

# The effect of cutting regime and cultivar on longevity of pure lucerne stands in Latvia

Z. Gaile

Research and Study farm "Vecauce" of Latvia University of Agriculture, Akademijas street 11.a, Auce, Latvia, LV-3708 Email: zinta@apollo.lv

**Keywords:** *Medicago sativa*, American cultivars, yield, longevity

**Introduction** Lucerne growing is important for high and excellent quality yields of hay or silage without application of N fertilisers, as well as for increasing crop diversity in crop rotation systems. It is comparatively expensive to establish lucerne stands in Latvia. Different aspects can affect longevity of lucerne stands: suitability of cultivar to specific conditions, soil characteristics, different stress conditions and cutting management, including frequency and height of cutting, and critical rest period in autumn (Sheaffer *et al.*, 1988). The aim of our study was to evaluate the persistence of lucerne stands without renovation while obtaining reasonable yields.

**Materials and methods** A series of five field trials was carried out at the research and study farm "Vecauce" of Latvia University of Agriculture (56° 28' N, 22° 53' E). Four trials were performed using a three-cut regime in the harvest years following an establishment year – 1993-2001 (8 varieties), 1994-2001 (the same 8 varieties), 1995-2001 (8 other varieties), 1996-2001 (24 varieties). The fifth trial, 1999-2004, used 10 varieties and three different cutting regimes – traditional three-cut schedule as for previous series, three-cut schedule by calendar date (May 25, July 10, August 20), four-cut schedule (three-cut schedule by calendar plus a 4<sup>th</sup> cut on October 10). The traditional three-cut schedule is based on known stand persistence: 1<sup>st</sup> cut in bud stage or in the 1<sup>st</sup> ten day period of June, 2<sup>nd</sup> cut in 10-25% full bloom, 3<sup>rd</sup> cut in early October. In every trial two or more regional (Latvian, Lithuanian, Estonian) cultivars were included together with others from North America. Stand longevity was measured by yield in specific years against yield of the first full harvest year. Stand density was evaluated visually in percentage from that in the autumn of the establishment year.

**Results** In each trial yields differed significantly with well performing local regional cultivars. North American cultivars also showed highly productive persistency. The trials have shown which specific cultivars can be recommended for Latvian conditions (Table 1). The benefit of the local traditional three-cut regime with respect to production persistency was confirmed. However, some modern cultivars can be persistent and high yielding under a four-cut regime (trial 5) and other work (Gaile & Kopmanis, 2004) showed that forage quality was then improved. In agreement with other trials (e.g. Sheaffer *et al.*, 1988) high yields were obtained over a range of stand densities. In trial 5 a significant decrease of 25% on average was observed in 2004, mainly explained by sharp varying conditions in winter/spring 2003/2004 and the spread of diseases; cultivar differences were also substantial ( $p < 0.01$ ).

**Table 1** Yields from the five trials (kg DM per single-row plot for 1<sup>st</sup> and 2<sup>nd</sup> trial; t DM/ha 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> trial)

Trial No	Duration (years)	1 <sup>st</sup> full harvest year		Last harvest year		Stand density <sup>1</sup> , %
		Average	Range	Average	Range	
1	8	2.33	1.65 – 2.65	2.29	0.63 – 3.11	-
2	7	3.03	2.70 – 3.65	2.63	0.90 – 3.48	-
3	6	18.89	14.66 – 21.89	15.20	6.78 – 18.78	61.3
4	5	22.90	16.87 – 28.68	15.41	10.14 – 21.15	53.5
5	5	18.38	14.63 – 20.73	13.93	10.20 – 16.71	53.6

<sup>1</sup>Average stand density in last year relative to establishment year = 100 %

**Conclusions** The results of these studies identified lucerne cultivars most suitable for Latvian conditions. The traditional three-cut regime proved advantageous to long term stand production and persistence but a four-cut regime could improve forage quality in some cultivars. High yields were obtained in spite of variable stand densities.

## References

- Gaile Z. & J. Kopmanis (2004) Harvest management effect on productivity and forage quality of ten lucerne varieties. *Grassland Science in Europe*, 9, 924-926.
- Sheaffer C.C., G.D. Lacefield & V.L. Marble (1988) Cutting Schedules and Stands. In: A.A. Hanson (ed) *Alfalfa and Alfalfa Improvement*. ASA, CSSA, SSSA, Madison, Wisconsin, USA, 411-437.