

Persistence of tall fescue and cattle grazing preference as affected by endophyte status

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Introduction Endophyte-infected (E+) grasses often exhibit increased survival, growth and resistance to herbivory compared to uninfected counterparts. Latch (1997) proposed a strategy for cultivar improvement of infecting elite cultivars with strains of *Neotyphodium coenophialum* that are non-toxic to livestock, but still able to convey the persistence advantage shown with wild-type, toxic endophyte. The strategy of re-infecting tall fescue (*Lolium arundinaceum* (Schreb.) Darbysh.) cultivars with naturally occurring, non-ergot-producing endophytes appears promising for removing animal toxicity symptoms and retaining agronomic performance (Bouton *et al.*, 2002; Hill *et al.*, 2002). The objective of this study was to compare the effect of endophyte status on grazing preference and persistence of tall fescue stand.

Materials and methods Tall fescue with three levels of endophyte [E-, toxic E+, and non-toxic E+ MAXQ[®] (NE+)] was no-till planted with a Tye[®] drill on 27 October 1999. Plots 6x20 m replicated 4 times within a 0.5 ha pasture on a Marietta soil (fine-loamy, siliceous, thermic Fluvaquentic Eutrochrepts) containing bermudagrass (*Cynodon dactylon*). Fertiliser was applied to supply 50 kg N/ha in the fall and spring of each year with lime, P and K applied according to soil test. Steers and/or cows (*Bos taurus*) were stocked continuously at 3000 kg live weight/ha from January through June each year and limit grazed during the summer, autumn, and early winter. Animals were observed for 1 h periods several times and their location within the plots was recorded every 2 minutes. Tall fescue stand coverage was determined visually from 2000 to 2003.

Results All groups of animals preferred to graze E- tall fescue (Table 1). Preference for novel E+ tall fescue was generally intermediate between toxic E+ and E- tall fescue with the exception of the three cows introduced to the plots in May 2002. These animals avoided both toxic E+ and novel E+ tall fescue. There was little preference for any endophyte status during January 2002, perhaps because of lower ergot alkaloid levels. Alkaloid levels were not measured in this study, but other workers have reported lower levels in mid-winter compared with spring or early summer in tall fescue (Belesky *et al.*, 1987). Stand of E- tall fescue declined to 25% while stand of E+ and NE+ tall fescue remained greater than 75% and were similar to each other.

Table 1 Grazing preference of steers or cows for tall fescue as affected by endophyte status 2000 to 2002 and stand persistence of tall fescue 2000 2003

Endophyte Status	2000		2001		2002			2000	2001	2002	2003
	April	March	April	January	April	May	April	March	April	May	
	----- Grazing Time min/animal/hr -----						-----% Stand Persistence -----				
E-	2.1	1.7	1.3	0.8	2.0	1.4	78	59	75	25	
Toxic E+	0.5	1.0	1.0	0.7	0.5	0.6	90	70	87	85	
Novel E+	1.0	1.2	1.2	0.9	1.6	0.4	88	71	85	78	
LSD P<0.05	1.4	0.6	0.6	0.2	0.7	0.2	13	20	11	19	

Conclusions Stand persistence of novel non-toxic endophyte-infected tall fescue was similar to toxic E+ tall fescue. Cattle preferred to graze E- tall fescue plots indicating that they could detect and avoid grazing tall fescue that was toxic E+ infected while their preference for NE+ tall fescue was generally intermediate.

References

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