

INFLUENCE OF AMINOCYCLOPYRACHLOR PLUS METSULFURON ON SEED HEAD DEVELOPMENT AND FORAGE QUALITY IN TALL FESCUE. Trevor D.

Israel*, G. Neil Rhodes, Jr., Thomas C. Mueller, Gary E. Bates, John C. Waller; Department of Plant Sciences, University of Tennessee, Knoxville, TN 37996.

Tall fescue (*Lolium arundinaceum*) is the major grass species found in pastures in the mid-South. Most tall fescue is infected with a fungal endophyte, *Neotyphodium coenophialum*, which imparts certain advantages to the plant such as drought tolerance, insect feeding deterrence, and enhanced mineral uptake. However, the endophyte also produces ergot alkaloids that are harmful to livestock and contribute to fescue toxicosis. Common symptoms of fescue toxicosis include increased body temperature, rough hair coats, nervousness, and reduced average daily gain (ADG). Since the alkaloids are highly concentrated in seeds and stems, a potential way to reduce the likelihood of fescue toxicosis is by suppressing seed heads with herbicides. Metsulfuron is an acetolactate synthase (ALS) inhibitor and is well documented to limit seed head formation, but also injures tall fescue. Aminocyclopyrachlor, hereafter abbreviated MAT28, a new synthetic auxin herbicide, has been registered for use in non-cropland and right-of-way applications; registration in pastures is expected in 2014. The first MAT28 pasture herbicide product to be registered will be a premixture containing metsulfuron.



Research was conducted in 2012 and 2013 using metsulfuron applied alone and in combination with other herbicides to determine the growth response of tall fescue, effects on forage quality, and potential to reduce the impact of fescue toxicosis by reducing ergot alkaloid concentration. Trials were conducted on endophyte-infected tall fescue pastures in Alcoa and Crossville, Tennessee. Experimental design was a randomized complete block with four replications and all herbicide treatments included non-ionic surfactant at 0.25%.

In addition to the anticipated use rates of MAT28 plus metsulfuron, other treatments were metsulfuron alone, aminopyralid plus metsulfuron, and MAT28 plus 2,4-D. Clipping at early boot stage was also included to compare effects of herbicide applications versus mechanical removal. Visual ratings were performed monthly to evaluate fescue discoloration and stunting on a 0-99% scale. Plots were harvested in late spring and summer to determine yield, seed head density, and stem/leaf ratio. Forage quality measurements were determined using NIRS. Alkaloid concentrations were determined by ELISA.

Tall Fescue Response, combined over year and location

Treatment	Rate (g ai/ha)	Seed heads per m ²	Stem/Leaf ratio	Spr. Yield (kg DM/ha)	Sum. Yield (kg DM/ha)
MAT28 + met.	47 + 7	149	0.82	2523	1867
MAT28 + met.	78 + 12	143	0.88	2008	1803
metsulfuron	7	201	1.40	2669	2026
metsulfuron	12	158	0.91	2249	1929
aminopyralid + met.	65 + 12	150	1.00	2178	2001
MAT28 + 2,4-D	78 + 591	391	1.75	4272	1927
Clip	--	175	0.86	3781	1834
Untreated	--	300	1.42	4135	1649
LSD		78	0.46	588	--

MAT28 plus metsulfuron (78 + 12 g ai/ha), metsulfuron alone (12 g ai/ha), and aminopyralid plus metsulfuron (65 + 12 g ai/ha) stunted tall fescue more than 50% at four weeks after treatment in 2012. Tall fescue was stunted more than 45% by those same treatments in 2013. Clipping or metsulfuron applied alone or in combination with MAT28 or aminopyralid reduced seed head density by 33% or more compared to the untreated control. Clipping, MAT28 plus

metsulfuron (78 + 12 g ai/ha) and metsulfuron alone (12 g ai/ha) reduced stem/leaf ratio in tall fescue at first harvest. Combined over years, yields from the spring harvest ranged from 49 to 65% of untreated for all treatments containing metsulfuron. No differences in yield were observed in the summer harvest. In 2012, forage quality was improved in treatments containing metsulfuron applied alone or in combination with MAT28 or aminopyralid, as shown by increased crude protein and total digestible nutrients (TDN) and decreased acid detergent fiber (ADF). Similar improvements in forage quality were observed in the 2013 spring harvest, but no differences were observed in the summer harvest.

Metsulfuron applied alone or in combination with MAT28 or aminopyralid reduced total ergot alkaloid concentration 30 to 51% from untreated forage in the 2012 spring harvest.

When applied alone or in combination with MAT28 or aminopyralid, metsulfuron reduced seed heads and

improved forage quality in tall fescue, but also caused injury and reduced spring yield. Also, metsulfuron applied alone or in combination with MAT28 or aminopyralid reduced total ergot alkaloid concentration and therefore can potentially reduce the severity of fescue toxicosis. Follow-up ratings and measurements will be performed in spring 2014. Additional research includes determining effects of application timing on tall fescue growth and yield.

Alkaloid Concentration (ppb) Spring 2012

