USE OF REPOPULATION METHOD FOR INTENSIFICATION OF PIGLETS PRODUCTION

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ABSTRACT

The aim of this study was to evaluate selected performance parametres and the piglet losses from birth to weaning after repopulation in productive farm of sows with SPF status. Monitored parametres were evaluated for two commercial programs. An experimental group consisted of 80 gilts (40 in commercial program A and 40 in commercial programm B Evaluation of live-born piglets per litter showed numbers of 14.74 ± 2.09 in the program A and 14.50 ± 2.10 in the program B. Numbers of reared piglets per litter were 13.20 ± 1.52 in the program A against 13.68 ± 2.00 in the program B. Statistical evaluation confirmed no significant differences between the two commertial programs in the selected reproductive parametres. Piglet losses from birth to weaning were also evaluated. In the program A 1.55 ± 1.48 piglets were lost per a gilt against 0.83 ± 1.39 in the program B. The percentage of piglet loss was 9.55 ± 9.04 in the program A and 5.28 ± 8.67 in the program B. The statisticaly significant difference ($P \leq 0.05$) was proved between the two commercial programs. The evaluation of birth weight of piglets from gilts in the commercial program A showed 1.31 ± 0.31 kg against birth weight 1.32 ± 0.28 kg of piglets from gilts in the commercial program B. The weight of a litter at birth was 19.25 ± 3.32 kg in the commercial program A and 19.18 ± 3.06 kg in the commercial program B. The statistical analysis did not prove a significant difference between the programs. The values found by the experiment in both programs can be considered very competitive therefore recovery by the means of repopulation and induction of SPF herds can be recommended.

Key words: sow, piglet, reproduction, repopulation, losses, weight, SPF

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INTRODUCTION

Breeding sows is from the farming and economical aspects one of the most exhausting branches of pig breeding. The aim of breeding sows is to produce piglets and to gain a profit. A prerequisite of efficiency of breeding sows is ensuring good health and high performance of sows characterized by a number of reared piglets per sow (Boudný and Špička, 2012). It is constantly poited out, that particularly the number of reared piglets per sow is the cause of problems in Czech famrs and also that there is a fundamental difference between our and succesfull foreign farms (Rozkot, 2012).Ensuring optimal reproduction is besides various endogenous and exogenous factors influenced by health condition which is subsequently reflected in pig rearing and fattening, thereby affecting the entire herd prosperity. Poor health situation in herds negatively influences the farm economy (Lambert *et al.*, 2012). Poor health situation in herds can be solved by the method of radical recovery by the metod of repopulation. According to Pelikán (1989) this method comes originally from the USA from the year 1952 and it continuously started to apply in conditions of the Czech Republic. Plhal (1987) states that the environment, nutrition, gene pool and health as conditions of high performance must be systematically checked and it is necessary to renew them in time periods and preferably by radical recovery by the method of repopulation. The method consists of extracting piglets shortly before birth either by Caesarian operation or by extraction of all whole uterus (hysterectomy) or by aseptic capture of piglets. According to Koliander *et al.* (1989), the disease life cycle can be interrupted this way as there is no contact between piglets and sow. This method is known as specific pathogen free (SPF).

MATERIAL AND METHODS

The aim of this study was to evaluate selected performance parametres and the piglet losses from birth to weaning after repopulation in productive farm of sows with SPF status. Monitored parametres were evaluated for two commercial programs.

Experimental population consisted of 80 repopulated gilts (40 in commercial program A and 40 in commercial program B). The original population of sows was removed. Newly delivered SPF gilts were placed into decontaminated stable with strict batch, black and white breeding system with stringent hygienic provisions.

Optimal microclimate for piglets was ensured using heated plates, supplementary feeding followed from the fifth day after birth. The piglets were weaned at the mean age of 28 ± 3 days. The experiment ran in the term from April to June. In both groups of gilts (commercial program A, B) phenotypic levels of selected performance parametres were observed, namely:

- number of live-born piglets,
- number of reared piglets
- number of piglets lost from the birth to the weaning
- individual birth weight (kg)
- weight of a litter at birth (kg).

The obtained performance paramteres and the loss of piglets in the commercial program A were compared to the parametres obtained for commercial program B and elementary statistical characteristics for differences in evaluated parametres between the groups of gilts were analyzed, namely mean, standard deviation and relevance based on the t-test. The symbol *** stands for $P < 0.001$, ** stands for $P < 0.01$, * stands for $P < 0.05$ a NS stands for $P > 0.05$. The statistical evaluation was done using the programs STATISTIKA version 9.0 and Microsoft Excel 2010.

RESULT AND DISCUSSION

I: Basic satistical characteristics of loss of piglets by the commercial program

Parameter	Program	n of litters	n of piglets	$\overline{x} \pm s_x$	Significance
Number of live-born piglets (pcs/litter)	A	40	590	14.75 ± 2.10	NS
	B	40	580	14.50 ± 2.10	
Number of reared piglets (pcs/litter)	A	40	528	13.20 ± 1.52	NS
	B	40	547	13.68 ± 2.00	
Loss of piglets (pcs/litter)	A	40	62	1.55 ± 1.48	*
	B	40	33	0.83 ± 1.39	
Loss of piglets (%/litter)	A	40	62	9.55 ± 9.04	*
	B	40	33	5.28 ± 8.67	

NS = statistically insignificant difference ($P \geq 0.05$); * = statistically significant difference ($P \leq 0.05$)

Tab. I show losses of piglets from birth to weaning per litter. In the commercial program A the loss amounted 1.55 ± 1.48 piglets against 0.83 ± 1.39 piglets in commercial program B. The percentage of loss of piglets was 9.55 ± 9.04 in commercial program A and 5.28 ± 8.67 in commercial program B. The statistical analysis demonstrated statistically significant difference ($P \leq 0.05$) between evaluated programs. According to Plhal (1987) a prevention of loss of piglets is very difficult issue, which is systematically divided into optimal production of health in herds of sows and piglets health protection per se. The issue of rearing pigs is an indicator of health and disease situation in breeding sows. The state of the basic herd of sows decides whether a litter will be numerous, born piglets balanced and with good vitality and with inborn resistance to stable diseases. This author also points out that the creation of health of piglets must be based on precautionary requirements for achievement of optimal health of their mothers, where recovery of sows by repopulation plays an important role. This statement is supported by O'Donoghue and Ballantyne (1965) who report, that SPF sows are characterized by lower loss of piglets before weaning, but they emphasize that repopulation itself is not sufficient and that it is necessary to ensure strict hygiene in the herd. Munsterhjelm *et al*. (2006), Andersen *et al.* (2009) and Oliviero *et al*. (2010) state that appropriate health programs in herds of sows minimize loss of piglets after birth. According to Rootwelt *et al.* (2012) the loss of piglets from the live-born to the weaned in problematic herds reaches 16.20 %. Rohe and Kalm (2000) highlight that the highest losses of piglets are recorded during the first week of life, which is confirmed by Arango *et al*. (2006) and in their work they add that of the piglets lost from birth to weaning, the loss during first day is around 4 %, the second day after birth the mortaliy is the highest up to 17 % and the following days it declines, the third day 16 %, the fourth day 9 % and the fifth day 7 %. From the sixth day, the mortality is stabilized at 4 %. Also Vaillancourt *et al.* (1992) say that an intensive production of sows is accompanied by certain critical phases. Loss of piglets from birth to weaning is considered an important one, either as a result of infectious diseases or nonpathogenic causes, therefore monitoring of piglets allows its optimization. They also point out that in problematic herds, the losses can be very high. For example in England, the worst herds reached 12 – 30 % of loss of piglets before weaning, 17.6 % in Croatia and 22.2 % in Slovenia. The loss of piglets observed in the experiment can be considered

satisfactory, however it is evident that even in SPF conditions of production farms attention has to be paid to the genetics of animals, which plays an important role in this respect.

II: Basic statistical characteristics of individual piglets birth weight and weight of a litter at birth by the commercial program

Parameter	Program	n of litters	n of piglets	$\bar{x} \pm s_x$	Significance
Number of live-born piglets (pcs/litter)	A	40	590	14,75 ± 2,10	NS
	B	40	580	14,50 ± 2,10	
Individual birth weight (kg)	A	40	590	1,31 ± 0,31	NS
	B	40	580	1,32 ± 0,28	
Weight of a litter at birth (kg)	A	40	590	19,25 ± 3,32	NS
	B	40	580	19,18 ± 3,06	

NS = statistically insignificant difference ($P \geq 0,05$)

Tab. II records weight parametres of piglets born within one litter. Piglets from gilts in the commercial program A weighed at birth 1.31 ± 0.31 kg in average against piglets from gilts in the commercial program B which weighed 1.32 ± 0.28 kg. The difference in the birth weight of piglets which amounted 0.01 kg was negligible. The birth weight o a litter was 19.25 ± 3.32 kg in the commercial program A and 19.18 ± 3.06 kg in the commercial program B. The difference between the programs was minimal and amounted 0.07 kg. The statistical analysis did not prove a significant difference. Čechová (2006) says, that sufficient number of quality piglets is one of the basic prerequisites for a succesful production of slaughter pigs. Čeřovský *et al.* (1999) who examined the variability in birth weight of piglets indicate that an imbalance of birth weight of live-born piglets in a litter has a significant impact on the loss of piglets before weaning and they consider viable piglets in the terms of rearing only those with birth weight of at least 1.20 kg. Potter *et al*. (2012) evaluated birth weight of piglets in SPF herd, which was PRRS and Mycoplasma hyopneumoniae negative and irrespectively of the order of litter and with the use of Duroc boar, the birth weight of piglets was 1.60 kg and the authors add that health programs in breeding sows influence primarily survivability of piglets after birth. The results mentioned above show that the more numerous is a litter the lower is birth weight of piglets, however the weight of litter increases. Wolf *et al*. (2008) recorded the weight of piglets 19.30 kg, which corresponds to the results of the experiment. Rootwelt *et al*. (2012) highlight that sows in the first litter have lower weight of litter and add that the weight of a third litter at birth is 21.46 kg. I can be concluded from these findings, that the resuts concerning weight of piglets at birth recorded in our experiments in both evaluated programs can be considered convenient for gilts, especially concerning the high litter weight, which these gilts reached.

CONCLUSIONS

The experiment did not reveal statistically significant differences in selected performance parametres between evaluated commercial programs in production farm, which indicates high health and genetic quality of sows used in observed herd. Evaluation of loss of piglets showed statistically significant difference ($P \leq 0.05$), which suggests that genetic basis of piglets is crucial for their survival to weaning. Values of selected performance parametres found in the experiment

within both programs can be considered very competitive, therefore recovery by the means of repopulation and induction of SPF herds can be recommended.

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