Analysis of Conformation Characters in Chinchillas of Standard and Polish Beige Strains in the Breeding Farm 'Raba' in Myślenice

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Abstract

The work aimed at the analysis of the influence of colour type on chinchilla utilitarian traits. Research concerns animal size and fur quality traits. The data for the analysis was collected from the breeding farm „Raba" in Myślenice (southern Poland). The data concerns standard and Polish beige chinchillas and covers 3 years. The analysis included the following factors: year of evaluation, animal sex, colour type and interactions of these factors.
The analysis of variance proved statistically significant influence of the year of evaluation, colour type and animal sex on evaluated traits. The year of observation influenced significantly animal weight, fur colour purity, colour type, fur's paunch part and total number of scores. Colour type influenced significantly animal weight and fur colour purity. Animal sex influenced significantly animal weight, animal size, animal build, fur quality, fur colour purity and total number of scores. Arithmetic means of studied traits during 3 years reached various levels, depending on colour type and animal sex; e.g. animal weight (in grams) in chinchilla ranged from about 560 g to 620 g. In what concerns total number of scores (in points), e.g. males of standard colour types were evaluated higher than females of beige colour type, while females of beige colour type obtained higher notes when compared with females of standard colour type. Variability coefficients, depending on traits, varied from 7.15% to 26.17%. It can prove that chinchillas which obtained very high notes in some traits had lower notes in other traits and consequently total number of scores was equalized. Phenotypic correlations were also estimated and ranged from -0.089 to 0.721.

Keywords: chinchilla, animal size, fur quality, colour, variability

1. Introduction

Chinchillas are one of the most original fur bearing animals of beautiful and unique fur. They are small and herbivorous rodents from South America. Mountaneous regions of Andes were the natural habitat of chincillas [1]. They have become very popular and well-known recently. It is estimated that about 10 000 females of the foundation stock are kept in Poland, and skin production amounts to over 20 000 per year [2]. Lately there has been a great interest in their colour strains. It is probably connected with a new performance direction, it means using young animals in amateur breeding. Chinchillas are suitable for studies on physiology and patophysiology of hearing as well as for vaccine testing, especially against flu [3-4].

At present chinchilla improvement in Poland tends towards the increase in animal size and aims at maintaining favourable fur characters, including proper colour purity and high-quality fur in each strain. It signifies the equality of hair length on the whole animal body and at the same time good fur density and its resilience [5].

The aim of the paper was to analyse the effect of some factors on performance traits in chinchillas. Conformation characters, including animal size and fur quality were tested. The studies were carried out on two colour strains: standard and

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Polish beige, which were bred in a farm in the south of Poland.

2. Materials and methods

Some factors influencing animal size and their conformation in two colour strains of chinchillas that originated from a Breeding Chinchilla Farm "Raba" in Myślenice in the south of Poland were analysed. Approximately 600 chinchillas (males and females) of two colour strains (standard and Polish beige) during three years (2005 – 2007) were tested. Chinchillas in farms are kept in four-stepped cages and fed pelleted all-mashes, which composition is appropriate for chinchillas, and high quality hay [2].

Estimation of conformation characters was carried out by an experienced selector during fur priming in chinchillas at the age of 6 months. The estimation comprised: animal size and their conformation (points are given for the trait after previous weighing), colour type, colour purity, fur quality, paunch part and sum of points for all traits (maximum number of points can amount to 30), Wzorzec [5]. Statistical parameters such as arithmetic means, standard deviation and coefficient correlations were tested in compliance with accepted methods. Analysis of variance for each trait was conducted using constant mathematical model and constant effects: year, colour strain, sex and interaction between the factors [6].

3. Results and discussion

Analyses of variance showed the statistically significant effect of year, colour strain and sex on most tested traits in chinchillas. Similarly, Socha et al. [7] in earlier studies also proved the significant effect of colour strain and sex on the characters.

Ststistical characterization of the traits was presented in table 1.The analyses indicated that all animals were characterized by quite large body weight. In experiments conducted by Socha et al. (2007) in 2003 – 2005 average body weight in chinchillas ranged from 516.66 to 650.00g.

Average estimation for size and conformation in chinchillas regarding colour strain and sex was shown in table 1. The estimation amounted to about 3.80 points. Similar results concerning animal size, which was expressed in points, were stated by Socha et al. [7], whereas lower results for animal size and their conformation were proved in other studies conducted by Socha and Olechno [8]. Average values for the traits amounted to 3.07 points.

Standard chinchillas compared to beige chinchillas obtained better estimation with regard to colour type. Results presented in table 1 showed that beige chinchillas both in males and females had higher values for colour purity. Colour purity of fur has aesthetic value and determines the skin price [2, 9].

Fur quality is an important conformation character. Fur thickness, hair length and its equality were tested. Similar values of the traits in analysed colour strains, both in males and females, were found. Slightly more points for the character in standard chinchillas were proved. Fur quality and animal size are thought to be of great economic importance. The traits, apart from health and prolificacy, mostly influence economic productive results [2, 9].

Paunch part is a specific character in fur bearing animals and it is estimated only in chinchillas. Animals with a narrow, snow-white paunch part, which differ in contrast against animal sides, are the most evaluated performance trait [5]. Beige chinchillas obtained more points for the trait (about 2.9) than standard chinchillas (2.8).

Table 1 presented statistical characterization for the total sum of points: the average value in beige chinchillas ranged from 23.50 to 23.59 points, while in standard chinchillas from 22.98 (females) to 23.99 (males). Socha and Olechno [8] proved better results than in the study and total value of the sum amounted to 27.54 points.

Variability of the traits shown as standard deviations and coefficients of variation was also analysed (table 1). Coefficients of variation for the tested characters ranged from 7.15 to 26.17. The largest values of the coefficients for colour type and colour purity, whereas the smallest coefficients of variation for the total evaluation were found. It could mean that there was similar total evaluation of the animals. Genetic variation of the traits is a reason for phenotypic variation, thus in the farm breeding improvement could be reached in the future.

Phenotypic correlations were analysed as well (table 2). Correlations mean a mutual interaction between tested traits, which could have genetic or environmental reasons.

Positive phenotypic correlations between traits were found. It stands that improvement of one trait results in improving the other one. Correlations had both positive and negative values and they ranged from -0.089 to 0.721. Negative correlations had values from -0.089 to -0.027, while positive correlations amounted to 0.026 – 0.721. The largest phenotypic correlations between fur purity and total sum of points were proved and they amounted to 0.721, whereas the smallest correlation between chinchillas size, their conformation and paunch part was stated and it amounted to -0.089.

Genetic effects (apart from the effect of colour strains and sex) were not analysed in the studies, however it must be noticed that high phenotypic evaluation has its reasons in genetic variation. Phenotypic correlations are very important relations between traits in animals of different species. Negative correlations are unfavourable, especially between fur quality and other traits, because they make breeding work difficult. Breeders have not any effect on the interactions, since performance traits are the result of genetic and environmental variation [10-12].

4. Conclusions

The analyses of conformation characters in each colour strain of chinchillas entitled to sum up and to form the following conclusions:

1.The analysis of variance showed a significant effect of colour type, year and sex on the tested traits. Different values of arithmetic means of traits in particular colour strains in three years of evaluation were found. Standard chinchillas compared to Polish beige chinchillas were characterized by slightly better results for animal size, fur quality and colour type. Polish beige chinchillas, however, obtained larger values for colour purity and paunch part.

2. Phenotypic correlations amounted to from -0.089 to 0.721. Positive correlations ranged from 0.026 (for colour type and paunch part) to 0.721 (for fur purity and total sum of points), whereas negative correlations ranged from -0.089 (between size, conformation and paunch part) to -0.027 (size, conformation and colour type). Negative correlations between some traits could make breeding work difficult.

3. It must be found that the tested animals were typified by good conformation characters. The "Raba" farm in Myślenice belongs to one of the best farms in our country, and chinchillas from the farm are characterized by very good performance and breeding values.

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Table 1. Statistical characterisation of chinchillas traits ($\bar{x}$ – mean, S – standard deviation, V- coefficient of variation)

Traits	Sex	Colour type (Different fur colour types)					
		Standard			Begin Polish		
		$\bar{x}$	S	V	$\bar{x}$	S	V
Animal size (in g)	Male	585.07	58.213	9.95	559.00	50.461	9.03
	Female	619.56	83.739	13.52	595.95	96.133	16.13
	Total	605.16	76.044	12.57	582.98	84.388	14.48
Body size and confor-mation (in score)	Male	3.72	0.592	15.91	3.70	0.733	19.81
	Female	3.87	0.421	10.88	3.84	0.553	14.40
	Total	3.81	0.505	13.25	3.79	0.620	16.36
Colour type (trait)	Male	3.78	0.575	15.21	2.85	0.745	26.14
	Female	3.38	0.632	18.70	3.03	0.440	14.52
	Total	3.55	0.640	18.03	2.96	0.566	19.12
Colour purity	Male	6.87	1.110	16.16	7.30	1.174	16.08
	Female	6.37	1.150	18.05	7.27	1.347	18.53
	Total	6.58	1.160	17.63	7.28	1.278	17.55
Fur quality	Male	6.80	1.053	15.49	6.70	0.979	14.61
	Female	6.56	1.050	16.00	6.57	1.068	16.25
	Total	6.66	1.058	15.89	6.61	1.031	15.60
Fur's paunch part	Male	2.83	0.394	13.92	2.95	0.224	7.59
	Female	2.77	0.430	15.52	2.90	0.315	10.86
	Total	2.80	0.411	14.68	2.91	0.285	9.79
Total number of scores	Male	23.99	2.129	8.87	23.50	1.670	7.11
	Female	22.98	2.044	8.89	23.59	2.140	9.07
	Total	23.40	2.139	9.14	23.56	1.973	8.37

Table 2. Phenotypic correlations of animal size and fur traits in chinchillas

Traits	Traits					
	Body size and confor-mation (in score)	Colour type (trait)	Colour purity	Fur quality	Fur's paunch part	Total number of scores
Animal size (in g)	0,460*	-0,053	-0,048	0,058	-0,087	0,072
Body size and conformation (in score)	-	-0,027	-0,035	0,129	-0,089	0,248*
Colour type (trait)	-	-	0,254*	0,162	0,026	0,510*
Colour purity	-	-	-	0,195*	0,044	0,721*
Fur quality	-	-	-	-	0,029	0,678*
Fur's paunch part	-	-	-	-	-	0,222*

* – statistical significance