Research plan for the international genetic evaluation for calving traits

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INTERBEEF TECHNICAL COMMITTEE MEETING
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Department of Animal Breeding and Genetics, SLU – Ultuna Campus

Outline / agenda

- Finance
- Composition of the research team and data protection
- Infrastructure available for the research team
- Calving traits research plan – time schedule
- Research proposal and selected points from the research of calving traits

Financial sources for research in the Czech Republic

Financial sources available for the research of calving traits

Fully cover all points mentioned in our application

It is also potentially feasible to realize future steps

(e. g. new countries will join Interbeef, recalculation of parameters, maybe other breeds in the future etc.)

Financial sources for research in the Czech Republic

- Grant QH81312
- New project QJ1310184 (National Agency for Research in Agriculture)
- Other grants within the Institute of Animal Science
- Internal resources of the Research Institute of Animal Science (common expenses)
- Internal resources of the Czech Moravian Breeders´ Corporation, Inc. (Pavel Bucek, project leader)

!!! Written and signed guarantees by the CEO of the Institute of Animal Science

VÝZKUMNÝ ÚSTAV ŽIVOČIŠNÉ VÝROBY, v.v.i.
Přátelství 815, 104 00 Praha Uhříněves

Confirmation of participation in the Interbeef project

Department of genetics and breeding of farm animals of the Institute of Animal Science is doing methodological development of genetic evaluation of farm animals and closely collaborates with the Czech-Moravian Breeder's Corporation, which is responsible for national genetic evaluation of farm animals and represents the Czech Republic in ICAR, Interbull and Interbeef, and with the Czech Beef Breeders Association, which is responsible for herdbook management and performance recording of beef cattle.

The Institute of Animal Science guarantees that all points mentioned in application for the international genetic evaluation for calving traits will be fulfilled. The Institute of Animal Science also guarantees the professionalism and commitment of the team of the Department of genetics and breeding of farm animals. We also guarantee that all members of the research team from the Institute of Animal Science will respect legal rules for data protection.

From a financial point of view, activities of the Department are funded by research grants and by internal sources of the Institute of Animal Science.

Assoc. prof. Petr Homolka, Ph.D., Ph.D.
Director of the Institute of Animal Science

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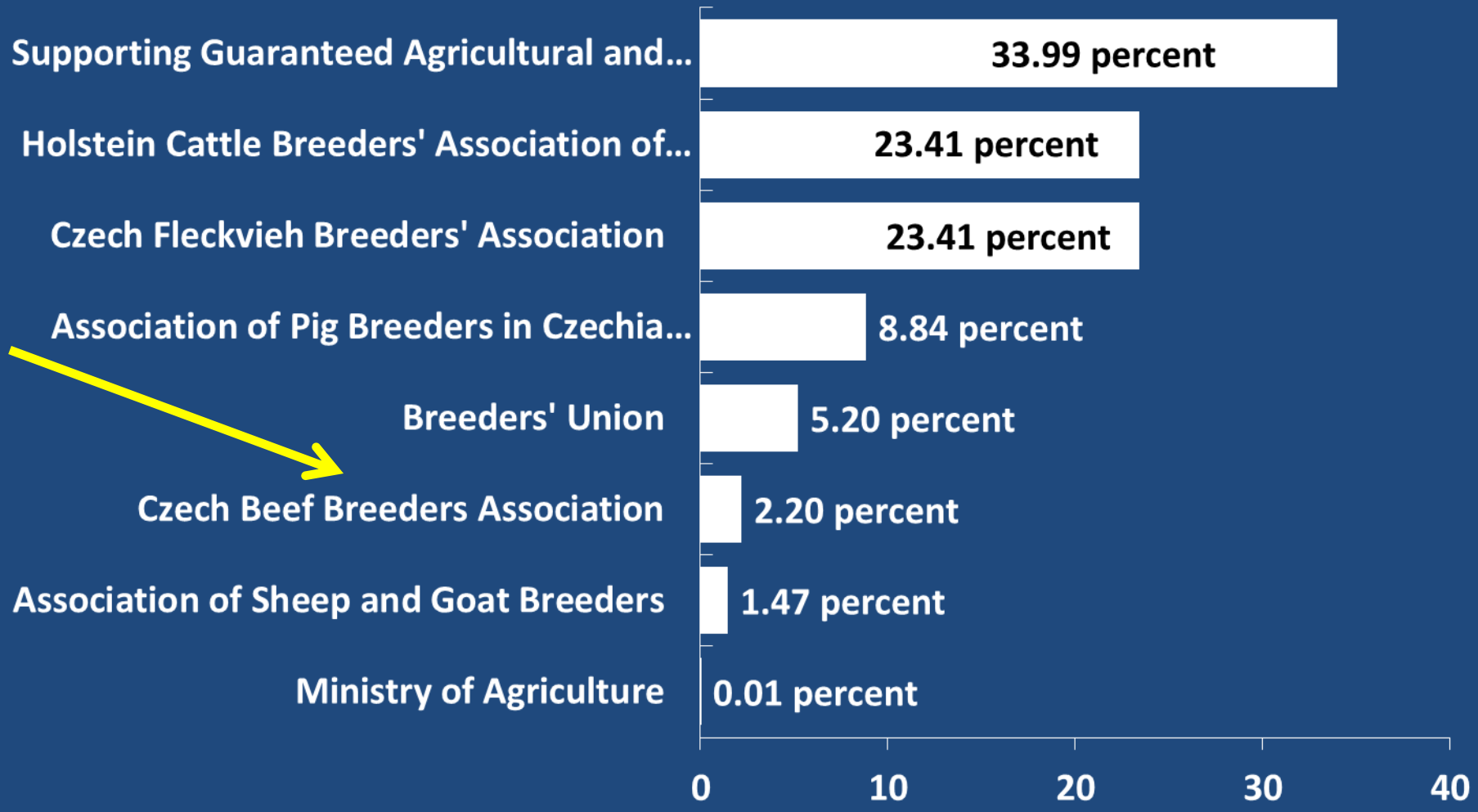
Composition of the research team

- **Czech Moravian Breeders´ Corporation, Inc.**
- **(2 members)**
- *Pavel Bucek, project leader, responsible for coordination and management*
- *Michal Vejvoda, new member of the team, specialist for IT (software and hardware)*

- **Czech Beef Breeders Association (2 members)**
- Jan Kopecky
- Kamil Malat

- **Institute of Animal Science (7 members)**
- *Zdenka Vesela, project co-leader, scientific matters*
- Emil Krupa
- Michal Milerski
- Josef Pribyl
- Alena Svitakova
- Lubos Vostry
- Ludmila Zavadilova

Czech Moravian Breeders' Corporation, Inc. shareholders:



- **Czech Beef Breeders Association is one of the shareholders in Czech Moravian Breeders´ Corporation**

Composition of the research team
Question for discussion

- Proposal: members of the research team from the Czech Republic
- Another possibility is to add other scientists from other countries to the research team (s) for Interbeef project (generally this is a possible option for all Interbeef projects)

Generally we are ready to accept this proposal from Cork, depending on the interest and potential details of the particular deal.

This was discussed during the Interbeef meeting in Cork

Agreement about data protection

Czech Moravian Breeders´ Corporation, Inc. (which signed the Interbeef agreement)

and/ or Czech Beef Breeders Association

Institute of Animal Science (has already provided a written guarantee signed by CEO), available from the project leader

Interbull centre

and/or ICAR

and/or individual agreement with other parties if requested

Infrastructure available for research team:

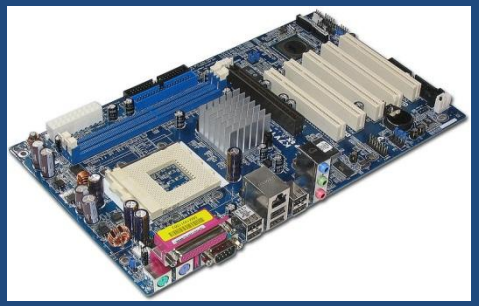
- **Institute of Animal Science (all available software, some of which are not relevant for Interbeef)**
- SAS
- BLUPF90 family
- DMU
- VCE
- PEST
- Survival Kit
- R-project.org

- **Mix 99 – open question, and point for clarification**
- MIX 99: this software is not available for the research team
- It is necessary to discuss technical requirements for the implementation of MIX 99

BLUPF90 family: we propose to start with the BLUPF90 program package and later to add MIX 99, when it is available

Hardware

- **Institute of Animal Science (hardware available for the research)**
- The Institute of Animal Science has necessary hardware capacities for the research and processing of extensive files
- It is feasible to realise this research with the available hardware



- **Czech Moravian Breeders´ Corp. (possible additional sources)**
- In the case of time pressures and problems that may arise during the research it is possible to use hardware sources at the Czech Moravian Breeders´ Corporation,
- and to consult with Michal Vejvoda, IT specialist from the Czech Moravian Breeders´ Corp.

Calving traits research plan – time schedule

- This research plan can be implemented when we have received all requested data (point 0)
- And when all points are clear for all participant countries (when all open questions and points for clarification are resolved)

Our estimate is approximately one year

(our proposal is to start at the end of January 2013)

This time period can be shorter or longer in case of some problems that may arise (for example we have received information that a country will be delayed with the requested files or some other similar problems)

- We propose regular discussions about partial results of the calving traits in forums, emails and/or special meeting(s)
- Appropriate interval can be at the end of each month (or every 1.5 to 2 months)

Selected factors that may influence time schedule

- Size of the files
- Data quality
- Wiping the files clear of extreme values
- Correctness of data
- Selection of appropriate data files
- Preselection of data
- Estimation of genetic correlations
- Reaction to the questions, etc.

- **<u>Estimation of genetic parameters and clearing of data will be the most time consuming operation</u>**

- **Rationale (why it is important):** calving traits are traits of economic importance in beef cattle production systems
- **Hypothesis:** The results of performance recording and data about calving traits and other relevant available data in participants' countries in Interbeef can be used for international genetic evaluation for calving traits



Time schedule

Phase 1

- Research commences after receiving data files from ITBC (resp. the participating countries)
- Statistical analysis and preparation of input data files for genetic parameters estimation

Phase 2

- Genetic parameters estimation, breeding values prediction (including reliabilities) – direct & maternal

Time schedule

Phase 3

- After the successful completion of the test and the calculation of EBV's & Rel's, the software will be transferred to ITBC for routine running.

Phase 4

- (and further) Continue international evaluation research (new parameters, evaluation model & reliability) for new countries and breeds for calving traits.

- **We would like to be customer oriented and focused on solutions acceptable for all partners in this project and for Interbull centre**

Working plan

1. Analysis of situation in participant countries
2. Basic statistic analysis and checking of data files
3. Identification of genetic connectedness between countries
4. Preparation of input data files for genetic parameters estimation
5. Preparation, testing of model equation and genetic parameters estimation on data files within participant countries
6. Genetic parameters 2 by 2 countries estimation

Working plan

7. Completion of covariance matrices for all participant countries and bending to obtain positive definite matrices
8. Preparation of input data for breeding value prediction
9. Breeding value estimation for all participant countries
10. Basic statistical analysis of breeding values
11. Documentation and transfer of software to ITBC for routine running

Expected Deliverables:

- Methodology for international genetic evaluation for calving traits
- Genetic parameters and breeding values
- Editing procedures (preferably codes), work flows and other documentation

Conclusion: the research team proposes to cover these relevant areas:

- *A. Method development*
- *Method testing*
- *Method documentation*
- *B. 1st Phase Pilots*
- *C. Productionised method*

Breeding value estimation (prediction)

- An animal model on raw performance, accounting for heterogeneous variance and different genetic correlations between countries, will be used. The aim will be to estimate direct and maternal genetic breeding values and permanent maternal environmental effects for calving ease
- Furthermore, we suggest joint evaluation of breeding values for calving ease and breeding values for birth weight due to the genetic correlation between calving ease and birth weight
- Bi- or multivariate analyses

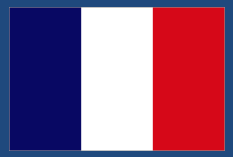
Breeding value estimation (prediction)

- **Joao´s proposal:** a sire model, where the identification of the calf is not necessary
- **Method proposed by Venot et al. 2009** for international genetic evaluations of calving traits in beef cattle data

- **We prefer to analyse different options and then on the basis of the results choose the best option for the customers (some of them have used models for these traits for a long time) and the Interbull centre (especially technical and practical requirements)**
- **This can be discussed on the forum or by email**










Thank you for your attention!

We are ready to answer together with Lubos and Zdenka your questions and points for clarification!