

Autograssmilk



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Challenging land fragmentation thanks to a mobile milking robot

2 cases of implementation:

Liège and Trévarez experimental farms



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Combining robotic milking and grazing

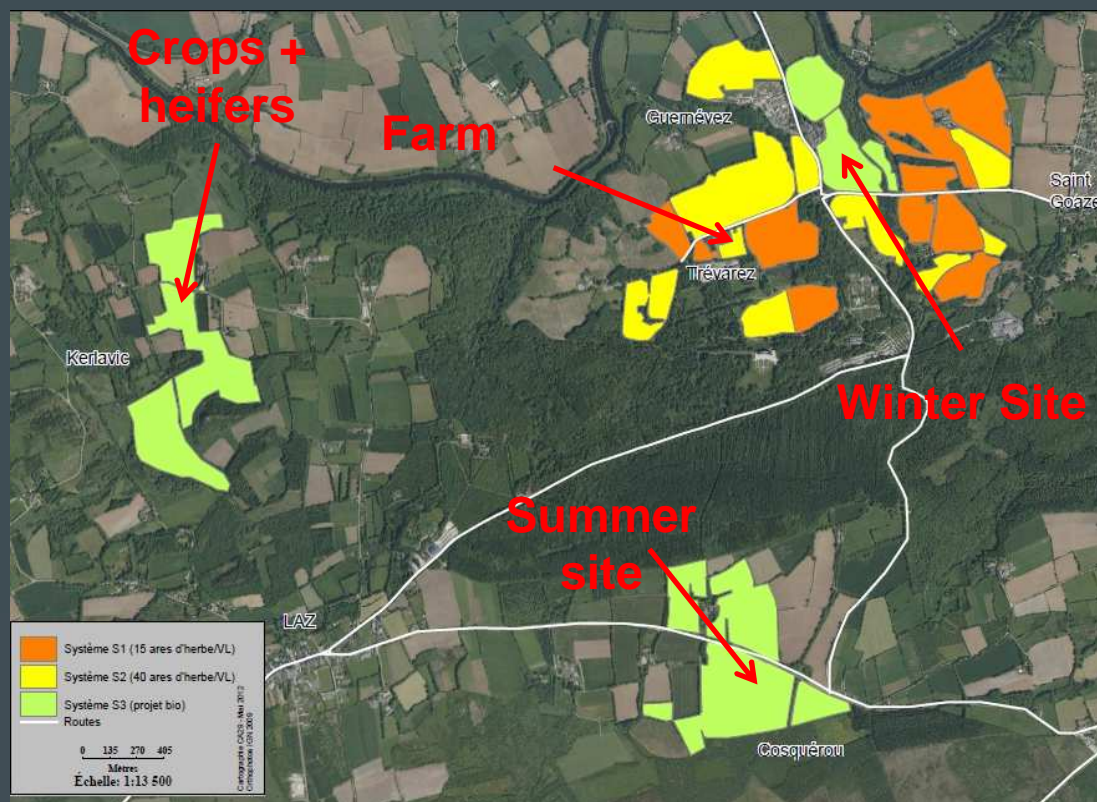
- A continuous increase in AMS worldwide
- Changes in production systems after implementation: less grazing
- Positive aspects of grazing: production costs, health, welfare, CAP greening...
- Increase in herd size: less grazeable area per cow → **fragmented land**



Fragmented farm designs: Liège, Trévarez



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 Trévarez

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The solution ?

- Design of two prototypes of mobile milking robots



Liège



Trévarez





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Implementation of mobile robots

	Liège 	Trévarez 
Year of purchase	2010	2012
colour	red	blue
First grazing (1 st transfer)	2011	2013 (2014)
N# cows	47 Holstein	52 Holstein (organic)
Grasslands	Permanent pasture	Ryegrass + white clover
Grass management	Rotational / strip	Rotational / strip
Paddocks per 24h	2 (AB)	2013 and 2014: 2 (AB) 2015: 3 (ABC)
Paddock management	pre+post grazing heights measurement	



Design of mobile robots

- Two successful experiences with local builders of trailers
- Very few problems since the start – easy to solve
- A "user's guide leaflet" to design your own mobile robot



Deliverable AGM EN and FR



Design of platforms: importance of stabilization around waiting area

Camera

Concentrate silo

Robot trailer

Tank trailer

technical room

 Trévarez





3 directions drafting gate

Stabilized track

Waiting area/ slatted floor / pit





Transfer management: not a problem with 50 cows

	Liège 	Trévarez 
Distance building to summer site	100 m but 4tracks carriage way to cross	4.5 km
Time required (human hours)	15 h (4 people)	13-17 h (3-4 people)
Transfer of	Cows, tank, robot	Cows, tank, robot, drafting gate
Robot stopped	4 h	3-4 h

- After 2-5 years: no longer considered as a problem. Does not require presence of AMS retailer
- Duration of transfer = silage organisation







Performances during grazing period

2014	Liège 	Trévarez 
N# days with 100% grazed grass diet	195	161
N# cows on AMS box	48	50
N# milkings per day	110	97
Milk per day in AMS (kg)	1,002	1,062
Prod cow ⁻¹ d ⁻¹ (kg)	20.5	18.6
Milking freq cow ⁻¹ d ⁻¹	2.3	1.8
Concentrate (kg cow ⁻¹ d ⁻¹)	3.1	0.9
Grazed grass intake cow⁻¹ yr⁻¹ (t DM)	3.15 t	2.65 t

- Grass use far over regional references
- MF consistent with literature (Oudshoorn, Lyons)



Feeding costs and margin over feeding costs



€ per 1,000 l	Liège 	Trévarez 
Feeding cost winter	197 	74 
Feeding cost summer	105	19
Margin over feeding cost winter	172	285 *
Margin over feeding cost summer	264	376 *



* Incl. 15€/1000 l premium organic conversion

- Huge decrease in feeding cost thanks to grazing
- Has to compensate investments related to mobility...



Investments and maintenance costs 2014

€ INVESTMENTS	Liège 	Trévarez 
Overcosts of mobility (trailers, platform, servicing)	90,000	95,000

€ MAINTENANCE 2014	Liège 	Trévarez 
N# milkings performed	41,192	33,061
Total maintenance+repair costs	7,394	6,913
Cost per 1000 l milk	21,5	23,8
Cost per milking €c	18	21

- No overcost of maintenance related to mobility itself compared to references with fixed robots
- Milking with AMS 4 times more expensive than with a 2x8 herringbone milking parlour...



Conclusions: mobile robots

- Mobility = Technically realistic
- Mobile robots robusts, no technical issue until now
- Transfers = not a problem



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Conclusions: mobile robots

- Mobility = Technically realistic
- Mobile robots robusts, no technical issue until now
- Transfers = not a problem
- Targets reached: feeding cost, grass use (over regional averages for AMS farms or even average farms)
- Herd performances (MF, Prod) satisfactory



Some (important) limits

- Overcosts of mobility remain high in particular if no pre existing barn on summer site (servicing) ~ 90-95,000 €
- Balances must be made on total depreciation duration (10-12 years)



Prospects: experiments implemented

- To improve cow traffic and limit human interventions
 - To reduce long waiting times and irregular milking intervals
 - Concentrate levels, paddock allocation AB vs ABC system, n# of fetchings, water supply...
- Impacts on milk quality and animal welfare



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Thanks for your attention



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Overcosts of mobility (trailers, platform, servicing)	90,000	95,000

€, 2014 MAINTENANCE	Liège 	Trévarez 
N# milkings performed	41,192	33,061
Total maintenance+repair costs	7,394	6,913
Maintenance costs	34%	39%
Routine maintenance	21%	25%
Repair costs	45%	36%
Cost per 1000 l milk	21,5	23,8
Cost per milking €c	18	21

- No overcost of maintenance related to mobility itself

