From genotypes to decisions:

Complete genomic evaluation services for livestock management and breeding

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Manufacturer’s Showcase
EUROFINS SCIENTIFIC
Worldwide excellence in bio-analytical testing

Eurofins is an international life sciences company and the global leader in the bioanalytical testing market

59 Countries

940 Laboratories

>€ 6.7 Billion Revenue

250,000+
Reliable and validated analytical methods

61,000+
Employees

#1 IN EUROPE FOR GENOMICS SERVICES

400 Million
Assays a year
Eurofins Genomics Europe Agrigenomics is part of the Eurofins Scientific group of companies.
Global Genomics Lab Locations

Main Genotyping Labs
- Aarhus, DK
- Wisconsin, US
- Milton Keynes, UK

Satellite Genomics Labs
- Kentucky, US
- Ebersberg, DE
- Tokyo, JP
- Bangalore, IN
- Sao Paolo, BR
Eurofins Genomics Europe AgriGenomics
Aarhus, Denmark

- **DNA Extraction**
  - Custom automation for high throughput
  - Flexibility to handle any sample type

- **Microarrays**
  - ThermoFisher and Illumina platforms
  - Capacity for >4M samples per year and growing

- **NGS**
  - Illumina MiSeq, NextSeq and NovaSeq
  - Ion Torrent S5XL

- **Realtime PCR**
  - Fluidigm Biomark

16,000 sq. ft state-of-the-art lab space dedicated to Agrigenomics
Located at Galten (Aarhus), Denmark
Eurofins’ platforms meet the genotyping needs of any genomics-based breeding program.

<table>
<thead>
<tr>
<th>Features</th>
<th>qPCR</th>
<th>GBS</th>
<th>Microarray</th>
<th>Low pass Seq</th>
</tr>
</thead>
<tbody>
<tr>
<td># Markers</td>
<td>1-192</td>
<td>25-5K</td>
<td>1K-1M</td>
<td>100K+</td>
</tr>
<tr>
<td>TAT (working days)</td>
<td>5</td>
<td>10</td>
<td>5-10</td>
<td>10-15</td>
</tr>
<tr>
<td>Relative cost</td>
<td>$</td>
<td>$</td>
<td>$$-$$$</td>
<td>$$$</td>
</tr>
<tr>
<td>SNP discovery</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Microarrays remain our core business, supporting the majority of our client’s genomic selection programs.

### Industry-leading Array Platforms
Maximum flexibility in terms of throughput and marker density needs

### Fully Automated Workflows
Fastest TATs (5-8 days) within minimal labour costs

<table>
<thead>
<tr>
<th></th>
<th>Infinium Bead Chip</th>
<th>Axiom Array Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>iScan: 170k samples/month</td>
<td>GeneTitan: 172k samples/month</td>
</tr>
<tr>
<td><strong>Sample Formats</strong></td>
<td>24 or 96</td>
<td>96 or 384</td>
</tr>
<tr>
<td><strong># Targets</strong></td>
<td>3,072-700,000</td>
<td>1,500-650,000</td>
</tr>
<tr>
<td><strong>Minimum # Samples (custom)</strong></td>
<td>Format 24: 1,152 Format 96: 100,000</td>
<td>Format 96: 480 Format 384: 1,920</td>
</tr>
<tr>
<td><strong>Multi-species designs?</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Best for</strong></td>
<td>High throughput</td>
<td>Flexibility</td>
</tr>
</tbody>
</table>
Our NGS platforms can support routine applications such as parentage verification (GBS), as well as research projects.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Illumina NextSeq/MiSeq</th>
<th>MGI DNBSEQ-400</th>
<th>ThermoFisher Ion Torrent S5XL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample throughput</td>
<td>Low-Med</td>
<td>High</td>
<td>Low-Med</td>
</tr>
<tr>
<td>Main Applications</td>
<td>GBS AgriPlex: 25-2,500 SNPs Paragon: 7-20,000 SNPs</td>
<td>Microbiome, Low pass sequencing (GBS), RNA-Seq,</td>
<td>GBS Ion AgriSeq 100-5,000 SNPs</td>
</tr>
<tr>
<td></td>
<td>Parentage verification, trait/disease screening, LD genomic selection, marker-assisted selection</td>
<td></td>
<td>Parentage verification, trait/disease screening, marker-assisted selection</td>
</tr>
</tbody>
</table>
Lab workflow at Eurofins Genomics is optimised for **low-cost and high throughput** genotyping at scale

- Ideal for organisations that have the resources to interpret genomic data and develop herd management strategies for their clients, eg.
  1. Large breeding companies
  2. Livestock co-operatives
  3. Livestock associations and consortia

- Outside of the major Western meat and dairy breeds, **there is a global need for customisable, end-to-end genomics solutions**…
Supporting the diverse global livestock community

1. Rare or indigenous breeds
   • Unique genetics and limited numbers

2. Newly established or emerging populations
   • Unique genetics derived through breed formation

3. Cross-bred and Composite breeds
   • Significant genetic diversity compared to purebreds

4. Non-bovine species
   • Different genetic architecture, statistical models and phenotype recording

Using a customised reference dataset for the population in question ensures genomic predictions are accurate and relevant, leading to selection decisions that meet the unique breeding goals.

Girolando is a composite breed developed from Holstein and Zebu cattle (Bos taurus × Bos indicus) and is widely used in Brazil’s dairy industry due to its adaptability to tropical climates, high milk production potential, and tolerance to diseases and parasites. [http://www.girolando.com.br/](http://www.girolando.com.br/)

Brazilian Association of Girolando Cattle Breeders
Diverse breeds have unique genetics and traits that must be optimised for the breeding strategy

1. Breed-specific traits
Consider the breed's inherent strengths and adaptability that align with the breed's intended purpose.

2. Market demand
High demand traits eg. beef marbling or milk fat content.

3. Environmental adaptation
Traits that contribute to adaptability, such as heat tolerance, disease resistance, or forage utilization.

4. Farmer preferences and goals
Management practices, available resources, and personal objectives such as ease of calving, or specific coat colour

Flexible tools for applying genomic selection are key for transitioning diverse livestock farming systems into the future!
Eurofins’ **Complete Solution** for Livestock Breeding

- **Tissue sample**
- **DNA extraction**
- **Genotyping**
- **Data delivery**

**Phenotypic data**
- Milk yield, milk fat etc

**Pedigree data**
- STRs, SNPs, herdbooks

**Herd Management Platform**
- Build custom reference datasets
- Assign genomic evaluations
- Store and secure all records accurately in one place
- Accessible online, anywhere

**Output:**
Custom analytics and selection tools for herd management and improvement...
Democratising access to genomics with **simple to use analytics** and selection tools for breeding

- **Dashboard** presents performance indices, ancestry, carrier and genotype status of the herd against the reference population.

- **Fully customisable** features:
  - Custom reference datasets
  - Customise GEBV, indices, phenotypes

- Use **custom filters** to identify animals for various breeding strategies, e.g.
  - Culling
  - Traditional mating
  - AI
  - **Embryo transfer**
Embryo transfer can be a good breeding strategy to meet a number of goals:

1. **Replication of elite female genetics**, increasing impact on herd genetic progress and accelerate herd expansion

2. **Overcome reproductive challenges** if donor has fertility or conformation deficiencies

3. **Facilitating breed preservation and propagation**, preventing loss of valuable genetic traits and helps conserve rare breeds

4. **Facilitates breeding across distances**, avoiding the need to transport high value animals
Apply relevant filters (GEBV, pedigree, carrier status etc) to select the animals with **best genetics for embryo donors**.

<table>
<thead>
<tr>
<th>General information</th>
<th>Index &amp; evaluations</th>
<th>Genetics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live animals only</td>
<td>Economic index</td>
<td>Genotyping status</td>
</tr>
<tr>
<td>Company</td>
<td>From</td>
<td>Genotyped</td>
</tr>
<tr>
<td>Demo_Farmgroup</td>
<td>To</td>
<td></td>
</tr>
<tr>
<td>Farm</td>
<td>GEBV milk yield, kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>From</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To</td>
<td></td>
</tr>
<tr>
<td>Farm</td>
<td>GEBV fat, kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>From</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To</td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>GEBV fat, %</td>
<td></td>
</tr>
<tr>
<td>Pregnant heifer</td>
<td>From</td>
<td></td>
</tr>
<tr>
<td>Heifer</td>
<td>To</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carriers of diseases (genotyped)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-carriers (genotyped)</td>
<td></td>
</tr>
<tr>
<td>Farm</td>
<td>Non-carrier or unknown (not genotyped)</td>
<td></td>
</tr>
</tbody>
</table>
Sort animals from highest to lowest index (default)
Name and save the custom filter

To save the new filter, please choose a name
Name: heifer for embryo

[Done]
Download list of the Top 50 embryo donor candidates

<table>
<thead>
<tr>
<th>Economic index</th>
<th>Genotype status</th>
<th>Date of genotyping</th>
<th>Diseases</th>
<th>Inbreeding</th>
<th>Inbreeding</th>
<th>Information</th>
</tr>
</thead>
</table>

**Number of animals for download**

Please set the number of animals to download.

50

[Download Table in Excel - range of animals]
Add **additional phenotype filters** for if required

You can add a filter "recommended for embryo transfer" which allows you to **select animals according to certain phenotypic characteristics** which are not displayed in the web-service (non GEBV/indices) eg:

- Age
- Calving interval and number of successful calvings
- Hormone responsiveness

The filter can be **configured for any traits** that are in the client's data
Repeat the filtering process to **select embryo recipients** by applying relevant filters.
Sort animals from lowest to highest index (exclude animals for culling)
Add any additional phenotypic filters (e.g. calving ease)

<table>
<thead>
<tr>
<th>Sex &amp; ID</th>
<th>Inventory ID</th>
<th>Status</th>
<th>Date of birth</th>
<th>Economic index</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEMO_5722</td>
<td>990987</td>
<td>Cow</td>
<td>16-03-2019</td>
<td>-21109</td>
</tr>
<tr>
<td>DEMO_6694</td>
<td>998753</td>
<td>Cow</td>
<td>23-04-2013</td>
<td>-20381</td>
</tr>
<tr>
<td>DEMO_6536</td>
<td>997430</td>
<td>Cow</td>
<td>10-07-2017</td>
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</tr>
<tr>
<td>DEMO_948</td>
<td>969996</td>
<td>Cow</td>
<td>07-01-2014</td>
<td>-18069</td>
</tr>
<tr>
<td>DEMO_2606</td>
<td>993876</td>
<td>Cow</td>
<td>19-02-2020</td>
<td>-17165</td>
</tr>
</tbody>
</table>

Genetic gain

Traditional mating

Embryo recipients

Embryo donors

Embryo donors

Worst animals

Embryo recipients

Animals for sale or cull

Sexed semen AI recipients

Best animals

Economic index
Download candidate list

Number of animals for download

Please set the number of animals to download.

200

Cancel  Done
Summary

• Eurofins Genomics has developed world-class lab capabilities that leverage the economies of scale and automation to deliver the fastest and lowest cost genotyping services.

• We serve all markets globally through our extensive network of labs.

• To compliment our lab capabilities, we are working to bring flexible, easy to use genomic tools to every breeder, large or small.

• Please visit our booth to discuss your breeding goals and learn how more about how we can help.
TESTING FOR LIFE