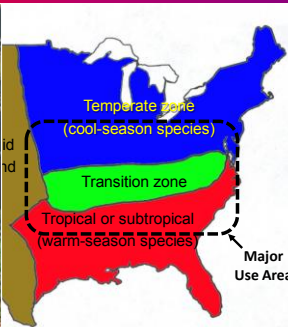


### Tall Fescue Adaptation

More tolerant to heat than other cool season grasses, yet, quite winter hardy



Temperate zone (cool-season species)

Transition zone

Tropical or subtropical (warm-season species)

Major Use Area

Although tall fescue is a bunchgrass, in a thick stand it acts like a sodgrass.



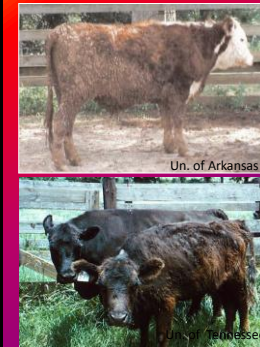
### Tall Fescue

- Became very popular starting in the 1940's
- Today, there is over 35 million acres in U.S.



### Animal Problems With Tall Fescue

- Unthrifty
- Poor hair coat
- Elevated body temperature
- Higher respiration rate
- Less time grazing
- More time in shade and water
- Decreased weight gain
- Lower milk production
- "Summer syndrome"



### Animal Problems With Tall Fescue

- "Fescue Foot"
- Dry, gangrenous condition of the body extremities
- Lameness or loss of tips of tails or ears
- Sloughing of hooves or feet
- Caused by vasoconstriction of the blood vessels
- Generally a cool weather condition

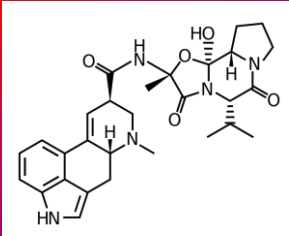


### Animal Problems With Tall Fescue

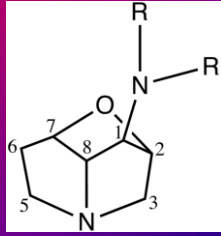
- Bovine Fat Necrosis
- Masses of hard fat in the abdominal cavity
- Causes digestive and calving problems
- Associated with tall fescue pasture that has been heavily fertilized with poultry manure or N fertilizer



## Tall Fescue Alkaloids



Ergovaline

One of the Ergot Alkaloids

Loline

## Endophyte and Tall Fescue

- In the 1980's researchers discovered that animal problems were caused by a fungal endophyte living inside the plant.
- It is the endophyte which produces the alkaloids found in tall fescue.



## Endophyte Associations

### TURFGRASS SPECIES

Perennial Ryegrass

Tall Fescue

Fine Fescues

### FUNGAL ENDOPHYTE

*Neotyphodium lolii**Neotyphodium coenophialum**Neotyphodium typhinum**Epichloe typhina*

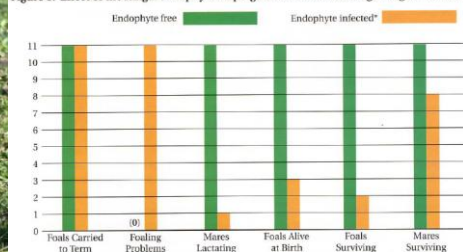
Table 1. Animal performance as affected by endophyte level of tall fescue.

Research	Endophyte level		Animal	Forage or feedstuffs
	High	Low		
	Average daily gain, lb			
Read and Camp (1986)	0.99	2.14	Steers	Pasture
Pedersen et al. (1986)	1.41	2.18	Steers	Pasture
Stuedemann et al. (1986)	1.02	1.31	Steers	Pasture
Hoveland et al. (1983)	1.00	1.83	Steers	Pasture
Schmidt et al. (1982)	0.44	2.12	Steers	Seed
Schmidt et al. (1982)	0.62	1.46	Steers	Hay
	Gain per acre, lb			
Pedersen et al. (1986)	371	462	Steers	Pasture
Stuedemann et al. (1986)	454	509	Steers	Pasture
Hoveland et al. (1983)	342	528	Steers	Pasture
	Milk production lb/day			
Siegel et al. (1985)	37.9	45.6	Dairy cows	Green chop
Schmidt et al. (1984)	6.7	11.7	Beef cows	Pasture
	Intake, lb/day			
Jackson et al. (1984)	2.40	3.31	Steers	Seed
Schmidt et al. & 1982	9.13	14.13	Steers	Seed
Schmidt et al. & 1982	9.70	10.56	Steers	Hay
Spears et al. (1984)	0.61	1.12	Lambs	Hay

J. Prod. Agric., Vol. 1, no. 1, 1988

## Equine Problems With Tall Fescue Endophyte

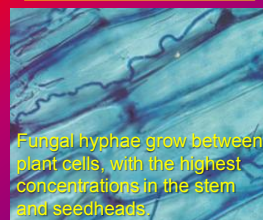
Figure 1. Effect of the fungal endophyte on pregnant mares and foals grazing tall fescue.



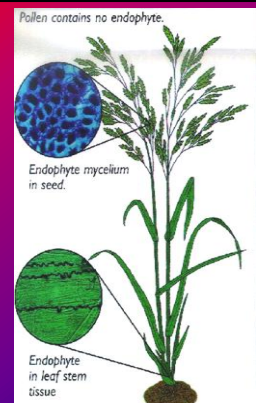
\* Greater than 80% of plants testing positive for *A. coenophialum* in analyses conducted at the Auburn University Fescue Diagnostic Laboratory.

Source: Putnam, et al., 1990. The effects of the fungal endophyte, *Acremonium coenophialum* in fescue on pregnant mares and foal viability. Am. J. Vet. Res. 52: 2071.

## Endophyte Infected Tall Fescue



Fungal hyphae grow between plant cells, with the highest concentrations in the stem and seedheads.



## Do We Have a Problem in Vermont?



## "Low Endophyte" Tall Fescue

- "Low endophyte" varieties are available that eliminate the animal problems; however, they are much less persistent than the high endophyte varieties sold for turf uses.



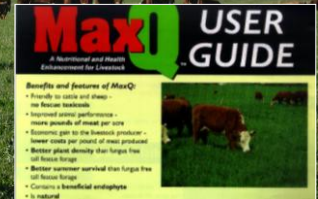
## Endophyte Infected Tall Fescue Provides Many Benefits

- Improved establishment of seedlings
- More vigorous plant growth
- Resistance to pests, nematodes
- Tolerance to abuse, overgrazing
- Tolerance to drought
- Persistence of the stand

## "Non-Toxic Endophyte" Tall Fescue

- New Zealand researchers discovered endophytes that do not produce ergovaline in the top growth, but still produce other alkaloids that help plant survival (eg. lolines in the roots).
- Referred to as "Novel Endophytes"

One of the NZ non-toxic endophytes has been patented under the name MaxQ



## Endophyte Dilution With Legumes

Table 1. Effects of white clover on steer growth performance in toxic endophyte-infected tall fescue pastures

Forage	Toxic Endophyte-Infected Tall Fescue		Endophyte-Free Tall Fescue	
	Clover %	Steer average daily gain, lb	Clover %	Steer average daily gain, lb
Grass alone	0	0.79	0	2.03
Grass + Regal white clover	5 to 7	1.47	0 to 2	1.96
Grass + Durana white clover	35 to 54	2.55	35 to 53	3.21

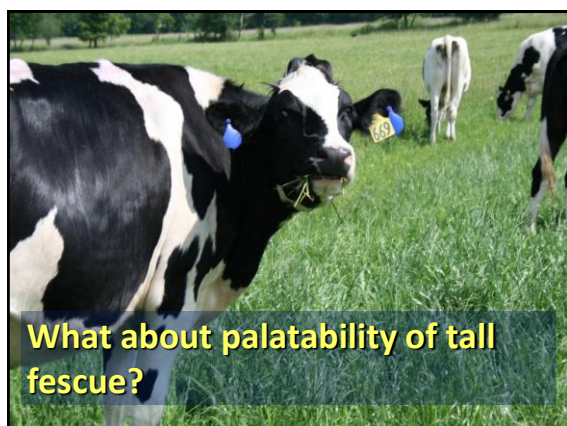
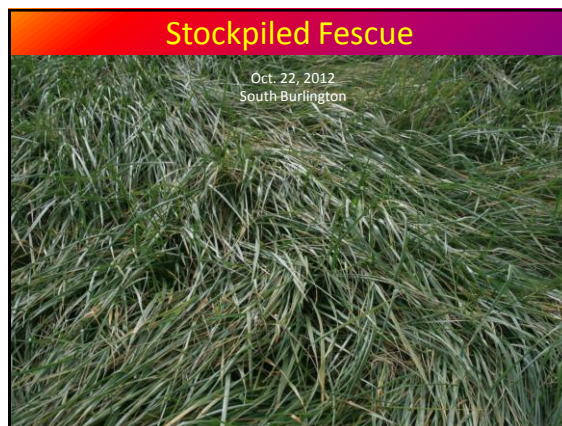
Source: J. H. Bouton, 2002, 29th Annual Conference Proceedings, Arkansas Forage and Grassland Council.



## Tall Fescue in Vermont?

- Introduction
  - What is tall fescue?
  - Where did it come from?
  - Why do we have it in Vermont and New England?
- Issues with tall fescue
  - Animal problems and the fungal endophyte
  - Palatability Issues
- What to do if you have it?
- Where does tall fescue fit in New England?





Tall Fescue in Vermont

Bosworth

