

Analyses of genetic change in grass-clover based systems over time

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Introduction Since the use of nitrogen fertilisers is reduced, swards based on grass-clover mixtures regain importance in grassland production. Management of these swards is more complicated than the management of pure grass swards. The population structure will develop in response to abiotic and biotic stresses. In this study we will test the genetic change in the clover components of grass-clover mixtures.

Material and methods We have sown 15 varieties of white clover and 15 varieties of red clover in the greenhouse on the 18th of November 2004. We will screen these varieties by AFLP markers and select 5 varieties of each of the species which have narrow diversities within the variety and high genetic distances between the varieties. We extracted DNA from 30 plants of these varieties by the Modified CTAB DNA-isolation protocol. AFLP markers are being performed.

Based on the results of the AFLP study we will carry out a field experiment which will be sown in May 2005. (Table 1). The clover will be sown in association with perennial ryegrass. The plots will be cut 4 times per year and we will sample the plots at each cut to know which varieties are dominating the mixture or to test the genetic shift within the variety. AFLP and SSR markers will be used to analyse the genetic change due to selection or shift.

Table 1 Different types of grass clover mixtures used to analyse the genetic change. (RC: red clover variety; WC: white clover variety)

type	number of plots	description
A	5	each of the RC
B	5	each of the WC
C	1	mixture of the 5 RC
D	1	mixture of the 5 WC
E	1	mixture of the 5 RC and the 5 WC
F	5	each of the RC with a mixture of the 5 WC
G	5	each of the WC with a mixture of the 5 RC

Analyses In the plots of type A and B we will test the genetic shift of one white or red clover variety growing in association with perennial ryegrass. These studies will be performed with AFLP markers. These results can be compared to the AFLP results of the plots of type F and G where the clover variety is growing not only in association with grass but also in competition with another clover species. To analyse the genetic change in the plots with competition within the species (types C, D and E) we will use AFLP markers as well as SSR markers.