

10.1071/CP12398

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Supplementary Material: *Crop & Pasture Science*, 2013, **64**(1), 71–85.

Table 1S. Site description

Character	Buntine			Newdegate		
Location	30° 00' 30" S 116° 20' 40" E			33° 06' 16" S 118° 49' 50" E		
Elevation (m)	317			333		
Soil classification (Northcote 1979) ^B	Sandy yellow earth (Ms9, Gn2.21)			Loamy sand over clay (Va66, Dy3.43)		
Long term (LT) average annual rainfall (mm) ^A	356			350		
Rainfall received Oct 2008 to Sept 2009 (mm)	363			379		
Rainfall received Oct 2009 to Sept 2010 (mm)	325			235		
Dry season rainfall (mm)	08/09	09/10	LT	08/09	09/10	LT
Summer	34	43	43	80	5	55
Autumn	80	93	91	24	120	91

^A Long-term data from 1889 to 2008.

^BNorthcote KH (1979) 'A factual key for the recognition of Australian soils.' (Rellim Technical Publications: Coffs Harbour, NSW)

Table 2S. Physical and chemical characteristics of the top 10-cm of soil at the two sites in February 2010 (n=10).

Site	NO ₃ -N (mg/kg)	NH ₄ -N (mg/kg)	Colwell P (mg/kg)	Colwell K (mg/kg)	Available S (mg/kg)	Organic-C (%)	Al (CaCl ₂) (mg/kg)	Fe (DTPA) (mg/kg)	EC (dS/m)	pH (CaCl ₂)
Buntine	7.2	1.9	27	60	7.8	0.60	2.4	63	0.053	5.5
Newdegate	11.1	3.4	19	32	3.8	0.95	2.7	38	0.035	4.8
THSD $\alpha=0.05$ ^A	1.7	0.3	4	3	2.0	0.06	1.5	13	0.006	0.15

^A THSD-Tukey's Honest Significant Difference

Table 3S. Significance of different sources of variability for plant survival in the density experiment. Source of variability are explanatory variables with their significant interactions. Last sampling time was Sept 2010.

Source of variability	Analysis across time, site and species	Analysis at last sampling time for tederá		Analysis at last sampling time for <i>Cullen</i>	
		Buntine	Newdegate	Buntine	Newdegate
Time	**				
Site	*				
Block	***	*	**	*	***
Species ^A	***	ns	ns	***	***
Density	***	ns	*	ns	***
Density × Species ^A	***	ns	*	ns	***
Cuts	*	ns	ns	ns	na
Cuts × Species ^A	***	ns	ns	*	na
Cuts × Density	***	ns	ns	ns	na
Time × Species	***				
Time × Density	**				

^A During the comparison at last time event, explanatory variable ‘Species’ should be considered as ‘Accessions’ of a species.

na, not applicable; ns, no significant difference; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 4S. Significance of different sources of variability for peak emergence and survival for the seed-sown row experiments. All explanatory variables, and their significant interactions at species and accession levels, are given for *Bituminaria bituminosa* var. *albomarginata* (tedera), *Cullen* spp. and *Medicago sativa*.

Source of variability	Species level		Accession level					
	Emergence	Survival	Emergence			Survival		
			Tedera	<i>Cullen</i>	<i>M. sativa</i>	Tedera	<i>Cullen</i>	<i>M. sativa</i>
Time		**				**	*	**
Site	n.s.	*	*	***	***	*	**	**
Block	***	**	*	***	***	*	*	
Species	***	***						
Species × Site	***	***						
Species × Time		***				*	*	*
Accession			***	***	***	ns	**	***
Accession × Site			ns	ns	***	ns	*	*

ns, no significant difference; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 5S. Significance of different sources of variability for measures of total shoot dry weight (DW), summer shoot DW production, DW of volunteer annual pasture and, in the first year only, the proportion of total shoot DW that was edible (*i.e.* leaves plus edible stems). Source of variability are indicated for all main effects and significant interactions.

Source of variability	Total shoot DW	Summer shoot DW increase	Volunteer annual pasture shoot DW	Proportion of shoot DW that was edible			
				1 st cut Nov 2008	2 nd cut Jan 2009	3 rd cut May 2009	4 th cut Aug 2009
Cutting date (time)	***	***	na	na	na	na	na
Site	***	***	na	ns	ns	ns	*
Block	**	*	ns	ns	ns	ns	ns
Cuts	***	**	na	ns	ns	ns	**
Density	***	***	***	ns	ns	ns	ns
Accession	***	***	*	**	**	**	***
Time × Accession	***	**	na	na	na	na	na
Site × Accession	***	**	na	ns	ns	ns	*
Cuts × Density	*	na	na	ns	ns	ns	ns
Cuts × Accession	**	na	na	ns	ns	ns	*
Density × Accession	*	na	na	ns	ns	ns	ns
Cuts × Density × Accession	*	**	ns	ns	ns	ns	ns
R^2	83	69	30	58	56	73	67

Note: R^2 is for the model with all possible interactions, excluding interactions between block and other factors.

na, not applicable; ns, no significant difference; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 6S. The highest-order significant interactions for shoot dry weight (DW) at each cutting date (time) and site.

Time	Site	
	Buntine	Newdegate
Cut 1	$S \times D \times B *$	$S \times D *$
Cut 2	$S \times D \times C *$	$S \times D \times C \times B *$
Cut 3	$S \times D \times C \times B *$	$S \times D \times C *$
Cut 4	$S \times D \times C \times B **$	$S \times D \times C \times B **$
Cut 5	$S \times D \times B *$	$S \times D \times B *$
Cut 6	$S \times D \times C \times B *$	$S \times D \times C \times B *$
Cut 7	$S \times D \times C *$	$S \times D \times C \times B *$
Cut 8	$S \times D \times C *$	$S \times D \times C **$

Note: S, D, C and B are Species, Density, Cutting frequency (cuts) and Block, respectively.

* $P < 0.05$; ** $P < 0.01$; na, not applicable.

FIG. 1S

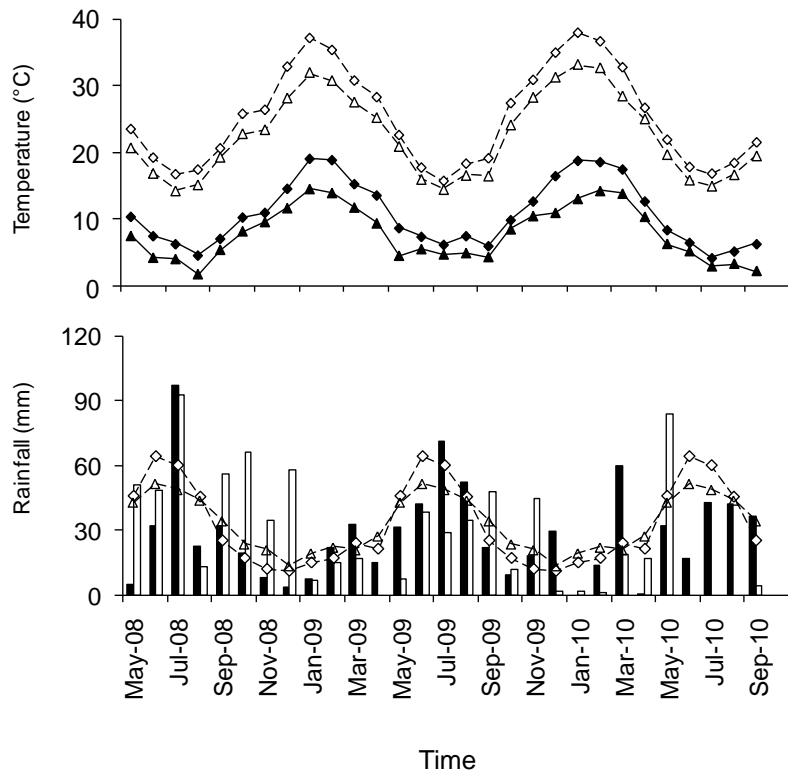


FIG. 2S

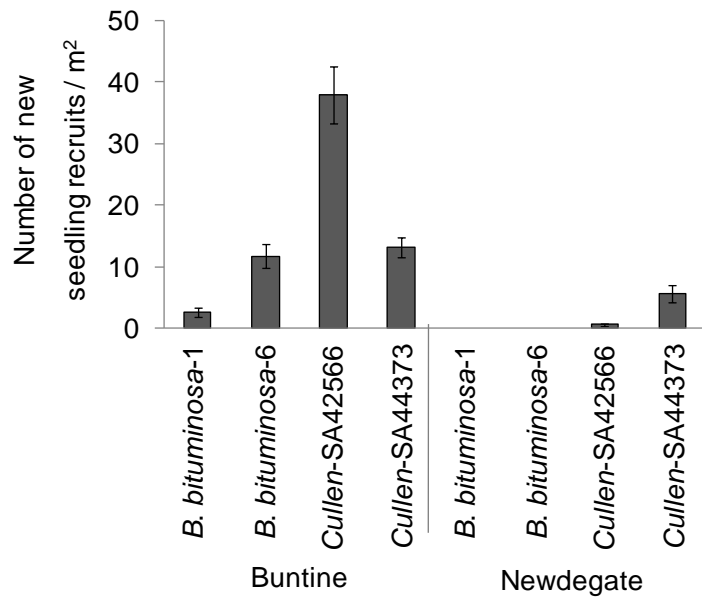


FIG. 3S

