



**HEALTHY COWS START  
WITH HEALTHY GRASS.**

**CHAPARRAL™ SPECIALTY HERBICIDE FOR  
FESCUE SEED HEAD SUPPRESSION.**

**Chaparral™**

**SPECIALTY HERBICIDE**



**Dow AgroSciences**

*Solutions for the Growing World*

## Overview

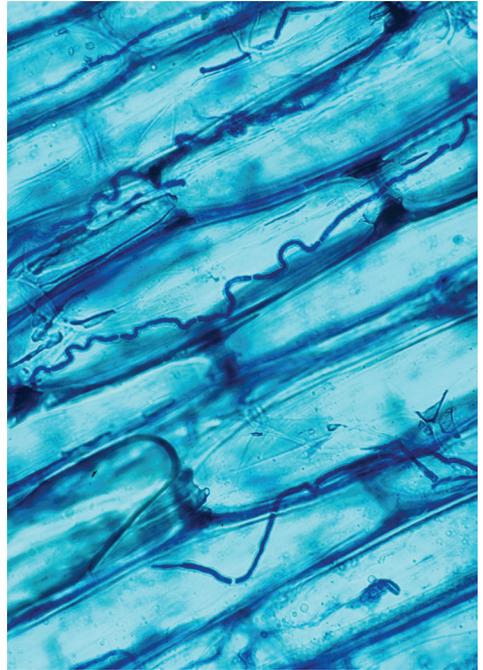
Tall fescue is a cool-season perennial grass found in pastures throughout the Eastern U.S., most commonly in the transition zone (Figure 1). It's tolerance to extreme temperatures, drought, poor soil fertility, heavy grazing and pests have made it a reliable forage base for livestock pastures. KY-31 tall fescue has been quickly adopted by cattle producers since its release in 1943, and it now inhabits an estimated 40 million acres in the U.S.



**Figure 1.** Distribution of Tall fescue (*Lolium arundinaceum* (Schreb.) throughout the US.

- Transition Zone - Fescue is adapted and of major use
- Fescue is adapted and of minor use

Soon after tall fescue's adoption, cattle producers began to notice a reduction in animal performance and signs that animals were heat stressed. These symptoms were an indication of an animal disorder that would later be called "fescue toxicosis." In the late 1970s, it was discovered that the issues with tall fescue were actually the result of a fungus living within some plants. This fungus (*Neotyphodium coenophialum*) produced a toxic class of compounds termed ergot alkaloids (Figure 2). The two most common alkaloids present are ergovaline



**Figure 2.** endophyte Mycelium growing between the cell walls of a tall fescue plant.

and ergovalinine. We refer to 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 and milk production, poor calf weaning weights, and reduced average daily gains in stocker cattle (Table 1).

Other sources of economic loss can be attributed to lower sale prices due to the unthrifty appearance of fescue cattle and higher receiving costs for feedlots (Figure 3). These economic losses can be mitigated by suppressing tall fescue seed head formation.

**Table 1.** †Summary of the effect of endophyte infected (E+) tall fescue on cattle.

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 0.3-1.2lbs/day
Water usage	Increased 25%
Body temperature	Increased 1-4° F

†Paterson et. al, 1994

Data derived from multiple research trials where pastures contained 70% or more E+ tall fescue.

**Figure 3.** Stocker cattle suffering from fescue toxicosis bring lower prices at sale as a result of their unthrifty appearance and poor body condition. The unthrifty appearance many times can be attributed to long hair coats that become mud caked due to the animal's efforts to cool themselves in ponds, puddles, or streams.



### What is the benefit of suppressing tall fescue seed heads?

Ergot alkaloid content in tall fescue has been reported to be as much as six fold higher in seeds than in leaf blades (Aiken et al., 2012). Because cattle tend to selectively graze mature tall fescue seed heads, suppression of these seed heads may reduce the amount of ergot alkaloids consumed (Goff et al. 2012), and lessen the effects of the toxicosis. In addition, fescue that remains in a vegetative state has been shown to maintain higher crude protein (~16%), *in vitro* dry matter digestibility (~11%), and water soluble carbohydrates (~9%), throughout the late spring and early summer when quality of tall fescue normally plummets (Table 2). This increase in forage quality helps cattle deal with the toxicosis. Finally, seed head suppression of fescue pastures has been shown to increase the diversity of grass species in pastures. Non-effected grass species become more competitive within the sward (Aiken et al., 2012), and this increase in diversity may help to dilute tall fescue consumption in the animal's diet, further aiding to mitigate toxicosis.

### What is the effect on cattle performance?

Suppressing seed heads in tall fescue has a positive impact on the weight gained by cattle in pastures. In three separate studies conducted by the USDA-ARS Forage Animal Production Unit in Lexington, KY, stocker cattle grazing seed head suppressed tall fescue pastures gained approximately 0.25-0.5 lbs/day more than steers on adjacent non suppressed fescue pastures (Table 2). Further research conducted by the USDA-ARS found that an even greater benefit can be obtained when seed head suppression is combined with rotational grazing. Based on their results, rotationally grazed pastures increased body weight gain per acre of stocker cattle – a 79 lbs/acre difference. An increase in average daily gain was also noted (Figure 4).

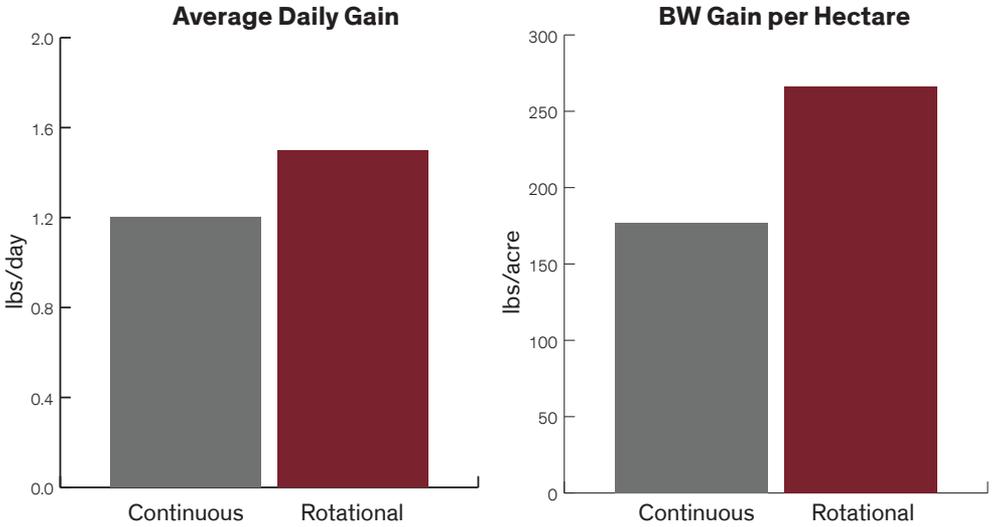
But the benefits of seed head suppression aren't just limited to stocker cattle. Cow-calf operations have also seen benefits. The effect of seed head suppression was studied at two Missouri cow-calf operations to determine its effect on herd pregnancy rates and weaning weights of calves. Table 3 and Table 4 show the favorable impact that both cow-calf producers experienced. The brangus herds averaged 13% higher pregnancy rates and 30lb heavier 205 day adjusted weaning weights for the calves. These herds also had higher pregnancy rates earlier in the breeding season, effectively tightening the calving window during the spring (Figure 5). While weaning weight data was not able to be analyzed on the Circle A pastures, an average of 9% unit increase in pregnancy rates was observed over a 60 day breeding period when Chaparral treated pastures were compared to non-treated (Boyer et al, 2015).

**Table 2.** Effect of seed head suppression on stocker cattle, and forage quality of pastures grazed. Data was collected from 2009-2012 on three separate studies conducted by the USDA-ARS Forage Animal Production Unit.

	Chaparral™ Treated	Non-Suppressed
2009-2010		
Steer ADG (lbs/steer/day)	2.1 lbs	1.48 lbs
Crude protein	14.4%	11.6%
<i>In vitro</i> 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%
<i>In vitro</i> dry matter digestibility	72.2%	66.4%
2011-2012		
Steer ADG (lbs/steer/day)	2.29 lbs	1.96 lbs
Crude protein	18.6%	14.8%
<i>In vitro</i> dry matter digestibility	76.1%	72.6%

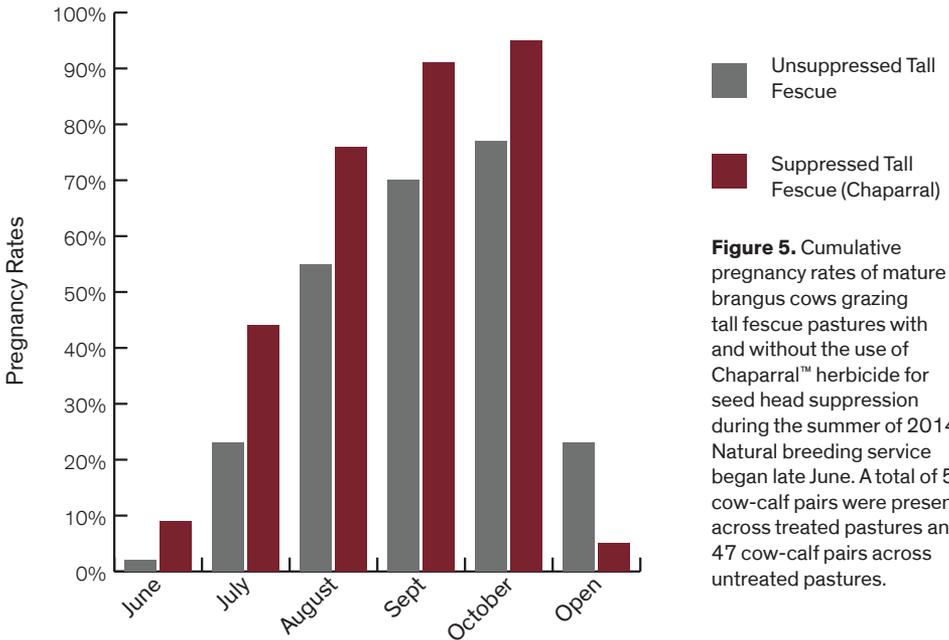
(Aiken et al, 2012; Goff et al, 2012a; Goff et al, 2012b)

**Figure 4.** Comparison of stocker cattle rotationally grazing and continuously grazing seed head suppressed (Chaparral™) tall fescue. Adapted from (Williamson et al. 2014)



Not only did rotational grazing increase gain per acre (237 vs 158 lbs/acre), it also increased average daily gain (1.2 vs 1.5 lbs/day).

### Cumulative Pregnancy Rates of Brangus Cows Grazing Tall Fescue



**Figure 5.** Cumulative pregnancy rates of mature brangus cows grazing tall fescue pastures with and without the use of Chaparral™ herbicide for seed head suppression during the summer of 2014. Natural breeding service began late June. A total of 56 cow-calf pairs were present across treated pastures and 47 cow-calf pairs across untreated pastures.

**Table 3.** Effect of seed head suppression on breed back of angus cows over a 60 day breeding period (May - June 2014).

<b>Treatment</b>	<b>Pasture ID</b>	<b>Suppression Level (%)</b>	<b>Herd Size (pairs)</b>	<b>Avg. Cow Age (years)</b>	<b>Pregnancy rate (%)</b>
<b>Chaparral™</b>					
	C-101	50-60	56	7.1	95%
	C-102	+90	35	2.4	97%
	C-103	+90	64	6.3	95%
	C-104	+90	59	7.7	92%
	C-105	+90	61	3.5	90%
	C-106	+90	56	4.9	86%
	C-107	+90	56	5.8	86%
	C-108	+90	35	2.4	71%
			<b>Averages</b>	<b>5.0</b>	<b>89%</b>
<b>No Chaparral</b>					
	NC-101	0	46	3.9	91%
	NC-102	0	46	7.6	78%
	NC-103	0	57	4.9	77%
	NC-104	0	35	5.8	74%
			<b>Averages</b>	<b>5.5</b>	<b>80%</b>

*Adapted from Boyer et al, 2015*

Data was collected from 12 different locations owned by Circle A Angus in Stockton, MO. A total of 422 cow-calf pairs were on Chaparral™ treated pastures (tall fescue seed heads suppressed) and 184 cow-calf pairs were on untreated pastures (non-suppressed pastures). All cows were supplemented with 3 lbs/day dried distillers grain.



**Table 4.** Effect of seed head suppression on 205 day adjusted weaning weights of calves and breed back of cows.

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

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

*Adapted from Boyer et al, 2015*

Data was collected from three different locations owned by Whitesell Land and Cattle Co. At each location the pastures were split into 2 paddocks so that half the herd would be on a Chaparral™ treated paddock (tall fescue seed heads suppressed) and the other half would be on a GrazonNext® HL treated paddock (non-suppressed).

**Grazing land treated with Chaparral™ herbicide (right) compared to untreated area (left) two months after application.**



### **How do I achieve fescue seed head suppression on my pastures?**

In the instances described here, effective seed head suppression was achieved using Chaparral™ specialty herbicide from Dow AgroSciences. Chaparral is the broadest-spectrum weed and brush control herbicide available for range and pasture, and is primarily used to control broadleaf weeds in pastures. It has been noted however that timely spring applications of Chaparral on tall fescue will inhibit the reproductive stages of fescue growth, keeping the plants in a vegetative state for the remainder of the season.

Both day length and temperature can affect seed head emergence in tall fescue – day length triggers the formation of the seed head and temperature influences the rate of growth and development. It is best to make an application of Chaparral for fescue seed head suppression starting within approximately 3 weeks of seed head emergence and up to the time in which tall fescue is in the boot stage. For most areas of the U.S., this means a Chaparral application should begin around April 10th and end at the boot stage. However, southern states may be able to spray as early as March 20th since warmer conditions will promote faster seed head development.

For optimal seed head suppression apply 2 oz/acre of Chaparral with a 0.25%, high quality non-ionic surfactant (NIS) during the optimal timing. Do not tank mix with other herbicides as this may reduce the level of seed head suppression.

### **Where does seed head suppression with Chaparral™ fit in my operation?**

Chaparral for seed head suppression works in rotational grazing systems and other deferred type grazing systems where quality forage is needed in late spring – early summer. Seed head 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 high quality forage without requiring every acre to be grazed over a short period (i.e. seed head suppression through grazing). It also gives producers the ability to rotate to a higher quality fescue pasture(s) during a time of year normally associated with mature, lower nutritive value fescue stands.

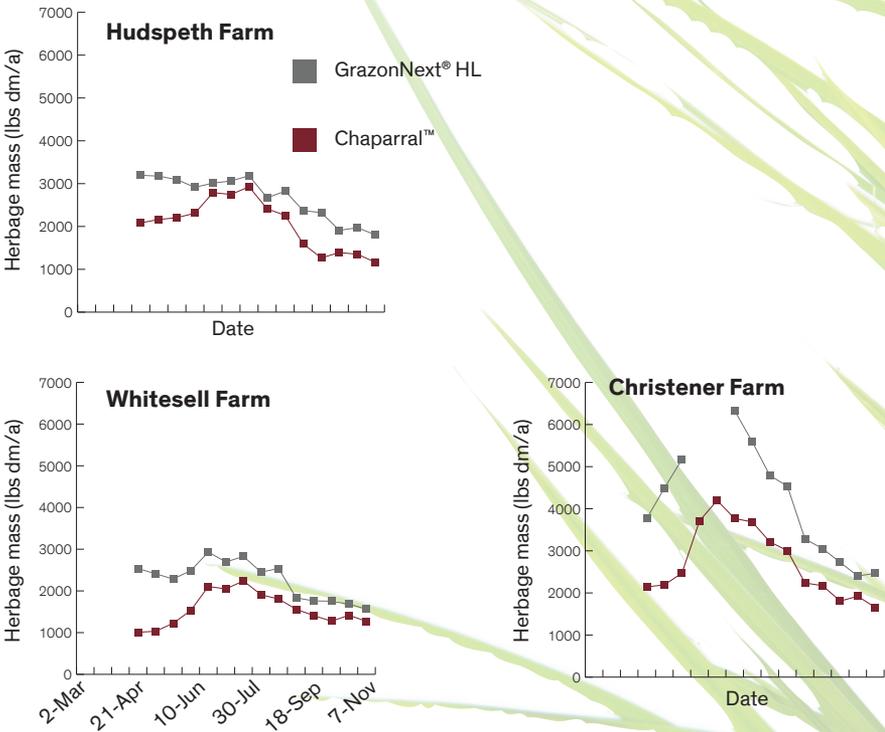
For tall fescue pastures where Chaparral is being used to suppress seed heads it is advised that no more than 50% of your total acres be treated in a single season or that applications be made on the same acres over two sequential years. Chaparral may cause some leaf yellowing in tall fescue for a period of 7 – 14 days after treatment. This period is often referred to as the “lag phase”. It is not advised to use Chaparral for seed head suppression in pastures with poor soil fertility as the length and severity of yellowing may be prolonged.

Suppressed pastures have less herbage mass early in the season due to the lack of seed heads but may catch up with unsuppressed pastures by summer, assuming pastures are not overstocked. Herbage mass in suppressed pastures may again decrease late summer due to increased forage utilization by less stressed cows and their calves (Figure 6). Thus it is suggested that producers

rotationally graze pastures to prevent overgrazing, and implement a spring and fall soil fertility program to maintain pastures for future high quality grazing.

**Remember, reducing the stress of fescue toxicosis in cattle will increase dry matter intake and put more pressure on your pastures.**

**Figure 6.** Pasture herbage mass data collected over the 2014 grazing season. Treatments were applied April 15-17, 2014. Chaparral pastures start out with less biomass due to seed head suppression but produce nearly equal biomass by summer. In some instances herbage in pastures treated with Chaparral decreased by late summer indicating that animals have increased dry matter intake more than cattle grazing the unsuppressed pastures.



# BODY CONDITION SCORES



Thin Condition: Little fat cover making the spine, processes, and the spaces between the processes visible.



Borderline Condition: 12<sup>th</sup> and 13<sup>th</sup> ribs are noticeable to the eye. The transverse spinous processes and spaces between are easily felt but feel rounded rather than sharp.

**BCS**

- 1
- 2
- 3**
- 4
- 5
- 6
- 7
- 8
- 9

Approximate Days to Cycle  
After Calving

**90 days**

Expected Pregnancy Rates

**<50%**

**BCS**

- 1
- 2
- 3
- 4**
- 5
- 6
- 7
- 8
- 9

Approximate Days to Cycle  
After Calving

**70 days**

Expected Pregnancy Rates

**50-75%**

*(Images are for educational purposes only and do not represent body conditions or pregnancy rates of study herds.)*



Moderate Condition: 12<sup>th</sup> and 13<sup>th</sup> ribs are not visible unless animal has been shrunk. Transverse spinous processes and spaces between can only be felt with firm pressure. Areas on each side of the tail head are starting to fill and the outline of the spine is not visible.



High Moderate Condition: Ribs are fully covered and visually undetectable. Hips are plump and full and brisket has some fat.

**BCS**

- 1
- 2
- 3
- 4
- 5**
- 6
- 7
- 8
- 9

Approximate Days to Cycle  
After Calving

**60 days**

Expected Pregnancy Rates

**75-85%**

**BCS**

- 1
- 2
- 3
- 4
- 5
- 6**
- 7
- 8
- 9

Approximate Days to Cycle  
After Calving

**50 days**

Expected Pregnancy Rates

**>85%**

## References

- Aiken , G.E, B.M. Goff, W.W. Witt, I.A. Kagan, B.B. Sleugh, P.B. Burch and F.N. Schrick. 2012. Steer and Plant Responses to Chemical Suppression of Seed head Emergence in Toxic Endophyte-Infected Tall Fescue. *Crop Sci.* 52:960-969.
- Boyer, W.F., G.W. Webb, E.S. Flynn. 2014. Cow-calf response to seed head suppressed tall fescue pastures in Southern Missouri. Master Thesis.
- Goff, B.M., G.E. Aiken, W.W. Witt, P.B. Burch, E.S. Flynn. 2012a. Effects of seed head suppression of endophyte-free tall fescue in grass mixtures on steer performance and nutritive values. PhD Dissertation.
- Goff, B.M., G.E. Aiken, W.W. Witt, B.B. Sleugh, P. Burch., 2012b. Steer consumption and ergovaline recovery from in vitro digested residues of tall fescue seed heads. *Crop Science.* 52:1437-1440
- Turner, K.E., J.A. Paterson, J.S. Kerley, and J.R. Forwood. 1990a. Mefluidide treatment of tall fescue pastures: Intake and animal performance. *J. Anim. Sci.* 68:3399–3405.
- Turner, K.E., J.A. Paterson, J.S. Kerley, and J.R. Forwood. 1990b. Mefluidide treatment of tall fescue pastures: Forage quality. *J. Anim. Sci.* 68:3406–3411.
- Williamson, J., G.E. Aiken, M Barrett. 2014. Cattle and pasture responses to grazing management of seed head suppressed toxic endophyte-infected tall fescue in grass mixtures. Presentation. Dow AgroSciences Pasture Summit, Springfield Missouri.

---

[www.RangeandPasture.com](http://www.RangeandPasture.com)



**Dow AgroSciences**

*Solutions for the Growing World*



®Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

Chaparral and GrazonNext HL are not registered for sale or use in all states. Contact your state pesticide regulatory agency to determine if a product is registered for sale or use in your state. Always read and follow label directions.

R01-371-017 (02/15) DAS 010-58476