Multispecies swards for sheep

ASA Sheep Masterclass
UCD Lyons Farm 17/01/2018

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Funded by:
SmartGrass Project

Production potential of mixtures:
- Forage quantity
- Forage quality
- Stability over time
SmartGrass Project

The effect of grazing on mixtures & their stability over time
Production potential of mixtures in sheep systems:

*Live weight gain & parasite load*
SmartGrass Project

The effect of mixtures on earthworm communities & soil quality
SmartGrass Project

The effect of mixtures on above ground invertebrate communities
Perennial Ryegrass only pasture

300+ grazing days
3.5-4.5 LU/ha
250 + kg N/ha

**Issues?**

High N requirement
Trace elements
Parasite burden/Control
We are looking for another way?
Is there another way?

Multispecies Mix

Seasonality
Persistency
Nutritive value
Weed Control
Why Multispecies Swards?

• Increasing species richness has been shown to increase biomass production (Nyfeler et al., 2009)
• N fixation by legumes in the mixture
• Higher biomass yield from lower N input (Finn et al. 2013)
• Niche complementarity
  - Rooting depth
  - Timing of growth
  - Enhanced usage of available nutrients
• Biodiversity
• Sustainable
Yield

Species 1

Species 2

Species 3

Individual Species Performance
Yield

Species 1
Species 2
Species 3

Individual Species Performance

Expected Mixture Performance
(1/3 Species 1 + 1/3 Species 2 + 1/3 Species 3)

Mixture

Smartgrass
Biodiversity for production
Yield

Species 1

Species 2

Species 3

Mixture

Individual Species Performance

Expected Mixture Performance
(1/3 Species 1 + 1/3 Species 2 + 1/3 Species 3) + Diversity Effect
Different forage species and their relative root depth and structure.

Image by Integrity Soils.
Grazing mixtures

• **PRG:** PRG only @ 163kg N/ha/yr

• **PRG & WC:** PRG & white clover @ 90kg N/ha/yr

• **6 Species mix:** 6 species @ 90kg N/ha/yr
  (PRG, Timothy, White Clover, Red Clover, Plantain, Chicory)

• **9 Species mix:** 9 species @ 90kg N/ha/yr
  (PRG, Timothy, Cocksfoot, White Clover, Red Clover, Birdsfoot Trefoil, Plantain, Chicory, Yarrow)
Methods

• 30 twin suckling ewes/treatment @ stocking rate of 12.5 ewes/ha repeated over 2 years (2015 and 2016)

• Rotational grazed 5 paddocks/farmlet
Sheep measurements

- Ewe weight and BCS recorded on 6 occasions
- Lambs weighed fortnightly
- Lambs drafted for slaughter at 45kg liveweight
- Lamb Faecal Egg Count measured fortnightly
- After weaning at 14 weeks, lambs grazed ahead of ewes, ewes grazed from 5cm to 4cm
Results
The effect of sward type on lamb weight at 6 weeks

P<0.05
The effect of sward type on average daily gain (ADG) from birth to 6 weeks (g/day)
The effect of sward type on lamb weaning weights

Weight (kg)

Sward Type

PRG

PRG & WC

6 Species Mix

9 Species Mix

P<0.05

+2.4 kg
The effect of sward type on average daily gain (ADG) from birth to weaning (g/day) $P<0.01$
The effect of sward type on number of days required to reach target slaughter weight

P < 0.05
The effect of sward type on slaughter performance

<table>
<thead>
<tr>
<th></th>
<th>PRG</th>
<th>PRG&amp;WC</th>
<th>6 Species</th>
<th>9 Species</th>
<th>SEM</th>
<th>P-Value</th>
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<tbody>
<tr>
<td><strong>KO%</strong></td>
<td>44.0a</td>
<td>44.4ab</td>
<td>44.8b</td>
<td>43.7a</td>
<td>0.38</td>
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<tr>
<td><strong>Slaughter weight (kg)</strong></td>
<td>45.9a</td>
<td>46.3b</td>
<td>45.9a</td>
<td>45.8a</td>
<td>0.15</td>
<td>&lt;0.01</td>
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<tr>
<td><strong>Carcass weight (kg)</strong></td>
<td>20.39a</td>
<td>20.59b</td>
<td>20.38a</td>
<td>20.39a</td>
<td>0.077</td>
<td>&lt;0.05</td>
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</tbody>
</table>
The effect of sward type on ewe live weight (kg) at key production stages

- 6 week weight
- Weaning weight
- Mating weight

PRG
PRGWC
6 species mix
9 species mix
The effect of sward type on ewe BCS at key production stages

- PRG
- PRGWC
- 6 species mix
- 9 species mix

Comparison of BCS at different stages:
- 6 week BCS
- Weaning BCS
- Mating BCS

Legend:
- PRG
- PRGWC
- 6 species mix
- 9 species mix
The effect of sward type on scanned litter size

- PRG
- PRGWC
- 6 species mix
- 9 species mix

P < 0.05
The effect of sward type on faecal egg counts (Trichostrongyle) at 10 weeks of age

$P < 0.01$
The effect of swards type on the time between first and second anthelmintic treatment

Sward Type: PRG, PRG & WC, 6 Species Mix, 9 Species Mix

No. of days

P<0.05

Legend:
- a
- b
- c
- d
The effect of swards type on mean number of anthelmintic treatments required

P<0.05

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<tr>
<th>Sward Type</th>
<th>No. of days</th>
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<tr>
<td>PRG</td>
<td>a</td>
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<tr>
<td>PRG &amp; WC</td>
<td>b</td>
</tr>
<tr>
<td>6 Species Mix</td>
<td>c</td>
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<tr>
<td>9 Species Mix</td>
<td>bc</td>
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The effect of swards type annual herbage DM production

Kg DM per ha

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<tr>
<th>Sward Type</th>
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<th>6 Species Mix</th>
<th>9 Species Mix</th>
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<tr>
<td>ab</td>
<td></td>
<td>a</td>
<td>b</td>
<td>ab</td>
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Conclusion

• 508kg of carcass produced per ha – approximately twice the national average

• Improved lamb performance
  – Driven by improved milk yield by the dam
  – Reduced parasite burden
  – Improved nutrition

• Improved ewe performance
  – Improved milk yield
  – Better maintenance of body weight in early lactation
  – Increased litter size
Where to now?

• Persistency!

• Product quality

• Incorporation into grazing systems

• Management blueprints

• Capturing the potential

• Dairy and beef
Acknowledgements: All staff and students at Lyons Farm