Benchmarking European permanent grassland production and utilization at national and regional levels

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Abstract

Grassland benchmarking was defined within the EIP-Agri Focus Group 'Permanent grassland' as an important subject because within Europe there are differences in grass production between countries and within countries. As yet there has not been clear benchmarking of national grass dry matter production within EU member states. For the grassland community to advance forward with knowledge of how to increase and improve grass dry matter (DM) production, benchmarking and understanding national levels of grass DM production and their differences will be an important first step. The objective of this work is to benchmark real grassland data based on local and regional site conditions, to establish the reasons for differences in grass output, differences in botanical composition, grazing season length, ratio of grazing to cutting and finally to establish a clear view of the level of grazing intensity in different member states. The secondary objective is to establish which grassland tools will work at farm level, to ensure grassland technology are available to improve farmers grassland knowledge and efficiency.

Keywords: grassland performances, benchmarks, pasture based diet, EIP

Introduction

Approximately half of the European Union's land is farmed, highlighting the importance of agriculture on the continent. Utilised agricultural area (UAA) in the EU is defined as the area taken mainly by arable land, permanent grassland and permanent crops (e.g. vineyards). Permanent grassland covers 32% of the UAA with important differences between the member states and differences in economics of grassland use (Huyghe *et al.*, 2014). France, UK and Spain have each over 7 million of hectares of permanent grassland. In 2007, over half of UAA was covered by permanent grassland in Ireland (76%), the UK (63%), Slovenia (59%), Austria (54%), Luxembourg (52%) and Portugal (51%). But not only does the area differ widely, grass utilisation is very variable among member states, as is the expression of ecological, structural, historical and cultural differences. Grazing systems are typically well developed for example in the North-West of Europe (Ireland, UK, France, Belgium, the Netherlands, North of Germany), some parts of the Centre of Europe (Austria), and in many parts of the Southern European countries (Portugal, Spain, South of Italy, Greece). Harvesting grassland for silage and hay is proportionally more important in central Europe (South of Germany, Switzerland, North of Italy) since indoor systems are more widespread in this region, although it is a common practice in other areas where forage conservation is needed.

Grazing systems became more environmentally sustainable as necessitated by the EU Nitrates Directive (1991), Water Framework Directive (2000), Kyoto Protocol (1997), the Soil Thematic strategy (2006), and CAP (2013-2020). Emissions of greenhouse gases (GHG) are a consequence of burning fossil fuel, converting forests and grasslands into arable land, and several other natural processes. Grass-based livestock systems are decreasing in importance in Europe despite the fact that grasslands maintain biodiversity and deliver many ecosystem services like carbon sequestration. Within Europe there are differences between grass production in quantity and quality terms within and between countries. As yet there has never been a clear benchmarking strategy of national grass dry matter production within EU member states. For the grassland community to advance forward with knowledge of how to increase and improve grass dry matter

(DM) production, benchmarking and understanding national levels of grass DM production and their differences will be an important first step. Indeed some countries may not be able to increase grass DM production due to climatic conditions and other major variables (water access, climate, etc.). The reasons why there is variation in DM production due to climate, soil types, types of vegetation and grass quality need to be established, benchmarked and well understood. Grasslands can be quite different in different countries as was shown in the European grassland classification that was recently published (Peeters *et al.*, 2014). This classification was the result of a combined work of the European Grassland Federation (EGF) and the EU-funded project MultiSward. In extensive livestock systems, abundant in European mountain areas and also in the Mediterranean region, permanent grasslands dominate, and it is common to have different grasslands in terms of botanical composition and structure (i.e. gradient from totally herbaceous to plant communities dominated by woody species) in the same rangeland. Factors like variations in geology, topography, microclimate and defoliation (selectivity, intensity and frequency) influence pasture diversity. In these systems, especially in communal areas, different livestock species and breeds graze at the same time with variable overlap in the use of resources depending on flock composition. Grassland overviews of Europe are given in papers of Helgadottir *et al.* (2014) for the North of Europe, Huyghe *et al.* (2014) for Mid Europe and Cosentino *et al.* (2014) for the Mediterranean Region.

If European grassland production continues not to be quantified, how can European grassland regions be assessed and how can the possibilities for any increase of profitability of permanent grassland be evaluated? The establishment of benchmarks will allow differences between European grassland productivity to be established and will allow for a better understanding why they exist and how to overcome their challenges.

Performances and competitiveness of grass

Some of the differences in member state milk production are highlighted in Figure 1, which shows a strong relationship between the total costs of production and the proportion of grass in the dairy cow's diet in a number of countries (Dillon *et al.*, 2005). The relationship shows that the average cost of milk production is reduced by 1 cent l^{-1} for a 2.5% increase in grazed grass in the cow's diet. The data also demonstrate that a considerable proportion of the dairy cows diet (50% +) must comprise grazed grass before a significant impact on cost of production is realized. This objective can be achieved easily in many EU member states. One of the main reasons for stressing the importance of grazing and better use of grass is that it is a home-grown resource and is a cost-effective feed. In Ireland, e.g. the ratio of the cost of grazed grass to that of grass silage and concentrate is 1:3:5; this can vary depending on the price fluctuations. These relationships may vary between all countries and are dependent on market prices for fertilizers, cereals, soybean and all other production inputs. The exact competitiveness of grass also needs to be documented for other member states.

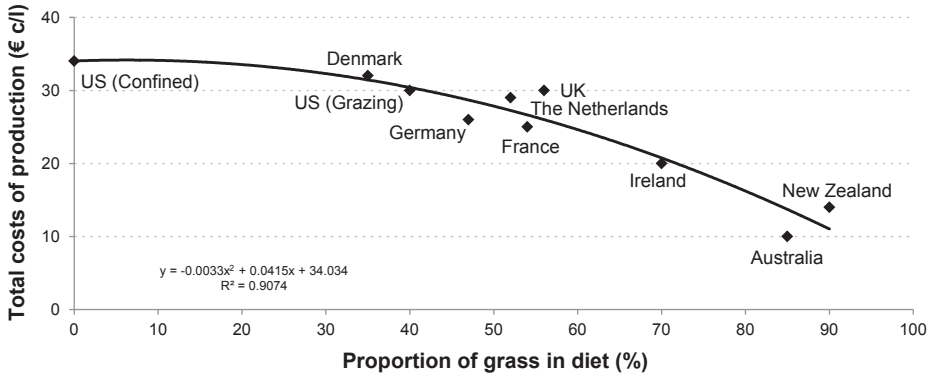

Figure 1. Relationship between total cost of production and proportion of grazed grass in the dairy cow's diet, ranging from total confinement (0% grass) to grass based feed systems (90% grass) (Dillon *et al.*, 2005).

In some countries high-cost milk production systems are based around indoor feeding. From a greenhouse gases viewpoint this is not favourable, as recent publications have stated that grazing systems have low GHG emissions (Del Prado *et al.*, 2014; O'Brien *et al.*, 2012; Soussana *et al.*, 2014). Full-time indoor systems are common in Switzerland, Germany, Denmark, the Netherlands, and Poland. Grazed grass cannot cover all feeding requirements of high yielding cows; they require a combination of grass, possibly other green forages, like e.g. silage maize and concentrates. There are, however, animals genetically suitable for grazing systems, and more grass-based countries are using such animals, i.e. crossbred dairy cows. Farm structure, land price and risk-reduction strategies explain that indoor feeding is most common in some regions. In countries where grazing is important, the management of the grazing season is broken down into the key seasons: spring, mid-summer and autumn. There are different approaches required at these different time periods due to differences in grass demand and supply, even in labour demand. For example, the grazing management required in the spring is focused on managing peak grass supply, whereas in mid-summer the focus is on managing the farm to grow sufficient grass to feed the herd with some pasture. Therefore, different levels of decision supports are required to ensure the produced grass is well utilised (Griffith *et al.*, 2014).

Conclusions

The above analysis highlights the need to benchmark member states for grass DM production and quality and to establish the reasons for differences in grass output, by member state and by region. The second objective is to establish which tools will work at farm level, in which farmers can use within their region or comparable areas to learn from each other and to have proper grassland technology available to improve the grassland knowledge. This work will have to be undertaken both at research and farm levels, which will require a participatory research. This work is a research proposal from the EIP-Agri-Permanent Grassland Focus Group, and it would require EU funding if it were to be undertaken.

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