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Gestation length for genetic evaluation of calving traits in dairy cattle

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Question

Is the gestation length able to improve the reliability of the breeding values for dystocia and stillbirth?

Data

14,095 calvings of German Holstein heifers and cows from three commercial farms, only single births after normal gestation periods (265 to 295 days), 12,968 birth weights also available,

mean frequencies: dystocia 9.5 %, stillbirth 7.8 %, gestation length: 279.4 ± 4.8 days, birth weight: 43.0 kg

Analysis

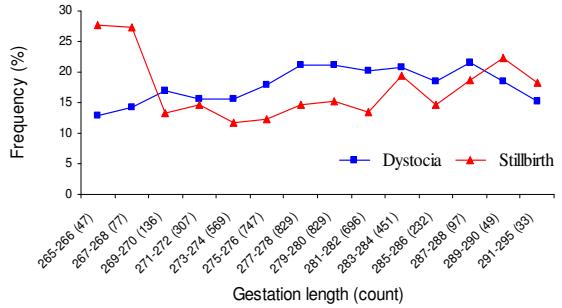
Estimation of variance components by REML with a multivariate linear model,

fixed effects: herd-year-season of calving and interaction between parity of dam and sex of calf,

random effects: direct effect of calf and uncorrelated effect of maternal grandfather, residual effect

Results

Dystocia and stillbirth rate depending on gestation length of heifers (n= 5099)



Direct heritabilities (on the diagonal) and direct genetic correlations (below the diagonal)

	(1)	(2)	(3)	(4)
(1) Dystocia	**0.06**			
(2) Stillbirth	0.26	**0.02**		
(3) Gestation length	0.33	0.12	**0.67**	
(4) Birth weight	0.68	0.33	0.47	**0.62**

High heritability for gestation length, but no clear relationships between gestation length and dystocia as well as stillbirth!

Mean relative reliabilities of sire breeding values

	Dystocia			Stillbirth	
Information traits	A	B	Information traits	A	B
Dystocia	100	100	Stillbirth	100	100
Dystocia + gestation length	109	102	Stillbirth + gestation length	99	98
Dystocia + birth weight	137	109	Stillbirth + birth weight	117	105

A: all sires, B: sires with at least 150 offsprings

Answer

Despite of high heritability gestation length is not able to improve clearly the reliability of breeding values of dystocia and stillbirth! Birth weight is a more suitable information trait.

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