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Health traits in the breeding goal for Norsvin Landrace and Norsvin Duroc

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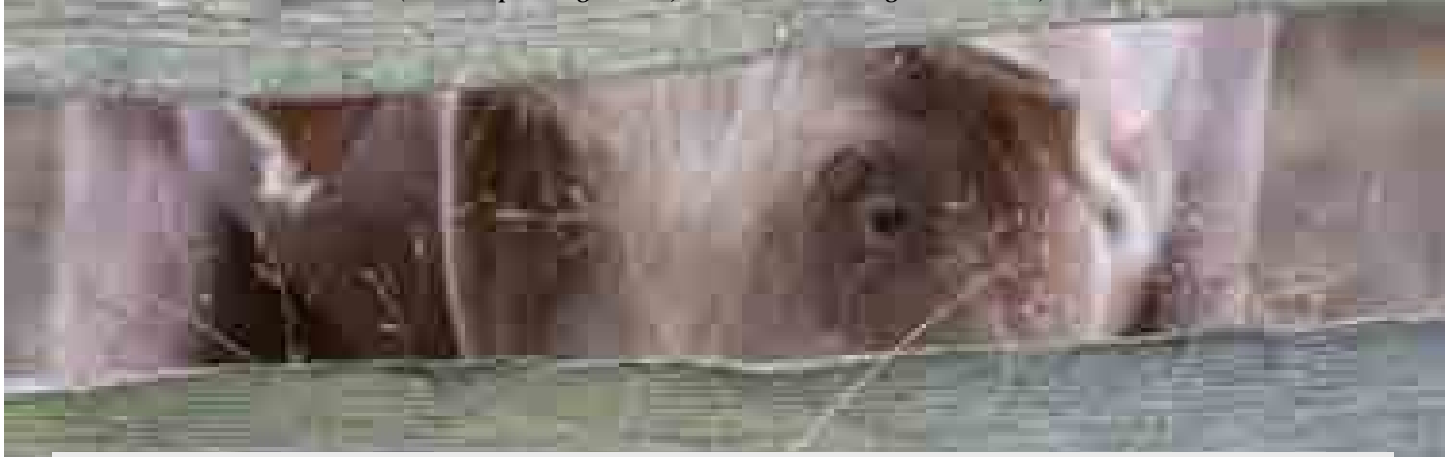

Introduction

Diseases in pig production lead to economic losses and poor animal welfare. Previous studies have found genetic variation for resistance to clinical and subclinical diseases in pigs (Henryon et. al., 2001; Lingaas and Rønningen, 1991; Lundeheim, 1988). In January 2007, Norwegian Pig Breeders' Association, NORSVIN, initiated the project "Breeding for better health in pigs" with support from The Research Council of Norway. The main aims of this project are to map important health traits in pigs, improve recording and data quality, estimate genetic parameters for health traits and implement the traits of interest in an optimal way in the breeding goal. Scrotal hernia, umbilic hernia, cryptorchism, and arthritis in piglets were chosen for a first genetic study of diseases in Norwegian pigs.

Material and methods

Data on purebred Norsvin Landrace born between 1995 and 2007 were obtained from NORSVIN's boar testing stations and nucleus herds. Herd managers record farrowings, inseminations, diseases etc. through the national recording scheme into the databank, InGris. There is probably some underreporting of diseases, and data from herds without any defect registration during two years periods were therefore omitted. All four traits were defined as binary based on whether or not the piglet had scrotal hernia, umbilic hernia, cryptorchism, or arthritis. A total of 564.132 piglets with data and 809.183 individuals in the pedigree were included in the analysis. Only male pigs had data on scrotal hernia and cryptorchism. The overall frequency of scrotal hernia, umbilic hernia, cryptorchism, and arthritis in piglets were 0.47%, 0.17%, 0.32%, and 0.47%, respectively.

Univariate mixed animal models were used to estimate variance components. The model for all 4 traits included fixed effects of herd - year, parity, month of birth, and litter size, and random effects of dam, animal and an error term. The REML estimates of the variance components were calculated using the DMU package (Jensen and Madsen, 1994).

Results and discussion

The heritabilities of scrotal hernia, umbilic hernia, cryptorchism and arthritis in piglets were low (Table 1). In April 2007, these 4 traits were included in the total merit index for Norsvin Landrace and Norsvin Duroc. Improved quality of reported health data and research on alternative methods of utilizing such data is needed to further enhance accuracy of genetic evaluation of health.

Table 1. Estimated (co)variance components and heritabilities for scrotal hernia, umbilic hernia, cryptorchism, and arthritis in piglets .

	Scrotal hernia	Umbilic hernia	Cryptor-chism	Arthritis
Variance, animal	1.2×10^{-4}	1.1×10^{-4}	9.3×10^{-5}	6.8×10^{-5}
Variance, residual	4.3×10^{-3}	1.5×10^{-3}	3.0×10^{-3}	4.0×10^{-3}
Heritability, %	2.6	6.2	2.9	1.5