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## THE COMPARISON OF USEFULNESS RESULTS OF THE PRIMIPAROUS AND MULTIPAROUS CATTLE OF THE LIMOUSINE BREED

## PORÓWNANIE WYNIKÓW UŻYTKOWOŚCI PIERWIASTEK I WIELORÓDEK BYDŁA RASY LIMOUSINE

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**Streszczenie.** Badania przeprowadzono w stadzie bydła rasy limousine, utrzymywanego w czystości rasy, w województwie kujawsko-pomorskim. Badaniami objęto łącznie 107 osobników – 27 pierwiaszek i 80 wieloródek. Dane dotyczące krów uzyskano z dokumentacji hodowlanej prowadzonej w gospodarstwie, zgodnie z wytycznymi Polskiego Związku Hodowców i Producentów Bydła Mięsnego z lat 2013–2014. Celem pracy było porównanie wyników użytkowości pierwiaszek i wieloródek bydła rasy limousine. W pracy uwzględniono wybrane pomiary zoometryczne oraz wskaźniki płodności i mleczości krów, jak również ocenę wyników odchovu cieląt. Analiza wykazała istotne różnice ( $P \leq 0,01$ ,  $P \leq 0,05$ ) w przypadku umięśnienia, obwodu klatki piersiowej i wysokości w krzyżu. Większe wartości wymienionych parametrów uzyskały pierwiaszki. Stwierdzono wyższą produktywność mleka u krów pierwiaszek, czego wynikiem były lepsze przyrosty ich cieląt. Wiek pierwszego wycielenia (WPW) w porównywanych grupach zwierząt był zbliżony. Cielęta po wieloródkach charakteryzowały się większą masą urodzeniową ( $P \leq 0,01$ ) niż cielęta po pierwiaszkach.

**Key words:** limousine cattle, primiparous, multiparous, age at first calving, muscularity.

**Słowa kluczowe:** bydło rasy limousine, pierwiaszki, wieloródky, wiek pierwszego wycielenia, umięśnienie.

## INTRODUCTION

Limousine breed is a breed of large-custard cattle and has enjoyed great popularity among Polish breeders in recent years (Wróblewska et al. 2007). It belongs to the breeds used intensively and extensively. Animals of this breed are characterized by early adolescence, good fertility, longevity and easy leaks. In addition, the cattle have a well-developed maternal instinct and vivacious temperament (Wróblewska et al 2007; Grodzki 2008; Chów bydła mięsnego 2009). When choosing a breed of cattle for cattle, a very important aspect is the analysis of the usability. It allows you to get a lot of information about individual breeds and their fattening predispositions in given breeding system (Szewczyk 2005). According to Domaradzki et al. (2016) consumers are now expecting meat of high nutritional value, safe as well as high sensory value, meeting the assumptions of the so- Food convenient.

## MATERIAL AND METHODS

The study was carried out on a farm located in the Kujawsko-Pomorskie province keeping the limousine cattle. There were 315 purebred cattle in the breed. The study included a total of 107 individuals: 27 primiparous and 80 multiparous. Cattle data were obtained from the farm documentation maintained on the farm, in accordance with the guidelines of the Polish Federation of Breeders and Producers of Cattle (PZHiPBM) for the years 2013–2014. The following parameters of primiparous cows and multiparous cows were analyzed: mass of animals, cow shape, muscularity, height in the cross, chest circumference, first calving (WPW days), intercourse (OMW days), milking. In addition, body mass index and calf gain were estimated: birth weight [kg], standardized weight in 210 days [kg], daily gains in 210 days [g]. The data collected was statistically calculated using the Statistica®12 PL program. The significance of the differences was calculated by one-way analysis of variance, using Duncan's multiple-stretch test.

## RESULTS AND DISCUSSION

Table 1 shows body weight results of multiparous cows and selected zoometric parameters of the primiparous limousine cattle. According to the results of the tests, the average body weight of the multiparous was 559.98 kg. According to other authors, body weight of over 80% of the population of the limousine population was 450–650 kg (Stanek 2006a). In their own study (Table 1), the animal's habit was different – the primiparous was 25.62 points, and the cows' multiply – 23.19 points. Considering the results obtained by Wójcik et al. (2008) analyzing in their work the parameters of cows of different breeds, it was found that the limousine cows gained the most points for the breed (15.1). Analyses of limousine musculature (Table 1) showed significant differences ( $P \leq 0.05$ ) between the examined group of primiparous and multiparous. Primiparous had a greater ( $P \leq 0.05$ ) number of points for muscular strength (17.92) compared to polyps (14.65). Wójcik et al. (2008) scored 7.2 points for limousine muscles in their study. This was the highest average for the breed (red angus – 6.8, salers – 7.1, hereford – 6.8, simon – 6.8). Another feature described is the height in the cross (Table 1). In the own studies, the values ( $P \leq 0.01$ ) of the indicator in question were higher ( $P \leq 0.01$ ) in the case of the primiparous (134.23 cm) than in the case of 132.51 cm. In his research, Stanek (2006b) analyzing the height of the cross of primiparous Hereford and Limousine breeds, found that limousine values ranged from 115 to 140 cm, and hereford ranged from 113 to 142 cm. Analyzing the results of multi-cow cows in relation to altitude in the cross, they were from 129 to 138 cm. In the studies of Czerniawska-Piątkowska et al. (2014) limousine cows were characterized by higher mean crosses than cows of red angus (137.45 and 134.29 cm, respectively). Also, Wójcik et al. (2008) for the limousine received an average of 136.6 cm high in the cross. Another feature analyzed in our own study (Table 1) was the perimeter of the thorax. This parameter for primiparous was at the level of 194.23 cm and the multiparous was lower ( $P \leq 0.05$ ) and was 192.83 cm. Wójcik et al. (2008) achieved similar results, recording 192.7 cm in limousine cows. A comparable mean of 194.07 cm was obtained by Czerniawska-Piątkowska et al. (2012).

Table 1. Body weight and selected zoometric measurements of limousine primiparous and multiparous  
Tabela 1. Masa ciała oraz wybrane pomiary zoometryczne pierwiastek i wieloródek bydła mięsnego rasy limousine

Parameter Badane parametry	Primiparous Pierwiastki		Multiparous Wieloródki	
	$\bar{x}$	SD	$\bar{x}$	SD
Body weight Masa zwierząt [kg]	–	–	559.98	25.56
Conformation Pokrój krowy [pt]	25.62	1.04	23.19	4.47
Muscularity Umięśnienie [pt]	17.92 <sup>a</sup>	0.95	14.65 <sup>a</sup>	4.47
Height of lower back Wysokość w krzyżu [cm]	134.23 <sup>A</sup>	2.05	132.51 <sup>A</sup>	1.74
Chest girth Obwód klatki piersiowej [cm]	194.23 <sup>b</sup>	2.09	192.83 <sup>b</sup>	2.66

<sup>a, b</sup> the meanings marked in lines in different letters differ significantly  $P \leq 0.05$  – średnie oznaczone w wierszach małymi literami różnią się istotnie przy  $P \leq 0,05$ .

<sup>A</sup> the average marked in lines in different letters differs significantly  $P \leq 0.01$  – średnie oznaczone w wierszach dużą literą różnią się istotnie przy  $P \leq 0,01$ .

The age of first calving (WPW) of the primiparous (Table 2) was 952 days (31.3 months). The multiparous cows were shorter (30.6 months). Other results were obtained by Stanek (2006a). The first calving of cows in the tested herd was recorded between 23 and 26 months of age. This result was obtained by 42.3% of heifers. Another 20.4% calved in the age of 28 to 33 months, they were 20.4%. Extreme values, ie those that fell below 23 months, were only 5.7% and 10.5% above the third year of life. Well-heared heifers can be hatched at the age of 15 months. In this case, the calving takes place at the age of 2, which allows to maintain the proper seeding season with good use of pasture (Przysucha and Grodzki 2007a, b). The interplanar period in the multiparous of the stock evaluated (Table 2) was 572 days (18.6 months). Czerniawska-Piątkowska et al. (2014) report that the intercourse period of the limousine cows in the herd tested lasted an average of 493.29 days. Przysucha et al. (2002) by analyzing fertility rates of red angus and hereford, the mean OMW was 397.9 days for red angus and 392.6 days for hereford. Dairy cows in the analyzed herd: primiparous and multiparous (Table 2) were 1951.41 kg and 1915.26 kg, respectively. Other authors obtained 1512.4 kg for the primiparous and 1637.8 kg for the multiparous. Differences were significant ( $P \leq 0.01$ ) (Litwińczuk and Shulc 2005). As Choroszy et al. (2011) the average milk yield of cows of limousine ranged from 1843.2 kg to 2069.2 kg. Of the breeds tested, the highest milk yield was given to charolais cows (from 1930 to 2186 kg).

In analyzing body mass index of calf of primiparous and multiparous weight gain in the limousine (Table 3), it was found that the weight of the calves from the primiparous was 29.85 kg and was lower ( $P \leq 0.01$ ) than the calves from the multiparous – 31.40 kg. Other authors in their work have proven that the order of calving affects the calf's birth weight. The limousine elements gave birth to purebred calves with a mean body weight of 31.37 kg. With

subsequent births, the tendency of body mass was observed (Wróblewska et al. 2007). As in the cited authors' analysis, the analysis has shown the highly significant influence of the order of incarnation on the mass of newborns. Litwińczuk and Szulc (2005) received different results. At the primiparous, this parameter was 32.1 kg and for multiparous was 31.4 kg.

Table 2. Selected fertility and milking indexes and limousine primiparous and multiparous  
Tabela 2. Wybrane wskaźniki płodności i mleczość pierwiastek oraz wieloródek bydła mięsnego rasy limousine

Parameter Badane parametry	Primiparous Pierwiastki		Multiparous Wieloródki	
	$\bar{x}$	SD	$\bar{x}$	SD
Age at first calving [days/months] Wiek pierwszego wycielenia [dni/mies.]	952/31.3	84.36	932/30.6	136.63
Calving interval [days/months] Okres międzywycieleniowy [dni/mies.]	–	–	567/18.6	159.59
Milk yield – Mleczość [kg]	1951.41	216.84	1915.26	149.49

Table 3. Body weight and calf-derived calves derived from limousine primiparous and multiparous  
Tabela 3. Wskaźniki masy ciała oraz przyrosty cieląt pochodzących od pierwiastek i wieloródek rasy limousine

Parameters Badane parametry	Primiparous Pierwiastki		Multiiparous Wieloródki	
	$\bar{x}$	SD	$\bar{x}$	SD
Birth weight of calves Masa urodzeniowa cieląt [kg]	29.85 <sup>A</sup>	0.66	31.40 <sup>A</sup>	1.88
Weaning weight in 210th day Masa standaryzowana w 210 dniu [kg]	239.44	24.11	231.95	35.22
Daily gain in 210th day Przyrosty w 210 dniu [g]	997.55	115.57	974.68	79.65

<sup>A</sup> the average marked in lines in different letters differs significantly  $P \leq 0.01$  – średnie oznaczone w wierszach dużą literą różnią się istotnie przy  $P \leq 0,01$ .

The result was 239.44 kg for the primiparous and 231.95 kg in the multiparous. Litwińczuk and Szulc (2005) report that primiparous limousine calves gained 218.9 kg and 233.8 kg multiparous ( $P \leq 0.01$ ).

The results showed that the increase in 210 days of life (Table 3) was at the following level: the calves from primiparous cows were growing at an average of 997.55 grams per day and 974.68 kg in the multiparous. In studies by Litwińczuk et al. (2005) analyzing calf growth at 210 days for limousine and hereford, the limousine primiparous yielded 889.6 g and 963.4 g multiparous ( $P \leq 0.01$ ). For Hereford, the following results were obtained: 759.9 g, 766.3 g.

## CONCLUSIONS

1. Comparing the results of zoometric measurements of primiparous cows and multiparous showed a more favorable effect on the muscular and chest circumference of the primiparous. Differences were significant ( $P \leq 0.05$ ).
2. A higher value of the height index in the cross at the primiparous has been shown. Differences were significant ( $P \leq 0.01$ ).
3. Age of first calving (WPW) in the groups of animals was similar and was 31.3 months in the primiparous and 30.6 months in the multiparous.
4. Higher milk production was found in the cows' primiparous, resulting in better growth of their calves.
5. The higher birth weight of calves in cows' multiparous was compared to the primiparous. Differences were significant ( $P \leq 0.01$ ).

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**Abstract.** The study was conducted in a herd of cattle kept in pure breed in the Kujawsko-Pomorskie province. The study included a total of 107 individuals: 27 primiparous and 80 multiparous. Cattle data were obtained from farm documentation maintained on the farm, in accordance with the guidelines of the Polish Association of Breeders and Producers of Cattle (PZHiPBM) for the years 2013–2014. The aim of the study was to compare the performance of primiparous and multiparous of limousine cattle. The work included selected zoometric measurements, fertility and dairy cows as well as calf rearing. Analysis showed significant differences ( $P \leq 0.01$ ,  $P \leq 0.05$ ) in the case of muscle, chest circumference and height of the cross. The higher values for the given parameters were obtained by the primiparous. It has been found that milk production is higher in primiparous cows, which results in better growth of calves. The age of first calving (WPW) in the groups of animals was similar. The calves after multiparous received a higher birth weight ( $P \leq 0.01$ ) compared with calves after the primiparous.