THE EFFECT OF SIRE ON SLAUGHTER VALUE OF PROGENY OF DANISH WHITE RABBITS

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Abstract - Studies were made on 112 heads of the progeny of 14 sires of Danish White (DW) rabbits.
There was marked individual effect of sires on the slaughter value of progeny, although the scores of their evaluation were close. The body weight of young rabbits, depending on sire, amounted to from 923 to 1254 g at 60 days of age and from 1763 to 2055 g at the age of 90 days. At 90 days of age the highest values of that trait were obtained in the progeny of sires I, II and III, and the smallest ones by sires XI and IX. Like in the body weight, in all sire groups the weight of carcasses and the weight of meat in carcass showed the same pattern.
The percentage share of meat in carcass appeared highest in rabbits by sires X, III and V (81,6 to 81,8%) and least by sires XI, I, III and II (77,6 to 79,7%). The fat content of rabbit carcasses in all groups was low and amounted from to 0,36 to 1,45%. Significant differences in that trait were found between means of progeny by sires I and IV-VII, VII, XII, XIII; XI and V, VII as well as IX and V, VII. No significant differences were found between the bone contents of particular rabbit carcasses.

INTRODUCTION

Danish White rabbits were imported to Poland twice and in certain regions of the country have been widely spread. At the moment, the performance of the animals has been examined (NIEDZWIADEK et al. 1985) and indirect methods for estimation of their slaughter value have been worked out (LEWCZUK and SZCZEPANIK 1994, LEWCZUK et al. 1992). It was shown that in comparison with New Zealand White, Californian White and Termond White rabbits, the Danish White rabbits are characterized by somewhat lower reproductivity but by better meat performance, the latter being dependent on many factors (BLASCO et al. 1984, LABECKA and GARDZIELEWSKA 1990, NIEDZWIADEK et al. 1985). One of them is origin by sire which has been commonly studied by the way of progeny test and heritability estimation (BRUN and OUHAYOUN 1988, KHALIL et al. 1986, VAREWYCK et al. 1986, 1987).
The objective of this work was to investigate the capability of sires to transmit meat performance to progeny.

MATERIALS AND METHODS

The experimental material included 112 heads of progeny of 14 males and 56 females of Danish White rabbits. Both males and females were characterized by similar scores of evaluation, similar body weight and age and came from spring kittening. Each of the males mated four females chosen by random. From each mating two heads (1 o and 1 o) of progeny were randomly taken for farther examination. At the age of 28 days rabbits were weaned, marked and weighed. Before slaughter the animals were measured (trunk length, thigh length, chest circumference and loins width).
Slaughtering of rabbits was done at the age of 90 days according to the methods of the Institute of Zootechnics in Balice (Poland), after starvation for 24 h. Carcass dressing was expressed as quotient of the carcass weight and body weight.
After cooling for about 18 h at 277 K, the carcasses were dissected to lean, bones and fat and the data obtained were analysed statistically.
The results were analysed using the variance analysis for one-factor, orthogonal sets. The significance of the differences among the progeny means was tested with a Duncan's new multiple test.

RESULTS AND DISCUSSION

The progeny of sire VII was characterized by the highest body weight (1248 g) at the age of 60 days (Table 1). Relatively high values of that trait were also obtained in the rabbits by sires VI and VIII. The lowest body weight at this age had the progeny by sires XII, XI and XIII (from 924 to 990 g). Significant differences in this trait were found between almost all the sire groups.

Differences in body weight at the age of 60 days did not effected the value of that trait in the next period. At the age of 90 days the highest body weight obtained the rabbits by sires I, II and III (from 2055, 2003 and 1993 g), and the lowest ones had those by sires XI and IX (1769 and 1832 g).

From the investigated body measurements, width of loins was the most differentiated. Remaining measurements were more similar at the sire groups.

The highest carcass weight was found in rabbits from groups I, II and III (from 1007 to 951 g). Relatively high values of that trait were obtained in animals from groups VIII (938 g) and XIII (927 g). The rabbits from group XI were characterized by the lowest carcass weight (827 g). Significant differences were found between means of groups I and IV, VI, IX, XI, XII, VII; II and IX, XI; III and XI. Carcass dressing percentage in the rabbit groups studied had not significantly differed and amounted to from 55,9 to 54,8% (Table 1).

The percentage lean content of carcasses of progeny by the sires studied varied (Table 2). Most meat contained rabbit carcasses from groups X, IV and V (81,79 to 81,58%) and least meat had these from groups XI, I, III and II (77,65 to 79,69%). A series of significant differences in that trait between the means of progeny by different sires were found.

The bone weight in progeny of the sires studied appeared significantly differentiated. However, no significant differences in the bone content between groups were found.

The fat content of the carcass averaged from 0,36% in progeny by sire V to 1,45% in progeny by sire I. Significant differences in that trait were found between the animals from groups I and V-VII, IV, VII, XII, XIII; XI and V, VII; IX and V, VII. However, it must be stressed, that the percentage content of fat of carcasses in all the animals studied was very low.

The percentage lean content of separate parts of carcass was as obtained by other researchers (LEWCZUK and SZCZEPANIK 1985, NIEDZWIADEK 1983, VAREWYCK et al. 1987). Most meat in fore part contained rabbit carcasses from groups X, II, IV, V and least meat had those from groups VIII, VI and XII. The highest values of percentage lean of loins characterized groups VI, X, IV, IX, and the lowest ones - XI, II and III. Similar tendency was found when the percentage lean content of carcass had been analysed. Meat content in hind part of carcass did not statistically differ.

Comparing these results (independently from sire) with those obtained by BLASCO et al. (1984), LABECKA and GARDZIELEWSKA (1990), LUKEFAHR and OZIMBA (1991), NIEDZWIADEK et al. (1985) it should be stressed that the rabbits studied were characterized by a lower body weight in the consecutive growing periods and a smaller carcass weight and its tissue components. This was probably due to the fact that the animals in this experiment were fed mainly farm feeds and in the cited studies the rabbits were fed pelleted mixtures. Nevertheless, it must be stressed that the carcasses of the rabbits studied were well muscled (from 77,6 to 81,8%) and contained little fat (ca. 1%). NIEDZWIADEK et al. (1985) rightly then stress that the Danish White rabbits are superior to New Zealand White, Californian White and Termond White rabbits with regard to meat performance.

Summing up it can be concluded that sire effect on the body weight and slaughter value of progeny appeared significant. Progeny by sires X, IV and V were characterized by the best carcass quality and progeny by sires XI, I, III, and II were characterized by the worst carcass quality. Discussion on this matter is, however, difficult as in the available literature no papers on the effect of a single sire on the growth and slaughter value of progeny are published. BRUN and OUHAYOUN (1988) confirmed that sire strain had a significant effect on slaughter yield and carcass muscularity but they did not study individual capability of sires to transmit those traits to progeny. Then, the results obtained in this study can be only discussed with these obtained by other workers with pigs and cattle. GRUDNIEWSKA et al. (1994) determined the fattening and slaughter performance of progeny by three Duroc boars mated to Polish White Log-eared sows-24. A marked individual effect of boars used for crossing was found, although the values of breeding index were close. It indicates that in breeding work there is the possibility of using boars of outstanding capabilities of transmitting features to progeny. Similar results were obtained by KIJAK et al. (1990) on the cattle. Progeny by different bulls from the same genetic group appeared differentiated with regard to the traits of fattening and slaughter value. Therefore, a conclusion can be drawn that, also in rabbits, more attention should be paid to the assessment of males with respect to the transmission of meat traits to progeny.

Table 1: Weight and measurements of body, carcass weight and dressing percentage

Sire	Body weight at age 60		90		Trunk length		Thigh length		Chest circumference		Loins percentage		Weight of warm		Dressing percentage	
	x	S	X	S	X	S	X	S	X	S	X		X	S	x	
I	ABCabcd 1137,8	86,9	Aa 2055,0	89,6	ABabc 33,50	2,37	ABdb 10,25	0,61	ABab 27,67	1,66	Aa 5,72	0,31	Aa 1007,3	56,5	58,1	1,3
II	ABCabc 1156,0	44,8	ABab 2002,9	86,6	ABbc 35,14	1,57	ABab 10,20	0,41	ABabal 26,43	1,17	ABab 5,63	0,37	ABab 961,7	63,5	57,2	2,8
III	ABCabc 1177,7	88,4	ABabc 1992,9	111,0	Bc 35,43	1,82	ABab 10,10	0,46	ABabcd 27,00	1,98	ABCcd 5,13	0,35	ABabc 951,1	71,9	56,8	1,6
IV	ABCDedef 1077,9	153,2	ABCbcde 1852,9	129,1	ABa 32,84	0,79	ABabc 10,00	0,42	ABabcd 26,36	2,29	Ccd 4,99	0,34	Bbcd 870,9	85,3	56,1	2,4
V	ABCabcd 1136,2	136,7	ABCbcde 1873,3	117,6	,ABabc 34,50	1,90	ABab 10,07	0,79	Bd 24,83	2,07	ABCcd 5,17	0,33	ABabcd 912,8	67,2	58,0	0,3
VI	Aa 1246,3	120,9	ABCbcde 1860,0	132,5	ABa :32,92	1,46	ABabc 9,92	0,13	ABabcd 25,92	1,36	Cd 4,77	0,37	Bbcd 865,8	77,5	55,9	1,8
VII	Aa 1247,7	107,2	ABCbcde 1860,8	152,1	Aa 32,50	1,82	ABab 10,13	0,70	Aa 28,25	3,04	BCcd 5,08	0,53	ABbcd 882,5	106,4	56,8	2,3
VIII	ABab 1233,8	43,7	ABCbcde 1850,0	75,5	ABabc 33,70	1,60	ABab 10,26	0,25	ABcd 25,10	1,39	BCcd 5,06	0,42	ABabcd 936,2	37,6	59,8	2,2
IX	BCDcdef 1040,6	149,3	BCde 1800,0	87,7	ABab :33,00	1,67	ABab 10,20	0,66	ABbcd 25,44	1,52	Ccd 4,89	0,33	Bcd 851,5	59,1	56,9	3,1
X	An 1254,0	47,3	ABCabcd 1939,0	128,9	ABabc 34,70	1,20	*Aa* 10,40	0,24	ABabc 27,40	1,29	Cd 4,80	0,51	ABabcd 917,4	65,5	56,8	4,1
XI	Def 933,9	58,2	Ce 1762,9	96,5	ABabc 34,21	1,18	Bc 9,41	0,53	ABcd 25,21	1,55	ABCabc 5,34	0,11	Bd 826,9	52,9	56,7	2,9
XII	Df 923,7	98,4	ABCcde 1831,7	117,2	ABa 32,58	1,56	ABab 10,13	0,49	ABabcd 26,25	2,04	Cd 4,83	0,43	Bbcd 859,7	88,7	56,5	2,1
XIII	CDdef 989,8	112,6	ABCbcde 1882,0	175,7	ABabc 34,34	2,18	ABbc 9,72	0,40	ABabcd 25,90	1,02	Al3Cbcd 5,22	0,26	ABabcd 927,4	104,6	58,6	1,4
XIV	ABCDbcde 1087,6	102,8	ABCabcd 1944,3	152,0	ABa 32,64	1,75	Aa 10,56	0,42	ABcd 25,14	1,68	BCcd 5,00	0,59	ABabcd 923,6	71,4	56,7	2,3

x - progeny mean, s - standard error

Means followed by different letters (columns) are significantly different; capital letters a = 0,01; small letters a = C),05

Table 2 Weight and tissue content of carcass and its parts

Sire	Weight of cold carcass		Content in carcass: lean				bones				fat				Content of lean in carcass parts: fore		loins		hind	
			g		%		g		%		g		%		%					
	x	S	X	S	X	S	X	S	X	S	X	S	X	S	X	S	X	S	X	S
I	961,2 Aa	56,9	759,8 Aa	46,1	79,0 ABab	2,2	157,7 Aa	14,0	16,5	1,4	12,5	10,0	1,4 Aa	0,7	74,05 ABabcd	2,73	87,40 Aabc	2,67	83,47	0,60
II	895,6 ABabc	53,9	706,7 ABab	47,7	79,7 ABCbcd	1,0	141,6 ABabc	13,0	15,8	1,4	8,7	2,9	0,9 ABCabc	0,3	77,15 Bod	2,57	85,56 Ailed	2,33	83,25	0,98
HI	907,4 ABab	66,7	721,6 ABab	84,9	79,6 ABac	1,7	155,1 Aab	15,7	17,2	2,2	7,7	4,1	0,8 ABCabc	0,4	75,86 ABbcd	3,27	85,99 ABbcd	2,32	83,15	1,14
IV	798,7 Bd	67,4	652,6 BCbc	61,0	81,6 Ce	1,8	130,0 Bc	11,2	16,4	1,7	6,9	4,6.	0,8 ABCbc	0,5	76,65 ABbcd	3,74	88,30 Aab	2,15	82,59	0,47
V	853,2 ABbcd	61,8	696,5 ABab	60,5	81,6 Bale	1,7	143,0 ABabc	10,5	16,8	1,6	3,0	1,5	0,4 Cc	0,2	76,39 ABbcd	4,25	88,11 Aabc	2,06	82,96	0,96
VI	808,7 Bed	78,9	647,5 BCbc	67,6	80,1 BCbcde	0,7	144,8 ABabc	10,9	18,0	0,9	4,8	2,8	0,6 BCbc	0,3	72,79 ABab	1,43	88,72 Aa	1,38	82,54	1,15
VII	820,5 Bbcd	97,1	658,3 ABCbc	85,9	80,1 BCbcde	1,2	150,5 ABab	14,1	18,4	1,1	3,3	2,0	0,4 B0c	0,2	73,66 ABabed	2,83	88,08 Aabc	1,60	82,24	1,25
VIII	874,2 ABbcd	23,5	705,2 ABab	25,8	80,7 BCbcde	1,1	150,6 ABbc	36,6	17,2	0,6	7,0	1,4	0,8 ABCbc	0,2	71,29 Aa	5,64	88,1.4 Aabc	1,04	83,44	0,35
IX	805,2 Bcd	51,2	648,4 BCbc	53,5	80,4 BCbcde	1,9	138,9 ABbc	10,6	17,3	2,0	8,6	5,2	1,0 ABCab	0,6	73,65 ABabcd	3,52	88,23 Aab	1,36	82,77	1,29
X	860,0 ABbcd	56,1	703,6 ABab	50,3	81,8 Ce	1,0	138,6 ABbc	10,9	16,2	0,9	5,8	2,8	0,7 ABCbc	0,3	77,65 Bd	1,52	88,64 Aa	1,60	82,04	1,32
XI	790,0 Bd	49,5	613,4 Cc	36,4	77,6 Aa	1,4	139,9 ABbc	11,0	17,7	1,4	9,7	5,5	1,2 ABa	0,6	73,36 ABabc	3,07	84,06 Bd	1,55	83,11	0,79
XII	810,5 Bed	81,7	649,5 BCbc	65,9	80,1 BCbcde	0,6	146,2 ABabc	15,1	18,,0	0,8	6,0	3,4	0,7 ABCbc	0,4	72,95 ABabc	1,02	87,69 Aabc	2,10	82,80	0,61
XIII	867,7 ABbcd	92,5	705,0 ABab	83,8	81,2 BCcde	1,2	146,0 ABabc	11,8	16,9	1,0	6,8	2,3	0,8 ABCbc	0,3	75,76 ABbcd	2,89	87,48 Aabc	1,99	83,05	1,28
X1V	881,4 ABabed	96,3	712,9 ABab	80,1	80,9 BCbcde	1,8	149,6 ABab	20,3	17,0	1,4	8,1	7,2	0,9 ABCabc	0,8	75,09 ABabed	3,37	87,70 Aabc	2,57	82,71	0,91

x - progeny mean, s - standard error

Means followed. by different letters (columns) are significantly different; capital letters P= 0,01; small letters P = 0;05

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WPŁYW OJCA NA WARTOŚĆ RZEŹNĄ POTOMSTWA KRÓLIKÓW RASY BIAŁEJ DUŃSKIEJ

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Polish Abstract

Badania wykonano na 112 szt. potomstwa 14 samców królików rasy białej duńskiej.

Stwierdzono wyraźny wpływ indywidualny samców na wartość rzeźną potomstwa, mimo zbliżonych not ich oceny. Masa ciała młodych królików w zależności od pochodzenia po ojcu wynosiła w wieku 60 dni - od 923 do 1254 g, 90 dni - od 1763 do 2055 g. W wieku 90 dni największe wartości tej cechy otrzymano u potomstwa ojców I, II i III, a najmniejsze - XI i IX. Podobnie do masy ciała w grupach ojcowskich kształtowała się masa tuszki i masa mięsa w tuszce.

Procentowy udział mięsa w tuszce okazał się natomiast największy u królików pochodzących od ojców X, IV i V (81,6-81,8%), a najmniejszy od XI, I, II i II (77,6-79,7%). Zawartość tłuszczu w tuszkach królików wszystkich grup była niska i wynosiła od 0,36 do 1,45%. Istotne różnice pod względem tej cechy stwierdzono między średnimi potomstwa ojców I a IV, VII, XII i XIII; XI a V i VII oraz IX a V i VII. Procentowa zawartość kości w tuszkach badanych królików nie różniła się istotnie.