

# Analysis of Factors Influencing Fur Quality in Minks of Standard, Pastel, Platinum and White Hedlunda Colour Strains

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## Abstract

The work aimed at the analysis of the factors that influence conformation traits, included animal size and fur quality traits in four colour types of mink: standard, pastel, platinum and white Hedlunda. The data concerns the evaluation of animal conformation traits in the period of three years. The analysis of variance of particular traits indicates statistically significant effect of the year of birth, colour type and animal sex on the majority of analysed traits. Higher means of license evaluation were obtained by males in majority of the traits. Statistic analysis of body weight showed that the highest body weight characterized males of platinum and white Hedlunda colour types. Minks of standard and pastel colour types were characterised by lower body weight. The mean body weight of males was 2581.17g and of females 1401.42g (there is a clear sexual dimorphism in minks). Minks of white Hedlunda colour type were characterised by the highest means of colour purity, both males and females. Other colour types obtained lower means. The best fur quality characterised platinum minks. Variability of traits, measured by variability coefficient, had the highest values in animal weight (in grams) and ranged from 6.0 to 32.0%. Variability of total number of scores ranged from 2.00 to 8.20%. Positive phenotypic correlations were the highest between body size (in points) and total number of scores (0.676), while the lowest were obtained between body size (in points) and fur quality (-0.178).

**Keywords:** mink, animal size, fur quality, colour, correlations, variability

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## 1. Introduction

Minks belong to a species, which have a lot of colour types in breeding. Many mutative strains, which considerably differ from the standard minks, were bred in farms [1, 2]. Animal size, fur colour, colour purity, fur quality, including hair density, its length and equality are traits that have a great effect on skin price [3-5]. The traits, apart from health and prolificacy, determine economic productive results [6, 7]. Mink breeding has been popular in Poland recently.

Minks have taken the first place among carnivorous fur bearing animals regarding their population. About 30 mln mink skins are produced in the world and their adaptation to farm conditions is still going on [2].

Distinct sexual dimorphism with regard to size and some conformation characters can be noticed. Males in farms weigh 1.8 – 2.5 kg although there are some individuals, which body weight exceeds even 3 kg. Females are much smaller and weigh 0.9 – 1.6 kg even though individuals that exceed the range can also be found [1, 6].

The aim of the paper was to analyse factors influencing conformation characters, including animal size and fur quality traits in four colour strains of minks: standard, pastel, platinum and white Hedlunda.

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## 2. Materials and methods

The studies concerned the analysis of factors influencing size and conformation in minks of four colour strains, which originated from a breeding farm (reproductive farm) located in the south of Poland. The experiment was carried out on 704 animals (males and females) during three years. Four colour strains: standard, pastel, platinum and White Hedlunda were analysed. The minks were kept in cages in a two-row pavillion and fed according to obligatory norms [1].

Estimation of mink conformation was conducted by a selector during fur maturity (in October and November). The following traits were tested: body weight (in grams), size and conformation (in points), colour type, colour purity, fur quality (including hair density and its length) and total sum of points for all traits (maximum number of points amounted to 20), Wzorzec [8]. Statistical parameters such as arithmetic means, standard deviation (not included because of too large table size) 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 were also estimated: year, colour strain and sex [9].

## 3. Results and discussion

Statistical characterization of tested traits was presented in table 1. As far as body weight is concerned, males of platinum and White Hedlunda strains were typified by larger body weight than other strains. Smaller body weight in minks of standard and pastel strains was found. Average body weight in males amounted to 2581.17 g and in females – 1401.42 g. A great difference in body weight was the result of sex and strain. Coefficients of variation for body weight ranged from approximately 7 to 32%. Mink size has a large economic value, because skin price depends on its size and quality [3, 7].

The type of colour in most strains is not estimated and 3 points are given to the trait. Therefore, all colour strains obtained 3 points in the studies. x Colour purity was the next analysed character. The results in table 1 indicated that minks of Hedlunda strain both in males and females were characterized by the largest colour purity, while the other strains obtained lower value of the trait

(the lowest value – platinum strain). The largest coefficients of variation for the trait in minks of pastel and platinum strains, whereas the smallest coefficients of variation in minks of White Hedlunda strain were proved.

Fur quality is very important conformation character in minks. Hair density, its length and equality were tested in the studies. The results showed that minks of platinum and standard strains obtained the largest values of arithmetic means, whereas the worst results in minks of White Hedlunda and pastel strains were found. Variability measured by coefficients of variation ranged from about 4 to 24%. According to Rozempolska-Rucińska et al. (2000) and Sławoń (2001) good fur quality in fur bearing animals, which are kept in farms, determines to a large extent the productive profitability. Therefore, it is also essential to establish, which factors affect fur quality. Fur structure – the proper content of particular hair – is one of the factors. Additionally, hair thickness and its resilience have an effect on fur quality. The analysed traits in each strain were characterized by coefficients of variation similar to those described by Kołodziejczyk and Socha [3], Socha and Markiewicz [4], and Rozempolska-Rucińska et al. [10].

Breeders pay a great attention to the total sum of points. According to the grading standard of mink conformation, the maximum number of points amounts to 20 [8].

Arithmetic means of total sum of points were differentiated: it was larger in males, but lower in females (in all analysed colour strains). Coefficients of variation differed slightly and ranged from approximately 2 to 8%. The trait was similar in particular colour strains. The best results of the total estimation (total number of points for all traits) in standard and platinum minks were proved. The average number of points obtained as the total estimation of all traits showed that animals in the farm were similar to the grading standard (20.00) and to the results presented by Rozempolska-Rucińska et al. [10] and Kołodziejczyk and Socha [3]. Genetic effects were not analysed in the paper. It is possible to assume that high phenotypic evaluation, however, can show narrow genetic variability [3].

Phenotypic correlations between tested traits were shown in table 2. Positive correlations indicate that the growth of one trait causes the growth of the other one. Negative correlations bring about

the opposite results, thus an increase in one trait is connected with the decrease in the other one. Phenotypic correlations had both positive and negative values. Negative correlations between mink size and fur quality (-0.178) were found. However, positive correlations between total number of points and the other traits were proved, and they ranged from 0.039 to 0.676.

Phenotypic correlations are very important between characters in breeding animals. Negative correlations are especially unfavourable with regard to fur quality and other traits. Lagerkvist et al. [11, 12] emphasized the fact that skin quality became worse together with the increase in animal size. Earlier studies conducted by Jeżewska et al. [13] confirmed the findings and the authors proved that selection on body weight had a negative effect on fur quality. Knowledge of the relations and the values of correlation coefficients is particularly important when selection is carried out on a few traits at the same time and in order to create selection indices.

#### 4. Conclusions and summing up

The analyses of conformation characters in each colour strain of minks, including animal size and fur quality, entitled to sum up and to form the following conclusions:

1. Statistically significant effects of year, type of colour and sex on most analyzed traits were found. Better estimation of most traits in males than in females was proved.
2. The largest sum of points for size in minks of standard and platinum strains was stated. Minks of standard and platinum strains obtained also the largest number of points for fur quality. Minks of White Hedlunda were characterized by larger mean values for colour purity.
3. Phenotypic correlations between analyzed traits were differentiated and ranged from negative values (about - 0.18) to positive values (0.68), which makes difficult to perform breeding work.
4. It must be shown that animals in the farm were typified by very good parameters. The total number of points for all traits amounted to 18 (maximum is 20).

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**Table 1.** Arithmetic means ( $\bar{x}$ ) variability coefficients (V) of traits in a herd of minks, depending on colour type and animal sex

Traits	Colour type	Sex					
		Males		Females		Total	
		$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V
Animal size (in g)	Standard	2454.28	7.78	1385.64	8.48	1544.87	28.28
	Pastel	2579.57	11.75	1419.87	13.09	1649.34	30.89
	Platinum	2621.43	7.11	1375.45	9.30	1744.24	32.17
	White	2607.82	5.88	1365.92	9.47	1603.21	32.27
	Hedlunda						
	Total	2581.17	16.27	1401.42	12.20	1636.17	31.12
Body size and conformation (in score)	Standard	5.85	6.46	5.97	2.86	5.95	3.66
	Pastel	5.31	18.32	4.89	25.35	4.97	24.18
	Platinum	5.85	6.46	5.58	10.87	5.65	9.92
	White	5.72	9.12	5.02	21.61	5.15	20.14
	Hedlunda						
	Total	5.77	14.78	5.31	23.60	5.41	23.31
Colour type	Total	3.00	3.00	3.00	0.00	3.00	0.00
Colour purity	Standard	4.57	11.69	4.21	12.78	4.26	12.86
	Pastel	4.47	12.99	4.25	16.12	4.29	15.64
	Platinum	4.42	12.08	3.77	14.78	3.83	17.85
	White	4.78	8.78	4.72	9.60	4.73	9.43
	Hedlunda						
	Total	4.55	12.18	4.33	14.71	4.37	15.01
Fur quality	Standard	5.85	6.46	5.97	2.86	5.96	3.65
	Pastel	5.31	18.33	4.89	25.36	4.97	24.18
	Platinum	5.87	6.44	5.78	10.50	5.65	9.93
	White	5.72	9.13	5.02	21.62	5.30	20.14
	Hedlunda						
	Total	5.50	11.03	5.19	15.51	4.92	15.65
Total number of scores	Standard	18.86	2.00	17.38	4.48	17.63	5.19
	Pastel	18.21	6.58	17.20	8.19	17.40	8.20
	Platinum	19.00	0.00	17.11	4.73	17.62	6.23
	White	18.25	5.21	17.13	8.46	17.35	8.26
	Hedlunda						
	Total	18.29	6.03	17.19		17.41	8.00

**Table 2.** Phenotypic correlations of body size and fur quality in mink

Traits	Body size and conformation (in score)	Colour purity	Colour type (trait)	Fur quality	Total number of scores
Animal size (in g)	0.317*	0.127*	0.011	0.242*	0.447*
Body size and conformation (in score)		- 0.066	- 0.019	- 0.178*	0.676*
Colour purity			- 0.018	0.062	0.430*
Colour type (trait)				- 0.009	0.039
Fur quality					0.424*

\* – statistical significance