Development of international beef genetic evaluations for calving traits

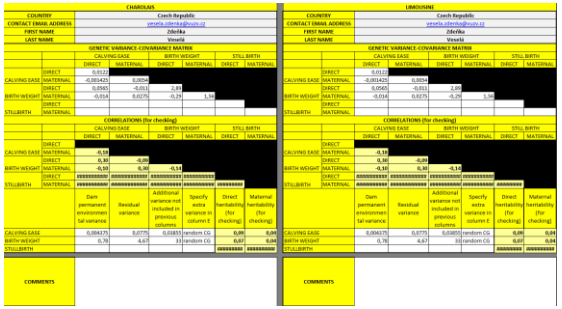
Report prepared by Czech Research Team

Interbeef TC and WG meeting
8 - 9 June 2015

VÚŽV, v.v.i.
INSTITUTE OF ANIMAL SCIENCE
PRAHA UHŘÍNĚVES

Progress

- Questionnaire
  - All countries sent parameters



- Some correlations re-estimated from different data set and slightly different approach were applied for bending
  - Resulting average correlations are slightly higher
    - CHA
      - average direct correlation 0.61 > 0.65
      - average maternal correlation 0.50 > 0.54
    - LIM
      - average direct correlation 0.68 > 0.69
      - average maternal correlation 0.53 > 0.54

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Number of common sires multiplied by 4 for direct correlations

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Number of common MGS multiplied by 2 for maternal correlations

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Number 40 for non-converged direct correlation

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Number 20 for non-converged maternal correlation

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Number 9999 on the diagonal and for direct-maternal correlation within countries

Bending Interbeef Full Correlation Matrix

- Weighting factor for Charolais:

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	9999									
	DNK	172	9999								
	FRA	380	248	9999							
	IRL	152	208	352	9999						
	SWE	40	40	40	104	9999					
MAT.	CZE	9999	1	1	1	1	9999				
	DNK	1	9999	1	1	1	98	9999			
	FRA	1	1	9999	1	1	480	172	9999		
	IRL	1	1	1	9999	1	106	110	236	9999	
	SWE	1	1	1	1	9999	20	20	20	20	9999

Number 1 for direct-maternal correlation between countries

Bending Interbeef Full Correlation Matrix

- Weighting factor for Limousine:

		DIRECT						MATERNAL					
		CZE	DNK	FRA	GBR	IRL	SWE	CZE	DNK	FRA	GBR	IRL	SWE
DIRECT	CZE	9999											
	DNK	144	9999										
	FRA	272	260	9999									
	GBR	136	240	432	9999								
	IRL	40	244	328	724	9999							
	SWE	40	236	156	104	40	9999						
MAT.	CZE	9999	1	1	1	1	1	9999					
	DNK	1	9999	1	1	1	1	20	9999				
	FRA	1	1	9999	1	1	1	20	206	9999			
	GBR	1	1	1	9999	1	1	20	20	574	9999		
	IRL	1	1	1	1	9999	1	20	20	242	466	9999	
	SWE	1	1	1	1	1	9999	20	164	68	20	20	9999

Correlations - Charolais

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE										
	DNK	0.42									
	FRA	0.42	0.86								
	IRL	0.80	0.49	0.74							
	SWE	0.71	0.86	0.63	0.52						
MAT.	CZE	**-0.18**	0.03	0.01	-0.04	-0.05					
	DNK	0.01	**-0.20**	-0.10	0.04	-0.07	0.47				
	FRA	0.08	-0.18	**-0.40**	-0.16	0.02	0.69	0.39			
	IRL	-0.06	0.02	-0.07	**-0.16**	0.03	0.56	0.60	0.36		
	SWE	-0.05	-0.03	-0.01	0.03	**-0.13**	0.59	0.59	0.59	0.59	

Average direct genetic correlation = 0.65, average maternal genetic correlation = 0.54

Correlations - Limousine

		DIRECT						MATERNAL					
		CZE	DNK	FRA	GBR	IRL	SWE	CZE	DNK	FRA	GBR	IRL	SWE
DIRECT	CZE												
	DNK	0.76											
	FRA	0.51	0.80										
	GBR	0.85	0.70	0.72									
	IRL	0.63	0.64	0.87	0.79								
	SWE	0.60	0.46	0.62	0.57	0.87							
MAT.	CZE	**-0.18**	-0.02	-0.03	-0.06	0.02	-0.01						
	DNK	-0.03	**-0.20**	-0.16	0.00	0.03	0.04	0.59					
	FRA	0.08	-0.25	**-0.56**	-0.16	-0.27	-0.05	0.58	0.63				
	GBR	-0.11	0.02	-0.15	**-0.35**	-0.06	0.06	0.59	0.58	0.63			
	IRL	0.01	0.03	-0.14	-0.03	**-0.16**	-0.08	0.59	0.59	0.55	0.47		
	SWE	-0.01	0.05	-0.07	0.00	-0.03	**-0.13**	0.59	0.39	0.55	0.59	0.58	

Average direct genetic correlation = 0.69, average maternal genetic correlation = 0.57

Interbeef (co)variance matrix

- Computed using national genetic variances (from questionnaire)
- CHAROLAIS

	var_{GD}	var_{GM}	var_{MPE}	var_{HYS}	var_{e}	h^2_D	h^2_M
CZE	0.0122	0.0054	0.004375	0.03855	0.0775	0.09	0.04
DNK	0.052	0.052	0.084		0.4004	0.09	0.09
FRA	0.0298	0.0182	0.0099		0.2356	0.10	0.06
IRL	0.02498	0.01	0.00585	0.21017298	0.22709	0.05	0.02
SWE	0.0533	0.04	0.003		0.2177	0.17	0.13

Interbeef (co)variance matrix

- Computed using national genetic variances (from questionnaire)
- LIMOUSINE

	var_{GD}	var_{GM}	var_{MPE}	var_{HYS}	var_{e}	h^2_D	h^2_M
CZE	0.0122	0.0054	0.004375	0.03855	0.0775	0.09	0.04
DNK	0.052	0.052	0.084		0.4004	0.09	0.09
FRA	0.0041	0.0013	0.003		0.0733	0.05	0.02
GBR	0.04	0.02	0.01		0.28	0.11	0.06
IRL	0.02498	0.01	0.00585	0.21017298	0.22709	0.05	0.02
SWE	0.0533	0.04	0.003		0.2177	0.17	0.13

Interbeef (co)variance matrix

Table 10. Full Interbeef genetic covariance matrix **CHAROLAIS**

		DIRECT					MATERNAL				
		CZE	DNK	FRA	IRL	SWE	CZE	DNK	FRA	IRL	SWE
DIRECT	CZE	**0.0122**	0.0106721	0.0080318	0.0140561	0.0182261	-0.001461	0.0003486	0.0011501	-0.000647	-0.001018
	DNK	0.0106721	**0.052**	0.0340468	0.0177009	0.0452467	0.0005334	-0.010399	-0.005541	0.0004539	-0.001602
	FRA	0.0080318	0.0340468	**0.0298**	0.0201439	0.025291	0.0001048	-0.004078	-0.009314	-0.001215	-0.000356
	IRL	0.0140561	0.0177009	0.0201439	**0.02498**	0.01909	-0.00042	0.0012878	-0.003365	-0.002529	0.001109
	SWE	0.0182261	0.0452467	0.025291	0.01909	**0.0533**	-0.000796	-0.003509	0.0007388	0.0007647	-0.006002
MAT.	CZE	-0.001461	0.0005334	0.0001048	-0.00042	-0.000796	**0.0054**	0.0078982	0.0068904	0.0041038	0.0086734
	DNK	0.0003486	-0.010399	-0.004078	0.0012878	-0.003509	0.0078982	**0.052**	0.0120703	0.0135919	0.0269093
	FRA	0.0011501	-0.005541	-0.009314	-0.003365	0.0007388	0.0068904	0.0120703	**0.0182**	0.0048733	0.0159307
	IRL	-0.000647	0.0004539	-0.001215	-0.002529	0.0007647	0.0041038	0.0135919	0.0048733	**0.01**	0.0118272
	SWE	-0.001018	-0.001602	-0.000356	0.001109	-0.006002	0.0086734	0.0269093	0.0159307	0.0118272	**0.04**

Table 11. Variances for permanent maternal environment

	CZE	DNK	FRA	IRL	SWE
CZE	**0.004375**	0	0	0	0
DNK	0	**0.084**	0	0	0
FRA	0	0	**0.0099**	0	0
IRL	0	0	0	**0.00585**	0
SWE	0	0	0	0	**0.003**

Table 12. Variance for HYS for CZE

	CZE	DNK	FRA	IRL	SWE
CZE	**0.03855**	0	0	0	0
DNK	0	0	0	0	0
FRA	0	0	0	0	0
IRL	0	0	0	0	0
SWE	0	0	0	0	0

Table 13. Variance for HYS for IRL

	CZE	DNK	FRA	IRL	SWE
CZE	0	0	0	0	0
DNK	0	0	0	0	0
FRA	0	0	0	0	0
IRL	0	0	0	**0.21017298**	0
SWE	0	0	0	0	0

Table 14. Residual variances

	CZE	DNK	FRA	IRL	SWE
CZE	**0.0775**	0	0	0	0
DNK	0	**0.4004**	0	0	0
FRA	0	0	**0.2356**	0	0
IRL	0	0	0	**0.22709**	0
SWE	0	0	0	0	**0.2177**

Interbeef (co)variance matrix

Table 10. Full Interbeef genetic covariance matrix **LIMOUSINE**

		DIRECT						MATERNAL					
		CZE	DNK	FRA	IRL	GBR	SWE	CZE	DNK	FRA	IRL	GBR	SWE
DIRECT	CZE	**0.0122**	0.0191252	0.0036055	0.0187324	0.0110825	0.0154361	-0.001461	-0.000759	0.0003077	-0.001749	0.000095	-0.000179
	DNK	0.0191252	**0.052**	0.0116269	0.0321013	0.0229293	0.0243655	-0.000399	-0.010399	-0.002086	0.0006152	0.0008099	0.0021846
	FRA	0.0036055	0.0116269	**0.0041**	0.0092623	0.008848	0.0091686	-0.000157	-0.002329	-0.001292	-0.001391	-0.000933	-0.000888
	GBR	0.0187324	0.0321013	0.0092623	**0.04**	0.0249628	0.0264747	-0.00085	-4.171E-6	-0.001195	-0.009898	-0.000667	0.0001952
	IRL	0.0110825	0.0229293	0.008848	0.0249628	**0.02498**	0.0319016	0.0003002	0.0011916	-0.001518	-0.001459	-0.002528	-0.000897
	SWE	0.0154361	0.0243655	0.0091686	0.0264747	0.0319016	**0.0533**	-0.000194	0.0022889	-0.000454	0.0020385	-0.001831	-0.006002
MATERNAL	CZE	-0.001461	-0.000399	-0.000157	-0.00085	0.0003002	-0.000194	**0.0054**	0.0098402	0.0015434	0.006086	0.0043131	0.0086312
	DNK	-0.000759	-0.010399	-0.002329	-4.171E-6	0.0011916	0.0022889	0.0098402	**0.052**	0.0051628	0.0188821	0.0133698	0.0177522
	FRA	0.0003077	-0.002086	-0.001292	-0.001195	-0.001518	-0.000454	0.0015434	0.0051628	**0.0013**	0.0032084	0.0019781	0.0040028
	GBR	-0.001749	0.0006152	-0.001391	-0.009898	-0.001459	0.0020385	0.006086	0.0188821	0.0032084	**0.02**	0.0066408	0.0165709
	IRL	0.000095	0.0008099	-0.000933	-0.000667	-0.002528	-0.001831	0.0043131	0.0133698	0.0019781	0.0066408	**0.01**	0.0117103
	SWE	-0.000179	0.0021846	-0.000888	0.0001952	-0.000897	-0.006002	0.0086312	0.0177522	0.0040028	0.0165709	0.0117103	**0.04**

Table 11. Variances for permanent maternal environment

	CZE	DNK	FRA	GBR	IRL	SWE
CZE	**0.004375**	0	0	0	0	0
DNK	0	**0.084**	0	0	0	0
FRA	0	0	**0.003**	0	0	0
GBR	0	0	0	**0.01**	0	0
IRL	0	0	0	0	**0.00585**	0
SWE	0	0	0	0	0	**0.003**

Table 12. Variance for HYS for CZE

	CZE	DNK	FRA	GBR	IRL	SWE
CZE	**0.03855**	0	0	0	0	0
DNK	0	0	0	0	0	0
FRA	0	0	0	0	0	0
GBR	0	0	0	0	0	0
IRL	0	0	0	0	0	0
SWE	0	0	0	0	0	0

Table 13. Variance for HYS for IRL

	CZE	DNK	FRA	GBR	IRL	SWE
CZE	0	0	0	0	0	0
DNK	0	0	0	0	0	0
FRA	0	0	0	0	0	0
GBR	0	0	0	0	0	0
IRL	0	0	0	0	**0.21017298**	0
SWE	0	0	0	0	0	0

Table 14. Residual variances

	CZE	DNK	FRA	GBR	IRL	SWE
CZE	**0.0775**	0	0	0	0	0
DNK	0	**0.4004**	0	0	0	0
FRA	0	0	**0.0733**	0	0	0
GBR	0	0	0	**0.28**	0	0
IRL	0	0	0	0	**0.22709**	0
SWE	0	0	0	0	0	**0.2177**

SUMMARY

- We tried to run estimation for all countries in one step using gibbs (GIBBS1F90)
  - without success
- Slightly higher correlation using different bending approach (weighting factor)
- Co-variance matrix was computed using national estimates (from questionnaire)
- Prepared parameter files, data files and CLIM for MIX99