66th EAAP
ANNUAL MEETING

# INNOVATION IN LIVESTOCK PRODUCTION: FROM IDEAS TO PRACTICE

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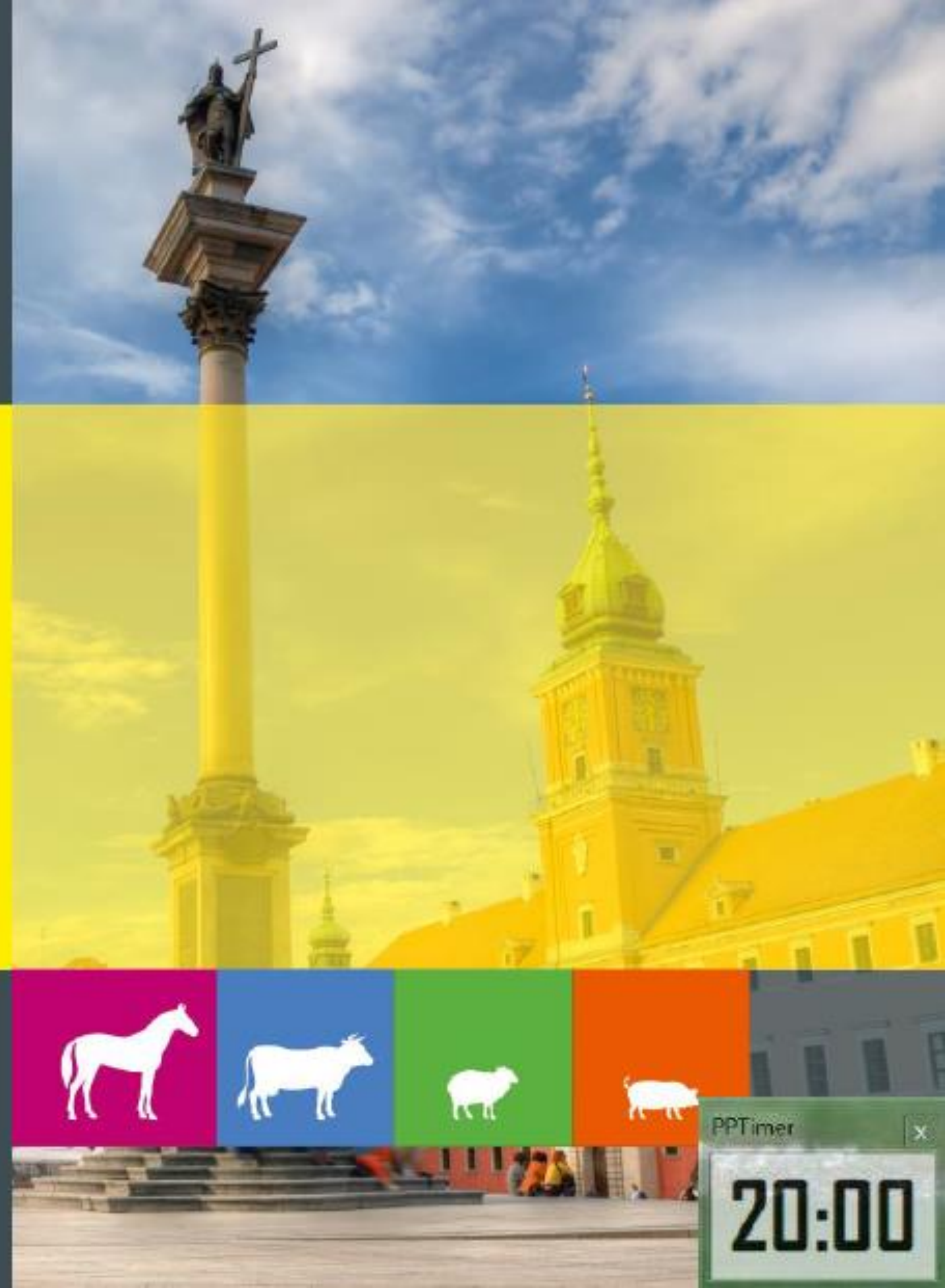

# Milking production, milking frequency and rumination time of grazing dairy cows milked by a mobile AMS

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# Introduction

- AMS spread worldwide

=> new challenges to improve their profitability

- Combining AMS and grazing : possible?

**Yes**

- but needs to warrant good traffic of cows to the robot

# Parameters influencing the traffic of grazing cows to the robot?

**A) Parameters linked to the cows:**

- Hierarchy
- Gregarious behaviour
- « Personnality »

# Parameters influencing the traffic of grazing cows to the robot?

**B) Parameters controlable by the farmer**

- General herd management (calving, number of cows, etc)
- Grazing management
- Concentrate allocation
- Water allocation
- Quality of paths (smooth, mud,…)
- Herd’s health (mammitis, lameness)

# Parameters influencing the traffic of grazing cows to the robot?

**C) Uncontrolable parameters**

- Weather conditions
- Soil conditions
- Day/night rythm
- Distance to the robot

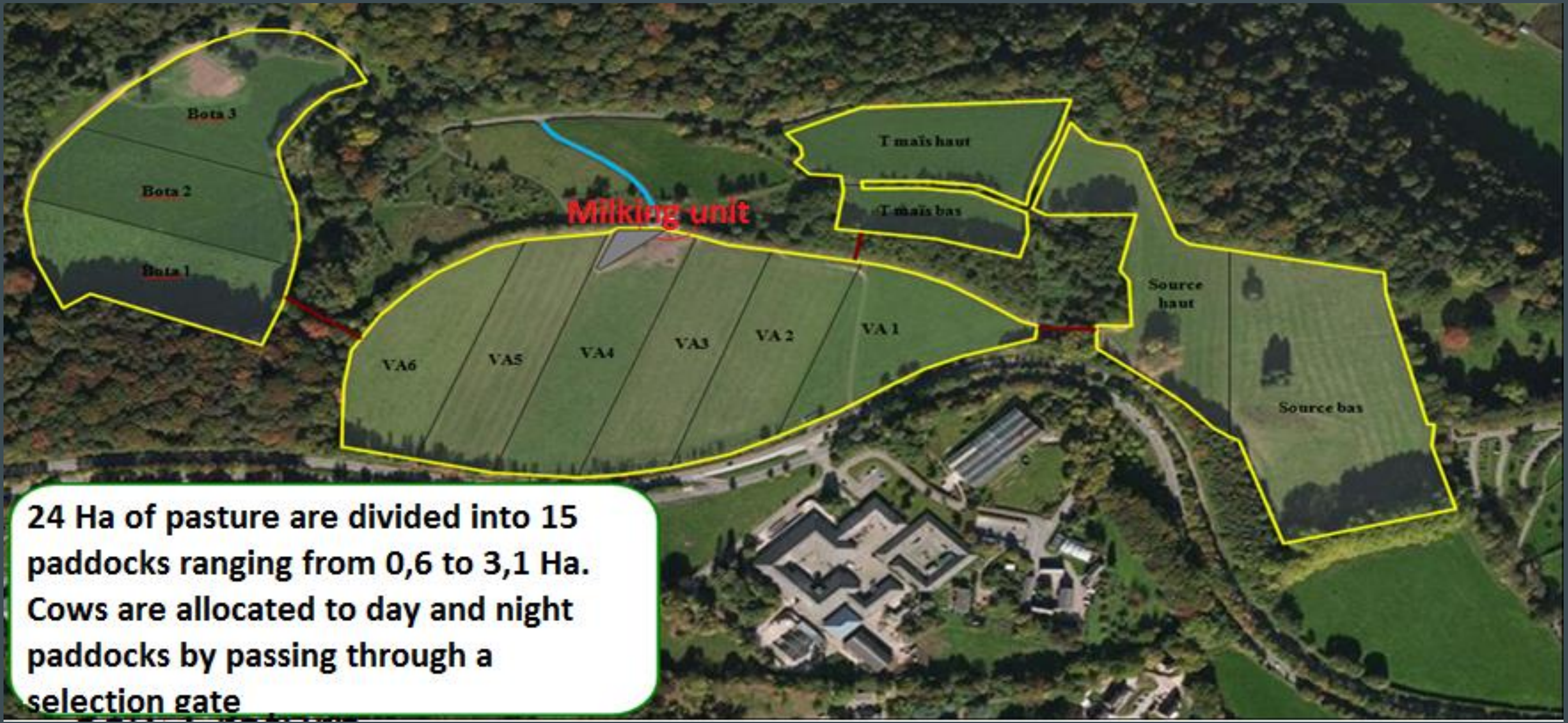
# Weather conditions

- The average temperature has increased by ~1°C over the past hundred years (IPPC, 2013)
- Heat stress periods are likely to be more numerous in temperate areas
- How will heat stress influence cows' traffic to the robot? => Aim of this study

# Material and Methods

- Experimental farm of Sart Timan (Liège – Belgium)
- Herd: 45 Prim'Holstein dairy cows
- Milked on pasture by a mobile AMS (Lely A3®)

# Description of the grazing system




24 Ha of pasture are divided into 15 paddocks ranging from 0,6 to 3,1 Ha. Cows are allocated to day and night paddocks by passing through a selection gate

# Description of the grazing system

Grazing management

- Grass height and cover evaluation
- Day and night allocation
- Strip-grazing
- Grass sampling => nutritional value

Water availability:

- in pastures: depending on pastures
- Big pond near the robot (700 L)


# Determination of Heat stress periods

- Temperature humidity indexes (THI) were calculated according to Ingraham et al (1979)
- $THI = (1.8 \times AT + 32) - (0.55 - 0.55 \times RH) \times [(1.8 \times AT + 32) - 58]$

AT: ambiant T°C- RH: relative humidity (%)

- Heat stress periods were defined by THI >72
- 2 periods of heat stress were identified in July (J) and in August (A)
- Each heat stress period compared with a "normal period"(N).

# Results

## Experimental design

| | | Nb cows | DIM | LN | distance | THI |
|---|---|---|---|---|---|---|
| **July** | HS | 33 ± 0 | 183 ± 85 | 2.46 ± 1.68 | 700 ± 0 | 78.4 ± 4.0 |
| | N | 33 ± 0 | 182 ± 85 | 2.39 ± 1.64 | 635 ± 150 | 69.8 ± 2.0 |
| **August** | HS | 33 ± 0 | 186 ± 92 | 2.58 ± 1.85 | 250 ± 34 | 77.3 ± 4.2 |
| | N | 33 ± 0 | 191 ± 75 | 2.30 ± 1.60 | 304 ± 0 | 67.9 ± 1.6 |

DIM: days in milk; LN: lactation number;
Distance: distance from the paddock to the robot.

# Results

## Grass supply

| Month | Grass height (cm) | | Grass yield (kg DM/ha) | Grass available (kg DM/cow/d) |
|---|---|---|---|---|
| | **Entry** | **Exit** | | |
| July | 12.0 | 6.6 | 1587 | 15 |
| August | 11.4 | 6 | 1734 | 17 |

# Results

| | July | | August | |
|---|---|---|---|---|
| | N | HS | N | HS |
| Milk yield (kg/cow/d) | 21.8 ± 0.6*** | 18.9 ± 0.6 | 17.8 ± 0.9 *** | 19.4 ± 0.9 |
| Milkings (/cow/d) | 2.19 ± 0.08*** | 2.54 ± 0.11 | 2.32 ± 0.10NS | 2.34 ± 0.11 |
| Refusals (/cow/d) | 0.72 ± 0.15 *** | 1.82 ± 0.21 | 0.90 ± 0.17NS | 0.98 ± 0.19 |

Values are least square means ± SE
***: p< 0.001 – NS: p>0.05
Stat: SAS 9.3 proc mixed repeated day random animal – AR(1)

# Results

| | July | | August | |
|---|---|---|---|---|
| | N | HS | N | HS |
| Rumination (min/cow/d) | 440 ± 14*** | 365 ± 15 | 410 ± 14 *** | 306 ± 17 |

Values are least square means ± SE
***: p< 0.001 – NS: p>0.05
Stat: SAS 9.3 proc mixed repeated day – AR(1)

# Conclusion

| HS | July | August |
|---|---|---|
| Milk Yield | ↘ | ↗ |
| Milkings | ↗ | = |
| Refusals | ↗ | = |
| Rumination | ↘ | ↘ |

# Conclusion

Difference between July – August:

- Waste of energy linked to increase in milkings and refusals
- Increase of distance to the robot: 700 m in July – 270 m in August
- Grass cover lower in July (15 kg vs 17 kg)
- Access due to water nearby the robot => easier in August
- THI higher in July

# Conclusion

## Rumination

- Decrease in rumination time during heat stress confirmed by other studies (Calamari et al., 2011)

$\Rightarrow$Heat stress has variable effects on milking parameters

# AUTOGRASSMILK

SEVENTH FRAMEWORK PROGRAMME

# Thank you for your attention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