Dairy system sustainability in link to grassland access: a case study

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Introduction

• In Wallonia, 50% of agricultural area are grasslands
• Nevertheless herd size increase and fields dispersion in the territory may limit grazing…
• So farmers and advisers question themselves about the total confinement alternatives

Dairy performances

GHG

Nutriment balance?

Production cost

Labor efficiency

?
Objectives

To compare, during two seasons, the technico-economical and environmental performances of two experimental dairy herds with similar genetic potential:

- Full access to grazed grasslands from May till October
- In cowshed all year long
## Systems description (2010-2012)

<table>
<thead>
<tr>
<th></th>
<th>Zero grazing</th>
<th>Grazing maximization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average herd size cows</td>
<td>26.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Agricultural surface ha</td>
<td>21.9</td>
<td>19.0</td>
</tr>
<tr>
<td>Grasslands</td>
<td>11.7</td>
<td>14.3</td>
</tr>
<tr>
<td>Maize</td>
<td>7.8</td>
<td>3.1</td>
</tr>
<tr>
<td>Cereals</td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Stocking rate cows ha⁻¹</td>
<td>1.21</td>
<td>1.19</td>
</tr>
</tbody>
</table>
* Prim’Holstein breed
* Heifers and dry cows graze in both systems

* Dairy cows diets:

**Zero Grazing**
- 7% Straw
- 27% Maize silage
- 38% Grazed grass
- 28% Concentrates

**Grazing Maximisation**
- 3% Straw
- 26% Maize silage
- 18% Concentrates
- 36% Grazed grass
Dairy performances

ZG: 7,868 kg of milk per cow
GM: 7,286 kg of milk per cow (NS; p = 0.29)

Season effect (p=0.04) with a huge interaction season*system (p<0.01)

➔ No season effect for ZG system but well in GM one: first season (May till July) leads to better performances…
Animal health

* No effect of the system on fertility parameters \((P > 0.05)\) excepted for the delay between calving and first insemination \((69 \text{ vs } 79 \text{ days in } ZG \text{ vs } GM, \text{ respectively } ; p = 0.02)\)

* No effect on mastitis occurrence and impact

* Feet health, one important cause of culling, improved in GM: barn with deep litter excepted in front of the feeding place where slurry is scrapped regularly during the day

Source: Vetvice, PTC+, Gezondheidsdienst voor Dieren

% of the herd with feet problem (Mortellaro's disease)
Mineral balances

<table>
<thead>
<tr>
<th></th>
<th>2010-2011</th>
<th>ZG</th>
<th>GM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen (kg<em>ha⁻¹</em>y⁻¹)</td>
<td>133</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>Phosphorus (kg<em>ha⁻¹</em>y⁻¹)</td>
<td>9</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Potassium (kg<em>ha⁻¹</em>y⁻¹)</td>
<td>106</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Nitrogen (kg<em>ha⁻¹</em>y⁻¹)</td>
<td>93</td>
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<td>13</td>
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<td>107</td>
<td></td>
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</tbody>
</table>

* N balance : + 15 % in GM system
* P balance : 3 to 4 times ↑ in GM system : P of the slurry has to be take into account in a better way in fert. scheme

➔ Lower N balances than observed in commercial farms of the DAIRYMAN network with, in average, 175 and 165 kg N ha⁻¹ for ZG (n = 27) and GM (n= 46) farms, respectively

➔ For P balances, these values were, respectively, of 7.5 and -0.6 kg P ha⁻¹ for ZG (n = 27) and GM (n= 46) farms
These balances, based on TIER 2 methodology, don’t take into account C sequestration in grassland soil. The advantage of GM would be accentuated.
Economics

Higher feeding costs in ZG system linked to:
- Higher cropping cost;
- Higher concentrates dependency
Conclusions

• Zootechnical:
  – No significant difference between the two systems but a more stable production in total confinement

• Economy:
  – Less production cost in grazing maximization system

• Environment:
  – Better mineral balances with the total confinement
  – But less GHG emission with pasture

More advantages to the grazing system nevertheless...
Conclusions (2)

- Some points are missing to evaluate the global sustainability of the system:
  - Fatty acids profile;
  - Workload evaluation and characterisation in terms of farmer satisfaction;
  - ...
- Some factors may limit grazing adoption:
  - Fields distribution in the territory in connection to farm location;
  - Climatic constraints;
  - Technicity of grassland management in order to offer a feed quality as constant and high as possible all year long;
- But some factors may also limit zero grazing adoption:
  - Huge investments
  - Input dependency
  ➔ Both negatively impacting system resilience in unstable economical context (input cost increase, ...)...
Perspectives

• Comparison of more contrasted systems
  • Higher stocking rate in ZG than in GM scheme;
  • Systems with bigger herd size
  • ...

→ Comparison of commercial farms performances for both these contrasted systems of production
Thanks for your attention