

## Phenotypic Correlations among Some Traits in *Chinchilla lanigera* Produced in Turkey

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Received: 03.09.2003

**Abstract:** The aim of this study was to investigate the phenotypic correlations among some morphological and pelt traits in *Chinchilla lanigera*. Male chinchillas aged 9-12 months were used. The average body weight at pelting was 466.22 g, the body length was 23.66 cm, the head length was 8.76 cm, chest circumference was 17.65 cm and the pelt length was 32.39 cm. The phenotypic correlation coefficients between the body weight and the chest circumference, the ear length, the ear width and the tail length were 0.180, 0.294, 0.361 and 0.233, respectively ( $P < 0.01$ ). The correlation coefficients between the body weight and pelt length and head length were found to be 0.160 and 0.150, respectively ( $P < 0.05$ ). The correlation coefficients between the pelt length and body length, head length, ear length, fur hair lengths of back of neck, back and rump were found as 0.896, 0.615, 0.365, 0.212, 0.307 and 0.296, respectively ( $P < 0.01$ ). In conclusion, performing selection using some morphological characteristics correlated highly with some pelt traits could contribute to improved fur quality for the production or breeding of chinchillas.

**Key Words:** *Chinchilla lanigera*, morphological traits, pelt traits, phenotypic correlations

### Türkiye'de Üretilen *Chinchilla lanigera*'da Bazı Özellikler Arası Fenotipik Korelasyonlar

**Özet:** *Chinchilla lanigera*'da bazı morfolojik özellikler ile kimi post özellikleri arasındaki fenotipik korelasyonların incelenmesi amaçlanmıştır. Çalışmada 9-12 aylık yaştaki erkek chinchillalar kullanılmıştır. Chinchillalarda ortalama canlı ağırlık 466,22 g, beden uzunluğu 23,66 cm, baş uzunluğu 8,76 cm, göğüs çevresi 17,65 cm, post uzunluğu 32,39 cm bulunmuştur. Canlı ağırlık ile göğüs çevresi, kulak uzunluğu, kulak genişliği ve kuyruk uzunluğu arasındaki korelasyon katsayıları sırasıyla 0,180, 0,294, 0,361 ve 0,233'dir ( $P < 0,01$ ). Canlı ağırlıkla post uzunluğu ve baş uzunluğu arasında ise sırasıyla 0,160 ve 0,150'lik önemli ( $P < 0,05$ ) korelasyon katsayıları bulunmuştur. Post uzunluğu ile beden uzunluğu, baş uzunluğu, kulak uzunluğu, ense, sırt ve sağrı tüy uzunluğu arasındaki korelasyon katsayıları 0,896, 0,615, 0,365, 0,212, 0,307 ve 0,296 olarak ( $P < 0,01$ ) belirlenmiştir. Sonuç olarak damızlık ya da post üretim amaçlı yetiştirilen sürülerde post kalitesini etkileyen bazı özelliklerle yüksek korelasyon gösteren morfolojik özellikler dikkate alınarak seleksiyona gidilmesi kürk kalitesini iyileştirilmesine katkıda bulunabilir.

**Anahtar Sözcükler:** *Chinchilla lanigera*, morfolojik özellikleri, post özellikleri, fenotipik korelasyonlar

### Introduction

*Chinchilla lanigera* is a rodentia strain belonging to the Chinchillidae family (1). There are many studies about reproductive traits, the effects of cage position and light on the litter size, birth weight and livability (2), different housing methods and diets on growing chinchillas (3), caging systems and management technologies on the reproductive performance (4), and birth weight on the growth and livability (5). However, little information is available on the traits of pelt, which is the most important

basic product. The quantitative features of pelt can be improved through selection methods.

Poyraz et al. (6) recorded that chinchillas of both sexes supplied from the producers in Ankara have 21.88 cm of body length and 502.24 g of live weight.

Lanszki (7) carried out an experiment to determine the correlation levels between body weight at pelting time and pelt length ( $n=125$ ) and between body length and pelt length ( $n=41$ ) on chinchillas aged 8-12 months on the matured pelt in Hungary. The average body weight at

pelting was found to be 539 g, the pelt length 384 mm and the body length 258 mm. No significant difference was observed between the sexes from the point of these traits. The correlation coefficient between body weight and pelt length was  $r = 0.65$  ( $P < 0.0001$ ), between body length and pelt length was  $r = 0.48$  ( $P < 0.01$ ) in the study by Lanszki (7).

In the experiment of Sulik and Cholewa (8), the correlation coefficients among chest circumference, body length and ear length of 296 female chinchillas maintained at a breeding farm in Poland were low and ranged from 0.054 to 0.063. Sulik and Cholewa (8) found that the body weight was positively correlated with ear length ( $r = 0.18$ ).

The quality of pelt is the most important factor affecting the market. The pelt quality is determined by the pelt length, hair density, hair length, pelt colour pattern and clearness. Skin should not contain holes or should not be damaged for pelt production (9, Personal communication: Edlefsen, J., Chinchilla fur expert. Tønder, Denmark. 1997, Personal communication: Reinhold, S., Copenhagen Fur Center, Glostrup, Denmark. 1998). Thus the pelt traits must be considered to make a correct selection on the basis of production and breeding. However, data are not sufficient for selection due to the limited studies. Therefore the aim of this study was to investigate the phenotypic correlations between some pelt traits at pelting time and morphological traits in male *Chinchilla Lanigeras* produced in various regions of Turkey.

**Materials and Methods**

In this experiment, 220 male *Chinchilla lanigeras* aged 9-12 months, supplied from producers in various regions of Turkey, were used. The experiment was carried out on the Research Farm of the Veterinary Faculty of Afyon Kocatepe University in Turkey.

Body weight at pelting time was recorded. The lengths of body, head and tail, ear length and width, chest circumference, the lengths of front and hind leg were measured. Body length was measured with a ruler between forehead and tail root; tail length was measured between tail root and tail tip. The chinchillas were killed by dislocation of the cervical vertebrae (10). Pelting was carried out. Pelt weight and length were measured and then pelt was dried. Fur hair lengths from neck, back and rump were measured.

Statistical analyses were performed by SPSS (version 10.0 for Windows; SPSS Inc, Chicago, IL, USA). Pearson correlation coefficients were used to assess the relationships among parameters (11).

**Results**

The means and standard errors related to some pelt traits and morphological traits of male *Chinchilla lanigeras* at pelting time, produced in various regions of Turkey are given in Table 1. The mean values for body weight, body length and pelt length at pelting time in male chinchillas were found to be 466.22 g, 23.66 cm and 32.39 cm, respectively. The phenotypic correlation coefficients between pelt traits and morphological traits and between pelt traits and body length are shown in Tables 2 and 3, respectively.

**Discussion**

In this study the mean body weight was small (below 500 g), and the mean pelt length was short (below 35 cm) according to the categories shown by Lanszki (7). Mean values for body weight and body length are different from other studies (6,7) due to the different animal care, housing conditions, birth weight, feeding, feed quality and genetics.

Table 1. The means ( $\bar{X}$ ) and the standard errors ( $S\bar{x}$ ) related to some pelt traits and morphological traits of male *Chinchilla lanigeras* at pelting time (n = 220).

Traits	$\bar{X} \pm S\bar{x}$
Body weight, g	466.22 $\pm$ 3.28
Body length, cm	23.66 $\pm$ 0.17
Head length, cm	8.76 $\pm$ 0.09
Chest circumference, cm	17.65 $\pm$ 0.07
Front leg length, cm	6.90 $\pm$ 0.03
Hind leg length, cm	13.16 $\pm$ 0.05
Tail length, cm	13.61 $\pm$ 0.09
Ear length, cm	4.71 $\pm$ 0.03
Ear width, cm	4.59 $\pm$ 0.03
Pelt length, cm	32.39 $\pm$ 0.21
Pelt weight, g	44.71 $\pm$ 0.51
Fur hair length, cm	2.67 $\pm$ 0.02

Table 2. The phenotypic correlation coefficients between pelt traits and morphological traits of male *Chinchilla lanigeras* at pelting time (n = 220).

	Body length	Chest circumference	Pelt length	Pelt weight	Head length	Ear length	Ear width	Tail length	Front leg length	Hind leg length
Body weight	0.112	0.180**	0.160*	0.666**	0.150*	0.294**	0.361**	0.233**	0.224**	0.385**
Body length		0.101	0.896**	0.065	0.201**	0.180**	-0.047	-0.011	0.156*	0.139*
Chest circumference			-0.032	0.151*	-0.234**	-0.066	-0.121	0.012	0.021	-0.124
Pelt length				0.098	0.615**	0.365**	0.106	-0.025	0.226**	0.274**
Pelt weight					0.115	0.181**	0.309**	0.152*	0.118	0.308**
Head length						0.495**	0.280**	-0.004	0.185**	0.329**
Ear length							0.532**	0.145*	0.184**	0.283**
Ear width								0.187**	0.106	0.356**
Tail length									0.176**	0.279**
Front leg length										0.281**

\*P < 0.05, \*\*P < 0.01

Table 3. The phenotypic correlation coefficients between pelt traits and body length (n = 220).

	Fur hair length on back	Fur hair length on rump	Body length	Pelt weight	Pelt length
Fur hair length on neck	0.519**	0.431**	0.200**	-0.132	0.212**
Fur hair length on back		0.495**	0.331**	-0.157*	0.307**
Fur hair length on rump			0.276**	-0.029	0.296**
Body length				0.065	0.896**
Pelt weight					0.098

\*P < 0.05, \*\*P < 0.01

The correlation coefficients between the body weight and the ear length and width were significant ( $P < 0.01$ ) and positive ( $r = 0.294$ ;  $0.361$ , respectively). Sulik and Cholewa (8) reported that body weight of female chinchillas was positively correlated with ear length ( $r = 0.18$ ).

The correlation coefficient between the body weight and tail length was significant and positive ( $r = 0.233$ ;  $P < 0.01$ ) in the present study. However, Poyraz et al. (6) reported a positive but insignificant correlation ( $r = 0.1298$ ) between the body weight and tail length.

The correlation was positive but insignificant between body weight and body length, positive and significant ( $P < 0.01$ ) between body weight and chest circumference in this study.

The correlation coefficient in male chinchillas between

the chest circumference and the body length was  $0.101$  ( $P > 0.05$ ) in the present study. Sulik and Cholewa (8) reported a low correlation between chest circumference and body length of female chinchillas.

Pelt length was related to body weight ( $r = 0.160$ ;  $P < 0.05$ ) and body length ( $r = 0.896$ ;  $P < 0.01$ ) significantly. Similar results were reported by Lanszki (7).

The mean pelt weight was  $44.71$  g. As expected, there was no relation between pelt weight and body length because pelt weight is affected by pelt quality such as fur hair density and length rather than body weight.

It is concluded that performing selection using body weight, head length, front and hind leg and pelt hair length of any part of the body can improve some pelt quality traits such as pelt weight and length, which are correlated significantly with them.

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