‘What stocking rate for my farm? Maximising milk production from pasture’

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Presentation Overview

• The Irish Dairy Industry in 2012
• First principles of seasonal, pasture-based milk production
• A review of two recent stocking rate studies
  • Curtins Farm, Teagasc Moorepark
  • Ballyhaise Agricultural College, Cavan
• Financial Implications of Increasing SR
• Conclusions
The Irish Dairy Industry in 2012

- There is significant potential for productivity gain on Irish dairy farms

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Top 10%</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Solids (fat + protein: kg/cow)</td>
<td>365</td>
<td>400</td>
<td>450</td>
</tr>
<tr>
<td>Milk solids (kg/ha)</td>
<td>722</td>
<td>840</td>
<td>1,300</td>
</tr>
<tr>
<td>Herd EBI (€)</td>
<td>100</td>
<td>120</td>
<td>150</td>
</tr>
<tr>
<td>6-week calving rate (%)</td>
<td>55</td>
<td>65</td>
<td>90</td>
</tr>
<tr>
<td>Stocking Rate (cows/ha)</td>
<td>1.9</td>
<td>2.1</td>
<td>2.5</td>
</tr>
<tr>
<td>Concentrates/cow (kg)</td>
<td>875</td>
<td>530</td>
<td>300</td>
</tr>
<tr>
<td>Grass utilisation (t DM/ha)</td>
<td>6.5</td>
<td>9</td>
<td>14</td>
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</table>
First Principles of Seasonal, Pasture-Based Milk Production

**1. 90% home grown feed**

**2. Environmentally efficient**

**3. Long grazing lactation (285+ days)**

**4. High milk productivity (1,250 kg MS/ha)**

**Compact calving high fertility status dairy herd**

- **CALVE**
- **285+ DIM**
- **DRIED-OFF**
Changing focus of Expanding Grass-based Dairy Systems

- EU Milk Quota removal 2015 – 50% increase in milk production (Food Harvest)
- Stocking rate (SR) governs productivity at pasture (McMeekan, 1956)
- Higher SR - increased grass utilised & milk production/ ha (McCarthy et al., 2011)
- Optimum SR: balancing grass utilisation and milk production efficiency

The key question: What SR will consistently deliver reasonable profits to Irish dairy farmers?
A Review of Two Recent Stocking Rate Studies

1. Curtins Farm SR Study 2009 - 2012

What is the biological potential of SR and herd calving date (MCD) on animal performance and feed utilisation?

2. Ballyhaise Agricultural College Farm System Study 2008 - 2011

A comparison of the productivity of two contrasting pasture-based production systems differing in SR in the BMW region.
Study 1. Description of Treatments 2009 - 2012

3 whole farm stocking rates compared

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<th>2.5</th>
<th>2.9</th>
<th>3.3</th>
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</thead>
<tbody>
<tr>
<td>Stocking Rate (cows/ha)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual Grazing Height (cm)</td>
<td>4.5</td>
<td>4.0</td>
<td>3.5</td>
</tr>
<tr>
<td>Fertiliser (kg N/ ha)</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Concentrate (kg/ha)</td>
<td>850</td>
<td>850</td>
<td>850</td>
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## Milk Production Effects

<table>
<thead>
<tr>
<th>Stocking Rate (cows/ha)</th>
<th>2.5</th>
<th>2.9</th>
<th>3.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactation length (days)</td>
<td>293</td>
<td>290</td>
<td>290</td>
</tr>
<tr>
<td>Milk yield (kg/cow)</td>
<td>5,811</td>
<td>5,434</td>
<td>5,110</td>
</tr>
<tr>
<td>Milk solids yield (kg/cow)</td>
<td>457</td>
<td>426</td>
<td>408</td>
</tr>
<tr>
<td>Milk yield (kg/ha)</td>
<td>14,589</td>
<td>15,978</td>
<td>16,803</td>
</tr>
<tr>
<td>Milk solids yield (kg/ha)</td>
<td>1,144</td>
<td>1,249</td>
<td>1,338</td>
</tr>
</tbody>
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Going from 2.5 to 3.3 cows/ha: milk solids/cow ↓ 11%; milk solids/ha ↑ 17%
Grass Production & Utilisation Effects

- Grass growth increases with SR

<table>
<thead>
<tr>
<th>Stocking Rate (cows/ha)</th>
<th>2.5</th>
<th>2.9</th>
<th>3.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass growth (t DM/ha/yr)</td>
<td>14.2</td>
<td>14.6</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Growth required (t DM/ha): 14.2 15.2 16.2
Cumulative Grass DM Production

Grass growth (t DM/ha/yr)

- **LSR**
- **MSR**
- **HSR**

Stocking Rate

- LSR
- MSR
- HSR

Years:
- 2009
- 2010
- 2011
- 2012

Precession:
- 12.0
- 12.5
- 13.0
- 13.5
- 14.0
- 14.5
- 15.0
- 15.5
- 16.0
- 16.5
Study 2
Ballyhaise Agricultural College Farm System Experiment 2008 - 2011

The Irish Agriculture and Food Development Authority
Grass Growth Characteristics

Growing Season (days)

- Shorter growing season with high peak growth
- Wet mineral impermeable drumlin

(Source: Brereton, 1995)
Improving Grass Production at Ballyhaise

Wetter parts of the farm targeted and managed preferentially

- Improved drainage – open drains / sub-soiling
- Reseeding and stitching with dense diploid varieties
- No silage conservation
- Increased N fertilisation
- Poaching avoided – on-off grazing/ stand off pad/ smaller cows
- Preferential grazing - identified on wedge & grazed > 8cm in good conditions
- Postgrazing residuals of 3.5cm

Growth potential has increased on average from 6.5 t to 12 t/ha
The BMW Region is capable of excellent grass growth
How much additional feed is required to sustain a higher stocking rate on a limited milking platform?

Additional Grass

Grazed grass

Supplements required

HI: SR
4.5 cows/ha

HG: SR
3.1 cows/ha

Experiment 2. Description of Treatments 2008 - 2011
# Effect of System of Milk Production

<table>
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<tr>
<th>Feed System¹</th>
<th>HG</th>
<th>HI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silage fed (kg DM/cow)</td>
<td>326</td>
<td>659</td>
</tr>
<tr>
<td>Concentrate fed (kg DM/cow)</td>
<td>542</td>
<td>864</td>
</tr>
<tr>
<td>MS yield (kg/cow)</td>
<td>377</td>
<td>391</td>
</tr>
<tr>
<td>MS yield (kg/ha)</td>
<td>1,144</td>
<td>1,786</td>
</tr>
<tr>
<td>Growth required (t DM/ha)</td>
<td>15.0</td>
<td>19.0</td>
</tr>
</tbody>
</table>

¹ Feed system HG = Low input pasture system, HI = High output per hectare system
Lessons from Study 1 & 2

- Increasing SR can increase milk output, grass growth and utilisation
- Target winter feed requirements were not achieved for the higher SR
- SRs that grossly exceed the growth capability of the farm (4.5 cows/ha)
  - greatly increase overall milk productivity but
  - contribute little additional grass utilisation and
  - significantly increase purchased feed requirements
- Grazing management focused on increasing DM production & quality
Impact of SR on the feed budget and production costs

Growth: 13 t DM/ha

- Grazed grass
- Silage produced
- Silage purchased
- Concentrate purchased

Stocking rate (cows/ha)

Home grown feed %
Impact of SR on the feed budget and production costs

Growth: 16 t DM/ha

Stocking rate (cows/ha)

Home grown feed %

Silage produced
Silage purchased
Concentrate purchased

Milk production costs (c/l)

Grazed grass
The Effect of SR on the Profitability of Irish Dairy Farms Post EU Milk Quotas

Financial Evaluation: 40 ha dairy farm post milk quota

Assumptions used in paper
Impact of SR on Net Farm Profit/ha @ 28c/l base milk price

Farm Growth Rate: 16 tons DM/ha 13 tons DM/ha

- Effect of SR highly dependant on grass growth
- At higher milk prices, higher SR is more profitable
Impact of SR on Net Farm Profit/ha @ 28c/l base milk price

Farm Growth Rate: 16 tons DM/ha 13 tons DM/ha

- Increase labour efficiency – system simplification

- Major benefits of increased SR realised where both grass and labour utilisation gains achieved

34% 31%
Conclusions

Outlook for Irish milk production is excellent

Future health of expanded industry dependant on milk from grazing

Target minimum SR of 2.4 cows/ha on farm growing 13 t DM/ha

Benefits of increasing SR beyond 2.8 cows/ha?
• highly dependant on farm grass growth - measurement critical
• dependant on increased grass and labour utilisation
• grazing/ nutrient management practices adopted for higher SR
We wish to acknowledge Irish dairy farmer funding of this research

http://www.agresearch.teagasc.ie/moorepark

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