Across-generation effects of maternal heat stress during late gestation on production, female fertility and longevity traits in dairy cows

Cordula Kipp, Kerstin Brügemann, Peter Zieger, Katja Mütze, Sibylle Möcklinghoff-Wicke, Sven König, and Kathrin Halli

SUPPLEMENTARY FILE

Supplementary Materials and Methods

Statistical models

For statistical analyses of the Gaussian distributed test-day production traits (MKG, PRO%, FAT%, SCS and MUN), the linear mixed model included herd, calving year, calving month, days in milk and age at first calving as fixed effects. For the binary trait NRR56, the generalized linear mixed model with logit link function included the effects herd, year of insemination, month of insemination, age at insemination and insemination sire. For the cow fertility trait ICFI, fixed effects in the linear mixed model were herd, year of insemination, month of insemination and age at insemination. The linear mixed model for the longevity traits LPL, LTP-MKG and MKG-DL included the fixed effects of the herd, year of culling, month of culling and age at first calving. Additionally, all models included the fixed effect of the average THI from the specific weeks before calving.

Supplementary Table S1

Descriptive statistics for the cow traits analyzed in the offspring generation (NNR56 = non-return-rate 56 in heifers, ICFI = interval from calving to first insemination in first parity cows, LPL = length of productive life, LTP-MKG = lifetime productivity, MKG-DL = milk yield per day of life)

Trait	No. of heifers or cows	Mean	SD	No. of herds
Milk yield[1] (kg)	172,905	26.23	5.88	1,968
Protein percentage[1] (%)	172,905	3.20	0.33	1,968
Fat percentage[1] (%)	171,150	4.21	0.79	1,968
SCS[1] (SCS/ml)	172,778	2.87	1.73	1,968
MUN[1] (mg/l)	35,433	187.95	64.24	1,968
NRR56 (%)	81,847	76.44	42.43	1,019
ICFI (days)	134,885	90.83	42.25	1,714
LPL (days)	119,599	907.32	633.01	1,746
LTP-MKG (kg)	119,634	19,323.37	14,769.39	1,746
MKG-DL (kg/day of life)	119,634	9.53	4.80	1,746

[1]Trait records from the first official test-day after calving

Supplementary Figure S1

Distribution for the daily average temperature-humidity index (THI) from November 1998 to October 2011.