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The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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## Changes in herbage quality of cocksfoot , prairie grass and tall fescue during regrowth

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**Key words** : herbage quality , regrowth

**Introduction** There has recently been increased interest in alternative perennial grass species such as cocksfoot (*Dactylis glomerata* L .) , prairie grass (*Bromus willdenowii* Kunth .) and tall fescue (*Festuca arundinacea* Schreb .) , with research focusing on the management requirements and potential role of these species within intensive grazing systems . The aim of this desktop study was to review and compare the changes in herbage quality of cocksfoot , prairie grass and tall fescue during regrowth .

**Materials and methods** Herbage quality data for cocksfoot [cv . Porto ; Rawnsley *et al.* (2002)] , prairie grass [cv . Matua ; Turner *et al.* (2006)] and tall fescue [cv . Advance ; Donaghy *et al.* (2007)] were utilised from three glasshouse studies conducted at the University of Tasmania , between 1999 and 2004 . In each glasshouse study , treatments consisted of one preliminary harvest followed by five sequential harvests when each new leaf had regrown , up to the 5-leaf stage (5 live leaves per tiller) . Leaf tissue was collected at each harvest event and analysed for acid detergent fibre (ADF) , neutral detergent fibre (NDF) , crude protein (CP) and digestible dry matter (DDM) . Metabolisable energy (ME) was subsequently calculated using the equation :  $ME = (0.17 \times DDM) - 2$  . Based on visual assessment of mean data for trends , linear and quadratic contrasts of quality parameters on leaf stage were undertaken for individual replicates . The slope (m) and intercept (c) of the linear contrast for each replicate were extracted and analysed using the statistical procedures of Genstat (Version 9 .1 , Lawes Agricultural Trust , distributed by VSN) , with replicate as the random effect and forage species as the fixed effect .

**Results and discussion** The mean data showed that the herbage quality of all three species follow expected trends , with leaf CP and ME decreasing ( $P < 0.001$ ) and NDF and ADF increasing ( $P < 0.001$ ) with regrowth . There was a significant ( $P < 0.01$ ) difference between species for rate of change of all herbage quality parameters , with tall fescue exhibiting the most rapid rate of decreasing CP and ME and increasing NDF and ADF with regrowth . For example , while the ME of cocksfoot and prairie grass decreased at a rate of 0 .048 and 0 .099 MJ/kg DM respectively with each additional leaf stage , the ME of tall fescue decreased at a rate of 0 .498 MJ/kg DM . Cocksfoot and prairie grass displayed similar rates of change in CP , ME and NDF with regrowth , while the ADF of cocksfoot increased at a faster ( $P < 0.05$ ) rate than for prairie grass .

**Table 1** Mean slope (m) and intercept (c) of the linear contrast of the quality parameters CP , ME , NDF and ADF on leaf stage , with associated F values and least significant differences (LSD) .

	CP		ME		NDF		ADF	
	m	c	m	c	m	c	m	c
Cocksfoot	-2 .12	34 .91	-0 .048	11 .54	0 .62	54 .39	1 .77	22 .29
Prairie grass	-2 .60	36 .75	-0 .099	12 .17	0 .92	53 .51	1 .38	20 .39
Tall fescue	-4 .59	27 .76	-0 .498	11 .87	2 .93	47 .76	3 .30	19 .13
F value	0 .002	< 0 .001	< 0 .001	< 0 .001	< 0 .001	< 0 .001	< 0 .001	< 0 .001
LSD ( $P=0.05$ )	1 .21	2 .66	0 .060	0 .18	0 .59	1 .87	0 .37	0 .98

**Conclusions** While a comparison of absolute herbage quality values across different species and studies must be carried out with care , the use of leaf stage as a developmental indicator and comparison of rates of change in this approach provides objective insight into the relative changes in herbage quality of the alternative perennial grass species cocksfoot , prairie grass and tall fescue .

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