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## Relationships between pasture management inputs and pasture consumption rates in non-irrigated dairy systems in south-eastern Australia

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**Key words** : dairy systems ,stocking rate ,perennial ryegrass ,tall fescue ,pasture consumption rate

**Introduction** Perennial ryegrass (*Lolium perenne* L.) ,the mainstay of non-irrigated dairy pasture-base in south-east Australia is relatively easy to be established and managed but generally does not produce well in winter and summer .Integrating other pasture species and forage crops into the ryegrass-base may improve the seasonality and annual forage production .This paper compares the seasonal patterns of pasture consumption from a well-managed perennial ryegrass-based dairy system ,with a complementary forage-based system comprising perennial ryegrass ,tall fescue (*Festuca arundinaceae* Schreb.) ,annual/Italian ryegrass (*Lolium multiflorum*) and a double cropping rotation .

**Materials & methods** Two 36-cow farmlets ,representing a ryegrass-only system ( ryegrass max RM) and a system combining pastures and crops ( complementary forages CF) were established at Terang in southwest Victoria (38°14'S ,142°54'E long-term mean annual rainfall 740 mm) in June 2005 . RM (16 ha) and CF (10.5 ha pasture and 2 ha crop) were stocked respectively at 2.25 and 2.9 Holstein Friesian dairy cows/ha .The pasture type compositions (based on age and species) of the two systems in 2006/07 are shown in Table 1 .Data from the 2006/07 lactation on pasture consumption rates for individual paddocks were used to analyse the effects of differences in system management and pasture types (principally stocking rate and N fertiliser use) on annual and seasonal patterns of pasture consumption from different pasture types .

**Results and discussion** The total amount of pasture consumed (kg DM/ha) from CF (7150) was significantly ( $P < 0.05$ ) greater than RM (6110) .There were no significant differences in the total pasture consumed between the three pasture types of the RM system or between the six pasture types of the CF system (Table 1) .Overall ,pasture consumption in CF was 1.3 t DM/ha greater than RM during winter but similar to RM in spring and summer .Consumption from ryegrass pastures >1 year old was higher in CF than RM .The apparent nitrogen fertilizer response efficiency (kg DM consumed / kg N applied) was 29 for CF and 15 for RM .

**Table 1** Total annual pasture consumption from different pasture types in two farmlets systems . Oversown = perennial ryegrass oversown with annual/Italian ryegrass .

	Pasture type						sed
	Perennial ryegrass			Over	Tall fescue		
Pasture age (years)	> 4	2	1	sown	7	1	
<b>Ryegrass max farmlet</b>							
Total area (ha)	11.42	3.16	1.86				
kg N/ha	159	134	82				
Total consumed (kg DM /ha)	6318	6468	5568				595.6 <sup>NS</sup>
<b>Complementary forage farmlet*</b>							
Total area (ha)	0.64	3.18	1.26	2.35	2.19	1.24	
kg N/ha	165	205	115	142	205	175	
Total consumed (kg DM/ha)	7767	8717	5757	6739	7842	6052	1372 <sup>NS</sup>

\* Estimated based on 10.5 ha of pasture area (excluding the 2 ha of cropping area)

**Conclusion** The results indicate that by managing grazing and nitrogen fertilizer in tune with seasonal conditions and integrating different pasture types ,total and seasonal pasture consumption rates can be improved to support higher stocking rates and per-hectare production .