

Among Forage Grasses in an Eastern Kentucky Hill Farm

Mary McCarty (mary.mccarty@uky.edu), Dr. Jimmy Henning and Gene Olson *

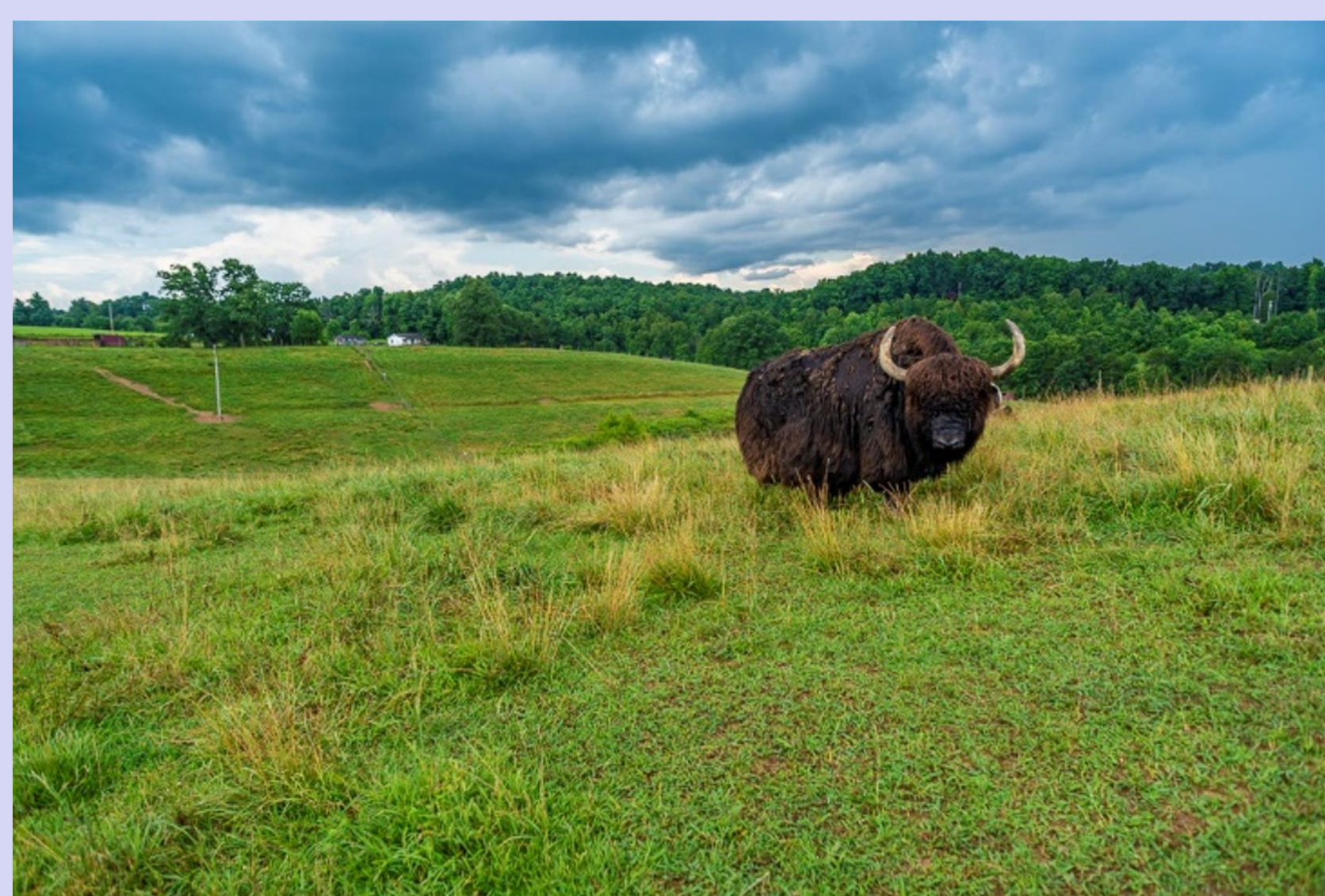
* Authors are County Extension Agent, Menifee County, Frenchburg, KY 40322; Extension Professor and Research Specialist, Ag Research Specialist Sr. Coordinator Forage Trials, Lexington, KY

Introduction

Yak (*Bos grunniens*) are native to the Tibetan Plateau and are a staple of the culture of Tibet, very valuable to Tibetan people still to this day. The climate in Tibet is much cooler than the climate of Kentucky, with significant precipitation differences. The landscapes of these two places vary in many other ways as well, including vegetation types.

Zhi-ba Shing-ga Yak Farm in Menifee County, Kentucky has 80 yaks. By farm size, Zhi-ba Shing-ga Yak Farm is average, with a focus on grass feed only and feed hay in the winter. Menifee County is home to KY 31 fescue. Observations by the owner of Zhi-ba Shing-ga Yak Farm, confirmed by the County Agent and UK Forage Specialist revealed that Yaks do not consume native KY 31 tall fescue even when vegetative and highly nutritious.

At the suggestion of the County Agent, a grazing study was initiated to determine the forage grasses preferred by yak.



Menifee County Kentucky is characterized by small farms on rolling to steep pasture land. Menifee County is also the site of origin for the tall fescue that eventually became KY 31. This field was later found to be highly infected with the toxic endophyte of tall fescue, as are most unimproved tall fescue fields in Kentucky.

Methods

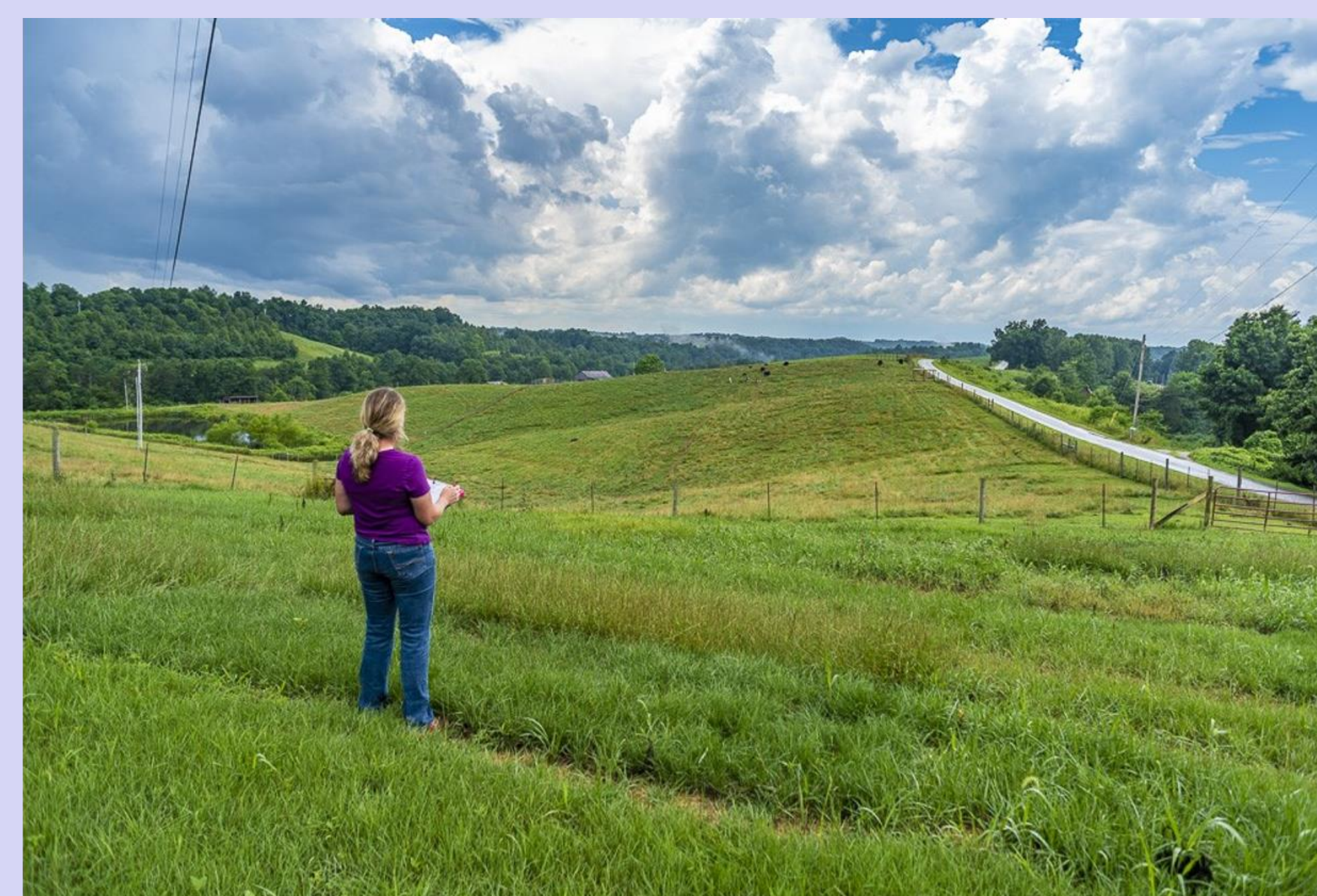
A forage species – grazing preference study was established April 13, 2018 with nine grasses replicated 4 times in a randomized complete block design. Plots (3 feet by 8 feet) of the following grasses were seeded on a prepared seedbed: Prairie (orchardgrass), Ginger (KY bluegrass), Duo, Pay Day (festuloliums), Linn (perennial ryegrass), Bar Optima Plus, Lacefield Max QII (novel endophyte tall fescues), KY 31 (endophyte free) and KY 31 (infected). The border of the plot was seeded with Linn ryegrass.

Grass preference was evaluated for each plot on each of two grazing periods in 2018. Yak were turned in when the forage was at least 6 to 8 inches high and removed when the most preferred grass was grazed lower than 3 inches. An endophyte infection test was run on each grazed pasture across the remainder of the farm, and each pasture was found to be heavily infected.

Results

The two cycles of summer grazing showed yaks preferred the festuloliums Pay Day and Duo and Linn, the perennial ryegrass. Festuloliums are a hybrid between tall fescue and ryegrass. Yak did graze novel endophyte and endophyte free tall fescues, and avoided infected KY 31.

Outside of the small plot area, 4 fields were 100% infected with the toxic endophyte and all fields tested above 60%. Ergovaline is an alkaloid present in infected toxic tall fescue that gives an indication of toxicity to grazing livestock. Although toxicity levels have not been established specifically for yak, 300 parts per billion (ppb) is often used as the threshold for toxicity in cattle (*Bos Taurus*). Field walks on the day of collecting tillers samples for endophyte testing revealed yak highly preferred crabgrass over tall fescue. Consequently, in spring 2019, the farm owner planted crabgrass in the blank plots where the festuloliums did not persist.



The county agent is standing at the edge of the first row of grasses in the small plot trial. Fields beyond the plot study show the rolling nature of the farm and of the average farm in Menifee County.

Endophyte infection (from immunoassay tiller tests) and ergovaline concentration in field sampled July 2018.

Field Number	Endophyte	
	(%)	Ergovaline (ppb)
1	71	309
2	100	203
3	100	387
4	40	315
5	100	313
6	100	292
7	60	239
8	75	420

Conclusions

The grazing study confirmed the dislike of yak for the infected, native KY 31 tall fescue. Yaks strongly preferred forage with ryegrass genetics (Linn, Pay Day, Duo).



Yak grazing the Menifee County hill farm were observed to avoid the native tall fescue across the full growing season (above). Yak preferentially grazed Kentucky bluegrass and crabgrass even when tall fescue was vegetative and high in nutritive value.

Acknowledgements

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Also like to thank Dr. Jimmy Henning and Gene Olsen from the Plant and Soil Science Department of the UK College of Agriculture Food and Environment for their help in establishing and managing the trial and whole farm endophyte testing.



Farm map showing fields tested for endophyte infection July 2018.