Seedhead Suppression in Tall Fescue with Chaparral Herbicide

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Introduction:

Tall Fescue (Lolium arundinaceum (Schreb.)) is cool-season perennial grass found in pastures throughout the Eastern US, most commonly in the transition zone. It's tolerance to extreme temperatures, drought, poor soil fertility, heavy grazing, and pests have made it a reliable forage base for livestock pastures. Released in 1943, 'KY-31' tall fescue was quickly adopted by cattle producers and now inhabits an estimated 40 million acres in the US.

Soon after its adoption, cattle producers began to notice a reduction in animal performance and signs that animals were heat stressed following tall fescue consumption. These symptoms were an indication of an animal disorder that would later be called "fescue toxicosis" by scientists and producers. In the late 1970s, it was discovered that the cattle health issues with tall fescue were actually caused by a fungus (Neotyphodium coenophialum) living within some plants, which produced a toxic class of compounds termed ergot alkaloids. We refer to these tall fescue plants that contain this fungus as being endophyte infected (E+) and those that do not as being endophyte free (E-).

Fescue toxicosis is estimated to cost the livestock industry 1$ billion annually. Economic losses are largely associated with reductions in pregnancy rates, milk production, and average daily gains in stocker cattle and poor calf weaning weights (Table 1). Other sources of economic loss can also be attributed to lower sale prices due to the unthrifty appearance of cattle suffering from fescue toxicosis and higher receiving costs for feedlots when fescue toxicosis stressed animals are delivered.

Table 1. †Summary of the effect of E+ tall fescue on cattle. Data derived from multiple research trials were pastures contained 70% or more E+ tall fescue.

Performance Metric	Effect on Production	
Pregnancy rates	Decreased	15-40%
Milk production	Decreased	25%
Weaning weights	Decreased	65- 85lbs
Time spent grazing	Decreased	20%
Forage intake	Decreased	25-40%
Average daily gain	Decreased	0.3-1.2 lbs/day
Water usage	Increased	25%
Body temperature	Increased	1-4°F

†Paterson et.al, 1995

Seedhead Suppression

Chaparral™ is a broad spectrum herbicide approved for control of susceptible broadleaf weeds and woody plants on rangeland and permanent grass pastures. It contains aminopyralid (2-pyridine carboxylic acid, 4-amino-3,6-dichloro-) and metsulfuron-methyl {methyl 2-[[[[(4-methoxy-6-methyl-1,3,5- triazin-2-yl)-amino]carbonyl] amino]sulfonyl] benzoate}. Timely spring applications of Chaparral on tall fescue pastures inhibit grass maturation, keeping the plants in a vegetative state for the remainder of the growing season.

Both day length and temperature can affect seedhead emergence in tall fescue. Day length of 12 hours or more triggers seedhead formation and temperature influences grass growth and development. With this in mind, it is best to apply Chaparral starting within 3 weeks before seedhead emergence to when tall fescue is in the boot stage. For most areas of the US where fescue is grown Chaparral application should begin around April 10th and end at the boot stage. Tall fescue in southern US could be treated with Chaparral as early as March 20th ($\geq$12hrs day length) as warmer conditions will promote faster seedhead development. For optimal seedhead suppression apply 2 oz/acre of Chaparral with a 0.25% volume per volume, high quality non-ionic surfactant (NIS). Do not tank-mix with other herbicides as this may reduce the level of seedhead suppression.

The Benefits of Seedhead Suppression

When seedheads are suppressed and weeds are controlled with Chaparral an increase in grass species diversity is usually observed. This increase in diversity along with the better nutritive value of tall fescue, and reduced consumption of ergot alkaloids has led to higher pregnancy rates in cows and higher 205-day adjusted weaning weights in their calves (Table 2) and improved average daily gains in steers (Table 3). Tall fescue pastures where seedheads have been suppressed by Chaparral have higher crude protein, in vitro dry matter digestibility (Table 3), and water soluble carbohydrates than pastures not treated with Chaparral. In addition, herbage dry matter intake by cattle is greater and cattle hair is shorter and smoother compared to cattle feeding on tall fescue not treated with Chaparral (Figure 1) (Turner et al. 1990a, 1990b; Aiken et al., 2012).

Table 2. Effect of seedhead suppression on 205 day adjusted weaning weights of calves and breed back of cows. Data were collected from three different locations owned by Whitesell Land and Cattle Co. At each location the pastures were split into two paddocks so that half the herd would be on a Chaparral-treated paddock (tall fescue seedheads suppressed) and the other half would be on a GrazonNext HL treated paddock (non-suppressed).

Location	205 Day Adjusted Weaning Wt.			Cow Pregnancy Rates	
	Chaparral Treated	Non-suppressed	difference	Chaparral Treated	Non-suppressed
Farm 1	473 lbs	418 lbs	+55lbs	95%	80%
Farm 2	483 lbs	463 lbs	+20lbs	95%	70%
†Farm 3	476 lbs	459 lbs	+17lbs	Equal at 91%	

†Heavy spring grazing on treated and untreated paddocks resulted in seedhead suppression through grazing, thus the non-treated paddock behaved similarly to the suppressed paddock.

Adapted from Boyer et al., 2015

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Table 3. Effect of seedhead suppression on stocker cattle and forage quality of pastures grazed. Data were collected from 2009-2012 in three separate studies conducted by the USDA-ARS Forage Animal Production Unit, University of Kentucky.

2009-2010	Chaparral™ Treated	Non-suppressed
Steer ADG (lbs/steer/day)	2.1 lbs	1.48 lbs
Crude protein	14.4%	11.6%
In vitro dry matter digestibility	78.6%	71.7%
2011-2012		
Steer ADG (lbs/steer/day)	2.1 lbs	1.74 lbs
Crude protein	14.2%	9.9%
In vitro dry matter digestibility	72.2%	66.4%
2011-2012		
Steer ADG (lbs/steer/day)	2.29	1.96
Crude protein	18.6	14.8
In vitro dry matter digestibility	76.1	72.6%

(Aiken et al., 2012; Goff et al., 2012a; Goff et al., 2012b)

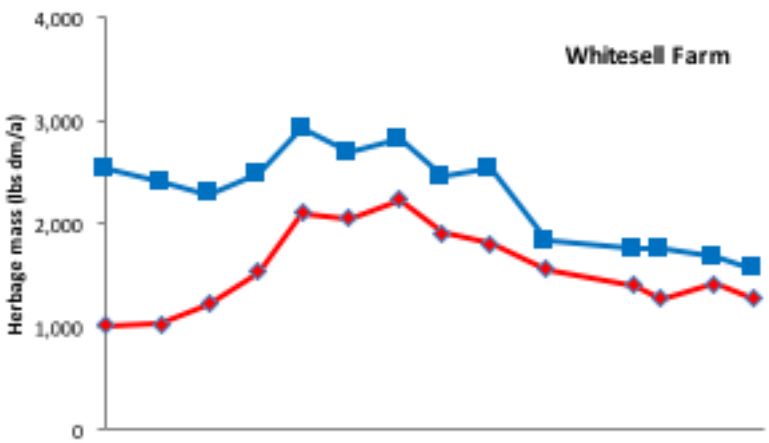
Figure 1. Comparison of 2-year-old brangus heifers bred on seedhead suppressed (left) and unsuppressed (right) pastures. Hair coat length and roughness is usually the most visually distinguishable characteristic of cattle suffering from fescue toxicosis.

Where does seedhead suppression with Chaparral™ herbicide fit in your operation?

Chaparral is an herbicide that suppresses tall fescue seedhead emergence. Chaparral for seedhead suppression works in rotational grazing systems and other grazing systems were quality forage is needed in late spring – early summer. Seedhead suppressed tall fescue maintains higher forage quality in spring and early summer when compared to unsuppressed tall fescue. This can allow cattle producers to keep up with spring grass production and maintain availability of high quality forage for a longer period during the summer. It also gives producers the ability to rotate to higher quality fescue pastures during a time of year when tall fescue is usually more mature and has low forage quality.

For tall fescue pastures where Chaparral is being used to suppress seedheads, it is advised that no more than 50 percent of total acres be treated in a single season also applications should not be made on the same acres over two sequential years. Chaparral will cause some leaf yellowing in tall fescue for a period of 7 to 14 days; it is not advised that Chaparral be used on pastures for seedhead suppression with poor soil fertility as the length and severity of yellowing will be prolonged.

Seedhead suppressed pastures produce less herbage mass early in the season due to the lack of a seedheads, but in some cases, grass herbage yields may catch up with herbage mass levels in unsuppressed pastures. Herbage mass in suppressed pastures may again decrease in late summer due to increased forage utilization by less stressed cows and their calves (Figure 2) (Boyer et al, 2014). It is recommended that producers rotationally graze pastures to prevent overgrazing and implement a spring and fall soil fertility program to maintain pastures with high quality grass forage. **Remember, reducing the stress of fescue toxicosis in cattle will increase their dry matter intake and put more pressure on your pastures.**



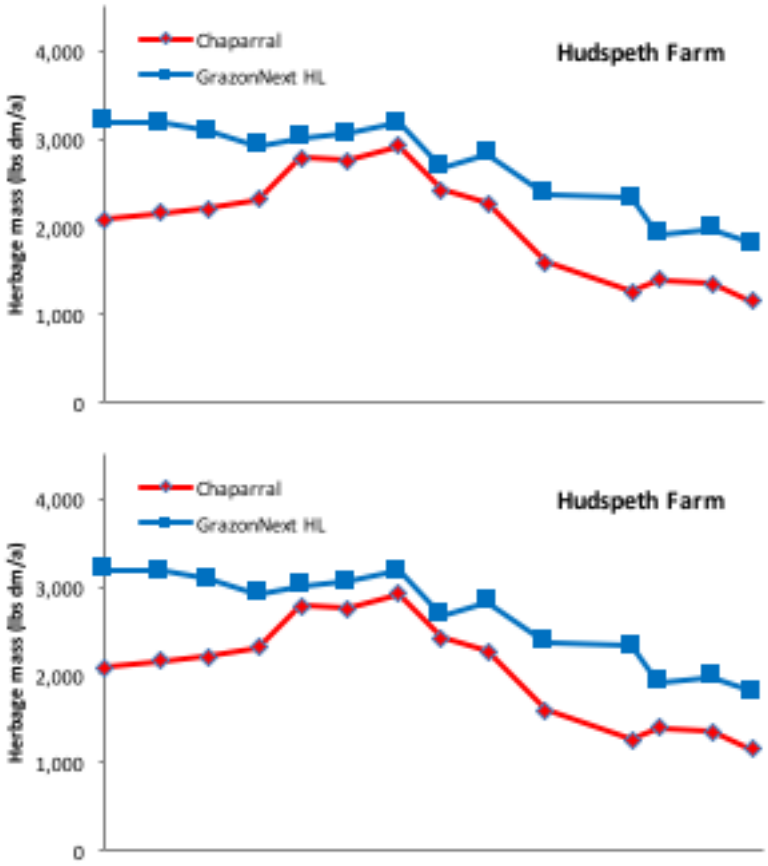


Figure 2. Pasture herbage mass data collected over the 2014 grazing season. Treatments were applied April 15-17, 2014. Chaparral™ herbicide pastures started out with less biomass due to seedhead suppression but began a rapid stage of growth by mid to late-May. However, Chaparral pastures did not grow back to the level of herbage mass of the untreated pastures due to increased grazing pressure by unstressed animals.

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