



Genetic Relationships Between Fertility and Milk Coagulation in Two Estonian Dairy Cattle Breeds

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INTRODUCTION

- Total number of dairy cows **90,516**, of which **95.4%** are in milk recording. **79.6%** of cows are **Estonian Holstein (EHF)** and **19.5% Estonian Red (ER)**. Average herd size is **135 cows**.
- Productivity. EHF: **9,062 kg milk, 3.90% fat, 3.32% protein**; ER: **8,105 kg milk, 4.12% fat, 3.44% protein**.
- Inseminations. Heifers' age at first insemination: **36.4 days (EHF)** and **36.9 days (ER)**; number of inseminations per pregnancy: **1.9 (EHF)** and **1.7 (ER)**; first service pregnancy rate: **51.4% (EHF)** and **57.4% (ER)**.
- Fertility traits have had increasing importance in dairy cattle farming.
- In dairy industry the improvement of milk technological properties is necessary.

THE AIM

To estimate the genetic relationships between heifers' fertility traits:

- **age of first insemination (AFI)**,
 - **number of inseminations (NI)** and
 - **non-return rate at 56 days after first ins. (N56)**,
- and first lactation milk coagulation properties:
- **rennet clotting time (RCT)** and
 - **curd firmness 30 min after addition of the clotting enzyme (A30)**.

MATERIAL AND METHODS

- Fertility data from **5,822 heifers** from 105 farms and two breeds, EHF (5,011) and ER (811), having first calving between years 2004 and 2009.
- **24,031** records of RCT and A30 from first lactation cows.
- Bivariate animal models were fitted with ASREML (incl. pedigree information over 24,000 animals).
- The random herd effect and fixed breed and calving year-season effects were considered, the 3rd order Legendre polynomial for additive genetic animal and permanent environmental effects plus fixed effects of calving age and sampling year-season for RCT and A30, and the random technician effect for fertility traits were included.

RESULTS

- The coagulation traits both had quite **high heritability** (around **0.40**) and quite **weak negative genetic correlation** between them (**-0.14**).
- The **heritability** of fertility traits was between **0.02** and **0.04** and the **genetic correlations** between them **were high** (absolute values between **0.62** and **0.83**).
- The genetic correlations between fertility traits and RCT and A30 were between **-0.1** and **0.1** over lactation (except genetic correlation between N56 and A30).

CONCLUSIONS

- Coagulation properties are **moderately heritable** with **weak genetic correlation** between them.
- The heifers' fertility traits are **weakly heritable** with **strong genetic correlation** between them.
 - The **genetic correlations** between coagulation properties and fertility traits are **weak**.

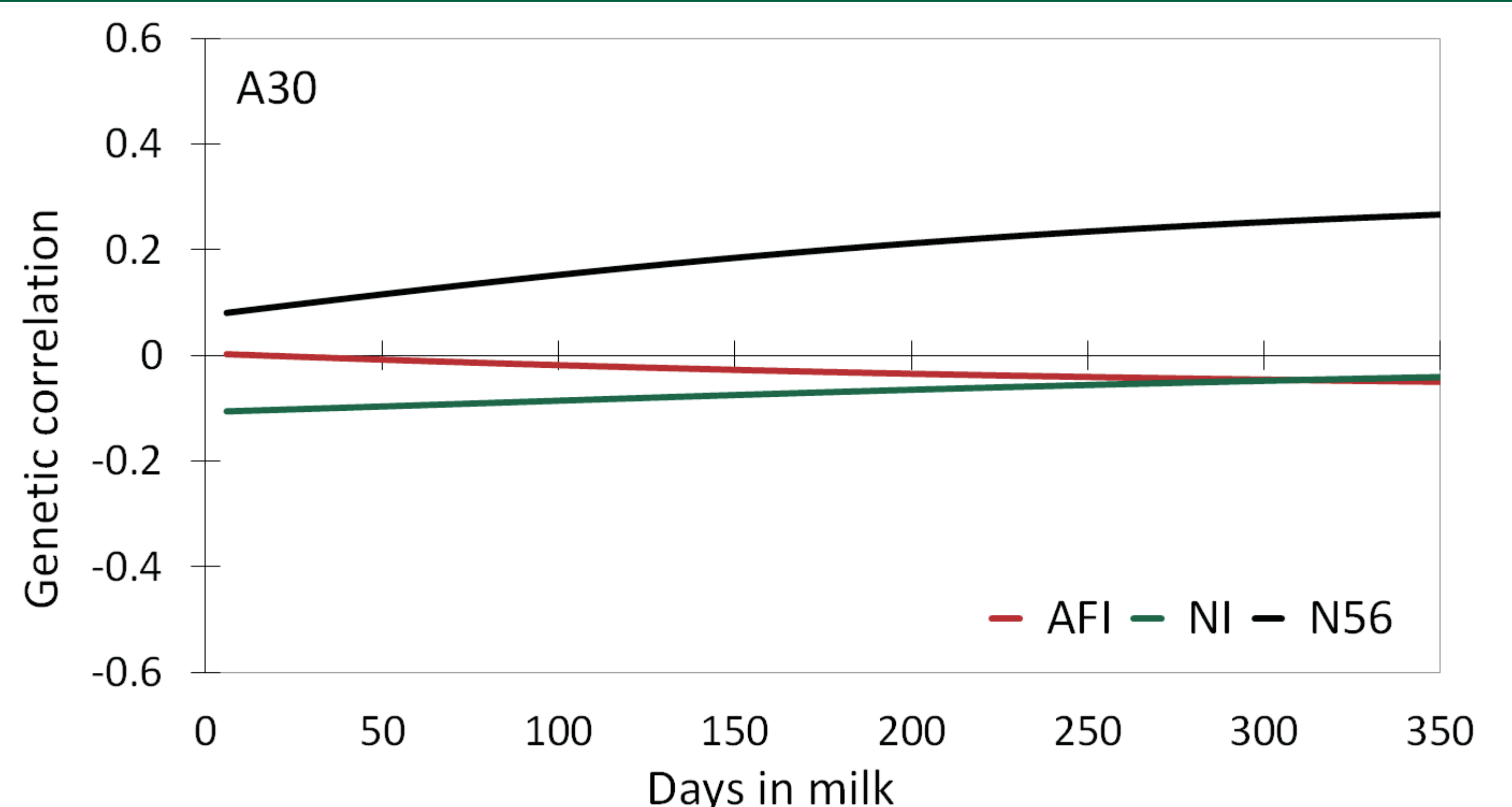
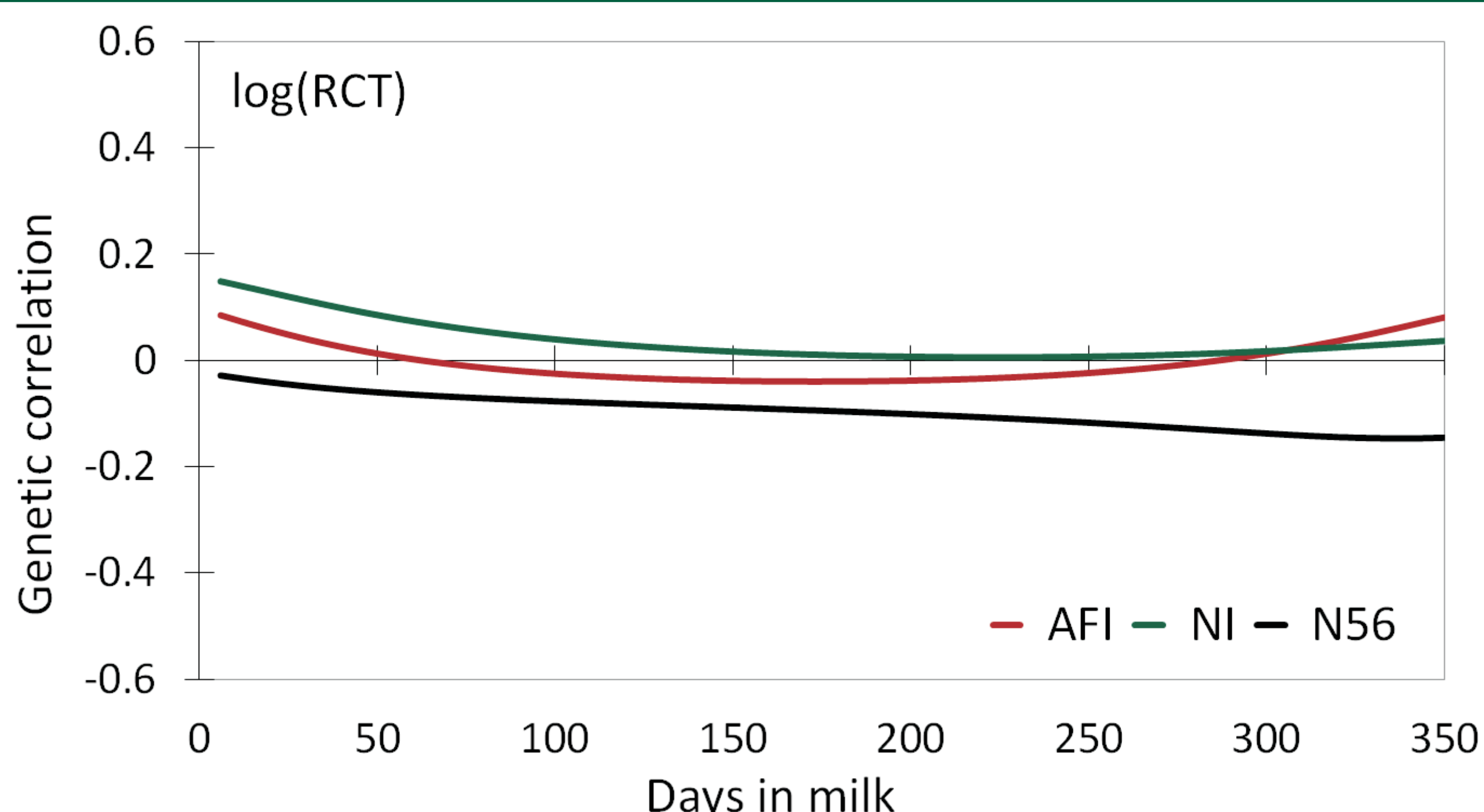


Fig. Genetic correlations between heifers' fertility traits and first lactation coagulation properties.

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