An International Perspective on Dairy Herd Fertility

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Causes of poor reproduction are multifactorial:

- Nutrition
- Management
- Genetics
- Health
Yearly averages for conception rate to artificial insemination for lactating dairy cows in either New York State (United States; Butler, 1998) or Ireland (O’Farrell and Crilly, 1999) during the past half-century.
Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.

Sir Winston Churchill
9 November 1942
Daughter Pregnancy Rate (USA)
Source: “Updated Economic Index Promotes Profitability” By Angie Coburn Associate Vice President - Dairy Genetics, Genex January 2010
Ever-Green-View My 1326-ET
Waldo, Wisconsin USA February 2010

32,805 kg of milk*
1,267 kg fat
974 kg protein
1,575 kg lactose

365 d lactation

*3-times average US cow in 2010
Fluid milk (USA)
EBI (Ireland) vs. Net Merit (USA)

- **Production**: 38% (Ireland) vs. 33% (USA)
- **Fertility**: 35% (Ireland) vs. 35% (USA)
- **Calving**: 35% (Ireland) vs. 33% (USA)
- **Health**: 38% (Ireland) vs. 35% (USA)
Genetic change over time
Irish cows

PTA Fat + Protein (kg)

PTA Calving Interval (d)
Dairy Reproduction in the USA 2001-Present

• Unprecedented change in the US dairy industry

• Unprecedented technological advances and innovation in dairy reproduction
Innovations of the past decade:

- Highly effective ovulation synchronization programs (Ovsynch) for fixed time AI (TAI) for lactating cows and virgin heifers.

- Highly effective resynchronization programs for cows that do not conceive to first service.
Innovations of the past decade:
Improved systems for automated estrus detection
Innovations of the past decade: Gender selected semen
Innovations of the past decade: Better and more portable ultrasounds
**Innovations of the past decade:**

**Blood pregnancy tests**

<table>
<thead>
<tr>
<th>Livestock/Poultry Diagnostics</th>
<th>Ruminant</th>
<th>Swine</th>
<th>Poultry</th>
<th>Equine</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDEXX.com</td>
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</tbody>
</table>

*[Image of blood pregnancy test tubes]*

**DG29™**

Bovine Pregnancy Results on Demand

DG29™ is an easy-to-use bovine blood pregnancy test. Blood samples are drawn from cattle on the farm or ranch, forwarded to a certified laboratory, and pregnancy diagnosis is determined by the presence of a pregnancy-related protein. Results are returned to the farm quickly and accurately.
IDEXX Milk Pregnancy Test

Test With Confidence™

Pregnant? Confirm it with milk.
Innovations of the past decade: Automated Milk Progesterone Testing

Fürster Technik: FT Multilyser

DeLaval: Herd Navigator
Herd Navigator System (DeLaval)
Cow 426 – Reproductive Graph

Graphs

Fields

Range: User Defined
New Mexico (United States)

- 172 dairies
- Average herd size 2100 cows
- Average milk production per cow 11,500 kg/year
Clovis, New Mexico

Albuquerque (pop. 555,417)
Clovis, New Mexico
Clovis, New Mexico
Doing the math in New Mexico

- 2100 cow herd
  - 14 month calving interval
  - 30% replacement rate
  - 35% conception rate to AI

- 105 pregnancies every month

- 300 cows found in heat every month
## Fixed time AI (TAI) Program (Presynch-Ovsynch)

<table>
<thead>
<tr>
<th>Sun</th>
<th>Monday</th>
<th>Tues</th>
<th>Wednesday</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Injection 1 (PGF)</td>
<td>Organize groups of 50 – 100 cows based on calving dates.</td>
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<tr>
<td>Week 1</td>
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<tr>
<td>Week 2</td>
<td></td>
<td></td>
<td>Injection 2 (PGF)</td>
<td>Start program on group at about 1 month postpartum</td>
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<td></td>
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<tr>
<td>Week 3</td>
<td></td>
<td></td>
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<tr>
<td>Week 4</td>
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<tr>
<td>Week 5</td>
<td>Injection 3 (GnRH)</td>
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</tr>
<tr>
<td>Week 6</td>
<td>Injection 4 (PGF)</td>
<td></td>
<td>Injection 5 (GnRH)</td>
<td>TAI</td>
<td>60 days postpartum</td>
<td></td>
</tr>
</tbody>
</table>

- **Fixed time AI (TAI) Program**
- **Presynch-Ovsynch**
- **Injection 1 (PGF)**
- **Injection 2 (PGF)**
- **Injection 3 (GnRH)**
- **Injection 4 (PGF)**
- **Injection 5 (GnRH)**
- **TAI**
- **60 days postpartum**
Morning lock down (NM)
Radiofrequency ID (RFID)
(electronic ear tag)
# TAI Breeding Calendar – PAG only – 28 d resynch

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thur</th>
<th>Fri</th>
<th>Sat</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>GnRH (3)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Week 2</td>
<td>PGF (4)</td>
<td>GnRH (5)</td>
<td>TAI</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Week 3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
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<tr>
<td>Week 4</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td></td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Week 5</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td></td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Week 6</td>
<td></td>
<td></td>
<td></td>
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<td>23</td>
<td>24</td>
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<tr>
<td>Week 7</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>35</td>
<td>36</td>
<td>37</td>
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</table>

No heat detection
Blood pregnancy test (PAG) 25 days after AI
Blue = pregnant
Clear = open

<table>
<thead>
<tr>
<th></th>
<th>103 cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>First AI pregnant</td>
<td>55.3%</td>
</tr>
<tr>
<td>Resynch AI pregnant</td>
<td>41.3%</td>
</tr>
<tr>
<td>4 week in-calf rate</td>
<td>73.8%</td>
</tr>
</tbody>
</table>
Innovations of the past decade: Bovine SNP chips and the identification of fertility markers.

FIGURE 1: BOVINESNP50 BEADCHIP

The BovineSNP50 BeadChip features more than 54,000 evenly-spaced SNPs across the entire bovine genome.
Redefining high fertility
Now is the time to define “high fertility”!

Pregnant after an observed in estrus and AI

Pregnant after a timed AI
Now is the time to define “high fertility”!

Pregnant after an observed in estrus and AI

Pregnant after a timed AI
1.07 million Irish dairy cows 
On farms on 30 June 2013

ICBF News, 10 Sept 2013
Take home messages for Irish dairy farmers

• Real progress is being made toward improving fertility and increasing milk production per cow in both the USA and Ireland.

• Be aware and open to new technology that can increase productivity and bring calving interval to the desired 365 days in Ireland.

• Define what “high fertility” means and make sure that the genetics of Irish cows of the future meet your needs as dairy farmers.
Thank you!