

**QUALITY ASSESSMENT OF THE COMMON FOX
(*VULPES VULPES*) PELTS OBTAINED
IN TWO REGIONS OF POLAND ON THE BASIS
OF SELECTED INDICES**

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Key words: *Vulpes vulpes*, pelt quality, hair length.

Abstract

The aim of this study was to characterise and compare the pelts of common foxes (*Vulpes vulpes*) obtained through reduction shootings in two Polish hunting districts: Olsztyn and Warsaw. The study material was a hundred pelts obtained by the hunters from the two districts. It has been concluded that the average weight and length of the pelts reflect the sexual dimorphism of the common fox. It has been further concluded that the area of origin does not affect the examined parameters. The extent of the silvering effect in the pelt did not depend on the sex or the area. It has been shown that male foxes in general and the foxes from the Olsztyn district (as drawn by Polish Hunting Association) were marked by both longer guard hair as well as longer down hair. The nature of the defects detected in the hides as well as the frequency of their occurrences has been similar and suggests improper initial treatment.

**OCENA JAKOŚCI SKÓR LISÓW POSPOLITYCH (*VULPES VULPES*)
POZYSKANYCH W DWÓCH REJONACH POLSKI
NA PODSTAWIE WYBRANYCH WSKAŹNIKÓW**

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Słowa kluczowe: *Vulpes vulpes*, jakość skór, długość włosa.

Abstrakt

Celem pracy była charakterystyka i porównanie skór lisów pospolitych pozyskanych w wyniku odstrzału redukcyjnego przez myśliwych z olsztyńskiego i warszawskiego okręgu Polskiego Związku Łowieckiego. Materiał do badań stanowiło 100 skór lisów pospolitych. Stwierdzono, że średnia masa i długość skór potwierdza występowanie dymorfizmu płciowego u lisów pospolitych, natomiast teren pozyskania nie wpłynął na badane parametry. Stopień wysrebrzenia skóry nie jest uzależniony od płci lisa i rejonu bytowania. Wykazano, że dłuższymi włosami pokrywowymi i puchowymi charakteryzowały się samce oraz osobniki pochodzące z olsztyńskiego okręgu Polskiego Związku Łowieckiego. Częstotliwość i charakter stwierdzonych wad skór była podobna i wskazuje także na niewłaściwą obróbkę wstępna skóry.

Introduction

There exist numerous subspecies of the *Vulpes vulpes* and they inhabit nearly entire Northern Hemisphere. Depending on the geographical location they may differ in colour and body size and quality of the hair coat. In Poland there occurs the *Vulpes vulpes crucigera*. The predominant fox in Poland is the common fox with various intensity of colouration. Far less common is the fox of the cross colour variant (GOSZCZYŃSKI 1995). The *Vulpes vulpes* is also common in breeding farms with melanistic silver fox being the most popular colour variant. Apart from that numerous other variants have been farm-bred (e.g. gold, platinum, ring neck, pastel) (NES et al. 1989).

The fox hunting season in Poland is between 1st June and 31st March. The majority of shooting however takes place between November and the end of February. Various methods of hunting are allowed. The technique, weapons and ammunition used determine the quality of hides (GOSZCZYŃSKI 1995).

According to The Polish Hunting Association records (www.pzlow.pl) in the season 2008/2009 most foxes were hunted in the Province of Wielkopolska (over 20 000). In the provinces of Mazowsze as well as Warmia and Mazury 12 993 and 10 383 were shot respectively.

For the fur industry the common fox pelt is a valuable material of universal use. The examples include making coats, hats and women's coat collars. The pelts are either dyed or used in their natural form (DUDA 1992).

The aim of the paper was to characterise and compare the pelts of the *Vulpes vulpes* obtained through the density reduction shooting by the hunters of the Olsztyn and Warsaw districts of The Polish Hunting Association.

Materials and Methods

The study material was the pelts of the *Vulpes vulpes* obtained in the season 2007/2008 by the hunters of the Olsztyn and Warsaw districts (as classified by The Polish Hunting Association.) Data of a hundred pelts have

been collected, out of which fifty originated from the Olsztyn district and another fifty from the Warsaw district. In either group there have been twenty five pelts of male foxes and twenty five pelts of female foxes. The pelts were chosen randomly in both areas, and after the hunting season ended they were tanned at a tanner's in central Poland. The hides were only evaluated after they had been tanned, and therefore the differences which might result from the various method of treatment such as tightening, forming and drying were minimized (PIÓRKOWSKA 1998).

During the research the physical parameters of the hides such as the weight and the length were defined. The length of both the tail and the white spotted tail tip were measured and the extent of the silvering effect was defined. The weight was measured with electronic scales to an accuracy of one gram. The length of the tail and the tail tip were measured with a tape measure to an accuracy of one centimetre. The silvering effect was given in percentage terms.

Also measured were both the underfur and guard hair length. The measurements were taken in nine points on the left side of the skin – three in each of the following areas: the front, the middle and the back. To define these points the findings of other fur animal researchers' were modified and then used (BARABASZ et al. 2000, PIÓRKOWSKA 2008). The points are illustrated in Figure 1. The measurements were taken to the accuracy of one millimetre.

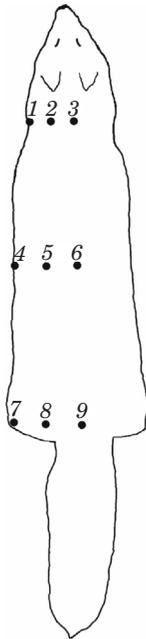


Fig. 1. Hair length measuring points. Explanations are in the text

The numerical data obtained was subjected to a statistical analysis based on a single-factor orthogonal analysis of variance (STATISTICA 8.0 PL).

Results and Discussion

All of the pelts examined from both sources have been classified as the typical red fox in its dark colour variant. The physical parameters of the pelts evaluated are presented in Table 1.

Physical parameters of pelts ($\bar{x} \pm SD$), $n = 50$

Table 1

Measurement	Sex		District	
	♂	♀	Warsaw	Olsztyn
Pelt weight (g)	320.84 ^A ± 44.12	257.51 ^B ± 42.47	294.80 ± 52.10	282.28 ± 54.76
Pelt length (cm)	85.24 ^A ± 5.72	81.10 ^B ± 5.20	83.24 ± 5.48	83.02 ± 6.20
Length of white tail tip (cm)	7.35 ± 2.47	6.95 ± 2.37	6.96 ± 2.23	7.37 ± 2.60
Extent of silvering effect (%)	38.58 ± 7.99	39.23 ± 8.58	39.21 ± 5.71	38.62 ± 10.24

A, B - $p \leq 0.01$

The results obtained from the pelts weight measurements have led to the conclusion that the pelts of male foxes are statistically significantly heavier than the pelts of vixen. This may result from the sexual dimorphism present in the species *Vulpes vulpes* (GOSZCZYŃSKI 1995). The above thesis is supported by the results of the skin length measurements. The pelts of male foxes were significantly longer in comparison with those of vixen. A similar difference in body weight, with male specimens heavier than female, was found by NOWICKI et al. (2000). It should, however, be noted that the pelts obtained from the farm-bred common foxes are noticeably longer (BRZOZOWSKI 2002). For instance the research by PIÓRKOWSKA (2008) shows the average weight of a tanned common fox hide (*Vulpes vulpes*) of the pastel colour variant was 378 grams and the length was 101 centimetres. The statistically significant occurrence of sexual dimorphism in farm-bred foxes was proven by LOREK et al. (2001). Moreover, PIÓRKOWSKA (1998) established that the tanned hides obtained from male specimens of another species – the arctic fox – were 11 per cent heavier than those obtained from the females.

No statistically significant difference has been observed between the pelts with regard to the area of acquisition. This may indicate that there exist no differences in body size between the fox population in Warmia and Mazury and Mazowsze (Warsaw) regions.

A characteristic of the *Vulpes vulpes* is the white tail tip. The feature is a subject of selection in the farm-bred fox populations (Wzorzec oceny... 1998). In wild fox populations the white tail tip is less pronounced and tends to be more changeable (GOSZCZYŃSKI 1995, NES et al. 1989). In the hides examined no difference in the length of the white tip has been observed either between sexes or the regions studied. The average length is seven centimetres (Table 1).

Also characteristic of the common fox (*Vulpes vulpes*) regardless of its colour variant is the silvering effect, or guard hair depigmentation. Depending on the extent of trunk depigmentation common foxes can be classified as being 0, 25, 50, 75 and 100 per cent silver (DUDA 1992, Wzorzec oceny... 1998). The extent of the silvering effect in the skins examined is similar in male and female specimens and fluctuates between 38.58 and 39.23 per cent. There is also no significant difference between the regions and the extent of silvering effect amounted to 39.21 per cent and 38.62 per cent in the Warsaw and Olsztyn districts respectively.

Table 2 shows the guard hair length of the examined skins. It has been observed that the male *Vulpes vulpes* specimens are marked by longer coat than the female specimens at the measurement points located at the front (point 1, 2 and 3) as well in the middle of the pelt (points 4, 5 and 6). These differences are a result of sexual dimorphism and have been proven highly significant. The male foxes are characterized by longer guard hairs on the neck that form the so called mane. The same phenomenon occurs in farm-bred foxes but it is of lesser intensity. This is considered undesirable as fox farm-breeding aims for the evenness in the guard hair length throughout the animal's body (Wzorzec oceny... 1998).

Table 2

Guard hair length ($\bar{x} \pm SD$)

Measurement point	Sex		District	
	♂	♀	Warsaw	Olsztyn
1.	6.32 ^A ± 1.27	5.33 ^B ± 1.10	5.59 ± 1.22	6.03 ± 1.31
2.	6.32 ^A ± 1.19	5.38 ^B ± 1.05	5.60 ^b ± 1.14	6.08 ^a ± 1.24
3.	6.24 ^a ± 1.24	5.35 ^B ± 1.14	5.52 ^b ± 1.24	6.04 ^a ± 1.24
4.	5.56 ^A ± 1.14	4.92 ^B ± 1.04	5.10 ± 1.06	5.42 ± 1.17
5.	5.51 ^A ± 1.15	4.93 ^B ± 1.00	4.99 ^b ± 1.04	5.44 ^a ± 1.14
6.	5.59 ^A ± 1.15	4.97 ^B ± 1.07	5.06 ± 1.10	5.49 ± 1.16
7.	7.89 ± 1.21	4.49 ± 0.95	4.44 ^b ± 1.02	4.93 ^a ± 1.12
8.	4.89 ± 1.10	4.51 ± 0.49	4.43 ^b ± 0.92	4.91 ^a ± 1.14
9.	4.82 ± 1.22	4.43 ± 0.95	4.43 ^B ± 1.02	4.91 ^A ± 1.14
\bar{x}	5.51 ^A ± 1.18	4.94 ^B ± 1.02	4.99 ^B ± 1.07	5.44 ^A ± 1.17

A, B ≤ 0.01; a, b ≤ 0.05

The guard hair length measurements demonstrate that the foxes from the Olsztyn hunting district are characterized by longer hair coat in comparison with those of the Warsaw district, the observation being scientifically significant. This might indicate the foxes' adaptation to a harsher climate (BOBEK et al. 1984).

The length of underfur hairs is shown in Table 3. It has been marked that in most measurement points the down hairs on skins of male foxes were noticeably longer than those on the skins of female foxes. This has been proven to be of high statistical significance. The foxes obtained in the Olsztyn district as classified by The Polish Hunting Association are characterized by longer underfur hair than those obtained in central Poland. Also PIÓRKOWSKA (2008) proved that the underfur hairs in the common fox (*Vulpes vulpes*) of the pastel colour variant are statistically longer in male specimens than in female ones.

Table 3

Underfur hair length ($\bar{x} \pm SD$)

Measurement point	Sex		District	
	♂	♀	Warsaw	Olsztyn
1.	1.46 ± 0.54	1.31 ± 0.41	1.32 ± 0.51	1.45 ± 0.45
2.	1.51 ^a ± 0.46	1.33 ^b ± 0.35	1.36 ± 0.43	1.47 ± 0.41
3.	1.56 ^A ± 0.46	1.31 ^B ± 0.40	1.34 ^b ± 0.45	1.52 ^a ± 0.43
4.	1.83 ^a ± 0.52	1.59 ^b ± 0.41	1.60 ^b ± 0.50	1.82 ^a ± 0.44
5.	1.89 ^A ± 0.45	1.63 ^B ± 0.43	1.68 ^b ± 0.46	1.84 ^a ± 0.44
6.	1.87 ^A ± 0.48	1.63 ^B ± 0.43	1.65 ^b ± 0.49	1.84 ^a ± 0.44
7.	2.18 ^A ± 0.51	1.89 ^B ± 0.45	1.90 ^B ± 0.46	2.16 ^A ± 0.51
8.	2.22 ^A ± 0.55	1.94 ^B ± 0.45	1.96 ^b ± 0.51	2.19 ^a ± 0.51
9.	2.24 ^A ± 0.53	1.95 ^B ± 0.45	1.95 ^B ± 0.48	2.24 ^A ± 0.51
\bar{x}	1.81 ^A ± 0.52	1.62 ^B ± 0.42	1.64 ^B ± 0.47	1.79 ^A ± 0.46

A, B ≤ 0.01; a, b ≤ 0.05

According to DUDA (1992) the length of guard hairs in the common fox can fluctuate between 6 and 11 centimetres. In the case of the down hairs it is between 3 to 5.50 centimetres. PRZYSIECKI et al. (2004) show that the guard hair height in the farm-bred common foxes of gold variant is within 6.85 and 7.05 centimetres in male and within 6.38 and 6.70 centimetres in female specimens. As far as the down hairs are concerned the respective values are 3.25–3.37 centimetres and 3.11–3.21 centimetres.

Table 4 presents the defects in the pelts examined. In the case of 21 pelts (which amount to 11.2 per cent of the total number) felted hair coating in the back regions has been observed. The degree to which the coat is felted is not

very noticeable, and the defect can be repaired through combing. Another defect that has been noticed is the bald areas on the fur. This is due to the local decay that can form because of improper drying or fleshing processes. Similar instances of defects are noted by DUDA (1992) as the ones most frequently found in the skins of the *Vulpes vulpes*. Furthermore, the defects are more frequently observed in the pelts obtained by hunting than those obtained from the breeding farms.

Table 4

Pelt defects

Type of defect	District				Total	
	Warsaw		Olsztyn			
	number	%	number	%	number	%
Felted hair areas	11	9.65	10	13.70	21	11.23
Bald areas	9	7.89	4	5.48	13	6.95
Blood stained areas	37	32.46	25	34.25	62	33.15
Improper fleshing result	14	12.28	17	23.29	31	16.58
Shot holes	19	16.67	5	6.85	24	12.83
Rips	13	11.40	6	8.22	19	10.16
Lack of tail	6	5.26	4	5.48	10	5.35
Lack of limb	5	4.39	2	2.74	7	3.74
Total	114	100	73	100	187	100

The pelt defect of highest occurrence is the blood stained areas, which are noticeable even after tanning. The blood stains are most often located in the rear parts of the pelts on the abdomen or limbs. This particular defect indicates that the hunters have not been using blood absorbents such as sawdust.

Improper fleshing that leads to hair bulb damage has been identified in as many as 31 pelts (which amounts to 16.58 per cent of their total number). What has also been observed is high occurrence of pelt rips and holes due to the methods of hunt used. In ten of the pelts the tails have been missing; in seven there have been limbs missing. The defects have been caused by the negligent or unskilful processing and preserving of the raw pelts. On the basis of the data obtained the conclusion has been drawn that the defects are of similar occurrence in both regions analysed.

Based on the research conducted with regard to the fox pelts obtained in the Olsztyn and Warsaw hunting areas (as defined by the Polish Hunting Association) it has been concluded that the average weight and length of the pelts confirms the occurrence of sexual dimorphism in the common fox (*Vulpes vulpes*). The area of origin did not affect the examined parameters. The extent

of the silvering effect on the pelt does not depend on the sex or the habitat of the fox. It has also been observed that the male foxes and the specimens originating from the Olsztyn hunting area (as classified by the Polish Hunting Association) were characterised by a longer hair coat. The high frequency of occurrence and the nature of the observed pelt defects indicate improper initial treatment of pelts.

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References

- BARABASZ B., BAGDONAS I.I., PIÓRKOWSKA M., KORCZYŃSKA M. 2000. *Badania parametrów okrywy włosowej norek po implantacji melatoniny*. Zesz. Nauk. Prz. Hod., 53: 195–204.
- BOBEK B., MOROW K., PERZANOWSKI K. 1984. *Ekologiczne podstawy łowiectwa*. PWRiL, Warszawa.
- BRZOSZOWSKI M. 2002. *Zmiany pokroju mięsożernych zwierząt futerkowych jako efekt pracy hodowlanej*. Zesz. Nauk. Prz. Hod., 66: 81–86.
- DUDA I. 1992. *Skóry surowe futrzarskie*. Wydawnictwo Akademii Ekonomicznej. Kraków.
- GOSZCZYŃSKI J. 1995. *Lis*. Oficyna Wydawnicza OIKOS, Warszawa.
- Kopański R. 1976. *Obróbka skór łownych zwierząt futerkowych*. PWRiL, Warszawa
- Lorek M.O., Gugołek A., Hartman A. 2001. *Studies on the relationship between body weight, trunk length and pelt size in common foxes (Vulpes vulpes)*. Czech J. Anim. Sci., 46:481-484.
- Łowiectwo*. 1994. Ed. P. Havet. Oficyna Wydawnicza Delta W-Z. Warszawa, 335 pp.
- NES N.N., EINARSSON E.J., LOHI O., JORGENSEN G. 1989. *Beautiful Fur Animals and their colour genetics*. Scientifur, Hillerod.
- NOWICKI W., BRUDNICKI W., JABŁOŃSKI R., WILAND C. 2000. *Charakterystyka populacji lica (Vulpes vulpes L.) w okręgu bydgoskim*. Materiały z konferencji: *Zwierzyna drobna jako element bioróżnorodności środowiska przyrodniczego*, Włocławek, 200–208.
- PIÓRKOWSKA M. 1996. *Relation between the body weight of arctic foxes and physical parameters of their pelts*. Apel. Sci. Rep., Prog. Animal Sci., 167–174.
- PIÓRKOWSKA M. 1998. *Charakterystyka parametrów fizycznych skór surowych i wyprawionych. Aktualne badania w hodowli zwierząt futerkowych*. Sympozjum naukowe. Kazimierz Dolny, 139–140.
- PIÓRKOWSKA M. 2008. *Ocena jakości okrywy włosowej lisów pastelowych utrzymywanych w Zakładzie Doświadczalnym IZ-PIB Chorzelów*. Roczn. Nauk. PTZ, 3(4): 271–277.
- Polski Związek Łowiecki, <http://www.pzlow.pl>, access: 1.07.2010.
- PRZYSIECKI P., NOWICKI S., PAWLAK F., NAWROCKI Z., STANISŁAWSKI D. 2004. *Wpływ niektórych zabiegów zootechnicznych na użytkowość produkcyjną lisów pospolitych płomienistych*. Zesz. Nauk. Prz. Hod., 72(6): 111–117.
- Wzorzec Oceny Lisów Pospolitych*. 1998. Centralna Stacja Hodowli Zwierząt, Warszawa.