Challenging land fragmentation

Thanks to a mobile robot...

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Main types of management strategies and production systems

Feeding system: grazed grass – maize silage-140 g concentrate per litre milk

Increase in herd size (av. 55 cows) and quota still linked to ground

- Destruction of field organisation
- Decrease in grazeable area per cow around buildings

Increase in purchases of AMS to limit compulsory working time
How to integrate grazing in a robotic milking system?

- 3 experimental sites incl. Trevarez, 21 pilot farms
- 4 years
- Various production systems and climates: plains / mountains

Transfering knowledge:
User’s guide for the robot owner to develop a rearing system based on grazed grass
Trevarez experimental farm

- Located in western France, cool and wet situation (average rainfall: 1260 mm); oceanic climate
- Applied research dairy farm with 150 Holstein cows + 140 heifers - 1,180,000 l of quota - 183 ha
- Target: maximising milk from forages – grazed grass

Variable costs per energy unit:

<table>
<thead>
<tr>
<th>Grazed grass</th>
<th>Stored forages (maize or grass silage, hay)</th>
<th>Concentrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>
The three farmlets in Trevarez

3 systems implemented to fit with main farmers' issues in Brittany

<table>
<thead>
<tr>
<th></th>
<th>S1 Limited access</th>
<th>S2 Average access</th>
<th>S3 Limited access</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 to 201?</td>
<td>48</td>
<td>54</td>
<td>45-60</td>
</tr>
<tr>
<td>Nbr of cows</td>
<td>0.15</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Grazed grass per cow (ha)</td>
<td>0.15</td>
<td>0.38</td>
<td>0.35+0.15</td>
</tr>
</tbody>
</table>

Limited grazable area
Maize silage and conc
9,000 kg milk/cow

Milk from forages
Grazed grass
100 g conc/ l milk
7,500 kg milk/cow

Mobile robot
Organic prod

Milk from grass

EGF congress 2012, Lublin
Trevarez experimental farm: 44 ha of grazable area / 183

As many Breton farms, facing land fragmentation: 4 blocks, distances, road traffic, ...

275 m asl: Cold and wet
Good grass growth
Not suitable for crops

Recently rent; Crops
How to graze the remote areas...a modern way?

- Grazed grass: base of forage system (cost, working time, environmental restraints...)
- New demands on good profile fatty acids, animal welfare
- KEEP GRAZING !!!

- Solutions to graze the non grazeable area?
- Give modern outlook to grazing?
- Bring robotic milking into grass based systems?
The solution? Move cows and milking parlour

- Graze the current non grazeable area thanks to mobile robot
- Moved twice a year in average climatic conditions:
  - 1 summer location (15th April-15th October)
  - 1 winter location in new barn (grazing in transition periods)
- Review of existing prototypes
- Many trips through Europe
- European project (Autograssmilk)
- French Research program and funding
Field allocation for the 3 systems

- Choice of the summer site /2
- Winter site with new building
2 options for the mobile robot

• Political + technical agreement: 2 years
• Specifications written – call for tenders
• 2 options

• Mobile robot on a trailer + platform
• Funding completed July 2011 (400,000 €)
The prototype and its design

- The "Belgian" solution with two trailers (Rolland SA)
- 1 Delaval AMS on a trailer
- 1 trailer for the milk tank
New barn for 60 cows
0.15 ha per cow for grazing
2 groups possible
Winter trials on organic diets
"Innovative building"

Winter site June 2012
The summer location: stabilized platform

- 0.35 ha grass per cow
- Road crossing if necessary (dry conditions)

Access for milkman + tractors

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The production system: organic, self-sufficient and modern

- 45 (...60) Holstein high genetic merit cows
- 8-9 months grazing per year (3-4 months: 100% grass diet); 700 kg concentrate per cow per year
- 7,000 kg milk per cow per yr expected
- Autumn / spring block calvings
  - Where to feed calves?
  - Ais or calvings in a "remote" area?
- OAD milking and crossbreeding: future options
- Maximising milk from AMS and grass (not per cow)
The forage system

In an average climatic year: 2 transfers of cows + robot per year

Forage calendar average year

- Winter site
- Summer site
- Winter site

Forage calendar unfavourable year (1yr/4)

- Winter site
- Summer site
- Winter site
- Summer site

Dry year: 4 transfers

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The targets of the experiments

- Test of a mobile prototype in a remote area: technical issues, wild animals, water and energy supply, WIFI, waste water storage and treatments
- Evaluation and improvement of cow traffic according to fields and tracks design
- Effects of concentrate / buffer feed
- Effect of increased number of cows
- Assess economic efficiency, working time, environmental impacts, acceptability by (organic) farmers, dairy industry and citizens...
State of the project

2012:
- February: robot and trailers ordered
- June: building finished and robot+trailers delivered
- July: start of robot and building in use
- September: first turning out of cows on winter site.

2013:
- February to late April: cows out grazing on winter site.
- Late April: summer site in use

2014: first analytic experiments
Conclusion

The issues around the mobile robot

- Reliability of the prototype
- Milk collecting and milk quality
- ...WORKING TIME AND CONDITIONS / COSTS:
  fixed vs variable
- Transfer into other regions: modern version of “transhumance” for mountains areas?
Thank you for your attention!

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