

## **CONFORMATION ASSESSMENT OF CHAROLAISE COWS AND CROSSBREDS WITH VARIOUS PROPORTIONS OF GENES OF THIS BREED**

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**Abstract.** The research material consisted of 101 primiparous cows born from Charolaise sires. Cows were divided into four genotype groups: 1) pure-bred Charolaise, 2) crossbreds with 75% Charolaise and 25% Black-and-White, 3) crossbreds with 50% Charolaise and 50% Black-and-White, 4) crossbreds with 50% Charolaise and 50% Simmental. An analysis of the body weight of primiparous cows and calves at weaning was performed. The measurements of the height at withers, hip height and chest girth were taken and the assessment of conformation, size and production traits was carried out. The crossbred cows obtained results similar to or somewhat worse than those for the pure-bred Charolaise cows. The obtained results indicate that cows crossbred with Black-and-White breed are a very good material for the production of beef calves with the fattening traits similar to those of the beef breed used for absorptive crossing or the crossbred cows of pure beef breeds.

**Keywords:** assessment of conformation, beef crossbreds, Black-and-White, Charolaise, Simmental

### **INTRODUCTION**

The number of beef breeds and their stock have increased in the recent years. It was a consequence of an increased interest in the breeding of beef cattle due to the low costs, low labour intensity and no need for large investments [Piasecki et al. 2000].

Under Polish conditions, commercial crossing should be used on as large scale as possible parallel to the use of female crossbreds for reproduction as a part of absorptive crossing with beef breeds. The use of these methods is the means of relatively fast increase in beef cattle stock in Poland and is less expensive than importing pure-bred animals at the same time. If the crossing is to produce expected effects, it should be preceded with a detailed analysis of the production capabilities of the crossbreds [Miciński et al. 1996].

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The aim of the study was the assessment of the conformation of Charolaise cows and crossbreds with various proportions of genes of this breed.

## MATERIAL AND METHODS

The study was conducted on a farm located in West Pomerania, on which cattle was kept under semi-intensive system. In summer, cattle remained on a pasture 24 hours a day, and at night and under unfavourable atmospheric conditions, they utilized permanent enclosures next to the buildings. Calves up to 2 months of age were fed concentrate. Cows received green fodder and additionally barley straw. In winter, calves, juveniles up to 1 year of age and cows after calving received grass silage and, in addition, (only calves) mixture of cereals: barley, oat and triticale. Cows were covered naturally or artificially inseminated. Bulls were put to the cows from the beginning of the grazing period to the end of August. Artificial insemination was performed in winter and early spring. The peak of calving season occurred from mid-February to March. Calves after birth were closed with their dam in a calving pen for one week so that they get used to her and drink colostrum *ad libitum*. Then they were set free. They stayed with their dams up to approx. 7 months of age.

The study involved 101 primiparous cows born from Charolaise sires divided into four groups:

- pure-bred Charolaise (35 cows) – CHL,
- 75% Charolaise + 25% Black-and-White (8 cows) – 75% CHL,
- 50% Charolaise + 50% Black-and-White x HF (45 cows) – 50% CHL,
- 50% Charolaise + 50% Simmental (13 cows) – CHL x SIM.

Cows calved from March to April 2003 and during this period they were kept in a stanchion barn and managed under extensive system. An analysis of the body weight of primiparous cows and calves at weaning was performed. The measurements of the height at withers, hip height and chest girth were taken and the assessment of conformation, size and production traits was carried out. The assessment was performed by a qualified selector. The results were analysed statistically with one-way analysis of variance using Statistica®PL software. In the evaluation of the meat performance of cows, the significance of the differences between groups was calculated using Duncan's test. The comparison of the conformation scores was made with the non-parametric Kruskal-Wallis test.

## RESULTS AND DISCUSSION

The mean body weight at first calving was similar in all groups and ranged from 590 kg in crossbreds with 75% of Charolaise genes to 612 kg in pure-bred cows; however, in a group of cows with 75% of Charolaise genes the body weight was more balanced (Table 1). Charolaise cows in the study by Wójcik et al. [2008] were characterized by similar body weight at first calving amounting to 614.8 kg, whereas those in the study by Pogorzelska et al. [1998] by a higher one (655 kg). Szarek et al. [2008] report that pure-bred Charolaise cows at first calving weighed, on average, 570 kg, whereas crossbred cows with

various proportion of Charolaise genes weighed, on average, 561.3 kg. The differences in the body weight of cows at first calving result from earlier or later covering of cows in different herds.

Table 1. Beef performance of primiparous cows

Tabela 1. Użytkowość mięsna krów pierwiastek

Specification Wyszczególnienie	CHL		75% CHL		50% CHL		CHL x SIM	
	mean średnia	sd	mean średnia	sd	mean średnia	sd	mean średnia	sd
Body weight of cows at calving, kg Masa ciała krów po wycieleniu, kg	612.0	35.40	589.9	19.46	593.5	32.08	604.4	26.49
Body weight of calves at weaning, kg Masa ciała cieląt po odsadzeniu, kg	239.7 <sup>A</sup>	5.70	223.9 <sup>ABC</sup>	20.15	238.4 <sup>B</sup>	4.48	237.8 <sup>C</sup>	3.61
Height at sacrum, cm Wysokość w krzyżu, cm	136.5	2.43	135.5 <sup>a</sup>	1.19	135.4 <sup>b</sup>	2.31	137.5 <sup>ab</sup>	2.22
Height at withers, cm Wysokość w kłębie, cm	133.2	2.56	132.4 <sup>a</sup>	1.51	131.7 <sup>Aa</sup>	2.80	134.4 <sup>A</sup>	2.14
Chest circumference, cm Obwód klatki piersiowej, cm	198.9 <sup>Aab</sup>	3.63	193.9 <sup>A</sup>	3.23	195.6 <sup>a</sup>	4.40	195.2 <sup>b</sup>	3.67

A – means marked with the same capital letters are significantly different,  $P \leq 0.01$ .

A – takimi samymi dużymi literami oznaczono różnice statystyczne istotne przy  $P \leq 0,01$ .

a – means marked with the same small letters are significantly different,  $P \leq 0.05$ .

a – takimi samymi małymi literami oznaczono różnice statystyczne istotne przy  $P \leq 0,05$ .

Calves from all genotype groups attained lower body weights at weaning than the mean body weight of weaned calves in the country (256.3 kg) or the West Pomerania Province (258.5 kg) [PZHiPBM 2010]. Calves born from dams with 75% of Charolaise genes obtained significantly ( $P \leq 0.01$ ) lower body weight at weaning compared to the calves from the remaining genotype groups, characterized by similar body weights. The likely reason for the lower body weight of calves from this group was a lower body weight of their dams (amounting to 589.9 kg) compared to cows from the remaining groups. Przysucha et al. [2002] found that the body weight of a cow had a highly significant effect on the body weight of calves at weaning. Calves born from heavier dams were characterized by the highest daily body weight gains. Jakubec et al. [2003] report that the highest body weights at weaning were attained by Charolaise and Simmental calves from among the 8 most popular beef cattle breeds in the Czech Republic. In the study by Przysucha and Grodzki [2007], the pure-bred Charolaise calves weighed at weaning 254 kg on average and were 21 kg heavier than the crossbred calves with the Charolais blood (233 kg).

Table 2. Conformation point score of primiparous cows  
Tabela 2. Ocena punktowa budowy krów pierwiastek

Specification Wyszczególnienie	CHL		75% CHL		50% CHL		CHL x SIM	
	mean średnia	sd	mean średnia	sd	mean średnia	sd	mean średnia	sd
General appearance, pts Wygląd ogólny, pkt	13	0.49	13	0.53	12	0.64	13	0.51
Head, neck, pts Głowa, szyja, pkt	4	0.51	3	0.46	3	0.39	3	0.38
Front, pts Przód, pkt	12	0.53	12	0.64	12	0.67	12	0.52
Barrel, pts Tułów, pkt	13	0.70	13	0.64	12	0.76	13	0.86
Rump, pts Zad, pkt	17	0.70	16	0.76	16	0.95	17	0.87
Legs and gait, pts Nogi i chód, pkt	8	0.45	8	0.35	7	0.55	8	0.44
Performance marks, pts Oznaki użytkowe, pkt	16	1.29	16	0.74	15	0.77	16	0.86
Overall score, pts Suma, pkt	82 <sup>A</sup>	2.83	80	3.02	78 <sup>AB</sup>	3.66	82 <sup>B</sup>	3.37

A – means marked with the same capital letters are significantly different,  $P \leq 0.01$ .

A – takimi samymi dużymi literami oznaczono różnice statystyczne istotne przy  $P \leq 0,01$ .

The CHLxSIM cows were characterized by the highest hip height and height at withers, whereas pure-bred CHL cows by the highest chest girth. In the study by Goszczyński et al. [1994], the highest values both for the mean hip height and mean chest girth were obtained for the group of pure-bred Charolaise cows (138 cm and 222 cm, respectively). Also Krzywda et al. [2002], in the studied population of pure-bred Charolaise cows after first calving, report higher mean values for the hip height (144.7 cm), height at withers (139 cm) and chest girth (204.9 cm). On the other hand, Wójcik et al. [2008] found that the heights at withers were similar in the analysed populations of the Simmental and Charolaise cows, whereas pure-bred Charolaise cows were characterized by significantly ( $P \leq 0.01$ ) higher chest girth. The lowest mean conformation scores were obtained by the cows with 50% of Charolaise genes, which were given one score less for the general appearance, barrel, rump, legs and gait as well as performance marks compared to the mean scores of the cows from remaining groups (Table 2). The highest total conformation scores were obtained by pure-bred Charolaise cows (83 scores). It was significantly ( $P \leq 0.01$ ) higher than the scores of cows with 50% of Charolaise genes (77 scores). The CHL x SIM cows achieved 82 scores in total, and 75% CHL achieved 81 scores. These results are reflected in the study by Drennan and Fallon [1998], who also gave the highest scores to pure-bred individuals during the conformation assessment of CHL cows and crossbred individuals with various proportions of genes of this breed; however, these differences were not significant.

## CONCLUSIONS

Crossbred cows obtained similar or somewhat worse results than the pure-bred Charolaise cows. The obtained results indicate that the cows crossbred with the Black-and-White breed are a very good material for the production of beef calves with the fattening traits similar to those of the beef breed used for absorptive crossing or the crossbred cows of pure beef breeds.

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### OCENA BUDOWY KRÓW RASY CHAROLAISE ORAZ MIESZAŃCÓW MIĘDZYRASOWYCH O RÓŻNYM UDZIALE GENÓW TEJ RASY

**Streszczenie.** Materiał doświadczalny stanowiło 101 krów pierwiastek pochodzących po ojcach rasy charolaise. Krowy podzielono na 4 grupy genotypowe: 1) czystorasowe charolaise, 2) mieszańce 75% charolaise i 25% cb, 3) mieszańce 50% charolaise i 50% cb x hf, 4) mieszańce 50% charolaise i 50% simental. Przeprowadzono analizę masy ciała krów po pierwszym ocieleniu oraz cieląt po ich odsadzeniu, wykonano pomiary wysokości w kłębie, krzyżu i obwodu klatki piersiowej oraz dokonano oceny budowy, kalibru oraz cech użytkowości. Krowy mieszańce uzyskały zbliżone lub nieco gorsze wyniki od krów czystorasowych charolaise. Uzyskane wyniki wskazują, że krowy mieszańce z rasą czarno-białą są bardzo dobrym materiałem do produkcji cieląt mięsnych o podobnych cechach opasowych jak rasa mięsna użyta do krzyżowania wypierającego lub krowy mieszańce czystych ras mięsnych..

**Słowa kluczowe:** bydło czarno-białe, charolaise, mieszańce mięsne, ocena budowy, simental

Accepted for print – Zaakceptowano do druku: 10.05.2011