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

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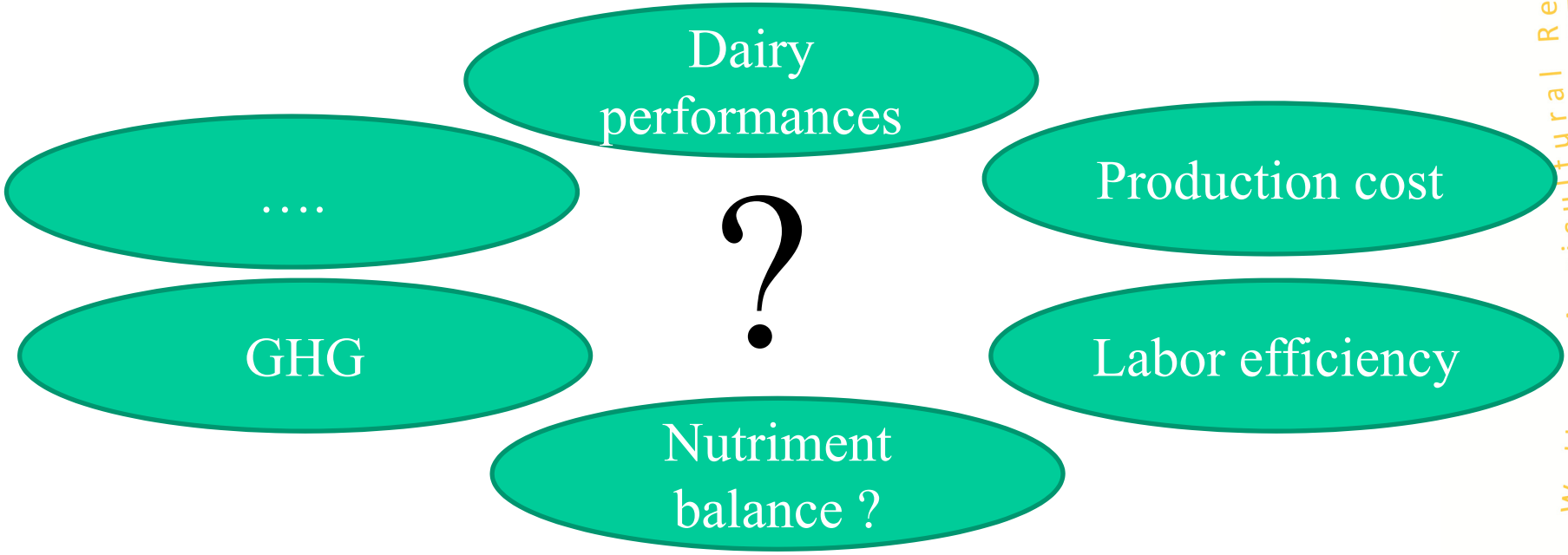
Introduction

- 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



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

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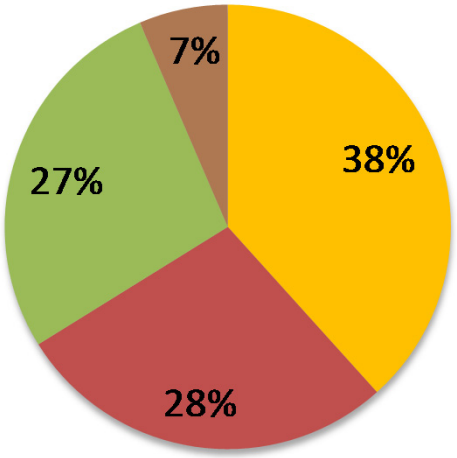
Systems description (2010-2012)

		Zero grazing	Grazing maximization
Average herd size	cows	26.5	22.5
Agricultural surface	ha	21.9	19.0
Grasslands		11.7	14.3
Maize		7.8	3.1
Cereals		2.4	1.6
Stocking rate	cows ha^{-1}	1.21	1.19

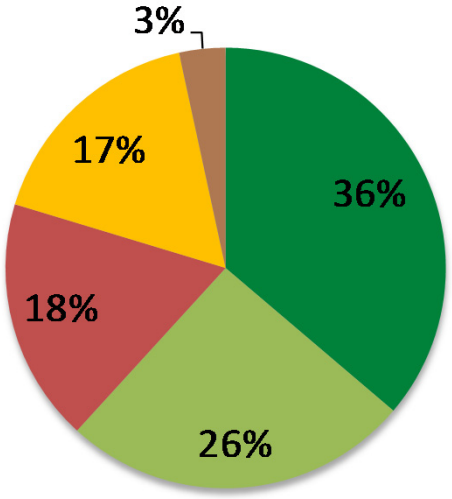
* Prim'Holstein breed
* Heifers and dry cows graze in both systems

* Dairy cows diets :

Zero Grazing



Grazing Maximisation



- Grazed grass
- Conserved grass
- Concentrates
- Maize silage
- Straw

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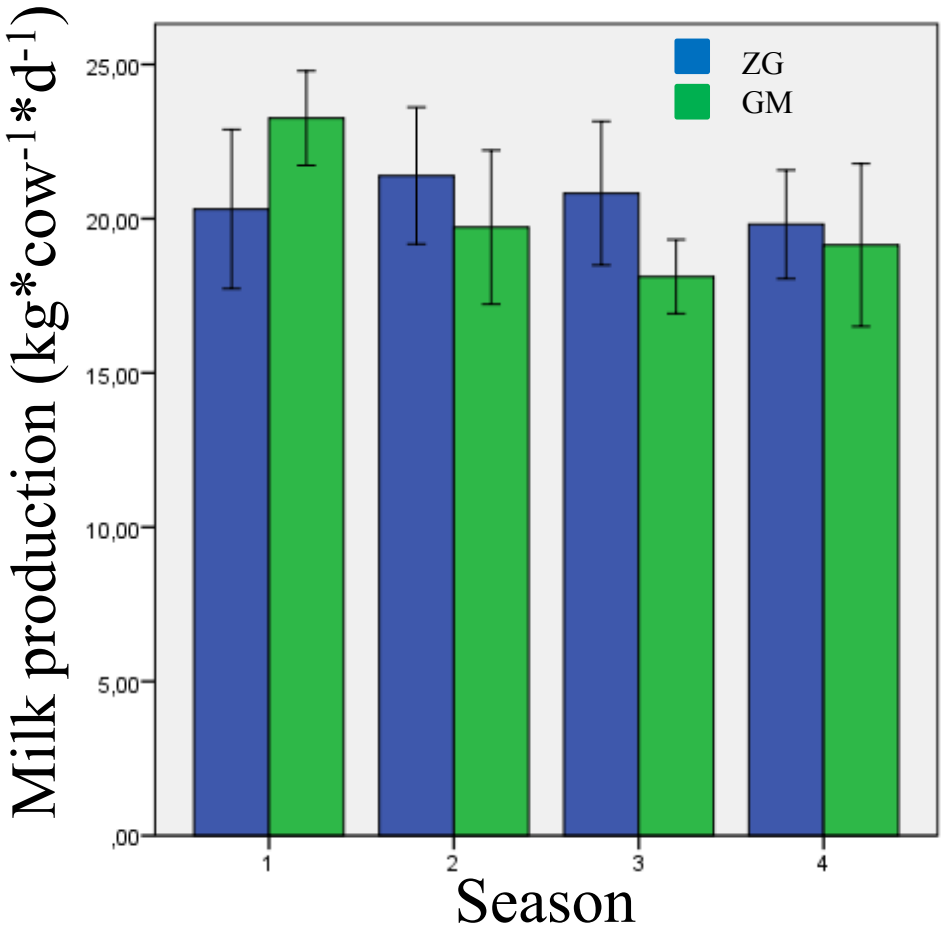
Dairy performances

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…

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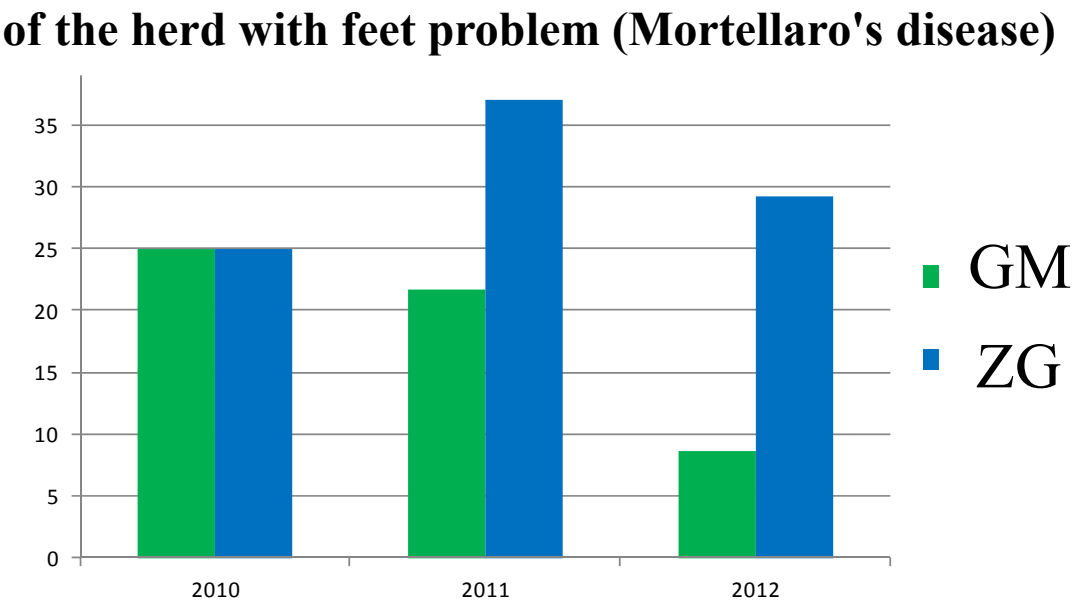
Animal health

* No effect of the system on fertility parameters (P > 0.05) excepted for the delay between calving and first insemination (69 vs 79 days in ZG *vs* GM, 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



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Mineral balances

2010-2011	ZG	GM
Nitrogen (kg*ha^{-1}*y^{-1})	133	154
Phosphorus (kg*ha^{-1}*y^{-1})	9	24
Potassium (kg*ha^{-1}*y^{-1})	106	101
2011-2012		
Nitrogen (kg*ha^{-1}*y^{-1})	93	108
Phosphorus (kg*ha^{-1}*y^{-1})	3	13
Potassium (kg*ha^{-1}*y^{-1})	91	107

* 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

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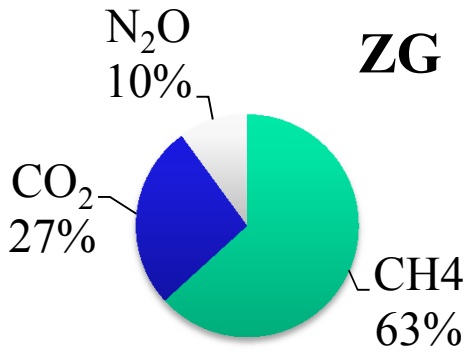
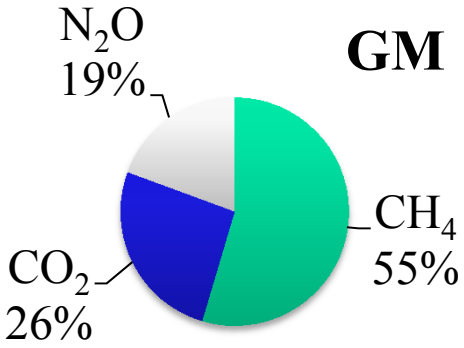
GHG

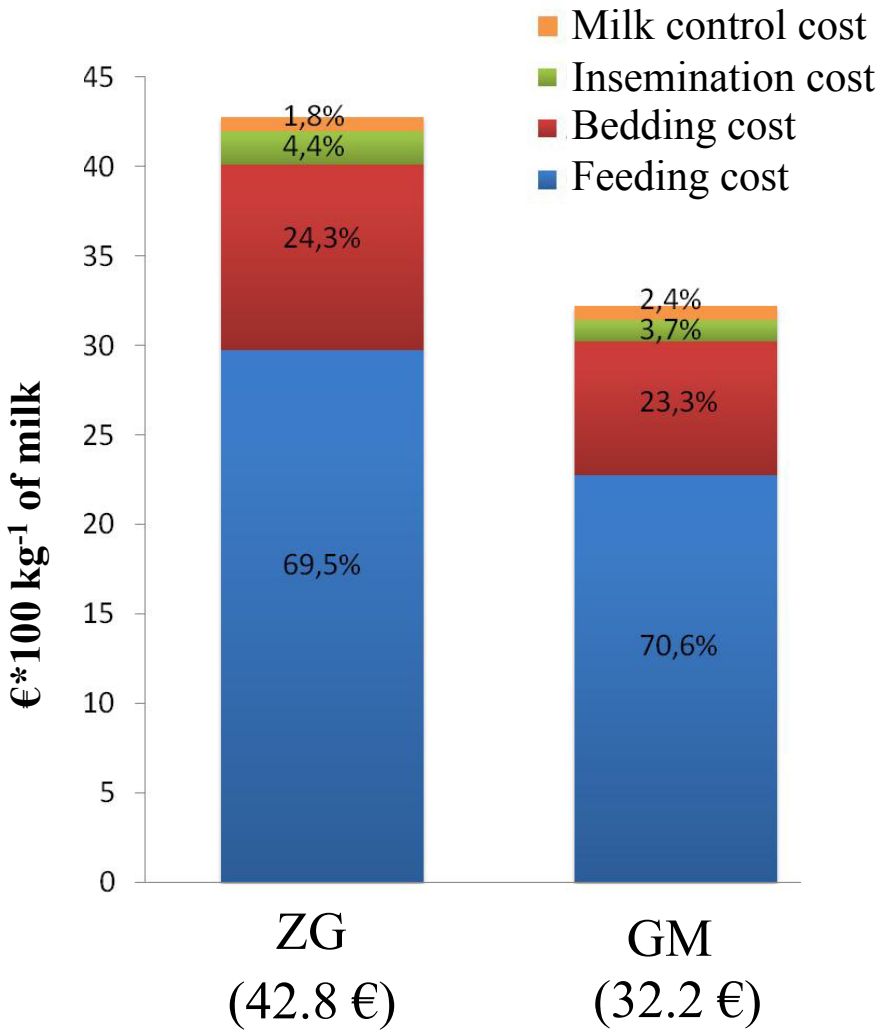
	ZG	GM
kg CO_2 eq*t^{-1} milk	1 350	1 140
kg CO_2 eq*ha^{-1}	10 700	8550





➔ These balances, based on TIER 2 methodology, don't take into account C sequestration in grassland soil ➔ 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