

MANAGEMENT OF RED CLOVER CONTENT OF ORGANIC GRASSLAND

Nykänen, A.⁽¹⁾, Leinonen, P.⁽²⁾ & Nykänen-Kurki, P.⁽³⁾

⁽¹⁾ MTT Agrifood Research Finland, 51900 Juva, Finland, e-mail: arja.nykanen[a]mtt.fi

⁽²⁾ Elomestari Ltd, 51900 Juva, Finland, e-mail: petri.leinonen[a]elomestari.fi

⁽³⁾ MTT Agrifood Research Finland, 50100 Mikkeli, Finland, e-mail: paivi.nykanen-kurki@mtt.fi

Abstract

The clover content is an important factor in organic grassland management to optimise yield, feeding value and pre-crop effect of the ley. The variation of red clover (*Trifolium pratense*) content in swards of different ages is often rather high in Finland. In the ongoing field experiment (1999-2002) staggered sowing of red clover seed was tested to regulate the clover content of the mixed sward. Sowing strategy did not have clear effect on the clover content or the yield of the sward. However the seeding rate affected the clover density of the field (plants m⁻²) in the first year. After two years the differences were equated. At the moment it seems that the best strategy to control the clover amount in the mixed swards is to sow 2 or 3 kg ha⁻¹ (100 or 150 seeds m⁻²) clover seeds in establishment and then oversow on a first or second ley year 1 or 2 kg ha⁻¹ (50 or 100 seeds m⁻²).

Key words: staggered sowing, oversowing, yield of mixed sward, *Trifolium pratense*

Introduction

Nitrogen fixation of legumes is one ‘corner stone’ of successful organic farming. In Finland the most common legume in mixed swards is red clover (*Trifolium pratense*). The clover content is an important factor in organic grassland management to optimise yield, feeding value and pre-crop effect of the ley. The variation of red clover content in swards of different ages is often rather high (Nykänen et al 2000). It is usual in Finland that the clover content of sward is too high in the first year and too low in the third year of a sward. This causes problems when estimating the feeding value for the cattle. Also the yields of swards diminish with the low clover content, which has an influence on the economy of the farm and on the preceding crop effect of next plant. The clover content of later years of sward may be improved by oversowing of clover seed on existing swards. Oversowing of sward is also more economical than resowing of the sward (van Eekeren 2002).

Materials and methods

In the ongoing field experiment (1999-2002) in Juva (60°53'N 27°53'E) it is studied a method of staggered sowing. The sowing of clover seed is distributed over the years: only 1/3 or 2/3 of clover seeds are sown at establishment of the sward and the rest is oversown during later years. Seeding strategy is shown in Table 1.

Table 1. Seed amounts of red clover (seeds m⁻² or kg ha⁻¹) in different seeding strategies in field experiment.

Strategy	Establishment	1 st year of sward	2 nd year of sward
000	0	0	0
111	50 seeds m ⁻² , (1 kg ha ⁻¹)	50 seeds m ⁻² , (1 kg ha ⁻¹)	50 seeds m ⁻² , (1 kg ha ⁻¹)
201	100 seeds m ⁻² , (2 kg ha ⁻¹)	0	50 seeds m ⁻² , (1 kg ha ⁻¹)
222	100 seeds m ⁻² , (2 kg ha ⁻¹)	100 seeds m ⁻² , (2 kg ha ⁻¹)	100 seeds m ⁻² , (2 kg ha ⁻¹)
300	150 seeds m ⁻² , (3 kg ha ⁻¹)	0	0
402	200 seeds m ⁻² , (4 kg ha ⁻¹)	0	100 seeds m ⁻² , (2 kg ha ⁻¹)
600	300 seeds m ⁻² , (6 kg ha ⁻¹)	0	0

The red clover was sown in seed mixture with timothy (*Phleum pratense*, 10 kg ha⁻¹) and meadow fescue (*Festuca pratensis*, 6 kg ha⁻¹). Half of the clover seeds were pre-inoculated with

Rhizobium and lime-pelleted. The results of non-inoculated and non-lime-pelleted seeds are shown here. The soil type of the field is fine sand moraine according to the Finnish soil classification. The soil contains 3-6% organic matter and $\text{pH}_{(\text{CaCl}_2)}$ is 6.3-6.8. The clover plants of the plots were calculated three times during growing season. The dry matter yield and clover content of the yields was determined.

Results and discussion

The seeding rate affected the clover density of the field (plants m^{-2}) in the first year. Sowing of 4 kg ha^{-1} or 6 kg ha^{-1} at establishment resulted too high clover density (60-80 clover plants m^{-2}). However, after two years the differences were equated on an appropriate level (30-40 clovers m^{-2}). (Figure 1).

The oversowing on the first or second ley year did not have clear effect on the amount of red clover plants of the sward. The ongoing year is, however, decisive for the conclusions of the usefulness of this staggered sowing method.

The seeding rate or sowing strategy did not have clear effect on the yields of the sward. However, adding of 1 kg ha^{-1} clover to seed mixture clearly increased the dry matter yield of the sward (1 000-1 800 $\text{kg ha}^{-1} \text{ cut}^{-1}$, dry matter (=dm)). Also using of clover seed 2 kg ha^{-1} or more in seed mixture increased the yield 300-1000 $\text{kg ha}^{-1} \text{ cut}^{-1}$ (dm). (Figure 2). The effect of staggered sowing could be higher on a more acid, colder or wetter (high water table) fields.

Conclusions

At the moment it seems that the best strategy to control the clover amount in the mixed swards is to sow 2 or 3 kg ha^{-1} (100 or 150 seeds m^{-2}) clover seeds in establishment and then oversow on a first or second ley year 1 or 2 kg ha^{-1} (50 or 100 seeds m^{-2}). For the final conclusions we must wait for the results of this growing season.

References

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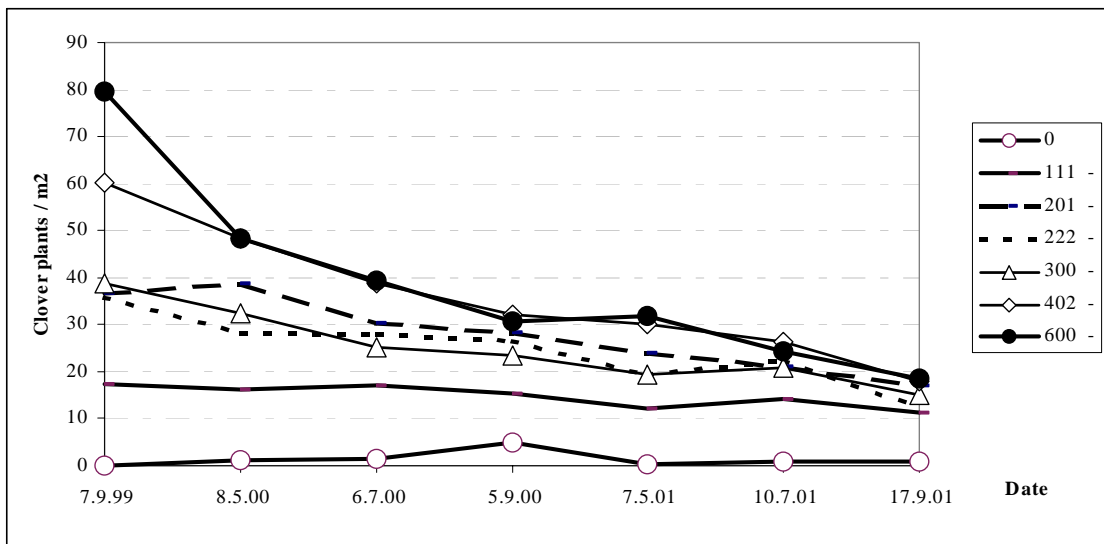


Figure 1. Red clover density (plants m^{-2}) with different staggered sowing strategies. (Numbers of selite??? refer to Table 1, not pre-inoculated and lime-pelleted clover seed).

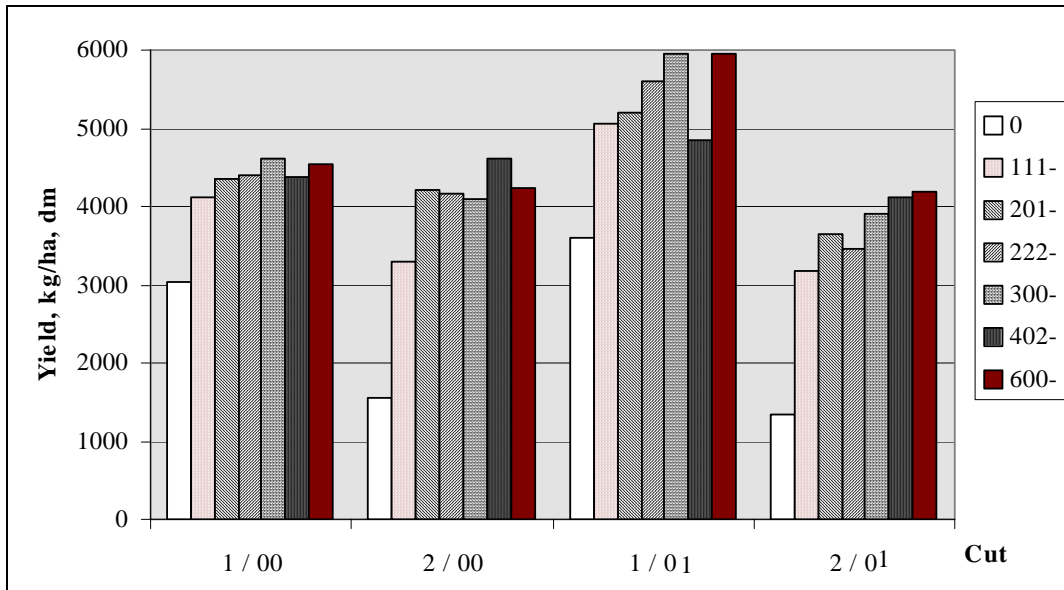


Figure 2. Yields of the mixed swards (kg ha^{-1} , dry matter (dm)) with different staggered sowing strategies. (numbers of selite??? refer to Table 1, not pre-inoculated and lime-pelleted clover seed).