

# CATTLE PRODUCTION AND BOTANICAL COMPOSITION IN CONTINUOUSLY STOCKED GRASS-CLOVER SWARDS

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## ABSTRACT

The performance of grass-clover mixtures was evaluated under cattle grazing, and the relations between grass variety, clover content and animal production were studied during four years at three locations. The prostrate diploid perennial ryegrass variety formed a dense sward with less clover and less weeds than the tetraploid or the erect diploid ryegrass varieties, which contained about the same amount of clover in the mixture. The ryegrass tiller density was lowest in the tetraploid. These differences between mixtures were not reflected in differences in animal performance or net energy production.

## KEYWORDS

grass-clover mixtures, animal production, cattle grazing, clover persistence

## INTRODUCTION

As the amount of N fertilizer applied to grassland is decreasing in The Netherlands, there is renewed interest in white clover with its nutritional benefits and its ability to fix N<sub>2</sub>. Clover content and persistence are affected by many factors such as N fertilizer, the level of N mineralization, pests and diseases, method of defoliation (cutting or grazing), interval between harvests, clover variety and companion grass. Diploid grasses form a dense sward with less clover in the mixture than tetraploids with their more open growth habit (Frame and Boyd, 1986). The effect of companion grass varieties with contrasting growth habits on the performance of grass-clover mixtures was evaluated under cattle grazing, and the relations between grass variety, clover content and animal production were studied.

## METHODS

Grazing trials were established in 1991 on two clay soils at Wageningen (HN and HW) and on a sandy soil at Achterberg (ACH), The Netherlands (Elgersma and Schlepers, 1994). Perennial ryegrass cultivars with a contrasting growth habit: Condesa (tetraploid), Barlet (diploid, erect) and Wendy (diploid, prostrate), were sown in mixture with the small-leaved white clover cultivar Gwenda. The experimental design was a randomized block with three replications on HN and HW and two on ACH. Plot size was approximately 3300 m<sup>2</sup>. The soil was fertilized with P and K, but no N was applied. The pastures were continuously stocked during the growing season with steers in 1991 - 1993, and with pregnant heifers during 1994 and 1995. Average sward height was maintained at 7-8 cm by adjusting the number of animals weekly. Rejected areas were cut at 8 cm height every month during the grazing season. Botanical composition and clover content were determined on a DM basis in April prior to the turnout of the animals and in October from 20 round 0.25 dm<sup>2</sup> cores per plot. The animals were weighed every month.

## RESULTS AND DISCUSSION

Because the amount of stolons fluctuates less than clover leaves, stolon abundance was used to estimate clover content. There were clear effects of grass variety on clover content, which was consistently lowest in mixtures with Wendy (Fig. 1). In contrast to the statement made by Frame and Boyd (1986), the erect diploid Barlet allowed

slightly more clover than the tetraploid Condesa. Wendy had the highest tiller density and Condesa the lowest. Despite the lower ryegrass tiller density of Condesa compared with Barlet, Condesa did not contain more clover. Thus also factors other than ryegrass tiller density affect clover growth in mixed swards. Mixtures with Barlet and Condesa had about the same number of tillers of the weed grass *Poa annua*, which was significantly higher than that in mixtures with Wendy.

The clover content fluctuated throughout years. In all locations it reached a maximum, followed for unknown reasons by a sharp decline, and a recovery. Despite these fluctuations, under the continuous stocking management imposed, clover had persisted in all paddocks more than four years after sowing.

There were no significant differences in LWG or net energy production among the mixtures; mean values are presented in Table 1. The higher liveweight gain in 1994 was due to the use of pregnant heifers. Within each year there was no relation between clover content and net energy production. In 1992 the clover content and animal output were highest on sandy soil (ACH), but during 1993 and 1994 the clover content in ACH was lower than that on clay soil. In 1993 and 1994 clover content was highest in HW but animal growth and net production were highest in HN. Therefore, the differences between mixtures were not reflected in differences in animal performance or net energy production in this experiment.

## REFERENCES

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