Farmer led innovation in the use of multi-species swards on Northern Ireland farms

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Abstract

There is evidence to suggest that increasing the diversity of plant species (multi-species swards (MSS)) can counteract some of the challenges faced by Northern Ireland (NI) ruminant livestock farmers. There are many suggested benefits from incorporating a mix of grass, legume and herb species into grazing platforms, such as their deep rooting properties, improved soil health and reduction in the requirement for manufactured nitrogen fertilizer input. However, there is a considerable lack of information surrounding the management of MSS on farms in NI. AgriSearch and AFBI have been working with eight NI commercial farmers trialling MSS on their farms through the SUPER-G and EcoSward projects and a European Innovation Partnership (EIP) Operational Group. With support from AgriSearch, AFBI and Queen's University the farms involved have trialled a range of seed mixtures and establishment options. Initial results have shown the MSS are significantly more drought resilient and can produce comparable dry matter yields to conventional perennial ryegrass dominant (PRG) swards with lower fertilizer inputs. Furthermore, animals grazing MSS required less use of anthelmintics than those on grass swards. In addition to the knowledge provided by researchers, the peer-to-peer learning and support has been beneficial, particularly regarding establishment techniques and initial management of MSS.

Keywords: multi-species swards, herbal lays, peer learning

Introduction

Farmers in Northern Ireland (NI) are increasingly facing financial, production and environmental challenges. Low profitability in beef and sheep production enterprises in particular is a real threat to the viability of the NI livestock sector. Finding a suitable balance between maintaining profitable and sustainable livestock performance from grassland and improving farm ecosystem service provision is critical to sustaining farm businesses and the wider industry for the future.

Multi-species swards (also referred to as species-rich, herbal leys or diverse grasslands; MSS) are communities comprised of grass, legume and herb species. There is a growing body of evidence to suggest that increasing the diversity of plant species in grassland can meet many of the aforementioned challenges, delivering a wide range of ecosystem services, reducing management costs and positively influencing sustainable livestock production.

Since grassland is the predominant crop in Northern Ireland, incorporation of MSS presents a significant opportunity for the livestock sector. Success will, however, be dependent on uptake and whilst the potential benefits of MSS are numerous there is a distinct lack of information on their establishment and initial sward management for NI commercial beef and sheep farmers.

Materials and methods

The first project (undertaken as part of the SUPER-G project) involved the establishment of MSS on seven dairy, beef and sheep farms across NI containing perennial ryegrass, white clover, chicory and plantain alongside a control mix containing the same perennial ryegrass and white clover but without

the plantain and chicory. The swards were established during autumn 2019 and spring 2020. The farmers provided sward management information, including pre-and post-grazing sward covers and organic and artificial fertilizer application rates. In addition, botanical assessments, herbage quality and mineral samples were taken three times per year (spring, summer and autumn).

Having been encouraged by their initial experiences, the beef and sheep farmers involved in the SUPER-G project, with assistance from AgriSearch, applied for funding for a European Innovation Partnership operational group to further investigate the feasibility of MSS for beef and sheep production. The first stage of the project investigated the most appropriate MSS mixtures to use on their individual farms. They were assisted in this by a literature review undertaken by AFBI as part of the project (Lowe *et al.*, 2021). Scientists from AFBI and Queen's University are also members of the EIP operational group.

The operational group sought to examine specifically the challenges in establishing and successfully managing MSS and, crucially, communicating both the benefits and challenges to other farmers. A series of 'meet the farmer' videos were recorded to introduce the farmers involved in the project, explain their interest in MSS and outline initial experiences in establishing the swards. Animal performance will be measured on-farm in the 2022 grazing season. This will compare the performance of ewe and lambs, finishing lambs or growing cattle on multi-species swards compared with either perennial ryegrass or perennial ryegrass with white clover swards.

A farm walk was held in September 2021 with each of the farmers communicating their experiences of establishing and managing multi-species swards.

Results and discussion

The farmers involved used one of three establishment methods which included full ploughing and cultivation, minimal cultivation, and surface seeding (with and without burning off the existing sward). In situations where complete cultivation was used, farmers who combined this with stale seed-bed techniques found reduced broad-leaved weed growth in the newly established sward.

Many of the farms involved are located in the eastern parts of County Down, which in recent years have experienced regular late spring/early summer droughts which further narrows the opportunities for reseeding. Autumn reseeds have lowered weed burden but from a practical perspective has resulted in the fields being out of production for a longer period of time.

The farmers involved quickly realized that a change of mindset was needed to manage these swards, in that they take longer to establish than a conventional reseed and require different early management techniques. These include using less artificial N fertilizer, along with higher entry and residual sward heights. In addition, when grazing MSS, the farmers aimed to increase the grazing rotation length to 3-4 weeks, to allow swards to recover and in an attempt to improve herb persistency.

While it is still relatively early in the project, the farmers involved have observed that the MSS perform considerably better than perennial ryegrass monocultures especially during drought events. Initial findings from the 2021 grazing season show that the MSS sown as part of the SUPER-G/EcoSward trial had a 7.4% higher dry matter yield than the control mixture of perennial ryegrass and white clover, while using 11.2% less nitrogen.

Initial herbage mineral analysis from the SUPER-G/EcoSward farm sites also show that the MSS have considerably higher mineral content (44% higher for boron, 11% higher for copper, 32% higher for calcium and 15% higher for phosphorus) which merits further investigation.

All the farmers involved in the EIP group are intending to establish additional MSS in the future. There has also been a great deal of interest in this topic in NI. Over 100 farmers and advisers attended a farm walk on this topic held in September 2021. Of those who attended, 94% rated the presentations as 'very good' or 'excellent', with many of the farmers who attended expressing an interest in establishing their own MSS in the future.

One major challenge is that there are very few farm advisers that currently have knowledge of managing MSS. The project is seeking to engage with local farm advisers to help address this issue.

Conclusions

While further institute-based research on MSS is very much needed, the experiences gained by sowing a selection of MSS sward types across a range of farms using a variety of establishment methods has been most beneficial. For example, the research scientists involved in the study have found the farmers' experience invaluable in drawing up management protocols for institute-based research trials. Ultimately, farmers learn best through peer learning alongside support from research scientists. The operational group has created an effective mutual support network, has highlighted areas for further research and has inspired many other farmers in NI to establish their own MSS.

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