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The effect of sex and slaughter time on the size of pelts in the Standard chinchilla

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Among all species of fur animals raised on Polish farms, chinchilla is ranked the second in terms of the number of breeding stock females, constituting a 15% of animals evaluated for performance and breeding value (KCHZ, 2017). In Poland, different color types of these animals are maintained (black velvet, beige, white and others) but Standard is a quantitatively dominating breed (Łapiński & Nowak, 2016).

Factors influencing auction prices of chinchilla pelts, apart from hair coat quality, include also pelt length which is decisive for profitability of chinchilla farming (Barabasz, 2008). Therefore, farmers are interested in knowledge which would be helpful in deciding whether selection of the animals for the largest pelt length is justified. From this perspective, it would be valuable to be able to predict in live animals the pelt length after slaughter.

The studies of many authors conducted to date suggest that pelt length after slaughter depends on live body weight. It was demonstrated in foxes by Filistowicz & Przysiecki (1990) and Gugołek et al. (2002). The same relationship in chinchilla was observed by Lanszki (1999) in Hungry and Poyraz et al. (2005) in Turkey. The latter team investigated also other indirect relations in chinchillas e.g. between body weight and head circumference, ear width or tail length. Dzierżanowska-Góryń et al. (2014) reported that till 4 months of age males are characterized by a greater body weight than females.

On the other hand, Baranowski et al. (2016) demonstrated that the rate of body weight growth in chinchilla till 8 months of age was the same in both sexes but later female showed more advantageous rate.

Proper slaughter time is the moment when fur is fully mature. Establishing this moment by farmers is difficult because many factors influence fur maturity, like genetic factors, nutrition, light intensity, ambient temperature and humidity (Nowak, 2003). Most often hair coat maturity in chinchilla is reached between 8 and 12 months of age and at that time pelts should be obtained.

The aim of the studies was to determine the effect of sex and slaughter time on chinchilla pelt length.

Material and methods

The study was conducted on 100 Standard chinchillas, including 30 females and 70 males from a farm in the Kuyavian-Pomeranian Voivodeship. The studies involved determination of: body weight on the day of slaughter (g), pelt weight with and without fat (g) and fat weight (g). After slaughter and before fleshing, pelts were measured with a measuring tape exact to 0.1 cm. For statistical analysis, animals were categorized into two groups according to the slaughter age: till 250 days of age (185–250) and older than that (251–336 days). Statistical analysis of the impact of sex and slaughter age on pelt length was performed with a two-ways ANOVA using the following linear model:

$$y_{ijk} = \mu + p_i + w_j + (pw)_{ij} + e_{ijk},$$

where:
y_{ijk} – value of trait, μ – mean for the studied animals, p_i – effect of sex i, w_j – effect of age group j, $(pw)_{ij}$ – interaction sex x age group, e_{ijk} – random error.

Significance of differences between the means was evaluated by Duncan's test. In addition, linear correlation coefficients (Pearson's) between the studied variables were calculated using SAS v. 9.4 software package, and GLM and CORR procedures (SAS Institute Inc. 2014).

Results and discussion

The mean slaughter time for the whole study population was 247.18 days while body weight and pelt length amounted to 493.34 g and 42.88 cm, respectively (Tab. 1). Similar results on body weight and pelt length but in slightly older chinchillas (9–10 months of age) were reported by Barabasz et al. (2010). The obtained mean fat weight was 11.25 g which corresponded to 2.28% of the whole carcass weight. It is difficult to compare this result with studies of other authors because such reports are lacking in available literature on this species. Based on comparison of the obtained results with data from other herbivorous fur animals, they can be considered as similar. For instance, Bielański et al. (2011) estimated fat content in carcasses of Popielno White, New Zealand and crossbred rabbits at 2.43 to 5.23%. From practical point of view, such pelts with small amount of fat are most desirable. The whole fat content should be removed during fleshing because residual fat can than reduce the pelt value or even make it worthless. As reported by Sulik & Felska (2000) incorrect fleshing is the most frequent error of fur animal farmers during fur processing.

Table 1. Results of measurements of chinchillas according to sex

Trait	Statistical measures	Total males and females n = 100	Sex	
			male n = 70	female n = 30
Lifespan (days)	$\overline{x}$	247.18	247.46	246.53
	SD	31.81	34.09	27.47
Body weight (g)	$\overline{x}$	493.34	500.98 A	475.51 A
	SD	49.01	50.85	41.54
Pelt weight with fat (g)	$\overline{x}$	64.67	65.43	62.92
	SD	9.64	10.25	8.29
Pelt weight without fat (g)	$\overline{x}$	53.43	53.97	52.17
	SD	7.44	8.05	5.99
Fat weight (g)	$\overline{x}$	11.25	11.46	10.75
	SD	3.65	3.66	3.76
Pelt length (cm)	$\overline{x}$	42.88	42.86	42.93
	SD	1.51	1.55	1.19

SD – standard deviation.
AA – means denoted by the same uppercase letters differ at P≤0.01.

The present analysis demonstrated that males were characterized by a statistically significantly higher body weight (P≤0.01) compared with females (Tab. 1). The obtained body weights of females (475.51 g) and males (500.98 g) at 8 months of age have to be ranked as low according to the chinchilla breed standard for the matching age range (7–8 months). The breed standard states that chinchillas over 8 months of age should reach body weight exceeding 560 g. Thus, the question arises which factors should be improved (nutrition, housing, microclimate) in order to obtain a greater body weight at slaughter in future.

The mean body weight obtained in the present studies by males was higher than in the studies of Poyraz et al. (2005), in which young males at 9–12 months of age had body weight at slaughter only of 466.22 g. However, compared with data reported by Kołodziejczyk et al. (2013)

for 8 months old chinchillas, the body weights obtained in this study were decidedly lower. The above-mentioned authors documented that slaughter body weights of 8 months old chinchillas measured in two consecutive years amounted to 530.42 and 586.25 g, respectively.

Table 2. The effect of slaughter time on the examined traits in chinchillas

Trait	Statistical measures	Slaughter to 250 days			Slaughter over 251 days		
		total n = 58	male n = 40	female n = 18	total n = 42	male n = 30	female n = 12
Lifespan (days)	$\overline{x}$	226.93	225.45	230.22	275.14	276.80	271.00
	SD	19.53	20.07	17.77	23.55	24.99	18.57
Body weight (g)	$\overline{x}$	485.40	488.98	477.46	504.31	516.99 a	472.60 a
	SD	45.96	45.97	44.87	52.63	52.51	35.58
Pelt weight with fat (g)	$\overline{x}$	63.22	63.31	63.03	66.68	68.25	62.75
	SD	9.28	9.45	8.86	10.11	10.57	7.31
Pelt weight without fat (g)	$\overline{x}$	51.35 A	51.19	51.70	56.30 A	57.67	52.88
	SD	6.46	6.54	6.26	7.97	8.35	5.45
Fat weight (g)	$\overline{x}$	11.88 a	12.12	11.33	10.38 a	10.58	9.87
	SD	3.99	3.83	4.26	3.05	3.19	2.56
Pelt length (cm)	$\overline{x}$	42.84	42.60	43.39	42.93	43.20	42.25
	SD	1.48	1.55	1.49	1.46	1.47	1.16

AA (aa) – means denoted by the same uppercase (lowercase) letters differ at P≤0.01 (P≤0.05).

The effect of sex on pelt length proved insignificant since pelts of animals of both sexes were of similar size, slightly in favor of females. Earlier studies of Zawiślak et al. (2014) on the effect of sex on the size and conformation of Standard chinchilla showed a little higher score for females compared to males.

The obtained more advantageous results for females and older animals confirm the opinion of Spotorno et al. (2004) that in chinchillas older than 8 months of age females show a higher body weight than males.

Analysis of the effect of slaughter time on pelt length (Tab. 2) demonstrated that chinchillas slaughtered later than at 250 days of age were characterized by longer pelts than those slaughtered till 250 days.

The mean time at which hair coat maturity was achieved was 226.93 days in the first group and 275.14 days in the second group. It was earlier than in studies of Bieniek et al. (2011) conducted on four farms where the mean age of hair coat maturity (i.e. slaughter time) was 284 days. Sulik (2003) reported that hair coat maturity in chinchillas began from 6 months of age while between 8–12 months the coat became fully mature.

The present study revealed a highly statistically significant difference in the mean fat-free pelt weight (g) in favor of animals slaughtered after 251 days, and a significant difference in the weight of fat (g) which was absent in the animals slaughtered till 250 days of age (Tab. 2).

Analysis of variance identified the interaction between sex x slaughter age as the source of variability of pelt length. The mean pelt length presented in Tab. 2 for both sexes and slaughter ages makes it easier to understand the cause of this interaction.

Females slaughtered till 250 days of age were characterized by longer pelts compared with males but this relationship was reversed in favor of males vs. females slaughtered after 250 days of age.

Table 3. Correlation coefficients of the analysed chinchilla traits (n = 100)

Trait	Lifespan (days)	Body weight (g)	Pelt weight with fat (g)	Pelt weight without fat (g)	Fat weight (g)	Pelt length (cm)
1		0.023	0.010	0.143	-0.264	-0.054
2			0.629**	0.598**	0.442	0.638**
3				0.941**	0.724**	0.672**
4					0.448	0.630**
5						0.491

** Highly significant coefficient of correlation (P≤0.01).

The Pearson correlation coefficients (Tab. 3) calculated between the studied traits ranged from -0.264 to 0.941. The studies showed a highly significant correlation between body weight and pelt length with and without fat and with pelt length (0.638**). A highly significant positive correlation was also noted between pelt weight with fat and without fat, between fat weight and pelt length and between pelt weight without fat and pelt length. Similar correlation coefficients between body weight and pelt length (0.636, P≤0.01) were obtained by Barabasz et al. (2010), and a little higher (0.666, P≤0.01) by Poyraz et al. (2005). The highest correlation coefficient was obtained between pelt weight with and without fat (0.941**).

The remaining relationships cannot be compared with results of other authors because there have been no relevant studies.

In conclusion, it can be stated that selection for high body weight in chinchilla directly leads to production of longer pelts and thus increases profitability of production. Since only a very few studies have investigated this vital indicator which is the relationship between body weight of an animal and its pelt size, it would be advisable to continue such studies on a greater population of animals.

Conclusions

1. It was found that independently of slaughter age, males were characterized by a statistically significantly greater body weight than females. However, pelts of females were longer than pelts of males, though this difference was not confirmed by statistical analysis.

2. It was observed that females slaughtered till 250 days of age provided longer pelts than males. In animals slaughtered at older ages males prevailed over females in this respects. This phenomenon was probably caused by a significant interaction between sex x slaughter age.

3. In addition, it was shown that pelt weight without fat and fat weight statistically significantly differed between the age groups. It was proven that older animals were characterized by heavier pelts with less fat.

4. It was documented that there was a highly statistically significant positive relation between body weight and pelt weight with and without fat and between body weight and pelt length.

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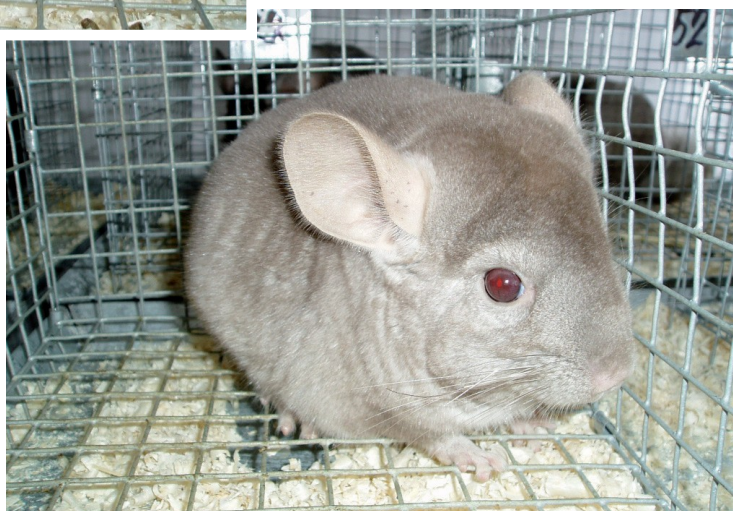
THE EFFECT OF SEX AND SLAUGHTER TIME ON THE SIZE OF PELTS IN THE STANDARD CHINCHILLA

Summary

The objective of the study was to determine the effect of sex and slaughter time on the size of pelt. The study was conducted on 100 Standard chinchillas including 30 females and 70 males. In our study, we also determined animal weight on the day of slaughter, as well as pelt weight, with and without fat. Upon slaughtering the chinchillas, their pelts were measured with accuracy of 0.1 cm. For statistical analysis, chinchillas were divided into two groups based on their slaughter age: pelts obtained at the age of less than 250 days, and over 251 days. The statistical analysis of sex, litter size and slaughter age on the animals' pelts was

conducted using the multi-factor analysis of variance. In the statistical model describing the variability of the controlled traits, besides the effect of the main factors we also included first-degree interactions. The significance of differences between means were examined with Duncan's test. Moreover, we calculated the correlation coefficients (Pearson's) for the analysed traits. The mean slaughter time for the entire population was 247.18 days, and the mean pelt size was 42.88 cm. The analysis of variance showed that among the two factors and interactions included in the model, sex had a statistical effect only on the mass of slaughtered animals while slaughter time had a high statistical effect on pelt weight without fat ($P \leq 0.01$) as well as fat weight itself ($P \leq 0.05$). First-degree interaction of both factors had a high statistical effect on pelt length. As regards other factors and interactions, despite occasionally clear differences between the means of the compared groups, their effect proved to be insignificant. Research showed high correlation of body weight with pelt weight with and without fat as well as with pelt length (0.638**).

Key words: chinchilla, sex, slaughter time, pelt length



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