Symbiotic nitrogen fixation and N-transfer in a grass-white clover mixture

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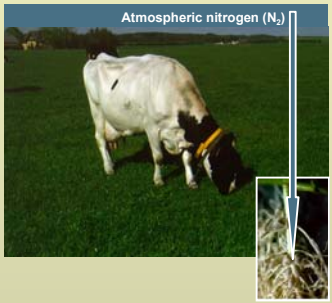
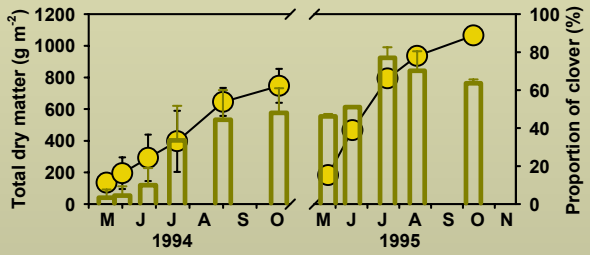
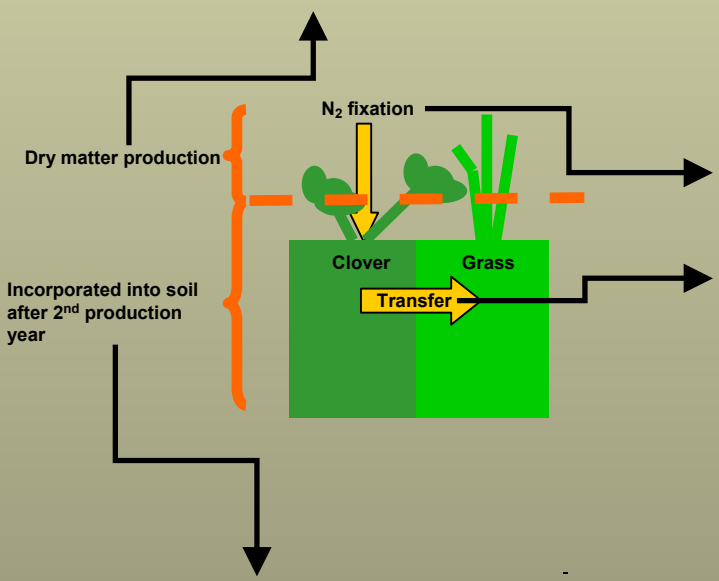
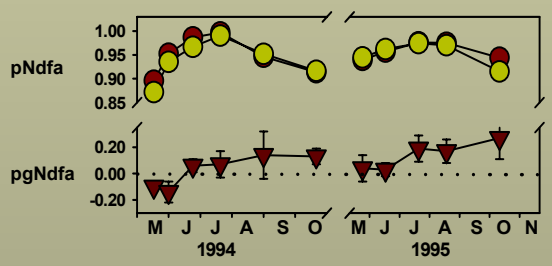


This study constituted a part of a larger investigation, where input, losses, and recycling of nitrogen were estimated in either grass-clover or fertilised ryegrass grazed by dairy cows. The objective of the present study was to estimate the input of symbiotically fixed N_2 into a grass-white clover mixture and the transfer of fixed N_2 from clover to grass. The study included an evaluation of monoculture ryegrass and ryegrass in the mixture as reference crop for estimating SNF in grass-clover mixtures. Further, in a parallel experiment the amount of nitrogen incorporated after a 2nd year grass-clover were estimated.

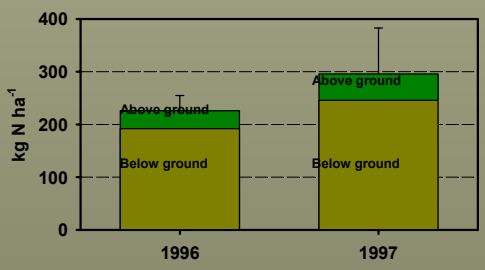


Due to a cold and wet spring in 1994 the clover was poorly established and the total dry matter production corresponded to 7.5 tons ha^{-1} compared to 10.6 tons ha^{-1} in 1995. These differences also resulted in large difference in the amount of N fixed between the two years (see below).

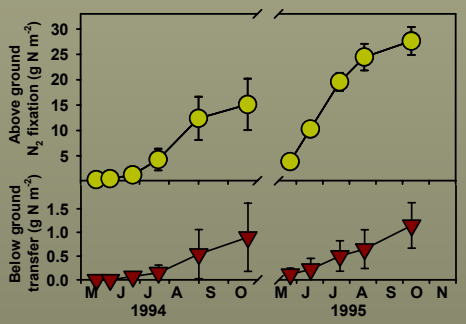




There was no significant difference between the two methods determining the proportion of N derived from atmosphere (pNdfa). The proportion of grass N transferred from clover to grass (pgNdfa) tended to increase during the growing season.



About 50% of the nitrogen incorporated into the soil was estimated to be derived from N_2 fixation.



The total N_2 fixation corresponded to 160 kg N ha^{-1} in 1994 and to 290 kg N ha^{-1} in 1995.