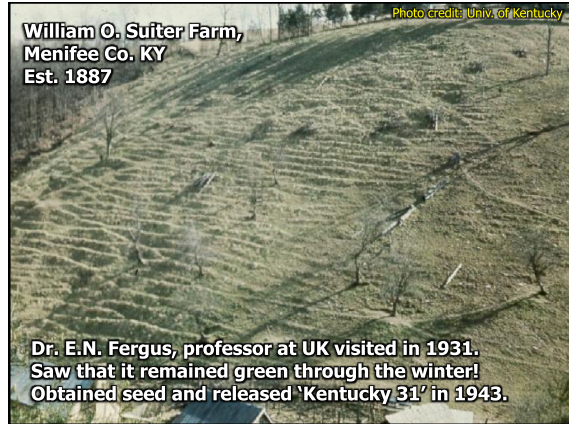
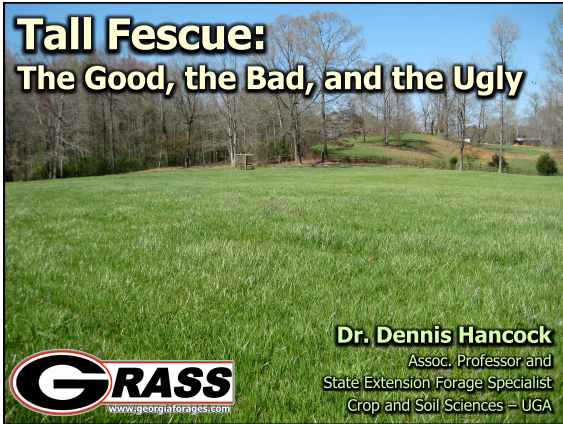


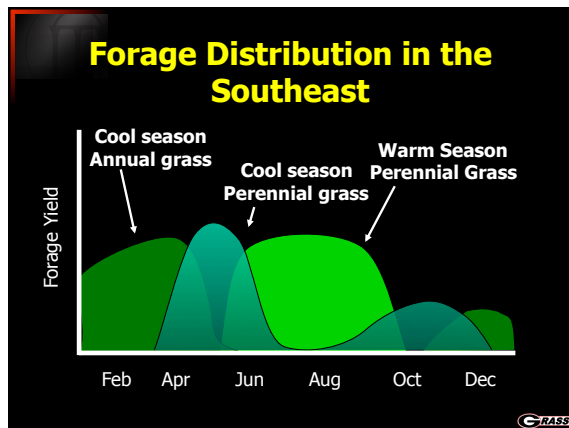
Tall Fescue Workshop

Tall Fescue: The Good, Bad, and the Ugly



Tall Fescue: the wonder grass

- Green through much of the winter
- Long grazing season
- High yields
- High seed yield
- Tolerant of abuse/overgrazing
- Pest resistant
- Adapted to wide range of soils
- Would grow in the South, where no other cool season perennial would
- Promoted for soil conservation and aesthetics



**The
GOOD**


**The
BAD**

Tall Fescue Workshop

Tall Fescue: The Good, Bad, and the Ugly

Reduced Cattle Performance

Photo credit: Dr. Carl Hoveland



Reports of poor cattle performance started in the late 1940s and early 1950s.
 "Tall fescue grass is poison for cattle." (Cunningham, 1948)
 Similar reports out of Ohio (Pratt and Haynes, 1950)

Fescue Toxicosis

- Retained hair coat
- Fescue foot (sloughing hoof)
- Lost tail switch
- Vasoconstriction
- High body temp
- Inc. respiration rate
- Low heart rate
- Altered fat metabolism
- Agalactia (no milk production)
- Immune system suppression
- Reduced intake
- Poor weight gain






Photo credit: Dr. David Bohner, Oregon State University




Photo credit: Dr. Nick Hill

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- Poor weight gain
- **Low pregnancy rates**










Photo credit: Dr. John Stuedemann






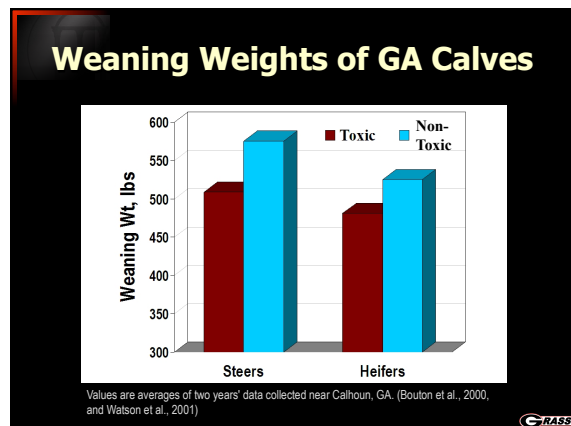
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- Immune system suppression
- Reduced intake
- Poor weight gain
- Low pregnancy rates
- **Thick/retained placenta**

Fescue Toxicosis

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- Fescue foot (sloughing hoof)
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- Inc. respiration rate
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- Low serum prolactin
- Agalactia (no milk production)
- Immune system suppression
- Reduced intake
- Poor weight gain
- Low pregnancy rates
- **Dystocia (birthing difficulty)**

Tall Fescue Workshop

Tall Fescue: The Good, Bad, and the Ugly


Cow-calf performance on toxic or novel endophyte (NE) tall fescue stands. †

Cow Performance	Toxic	Non-Tox
Wt. at end of breeding, lbs.	1110	1236
Wt. at end of weaning, lbs.	1005	1122
BCS at end of breeding	5.4	5.7
Pregnancy Rate, %	44.7	85.1
Calf Performance		
Actual Weaning Wt., lbs.	461	529
Adj. (205 d) Weaning Wt., lbs.	436	504
ADG (birth to wean), lbs.	1.7	2.1
Replacement Heifers		
Actual Weaning Wt., lbs.	459	498
Calving Rate, %	64.1	90.6

† Adapted from Univ. of Arkansas Exp. Stn. Reports by Coffey et al. (2007 and 2008).

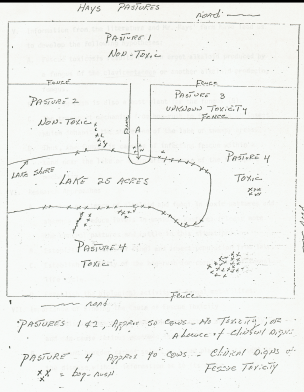
What is the cause?

- 1973: Fescue Toxicity Conference, Lexington, KY
- Attended by USDA-ARS Russell Research Center Scientists
 - Drs. Joe Robbins, Charles Bacon, James Porter.
 - Noted a lack of multi-disciplinary effort and unified hypothesis
- Days after, they visited A.E. Hays' farm in Mansfield, GA



A.E. Hays Farm

- Cattle on pasture 4 performed very poorly and showed classic tall fescue toxicosis symptoms.
 - At least 10 of 50 affected by June 1973
 - 2 had died.



Drawing: Robbins, 1973.

"Hot" Fescue

Dr. Charles Bacon, microbiologist at USDA-ARS Russell Research Center

- Attributes of the *Neotyphodium coenophialum* Endophyte
- 1977 article concluded:
 - Production of Ergot Alkaloids
 - Linked to Fescue Toxicosis




Photo credit: Dr. Nick Hill
Photo credit: USDA-ARS

Endophyte Free Fescue

Dr. Carl Hoveland, Auburn Univ.

- Planted toxic tall fescue and year-old (endophyte free) tall fescue seed
- No fescue toxicosis in EF tall fescue!

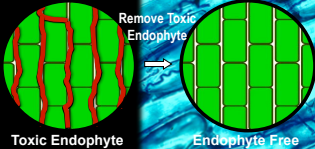
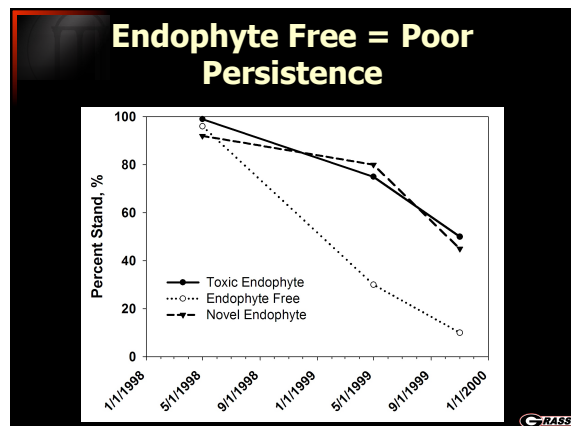
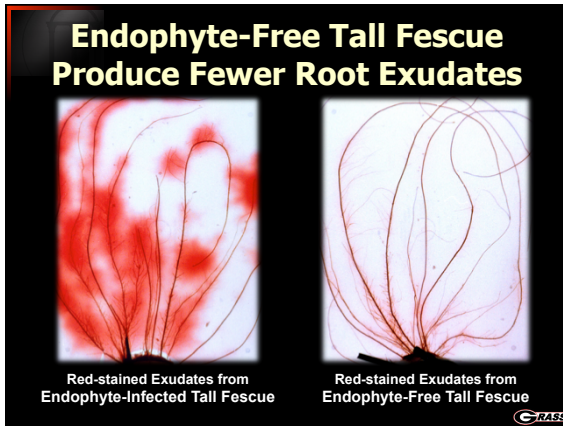


Photo credit: Univ. of Georgia



Tall Fescue Workshop

Tall Fescue: The Good, Bad, and the Ugly



***Neotyphodium coenophialum* Endophyte Alkaloids**

Alkaloids are naturally occurring N-containing compounds (e.g., nicotine, caffeine, morphine, etc.)

- 3 classes of alkaloids produced by the fescue endophyte:
 - Pyrrolizidines (lolines)
 - Peramine (pyrrolizidines)
 - Ergot alkaloids (clavines, ergovaline, lysergic acid derivatives, etc.)

Photo credit: Dr. Nick Hill

***Neotyphodium coenophialum* Endophyte Alkaloids**

- Pyrrolizidines (lolines)
 - Reduce drought stress
 - Insect deterrent
- Peramine (pyrrolizidines)
 - Strong insect deterrent
- Ergot alkaloids (clavines, ergovaline, lysergic acid derivatives, etc.)
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The Effect of Alkaloids in Toxic Tall Fescue on the Animal

Dr. Nick Hill

Photo credit: Scott Bauer

GRASS

