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Determination of Cashmere Fiber Production and Quality Traits in Turkish Hair Goat

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Abstract: The aim of this research was to determine the cashmere fiber production potential and quality characteristics in Turkish hair goat. In this study, 58 cashmere fiber samples taken from three different geographical areas were evaluated. Greasy cashmere weight (GCW), fineness, fiber length, cashmere out put, elasticity, resistance and degree of curvature were found to be as 46 ±1 g, 16.6 ±1 μm, 25 ±1 mm, 87 ±1 %, 33 ±1 %, 2.5 ±0.1 g/den and 62 ±1 deg/mm, respectively. The area effect on GCW, cashmere out put and resistance was significant. In addition, the age effect was significant on GCW and fineness,however, the sex effect did not affect on all traits.

Key words: Cashmere, Turkish hair goat, Quality

Introduction

Turkey' s goat population consists of Turkish Hair Goat (THG), Angora Goat, Kilis Goat and Maltese Goat, is estimated to be 8.3 million (Anonymous 2002). These breeds represent respectively 94.4, 4, 1.5 and 0.5 % of the whole goat population. The main product of Angora goat is mohair, Kilis and Maltese goats are raised for milk and meat production. Turkish Hair Goat are reared for meat, primarily and some milk and hair. Turkish Hair Goats are well adapted to ecological conditions in Turkey and about 95 % of their population are owned by traditional farmers.

They are raised over a vast area and live in various environmental conditions. In the gren season the Turkish goat population grazes in range and forest areas. In the dry season, goats are mainly housed and given supplementary feed. Goats provide a valuable source of cash income. Besides meat, milk, hair and skin are also produced for home consumption. Researches related to goat in Turkey are rare. Cashmere production interests Turkey, because it can be obtained from THG. Thats why some researches on cashmere production and quality have been reported. Recently in Turkey, Kaymakcý ve Aþkýn (1997) reported that cashmere yield, fineness and cashmere length were 55 g, 16.2 μm and 53 mm, respectively for Kilis goat. Eliçin *et al.* (2000) found that cashmere length and fineness were 28 mm and 16 μm in THG, respectively. Investigations about THG showed that cashmere begins to grow after the on set of spring. The purpose of the present study was to determine cashmere production and quality traits of THG.

Materials and Methods

This study was made in the province of Konya, at the central Anatolia. This region can be accepted as represantative for all areas where THG is run. Study regions are hilly, at an altitude of 1120 to 1902 meters. The average of the annual temperature is 12.3 °C, the average of annual precipitation is 727.6 mm. Goats, which are used in the present study, were raised in three regions in Konya; Güney dere village, Güney dere highland and Kuran Village. The animals are housed in winter which minimize environmental differences. The management practice does not make any difference between farms. Breeders go to highland in the spring until the autumn. The breeding occures in October-November. Kids of THG are weaned at 2½ monthes old. Goats usally are not sheared because the hair is not enough grown. However goats were combed for this research.

Greasy and cleaned cashmere weights were determined using a scale sensible to one gram. The cashmere can be combed with several combs (Fig. 1). The Chinese comb injured goats because the THG cashmere stick to the hair firmly and this comb was also deformed during the combing . Therefore, combs showed as b in Fig. 1 were developed for the study.

Cashmere traits which are fineness, fiber lenght, cashmere output, elasticity, resistance and degree of curvature were determined from cleaned cashmere. All of the traits were analysed by the wool laboratory of Lalahan Livestock Research Institute.Laboratory conditions were in accordance with IWTO standards. Fineness and degree of curvature were determined on 1200 fibres which were actually measured by using OFDA (Optical Fibre Diameter Analyser). Fiber lenght was determined by using the Uster 100 instrument, elasticity and resistance were determined by the fafegraph instrument. The fafegraph is a device which is used for elasticity and resistance measurements. This device reports as extention percentage for elasticity and as gram/denier for resistance when the fiber break off. Cashmere output was calculated from the followed equation (Ýmeryüz, 1968).

Cashmere Output (CO) % = ((Cleaned and Dried Fiber Weight g)x(1.17)/(Greasy Fiber Weight))x100
Least squares method was used for statistical analyses (Harvey, 1987).

Results and Discussions

Greasy Cashmere Weight (GCW): The least squares mean (LSM) of the GCW was 46 ± 1 g. A similar result was obtained by Utkanlar *et al.* (1963). However, Altýnbaþ (1976) reported the mean GCW in Turkish hair goat as 55 g. Couchman and McGregor (1983), Pattie and Restall (1989) reported GCW values in Australian cashmere goats higher than the present study ones. The area effect on GCW was significant. Means of GCW were found as 42.1g for Kuran village, 47.0g for Gü neydere village, 49.8g, and for Gü neydere highland, respectively. Mean values for Gü neydere highland and Gü neydere village were higher than for the Kuran village. This results may be explained by the lower altitude of the Kuran village which is moderately warmer than the high altitude. The cashmere yield is expected to decrease in low altitudes; similar results were reported by Utkanlar (1963). The age effect on the GCW was also significant. Differences between 1½ 2½and 3½years old groups were not significant, while means of 4½and 4½+ ages were lower than others. A decrease in GCW with age has been reported by Þengonca (1966). However, the sex effect was not significant (Table 1).

Cashmere Fineness: The LSM of cashmere fineness was 16.6 ± 0.1 μm. Similar values was reported by Holst *et al.*, (1982), Wilkinson (1987), Ning *et al.*, (1996) and Eliçin *et al.*, (2000). On the contrary, Abdullaev and Musalaev(1983) reported lower values than our value, while Utkanlar *et al.*, (1963) reported the highest than ones. The area affects significantly the fineness which means were 16.2 μm, 17.3 μm and 16.3 μm for the Güneydere highland, Güney dere village and Kuran village, respectively. There was any significant difference between the Gü neydere highland and the Kuran village while the mean of fineness for the Güneydere village was lower than the Güneydere highland and the Kuran village ($p<0.01$).
The age effect on fineness was significant ($p<0.01$). The finest cashmere was obtained from 1½ year old goats. The most coarse cashmere was obtained from 2½and 4½years old goats. Similar results concerning fineness, for the 1½ years of age was obtained by Mc Gregor (1996).
The sex had not a significant effect on fineness (Table 1).

Cashmere Fiber Length (FLC): The LSM of the FLC was 25 ± 1 mm. This result was similar to the value reported in THG by Eliçin *et al.*,(2000). However, Holst *et al.*, (1982), Abdullaev and Musalaev (1983), Wilkinson and Stark (1987) were reported higher values. The FLC value in this study was suitable for textile industry. However, the longer fiber makes stronger yarn than pills. The pilling is caused by the abrasion of short fibers into small balls on the surface of the fabric. Some pilling will occur in the most of new sweaters, but the problem will not persist in a good garment after the first cleaning. Lower quality manufacturers use shorter fiber because it is cheaper (Anonymous, 2003).
Area, age and sex effects on the FLC were not significant.

Cashmere Output (CO): The LSM of CO was 87 ± 1 %. This value was higher than that reported by Ning *et al.*, (1996) in the Liaoning breed. There was not any other reference related to CO. The area effect on CO was found significant ($p<0.01$). CO means for Kuran village, Güneydere village and Güneydere highland were 82, 89 and 88 % respectively. The difference between Güney dere village and Güney dere highland was by chance, while means of the Gü neydere village and the Gü neydere highland were higher than the Kuran village' s ($p<0.01$). This result may be explained by the fact of that goats in Kuran village were housed longer than in the Güney dere village and the Güneydere highland.

Cashmere Elasticity (EC): The LSM of EC was 33 ± 1 %. This result was not compared with other references, because there was not any study concerning the EC. Area, age and sex. effects on the EC were not significant.

Cashmere Resistance (RC): The LSM of RC was 2.5 ± 0.1 g/den. Also there was not any reference for the RC. Area effects was significant ($p<0.01$), while age and sex of ones did not affect on the RC. The best resistance was found in the Gü neydere village. RC means were found to be as 2.5, 3.0 and 1.9 g/den for the Kuran village, the Gü neydere village and the Güneydere highland, respectively. All of the differences among the means were significant ($p<0.01$).

Cashmere Curvature Degree (CDC): The CDC was determined by the OFDA instrument as deg/mm. The LSM of the CDC was 62 ± 1 deg/mm. We dis not found any reference related to the CDC. The factors effects on the CDC were not significant.

Table 1: Least Squares Means(±SE) for effecting cashmere properties of the research materials

Factors/Traits		n	Greasy Cashmere Weight (g)	Fineness (μm)	Fiber Length of cashmere (mm) (%)	Cashmere output (%)	Elasticity of Cashmere (g/den)	Resistance of chasmere	Curvature degree of Cashmere (deg./mm)
Areas	Kuran Village	18	$42^{b}\pm2$	$16.3^{b}\pm0.3$	24 ± 2	$82^{b}\pm1$	34 ± 1	$2.5^{b}\pm0.2$	62 ± 1
	Güneydere Village	13	$47^{a}\pm2$	$17.3^{a}\pm0.3$	25 ± 2	$89^{a}\pm1$	32 ± 2	$3.0^{a}\pm0.2$	63 ± 2
	Güneydere Highland	27	$50^{a}\pm2$	$16.2^{b}\pm0.2$	24 ± 2	$88^{a}\pm1$	32 ± 1	$1.9^{c}\pm0.2$	62 ± 1
Ages	1.5	21	$52^{a}\pm2$	$15.7^{b}\pm0.2$	25 ± 2	86 ± 1	32 ± 1	2.2 ± 0.2	65 ± 1
	2.5	16	$47^{ab}\pm2$	$17.2^{a}\pm0.3$	25 ± 2	86 ± 1	33 ± 1	3.0 ± 0.2	61 ± 1
	3.5	9	$50^{a}\pm3$	$16.4^{ab}\pm0.3$	25 ± 2	88 ± 1	32 ± 2	2.2 ± 0.2	63 ± 2
	4.5	5	$43^{bc}\pm3$	$17.1^{a}\pm0.4$	24 ± 3	87 ± 2	35 ± 2	3.0 ± 0.3	59 ± 2
	>4.5	7	$40^{c}\pm3$	$16.6^{a}\pm0.4$	24 ± 3	86 ± 2	30 ± 2	2.5 ± 0.3	62 ± 2
Sex	Male	24	47 ± 2	16.3 ± 0.2	24 ± 2	86 ± 1	32 ± 1	2.4 ± 0.2	62 ± 1
	Female	34	46 ± 1	16.9 ± 0.2	25 ± 1	87 ± 1	33 ± 1	2.5 ± 0.1	62 ± 1
Total		58	46 ± 1	16.6 ± 1.0	25 ± 1	87 ± 1	33 ± 1	2.5 ± 0.1	62 ± 1

a, b,c, : Means within a column not followed by the same letter differ ($p<.05$)

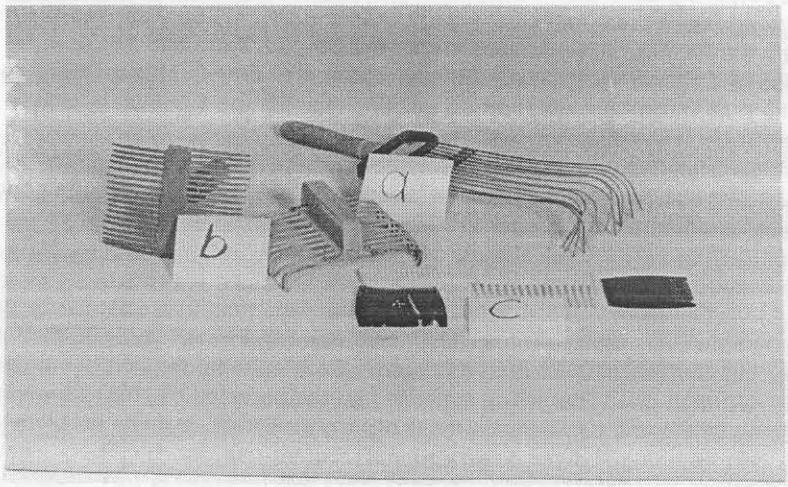

Fig. 1: The combs used in combing cashmere in the study
a: The combs developed in China b: The combs developed especially for this study
c: The combs developed in other research in Turkey

In conclusion, these first results showed that the cashmere potential of the THG was suitable. Cashmere production from the THG can provide some income to Turkish breeders. On the other hand, THG cashmere traits were found available for hand-made textile products such as hat, scarf, gloves and stocking. It is possible that GCW, fineness, FLC, CO, EC, RC and CDC for textile industry can be improved by the selection; because of the lack of studies concerning the improvement of these traits in THG. However, the introduction of cashmere in Turkey could represent an aviable alternative to goat breeders.

References

Abdulaev, A. O. and K. H. Musalaev, 1983. White Down Producing Goat of Dagestan. Anim. Breed. Abst., 51: 4382.

Altinbas E. T., 1976. A research on some technological traits of down fibers in Kilis goat. Ann. of Ankara Univ. Agr. Fac. 26: 598-610 (in Turkish).

Anonymous, 2002. Ann. of Statistics of Turkey. The State Institute of Statistics, Ankara (in Turkish).

Anonymous, 2003. http:/www. Cashmere.com/htm/101/101 howto.html

Couchman, R. C. and B. A. McGregor, 1983. A Note on The Assessment of Down Production in Australian Cashmere Goats. Anim. Breed. Abst., 51: 3713.

Eliçin, A., G. Dellal, F. Soylemezoðlu, Z. Erdogan and İ. Z. Arik, 2000. Some Physical characteristics and using areas of coarse and down fibres in Hair Goat. Ank. Univ. Press, Ankara (in Turkish).

Harvey, W. R., 1987 User's Quide For LSMLMW PC-i Version Mixed Model, Least and Maximum Likelihood Computer Program. Ohio State University Columbus, Mimeo.

Holst, P. J., W. H. Clarke, I. G. Maddocks, 1982. Skin and Fleece Characteristics of Two Groups of Feral Goats. Agric. Anim. Husb., 22: 173 - 176.

Imeryuz, F., 1968. Determination of fiber and staple lengths concerning with fineness and number of curvature in Turkish Mohair. J. of Lalahan Anim. Res. Inst. No: 15 (in Turkish).

Kaymakci, M., Aşkin, Y., 1997. Goat Breeding. Baran Ofset Press, Ankara (in Turkish).

McGregor, B. A., 1996 Enviromental, Nutritional and Management Influences on Quality and Production of Mohair and Cashmere, VI. International Conference on Goats, 1: 285 - 296

Ning, M. A., L. Yongjun and Y. Song 1996. Breed Resarch and Production of China Cashmere Goats. Department of Animal Science, Jilin Agricultural Universty, 161-165

Pattie, W. A. and B. J. Restall, 1989. The Inheritance of Cashmere in Australian Goats. Livest. Produc. Sci., 21: 251-261.

Şengonca, M., 1966. Goat Breeding in Ýzmir, Manisa, Aydýn, Denizli and Muðla provinces, and researches on milk ånd other yields in Goat Types raising at different environments. J. of Ege Univ. Agr. Fac. No: 116, Izmir (in Turkish).

Utkanlar, N., F. İmeryü z, K. Öznacar and S. ve Mü ftü oðlu, 1963. Some researches on fiber diameter and color properties in Turkish Hair Goat and their comparision with fibers of Cashmere, Lama, Vicuna and Guanago. J. Lalahan Anim. Res., Inst. 3: 8-25 (in Turkish).

Wilkonson, J. M., B. A. Stark, 1987. Commercial Goat Production. Sons Ltd., Wancoster, p: 154.