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EFFECT OF SELECTION PRESSURE ON FIXING THE QUALITATIVE FEATURES OF LAMB PELTS OF KARAKUL TYPE

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Abstract

*This paper describes comparative aspects of the qualitative features of lamb pelts in two populations of lambs belonging to two farm types of Karakul sheep: elite farm within the R-DSSGB and private farm within the SGBA "MOLDOOVIS" Botosani. The qualitative analysis of lamb pelts by the complex (multifactorial) estimation method revealed the morphological and production superiority of individuals from elite farm compared to those from private farm concerning their distribution in zootechnical (breeding) classes. In the elite farm three quarters of lambs are in Record class and a quarter of them belong to Elite class; the presence of individuals in Ist class is sporadic. In contrast, in the private farm, half of individuals fall within the Elite class and only a third of them are in the Record class; the lambs belonging to Ist class have a relatively high frequency. Differences between the two farms regarding the lamb pelt quality have statistical assurance validated by high value of the test χ^2 (253.39***). The differences between the two types of farms, in this respect, would be caused by the accuracy of selection system and of reproduction process. In the elite farm the selection pressure is more intense and the activities of selection and mating matching are made with a higher accuracy than in the private farm. Also, in private farm the selection was focused on immediate commercial characters (shape and size of curls) whereas in the elite farm the selection works took into account the setting of some finer characteristics (such as lustre and quality of hair fibre). However, due to the fact that in both populations the zootechnical classes IInd and IIIrd are missing shows that in both kinds of farms the animal selection is made accurately, with rigor distinctions between them.*

Keywords: Botosani Karakul sheep, lamb pelts.

INTRODUCTION

The lamb pelt of Karakul type, through its characteristics, is the only qualitative production trait met in ovine species. In the other sheep breeds, all characters of production have continuous (quantitative) distributions (meat, wool, milk) (Taftă et al., 1997; Pascal, 2007). Currently, there are two major trends concerning sheep breeding for the lamb pelt production, both equally important: selection for improvement of morphological features of lamb pelt curling and selection for strengthening the colours of hairy coating in the colour varieties and diversifying their shades (Marin and Niga, 1975; Niga et al., 1989; Filote et al., 1994). In the greatest extent, these qualitative characteristics have a profound genetic determinism and are less influenced by the environment or technological factors, therefore non-genetic influences (Taftă et al., 1997).
Exteriorization of the qualitative features of Karakul lamb pelt is determined by the selection criteria applied by the sheep breeder (improver) according to his preferences to achieve a certain type of lamb pelt (Taftă et al., 1997; Pascal, 2007).
In this context, this paper aims to analyze comparatively how the selection was reflected on the morphological traits of lamb pelt curling in two types of farms in which the selection criteria used were differentiated to obtain various characteristics of lamb pelts.

MATERIALS AND METHODS

For the aim pursued, we made experiments in two populations of Botosani Karakul sheep belonging to two types of farm, in each of them the selection pressure and accuracy of reproduction process have had differentiated valences: 194 lambs of the farm elite within the *Research and Development Station for Sheep and Goat Breeding Popauti* (RDSSGP Popauti) and 161 lambs into a private farm

within the *Association of Sheep and Goat Breeders "MOLDOOVIS"* Botosani (SGBS "MOLDOOVIS" Botosani).
The main qualitative physical and morphological features of their pelts were revealed by multifactorial estimation method, as follows (Filote et al., 1994; Hrinca et al., 1994).

- curl shape, with characteristics: cylindrical tube, tube+grain, grain, flat tube, varia (heterogeneous shapes of curls);
- curl size, with characteristics: middle, middle-small, small, big;
- hair fibre quality, with characteristics: silky, normal, rough, soft;
- hair fibre lustre, with characteristics: intense, good, satisfactory, weak-metallic-mat;
- framing in zootechnical classes. The two populations of lambs were analyzed depending on their productive performances, too, by distribution of the animals in zootechnical classes; in the Botosani Karakul breed this operation is performed at the time of estimating the qualitative characteristics of lambs and represents a summation of the scores obtained by all morphological traits of lamb pelt.

To see the significance of differences between the two types of farm as regards the qualitative features of lamb pelts we used the Hi^2 test (χ^2).

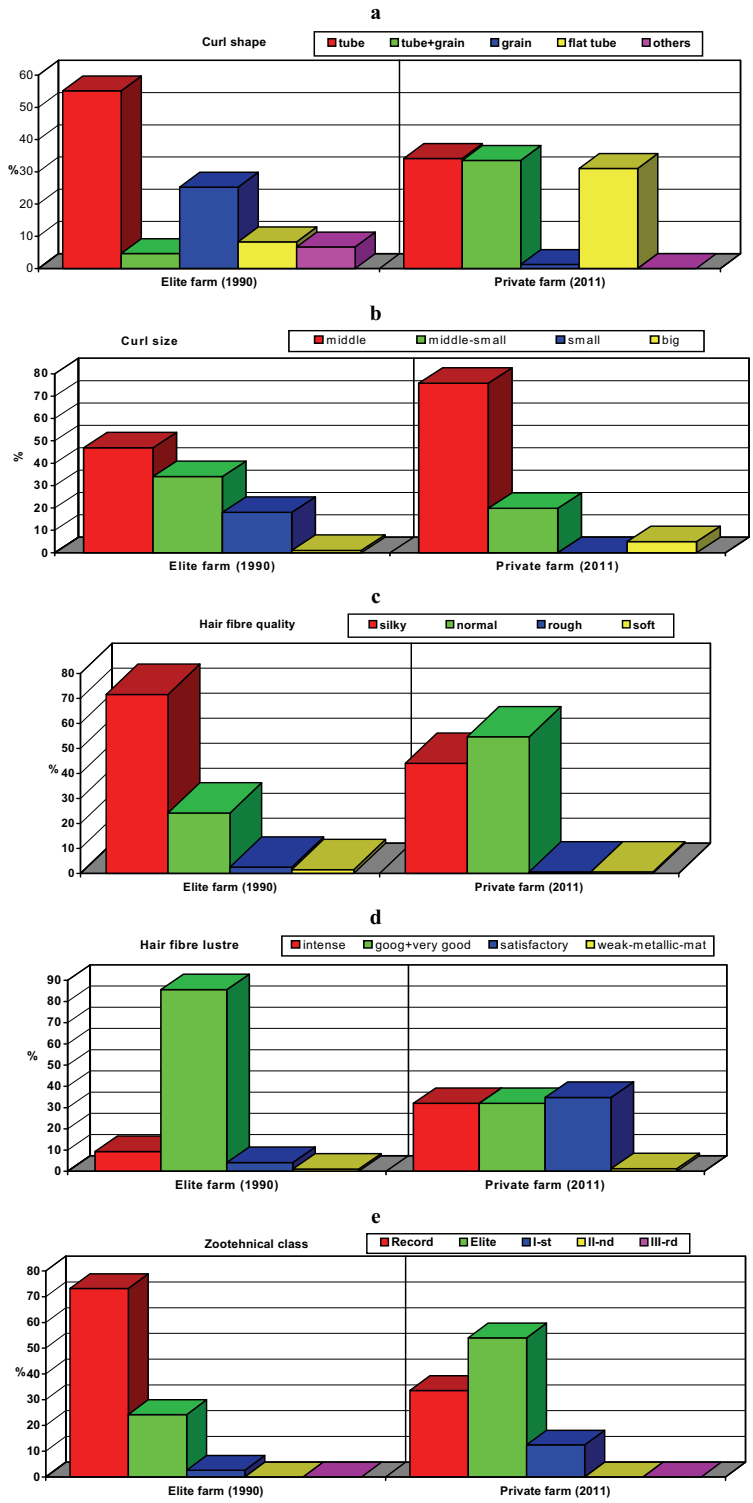
RESULTS AND DISCUSSIONS

The comparative analysis of general panel, relating to the qualitative features of lamb pelts, the elite farm of RDSSGB Popăuţi and the private farm of SGBS "MOLDOOVIS" Botosani, records some differences, as fallows (fig 1).

Curl shape (Figure 1a)
For a long time the classical shapes of "tube" and "grain" were considered the most valuable, from the economic point of view, in particular the "tube" shape presenting a special curling of hair fibres. The combined type of the first two shapes, “tube+grain”, is also an appreciated zoo-economic feature. The diversified practice of improvement systems lead to the occurrence of a "flat tube" type of curl, which (though it seems that presents some histological and chemical deficiencies regarding the curling of hair fibres) has a very nice design. Therefore, all four curl types, with their specific histo-chemical and morphological peculiarities, are valuable economically, their qualitative appreciation being a fashion matter. The last feature, "varia", shows a very heterogeneous design, with Tsurcana aspect, and therefore has a low zoo-economic value.
In the elite farm, the "tube" and "grain" shapes are more frequent than in the private farm. In contrast, the incidence of "flat tube” and of combined shape "tube+grain" in lambs of private farm are higher than those of elite farm. It is however surprisingly the presence of lambs with inhomogeneous curls (right in low rate) in elite farm, such samples missing in private farm. In elite farm, the large presence of lambs having curls with "tube" and "grain" shapes may be due to breeding of black variety in specialized zootechnical lines, too: the line 5 is composed of individuals whose hairy coating is curled in “tube” shape and line 1557 includes individuals with a considerable presence of the "grain".

Curl size (Figure 1b)
The first two sizes of curls present high economic value, while the extreme sizes are undesirable traits in the livestock practice.
The "middle" size of curl is the essential characteristic found in the private farm, while in the elite farm the size characteristics of curls have a more balanced distribution. In the elite farm, as in the private one, the "middle" size is more frequent than the other sizes, but as well the curls with “middle-small” size represent an important share. Among the less valuable characteristics, the lambs with "small" curls are missing in the private farm, and in the elite farm registering a moderate incidence, while the lambs with “big” curls have low frequencies in both farms, but in the private farm their frequency (5%) is five times higher than in the elite farm (1%).

Quality of hair fibre (Figure 1c)
Only the first feature corresponds, to the highest degree, to the economic exigencies and partially the second feature, while the last two characteristics are attributes that must be eliminated from population.
In the elite farm, most lamb pelts have "silky" hair and to a lesser extent the hair fibre is "normal", while in the private farm the percentages of the two qualities of hair fibre are in a sensible balance. The fibres with "soft" and "rough" hair are rarely or sporadically found in lambs of both types of farm.



χ^2 =253.39*** p<0.01

Figure 1. Incidences of qualitative features of lamb pelts in Botosani Karakul sheep from two farm types

Lustre of hair fibre (Figure 1d)
The "intense" lustre is one of the most important properties of lamb pelts, but it is obtained hard enough, its incidence being relatively low, so that most valuable lamb pelts have a "good+very good" lustre (very accepted trait in the selection respect). The "satisfactory" lustre is increasingly harder accepted in selection works, and the "weak-metallic-mat" one confers to lamb pelts a very poor quality.
In elite farm the hair lustre is mostly "good+very good" (approximately 86%); a certain part of lamb pelts have hair fibres with "intense" lustre (approximately 10%). In the private farm, the three categories of lustre record almost equal frequencies (approximately 1/3 for each lustre characteristic). Noteworthy that in the private farm the "intense" lustre is three times more frequently than in the elite farm, this fact being correlated with a high incidence of "flat tube" curls found at lamb pelts from the first farm type, but the "good+very good" lustre is very incident in lambs of elite farm towards the one of private farm. On the other hand, if in the private farm the "satisfactory" lustre is present to a third of lamb population, then in the elite farm this feature is very little common (4%). In both types of farm the lambs with "weak-metallic-mat" lustre are quite rarely met (1%).

Framing in zootechnical classes (Figure 1e)
Depending on the production performance of animals, the zootechnical classes in the Karakul sheep breed are ranked thus: Record, Elite, I^{st}, II^{nd} and III^{rd}.
Cumulating all qualitative features of lamb pelts which determine the framing of individuals into zootechnical classes, it comes out that in the elite farm three quarters of the lambs are in Record class, and a quarter of them belongs to Elite class; the presence of individuals in I^{st} class is sporadic. In contrast, in the private farm, half of individuals fall into Elite class and only a third of them are in Class Record; the lambs belonging to I^{st} class register a relatively high frequency (approximately 13%). The classes II^{nd} and III^{rd} are missing in the two populations, sign that in both types of farm the animal selection is made accurately, with certain differences between them concerning the application rigors of selection process.
This configuration of qualitative features of lamb pelts (especially their distribution in zootechnical classes) confers a certain economic and production advantage to elite farm in comparison with the private one. The differences between the two farm types, in that regard, would be caused by the accuracy of selective system and reproductive process. In the elite farm the selection pressure is stronger than in the private farm. Also, the selection and matching mating activities are more elaborated and are made with higher accuracy in the elite farm towards the private farm. This issue is determined by the herd size of the two types of farms. In the elite farm the selection area is wider, thanks to bigger herds which it holds. Also, the sheep breeding on the basis of zootechnical lines in elite farm confers on it a more elevated selective advantage compared to private farm. Related to this, a specification would be required. The analysis moments were 1990 for farm elite and 2011 for private farm. In 1990, there were more than 15,000 animals in the elite farm, so that the selection range was very wide. It is possible that during the last years, these features have undergone a certain dynamics because of drastic decline in the animal number in this farm, thus the selection area being narrowed too, and therefore it is possible to decrease the incidence of valuable traits of lamb pelts. That is a hypothesis which should be taken into account, but it must be tested by further observations and experiments.
In the private farm there were preponderantly aimed the shape of curls and their size, while in the elite farm the selection was focused on all qualitative features of lamb pelts. In elite farm the selection works aimed fixing of traditional shapes of curls ("tube" and "grain"), while in private farm the main target of breeder was to obtain "flattened" curling. However, it should not be overlooked from the improvement equation that in experimentation period in elite farm the Line 2000 (with "flattened" curling) was at the beginning of its creation or have had a very short history, so that the fixing of its characteristics was at a low level. It seems that only in the respect of curl size, the private farm presents a slight productive advantage on the elite farm. As regards the features of hair fibres (quality and lustre), the superiority of the elite farm on the private farm is more than obvious.

At the same time, the morpho-production superiority of elite farm towards the private one might also be due to the fact that in the private farm the selection was focused on immediate commercial characters (shape and size of curls), while in the elite farm the selection works took into consideration fixing certain features of fineness (especially those concerning quality and lustre of hair fibres).
From the economic point of view, to respond quickly to the changing market demands, it is necessary that the improvement of Karakul sheep to be carried out on all the qualitative features of their individuals to obtain various assortments of valuable lamb pelts; doing so the unilateral selection can be avoided.

CONCLUSIONS

Between the elite farm and the private farm there are some production differences as regards the qualitative features of lamb pelts as a result of the selection criteria applied in a differentiated manner in the two farm types.
In the private farm the selective process aimed preponderantly shape and size of curls, whereas in the elite farm the selection was focused on all the qualitative features of lamb pelts (shape and size of curls, quality and lustre of hair fibres).
The individual distribution in zootechnical classes, depending on the qualitative features of lamb pelts, confers a certain economic and production advantage to the elite farm on the private one.

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