Effect of maturity type of *Lolium perenne* cultivars on performance of grass-clover mixtures under frequent cutting

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**Introduction**

Perennial ryegrass (*Lolium perenne* L. (Lp)) is the main companion grass in grass-white clover mixtures in permanent pastures of north Germany. In grass-clover mixtures the differences in phenological development of Lp-varieties can influence the competition between grass and clover. The main aim in this investigation is to quantify the influence of maturity type (early, late, mixture) of Lp-cultivars in grass-white clover mixtures on productivity, forage quality parameters and white clover (*Trifolium repens* L.) compatibility.

**Material and methods**

**Experimental treatments:**
- Lp-maturity type:  
  - early (cv. 'Gremie', 2n; cv. 'Bastion', 4n; each 50 %)  
  - late (cv. 'Vigor', 2n; cv. 'Condesa', 4n; each 50 %)  
  - early/late mixture (all cultivars, each 25 %)
- N-Fertilisation:  
  - 0, 50, 100, 150, 200 kg N ha\(^{-1}\) year\(^{-1}\)

The amount of N fertilizer was applied with emphasis on the first part of the vegetation period (50 kg: only to the first cut; 100 kg: 50 kg to each first and second cut; 150 kg: 50 kg to each first, second and third cut; 200 kg: 50 kg to all four cuts).

**Field trial:** Split plot design with 4 replicates, 1993 – 1995

**Location:** Ostenfeld, loamy sand site near Kiel, in Schleswig-Holstein, northern Germany

**Analysed parameters:** Dry matter (DM)-yield, Net energy (NE\(_L\))-yield, NE\(_L\)-content, N-yield, crude protein (CP) content

**Cutting system:** 4 cuts per year

The harvesting dates were adapted to practical conditions to maximize productivity of the swards. First cut with ear emergence of the Lp-varieties, following cuts at a DM stage considered optimum for grazing (1.5 to 2 Mg ha\(^{-1}\)).

**Results and discussion**

Compared with the grass-clover mixture with late Lp-varieties, the mixture with early Lp-varieties:
- had on average over three years and five N-levels the highest cutting frequency (4.4 to 3.7 cuts y\(^{-1}\)),
- produced a higher clover content (Figure 1),
- had on average over all N-levels a significantly higher annual DM-yield (+ 3.5 %), NE\(_L\)-yield (+ 5.9 %) and N-yield (+ 13 %) (Table 1),
- had the highest quality in terms of mean annual NE\(_L\)- and CP-content (Table 1).

The effects was especially pronounced at low N-input (Figure 2).

In the mixture with the early Lp-varieties the nitrogen fertilisation level had no statistical influence on the yield, whereas with low nitrogen the yield of the late mixtures decreased significantly.

**Conclusions**

The results reflected the clearly superior performance of grass-white clover mixtures with early maturity types of *Lolium perenne*. These mixtures should be considered in grassland production systems with low nitrogen input.