

WOOL PRODUCTION AND SOME WOOL PROPERTIES FROM EWES FROM SYNTHETIC POPULATION BULGARIAN MILK

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Abstract

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The aim of the present study was to determine the wool production and some wool properties from ewes from Synthetic population Bulgarian milk. The study was carried out with 25 ewes at age of 18 months and 25 ewes at 2.5 years reared in Institute of Animal Science – Kostinbrod. The wool samples were taken from the sides of ewes for laboratory assessment of the fiber thickness. The thickness of the wool was measured for 100 fibres from each nonfat wool sample, in μm , by Lanimetre MP 3, PZO, Poland with enlargement 20. During the shearing of sheep, it was measured the individual quantity of grease wool with accuracy up to 100 g. Samples were taken from different parts of the body in amount of 300 g for determining the yield and preparation of the samples for measurement of the wool's whiteness. On base of the information for the individual wool production and yield it was calculated the quantity of clean fiber. The whiteness was assessed by photometric methods with Spekol 11 - Carl Zeiss Yena on the base of the measurements of red (X), green (Y) and blue (Z) components of the reflected light from the wool sample. The degree of whiteness, the degree of yellowing and index of yellowing were calculated. The obtained information was analyzed by methods of variation statistics, the effect of age was established by one-way ANOVA. The significance of the influence of the studied factor was established by F-criterion of Fisher. The significance of the differences between means of the studied traits was evaluated by t-criterion of Student. The age of ewes had significant influence on the yield, clean fiber, thickness and whiteness of wool ($P < 0.05$) ($P < 0.001$). It was established negative, considerable high, significant correlation coefficients ($r = -0.51^{**} \div -0.65^{***}$) between the whiteness, degree of yellowing and index of yellowing. The ewes with 48 quality of wool had the highest percentage (over 50%).

Key words: sheep, wool production, yield, whiteness, degree of yellowing

Introduction

There were series of studies on wool production and properties of the wool from different sheep breeds in Bulgaria (Stankov et al., 1994; Todorova et al., 1994; Mihailiva, 1995; Lazarov and Iliev, 1997; Slavova and Tzenkova, 1997; Stefanova and Boikovski, 1998; Dimitrov and Slavov, 2001; Slavova, 2002; Slavov et al., 2005; Dimitrov, 2006; Slavov, 2007; Panayotov, 2012; Panayotov and Pamukova, 2012). However, the information available to us in the literature about the properties of wool from sheep from Synthetic population Bulgarian milk is scarce.

The wool production was not the main selection trait in the specialized dairy sheep and because of that there was a big dif-

ference in wool quality. Besides this, in the last years in connection with the restructuring of the sheep breeding and changes in its breed structure, the wool lost its economic importance. However that does not change the need for scientific studies of the wool properties, because except industrial raw material, the wool is a trait for the physiological condition of the animals.

The aim of the present study was to determine the wool production and some wool properties from ewes from Synthetic population Bulgarian milk.

Materials and Methods

The study was carried out with 25 ewes at age of 18 months and 25 ewes at 2.5 years from Synthetic population

Bulgarian milk, reared in Institute of Animal Science – Kostinbrod (IAS – Kostinbrod). The wool samples were taken from the sides of ewes for laboratory assessment of the fibre thickness by the adopted methods in the “Wool laboratory” in IAS – Kostinbrod. The thickness of the wool was measured for 100 fibres from each nonfat wool sample, (all 2500 measurements), in μm , by Lanimetre MP 3, PZO, Poland with enlargement 20.

During the shearing of sheep, it was measured the individual quantity of grease wool with accuracy up to 100 g. Samples were taken from different parts of the body in amount of 300 g for determining the yield and preparation of the samples for measurement of the wool’s whiteness by the adopted methods in the “Wool laboratory” (Stoyanov, 1980; Nedelchev, 1983; Todorova, 1989).

On base of the information for the individual wool production and yield it was calculated the quantity of clean fiber.

The whiteness was assessed by photometric methods with Spekol 11 - Carl Zeiss Yena on the base of the measurements of red (X), green (Y) and blue (Z) components of the reflected light from the wool sample. The degree of whiteness, the degree of yellowing and index of yellowing were calculated by the next formulas: degree of whiteness = $(2Z - X) \times 100$; degree of yellowing = $Y - Z$; and index of yellowing = $(Y - Z)/Y$ (Todorova et al., 1994).

The obtained information was analyzed by methods of variation statistics, the effect of age was established by one-way ANOVA with computer program Excel, 2003. The significance of the influence of the studied factor was established by F-criterion of Fisher. The significance of the differences between means of the studied traits was evaluated by t-criterion of Student.

Results and Discussion

The effect of age on the investigated traits was showed on Table 1. The age had high significant influence on the yield

and on the clean fiber ($P < 0,001$). Significant values of F-criterion for thickness and whiteness of wool was obtained ($P < 0,05$) but the age had not significant influence on the wool production.

Wool production and some wool properties from ewes from Synthetic population Bulgarian milk were presented in Table 2. The quantity of grease wool was not showed significant differences between both studied groups. The obtained wool production for one year growth from ewes at age of 18 months was 3.58 kg and from ewes at 2.5 year - 3.96 kg which exceeded the minimum requirements for the first class of this breed (2.5 kg) (Instruction for control of the productivity qualities, 2003). The variation of this trait in the studied animals was in a wide range, 2.2 kg - 4.6 kg for ewes at age of 18 months and 2.4 kg - 6.0 kg for ewes at 2.5 year, respectively, which was explained with the lack of selection by wool production in dairy direction. The obtained results in the research corresponded with the results of Mihailova (1977), Dimitrov (1986), Todorova (1987) and Dimov (1995) for ewes at 2.5 year. Higher values for wool production were reported by Stancheva (2003) and Dimov (1995) for ewes at age of 18 months and lower from obtained from us - by Nedelchev (1989) and Georgiev (1990).

Table 1
Values of F-criterion for the effect of the age on the studied traits, n=50

Traits	F-criterion
Wool production, kg	NS
Yield, %	155.37***
Cleanly fibre, kg	30.04***
Fibre thickness, μm	4.50***
Whiteness, %	6.32*

Note: Significant at: * - $P < 0,05$; *** - $P < 0,001$

Table 2
A wool production and some properties of wool, n=50

Traits	18 months		2.5 years		Sign.
	X	SE	X	SE	
Wool production, kg	Mar-58	0.141	Mar-96	0.18	NS
Yield, %	50.62	1.203	68.68	0.806	***
Cleanly fibre, kg	Jan-82	0.092	Feb-72	0.137	***
Fibre thickness, μm	32.95	0.361	34.05	0.374	*
Whiteness, %	24.46	1.396	12-Jan	4.712	*

Note: Significant at: * - $P < 0,05$; *** - $P < 0,001$

The yield from ewes at 2.5 year (68.68%) significantly exceed the yield from ewes at age of 18 months (50.62%) ($P < 0.001$). Analogous was the result for the clean fiber (2.72 kg and 1.82 kg) ($P < 0.001$) (Table 2). The results of Dimitrov (1988), Nedelchev (1989), Georgiev (1990), Dilova (1990), Dimov (1995), Slavova (2000), Panayotov (2012) and Panayotov and Pamukova (2012) were similar with our results. Higher values for the clean fibre and yield were published by Slavova (2000) and Stancheva (2003).

The wool fiber thickness showed significantly finer wool from ewes at age of 18 months compared to ewes at 2.5 year ($P < 0.05$) (Table 2). According to thickness, the studied wools were related to qualities 44, 46, 48 and 50. The distribution of animals according to the wool quality was showed in Figure 1. The highest percentage had the wool with quality 48 (64% from 18 months ewes and 56% from ewes at 2.5 year). Similar results for wool thickness were reported by Stancheva (2003) for the same breed and Dimitrov (1988) for the synthetic dairy line, while for ewes from different productivity directions Mihailova (1977), Nedelchev (1989), Georgiev (1990), Dilova (1990), Dimov (1995) and Panayotov and Pamukova (2012) obtained lower values.

The wool samples from ewes at age of 18 months were with significant higher whiteness (42.46%) compared to ewes at 2.5 year (21.10%) ($P < 0.05$) (Table 2). Analogous tendency for higher values of the whiteness from ewes at age of 18 months was observed in the distribution according to wool quality too (46th and 48th) (Figure 2). The whiteness was studied in different breeds and showed similar values (Nedelchev, 1983; Dilova, 1990) but in dairy population lacks such information.

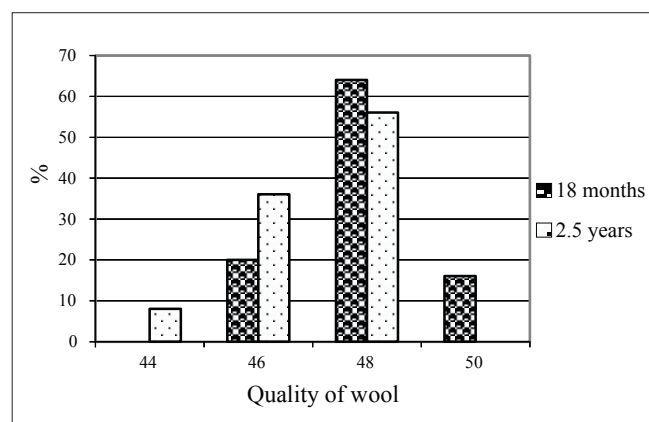


Fig. 1. Distribution in percentage of the wool according to the quality at sheep from SPBM

The correlation coefficients between the whiteness and the degree of yellowing and the index of yellowing were showed on Table 3. It was obtained negative, considerable high, significant correlation coefficients ($r = -0.51 \div -0.65$) ($P < 0.01$; $P < 0.001$).

Conclusions

- The following conclusions could be made from the present study:
- The age of ewes had significant influence on the yield, clean fiber, thickness and whiteness of wool ($P < 0.05$) ($P < 0.001$).
- It was established negative, considerable high, significant correlation coefficients ($r = -0.51^{**} \div -0.65^{***}$) between the whiteness, degree of yellowing and index of yellowing.
- The ewes with 48 quality of wool had the highest percentage (over 50%).

Table 3
Correlation coefficients in relation to whiteness of the wool

	Whiteness	
	18 months	2.5 years
Degree of yellowing, %	NS	-0.63 ***
Index of yellowing	-0.51 **	-0.65 ***

Note: Significant of correlation coefficients at:
** - $P < 0.01$; *** - $P < 0.001$

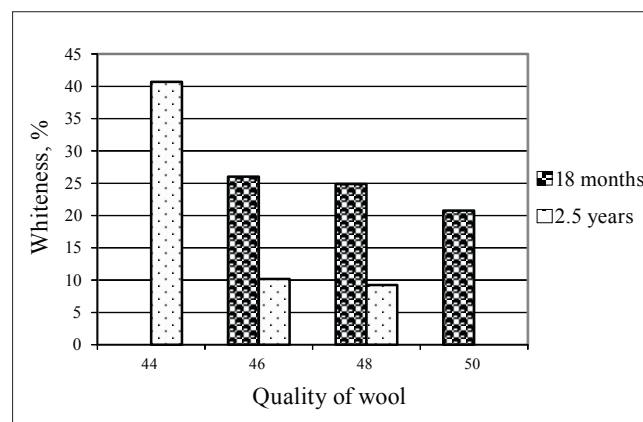


Fig. 2. Whiteness of the wool according to the wool quality

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