

## Persistence and yield of ten lucerne cultivars under dryland and heavy continuous grazing in the Western Cape Province of South Africa

J.M. van Heerden

ARC Range & Forage Institute, PO Box 3320, Matieland, 7602, South Africa, Email: jmvh@sun.ac.za

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**Introduction** Pastures in the Rûens region of the Western Cape are mainly legume based with lucerne being the most important and productive legume used (van Heerden & Tainton, 1987). Most pastures are sown to the land race cultivar SA Standard (SAS). Grazing resistance of SAS is high, but relative to other imported cultivars resistance to endemic insect and other pests is poor. This study therefore involves the evaluation for yield and persistence of nine new cultivars compared to SAS under local grazing conditions.

**Methods** The cultivars WL320 (320), WL414 (414), PAN4546 (546), PAN4764 (764), Meteor (MET), Alfagraze (ALF), Aurora (AUR), Genesis (GEN) and Aquarius (AQU) were compared with SAS under dryland conditions and heavy (10 sheep/ha) continuous grazing with Merino sheep in the Caledon district with an average winter rainfall of 470 mm, for three seasons (2001/02 to 2003/04). The cultivars varied in winter activity (see Table 1). The soil of the trial site was fertilised with P and lime and well cultivated. Individual plots were 5m x 50m and the respective cultivars were randomly allocated to plots in three blocks and sown in rows at 20 kg/ha during May 2001. All seed was inoculated with standard commercial Rhizobium. Grazing started during October 2001. An index of lucerne plant cover (number of grids with lucerne plant material in a 60 grid 0.25 sq m quadrat) was derived for each cultivar during September 2002 and August 2004 and expressed relative to SAS. Yield was determined, using round 0.70 sq m enclosure cages constructed of wire mesh, taking 0.17 sq m samples six-weekly in- and outside each cage and moving the cages to new positions in the plots after sampling. Cut samples were washed, dried and weighed. The data was analysed over three seasons, using analysis of variance.

**Results** Plant cover and average annual yield of the respective cultivars, are shown in Table 1. The relative cover of the cultivars varied ( $p < 0.05$ ) between sampling dates. Cultivar PAN4546 had the highest ( $p < 0.05$ ) cover in September 2002, but did not differ from WL320, Alfagraze and WL414 in August 2004. Plant cover for SAS and Genesis was lower ( $p < 0.05$ ) than WL320, Alfagraze, PAN4546, WL414, Meteor and Aurora in September 2002 and than WL320, Alfagraze and PAN4546 in August 2004. The cover of WL320, Alfagraze, Meteor, Aquarius and Genesis relative to SAS did not decline ( $p < 0.05$ ) between sampling dates. The relative yield of the cultivars did not vary ( $p < 0.05$ ) between seasons. Yield for SAS was lower ( $p < 0.05$ ) than WL320, WL414 and PAN4546.

**Table 1** Index of plant cover and average annual yield of 10 grazed lucerne cultivars

Date	Cultivar (winter activity)									
	546 (5)	320 (5)	ALF (2)	414 (7)	MET (2)	AUR (7)	AQU (8)	764 (7)	SAS (6)	GEN (7)
	Cover (relative to SAS)									
2002	1.65 a*	1.58 b	1.54 bc	1.37 cde	1.28 defg	1.22 defg	1.18 efgh	1.14 gh	1.00 hi	0.86 ij
2004	1.35 cdef	1.40 bcd	1.38 cd	1.16 fgh	1.10 gh	1.04 hi	1.12 gh	0.60 kl	1.00 hi	0.87 ij
	Average yield (kg DM/ha)									
	3047ab	3258 a	2695 abc	3103ab	2792 abc	2588 bc	2677 bc	2561 bc	2235 c	2251 c

\* Data followed by the same letters do not differ significantly ( $p < 0.05$ )

**Conclusions** With the possible exception of PAN4764, all the cultivars evaluated in the trial are better than or at least equal to SAS in suitability for use in pastures in the area where the trial was conducted. The three highest yielding and most persistent cultivars were also the least winter active types. These cultivars therefore are recommended for use within the area.

### References

van Heerden, J.M., & N.M. Tainton (1987). Potential of medic and lucerne pastures in the Rûens area of the Southern Cape. *Journal of the Grassland Society of Southern Africa*, 4, 95-99.