The “Gene2Farm” and “Fecund” EU FP7 projects

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Gene2Farm: project n. 289592

- Start date: **January 2012**
- Duration: **48 months**
- Budget: **3,943,586,33 €** (req.EU contribution **2,999,593.00 €**)
- Partners: **18** (from 10 countries)

List of Beneficiaries

No	Name	Short name	Beneficiary type	Country
1	Fondazione Parco Tecnologico Padano	FPTP	RTD Performer	Italy
2	ZUCHTDATA EDV-DIENSTLEISTUNGEN GMB	ZuchtData	SME participant	Austria
3	GENO SA	GENO	SME participant	Norway
4	GENOSSENSCHAFT SWISSHERDBOOK ZOLLIKOFEN	SHB	SME participant	Switzerland
5	Associazione Nazionale Allevatori bovini della Razza Bruna	ANARB	SME participant	Italy
6	SVAZ CHOVATELU CESKEHO STRAKATEHO SKOTU	CESTR	SME participant	Czech Republic
7	ASSOCIAZIONE NAZIONALE ALLEVATORI BOVINI DI RAZZA PEZZATA ROSSA ITALIANA	ANAPRI	SME participant	Italy
8	THE ENGLISH GUERNSEY CATTLE SOCIETY	EGCS	SME participant	United Kingdom
9	FEDERACION ESPANOLA DE ASOCIACIONES DE GANADO SELECTO	FEAGAS	SME participant	Spain
10	Schweizer Braunviehzuchtverband	BVCH	Other enterprises or end-users	Switzerland
11	EUROPAISCHE VEREINIGUNG DER FLECKVIEHZUCHTER VEREIN	EVF	Other enterprises or end-users	Germany
12	BIOSCIENCE NETWORK LIMITED	BKTN	Other enterprises or end-users	United Kingdom
13	UNIVERSITETET FOR MILJO OG BIOVITENSKAP	UMB	RTD Performer	Norway
14	THE UNIVERSITY OF EDINBURGH	UEDIN	RTD Performer	United Kingdom
15	UNIWERSYTET PRZYRODNICZY WE WROCLAWIU	UPWROC	RTD Performer	Poland
16	UNIVERSIDAD DE ZARAGOZA	UNIZAR	RTD Performer	Spain
17	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	AUTH	RTD Performer	Greece
18	SRUC	SRUC	RTD Performer	United Kingdom

Gene2Farm: objectives

"Next-generation European system for cattle improvement and management"

- Methods and tools to apply **genomic selection** & co. in (relatively) smaller European **cattle breeds** (mainly dairy cattle)
- Generate **whole-genome sequence** data and **HD-SNP** data
- Research to **benefit** European **SMEs**

Gene2Farm: achievements

- Research papers: **18** (so far)
- Congress abstracts/oral presentations: 21
- 2 Winter Schools organized

- Models and tools for **within-**, **across-** and **multiple-breed genomic selection**
- **~200 whole genome sequences**, **> 6000 genotypes** from **14** dairy, beef, and dual-purpose European cattle populations

Gene2Farm: achievements

TOOLS: (e.g.)

- **SNPchiMp**: SNP data conversions
- **Zanardi**: suite for imputation, data format conversions, quality control, inbreeding ...

ANIMAL GENETICS
BRIEF NOTE

ZANARDI: an open-source pipeline for multiple-species genomic analysis of SNP array data

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Gene2Farm: lessons learnt/challenges

- There is potential for genomic selection in smaller European cattle breeds: **across-breed / multiple-breed genomic selection**

- Genomics is much **more than just GS**:
  - Estimate inbreeding
  - Mate planning (e.g. for conservation)
  - Traceability
  - Identifying carriers of mutation
  - Tracking genes
  - …

- Financing scheme: SME financing RTD, VAT issue with within-country operations (found a way to minimize problems)

Fecund: project n. 312097

- Start date: **February 2013**
- Duration: **48 months**
- Budget: **3,912,282,83 €** (req.EU contribution **2,999,393.00 €**)
- Partners: **13** (from 7 countries)

List of Beneficiaries

No	Name	Short name	Country
1	Fondazione Parco Tecnologico Padano	FPTP	Italy
2	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	LMU	Germany
3	INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE	INRA	France
4	UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND, DUBLIN	NUID-UCD	Ireland
5	VETERINAERMEDIZINISCHE UNIVERSITAET WIEN	WUV	Austria
6	Instytut Genetyki i Hodowli Zwierzat Polskiej Akademii Nauk	IGHZ PAN	Poland
7	AVANTEA srl	AVANTEA	Italy
8	BAYERN GENETIK GMBH	BG	Germany
9	NATIONAL CATTLE BREEDING CENTRE LIMITED	NCBC	Ireland
10	UNION NATIONALE DES COOPERATIVES AGRICOLES D'ELEVAGE ET D'INSEMINATION ANIMALE	UNCEIA	France
11	OSRODEK HODOWLI ZARODOWEJ OSIECINYSP ZOO	OBF	Poland
12	EUROPEAN FORUM OF FARM ANIMAL BREEDERS	EFFAB	Netherlands
13	UNIVERSITA CATTOLICA DEL SACRO CUORE	UCSC	Italy

Fecund: objectives

"Optimisation of early reproductive success in dairy cattle through the definition of new traits and improved reproductive biotechnology"

- gain **new knowledge** on fundamental aspects of **cattle reproduction**
- **identify genetic loci, proteins, miRNAs, biomarkers, novel phenotypes** associated with cattle **fertility**
- evaluate potential applications to cattle breeding and farming

Fecund: achievements

- Research papers: **11** (so far)
- Congress abstracts/oral presentations: **16**
- 1 doctoral thesis (University of Vienna)

- **Two large experiments:** energy balance (low vs high), genetic (low vs high fertility heifers)
- Lots of data (**NGS**) generated on fundamental aspects of reproduction (SNP data, phenotypes, RNA-seq, miRNA, proteomics, biomarkers, metabolites …) from oocytes, embryos, oviducts etc ...
- **Tools** developed: e.g. bioinformatics **pipeline** for automated **gene functional and pathway analysis** (at PTP Science Park)

Fecund: what was not (yet) achieved

(Project still on-going)

- **differential methylation** (**epigenetics**) from **oocytes**
- too technically difficult, too risky
- only 24 cells for each experiment

→ changed to the quantification of DNA Mtase (e.g. by PCR)

Fecund: lessons learnt/challenges

- Complexity of carrying out two large experiments simultaneously

- Deliverables/Tasks linked to comparisons between experiments: better split in order to be able to deliver, and then compare

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Thank you

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