Sustainable Farm Animal Breeding and Reproduction Technology Platform
European Forum of Farm Animal Breeders
EFFAB

- Forum of European farm animal breeding and reproduction organisations (cooperative, industry)
- Ruminants, pigs, poultry, farmed fish
- Established in 1995
- 32 members in 11 countries
Farm animal breeding

- €2 billion annually & cumulative
  - support steady increase in global need for animal food (demand driven)
  - breeding effects are cumulative
  - knowledge and technology intensive
  - breeding and reproduction are society sensitive
  - world leadership for European breeders
FABRE TP

- **Industry** led
- Strong involvement **research**
- Commitment **98** European organisations

- **Start** April 2005
- **Vision Paper** and Launch March 2006
- EU funded project July 2006
- **Strategic Research Agenda** Autumn 2007
- **Implementation Action Plan** Spring 2008
EU Project

Aim
make Strategic Research Agenda (SRA) Implementation Action Plan

• € 377.000
• Executing partners
  – EFFAB, EAAP, Roslin, Genesis Faraday
  – Over 500 specialists involved
3 Phases:

1. Vision Paper
   - Sustainable Farm Animal Breeding and Reproduction
   - A Vision for 2025

2. Strategic Research Agenda
   - End 2007

3. Action Plan
   - Spring 2008

EAAP 2007 Dublin
SRA

- Meet developed vision
- Facilitate and accelerate R&D in animal breeding and reproduction to meet the opportunities and needs of stakeholders
- Specialized subgroups to prepare SRA
- Involvement Member States
- Also socio-economic and horizontal issues
- Future: Action Plan

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SRA planning

Initial draft
Draft + **expert group** opinions
Draft + results of expert meeting
Final SRA +
  - **Country** discussions
  - **Horizontal** discussions

Implementation Action Plan
Spring 2008...
Expert Groups

1. **Species**
   1. Cattle
   2. Sheep/goats
   3. Pigs
   4. Poultry
   5. Horses
   6. Aquaculture
   7. Other/companion

2. **Themes**
   1. Food Quality and Safety
   2. Health, Welfare and Performance
   3. Diversity and Distinctiveness

3. **Technologies**
   1. Genomics
   2. Genetics
   3. Reproduction

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Expert Group

Responsible for the work/drafts:
- Core group of 4 people
- 50% industry, 50% research
- Representations all over Europe

Involvement all interested
- Email discussions
- Stakeholder meeting June 2007 Utrecht
Expert Group Tasks

2 page report with
- opportunities 5-15-25 years
- what if nothing is done
- needs to make opportunities come true
- state of the art
Lost Opportunities: No Research (1)

- Competitiveness against **imported food**
- **Leading position** in animal breeding
- **Balance** breeding goals for the benefit of animal welfare
- Manage **biodiversity** - optimise **land use**
- **↓** in the **environmental footprint**
- Opportunities to improve **animal welfare**
- Reduce **human ill health** through breeding for resistance to zoonoses
Lost Opportunities: No Research (2)

- Meet **consumer’s needs** for affordable, high quality and distinctive food products
- **Respond** to a changing environment
- Inability to take advantage of **new scientific knowledge** for the benefit of agriculture, the environment and society
- A lack of capability to understand the **benefits and risks** of new technologies
- A missed opportunity to gain from **coordination, synergy and critical mass**
Expert Groups - Phenomics

- **Trait measurement and recording**
  - *Cost-effectiveness* of existing tools
  - *Novel measurement* technologies
  - Agreed trait *ontologies*

- **Information from entire chain**
  - Electronic *identification* technologies
  - Genomic *relatedness and traceability*
  - Electronic data capture, storage and retrieval
  - Data *interchange and access protocols*
Expert Groups - Reproduction

- **Efficiency of basic technologies**
  - AI and IVF *efficiency across species*
  - *Semen sexing* technologies
  - Closed breeding cycles for ‘new’ species
  - Cryopreservation of *gametes* etc.
  - Improving *biosecurity*

- **Advanced reproductive technologies**
  - Derivation etc. of livestock *stem cells*
  - Improved *GM* technologies
  - Improved *nuclear transfer*
  - Novel technologies for control of *epigenetic factors*

- **15-25 years**
  - *In vitro gametogenesis and selection*
Expert Groups - Genetics

Tools to analyse, interpret, predict
- Performance across environments
- Heterosis across genetic backgrounds
- Non-linear relationships among traits
- Population level interactions

Using quantitative + molecular data
- Marker / Gene Assisted Selection
- Genome-Wide Selection
- Optimisation of diversity & heterosis
- Optimised breeding programme design

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Expert Groups - Genomics

- Basic tools of genomics
  - Finished **sequence** chicken, cattle, pig, salmon, sheep (horse)
  - Draft sequence for duck, turkey, goat, trout
  - **Bioinformatics**: open-access annotation and interrogation within and across species
  - **SNP panels** (0.5 to 1M SNPs per target species)
  - Transcriptomic tools
  - Other ‘omics tools

- Tools to dissect complex genetic traits from genomic information
  - Gene-gene interactions
  - Gene networks
  - Heterosis and epistasis
  - Epigenetic effects
  - Environmental interactions
Expert Groups - Traits

Priorities traits that drive:
- Safe and healthy food
- Robust, adapted, healthy animals
- Balanced breeding and biodiversity
- Social responsibility
- Competitive and distinctive Europe
- Diversity of benefits
Expert Groups - Traits

The research needs are:

- Genetic and socio-economic parameters for novel traits and improved breeding goals
- Genetic loci relevant to traits and to identify causative polymorphisms
- Basic biology of genetic variation, interaction with the environment underlying trait variation (and genetic change)
- The inter-genomic biology of traits for which there are population level interactions

- 15-25 years
  - Models predicting phenotypic consequences of genetic and environmental variation
29 Country Visits

- Invitations:
  - Industries
  - Research Institutions
  - Ministry of Agriculture
  - Others…

- Number of participants is very large (from 15 to >100)

- Comments and questions on-going process
- Any items missed in present SRA
- SRA: integrated information produced by 13 expert groups => complex
- Country discussions: to create national awareness & additional national funding
- How do we come to priority list for R&D subjects?
We have been...

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</table>
We will go...

13-9-2007 United Kingdom
18-9-2007 Slovak Republic
20-9-2007 Denmark
25-9-2007 Germany
26-10-2007 Italy
21-11-2007 Sweden

Autumn and Spring furthermore:

Malta
Romania
Finland
Spain
Norway
Switzerland
Ireland
Country Visits

• **Positive aspects:**
  – Give voice to *everyone*
  – Raising interest in the FABRE TP activities
  – Advertising the EU support research activities

• **Negative side:**
  – Skepticism
  – *Political and Strategic Issues*
Country Visits

• Preliminary Comments:
  – Very interesting experience
  – Large *enthousiasm*, for many, for being for the first time involved in EU strategy
  – The SRA is **too broad**, needs to give priorities
  – Small countries must give few priorities
Horizontal issues

Technology transfer, education committee advice in SRA 1

Legal aspects: legislation, IPR committee workshop autumn 2007 Brussels

Horizontal meeting ethics, global aspects, consumers… ‘society’ organisations video web cam Spring 2008 Rome

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Future

- Easy reading brochure (20 languages...)
- Annually input/ideas → future research
- European level

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New technologies & data recording for product quality and robustness

Network of excellence for cooperation research, knowledge transfer & innovation

Endemic infections & metabolic diseases of farm animals (incl farmed fish)

Gastro-intestinal health and functionality

International comparability, exchange and access animal health & performance data

Farming systems & climate changes

Genetic diversity & adaptation environments

Consumer perception and attitudes

International technology transfer and life long learning practices

Optimization methods maintain biodiversity

Male fertility genetics accurate phenotyping

Endemic viral diseases of livestock

Large scale genomic information

Genomic tools, novel phenotyping approaches and breeding concepts ruminants

Breeding approaches composition of milk, meat and eggs for nutritional factors
Implementation Action Plan

Exploration:
- Cooperations breeding/research
- The various countries:
  - National breeding platforms
  - Already existing informal platforms
- Funding bodies
- Life long learning breeding
- Technology/knowledge transfer/exchange across Europe
Thank you for your input!
INVITATION
Stakeholder meeting
24 October 2007 Paris
www.fabretp.org