

Protection of agrobiodiversity: model calculations in Rhineland-Palatia: costs and implications for farmers

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Introduction Biological conservation and production use the same areas of land in less favoured areas. Grassland in these areas makes an important contribution to the protection of agro-biodiversity. However, under existing market conditions and production needs, the use of low yielding grasslands is not economically efficient. The objective of this study was to analyze the economic consequences of different mowing strategies in a small region in Rhineland-Palatia (Germany) that served the protection of two butterfly species.

Materials and methods The impacts of extensification measures for nature protection on herbage quality and yield have been described from a literature analysis. The effects of different cutting dates on quality and yield were calculated, based on a function by Opitz von Boberfeld (1994). Before these calculations, the calculated yields/ha were qualified in relation to nutritional requirements of cattle. The method of standard gross margin calculations was used to determine the compensation payments for the profit foregone by farmers that adopt alternative mowing regimes. It was assumed that farmers purchased concentrates as an additional fodder to compensate for the loss of energy yields and the compensation payments were calculated accordingly. Because most farmers in the region used meadows for silage, the calculations were based on silage production with a base energy yield of 52 GJ NEL/ha.

Results The literature on cattle and horse nutrition suggests that fodder with an energy content >6 MJ NEL/kg DM is usable in intensive cattle production, while fodder of 4-6 MJ NEL/kg DM is mostly usable in horse and heifer nutrition. Due to its low quality, silage harvested with a first cut in August is not recommended for use in horse nutrition or for cattle (except for yearlings between 12-18 months old; Figure 1). Therefore, for mowing regimes with a first cut after the beginning of August, farmers must be compensated for the complete loss of use of the meadow. The curve of calculated compensations (Figure 2) shows three stages, (1) until 15 June, with compensation costs of about 200 €/ha, (2) from 15 June to 1 August, with compensation costs increasing to 1000 €/ha and (3) after 1 August, when a total loss was presumed, with compensation costs of 1156 €/ha.

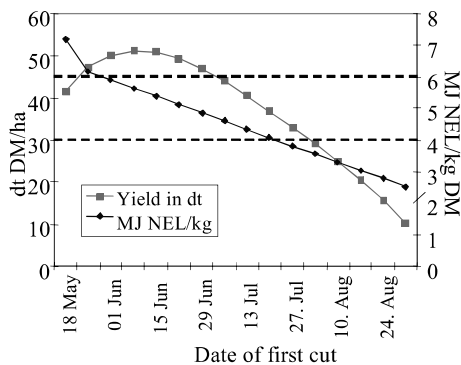


Figure 1 Effect of different mowing dates on MJ NEL/kg, DM/ha and their usability Source: Own calculations based on Opitz von Boberfeld (1994)

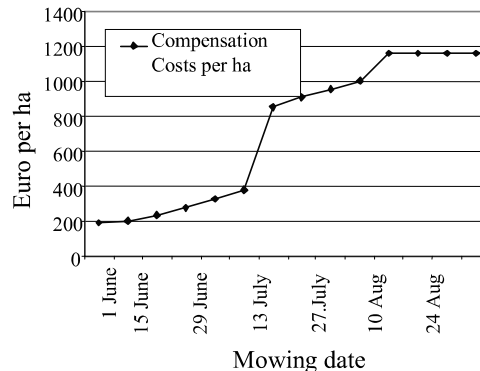


Figure 2 Compensation Costs in dependence of mowing date (1 cut a year) Source: Own calculations

Conclusions Linearity in compensation calculations is not a realistic way to reimburse farmers for extensification requirements. Justifiable compensation amounts can be calculated only in combination with specific grassland science, cattle nutrition and ecological knowledge.

References

Opitz von Boberfeld (1994). Grünlandlehre, UTB 1770, Stuttgart.