Grazing for Profit and Biodiversity:

Multi-Species Swards

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What are Multi-Species Swards?

Multi-species swards (MSS) contain three or more species from three plant groups:

- Grasses such as perennial ryegrass (PRG), timothy, meadow fescues and cocksfoot.
- Legumes such as clovers (e.g. white, red and alsike), bird's-foot trefoil (BFT) and in areas of more alkaline soils, lucerne and sainfoin.
- Herbs such as chicory, plantain, yarrow, sheep's parsley and burnet.

Benefits for Profit

- Complementary growth characteristics and nitrogen fixing legumes can provide improved sward productivity on no / lower bagged nitrogen input levels:
  - The SmartGrass project found several different MMS receiving no synthetic N to equal or out-yield grass only swards receiving 135kgN/ha.
- High digestibility mineral rich forage can lead to improved stock performance over conventional swards:
  - The SmartGrass project found a 2.3kg benefit in lamb weaning weight on a 6 species MSS compared to a PRG and white clover sward.
- Anthelmintic properties from tannin compounds in species such as chicory, sainfoin and BFT and different sward structures inhibiting larvae can reduce the need to worm stock:
  - The SmartSward project found lambs grazing MSS required 50% fewer lifetime drenches to slaughter than those grazing PRG only swards.
- Potential for higher summer pasture yields and improved resilience during drought conditions:
  - Deep rooting species such as chicory and cocksfoot are much more drought tolerant than conventional swards of PRG and white clover, being capable of greater pasture growth in dry conditions.

Tup hoggs grazing MSS at Coldrochie Farm

Benefits for Biodiversity

- Greater variety of flowering species such as clovers, BFT and chicory provides increased floral diversity and a greater range in flowering dates. This provides greater diversity of nectar and pollen, more of it and improved supply through the seasons for pollinators:
  - Clovers provide an abundant source of nectar and pollen through into late summer for a wide range of flower visiting insects including honeybees and bumble bees.
  - Woodcock et al (2014) found the inclusion of herb species to further increase pollinator species richness and abundance including bees, butterflies and hoverflies.
  - Some of Scotlands rarest insect species are specialized and completely dependent on specific flowering plants. This includes pinewood-, mountain- and wall-mason- bees' which are solely dependent on BFT.
- Greater plant species diversity brings a wider range of growth habits creating more structurally diverse sward habitats for insects, small mammals and birds.
- Diversity of plant and root structures benefits soil health and structure.
- Greater plant diversity promotes soil microbial activity and worm numbers:
  - The SmartGrass project found increasing sward legume content to dramatically enhance earth worm abundance and that this in turn is linked to improved water infiltration
- Reduced N_2O emissions and nitrate leaching associated with fertiliser use.

Left hand photo: MSS in flower including the pink and blue flowers of chicory and yellow BFT

Right hand photo: Dragonfly on a flowering plantain stem

Management Challenges and Solutions

- Persistency of species such as chicory, plantain, red clover and BFT can be disappointing with species reducing and/or disappearing after 2 – 4 years. Plants are lost from the sward through competition from other species, by over-grazing or damage during poor weather.
- Set stocked grazing can lead to very rapid loss of the above species in part because stock will selectively graze them over other species.
- Rotational grazing is essential for good persistency with a longer rest between grazing required compared to conventional swards.
- Provide ~30 days rest in the spring/summer extending this into late summer/autumn.
- Graze at higher covers and come out at higher residuals (6cm) than conventional PRG swards to protect the growing point of herbs and prostrate legumes.
- Shorter grazing days (1-2 days) in each paddock will limit over selection of clovers and herbs by stock and prevent grazing of regrowth.
- Grasses grow at lower temperatures and therefore have a competitive advantage over the herbs and legumes; they also replenish their root reserves quicker and can become dominant
- Excluding grasses in favour of straight legume and herb mixes provide the opportunity for easier managed high productivity but shorter term swards.
- Many species, in particular herbs, are not tolerant of grazing in wet conditions as growing points/crowns can become damaged. As such winter grazing is not recommended.
- Incorporation of MSS into the grazing platform needs careful considerations as grazing opportunity is lost in the winter and reduced in the shoulders of the season.

Tup hoggs grazing MSS at Coldrochie Farm

Multi-Species Swards at Coldrochie Farm

- Emily Grant grows on 170 ram lambs each year for sale as shearlings at Coldrochie, a 30ha farm near Perth.
- Emily says that MSS bring a wide range of natural capital benefits to their forage only system with improved soil health and function, nutritional value, mineral content and anthelmintic benefits.
- Incorporating plantain, chicory and yarrow (and unsuccessfully sheep's parsley and burnet) into reseeds has been trialled since 2014. Whilst impressed with the benefits these herbs have brought to the system, persistency of plantain and chicory when grazed continuous and on a winter grazed system was poor
- Influenced by experiences of MSS in New Zealand, Emily put a 5ha field into a diverse MSS mixture including grasses, white clover, red clover, alsike clover, BFT, yarrow, chicory and plantain in 2020 and has shifted to a rotational grazing system with stock on daily shifts. This has yielded promising results with all species still faring well in year 3.
- Looking to create an easier managed MSS sward and improve herb, clover and BFT persistency in the field, she minimised the PRG in the mix in favour of timothy, festulolium and cocksfoot. Whilst undecided about cocksfoot (can become less palatable for sheep), Emily states that timothy and festulolium will certainly be in future mixes.
- In a bid to further improve persistency, the field was allowed to flower and set seed after a mid-June silage cut in 2021. The field was lightly grazed at the end of July for 2 weeks and then again in October. This has yielded positive results with an increase in red clover, plantain and to a lesser extent chicory seedling's in 2022.
- In terms of biodiversity, Emily has seen an increase in insects, particularly moths, butterflies and sawflies. Skylarks are nesting successfully on that field and flocks of goldfinches take advantage of the chicory seed from any of the plants that have bolted.
- It's harder to assess the below ground benefits, but Emily undertook full soil analysis, including biology prior to putting the crop in and will retest in a couple of years' time. Simple soil health indicators such as earthworm counts, aggregation and root depth are good.

Common frog in clover

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With thanks to Emily Grant, Coldrochie Farm and Forrit Consultancy, for her contribution and for providing all photos used in this factsheet.

SRDP Farm Advisory Service

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