**Breeds and Nations of Genomic Evaluation on Seven Traits of Dairy Cattle**

**Portfolio of Interbull evaluations**

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Type</th>
<th>Celacount</th>
<th>Longevity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
<tr>
<td>1999</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
<tr>
<td>2001</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
<tr>
<td>2004</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
<tr>
<td>2005</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
<tr>
<td>2007</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
<tr>
<td>2008</td>
<td>Production</td>
<td>Type</td>
<td>Celacount</td>
<td>Longevity</td>
</tr>
</tbody>
</table>

1. ICAR Guidelines on Sexed Semen and Insemination Technologies in Dairy Cattle

2. International information 乳牛性能分項

3. National Genetic Evaluation Programmes Provided by Countries (12 Nations)

4. 2010 乳牛精液選用研討會

**ICAR Guidelines on Sexed Semen and Insemination Technologies in Dairy Cattle**

**Portfolio of Interbull evaluations**

乳牛精液選配國児規範研討會

Breeds and Nations of Genomic Evaluation on Seven Traits of Dairy Cattle

手册院農業委員會畜產試驗所

行政院農業委員會畜產試驗所

Mr. Ming-che Wu
Cattle Genetic Improvement

- **Genotype x Environment Interaction**
  - Climate, production system, etc

- **Trait Definition**
  - Lactations, days included, etc

- **Methods Used for Nat'l Evaluation**
  - Sire model vs animal model
  - Lactation yield vs. test-day records

- **Estimation versus True Correlation**
  - Connectedness
  - Pedigree and identification errors

Table 1. Improvement of performance in livestock species from the sixties to the present

<table>
<thead>
<tr>
<th>Species</th>
<th>Trait</th>
<th>Sixties</th>
<th>Present</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pigs</strong></td>
<td>Pigs weaned/sow/year</td>
<td>1.4</td>
<td>21</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Lean %</td>
<td>40</td>
<td>55</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Feed Conversion Ratio</td>
<td>3.0</td>
<td>2.2</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Kg lean meat per ton of feed</td>
<td>8.5</td>
<td>170</td>
<td>100</td>
</tr>
<tr>
<td><strong>Broilers</strong></td>
<td>Days to 2 kg</td>
<td>100</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Breast meat %</td>
<td>12</td>
<td>20</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>FCR</td>
<td>3.0</td>
<td>1.7</td>
<td>43</td>
</tr>
<tr>
<td><strong>Layers</strong></td>
<td>Eggs per year</td>
<td>230</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Eggs per ton of feed</td>
<td>5000</td>
<td>9000</td>
<td>80</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>Milk production/cow/lactation (kg)</td>
<td>6,000</td>
<td>10,000</td>
<td>67</td>
</tr>
</tbody>
</table>

‘Average’ &gt;50

* The figures vary greatly between regions and production systems.
The table provides an indication of the change rather than accurate estimates.
Both are operating at 4x their resting energy requirements!

Milk Production in Taiwan how to reach out?

Average Milk Yield of Ten-tons Cows, Breeding Farm and Production Farm in Taiwan DHI Program

2019年台灣酪農戶參加DHI(牛群性能改善計畫)統計(截至2019/5/23)

2019年3月底乳牛飼養場數及在飼養量

### Average Milk Yield of Ten-tons Cows

**Breed Farm**

<table>
<thead>
<tr>
<th>Ten-tons Cows</th>
<th>161</th>
<th>190</th>
<th>138</th>
<th>4.4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>11.5</td>
<td>109.8</td>
<td>557</td>
</tr>
<tr>
<td></td>
<td>115360</td>
<td>62417</td>
<td>52355</td>
<td>578</td>
</tr>
<tr>
<td></td>
<td>28.9</td>
<td>35.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Production Farm

<table>
<thead>
<tr>
<th>DHI (Dairy Herd Improvement)</th>
<th>161</th>
<th>190</th>
<th>138</th>
<th>4.4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>11.5</td>
<td>109.8</td>
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<td>28.9</td>
<td>35.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

http://pigbase.angrin.tlri.gov.tw/pigbase/DairyFarmDHI.asp

2019/07/06 by Mingche WU
3.1.3.3.3.2 Calculated ages at various reproductive events

Many ways of calculating ages and intervals as measures of reproductive performances are reported. In order therefore to provide a comprehensive picture of the trait, the details of the animals involved and of the elements included in the calculation are required.

- **Age at puberty.**
- **Age at first breeding (in days or months).**
- **Age at first successful breeding (in days or months).**
- **Age at first calving (in days or months).**

The first calving of the animal should be checked against normal biological criteria and with reported calving number.

- **Age at nth calving (in days or months).**

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**Canada**

**Figure 2: Average Profit to 6 Years by Age at First Calving in Holsteins**

![Graph showing average profit by age at first calving in Holsteins in Canada](image)

- **Profit to 6 Years ($)**
  - **Age at First Calving (Months)**
    - 20
    - 21
    - 22
    - 23
    - 24
    - 25
    - 26
    - 27
    - 28
    - 29
    - 30
    - 31
    - 32
    - 33

---

**Tropical Dairy Cattle**

**Figure 1: Trend in Average Age at First Calving by Breed**

![Graph showing trend in average age at first calving by breed](image)

- **Canada**
- **Taiwan**

---

**HO Breed**

- **Year of First Calving**
  - 2000
  - 2001
  - 2002
  - 2003
  - 2004
  - 2005
  - 2006
  - 2007
  - 2008
  - 2009
  - 2010
  - 2011
  - 2012
  - 2013
  - 2014

- **Age at First Calving (Months)**
  - 21: 28.0
  - 22: 28.7
  - 23: 29.3
  - 24: 29.8
  - 25: 30.3
  - 26: 30.8
  - 27: 31.3
  - 28: 31.8
  - 29: 32.3
  - 30: 32.8
  - 31: 33.3
  - 32: 33.8
  - 33: 34.3

---
Section 3 - Rules, standards and guidelines for meat production recording

3.1.3.3.10 Calving ease or difficulty, calving mode

Difficult calvings lead to increased calf and cow mortality and could impair the health of the calf, the health of the dam, her subsequent fertility and her production performances.

Dystocia can be of maternal or foetal origin. Maternal factors are:
1. anatomical or pathological defects in the pelvic canal (variation in pelvic opening area, pelvic immaturity, and fibrosis of the reproductive tract);
2. insufficient preparation for parturition or explosive contractions;

Fetal factors are:
1. oversize (relative, absolute or pathological);
2. faulty position;
3. dead calf;
4. twinning.

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Dr Dan Ryan
March 8 2011 5:00 AM
By 2067, the United Nations predicts world population will grow by 3 billion to 10.5 billion people. Most of these folks will be added in Asia and Africa. Not only will population increase, but dairy consumption will increase even more as incomes rise and the demand for diets higher in protein grows. All totaled, milk production will have to grow 13.2 trillion pounds. For that to happen, the average dairy cow in the world will have to double its annual milk production.
Denmark

WHERE WE CAME FROM AND WHERE WE ARE HEADING
Milk recording and data value before and now
Uffe Lauritsen RYK, Denmark

Productivity 1.0 2.0 3.0 4.0

3,800頭
每天擠乳三次
美國南部

Milk recording and data value before and now
Uffe Lauritsen RYK, Denmark

Productivity 1.0 2.0 3.0 4.0
GMACE Methodology

The following materials are recommended readings on the GMACE methodology:

- Sullivan, P.G. 2012a. GMACE reliability approximation. Report to the GMACE working group of Interbull. GMACE_rels 2013
- Sullivan, P.G. 2012b. GMACE variance estimation. Report to the GMACE working group of Interbull. GMACE_vce 2013
- Sullivan, P.G. 2012c. GMACE Weighing Factors. Report to the GMACE working group of Interbull. GMACE_gedcs 2013

https://interbull.org/b/gmace_ref

FIVE CRITERIA FOR BREEDING ROBOT READY COWS

BY JEAN - DOMINIC CARON, ROBOT MILKER ADVISOR, CIAQ

- Somatic cell count and resistance to mastitis
- A good rear leg rear view
- Teat position and length
- Milking speed
- Temperament

COMMON REASONS FOR RETRIEVED COWS

- LANERSNESS 19.0%
- UDDER HEALTH 5.7%
- DISEASE CONFIRMATION 4.5%

AVERAGES OF ALL ROBOT READY™ BULLS

<table>
<thead>
<tr>
<th>Trait</th>
<th>Australasian</th>
<th>European</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTA RBC</td>
<td>+1.52</td>
<td>2.78</td>
</tr>
<tr>
<td>PTA SCs</td>
<td>+1.80</td>
<td></td>
</tr>
</tbody>
</table>

Release dates for year 2019 of national and Interbull evaluations for WORKABILITY TRAITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Breed(s)</th>
<th>Evaluation date(s)</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>BSW, GUE, HOL, JER, RDC</td>
<td>2019-04-08, 2019-08-19, 2019-12-09</td>
<td>above are official releases, additional provisional releases will be released on every first Tuesday of the month (except 1/8 and 6/11)</td>
</tr>
<tr>
<td>Germany</td>
<td>BSW, SIM, HOL, JER, RDC</td>
<td>2019-04-02, 2019-08-13, 2019-12-03</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>BSW</td>
<td>2019-04-02, 2019-08-13, 2019-12-03</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>BSW, HOL, JER, RDC, SIM</td>
<td>2019-04-03, 2019-08-14, 2019-12-04</td>
<td></td>
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<tr>
<td>New Zealand</td>
<td>BSW, GUE, HOL, JER, RDC</td>
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<tr>
<td>Norway</td>
<td>RDC</td>
<td>2019-04-02, 2019-08-13, 2019-12-04</td>
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<tr>
<td>Slovenia</td>
<td>BSW, HOL, SIM</td>
<td>2019-04-02, 2019-08-13, 2019-12-04</td>
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<tr>
<td>Switzerland</td>
<td>BSW, HOL, JER, SIM</td>
<td>2019-04-02, 2019-08-13, 2019-12-04</td>
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</tr>
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https://interbull.org/b/release dates
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Cow traffic concepts

Robotic Milking

https://www.delaval.com/