

# PastureBase Ireland – a National Grassland database for Ireland

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## Abstract

PastureBase Ireland (PBI) is a web-based grassland management tool incorporating a dual function of grassland decision support and a central database to collate grassland data. This database facilitates the collection and storage of a vast quantity of grassland data from grassland farmers in Ireland, providing infinite opportunities to increase the understanding around all aspects of grassland production and ultimately utilisation. The database spans across enterprises (dairy, beef and sheep), with grassland data recorded by all enterprise groups. Key questions that PBI can address include the quantification of seasonal and annual grass dry matter (DM) production, establishing the factors that affect production across different enterprises, including for example grassland management, region, and soil type. This database is designed to be functional at the paddock level. PBI has the potential to refocus grassland research in Ireland, while contributing to significant increases in productivity and profitability on grass-based farms. The objective of this paper is to briefly describe PBI and to demonstrate some of the outputs of the model.

**Keywords:** PastureBase Ireland, grassland management, yield, decision support

## Introduction

Irish agriculture's ability to grow and utilise grazed grass in an efficient and economically profitable manner is widely considered to be a major competitive advantage over other food producing countries in terms of low-cost animal production (Hurtado-Uria *et al.*, 2013), while generating a sustainable, green and a highly reputable image which is marketed throughout the world. Dillon *et al.* (2005) found that for every 10% increase of grazed grass as a proportion of the overall diet of a dairy cow there was a reduction in the cost of milk production by 2.5 cents l<sup>-1</sup>. In a separate study by Shalloo (2009), it was shown that approximately 44% of the variation in net profit per hectare is associated with grass utilisation per hectare. Therefore, with the removal of EU milk quotas and for many farmers the freedom to expand the dairy business for the first time, their focus should centre on increasing grass growth and utilisation at farm level. As there is such a range in performance of grass growth within and between farms, the development and use of a decision support system with a centralised database has the potential to significantly increase profits at farm level through benchmarking between farms. This tool can directly affect the decision making process at farm level by providing information to the user in a usable format (grass wedge or rotation plan) while at the same time providing data that can be used to dramatically broaden the field of grassland research. The database can be used to investigate the traits contributing to dry matter (DM) yields and can identify areas where farmers, researchers and the industry can be continuously improving and innovating going forward. PastureBase Ireland (PBI) is a leader in its own class as it provides supply security of large quantities of verifiable data as well as other variables of interest, such as cultivar performance or soil fertility status. The objective of this study is to describe the functionality of a web based grassland decision support tool (PBI) by demonstrating the grass growth differences between years 2013 and 2014.

## Materials and methods

PBI is a web-based system and functions by the farmer interacting with the model. The data are enriched with background paddock information and grass growth for each paddock is then linked to the external

factors. The farmer uses the web-based package to assist in the decision making process around grazing rotations, silage making, supplementation, etc. The main aspects of PBI as a decision support tool are the grass wedge, grass budget and the Spring and Autumn rotation planners (Teagasc, 2009). Through this inputted information cumulative grass growth rates are calculated for each paddock. The PBI model functions through a large series of calculations using the grass data entered by the farmer. The primary calculations that this paper concentrates on are both daily and cumulative growth rates. A daily farm growth rate is calculated as the weighted average difference in pasture herbage estimates on all paddocks with a paddock status of 'Grass' and a previous paddock status of 'Grass' with a herbage estimate greater than or equal to the previous recording between two consecutive measurement dates divided by the number of days between estimates. Cumulative growth is calculated by a further series of calculations which must be carried out to account for when paddocks are not included in daily growth rate calculations (e.g. being grazed, cut for silage, and grazed since last measurement). This information is then used for producing the paddock summary report and overall weighted farm growth for the year. In this study average grass growth for 2013 and 2014 is compared on commercial farms using PBI since 2013. The data from each farm were statistically analysed using SAS with the mean DM yield of 47 commercial farms being used for the comparison. PBI was used weekly on these farms over the two-year period.

## Results and discussion

Figure 1 shows the average grass growth from the PBI system in 2013 and 2014 of the farms analysed. There was a substantial increase in DM yield in 2014 over 2013. The mean DM yield on the 47 commercial farms increased from 12,389 kg DM ha<sup>-1</sup> to 14,315 kg DM ha<sup>-1</sup> in the two years. The more favourable climatic conditions of 2014 had a large effect on this result as 2014 was more conducive to grass growth due to a warmer spring combined with a more even spread of rainfall throughout the year. Grazed grass yields were 10,576 kg DM ha<sup>-1</sup> and 11,703 kg DM ha<sup>-1</sup> in 2013 and 2014, respectively. The corresponding figures for grass silage were 1,813 kg DM ha<sup>-1</sup> and 2,612 kg DM ha<sup>-1</sup> in 2013 and 2014, respectively. Annual growth comprises three seasonal growth periods: spring, main season and autumn (McEvoy *et al.*, 2011). From the data studied there appears to be a trend associated with spring DM yield and annual DM yield with the highest performing farms in spring having the highest levels of annual grass growth.

Increasing grass growth on farm will allow for profitable dairy expansion on farm with less reliance on bought-in feed, thus creating a system that is more resilient to the ever changing dynamics of input and output prices. If the additional grass grown in 2014 was utilised at farm level it would result in increased

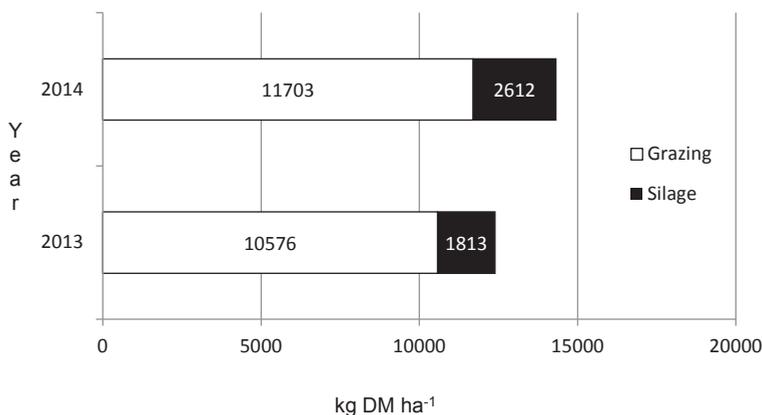


Figure.1. PastureBase Ireland dry matter (DM) yield (kg DM ha<sup>-1</sup>) data for 2013 and 2014.

animal performance from grazed grass, lower production costs and increased profits, with Moorepark research showing there is an increase of € 161 in additional profit for every extra Mg of grass utilised (Shalloo, 2009). PBI will assist in realising this potential as it enables farmers to evaluate the performance of paddocks more easily through its paddock summary reports and decision support mechanisms.

## Conclusions

This study has demonstrated the potential of the newly developed PBI system. For farmers the initial direct impact of PBI will come from the advancement of the decision making process. This allows farmers to more easily evaluate paddocks and cultivars on farm, which will encourage better grassland management practices and therefore increase DM yields. However, significant gains will be achieved by the research conducted from the PBI database through a new research programme which will be facilitated by the new research database.

## References

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