RELATIONSHIP BETWEEN LITTER SIZE IN MULTIPLICATION AND BREEDING HERDS

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Abstract

Hyperprolific line efficiency is commonly evaluated in regard of breeding herd progress. We decided to study how effective it is with respect to increasing of litter size in multiplication herd. Our study is based on the information about the ancestor of sows in multiplication herd. The ancestors could be the member either hyperprolific line or normal line. The information about performances of sows breed in multiplication herd was known. The mixed linear models in SAS for Windows 9.1.2. were conducted to statistical analysis. In studied population no differences between TNB, NBA or NW were found on the 1^{st} as well as on the 1^{st} -5th litters. When the results of our study are considered the limited population size is necessary to take into account. Nevertheless, the results indicate that more studies with larger population should be done to reevaluate the selection criteria for hyperprolific line.

Key Words: Pigs, selection, reproduction, hyper prolific line

Introduction

Nonsufficient increasing of litter size which was achieved by means of conventional breeding methods is caused mainly by the low heritability and not achieving of intense selection in practice as well as complexity of reproduction (Rothschild and Bidanel, 1998). Recently, the creation of hyper prolific line combined with the selection based on the evaluation of breeding value is believed to be very effective. In sows, the success of direct selection based on the evaluation of breeding value on litter size has been confirmed for instance by Holl and Robinson (2003). The objective of this study was to estimate the effect of creation of hyper prolific line in breeding herd on the litter size of sows in multiplication herd.

Material and Methods

Studied population consists of 176 purebred Czech Large White sows originated from one breeding herd from which they were moved at age of 6 months to one multiplication herd. All sows included in the study were breed under the same living and breeding conditions. The ancestors of this sows could be the member either hyperprolific line or normal line from breeding herd. The data about their performance were collected during last fifth seasons. As the litter size is considered as most important trait in Czech Large White sows, we focused on the total number of piglets born (TNB) defined as the number of all fully formed fetuses expelled at farrowing, dead or alive; number of piglets alive immediately after birth and

by the number of piglets weaned (NW) defined as the number of piglets available on the day post weaning.

The mixed linear models, in SAS for Windows 9.1.2. were conducted to estimate the differences. Independent analyses in the 1^{st} and in the 1^{st} -5th litter independently were carried out for each of studied trait. Individual models are defined in the table 1.

Results and Discussion

The complexity of reproduction caused non sufficient improvement in contrast to improve in lean growth traits (Webb, 1998). Although generally the low response on the selection on the litter size is considered, the results of some studies show considerable litter size increasing as an outcome of selection (Lamberson et al., 1991; Johnson et al., 1999; Bolet et al., 2001 and Robinson, 2003). Based on the experience from other countries, the hyperprolific line seemed to be promising method for litter size increasing. The goal of are study was to evaluate if the hyperprolific line creation have desired effect not only in breeding herd but in multiplication herd so. Our assumption was that descendents of hyperprolific sows should have higher number of piglets per parturition. This is in according with breeding goal of hyperprolific line which is primarily focused on the litter size, teat number and average daily gain. In contrast to our assumption no considerable effect was observed in our population. No differences between TNB, NBA or NW were found on the 1^{st} as well as on the 1^{st} - 5^{th} litters (Table 2). Small number of sows included in the study is can negatively bias the results. On the other hand the results outlined that the breeding goal of hyperprolific line should be reevaluate in context of results in multiplication herds.

Table 1	1.	Specij	fication	of used	models
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	Litters	Line	YS	Mat	OL	AFF	Boar	BF
	1^{st}	F	F	F	-	L	R	-
TNB	1^{st} -5 th	F	F	F	F	L	R	-
	1^{st}	F	F	F	-	L	R	-
NBA	1^{st} -5 th	F	F	F	F	L	R	-
NW	1 st	F	F	F	-	-	R	L
	1^{st} -5 th	F	F	F	F	-	R	-

F - fixed effect; R - random effect; L - linear regression; TNB - total piglets born; NBA - piglets born alive; NW - number of piglets weaned; LINE - HP or N line; YS - year and season of litter; MAT - mating or artificial insemination; OL - order litter; AFF - age at first farrowing; DAM - dam of sows; SIRE - sire of sows; BOAR - mating boar; BF - back-fat thickness

Table 2. Differences of litter size between the sows with ancestor originated from hyper prolific line (HP) and normal line (N)

	Ν	НР				
1 st litters						
TNB	10.88 ± 0.49	11.69 ± 0.61				
NBA	10.22 ± 0.48	10.97 ± 0.58				
NW	10.02 ± 0.29	10.21 ± 0.31				
1 st -5 th litters						
TNB	12.39 ± 0.38	12.41 ± 0.41				
NBA	11.79 ± 0.36	11.91 ± 0.38				
NW 10.42 ± 0.29		10.61 ± 0.31				

TNB – total number of piglets born; NBA – number of piglets born alive, NW – number of piglets weaned; Values with the different superscripts show significance level within rows: $P \le 0.01 \, (^{A}, ^{B})$; $P \le 0.1 \, (^{*}, ^{**})$

Conclusion

The aim of our study was to found the real impact of hyperprolific line selection on the litter size in multiplication herd. The study was performed under the commercial conditions and the results outlined the usefulness of creation of hyper prolific line. The results of our study indicate that major accent should be put on the prolificacy, mainly on the litter size. Otherwise the emphasis aimed to improve the production traits should be lesser.

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