

## THE BACKFAT THICKNESS AND PARAMETERS OF REPRODUCTION IN THE CZECH LARGE WHITE BREED SOWS OF DIFFERENT AGE

Z. Tvrdoň, E. Marková

*Mendel University of Agriculture and Forestry Brno, Faculty of Agronomy, Department of Animal Breeding, Brno, Czech Republic*

### Introduction

At present, the majority of pig breeds are selected for the production of lean meat. In some cases an unilateral selection for meat performance caused undesired correlative changes in other traits and resulted. Rothschild and Ruvinski (1998) mentioned a lack of data concerning relationships existing between meatiness and reproduction of pigs. Matoušek and Kernerová (1997) observed in young sows of the Large White (LW) breed a decrease in the thickness of backfat from 24.3 to 12.0 mm within the period of 1975 – 1995. Problems associated with the negative correlations existing between meatiness and reproduction were studied by Brien 1986, Čeřovský 1997 and Gordon 1997. Tvrdoň et al. (1998) observed that the fertility increased with the increasing backfat thickness. This trend was highly significant in the number of piglets live-born in the group of sows with the thickness of backfat ranging from 11.1 to 14.0 mm. The correlation between the number of piglets live-born and the lifelong performance was  $r = 0.0919$ . Čechová and Buchta (1995) studied the development of performance and reproduction parameters within a series of generations of mother and their granddaughters and found out that the thickness of backfat decreased by 7.3 mm (i. e. by 37.24 %). Within the same period, the number of all piglets born decreased by -1.06 heads. The number of all wean piglets decreased by 1.14 heads (i.e. 10.59 %).

### Material and methods

Relationships existing among backfat thickness, rank of parturition and numbers of all, live-born and wean piglets were analysed in a set of 8,285 sows of the LW breed. The analysis was performed using data about the Performance control of pigs (the standard ČSN 46 6164), which were obtained from the Union of Pig Breeders in Bohemia and Moravia. The thickness of backfat was measured with the apparatus Piglog 100 in the course of performance testing carried out within the framework of field tests. Animals that passed through these performance tests were fed ad libitum on a uniform feed mixture (TESTA). This test lasted for 63 days and began at the age of 12 weeks ( $\pm 4$  days). The size of a tested group was 6 to 12 animals per pen and each group consisted of progeny of two boars at least.

The minimum floor area per sow was 0.8 m<sup>2</sup>. The average thickness of backfat (mm) was calculated on the base of two measurements and corrected to a uniform live body weight of 90 kg.

### Results and discussion

Basic statistical characteristics of backfat thickness estimated within the framework of performance control of LW sows on the base of different ranks of parturitions are presented in Tab. 1. These means enable indicate that the backfat thickness showed an increasing tendency from 10.99 mm at the first farrowing to 12.21 mm at the seventh and subsequent parturitions. The difference between the backfat thickness at the 1<sup>st</sup> and the 7<sup>th</sup> (and subsequent) farrowing was 2.78 mm (25.30 %). The increasing backfat thickness of sows with a higher number of parturitions indicates that sows with a higher percentage of fat remain in the herd for a longer period and that they show a positive effect on the average longevity. This finding corresponds with conclusions published by Wolfová (1997) who observed that the longevity of sows decreased with the decreasing thickness of backfat. Whittemore et al. (1995) mentioned that in primiparous sows an adequate layer of backfat assured their good performance and fertility also after the 2<sup>nd</sup> farrowing. The statistical analysis revealed a highly significance ( $P < 0,001$ ) effect of litter number on fertility (Tab. 3). The backfat thickness did not show a significant effect on fertility; however, a certain tendency ( $P < 0,096$ ) was observed in case of the number of all piglets born. Coefficients of correlations existing between numbers of all, live-born and wean piglets on the one hand and the backfat thickness and litter rank of LW sows on the other are presented in Tab 2. As one can see, the coefficients of correlation existing between the backfat thickness and fertility (expressed in numbers of all, live-born and wean piglets) are mostly negative and range closely around zero ( $r = -0,3530$  to  $0,0391$ ). When evaluating the calculated correlation coefficients of traits under study for individual litters it is possible to conclude that their values were low as far as the rank of the parturition was concerned. Vidovic (1988), as well, found very low phenotypic correlations between the backfat thickness and fertility parameters. Similar conclusions were drawn also by Lember (1994) and Superchi et al. (1992). These results backfat thickness influence on fertility and longevity of sows.

**Table 1. Relationship between backfat thickness and fertility in sows on different parturitions**

Litter order	n	Mean x	S	Vx
1 <sup>st</sup>	8,285	10.99	1.85	0.1687
2 <sup>nd</sup>	5,364	11.15	1.87	0.1681
3 <sup>rd</sup>	3,526	11.26	1.89	0.1682
4 <sup>th</sup>	2,246	11.48	1.86	0.1616
5 <sup>th</sup>	1,377	11.67	1.89	0.1622
6 <sup>th</sup>	718	11.95	1.92	0.1608
7 <sup>th</sup> and more	322	12.21	2.21	0.1809

**Table 2. Correlation coefficients of all, live-born and wean piglets on the one hand and backfat thickness on the other as dependent on the litter order**

Litter order	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>
Number of sows	8,285	5,364	3,526	2,246	1,377	718	322
All	-0.2160*	-0.0380**	-0.0307*	-0.0249	-0.0717**	-0.0391	-0.0157*
Alive	-0.0325**	-0.3530**	-0.0342*	-0.0474*	-0.0911**	-0.0034	-0.1227**
Wean	-0.0047	-0.0057	-0.0156	-0.0482	-0.0530*	-0.0195	-0.0730

\*P &lt; 0,05; \*\*P &lt; 0,01

**Table 3 Results of variance analysis of piglet numbers**

Source of variability	All.	Live-born	Wean
Litter order	***	***	***
Backfat	0.096 <sup>NS</sup>	0.847 <sup>NS</sup>	0.507 <sup>NS</sup>

\*\*\* P &lt; 0,001; NS – non-significant

## References

- BRIEN, F. D.: A review of the genetic and physiological relationships between growth and reproduction in mammals. *Animal Breeding Abstracts*, 12, 1986: 975 - 997.
- ČECHOVÁ, M. – BUCHTA, S.: Působení genetického antagonismu mezi znaky reprodukce a jatečné hodnoty u prasat mateřských plemen. "Zemědělství v marginálních podmínkách"; sborník referátů k 35. založení fakulty, ZF JU, České Budějovice, 1995: 291 - 297.
- ČEŘOVSKÝ, J.: Předpoklady pro intenzivní reprodukci v chovu prasat. In.: Výkonný genofond, úspěšná reprodukce, dobré zdraví, plnohodnotná výživa = úspěch v chovu prasat; Práce, Plemenáři Brno, a. s., 1997: 30 - 35.
- ČSN 41 6164: Kontrola užítkovosti a dědičnosti prasat
- GORDON, I.: Controlled Reproduction in Pigs. CAB International, 1997: 17 - 19.
- LEMBER, A.: Backfat Deposition and Utilization During the Reproductive Cycle of Gilts. Publishers of Tartu Agricultural University, 1994: 90 - 95.
- MATOUŠEK, V. – KERNEROVÁ, N.: Kontrola užítkovosti. *Náš chov*, 1997, 3: 9 - 11.
- ROTHSCHILD, M. F. – RUVINSKI, A.: The Genetics of the Pigs. CAB International, 1998: 430 - 462.
- SUPERCHI, P. – SABBIONI, A. – QUARANTELLI, A. – ZAVATTINI, S.: Effetti dello stato di ingrassamento sull'efficienza riproduttiva di scrofe pluripare. *Annali della Facoltà di Medicina Veterinaria, Università di Parma*, 12, 1992: 133 - 142.
- VIDOVIC, V.: Genetska i fenotipska zavisnost nekih tovnih i svojstva plodnosti krmaca. *Zbornik Radova, Institut za Stocarstvo, Novi Sad*, 16, 1988: 115 - 123.
- WHITTEMOORE, C. T. – DOURMAD, J. Y. – ETIENE, M.: Reproduction in primiparous sows nutrition and body condition in relation to productivity. 46<sup>th</sup> EAAP, Praha, 1995: 301.
- WOLFOVÁ, M.: Zůstávají prasnice s vyšší vrstvou hřbetního sádla déle v chovu? *Náš chov*, 1997a, 5: 43, překlad.

The research of supported by project QF 3218