Session 2 laurence@ccsi.ca

Identification of pigs with increased overall disease resistance using hematological and immunological tests

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Project Team

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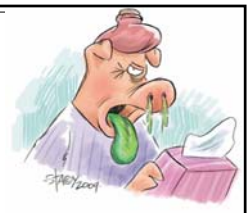
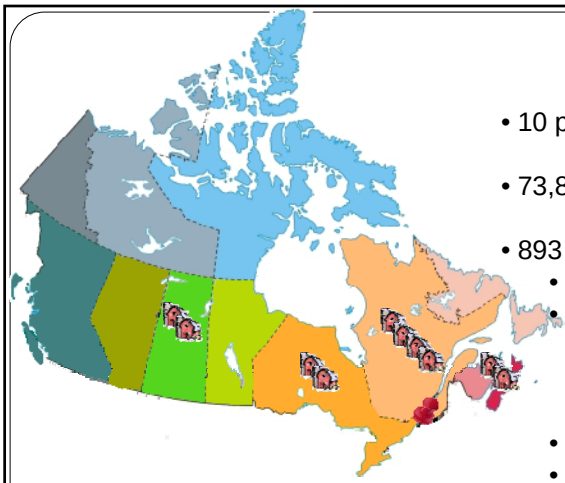
Disease Resistance



- A challenge in swine breeding
  - Very important economically
  - Included in few pig breeding programs
- Complex trait, involving various pathways
- Difficult to improve through quantitative selection
  - Difficult to measure
  - High health status breeding farms
- Potential avenues?
  - Information systems (mortality data recording)
  - *In vitro* tests
  - Molecular genetics (SNP panels)

Objectives

- Compare different breeds, families and sires with respect to their immune capacity
- Analyze the genetic variability of different hematological and immunological parameters
- Study relationships between immune capacity and performance traits



Project Design

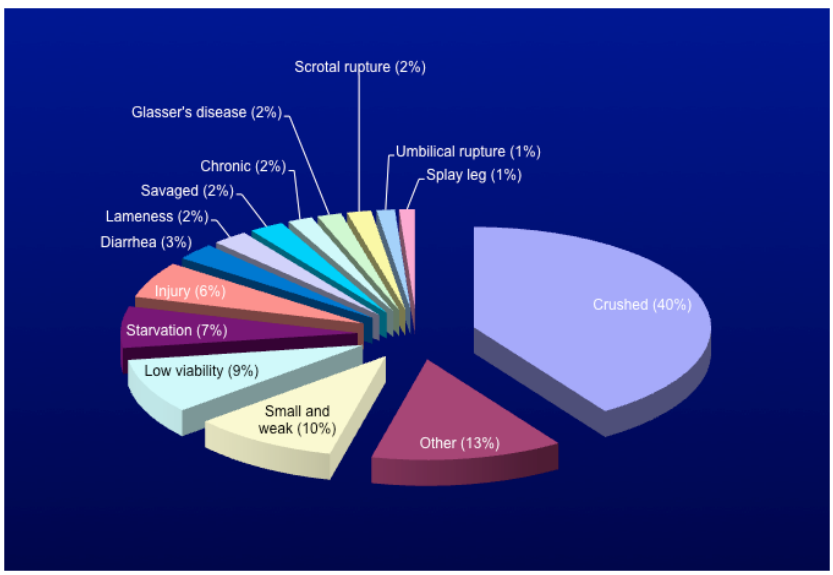
- 10 participating breeding farms
- 73,845 pigs tracked for mortality
- 893 pigs sampled for blood testing
  - targeted sire families
  - 15 progeny/sire

- Classical blood parameters
- In vitro “immuno-assay” (lymphocyte proliferation test) using 5 mitogens
- 5 TABIs (Transformed Animal Blastogenic Indices) computed from Principal Component Analysis

	Males	Females	Castrates
Duroc	89	141	6
Landrace	46	192	
Yorkshire	60	211	30
Crossbred		28	36

Mortality data

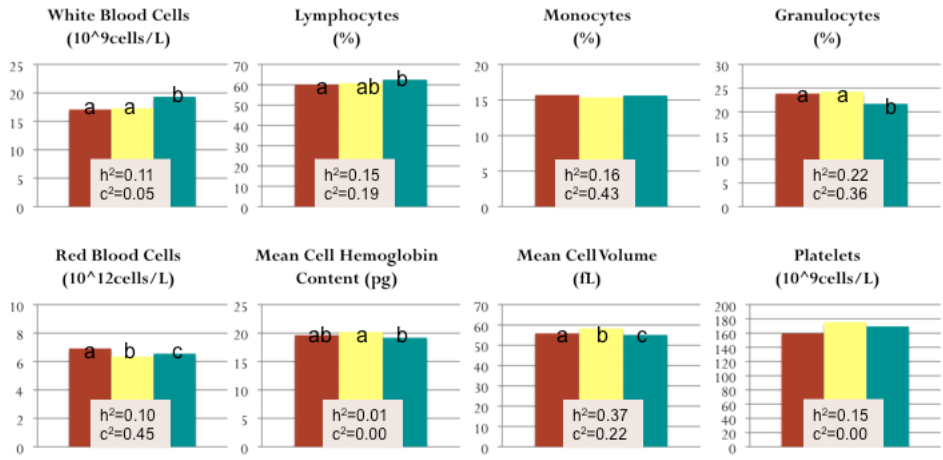
Birth to weaning (4,285 piglets)



Results – Hematology

LS Means by breed & variance ratios

Duroc
Landrace
Yorkshire



Results – Immunology

LS Means by breed & variance ratios

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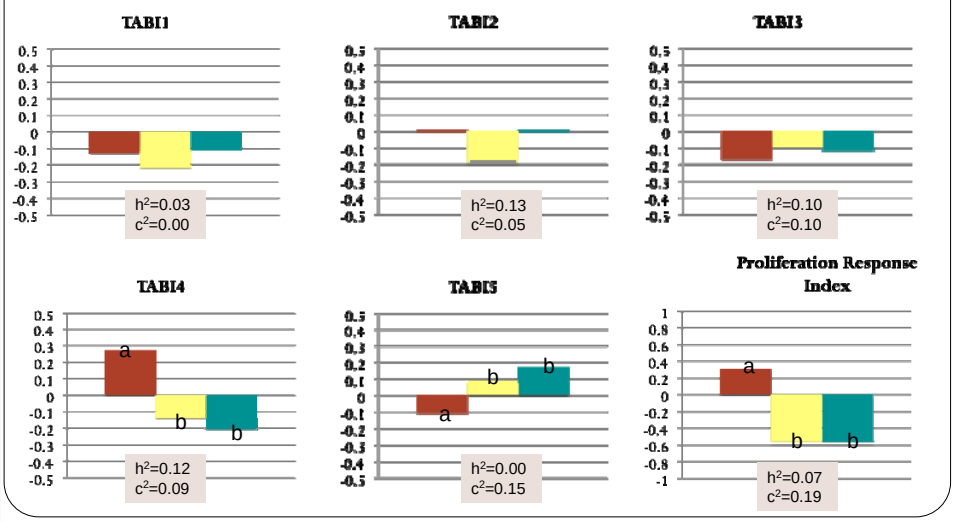

Partial correlations with performance traits

	Birth weight	Litter size of birth litter	Days to 100kg	Backfat adjusted to 100kg	Loin Depth adjusted to 100kg
WBC	-	-	-	-	-
Lymphocyte %	-	-	-	-	-
Monocyte %	-	-	-	**-0.08**	**-0.09**
Granulocyte %	-	-	-	**+0.09**	-
RBC	-	-	-	-	-
MCHC	**+0.11**	-	**-0.12**	-	-
MCV	-	-	-	-	-
Platelets	-	-	-	-	**-0.15**
TABI1	-	-	-	-	-
TABI2	-	-	-	-	-
TABI3	-	-	-	-	-
TABI4	-	**+0.08**	-	-	-
TABI5	-	-	-	-	-
PR Index	-	-	**-0.08**	-	-

Conclusions

- Significant genetic variability for hematological and immunological parameters studied
  - Differences between breeds
  - Variability within breeds
  - Low to moderate heritability

- Null or low correlations between blood parameters and performance traits

- So far, no link found between in-vitro tests results and on-farm mortality data in the families sampled in this project
  - More data needed
  - High health status farms

Perspectives

- Tools in place for breeders to record mortality data
  - Standards for data recording are critical
  - Specific reports developed for management purposes (piglet mortality)
  - Opportunities for data mining and survival analyses
  - Survival EBVs (at birth/to weaning/to market) under study, based on mortality data recorded by breeders and multipliers
- Association studies performed based on SNP panel results (Jafarikia et al, EAAP 2010)

Acknowledgements

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Thank you for your attention !

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