More efficient use of resources (e.g. land, labour, feed, fertilizer, fossil fuel and water) is one of the biggest challenges to face dairy farming in Europe, directly affecting competitiveness, social acceptability, environmental sustainability and biodiversity/habitats. Through the application of best practice, and practice-based innovation, EuroDairy aims to improve the efficiency of dairy farms in the use of resources, in order to increase technical performance, improve profitability and reduce environmentally damaging emissions to air and water.

For example, improving feed efficiency among dairy cattle herds offers an opportunity to address two mains issues for the dairy farmers. On the first hand, feed costs are an important threat to dairy farmer profitability. On the second hand, there is a greater emphasis being placed on reducing the negative impacts of dairy production on the environment: to lower greenhouse gas (GHG) emissions and nutrient losses to the environment associated with cattle production.

"The resource efficiency use" was the theme of the Eurodairy Workshop organised on September 13, 2017 on the experimental farm of Derval (Pays de la Loire, France).

Work done on the environmental optimization of the Derval dairy farm, combining automatic milking and grazing, was presented and discussed with a delegation from 9 countries.

Topics included nitrogen use efficiency, the carbon footprint of the milk, and the on-farm practices to improve them.

Presentations were made in a room and during the visit of the farm (despite the rainy weather).

Visitors enjoyed the exchanges with the farm staff, in particular how they combine automated milking and grazing, but also how they manage the feed of the herd, the piloting of the wheat fertilization with a drone (to define the right amount of fertilizer), or the weed management.
WEDNESDAY 13 SEPTEMBER 2017

WORKSHOP ON RESOURCE EFFICIENCY

Derval experimental farm case
During the International Exhibition for Animal Production of Rennes - SPACE (12th – 15th sept), a visit to the experimental dairy farm of Derval is organized by the Chamber of Agriculture of Loire-Atlantique and the French Livestock Institute.

This year, this event for advisors, breeders, researchers and stakeholders will be the support for a workshop proposed by the European EuroDairy project on the following topic: the efficient use of resource.

On this farm, combining robotic milking and grazing, the focus is made on research, forage production and environmental issues with the objective to improve the social and environmental sustainability of dairy farms.

PROGRAM
1:30 pm – 5 pm

- Presentation of the farm and its objective to maintain a high level of animal productivity with a low impact on environment in a dry context for forage production
- The environmental assessment: focus on the nitrogen cycle and the carbon footprint of the milk

FARM TOUR
- Combining robotic milking and grazing
- Manure management
- Minimizing the energy consumption
- Pest control

MAIN SPEAKERS
Marc FOUGERE, director of the farm
Sylvain Foray, Idele

LANGUAGE
English and French

TRANSPORT AND REGISTRATION
Website of the SPACE: http://uk.space.fr/international/farm-visits.aspx
Transport is provided from the SPACE after registration

LOCATION
Ferme expérimentale de Derval
La Touche
44590 Derval
Experimental farm of Derval

Marc Fougere, Farm manager, Chambre d’Agriculture de Loire-Atlantique
Sylvain Foray, French Livestock Institut
LIVESTOCK (AVERAGE 2011-2015)

- **86 dairy cows**
  - 712,000 l sold
  - 8,540 litters produced / cow / year
  - 7,790 litters produced / ha forage area
  - Fat content : 4.2% ; Protein content 3.4%
  - Concentrates / l sold : 160 g (364 pounds)
  - Concentrates / cow / year : 1,360 kg

- **75 heifers**
  - First calving age : 28 months

- **Facilities**
  - DeLaval Milking robot - 1 stall
  - Herd navigator
  - Cubbicul Housing with 85 places
CROP PRODUCTION (AVERAGE 2010-2015)

- Agricultural area: 108ha
  - 37 ha of maize silage
  - 57 ha of grasslands
  - 14 ha of wheat

  Silage area: 94 ha (87% of the AA)
  39% of maize in the forage area

Crop rotation

Grassland/ Main fodder area = 61%
Grazing system: Simplified rotating pasture
Composition of temporary pasture:
- White clover + RGA

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>11 TDM</td>
</tr>
<tr>
<td>Wheat</td>
<td>75 q</td>
</tr>
<tr>
<td>Grassland</td>
<td>5.5 – 6 TDM/ha</td>
</tr>
</tbody>
</table>
DERVAL
MEASUREMENTS = 3 ISSUES FOR ONE GOAL

- **Milking**
  - Reduce milking time
  - Milking robot & grazing
    - Consume less energy around milking parlour

- **Forage production on dry condition**
- Improve use of organic fertilizer

- **Environment**
  - Decrease concentrate brought-in
  - Decrease use of mineral fertilizer
  - Decrease use of pesticide
  - Soil cultivation

**Maintain a high level of animal productivity with a low impact on environment.**
EuroDairy is a European project involving 14 European countries and 20 partners. EuroDairy is a thematic network on innovations and aims to support EU dairy farming in these regions where dairy farming is a main economic activity. More information: [www.eurodairy.eu](http://www.eurodairy.eu)

Workshop on Resource Efficiency
Topics

Resource efficiency / Environment

The herd

- 122 Livestock Units (LU)
- 86 dairy cows
  Breeds: Holstein
- 75 dairy heifers
- Calving period: all year round
- Age at first calving: 28 months

Agricultural Area

- 108 ha AA
- 57 ha grassland
- 37 ha maize silage
- 14 ha wheat
- 94 ha forage area
- 39% of maize / forage area

Buildings

Dairy cows
- Cubicle housing with 85 places
- Production of slurry
- Delaval milking robot (1 stall)
- Automatic sorting gate
- Automatic Feed Station

Heifers and calves
- Individual boxes
- Collective boxes on straw litter

Workforces:
- 4 labour units + staff of the KTC

Production

- 732,200 liters of milk produced
- 712,000 liters sold
- 4.2% fat & 3.4% protein content

- Stocking rate: 1.3 LU / ha forage area
- 8,540 l of milk produced / cow / year
- 7,790 l of milk / ha forage area

Aims and constraints

- Maintain a high level of animal productivity with a low impact on environment
- Forage production on dry condition
- Combine automatic milking and grazing

Climate

- 750 mm rainfall / year
- Draining water (Rain – Evapotranspiration): 250 mm
- Average T° in winter: 7.7°C
- Average T° in summer: 15.7°C

Contacts

marc.fougere@loire-atlantique.chambagri.fr
sylvain.foray@idele.fr

Ferme expérimentale de Derval - La Touche - 44590 Derval
MILKING ROBOT AND GRAZING ARE BRIDGEABLE

ONE GOAL, ONE IDEA...

- feed
- 100% grass diet
- production
- saturated robot
- traffic
- reasonable workload

... BUT DIFFICULTIES

- Ensure milkings at night
- Compose with cows’ gregarious instinct
- Act individually or collectively

- 20 hours of milking + 1 hour to clean the robot + 3 hours due to the cows coming in, coming out...
- 70 cows at any time saturate the robot
- 145 milkings every day (2 000 liters of milk)

DAIRY COW NUTRITION

<table>
<thead>
<tr>
<th>FORAGES</th>
<th>Kg DM / dairy LU/ year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize silage</td>
<td>4 300</td>
</tr>
<tr>
<td>Grass silage</td>
<td>450</td>
</tr>
<tr>
<td>Grass grazed</td>
<td>1 500</td>
</tr>
<tr>
<td>Other (hay,..)</td>
<td>50</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6 300</td>
</tr>
<tr>
<td>CONCENTRATE</td>
<td>1 224</td>
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</tbody>
</table>

Forages (% of forage in the annual diet of dairy cows)

- Maize silage 68%
- Grass silage 24%
- Grazing grass 7%
- Others 1%
CROPPING PLAN
Grassland/ Main fodder area = 61 %
Grazing system: Simplified rotating pasture
Composition of temporary pasture:
White clover + RGA
Maize head silage yield: 11 T DM / ha
Grassland yield : 5,5 – 6 TMS (valorized)
Wheat yield : 75 q

Main crop rotations:
Temp. Grass. (5 / 8 years) → Maize (1 year) → Wheat (1 year) → Maize (2 years) → Wheat (1 year)

FERTILIZATION

<table>
<thead>
<tr>
<th>(units per ha)</th>
<th>Organic manure</th>
<th>Chemical fertilizer</th>
<th>Yield</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Kg N</td>
<td>Kg P2O5</td>
</tr>
<tr>
<td>Grasslands</td>
<td>40 m³ of slurry</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Maize silage</td>
<td>50 m³ of slurry</td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td>Wheat</td>
<td></td>
<td>140</td>
<td>0</td>
</tr>
</tbody>
</table>

N min/ ha AA = 32 kg

MINERAL BALANCE (Average 2012-2015)
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<tr>
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<td>ANNA MOSSENI</td>
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<td>JESSY KAMELANTA</td>
<td>INDONESIA</td>
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<td>Alexander Dobylinski</td>
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