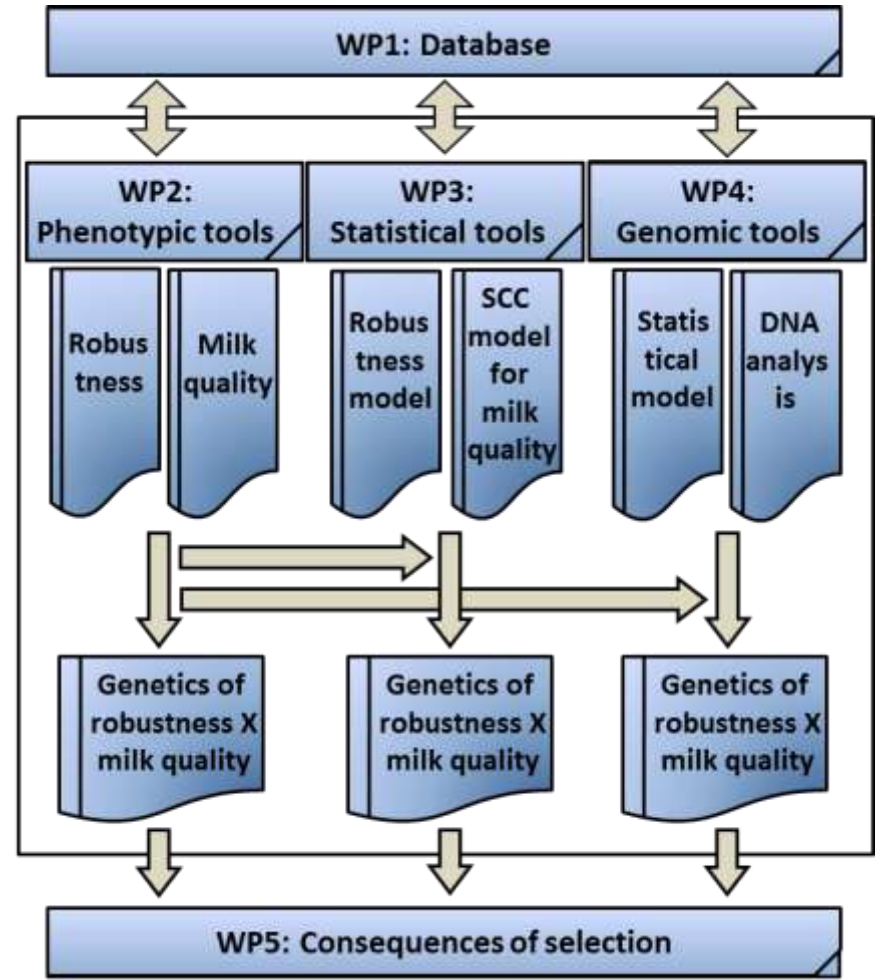


Develop innovative and practical breeding tools for improved dairy products from more robust dairy cows



Partners

Scottish Agric.
College (SAC)

Swedish Uni of
Agric. Sci. (SLU)

Moorepark

Lelystad Animal Sciences

Wageningen Uni.

Gembloux Uni.



Objective

To develop new practical technologies to allow breeders to re-focus their selection to include milk quality and dairy cow robustness and to evaluate the consequences of selection for these traits taking cognisance of various milk production systems

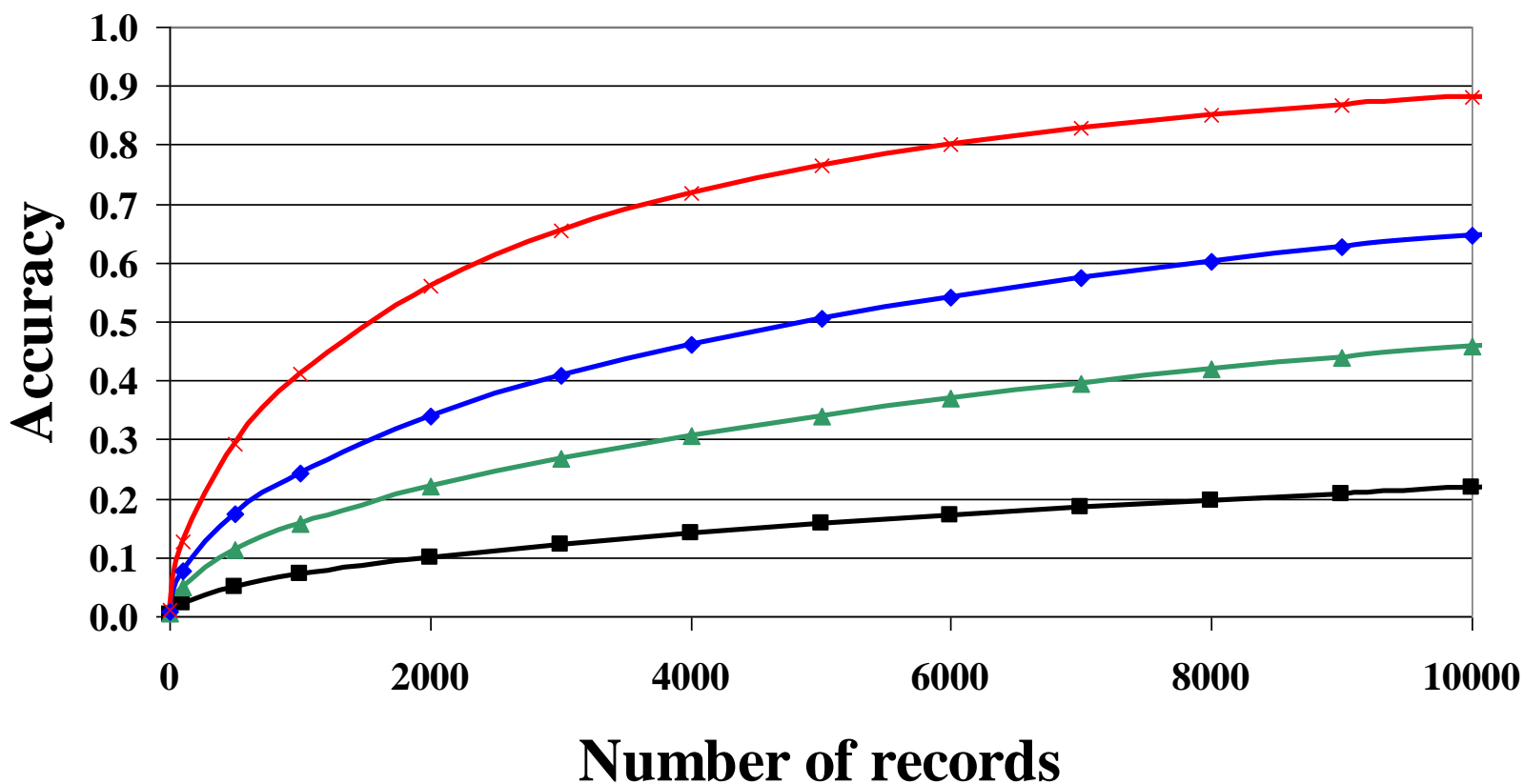
Healthy, fertile,
long-living cow

capacity to handle
environmental disturbances

- How to find topper for milk quality & robustness?
- Develop selection tools (EBV)
 - Measure new traits
 - Statistics to get more out of existing data
 - Genomics
- RobustMilk follows all three routes

WP1. Common database

Accuracy of genomic selection



■ $h = 0.03$ ▲ $h = 0.15$ ◆ $h = 0.35$ ✕ $h = 0.90$



[Home](#) | [Explore Database](#) | [Animal List](#) | [Upload](#) | [Phenotypic Data](#) | [Documents](#) | [Admin](#) | [Field Tags](#) | [Logout](#)

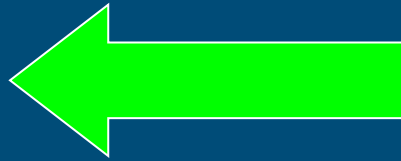
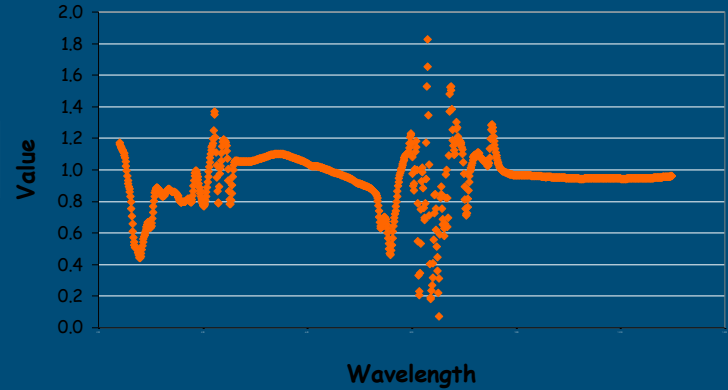
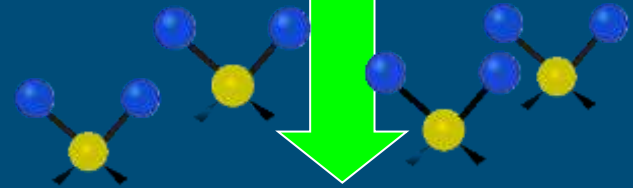
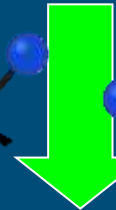
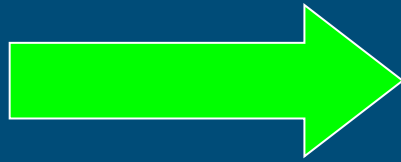
Database Name	Table Name	Description	Choose
T'Gen	hollandPhenoTable1	Wageningen phenotypic breed table	<input type="radio"/>
T'Gen	hollandPhenoTable2	Wageningen birthdate and genetic line	<input type="radio"/>
T'Gen	hollandPhenoTable3	Wageningen milk sample analysis data	<input type="radio"/>
Teagasc	irelandPhenoRbBreeds	Teagasc breed 1 and breed 2 composition of animals	<input type="radio"/>
Teagasc	irelandPhenoRbExperiments	Teagasc experiment period detail of animals	<input type="radio"/>
Langhill	langhillPhenoTable1	SAC Table of genetic line and feed group details	<input type="radio"/>
Langhill	langhillPhenoTable2	SAC Table of breeds and breed percentages	<input type="radio"/>
Langhill	langhillPhenoTable3Weekly	SAC Table of milk yields and content analysis	<input type="radio"/>
Langhill	langhillPhenoTable4	SAC Table of calving/service details	<input type="radio"/>
Langhill	langhillPhenoTable5	SAC Table of sporadic health events	<input type="radio"/>
T'Gen	hollandPhenoTable4	Wageningen calving/heat details	<input type="radio"/>
Teagasc	irelandPhenoRbFixedEff	Teagasc fixed effects of animals	<input type="radio"/>
Teagasc	irelandPhenoRbLactation	Teagasc lactation details of animals	<input type="radio"/>
Teagasc	irelandPhenoRbRoutine	Teagasc routine milk sample details	<input type="radio"/>
Teagasc	irelandPhenoRbSporadic	Teagasc sporadic codes and dates of events involving animals	<input type="radio"/>
T'Gen	hollandPhenoNBZMaster	Wageningen extra animals master table	<input type="radio"/>
T'Gen	hollandPhenoNBZPedBreed	Wageningen extra animals pedigree/breeds	<input type="radio"/>
T'Gen	hollandPhenoNBZTable1	Wageningen extra animals breed compositions	<input type="radio"/>
T'Gen	hollandPhenoNBZTable2	Wageningen extra animals genetic merit	<input type="radio"/>
Langhill	langhillPhenoProgesterone	direct transfer from langhill Progesterone table	<input type="radio"/>
	phenotypicAnimalsUnion	Union of animals with phenotypic data from all partners	<input type="radio"/>
	phenotypicMilkUnion	union of milk sample data from partners(Langhill,ASG and MPK)	<input type="radio"/>

[View Table Contents](#)

Logged in as Donagh Berry.

WP2. Phenotypic measurement tools

What is "Mid infrared" (MIR)?



Group	Num of Cows	N Kg F Kg P Kg	F% P %	Surv% CI Days	Milk Solids % Contrib	Fertility % Contrib	Calving % Contrib	Beef % Contrib	Health % Contrib	EBI €
Overall Cows	81	158	7.8 0.03 7.8 0.04	-0.1 -0.3	€ 44 70.8%	€ 2.7 44%	€ 15.4 24.8%	€ -7.4 0%	€ -1.7 0%	€ 53
1st Lactation	16	187	7.7 0.03 7.4 0.04	-0.2 -0.4	€ 45.8 89.4%	€ 2.5 3.8%	€ 17.7 28.8%	€ -7 0%	€ -1.6 0%	€ 57
2nd Lactation	22	148	6.5 0.02 6.5 0.03	-0.4 -0.4	€ 30.8 73.3%	€ -0.4 8%	€ 14.4 22.7%	€ -8.4 0%	€ -1 0%	€ 44
3rd Lactation	18	196	7.9 0.04 6.7 0.03	-0.5 0.7	€ 42.4 70%	€ -14.8 8%	€ 13.3 39%	€ -9 0%	€ -0.8 0%	€ 31
4th Lactation	10	125	8.0 0.06 5.8 0.03	0.0 -0.8	€ 39.2 81.4%	€ 11.5 18%	€ 13.1 20.6%	€ -8.3 0%	€ -1.6 0%	€ 54
5th Lactation (*)	15	189	8.4 0.05 8.5 0.04	0.9 -1.1	€ 53.8 96.0%	€ 22.5 23.8%	€ 18.6 19.7%	€ -3.9 0%	€ -3.8 0%	€ 87

Proportion of variance explained

Fatty acid	ROBUSTMILK	Dutch	Ireland
	n=250	n=190	n=144
C4:0-C12:0	0.83 to 0.90	0.84 to 0.92	0.82 to 0.93
C14:0	0.91	0.94	0.92
C16:0	0.86	0.93	0.90
Saturated	0.98	0.99	0.98
Mono-unsat	0.96	0.92	0.90
Poly-unsat	0.83	0.48	0.69
Short chain	0.91	0.96	0.93
Medium chain	0.91	0.96	0.96
Long chain	0.91	0.87	0.91

Variance explained

- **Energy balance**
 - Across lactation = 0.50 to 0.58
 - Early lactation = 0.49 to 0.61
- **Energy intake**
 - Across lactation = 0.67 to 0.72
 - Early lactation = 0.64 to 0.77
- **Body condition score**
 - Across lactation = 0.20 to 0.23
 - Early lactation = 0.00 to 0.04

WP3. Statistical tools

Objective

- Develop the statistical tools to model robustness (*i.e., sensitivity to micro- and macro-environments*)
- Develop statistical tools for modelling milk quality (somatic cell count)
- Joint models for milk quality and robustness

Outcomes to date

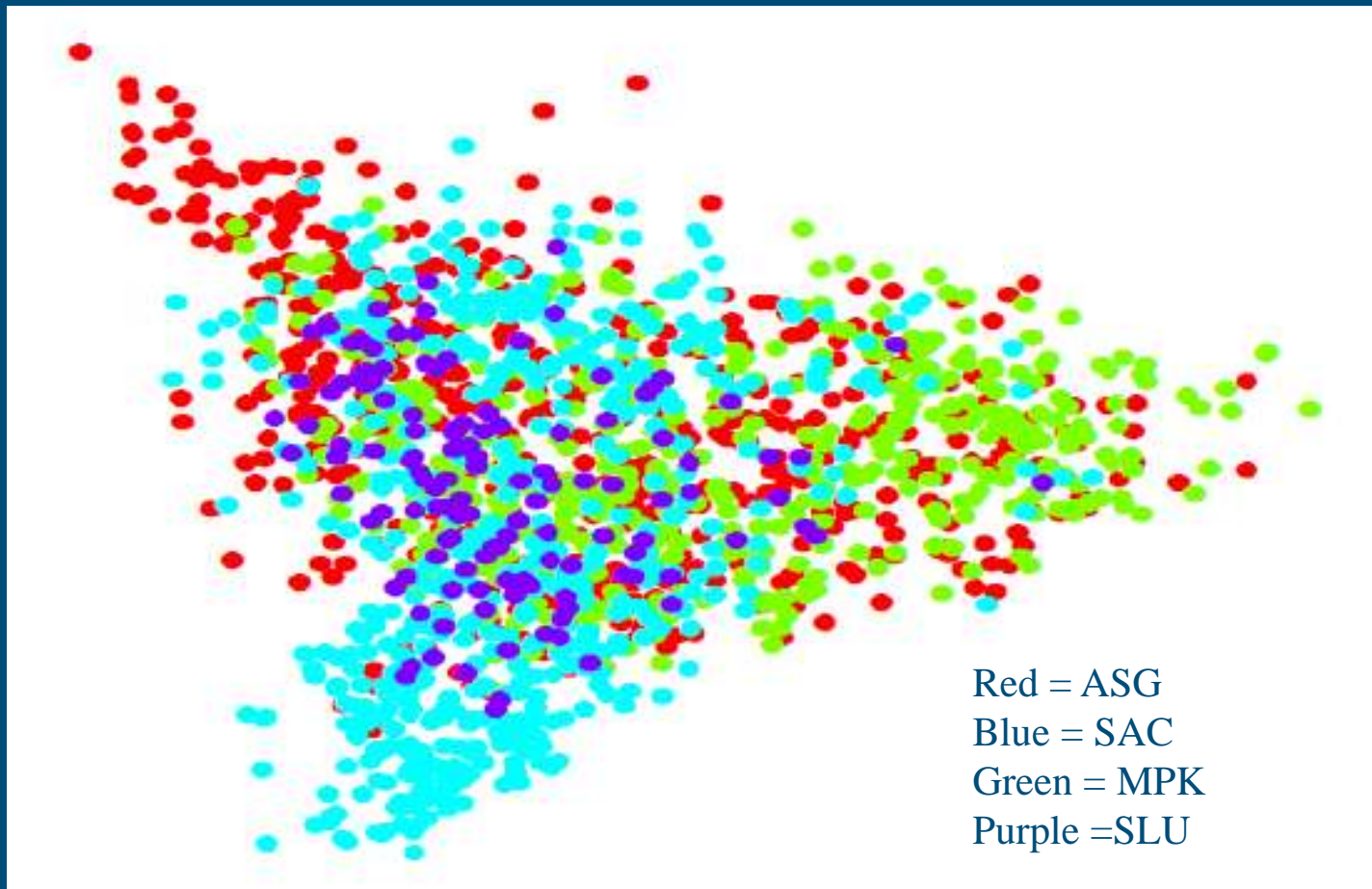
- $SCC > 500,000$ cells/mL and $\log \sigma_{SCC}$ better predictor of mastitis irrespective of whether measured weekly or monthly
- Genetic evaluations for probability of getting mastitis and probability of recovering from mastitis using just SCC data
- Developed statistical methodology to estimate genetic variation in residual variance

WP4. Genomic tools

Approach

- Holstein cows from four countries (#1816)
 - Ireland: 415
 - Scotland: 558
 - Sweden: 209
 - The Netherlands: 634
- Illumina Bovine50 Beadchip

How alike is the genetics in the herds?



Outputs

- Improved prediction equations for milk fatty acids
 - Being used by Optimir project
 - Being rolled out in UK, Belgium and Ireland
- New equations for Lactoferrin
- Milk spectral data routinely collected in many countries
- Use of spectral data being explored to predict many new traits
- Discussions opened with other research herds for merging of feed intake data for increased power
- TSB project in UK to roll out fatty acid profiles in milk recorded cows

Conclusions

- Progress can only be achieved by working together and intellectual property should be left at the door
- Huge potential for developing phenotypic tools...just a bit of clear thinking
- Improved models for evaluating udder health
- Significant genomic associations detected with ~1,800 cows



<http://www.robustmilk.eu>



ROBUSTMILK

Home

Project

Publications

Participants

Contact

Title

Title

The full title of this European Project is:
Innovative and practical breeding tools for improved dairy products from more robust dairy cattle

Objective

Objective

The objective of RobustMilk is to develop **new practical technologies** to allow breeders to re-focus their selection to include **milk quality** and dairy **cow robustness** and to evaluate the **consequences of selection** for these traits taking cognisance of various milk production systems.

The **leaflet about the RobustMilk project** is available ([Leaflet](#)).

News

News

Results obtained so far in the project have been summarized and are available: [WP1](#), [WP2](#), [WP3](#), [WP4](#) and [WP5](#).

What does a **genotype** look like? ([more](#)).

The **list of publications** was updated ([more](#)).

The RobustMilk project receives financial support from the Commission of the European Communities, FP7, KBBE-2007-1. This presentation represents the authors' views and does not necessarily represent a position of the Commission who will not be liable for the use made of such information.

