PRELIMINARY ANALYSIS OF BIOMETRICS OF SIBERIAN HUSKY DOGS

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Abstract. Siberian Husky population lacks scientific studies regarding the conformation within sex and age groups. The aim of this study was to analyse some breed biometrics important in terms of sled-dog abilities. The study included 13 body measurements and, based on these, 7 calculated conformation indices. The animals were divided into three age groups, I: 10–12 months, II: 24–36 months and III: 4–8 years of age. The analysis of the results indicated a significant diversity of dogs with regard to sex and age within the study group. In group I, females were heavier than males by 15.6%. Adult dogs (group III) had a slightly lower body weight than that preferred by most breeders (dogs 28 kg, bitches 23 kg). Eurysomia indx, which reflects the size of the animal, differed ($P \leq 0.05$) between sexes in groups I and II in favour of males. Highly significant ($P \leq 0.01$) differences were found in body length index, which was higher in bitches in group I by about 20 percentage points. Therefore, as for the body measurements, chest girth and the diagonal body length were of key importance. The analysis of the other measurements and indices also showed differences, which – although did not disqualify the study group from dog sledding competitions – could result in their worse starting position.

Key words: biometry, body measurements, body indices, pedigree dogs, Siberian Husky

INTRODUCTION

The domestication of dogs began at the earliest, when it comes to animals which accompanied a man through his life. This was to happen, depending on

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a source, about 10–15 thousand years ago. Owing to this process and progress related to the development and operation of society, the dogs began to play an increasingly important role in people's everyday lives. They served a number of functions, as from the Stone Age when they guarded our ancestors and herds, being watchdogs then. Over time, the quadrupeds began to help people hunt (which was of mutual benefit), and thus hounds 'were born' [Kuźniewicz and Kuźniewicz 2003, Charytonik 2011]. At the turn of the nineteenth and twentieth century, the dogs were no longer used only to guard homes and farmsteads. They took on a few new roles such as the role of a guide dog, a dog therapist or a livestock herder (e.g. cattle dogs or sheep dogs). They can be found working in the police, the army and water and mountain rescue forces. The quadrupeds inhabiting the far north, where there is a long-lived snow cover, played and still play (to a lesser extent) another vital part in human life – they work as beasts of burden [Kuźniewicz and Kuźniewicz 2003, Boryczko 2003, Tarułka 2010]. In Poland, draft dogs are more and more eagerly kept especially on farms as an offer for tourists. For example, in the region of Lubelskie and Podlaskie voivodships, where more and more tourist trails are created, it was one of the factors that caused a quadrupled increase in the population of the Siberian Husky breed in Poland in recent years [Panfiluk 2010, Nowotarska 2013, Pawłowska 2014].

The best-known draft dog breeds of the north are: Alaskan Malamute, Samoyed, Siberian Husky and Greenlandic dog. Spitz-typed dogs pulling sleds can be characterised by courage, endurance (temperatures reaching –45°C are still bearable for them) and great strength; that is why they can pull a load of up to 1000 kg. They can also be characterised by the heightened sense of smell; that is why they do not have any problems finding a human settlement or sniffing out game. They get their bearings perfectly well and memorise a route after having covered it once, which means they always know how to get home [Monkiewicz and Wajdzik 2003]. The Siberian Husky dogs are classified into Group 5 (spitz and primitive types), Section 1: Nordic sledge dogs. Siberian Huskies are sporting dogs especially due to their motor abilities and have long been used in dog sledding in harsh environmental conditions [Czarkowska 2001].

In the population of Siberian Husky dogs there is no scientific study on evaluation of conformation within sex and in relation to the age of the animals. Therefore, the aim of this study was to analyse the selected biometric features important in the performance of Siberian Huskies as sledding dogs.

MATERIAL AND METHODS

The study was conducted on a group of 36 Siberian Husky dogs (19 female and 17 male dogs) registered with the Polish Kennel Club [pattern 270]. All the

dogs participating in the experiment had taken part in dog sledding competitions and had competed in national and international dog shows.

The analysis of growth and development was to determine: body weight, zoometrical measurements and conformation indices in relation to sex (female and male dogs) and the age of the animals (group I: 10–12 months, group II: 24–36 months and group III: 4–8 years). The body weight was controlled in different age groups in increments of 0.5 kg.

The zoometrical measurements (13 measurements) were taken to the nearest 0.5 cm, including the following measurements:

1. HW – height at the withers (from the ground to the highest point of the withers);
2. SpL – spine length (from the line that connects the rear edges of the shoulder blades to the line that connects iliac tubers);
3. NL – neck length (from the occiput to the last cervical vertebra);
4. WG – wrist girth (at its thinnest point);
5. ChD – chest depth (from the top of the withers to the manubrium of the sternum);
6. ChG – chest girth (below the rear edges of the shoulder blades);
7. DBL – diagonal body length (from the humeral tuber to the ischial tuber);
8. HLB – height at the low back (from the ground to the highest point in the low back);
9. ChW – chest width (between shoulder tubers);
10. HG – head girth (at its widest point);
11. ML – muzzle length (from the nose truffle to the stop);
12. SkL – skull length (from the occiput to the stop);
13. SkW – skull width (between the most salient points of temporal bones).

Next, these measurements were used to calculate the following 7 conformation indices (%):

1. DI – depth index (chest depth / height at the withers × 100%);
2. OI – overbuild index (height at the low back / height at the withers × 100%);
3. BI – boniness index (wrist girth / height at the withers × 100%);
4. BLI – body length index (diagonal body length / height at the withers × 100%);
5. MI – massiveness index (chest girth / height at the withers × 100%);
6. EI – eurysomia index (chest girth/ diagonal body length × 100%);
7. HSI – head size index (head width / height at the withers × 100%).

Furthermore, in order to determine the proportion of head conformation, the length of the muzzle to the length of the skull ratio was calculated. On the basis of the measurements taken and conformation indices, a physical build characteristics of individuals was made.

The significance of differences between the average characteristics was verified by the two-way analysis of variance in relation to the age and sex [Stat 9.0].

RESULTS AND DISCUSSION

Working spitz-type dogs, and the Siberian Husky breed is undoubtedly one of them, can be characterised by courage, endurance and great strength which is directly related to their physique. The specimens analysed in this study are breeding animals that have won awards in dog shows. Photo 1 shows LINO, the dog from the Two Crowns Kennel, that has won many awards and prizes in national and international dog shows.

Phot. 1. The LINO dog from breeding Two Crowns, Sławacinek Stary near Biała Podlaska, owner Edyta Sweklej (photo E. Sweklej)

Fot. 1. Pies LINO z hodowli Dwie Korony, Sławacinek Stary k. Białej Podlaskiej, właściciel Edyta Sweklej (fot. E. Sweklej)

The characteristics of conformation of dogs bred in Poland is based mainly on foreign purebred standards. There are no national studies of comprehensive data on the Siberian Husky breed biometrics.

The animals that the study was conducted on were divided into three age groups: group I: 10–12 months old, group II: 24–36 months old, group III: 4–8 years old. The youngest analysed female and male dogs received 78 and 54% of body weight compared to the adult dogs from the third group. The mean body weight (Fig. 1) of females within group I amounted to 16.0 kg and was significantly higher ($P \leq 0.05$) than in dogs by about 15.6%. This is the value corresponding to the Siberian Husky purebred standard for this age, which gives the range of 16 to 18 kg [Jakubiel 1995].

Breeders often point to a long period of psychosomatic maturation of this breed and earlier maturity in bitches than in dogs. The age between 1.5 and 2.5 years is considered to be full maturity. At this age, the weight of the animals is vital and it should amount to, according to the American standard for this breed,
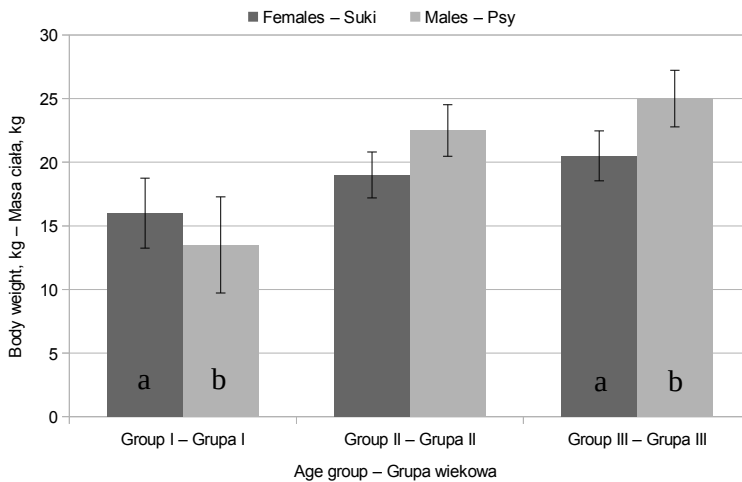
Fig. 1. Comparison of body weight in females and males age groups in the breed Siberian Husky (a, b – differences significant at P ≤ 0.05)

Rys. 1. Porównanie masy ciała w grupach wiekowych suk i psów rasy Syberian husky (a, b – różnice istotne przy P ≤ 0,05)

about 20–21 kg [Horsey 2009]. On the other hand, Gehring [2011] claims the weight of the Nordic Siberian Huskies should be from 15.5 kg to 23.0 kg for bitches and from 20.5 kg to 28.0 kg for dogs respectively. The bitches from the study obtain a lower average body weight by approximately 3.5 kg compared to the dogs (22.5 kg). Similar trends were found in group III, where the average body weight was significantly (P ≤ 0.05) higher in dogs (25.0 kg) compared to bitches, and the difference amounted to 18%. The purebred standard claims the final body weight of an adult dog should be 26–27 kg [Jakubiel 1995, Horsey 2009, Gehring 2011]. The research conducted confirms slower growth in dogs compared to bitches and proves that the differences between the analysed individuals within the same sex level out with age. Within the oldest group, the variation coefficient among the bitches amounted to 9.6 and 9.9% among the dogs. According to Czarkowska [2002, 2010] and Boryczko [2003], the balance should be struck between the body weight and the conformation of the individual. The dog should obtain the normal body weight at a certain age and this weight predisposes it to participate in competitions and constitutes its subsequent value.

Zoometrical measurements are used, inter alia, to compare the conformation of the animals within the breed, the age group and sex. The description of the conformation of the individual that represents the population is made based on these measurements. Furthermore, they are an indicator of the relative development of the individual. In terms of conformation features, the Siberian Husky bitches did

not differ from the purebred standard. The most significant differences between the sexes in all groups included the following: the width of the chest, the circumference of the chest and the height at the withers (Figs. 2, 3, 4). Up to 36 months old dogs had a significantly ($P \leq 0.01$) wider chest (by approximately 16 cm and 9 cm) and the circumference of the chest (by approximately 13 cm and 10 cm) which indicated their far greater solidity. Levelling out the differences in the circumference of the chest between the two sexes and relatively high differentiation within the group of females were observed in the group of the oldest individuals. It should be borne in mind that farmers prefer dogs, especially among male individuals, higher at the withers and the low back and the ones with a wider chest as more massive and stronger to pull sleds. Bigger individuals are more likely to be predisposed to take part in dog sledding competitions (e.g. Alaskan Malamute breed) [Kobryńczuk and Borkowski 1999].
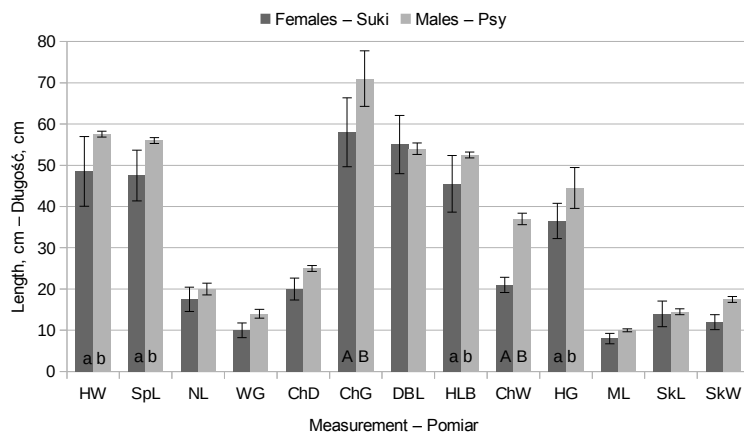

Fig. 2. Comparison of body measurements at age 10–12 months in Siberian Husky dogs (A, B – differences significant at $P \leq 0.01$; a, b – differences significant at $P \leq 0.05$)

Rys. 2. Porównanie pomiarów zoometrycznych w wieku 10–12 miesięcy u rasy Syberian husky (A, B – różnice istotne przy $P \leq 0{,}01$; a, b – różnice istotne przy $P \leq 0{,}01$)

The average height at the withers in group I was 48.5 cm with the height at the low back of 45.50 cm. The height at the withers set for the breed (purebred model No 270) within females is about 51–55 cm and in the study group of the animals aged 4–8 years it was similar and amounted to 54 cm. The female specimens could be characterized by a discordant physique which affects the way they move. The imbalance between the length of the spine and the height at the withers in bitches was observed. The length of the spine should slightly exceed the height at the
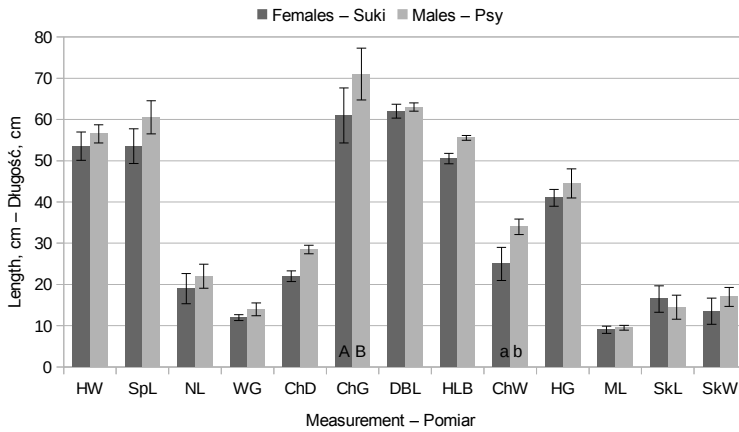
Fig. 3. Comparison of zoometrical measurements zoometrical at age 24–36 months in Siberian Husky dogs (explanations: see Fig. 2)

Rys. 3. Porównanie pomiarów zoometrycznych w wieku 24–36 miesięcy u rasy Syberian husky (objaśnienia jak na rys. 2)
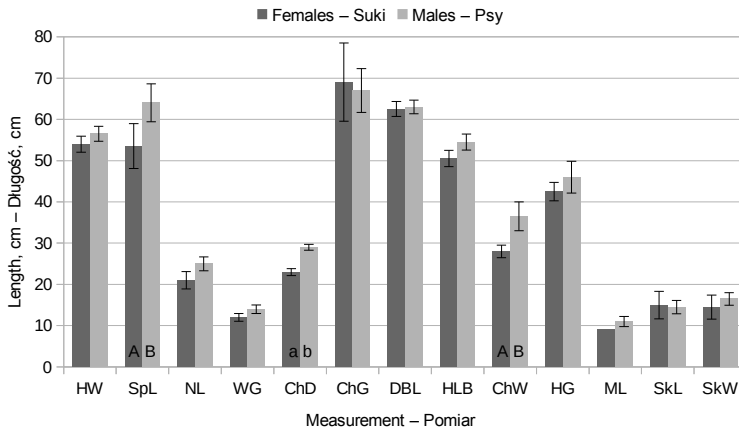

Fig. 4. Comparison of zoometrical measurements zoometrical at age 4–8 years in Siberian Husky dogs (explanations: see Fig. 2)

Rys. 4. Porównanie pomiarów zoometrycznych w wieku 4–8 lat u rasy Syberian husky (objaśnienia jak na rys. 2)
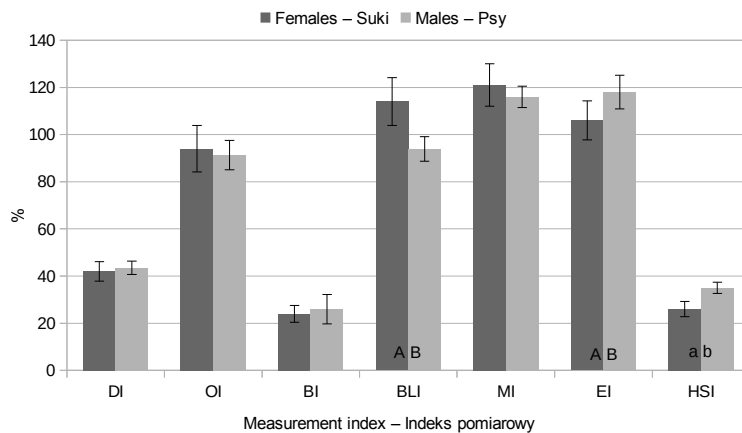
Fig. 5. Comparison of measurment indices at age of 10–12 months in Siberian Husky dogs (A, B – differences significant at P ≤ 0.01; a, b – differences significant at P ≤ 0.05)

Rys. 5. Porównanie indeksów pomiarowych w wieku 10–12 miesięcy u rasy Syberian husky (A, B – różnice istotne przy P ≤ 0,01; a, b – różnice istotne przy P ≤ 0,05)
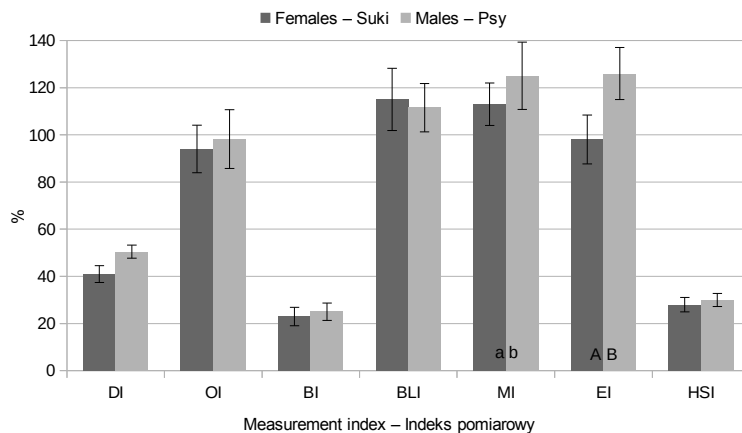

Fig. 6. Comparison of measurment indices at age of 24–36 months in Siberian Husky dogs (explanations: see Fig. 5)

Rys. 6. Porównanie indeksów pomiarowych w wieku 24–36 miesięcy u rasy Syberian husky (objaśnienia jak na rys. 5)

withers, which was found in dogs. In contrast, females were shorter and lower in different age periods. The dogs from groups I and III compared to the bitches had a significantly longer ridge by 13.0 and 10.5 cm respectively. At the same time, a high variability of this characteristic was observed especially among the bitches (17.36% in group I and 10.26% in group III). The dogs, however, were uniform (Figs. 2 and 4). Purebred standard sets the height at the withers between 53.5 cm and 60 cm for dogs and the one for bitches is slightly lower and ranges from 50.5 cm to 56.0 cm [VHD 2000]. The study animals aged 24–36 months and 4–8 years were higher at the withers, thus exceeding 60 cm. The greatest variability was found in the oldest group of bitches and regarded the length of spine (10.16%) and the circumference of the chest (13.75%). As for the other measurements in the group regarding the sexes they were quite uniform and the variation coefficient did not exceed 10%.
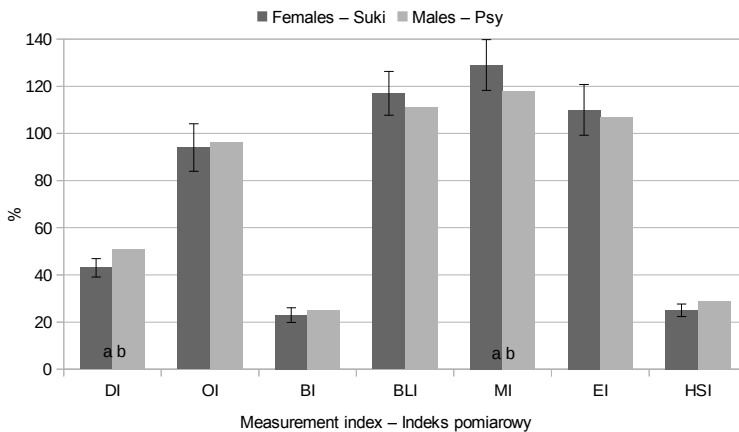

Fig. 7. Comparison of measurment indices at age of 4–8 years in Siberian Husky dogs (explanations: see Fig. 5)

Rys. 7. Porównanie indeksów pomiarowych w wieku 4–8 lat u rasy Syberian husky (objaśnienia jak na rys. 5)

The results of zoometrical measurements made it possible to determine the seven conformation indices that were diverse in terms of sex. Highly significant (P ≤ 0.01) differences were found in the body length index which was higher in bitches in group I by approximately 20 percentage points (Fig. 5). This result was affected by the lower height at the withers in bitches. As the individuals matured (group II and III), the body length index became uniform, regardless of sex. The dogs, as they matured, differed significantly (P ≤ 0.05) with regard to the massiveness index (group II). The difference amounted to 10% and resulted from a

significantly wider circumference of the chest in dogs in group II. But then again, in group III the bitches had a significantly (P ≤ 0.05) greater massiveness index by about 8% (Fig. 6) due to an increase of the circumference of the chest at a lower height at the withers. As for the index of eurysomia, which describes the relation between the circumference of the chest and the diagonal body length, significant differences (P ≤ 0.01) were found in groups I and II in favour of dogs. This index was the lowest (98%) in bitches aged 24–36 months. It could be related to the completion of the full maturation of a young body and the formation of proper physique. It was observed that the bitches over the age of 2 years stopped growing in terms of the height at the withers, and their bodies were more compact than dogs'. Levelling out the proportions of the bodies (the index of eurysomia and the body length index) of the animals occurred in the oldest group (Fig. 7). The head size index indicates the appearance and the profile of the head which is one of the characteristics of the Siberian Husky breed. No significant impact of sexual dimorphism on this index was observed. The purebred standard does not explicitly define the ratio of viscerocranium to cerebral cranium, but most breeders believe that for bitches it should be 1:1 [Jakubiel 1995, Horsey 2009]. In this study, the measurements for males and females did not exceed the required standards of the breed and amounted to 1:0.6 in bitches and to 1:1.3 in dogs.

CONCLUSIONS

The developed purebred Siberian Husky standard does not contain the accurate biometric characteristics of the animals in the collated data. In this study, the results regarding the biometrics indicate relatively high diversity of dogs from different breedings, depending on the age and sex, which could valuably supplement the data regarding the purebred standard. The animals included in the study had a slightly lower body weight than the one which is preferred by most farmers (i.e. 28 kg for dogs and 23 kg for bitches). Among the zoometrical measurements, which are of key importance as far as the Siberian Husky dogs' work in harness is concerned, one should pay attention to the width of the chest, the circumference of the chest and the height at the withers. The studies have confirmed the differences in these measurements in favour of dogs. These measurements have also affected the index of eurysomia and the body length index which determine the strength and endurance of the dog, the characteristics shaped during sports training.

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WSTĘPNA ANALIZA BIOMETRII PSÓW RASY SYBERIAN HUSKY

Streszczenie. W populacji rasy Syberian husky brak jest naukowych opracowań dotyczących oceny pokroju w obrębie płci i z uwzględnieniem wieku zwierząt. Dlatego celem pracy była analiza wybranych cech biometrycznych ważnych u rasy Syberian husky w pracy zaprzęgowej. W badaniu pokroju uwzględnionych zostało 13 pomiarów zoometrycznych i na ich podstawie wyznaczono 7 indeksów pokrojowych. Zwierzęta zostały podzielone na trzy grupy wiekowe I: 10–12 miesięcy, II: 24–36 miesięcy, III: 4–8 lat. Analiza wyników wskazała na dość duże zróżnicowanie psów pod względem płci oraz wieku w obrębie grupy badawczej. W grupie I suki były cięższe od swych rówieśników o 15,6%. Dorosłe zwierzęta (grupa III) uzyskały nieco niższą masę ciała jaka jest preferowana przez większość hodowców (psy 28 kg, suki 23 kg). Indeks eurysomii określający kaliber zwierzęcia w obrębie płci różnicował (P ≤ 0,05) grupę I i II na korzyść psów. Wysoko istotne (P ≤ 0,01) różnice stwierdzono w przypadku indeksu długości tułowia, który wyższy był u suk w grupie I o ok. 20 punktów procentowych. Dlatego w przypadku pomiarów zoometrycznych istotny wpływ miały obwód klatki piersiowej i skośna długość tułowia. Analiza pozostałych pomiarów i indeksów wykazała również różnice, które jednak nie dyskwalifikowały badanej grupy z udziału w zawodach psich zaprzęgów, mogły jedynie wpływać na ich słabsze wyniki startowe.

Słowa kluczowe: biometria, pomiary zoometryczne, indeksy pokrojowe, rasa psów, Syberian husky