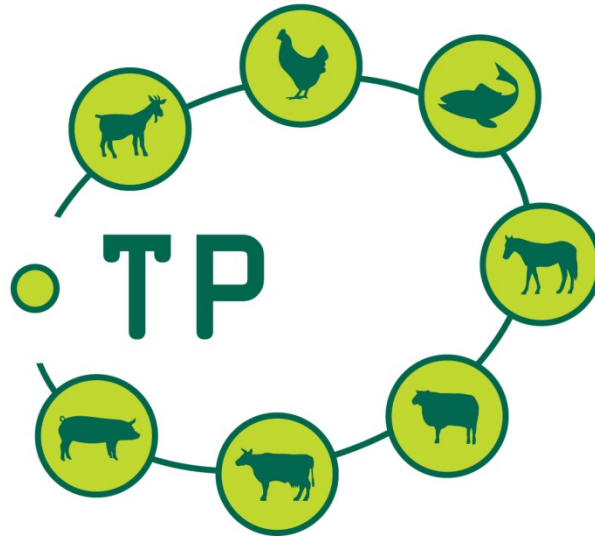


FABRE • TP



STRATEGIC RESEARCH AGENDA

UPDATE 2011

ROBUSTNESS

P. Bækbo, J. Bidanel, N. Gengler and C. Ligda

INTRODUCTION

- Describes the Status Quo
- Prioritises research and development needs for the near and long-term future
- Emphasis on the bi-directional relationship animal – climate change
- Robustness: **The way animal can cope with its environment and potential changes in this environment**



CHALLENGES, KNOWLEDGE GAPS AND OPPORTUNITIES

Climate Change

- Impacts of climate change on livestock

Disease challenge

Fodder /
water availability

Land degradation

- Data on production environment
 - modelling the impact of climate change on animal breeds
 - possibilities of animal breeding to mitigate climate change consequences



CHALLENGES, KNOWLEDGE GAPS AND OPPORTUNITIES

- Environments will become less "optimised" due to welfare consideration
- Genetic characteristics need to be adapted (avoid decrease in fitness)
- Product quality, healthy and safe products
- More robust animals in high producing dairy and beef cattle
- Interaction between breeding and environment
- Optimized animals for economic and production environments



CHALLENGES, KNOWLEDGE GAPS AND OPPORTUNITIES



- Automatic on-farm performance recording
- Interaction between recording protocols and modelling of genetic and non-genetic goals
- Correlations between optimal and “real-life” conditions
- Expert systems based on existing and novel data
- Methods integrating molecular and phenotypic data



CHALLENGES, KNOWLEDGE GAPS AND OPPORTUNITIES

Enabling Factors

- Adapted performance recording systems
→ valuable and novel phenotypic data
- Pooling these resources and linking to genotypes
→ critical mass for genomic research.
- Information of production environment(s)
→ comparisons / evaluation of breed performance
- Training scientific staff, farmers, information exchange with consumers
- Balanced selection goals (production/fitness, short/long term genetic variability), niche production



PROBLEM OF STASIS

- Increase the gap between available and needed animals
- Increase the gap between technological possibilities and adequate use
- Industry unable to adapt and face challenges
- EU citizens will not find the quality of products and production circumstances
- Lack of research → continue diminishing functionality of animals and animal welfare (lack of adaptation to production circumstances)



RESEARCH PRIORITIES – SHORT TERM -1



- Improved performance, environmental impact, health and welfare recording for diverse commercially and socially important traits
 - Sustainable performance recording linked to genotypic data
 - Product quality (innovative methods)
 - Biological efficiency and environmental sustainability
 - Animal health
 - Animal welfare
 - Linking of existing databases, easier data exchange, obtaining data in commercial use environments



RESEARCH PRIORITIES – SHORT TERM -2

- Improved genetic evaluations for performance, health and welfare traits
 - Routine combined genetic evaluation, using optimally existing Databases
 - Novel traits: product quality, animal fitness, robustness
 - EU wide cooperation on common breeding animal comparisons
 - Proper use of international evaluation results in developing countries
- Improved breeding programmes for performance, environmental impact, product quality, health and welfare
 - Breeding for improved products and production circumstances, health, environmental impact, welfare traits and reproduction, social considerations



RESEARCH PRIORITIES – LONG TERM – 15 year

- Genomic information
- New ways of getting traits closer to the genes and animal physiology
- Selection for product quality and animal robustness
- Advanced modelling for new and potentially massive data
- Integration of GxE in routine genetic evaluations.
- Interaction, data exchange, distributed computing and expert-systems
- Genetic solutions to diseases → generalised immunity. Molecular or polygenic genetic mechanisms specific to individual diseases
- Alternative methods to experimental challenges
- Use of laboratory species to identify disease resistance candidate genes



RESEARCH PRIORITIES – LONG TERM – 25 year



- Increase capabilities to:
 - monitor directly biological processes to gain new inside into animals
 - acquire molecular, gene-expression and other novel types of data
 - analyze data and predict genetic merit and non-genetic management related values
 - manage animals, select the best and disseminate superior germplasm



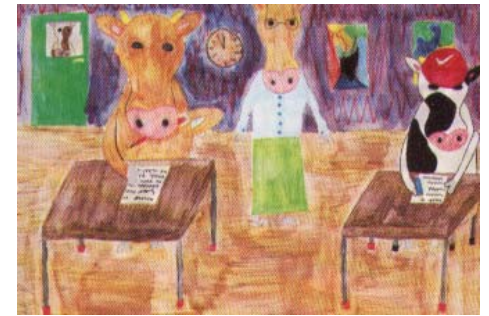
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Thank you for your attention!

