

Italian ryegrass and whole crop cereal mixture: effect of sowing rate and maturity on variety on yield and botanical composition in northern latitudes

O. Niemeläinen, O. Nissinen and M. Kontturi

MTT Agrifood Research Finland, FIN-31600 Jokioinen, Finland, Email: oiva.niemelainen@mtt.fi

Keywords: cropping systems, Italian ryegrass, whole crop cereals

Introduction The profitability of a dairy farm using whole crop cereals (WCC) is better in Finland than that of a farm producing combine harvested cereals and grass silage (Turunen, 2000). The main reason for that is the decrease in the machinery costs. However, quality of the WCC yield can vary considerably depending on the ear- straw ration. This may lead to problems in feeding. In this experiment we studied the effect of sowing rate and growing time of the cereal cultivar on the botanical composition, quality and yield of the WCC harvest. The objective was to study if it would be possible to increase the grass component in the WCC harvest by cultivation management to such a level that the WCC yield would be feasible to be used in feeding with pure grass silage. In this paper we present results of the botanical composition of the WCC harvest.

Materials and methods Early (E) Artturi cv. and late (L) Inari cv. of barley were sown at three densities: 500, 350 and 200 viable seeds/m² in Jokioinen (60°49 N, 23°30 E), Finland. Italian ryegrass (IRG) cv. Turgo was sown on the whole experimental area right after sowing the cereal treatments at 850 viable seeds/m². Nitrogen fertiliser application was 110 kg N/ha at establishment and 60 kg N/ha after the harvest of WCC. Results of 2002 and 2003 are presented. Plot size was 2,0 x 10 m and the harvested area was 1,5 x 10 m. Experimental design was a completely randomised block with four replicates. WCC was harvested at the dough stage. Botanical composition was estimated on a 500 g sample taken from the harvested yield from each plot, and the yields were corrected to 100% DM based on DM percentage of each yield component. Autumn was exceptionally dry in both years. In 2003 the experiment was irrigated after the harvest of WCC.

Results In 2002 treatments of the E cv. were harvested on July, 25. and of the L cv. on August, 1. The second cut was delayed by early snow and was taken on October, 29. In 2003 the E cv. was harvested on August 4. and L cv. on August, 12. The second cut was taken on September 24. Dry conditions affected negatively the yield of 2nd cut of IRG in 2002 (Figure 1). The contribution of IRG at WCC harvest ranged from 9 to 38 percent in 2002, and from 14 to 37 percent in 2003.

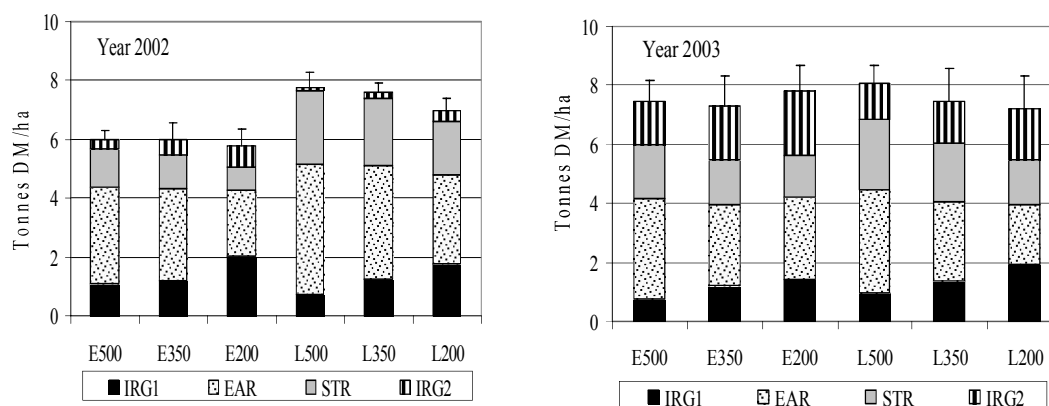


Figure 1 DM yield of ears, straw and Italian ryegrass at WCC harvest and in the 2nd cut in 2002 and 2003 in Jokioinen, Finland. Bar indicates standard deviation in the total DM yield of the growing season

Conclusions The results indicate that by using IRG in WCC cultivation the grass component in the WCC harvest can be raised so that the use of WCC would be easier than that of pure cereal WCC.

Reference

Turunen, H. (2000). Kokoviljasäilörehun viljelyn tuotantokustannukset ja kannattavuus maidontuotannossa. (In Finnish) Summary: Production costs and profitability in the cultivation of whole crop silage in milk production. Agricultural Economics Research Institute, Finland. Working papers 6/2000. 54 pp.