Potential economic gains from using forage legumes in organic livestock systems in northern Europe

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ABSTRACT

Forage legumes, with their ability to fix nitrogen biologically, seem especially attractive for organic livestock production. In an attempt to assess their true potential, this study draws on a four-year trial conducted at 12 sites in northern Europe with four different forage legumes. One third of the sites were managed as organic systems, with the harvested forage being fed as silage to dairy cows. Based on the trial results, an economic assessment has been made of the potential of forage legumes to improve the competitive edge of organic dairy systems, relative to conventional grass-based ones. Although the results suggest that the organic milk price premium plays a major role in determining the comparative profitability of organic dairy systems, the use of forage legumes also gives a significant cost advantage to organic production.

Keywords: organic farming; silage, forage legumes, economics, northern Europe

INTRODUCTION

As part of a four-year study, conducted in the UK, Germany, Sweden and Finland, into the potential of forage legumes for silage production, a comparison was made of the forage yields and livestock performance on organic and conventional systems of production. Out of the 12 trial sites used, four were on organic sites and managed as organic systems. By comparing the results from the trials at these four sites with those from experimental controls based on conventional grass-based systems receiving 200 kg N ha^{-1}, it was possible to draw some inferences about the potential of forage legumes for organic systems. Specifically, in the trials, four forage legumes (red clover, white clover, lucerne, and galega) were investigated. The nutritive value of the silage made was determined by feeding the material to dairy cows. This paper presents the results of the economic evaluation for dairy systems.

BASIS OF THE ECONOMIC ASSESSMENT

Estimates of the costs of silage production were prepared by first collecting detailed data on the costs of establishment, maintenance and harvesting for the four forage legumes in the UK. Comparable costs for Germany, Sweden and Finland were then extrapolated using published national prices for machinery, fuel, labour and other purchased inputs. The main differences assumed between organic legume-based and conventional grass-based systems were the absence of inorganic fertiliser and chemical sprays, the use of mechanical treatments at

establishment and the employment of inoculant, rather than formic acid, in ensiling.

The economic value of the silages was imputed from the observed milk yield response to feeding the different forages. This involved determining the value of the milk produced, using reported prices paid for organic and conventional milk in the different countries and determining the proportion of this attributable to forage as distinct from other inputs. Because of the absence of feeding trials in Germany the results could only be estimated for UK, Sweden and Finland.

RESULTS

Using the reported yields from the organic sites, the projected profits per hectare from organic legume-based systems for silage production were compared with those from conventional grass-based systems, receiving 200 kg N ha^{-1}, at comparable sites. The projected economic gains from adopting the organic legume-based silage system are shown in Table 1, for the UK, Sweden and Germany. The figures show the absolute gain in € ha^{-1}. In addition, to give an indication of the scale of the economic gain, the improvement in profits has also been expressed as a percentage of the value of the equivalent silage crop harvested from a grass sward receiving 200 kg N ha^{-1}. Not all the silages were fed in every country, so the results are selective.

Table 1. Economic gains, € ha^{-1} (bracketed figures are percentage of grass value)

Forage Crop	UK	Sweden	Finland
Red clover	1367 (120)	466 (41)	-
White clover	1048 (92)	438 (38)	138(12)
Lucerne	1031 (91)	-	-
Galega	-	-	-65(-6)

The results indicate that organic dairy systems using forage legumes can produce economic performances that are better than those from conventional grass-based systems. However, the economic gains are strongly related to the presumed premium paid for organic milk. At the time the analysis was conducted in 2000, the premium was as much as 80 per cent in the UK, 20 per cent in Sweden and only 10 per cent in Finland. In the UK where the premium has fallen to between 20 and 40 per cent in late 2001, the effect is to cut the gains per hectare by about 500-600 € ha^{-1}.

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