grass Based Health

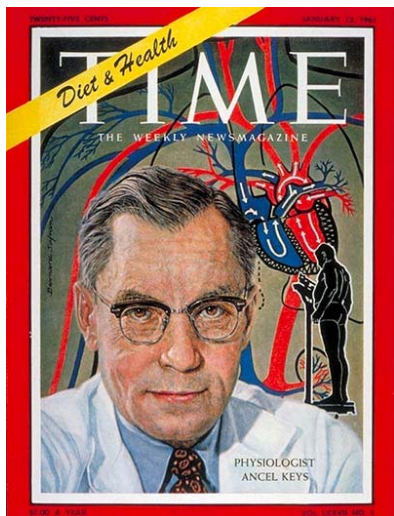


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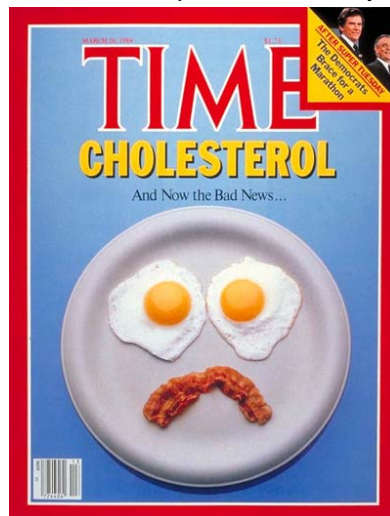


## Fake News Kills!

"...it's now clear that so-called fake news can have real-world consequences," Hillary Clinton



January 13, 1961 <sup>a</sup>



March 26, 1984 <sup>b</sup>

a <http://content.time.com/time/covers/0,16641,19610113,00.html>  
b <http://content.time.com/time/covers/0,16641,19840326,00.html>

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<https://www.dietdoctor.com/member/presentations/eenfeldt-sd>

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# Grass?



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## ***Poaceae***

Large and nearly ubiquitous family of monocotyledonous flowering plants.

Approximately 780 genera and around 12,000 species, the fifth-largest plant family

The Poaceae are the most economically important plant family, providing feed for domestic livestock and wildlife from natural grassland, cultivated pasture and forage crops, staple foods from domesticated cereal crops such as corn, wheat, rice, barley, and millet, building materials (bamboo, thatch, straw) and fuel (ethanol).

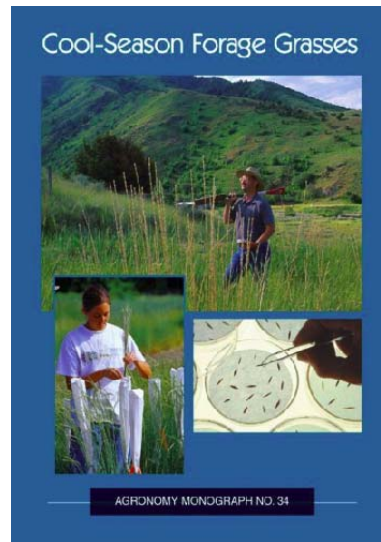
Grasslands (savannah and prairie) approx. 40.5% of the land area of the Earth (excluding Greenland and Antarctica)

Grasses are also an important part of the vegetation in many other habitats (wetlands, forests and tundra).

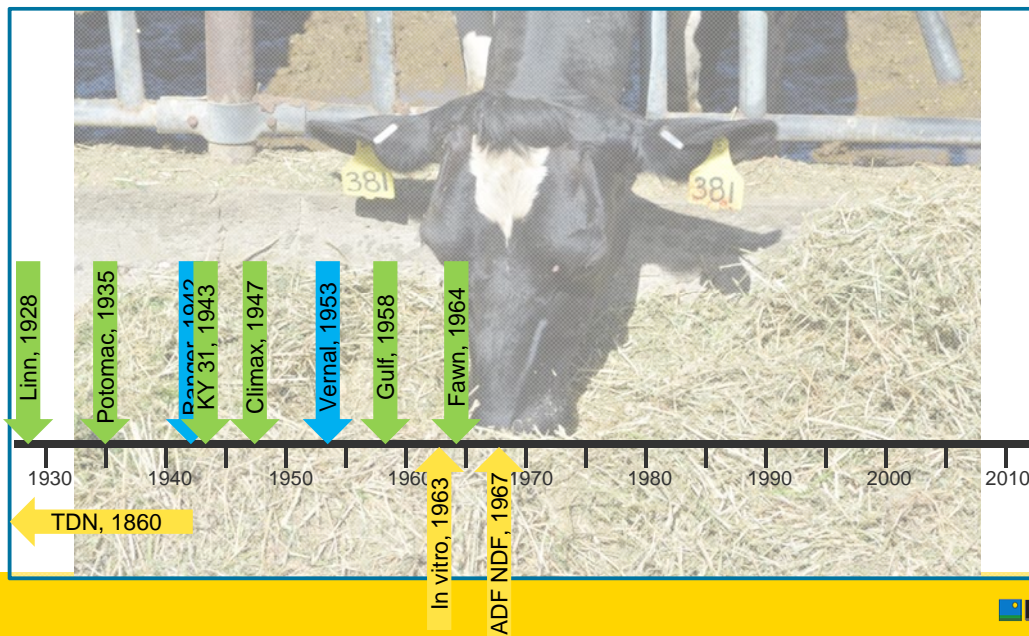


# Cool Season Forage Grasses

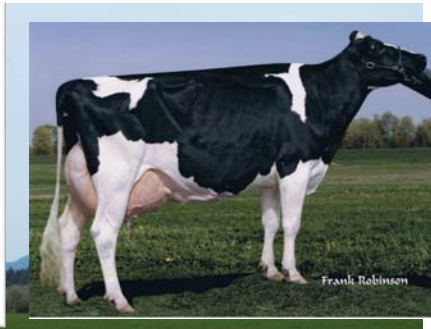
- 11 Main Groups
  - Tall Fescue
  - Orchard grass
  - Brome Grasses
  - Wheatgrasses
  - Phalaris
  - Ryegrasses
  - Timothy
  - Bluegrasses
  - Wildrye
  - Creeping and meadow Foxtails
  - Other (50 species)



# Grandfather's Grasses



# Progress in Agriculture

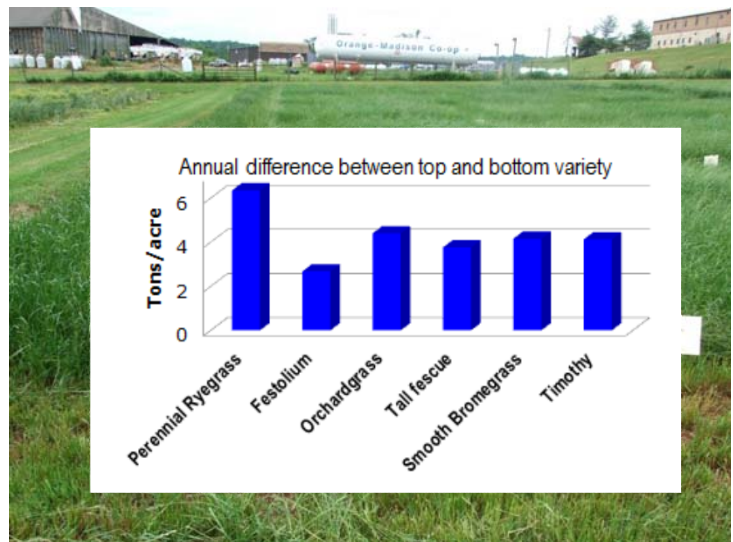


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# Varietal differences

“Greater differences exist among grass varieties than among corn hybrids and soybean varieties”

Dr. Dan Undersander, Univ. WI



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There's nothing so expensive as cheap seed!



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## Breeding Improved Forage Grasses

Factors affecting selection for both cutting and grazing systems

- Persistency
- Stress tolerance to heat, drought, freeze
- Disease (Rust, Xanthomonas)
- Effluent water / Salt tolerance
- Forage quality



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## Breeding Improved Forage Grasses



## Carbohydrate Digestibility Affects Health & Production



Dairy rations contain carbohydrates (NFC and NDF)

Properly balancing NFC and NDF is critical for health and production in high producing dairy cows.

Variations in fiber digestibility affect production more than variations in starch digestibility

Starch digestibility => 3-5 lb/day

Fiber digestibility => 6-7 lb/day



## Assessing fiber digestion not easy



Poor digestion < 40%



Excellent digestion > 50%

*A 2-3 unit change in fiber digestibility corresponds to 1 lb change in milk yield.*

## What is your forage made of?

	ALFALFA	GRASS
Protein	27%	16%
NDF	35%	43% to 70%
ASH	8%	8%
FAT	3%	3%
NFC	27%	18% to 30%
	100%	100%
NDFd	25-45%	25-60%

# Fiber Digestibility Varies in Grasses

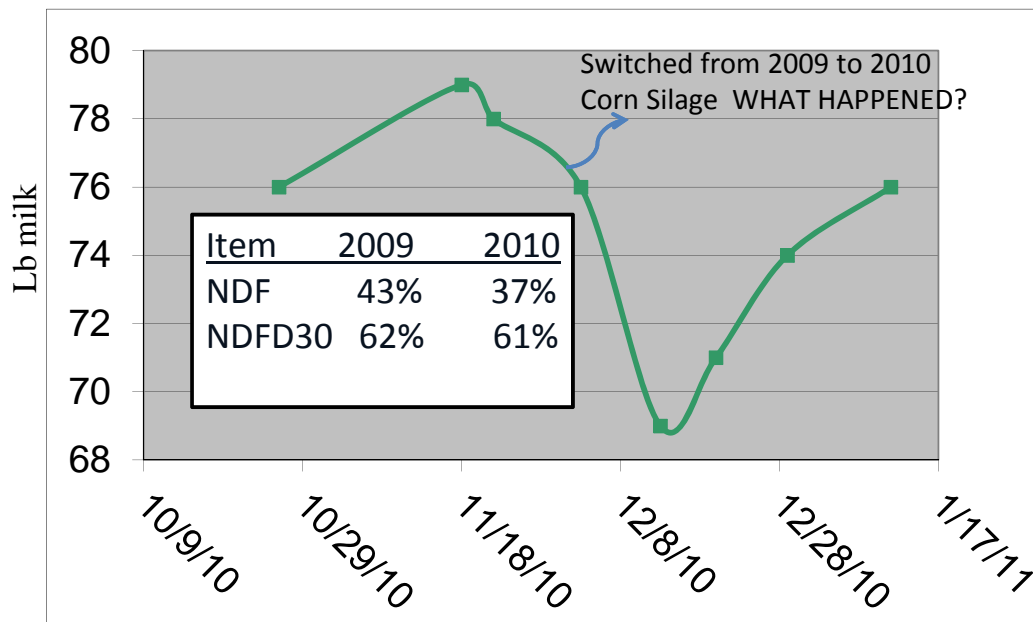
NutriFiber grasses are higher in fiber digestibility than other grasses with similar NDF content\*

Item	N	NDF Range % of DM	TTNDFd % of NDF
Green Spirit®	13	46 to 56	59.5
Other Grass Forage	448	46 to 56	48.3

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



# Troubleshooting with TTNDfD



## Relative Forage Quality of Grasses

All Grasses harvested at Boot Stage

		Heading Date	PROTEIN (%)	NDF (%)	NDFd (%)	IVTD (%)
Perennial Ryegrass	BAR 1M	16-May	16.9	55.5	83.5	90.9
Perennial Ryegrass	Remington	25-May	14.0	57.0	81.0	89.2
Meadow Fescue	Pradel	16-May	16.8	55.5	83.7	90.9
Meadow Fescue	Barvital	14-May	17.7	51.9	89.0	94.3
Tall Fescue	Retu	21-May	15.5	57.2	75.4	85.9
Tall Fescue	Barcel	18-May	16.8	54.7	79.3	88.7
Orchard grass	Potomac	14-May	16.7	64.2	75.4	84.2
Orchard grass	Baridana	14-May	17.6	62.6	79.7	87.3

Grass Trial in Ithaca, NY, Forage quality predictions by NIRS;

NDF: neutral detergent fiber

NDFd: NDF digestibility (48 hour digestion)

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Timothy	Barpenta	17-Jun	8.1	67.7	66.8	77.5
Timothy	Climax	27-May	12.9	63.2	74.6	83.9

Grass Trial in Ithaca, NY, Forage quality predictions by NIRS;

NDF: neutral detergent fiber

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# Return to Your Roots



# Barenbrug's Breeders



# Spaced Plants: The Final Frontier...





## Genetic Diversity



## You can tell the difference



BarOptima PLUS E34

Traditional Rough Leaf Tall Fescues

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## You can tell the difference



Barenbrug Soft Leaf Fescues



Traditional Rough Leaf Tall Fescues

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And so can they!

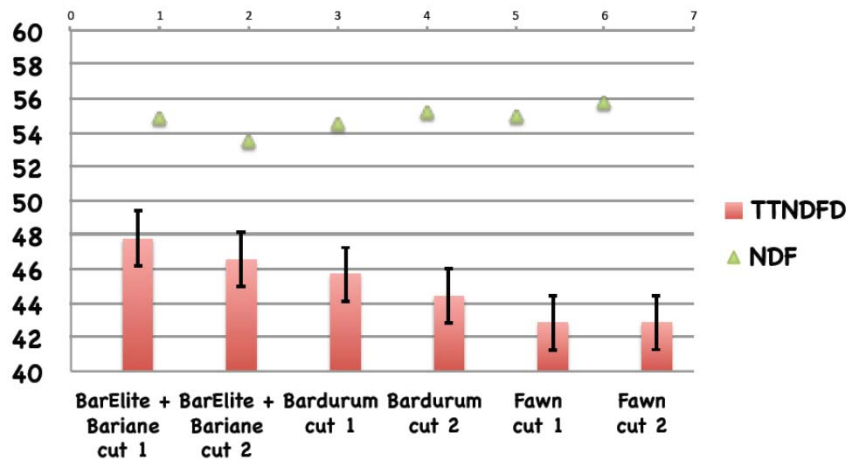


Kentucky 31 Paddock



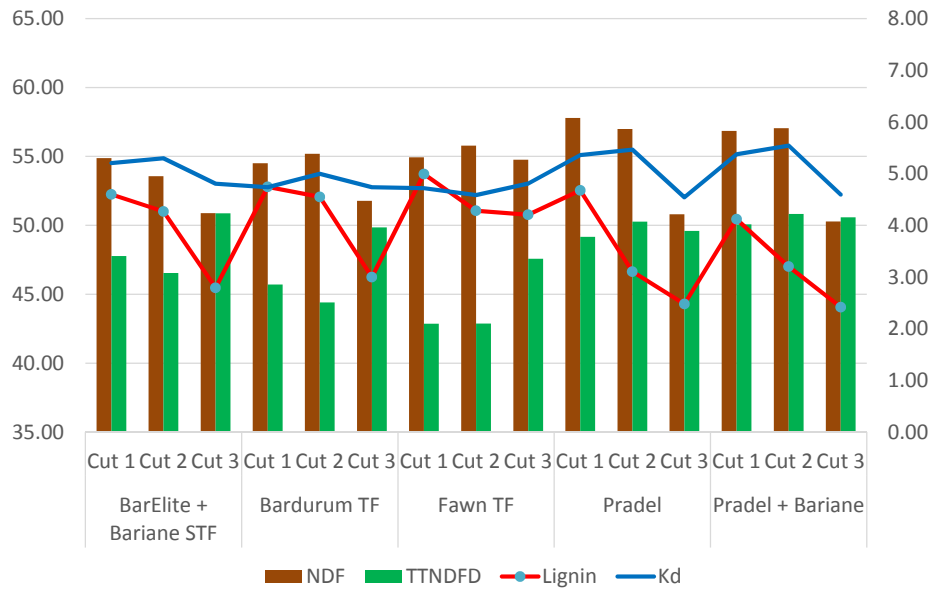
BarOptima PLUS E34

### TTNDFD and NDF of Tall Fescue 2015 MSU Study





All Cuts Tall Fescue Varieties in Michigan 2015



## Prize winning, 2015



Champion in Quality Counts Hay/Haylage  
 1<sup>st</sup> place in the Haylage and Baleage Divisions  
 2<sup>nd</sup> place in the Grass Hay Division

## Prize winning, 2015



### **Green Spirit**

1<sup>st</sup>, 2<sup>nd</sup>, 13<sup>th</sup>, and 18<sup>th</sup> in the Haylage Division

42% dry matter

15.5% crude protein

24.3% ADF

39.5% NDF.

RFQ 254, 4,040 lbs of milk predicted per ton

Also won the Quality Counts award for the Hay/Haylage category, surpassing all other entries in the Baleage, Commercial Hay, Dairy Hay, Grass Hay and Haylage Divisions



## Prize winning, 2015



### **Barenbrug soft leaf fescues**

1<sup>st</sup> and 2<sup>nd</sup> in the Baleage Division

56.6% Dry Matter

15% Crude Protein

22.2% ADF

37.4% NDF

245 RFQ

2<sup>nd</sup> in Grass Hay Division with BarOptima PLUS E34<sup>®</sup>



## Prize winning, 2016



World's Forage Grand Champion (over all categories including corn silage)

Tom Leubke, Mayer, MN

Green Spirit - Alfalfa Mix From Grass Hay Category

81.4% Dry Matter  
19.6% Crude Protein  
19.9% ADF  
28.8% NDF  
77.0% NDFd 30hr IV  
216 RFQ, 4,086 lbs of milk predicted per ton

Barenbrug represented in 5 of the top 10 finalist in the grass hay division



## Coming attractions



Thank you!



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Questions?



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