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Upgrading dairy cattle evaluation system in Russian Federation.

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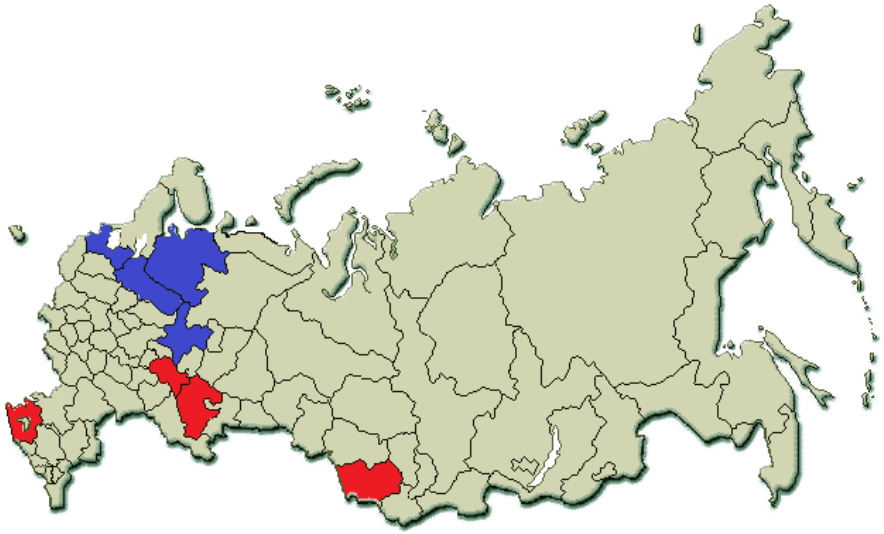
Interbull, Tallin, 26.08.2017

Russian Dairy Industry - Background

- Number of cows: **8.3 millions**
- Main breeds.
  - Black and White – 54,2%
  - Holstein - 13,9%
  - Simmental – 7,1%
  - Kholmogor – 7,1%
  - Other breeds – 17.7%
- Type of Farms.
  - Breeding herds
  - Breeding reproducer
  - Commodity farms



- Max production regions. (Red)

Bashkortostan republic– 1812K kg

Tatarstan republic– 1751K kg

Altaysky kray- 1413K kg

Krasnodar kray- 1320K kg

- Regions with max per cow production lavel. (Blue)

Leningrad region – 8432kg (74 farms)

Archangelsk region – 7444kg (15 farms)

Kirov region – 7328kg (54 farms)

Vologda region – 7320kg (50 farms)

RRIFAGB Background

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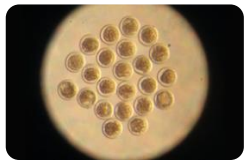
- Russian Research Institute of Farm Animal Genetics and Breeding established in 1969.
- State research and service institute for cattle, poultry and pigs.

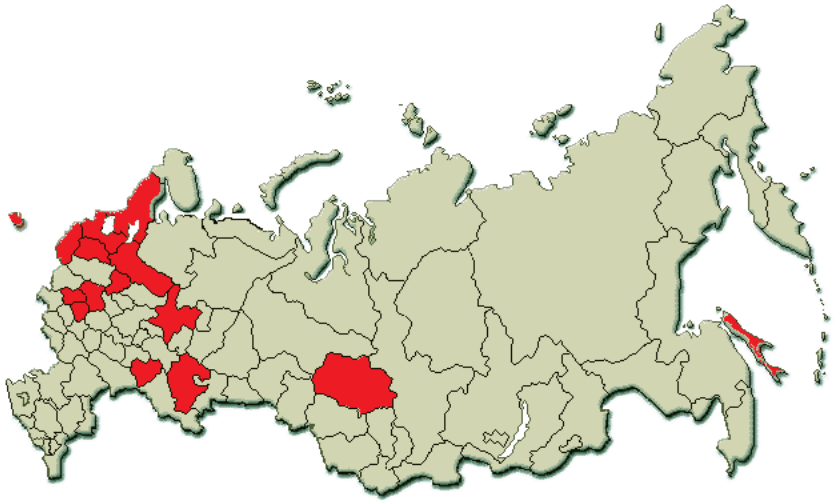






- Black and White, Holstein and Ayrshire cattle association.





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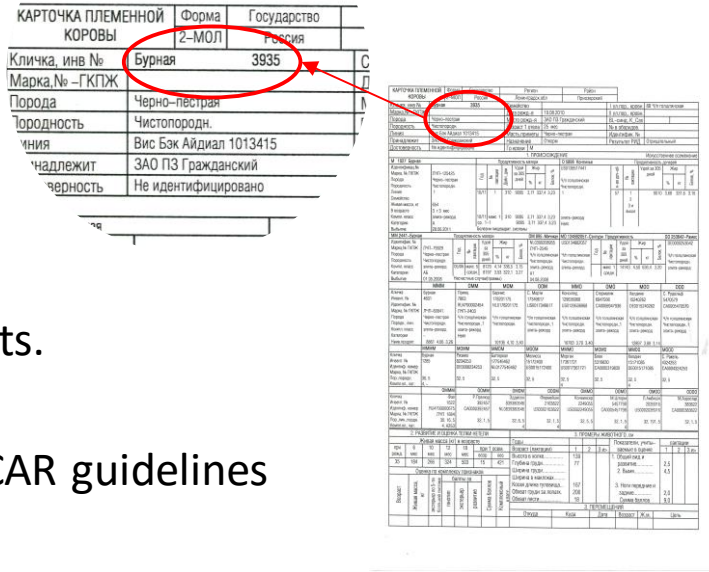
Industry overview

- Identification.
  - ICAR standards not in use.
  - Name and short (barn) number.
  - Internal data base number has 13 digits.
  - New identification project based on ICAR guidelines started in 2017.



Industry overview (continue)

Milk recording system.

Direct flow

Test day

Regional data center

Laboratory report (Fat, protein, SCS)

Industry overview (continue)

Breeding value evaluation.

- Official document: “Instruction for the inspection and evaluation of bulls of dairy and dairy-beef breeds on the quality of offspring”.
- Published in 1980.
  - Official method is contemporary comparison (CC).
  - Bulls getting categories (A1 to A3) based on superiority of daughters.
  - Old phenotypic base used for contemporary groups.
  - Neutral category given to bulls with yield +180% from phenotypic base.
  - Minimum number of daughters is 30.

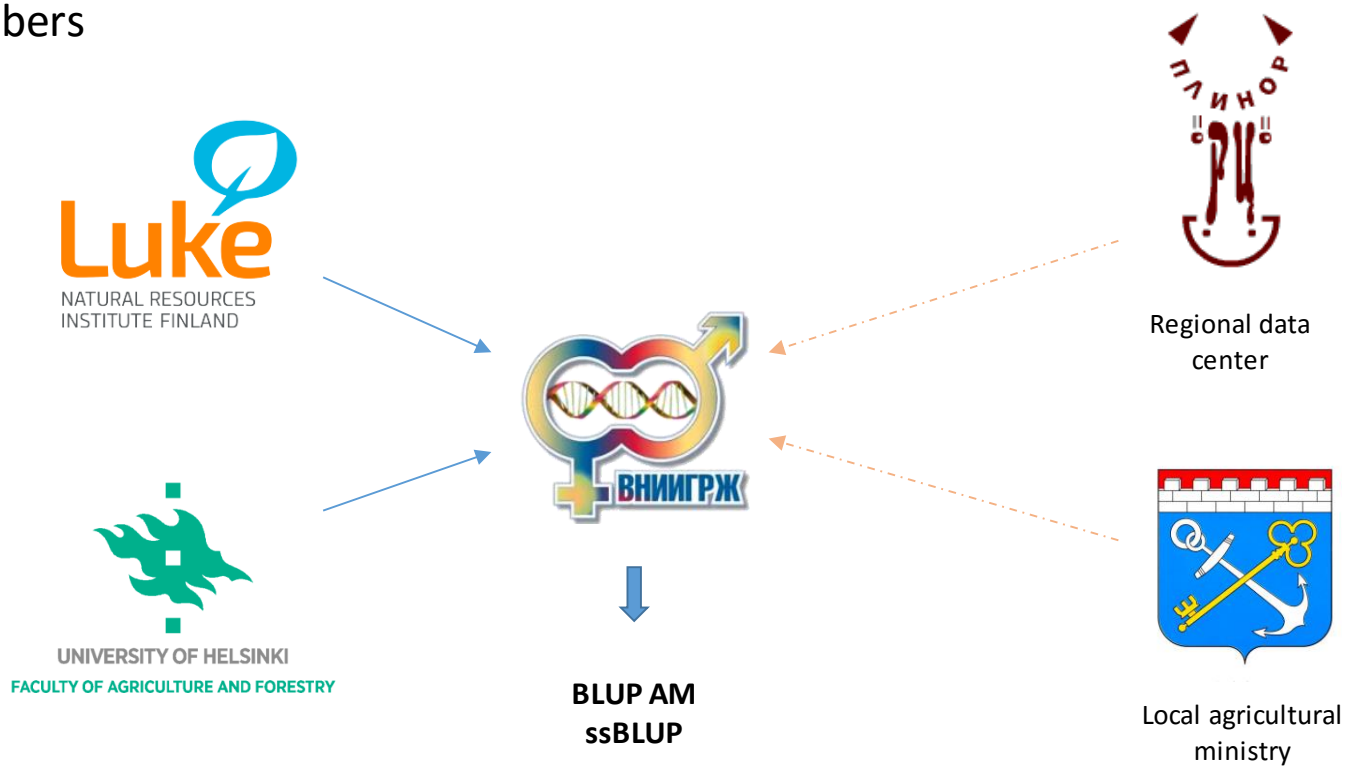
Contemporary group	Production level (kg)	Difference from contemporary group in %			
		A1	A2	A3	Neutral
I	>4501	> 3	2.9 - 2.0	1.9 - 1.0	+0.9 – (3.5)
II	4001-4500	> 4	3.9 - 3.0	2.9 - 2.0	+1.9 – (-3.0)
III	3401-4000	> 6	5.9 - 4.0	3.9 - 2.5	+2.4 – (-2.5)
IV	2800-3400	*	>9	8.9 - 3.0	+2.9 - (-2.0)

Leningrad region (Dairy industry background).

- Region with highest milk production level per cow.
- Breeds
  - Holstein - 10936 (kg/305d.)
  - Black and White – 8785 (kg/305d.)
  - Ayrshire – 7239 (kg/305d.)
- 60 herds (Breeding plant and breeding reproducer).
  - Holstein – 10 herds
  - Black and White – 38 herds
  - Ayrshire – 12 herds
- Herd size from 500 to 2100 cows.
- All breeding herds participating in milk recording system.

Research agreement

- Russian Dairy Cattle Genetic Evaluation (RUDGE).
- Period: 2015-2017
- Aim of project : Research and development in Russian B&W and Holstein dairy cattle genetic evaluation.
- Members



Phenotypic data and evaluation model.

Phenotypic data.

- 452622 animals in pedigree.
- 356907 repeated records from 142083 cows

Model.

- Repeatability Animal Model with two fixed effects.

  Fixed effects:

  - HYS – herd-year-season (2603 levels).
  - DOAC – Days open – age of calving (155 levels).

- Genetic parameters were calculated using DMUv6 (Madsen and Jensen, 2008).

Traits	Variances			Parameters	
	σ^2_g	σ^2_{pe}	σ^2_e	h^2	r
Milk	330956	270116	1244178	0.18	0.33
Fat	420	308	1718	0.17	0.29
Protein	242	149	972	0.18	0.28

- Breeding value evaluation was done using MiX99 software (Luke, 2017).
- Interbull validation **method I** for trend validation.

Calculation of EBV's.

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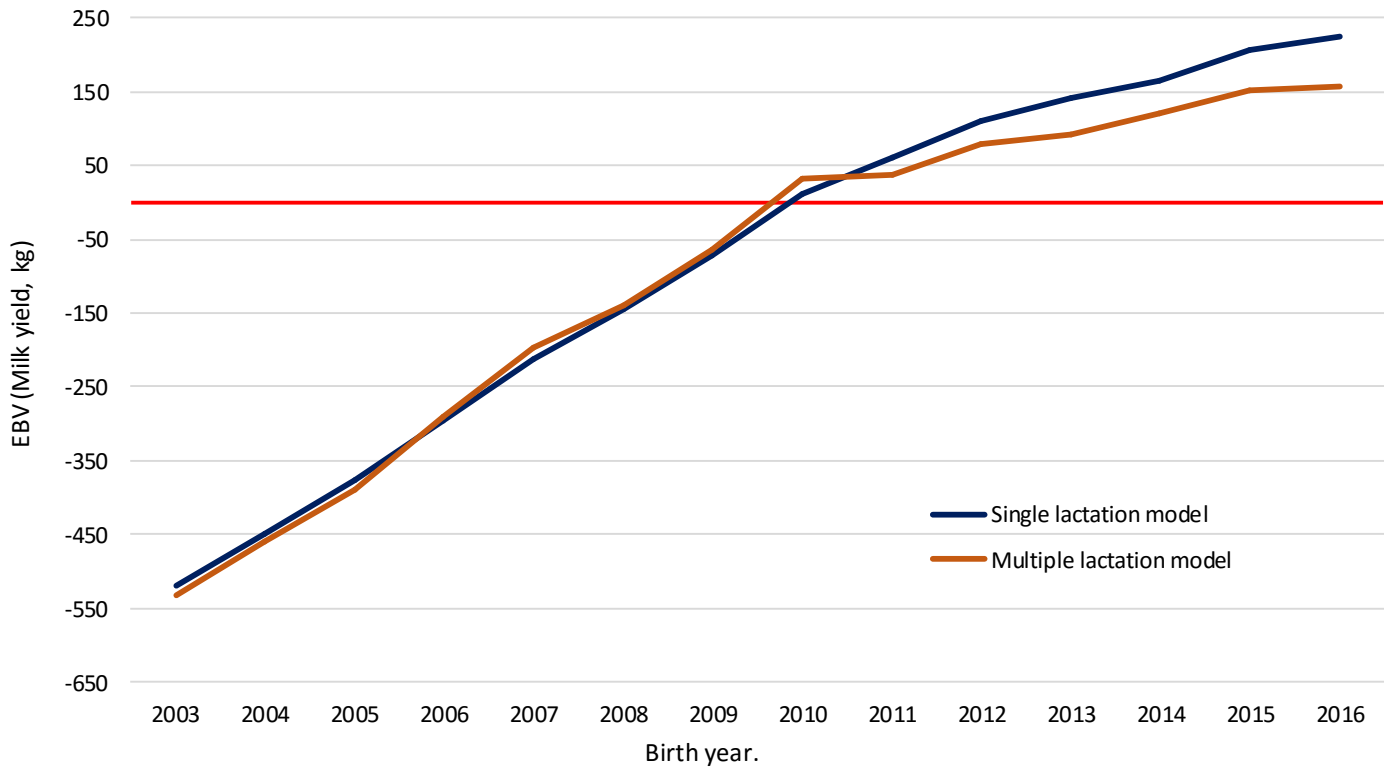
Cows genetic trend in milk yield



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Calculation of EBV's.

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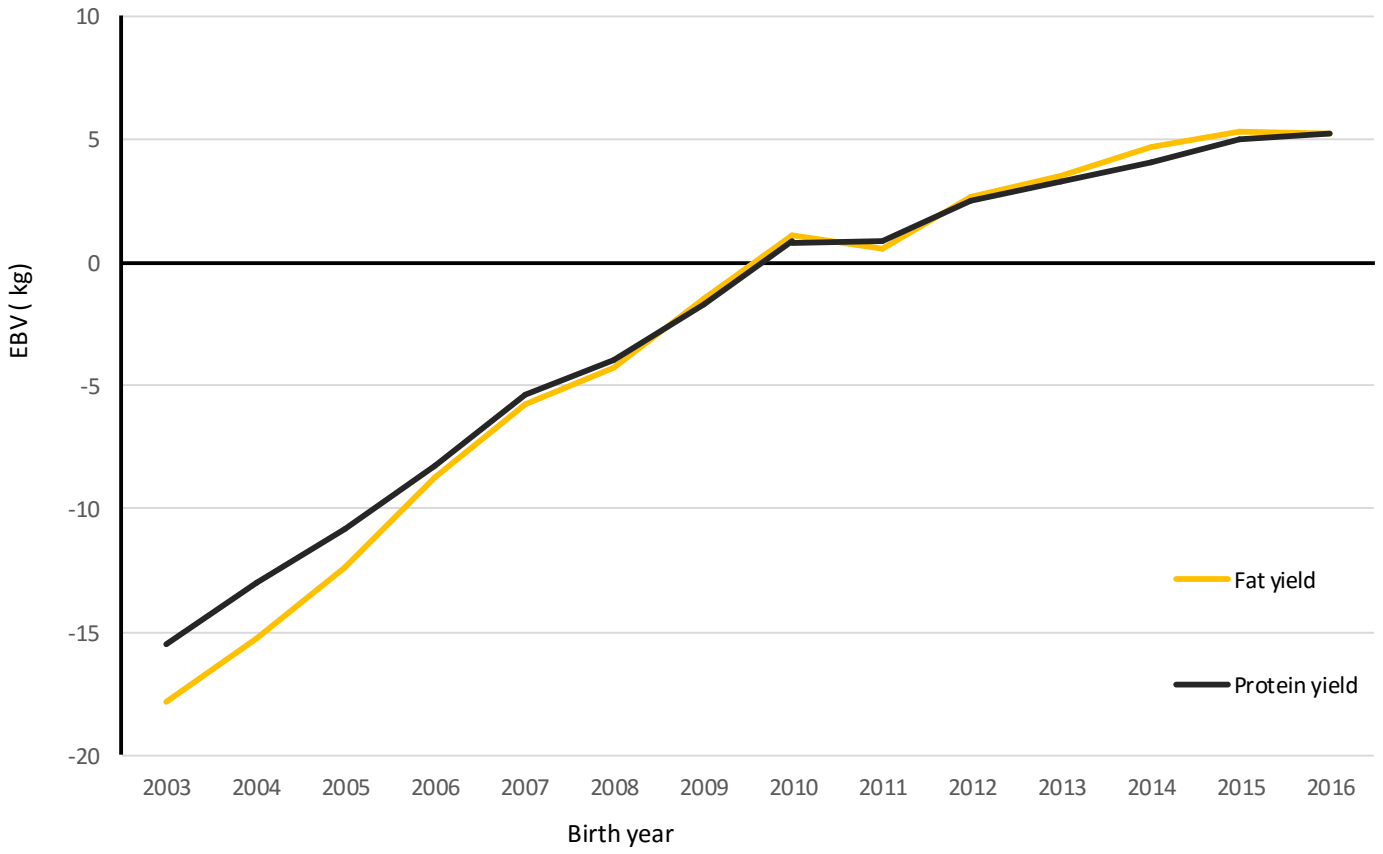
Cows genetic trend in fat and protein yield.



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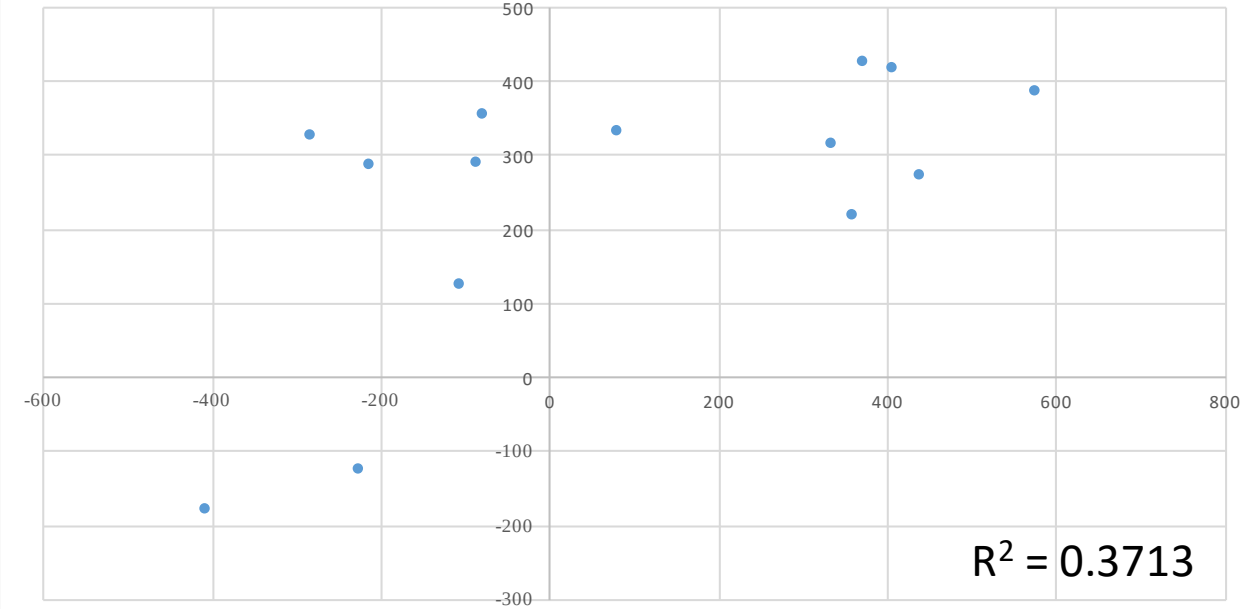
Comparing CC to BLUP AM.



Regression of CC (X) on BLUP AM (Y) in milk kg.

Genotypic data from bulls and cows.

- 500 cows using 54K SNP chip
- 600 cows using IDBv3
- 272 bulls using 54K
- 201 bulls using IBDv3

1573 animals

Few pitfalls make system slip.

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- Repeating and overlapping of names and numbers.
- Data recording system is not secured from editing.
- Old legislation gives second chance to poor bulls.
- Low phenotypic base makes negative bulls neutral.

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Thank you for your attention!