

# DRY MATTER DEGRADABILITY OF RED CLOVER (*Trifolium pratense* L.) GROWN AT DIFFERENT ALTITUDES TESTED WITH RUMEN FISTULATED RAMS

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## ABSTRACT

Among ecological factors altitude can have significant influence on forage dry matter degradability. Red clover is a very important forage species in hilly-mountain regions. Its response in dry matter degradability to different altitudes has been little studied. In this experiment degradability of six red clover cultivars grown at two different altitudes (123 and 650 meters above the sea level) was studied by using rumen fistulated rams (in sacco technique). The clover samples for the degradability determination were taken from the first cut done at the beginning of flowering at each altitude. The experiment was organised as tree factorial CRD. Five out of six clover cultivars had better degradability when grown at the higher altitude. The difference was significant for two cultivars. The sixth cultivar had slightly better degradability when grown at the lower altitude.

## KEY WORDS

*Trifolium pratense*, cultivar, altitude, in sacco degradability, rumen fistulated rams

## INTRODUCTION

Hilly-mountain regions in Croatia are most suitable for animal husbandry and, production of forage is often the only plant production in such regions. Among ecological factors which influence the grass and legume growth and their feeding value altitude, plays an important role (Spatz, 1984; Hay and Heide, 1984). Hahn (according to Sostaric-Pisacic and Kovacevic) analysed in cooler and temperate climate the relation between altitude, yearly temperatures and vegetation period. With increasing altitude by 100 m average yearly temperatures decreased by 0.55°C and vegetation period shortened by 11.5 days. Habovstiak, (1977) found that with increasing the altitude by 100 m vegetation period decreased by 6 to 9 days. With increasing the altitude, growth potential of grasslands diminished, but feeding quality of forage was improved due to a decreased content of crude fibers, lignin and cellulose (Domes, 1936; Klapp, 1956; Papendick, 1956; Caputa, 1966). Degradability of forage dry matters is an important indicator of its nutritive value. Degradability of the forage organic matter depends very much on the lignin-cellulose complex content. The altitude influence on forage degradability has been little studied. Cizek (1978) found that with increasing altitude to 1200 meters the dry matter degradability of grass species *Dactylis glomerata* L., *Festuca pratensis* L. and *Phleum pratense* L. decreased and above 1200 meters started increasing. The purpose of this study was to find out the relation between the red clover degradability and different altitudes.

## MATERIALS AND METHODS

Six red clover cultivars (Croatia, Nada, Reichersberger, K-17, Marino, Viola) were grown at two nearby locations (Maksimir, Sljeme) which have different altitudes. At the location Maksimir the clover was grown at the altitude of 123 m and at Sljeme the altitude was 650 m above the sea level. For studying the degradability rumen fistulated rams were used and in sacco technique (Orskov and McDonald, 1979) was applied. The clover samples for determining the degradability were taken from the first cut done at the beginning of flowering. During the pre-experiment time the four rams used in the experiment were fed on mountain hay *ad lib*. The experiment was conducted and the obtained data were statistically analysed as a three factorial CRD.

## RESULTS AND DISCUSSION

The red clover degradability results obtained are shown on the graph 1. Five cultivars (Croatia, Nada, Reichersberger, K-17, Marino, Viola) out of six studied, had higher degradability when grown at the higher altitude. Significantly higher degradability was found for two cultivars (Nada, Reichersberger). The degradability difference for the cultivar which degradability decreased with the higher altitude (Viola) was not significant. Cizek (1978) found for several forage grass species that altitude influenced the lignin-cellulose complex content of their organic matter. A similar mechanism might have caused the clover dry matter degradability decrease with increasing altitude. Chemical analyses of the clover dry matter however, have not been done. Also, a higher number of replications and fistulated rams would decrease the experimental error. Nevertheless, the obtained results indicate (1) that altitude could influence the red clover degradability and (2) that the influence depends on the cultivar. Thus, (3) it might be possible to select appropriate red clover cultivars for growing at different altitudes.

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**Figure 1**

The *in sacco* dry matter degradability (DMD - %) of red clover from two altitudes, Maksimir and Sljeme, 1996

