

Statistical analysis of conformation traits of New Zealand White rabbits in a breeding farm

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The aim of the study was the statistical analysis of conformation traits of New Zealand white rabbits from a breeding farm for a period of ten years. Analysis of variance showed a statistically highly significant effect of gender on body size and weight of the animal, as well as on fur quality, body built and racial type. The year of license had statistically highly significant impact on animal size, body weight, fur quality, the specific racial features, body built, racial type and the total number of points received by the rabbits. The interaction of gender and year of license had statistically high impact only on body weight, while there was no statistically significant effect for other analyzed traits. The study also estimated phenotypic correlations between the studied traits. The correlations were quite varied and ranged between 0.772 (between racial type and the year of the license) to 0.6017 (between body built and the total sum of points).

Keywords: breeding, New Zealand White, body built, evaluation, use, statistical analysis.

1 Introduction

Breeding of rabbits, although known for a long time, is relatively young as a branch of animal production. It reached more significant economic importance, both in Poland and worldwide, only in the sixties of the twentieth century, when the global turnover of meat rabbit intensified. The breed of rabbits, which was and is very important in rearing and breeding is New Zealand white. The aim of the study was the statistical analysis of conformation traits of New Zealand white rabbits from a breeding farm for a period of ten years.

2 Material and methods

The present paper analyzes the conformation traits of New Zealand white rabbits. The analysis was conducted on the basis of a license evaluation of animals from a breeding farm. The assessment included a period of 10 years. 858 animals were analyzed, including 117 males and 741 females. During the license evaluation, as given in Rabbit Model (Frindt, 2000), the following characteristics were taken into account: body weight, body build, racial type, fur quality and specific racial traits. For every feature an animal could receive a maximum of 10 or 20 points. The lowest permissible rabbit weight at the age of 8 months and over was 3.5 kg; the highest 5.5 kg. While assessing males and females at exhibitions, body weight by 5 % lower than aforementioned was allowed, for this trait an animal might receive a maximum of 10 points. Body built had to be harmonious whit Trunk of medium length, cylindrical, well muscled, well developed front and hindquarters, broad shoulders and dorsal part. The head firmly set on a short neck, close to the body. Limbs were strong, massive and short. A small, symmetrical, single dewlap was allowed in older females (over 1 year). It had short tail close to the body. The maximum number of points for this feature was 20.

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Based on a mathematical continuous model an analysis of variance was performed for each feature, taking into account the impact of: the year of the study and animal sex, as well as interaction. The study estimated also phenotypic correlations between the analyzed features.

3 Results and discussion

Analysis of variance showed a statistically highly significant effect of gender on body size and weight of the animal. Similar studies of the impact of gender on the growth rate of rabbits were carried out for a long time. In the eighties it was believed that animal sex has a very significant impact on growth rate in particular weeks of fattening. This was what believed Staliński et al. (1989) and Ristić (1988), who on the grounds of his own research showed that the growth rate of purebred animals is subjective to gender. Slightly different results were obtained in half-breed animals. For these rabbits he has not observed relation between gender and body weight. Parigi-Bini et al. (1992) presented the idea that sex is important only in the final stage of fattening, and that it has an impact on feed consumption. A similar issue was analysed by Bieniek (1997) and noted the differences between sexes and the daily weight gains in the period from 14th to 42nd day of animal age. Similar conclusions was drawn by Zając et al. (1998) and Zając (2002). However, Castellini and Panella (1988) considered that different weights of animals really started to be apparent when animals reached full sexual development, i.e., at the age of 4-5 months.

Conducted analysis of variance also showed a highly statistically significant effect of gender on fur quality, body built and racial type. The year of license had statistically highly significant impact on animal size, body weight, fur quality, the specific racial features, body built, racial type and the total number of points received by the rabbits. The interaction of gender and year of license had statistically high impact only on body weight, while there was no statistically significant effect for other analyzed traits.

The means of the studied traits differed in evaluated rabbits. These values varied within the following ranges: for animal body weight from 8.98 to 10 points, for fur quality from 18 to 20 points, for specific racial traits from 19.33 to 20 points, for body built from 16.60 to 19.43 points, for body weight from 8.98 to 10 points, for racial type from 17.67 to 20 points, for a total number of points from 93.67 to 97.67 points. The coefficient of variation, depending on animal sex and the year of license, ranged from 0 to 12.98 %. The highest general variability in all evaluated animals was 9.18% and concerned a feature referred to as animal size. For other traits it was as follows: body weight - 5.88%, fur quality 4.67%, specific racial traits 1.10 %, body built 7.28 %, racial type 5.27 %, total number of points 1.80 %.

The study also estimated phenotypic correlations between the studied traits. The correlations were quite varied and ranged between 0.772 (between racial type and the year of the license) to 0.6017 (between body built and the total sum of points). Both correlations proved to be highly significant. The correlations are important in the breeding work. They inform about the relations between the different characteristics of the same individual. A negative correlation means that improving one characteristic will worsen the other, a positive correlation means that improving one characteristic we will obtain improvement in the other (Barabasz and Bieniek, 2003).

4 Conclusions

The rabbits from the breeding farm subjected to statistical analysis were characterized by very good parameters of body built and conformation, as well as fur quality traits, which was proved by high scores they received during the evaluation of the particular characteristics.

The correlations were quite varied. The highest negative correlation was found between racial type and the year of the license and the highest positive between body built and the total sum of points. Existing negative correlations may complicate achieving the breeding progress reached in subsequent generations.

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