

## The quality of camel wool held in the Tunisian Sahara Desert

EWA KUŹNICKA, ANNA GRONDKOWSKA

Department of Animal Breeding and Production, Warsaw University of Life Sciences – SGGW

**Abstract:** *The quality of camel wool held in the Tunisian Sahara Desert.* The goal of present work was to investigate wool quality of camels breeding in the Tunisian part of Sahara Desert. The study was carried out with 10 camel males at the age of three years. The samples of wool were taken from the left mid-side of a shoulder. Due to the low regrowth rate of wool, the samples were not split into the external and internal fractions before a measurement. The individual fibers were classified into three groups: 1) fibers with continuous medulla, 2) fibers with intermittent medulla, 3) fibers without medulla. Then the percentage of each type of fibers was evaluated. Thickness measurement was made using the microprojection method according to Polish Standard PN-72/P-04900. At least 600 fibers were measured in each sample. The high fraction of hair from the core constant rate of 78% wool with a thickness of up to 48  $\mu\text{m}$ , and the hair thickness variation of 47% be attributed to the roughness of the wool. The wool of the camels under study should be used for the production of carpets and handicrafts. The occurrence of continuous core both in the thin and thick fibers confirmed the adaptation of camels to a large diurnal temperature variation, as in llamas and alpacas.

*Key words:* camel, wool, quality

### INTRODUCTION

The camel population is around 26 million (FAO statistics from 2011). Most of them are dromedaries, whose habitat are dry, semi-arid, or desert areas of Africa. Camel's wool is a valuable and sought-after product. Its value depends mainly on the thickness and length. The most

valuable thin fibers are soft and provide an attractive material for scarves and sweaters of the highest quality. The fibers of medium thickness may be used for the production of outerwear. Thick wool finds its way in the manufacture of tents, carpets, blankets, ropes and halters as well as insulating material (Chand et al. 2011). The quality of camel's wool also depends on the part of body it is obtained from. Thinner wool, taken from a side of the body or from the abdominal, is best suited for spinning. This is the first shearing wool fiber of the diameter from 20 to 23 microns and is obtained from camels under the age of 3 years. Longer (and also rougher) wool comes from the front of the neck and the top of the humps. The color of camel wool is from cream to almost black and is easy to dye (Huebscher 2008, Mathias 2010).

Wool is harvested by combing as well as picking molting fiber or clipping, which takes place once a year in spring. The average yield for an individual in stocks is 5 kg. The fibers of wool obtained from adult male dromedary have a diameter of 31–35 microns. Thinner wool is produced by yearlings and its yield is from 1 to 4 kg (Khan et al. 2003, Huebscher 2008, Mathias 2010).

A typical farm consisting of 46 camels generates about 12% of its annual income from the sale of greasy wool (Mathias 2010).

The goal of present work was to investigate wool quality of camels breeding in the Tunisian part of Sahara Desert.

## MATERIALS AND METHODS

The study was carried out with 10 camel males at the age of three years.

The samples of wool were taken from the left mid-side of a shoulder. Due to the low regrowth of wool, the samples were not split into the external and internal fractions before a measurement. The individual fibers were classified into three groups: 1) fibers with continuous medulla, 2) fibers with intermittent medulla 3) fibers without medulla. Then the percentage of each type of fibers was evaluated. Thickness measurement was made using the microprojection method according to Polish Standard PN-72/P-04900. At least 600 fibers were measured in each sample.

## RESULTS AND DISCUSSION

The average thickness of the wool was 40.26  $\mu\text{m}$  (Table 1) and ranged from 28.80 to 48.13  $\mu\text{m}$ . The average deviation was 18.33  $\mu\text{m}$ , with 47.61% variance which demonstrates a high diversity of wool thickness in Tunisian camels. The wool in our samples appeared thinner compared to the study of Rozbicka (2006). Other authors reported that 80% of wool derived from adult camel had a thickness of 17–20  $\mu\text{m}$ . This difference could be due to the quality of feed. The best fibers of inner fractions have been derived in central Mongolia, and their thickness ranges from 19 to 24  $\mu\text{m}$ , while the thickness of fibers in the outer fraction can vary between 20 and 120  $\mu\text{m}$  (Petrice 1995, Huebscher 2008).

Most of the tested samples consisted of continuous and discontinuous hair core (Fig. 1), and their fractions were, respectively, 78 and 17%. Coreless hair was only 5% but their fraction was

TABLE 1. Mean thickness of fiber per wool sample

Number of sample	Fiber diameter		
	mean thickness ( $\mu\text{m}$ )	standard deviation ( $\mu\text{m}$ )	variation (%)
1	37.01	22.65	61.19
2	40.00	17.21	43.03
3	28.80	24.57	85.31
4	46.98	25.95	55.24
5	47.18	15.96	33.82
6	48.13	10.70	22.23
7	46.20	17.71	38.33
8	41.78	15.22	36.43
9	34.87	16.51	47.35
10	31.66	16.84	53.19
Mean	40.26	18.33	47.61

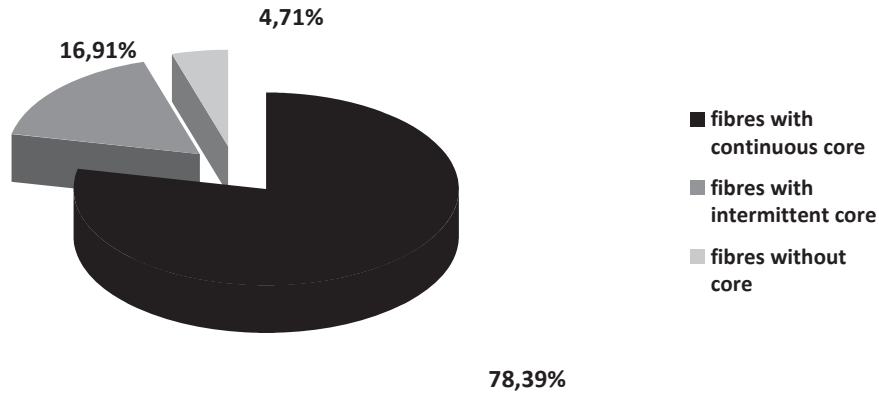


FIGURE 1. The percentage of fibres with continuous core, intermittent core, and without core in all samples under test

greater than that reported by Rozbicka (2006). The fraction of continuous-core hair in a sample varied between 50 and 100%; the share of intermittent-core hair was from 0.2 to 33%, and the coreless hair comprised 1 to 18% of the sample. In three samples, there was no hair without a core, and their share in the remaining samples was very small (Fig. 2).

The occurrence of continuous core both in the thin and thick fibers results from the adaptation to a large diurnal

temperature variation, as in llamas and alpacas (Kujaszewska and Kuźnicka 2012).

### CONCLUSIONS

The high fraction of hair with continuous core amounting to 78% wool with a thickness of up to 48 microns, and hair thickness variation of 47% is a proof of high roughness of the wool. The wool of

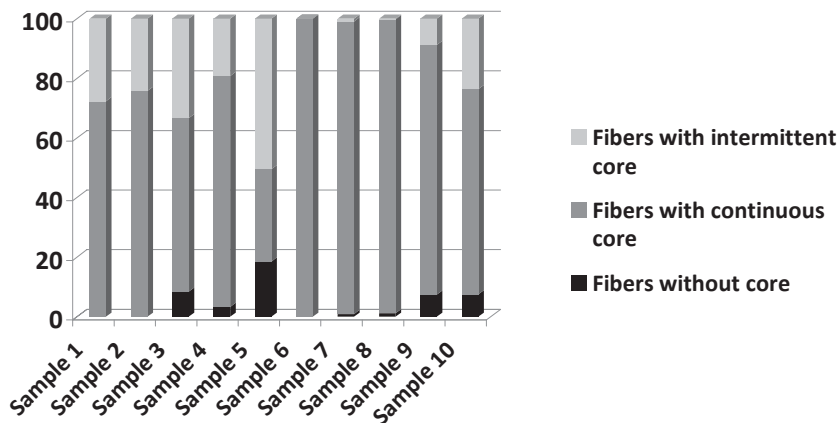


FIGURE 2. The participation of fibers without core, with continuous core, and intermittent core in each trial

the camels under study should be used for the production of carpets and handicrafts. The occurrence of continuous core both in the thin and thick fibers confirms the adaptation of camels to a large diurnal temperature variation, as in llamas and alpacas.

## REFERENCES

- CHAND K., JANGID B., ROHILLA P., 2011: Traditional of knowledge of processing and value addition to dromedary camel wool. *Indian Journal of Traditional Knowledge* 10(2), 316–318.
- HUEBSCHER C., 2008: Bactrian Camel. *Spin-off Magazine* 3, 50–51.
- KHAN B., IQBAL A., RIAZ M., 2003: Production and management of camels. Department of Livestock Management, University of Agriculture, Faisalabad.
- KUJASZEWSKA J., KUŹNICKA E., 2012: Alpaki – warunki chowu, użytkowanie, zabiegi pielęgnacyjne i profilaktyka. *Życie Wet.* 7, 591.
- MATHIAS E., 2010: Adding value to livestock diversity. Rome.
- PETRICE O., 1995: Harvesting of textile animal fibres. *FAO Agri. Services Bulletin* 122.
- PN-72/P-04900. Metody badań surowców włókienniczych, wełna.
- ROZBICKA A., 2006: Charakterystyka okrywy włosowej udomowionych wielbłądotnych. Praca magisterska SGGW, Warszawa.
- Streszczenie:** Jakość wełny wielbłądów utrzymywanych na obszarze tunezyjskiej Sahary. Analizie poddano wełnę pochodzącą od 10 wielbłądów utrzymywanych na obszarze tunezyjskiej Sahary. Próby pobrano z boku za łopatką od samców w wieku 3 lat. Ze względu na mały odrost wełny pomiary zostały przeprowadzone na całym zespole włosowym, nie rozdzielano włókien na frakcję zewnętrzną i wewnętrzną. W trakcie pomiarów grubości poszczególne włókna klasyfikowano do 3 grup: 1) włókna o rdzeniu ciągłym; 2) włókna o rdzeniu przerywanym; 3) włókna bez rdzenia. Pomiar grubości dokonywany był metodą projekcyjną za pomocą lanometru na wyodrębnionej frakcji (pęczku). Obliczono procentowy udział włosów rdzeniowych, bezrdzeniowych i z rdzeniem przerywanym występujących w badanych próbkach. Bardzo duży udział włosów z rdzeniem ciągłym, wynoszący 78% przy grubości wełny dochodzącej do 48 μm i zmienności grubości włosów wynoszącej 47%, może świadczyć o szorstkości wełny. Wełna badanych wielbłądów powinna być wykorzystywana do produkcji dywanów i rękodzieła ludowego. Występowanie rdzenia ciągłego zarówno we włosach cienkich, jak i grubych wskazuje na przystosowanie do dużej dobowej zmienności temperatury, podobnie jak u lamy i alpaki.

*MS. received in November 2013*

### Authors' address:

Ewa Kuźnicka, Anna Grondkowska  
Wydział Nauk o Zwierzętach SGGW  
Katedra Szczegółowej Hodowli Zwierząt  
ul. Ciszewskiego 8  
02-786 Warszawa  
Poland