Smart grassland systems:

Using multi-species swards to enhance agricultural production & environmental benefits

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Smart grass
Biodiversity for production

Introduction

One of the greatest challenges facing farmers is to increase production in an economically viable and environmentally sustainable manner. Reliance on high fertiliser inputs using grass monocultures has become less economically viable and socially acceptable (Spiertz, 2010). The ability to produce high yields of good quality forage, at minimal cost to farmers and with minimal impact on natural resources, is fundamental to the sustainability of future growth in Irish grass-based farming systems. Research indicates that the production potential of multi-species grasslands, which may require comparatively lower levels of nutrient inputs, has been greatly underestimated (Finn *et al.* 2013, Marquard *et al.* 2009).

Aim & Objectives

Our aim is to investigate the production potential of multi-species swards consisting of one to three plant functional groups (grasses, legumes and forage herbs) when compared with ryegrass monocultures. These swards will be compared in terms of production and environmental benefits (Figure 1).

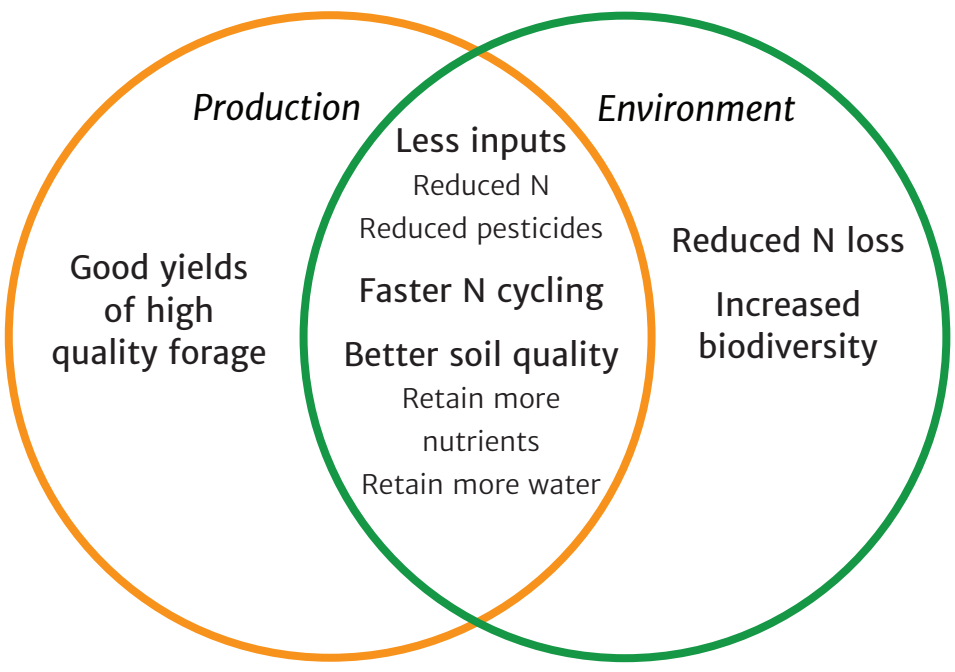

Figure 1. Potential benefits of multi-species swards

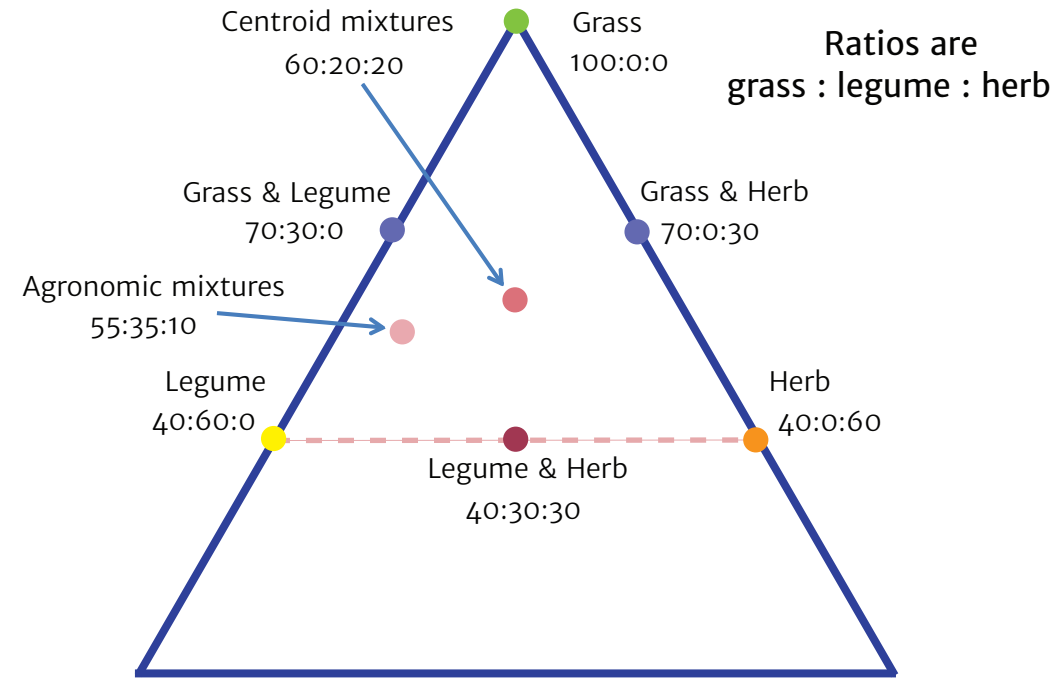

Figure 2. Conceptual drawing of restricted simplex-centroid design.

Method

Four field experiments have been set up over two sites, UCD Research Farm, Lyons, Co. Kildare and Teagasc Animal and Grassland Research Centre, Grange, Co. Meath. The first experiment has a restricted simplex-centroid design after Kirwan *et al.* (2007), consisting of eight different functional group ratios (Figure 2) with three levels of species richness, giving a total of 24 mixtures. Mixtures are being investigated in terms of yield, biodiversity and quality of forage under four levels of nitrogen input (0 to 135 kg N ha^{-1}). Subsets of these mixtures are being investigated within the other three field experiments to compare:

1. The effect of mowing versus actual grazing
2. The nutrient composition of the forage
3. The effect of mixtures on animal performance
4. The quality of ensiled forage

References

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This research has been funded by the Research Stimulus Fund, Department of Agriculture, Food and the Marine: Grant No. 11/S/147