RESULTS OF REPRODUCTIVE TRAITS IN TESTED HYBRID COMBINATION (CLW X CL) X D AND AN INFLUENCE OF USED BOARS ON REPRODUCTION

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Abstract

The aim of the study was to evaluate the results of reproductive traits of tested hybrid combination (CLW x CL) x D and an influence of Duroc boars which were used in test. These traits of reproduction were studied: number of all born piglets, number of live born piglets and number of weaned piglets. Losses from live born piglets till weaning were checked too. Birth weight and weaning weight were monitored for complementation. In a file of 56 sows there was found an average number of all born piglets 13.86, number of live born piglets 12.61 and number of weaned piglets 11.13. Sows which were inseminated by sperm of boar HAI 35 they had the highest number of live born piglets in average (13.63). HAI 34 was the boar with the worst results – 11.9 live born piglets per sow in average. Numbers of weaned piglets are well-balanced in boars DUR 363 and HAI 35, sows had more than 11.6 of weaned piglets per litter in average after both of them. After boar HAI 34 was the lowest number of weaned piglets – 10.3. There was not found statistically conclusive difference among boars during statistical analysis of number of all born, live born and weaned piglets. An average birth weight of tested piglets was 1.47 kg. A statistical conclusive difference on a level of importance P≤0.01 was found between sexes. A higher birth weight 1.51 kg was determined in boars in comparison with gilts – 1.42 kg. The lowest birth weight had offspring after boar DUR 363 - 1.37 and offspring after boar HAI 35 (1.39). Among offspring of the other boars the birth weight was around 1.5 kg in average. A statistically conclusive difference was found during test of conclusiveness of birth weight in each boar.

Key Words: Pig, reproductive traits, number of all born piglets, number of live born piglets, number of weaned piglets

Introduction

One way how to be profitable in pig breeding is to improve all parameters of efficiency. Carcass value was markedly improved during past years so interest of pig breeders is target on problems with reproduction now as a significant part of total costs during production of carcass pig. For every breeding with carcass pig production is quite important good reproduction which has impact on total efficiency or loss of this production. De Vries (1989) and Tess et al. (1983) mention that size of litter is the most important economical trait. With growing fertility costs on sow breeding are decreasing. Every improving of reproduction is projected on total profitability of breeding.

From zootechnician viewpoint number of live born and number of weaned piglets per sow per year are the most important traits for breeder. To be able to compete in piglets production breeders have to have 25 and more weaned piglets per sow per year. Breeders in advanced countries of European Union reached 27 – 30 weaned piglets per sow per year. Potential fertility of our breeds is making possible to reach such a high goals.

In the Czech Republic the average number of weaned piglets per sow per year is 20.8 and some farmers are reaching 24 and more now.

Material and Methods

The aim of the study was to evaluate the results of reproductive traits of tested hybrid combination (CLW x CL) x D and an influence of Duroc boars which were used in test. These traits of reproduction were studied: number of all born piglets, number of live born piglets and number of weaned piglets. Losses from live born piglets till weaning were checked too. Individual birth weights and weaning weights were monitored.

Average number of days from birth till weaning was 28. Functional test of pigs was done in concurrent conditions of environment in chosen commercial breeding. Hybrids F 1 generation (CLW x CL) were used as mothers and they were inseminated with insemination doses of Duroc boars from insemination stations of boars in Velké Meziříčí. Five boars were used in a study with registration marks HAI 27, HAI 34, HAI 35, DUR 34 and XDUR 363. Approximately 12 sows were inseminated with insemination doses after one boar.

Basic statistical characterizations were counted from measured values – average, standard deviation, minimum and maximum. A method of multiple comparison of analysis variance - Student-Newman-Keuls test – was used for testing of cogency of differences among traits. Statistical program UNISTAT 5.1. was used for these purposes.

Results and Discussion

In practice sows fertility is determined according to number of all, live born and weaned piglets in litter. In test these traits were studied in hybrid combination (CLW x CL) x D and they are evaluated in Table 1. In a file of 56 sows there was found an average number of all born piglets 13.86, number of live born piglets 12.61 and number of weaned piglets 11.13.

Čeřovský (2007) mentions that optimal litter means 14 all born piglets, 13 live born and 12 weaned piglets. Average numbers of piglets in the test are close to this optimal litter. Sládek et al. (2002) mention for hybrid combination (CLW x CL) x (Pn x H) average number of all born piglets 10.65, live born 9.90 and weaned 9.48. Žajdlíková (2007) mentions for hybrid combination (CLW x CL) x Pn average number of all born piglets 11.25, live born 10.64 and weaned 9.62. Loses from all born piglets were 9.02 % and loses from live born piglets till weaning 11.74 % as it is shown in Table 1.

Knol and Leenhouwerse (2004) mention that 7 % piglets in litter are born death in average and 13 % from live born will die during lactation. Čeřovský (2005) mentions that loses from live born piglets till weaning are usually about 10 or more percent. According to ČSÚ (Czech statistical institute - year 2008) an average mortality from born piglets was 11.1 %.

Table 2 shows values of all born piglets, live born and weaned piglets according to used boars. The best results in number of all born piglets showed boar DUR 363 – 15 piglets per sow. The lowest number of born piglets had sows inseminated by boar DUR 34 – 13.54. Sows which were inseminated by boar HAI 35 had in average the highest number of live born piglets (13.63). Boar HAI 34 was the worst in this trait with average 11.9 of live born piglets per sow. The highest number in one litter was after HAI 35, the lowest number after boar DUR 363. Numbers of weaned piglets are well-balanced in boars DUR 363 and HAI 35, sows had more than 11.6 of weaned piglets per litter in average after both of them. After boar HAI 34 was the lowest number of weaned piglets – 10.3. There was not found statistically conclusive difference among boars during statistical analysis of number of all born, live born and weaned piglets.

Table 1. *Total results of reproductive traits in tested hybrid combinations*

Combination	Number of litters	All born piglets (average)	Live born piglets	Weaned piglets	Losses from all born piglets in %	Losses from live born piglets till weaning in %
(CLW x CL) x D	56	13.86	12.61	11.13	9.02	11.74

Table 2. *Basic statistical characterizations of studied reproductive traits in sows inseminated by boars D*

Boar	Number of litters	All born piglets			Live born piglets			Weaned piglets			Losses from birth till weaning in %
		Mean	X_{min}	X_{max}	Mean	X_{min}	X_{max}	Mean	X_{min}	X_{max}	
HAI 27	12	14.08	8.00	18.00	12.50	7.00	17.00	11.25	7.00	15.00	10.00
HAI 34	10	12.40	9.00	16.00	11.90	9.00	16.00	10.30	6.00	13.00	13.45
HAI 35	8	14.00	9.00	22.00	13.63	8.00	22.00	11.63	7.00	18.00	14.67
DUR 34	13	13.54	10.00	20.00	12.00	9.00	17.00	10.77	8.00	14.00	10.25
DUR 363	13	15.00	10.00	18.00	13.23	6.00	18.00	11.69	6.00	18.00	11.64

Statistical evaluation of birth weight of piglets is shown in Table 3. An average birth weight in tested piglets was 1.47 kg. Sládek et al. (2002) in their study mention an average birth weight 1.34 kg in combination (CLW x CL) x CLW – sire line and 1.26 kg in combination (CLW x CL) x (Pn x H).

Herčík (2003) recommends from a viewpoint of weaning and next growth as vital these piglets which had birth weight higher than 1.20 kg. Kyriazakis (1999) mentions that only 44 % piglets with birth weight less than 1 kg will survive till weaning. A statistical conclusive difference on a level of importance P≤0.01 was found between sexes. A higher birth weight 1.51 kg was determined in boars in comparison with gilts – 1.42 kg. In Table 4 there are shown birth weights of piglets according to used boar in test. The lowest birth weight had offspring after boar DUR 363 - 1.37 and offspring after boar HAI 35 (1.39). Among offspring of the other boars the birth weight was around 1.5 kg in average. A statistically conclusive difference was found during test of conclusiveness of birth weight in each boar as it is shown in Table 4.

Statistical evaluation of weaning weights of piglets is shown in Table 5. An average weaning weight in age of 28 days was 6.62 kg. The lightest piglet had 3.30 kg, the heaviest one 10.70 kg. Between hogs and gilts there were found similar values – 6.63 kg, respectively 6.62 kg. In Table 6 there is evaluation of weaning weights of piglets according to individual boars. The lowest average weight of piglet during weaning was found in offspring after boar DUR 363 (6.24 kg). The highest weight had piglets after boar HAI 35 (6.98 kg). During test of conclusiveness of weaning weights of piglets in individual boars there was found a conclusive difference.

Table 3. Basic statistical characterizations for trait birth weight of piglets in tested hybrid combinations

Hybrid combination	Sex	Birth weight (kg)				
		n	$\overline{X}$	S_x	X_{min}	X_{max}
(CLW x CL) x D	Boars	366	1.51[a]	0.43	0.50	2.60
	Gilts	302	1.42[a]	0.40	0.50	2.40
	Total	668	1.47	0.42	0.50	2.60

a: P≤0.01

Table 4. Basic statistical characterizations for trait birth weight of piglets according to boars (CLW x CL) x D

Boar	n	Mean	S_x	X_{min}	X_{max}
HAI 27	144	1.54[b,e]	0.36	0.50	2.20
HAI 34	113	1.52[a,d]	0.35	0.50	2.20
HAI 35	100	1.39[b,c,d]	0.45	0.50	2.30
DUR 34	148	1.52[c,f]	0.48	0.50	2.60
DUR 363	163	1.37[a,e,f]	0.40	0.50	2.20

a,b,c,d: P≤0.05 e,f: P≤0.01

*Table 5. Basic statistical characterizations for trait weaning weight of piglets in tested hybrid combinations*

Hybrid combination	Sex	Weaning weight (kg)				
		n	$\overline{X}$	S_x	X_{min}	X_{max}
(CLW x CL) x D	Boars	341	6.63	1.24	3.30	10.70
	Gilts	279	6.62	1.30	3.70	10.70
	Total	620	6.62	1.27	3.30	10.70

*Table 6. Basic statistical characterizations for trait weaning weight of piglets according to boars* (CLW x CL) x D

| Boar	n	Mean	S_x	X_{min}	X_{max}
HAI 27	135	6.59^b	1.12	4.10	9.50
HAI 34	101	6.67^a	1.08	4.00	9.00
HAI 35	93	6.98^c	1.36	3.50	10.70
DUR 34	140	6.79^d	1.47	3.30	10.70
DUR 363	151	$6.24^{a,b,c,d}$	1.15	4.00	9.70

a,b: P≤0.05   c,d: P≤0.001

Graph 1. Results of reproductive traits according to boars in hybrid combination (CLW x CL) x D
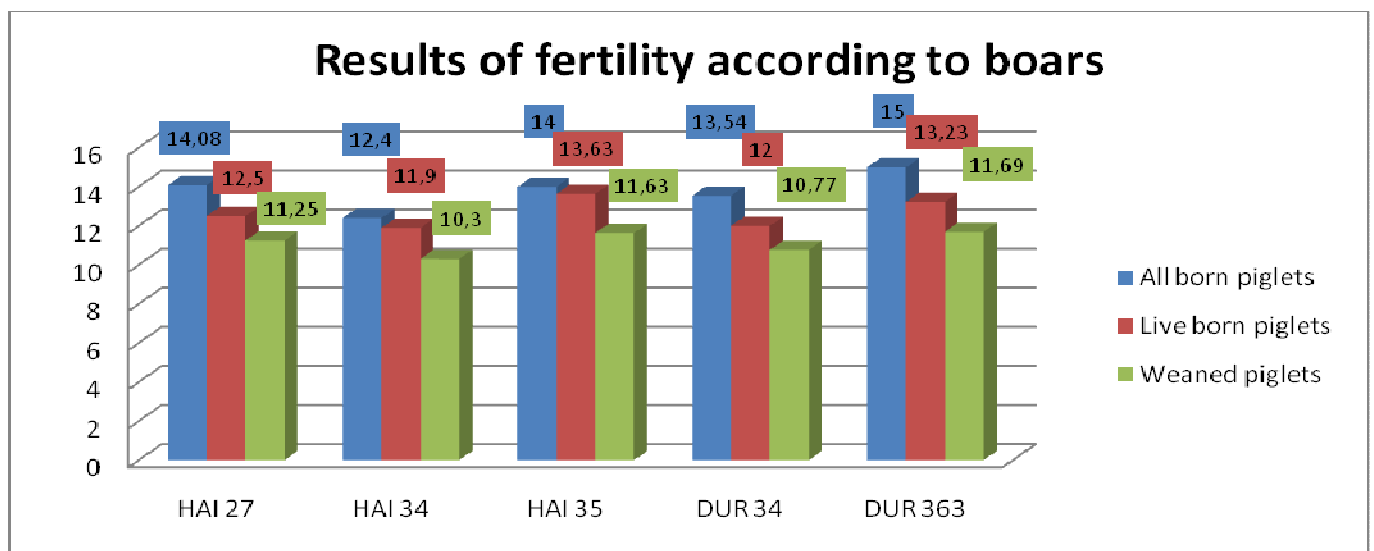
Graph 2. Birth weight of piglets (in kg) according to boars in hybrid combination (CLW x CL) x D
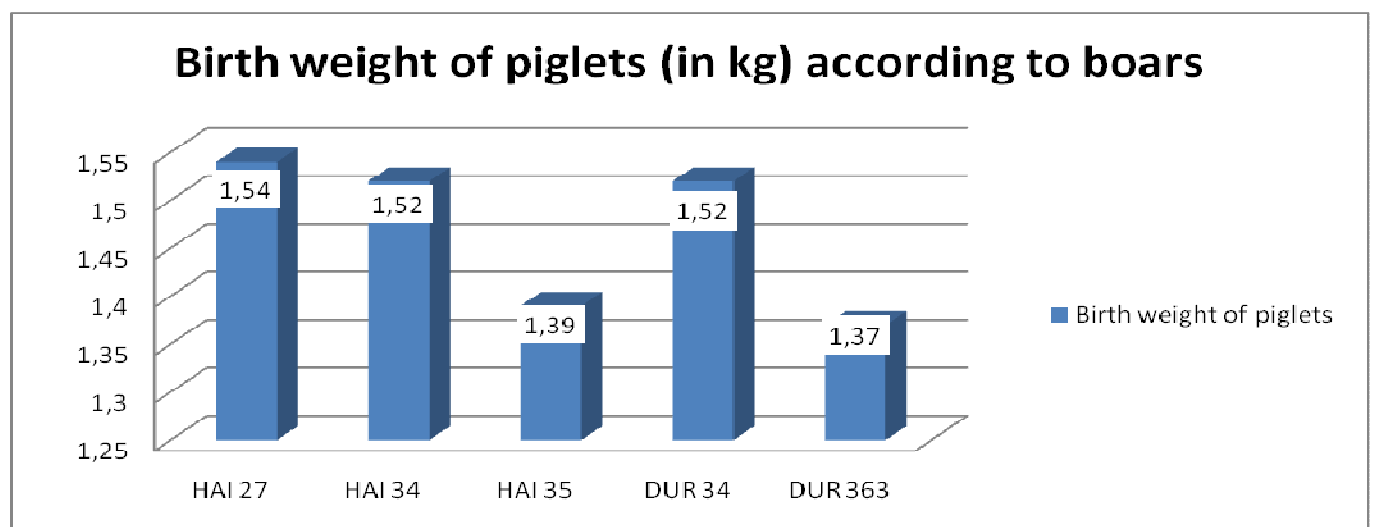
Graph 3. Weaning weight of piglets (in kg) according to boars in hybrid combination (CLW x CL) x D
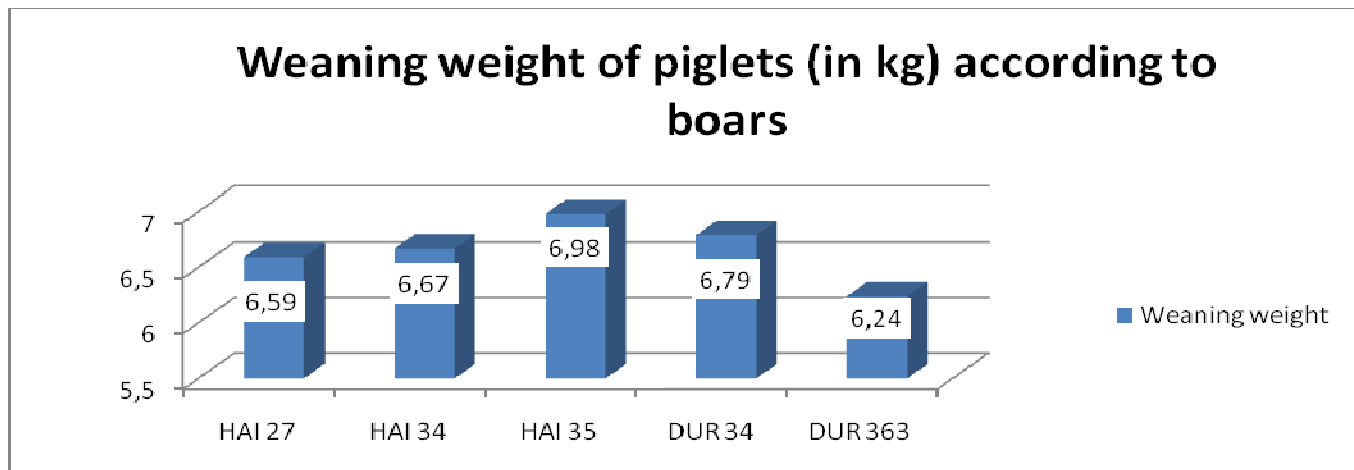
Conclusion

On a base of determined values of reproduction in tested hybrid combination (CLW x CL) x D is possible to claim that a really good result was reached. In a file of 56 sows there was found an average number of all born piglets 13.86, number of live born piglets 12.61 and number of weaned piglets 11.13.

In chosen breeding meantime was 153 days which means 2.4 litters per sow per year and 26.7 of weaned piglets per sow per year.

Numbers of weaned piglets are well-balanced in boars DUR 363 and HAI 35, sows had more than 11.6 of weaned piglets per litter in average after both of them. After boar HAI 34 was the lowest number of weaned piglets – 10.3. There was not found statistically conclusive difference among boars.

An average birth weight in tested piglets was 1.47 kg. A statistical conclusive difference on a level of importance P≤0.01 was found between sexes. A higher birth weight 1.51 kg was determined in boars in comparison with gilts – 1.42 kg. A statistically conclusive difference was found during test of conclusiveness of birth weight of offspring after each used boar. The lowest birth weight had offspring after boar DUR 363 - 1.37 and offspring after boar HAI 35 (1.39). Among offspring of the other boars the birth weight was around 1.5 kg in average.

References

Čeřovský, J.: Reprodukce prasat. In: Nové poznatky v chovu prasat. Kostelec nad Orlicí, 2007, s. 6-8

Čeřovský, J.: Chov prasat. Praha: Profi Press, 2005, č. 5, s. 55-68

De Vries, A.G.: A model to estimate economic values of traits in pig breeding. Livest. Prod. Sci., 21, 1989, s. 49-66

Herčík, Z.: Hodnocení porodní hmotnosti. Náš chov. 2003. Č.10. s. 36

Knol, E.F., Leenhouwers, J.I. Je přežitelnost selat dědičná? Náš chov. 2004, č. 2. s. 32-33

Kyriazakis, I Aquantitative biology of the pig. Edinburg. UK: CABI Publishing, 1999, 398 s.

Sládek, L., Čechová, M., Mikule, V.: Dosažené výsledky reprodukce u vybraných kombinací víceplemnného užitkového křížení prasat. XVIII. Mezinárodná konferencia o reprodukcii hospodárskych zvierat. Zborník referátov. Nitra: SPU, 2002, s. 252-258

Tess, M.W., Benett, G. L., Dickerson, G.E.: Simulation of genetic ganges in life cycle efficiency of pork production. J. Anim. Sci., 56, 1983, s. 354-368

Žajdlíková, V.: Úroveň reprodukčních ukazatelů u testované trojplamenné kombinace užitkového křížení prasat při využití plemene Pietrain. Brno, 2007, diplomová práce, MZLU v Brně