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COMPARISON OF MEAT PERFORMANCE OF FATTENING BULLS AND CULLED COWS OF MONTBELIARDE AND POLISH HOLSTEIN-FRIESIAN BREEDS AND THEIR INFLUENCE ON INCOME VALUE FROM THEIR SALE

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Abstract. The aim of the researches was to compare meat performance of fattening bulls and culled cows of Montbeliarde and Polish Holstein-Friesian breeds as well as to estimate their influence on income value. In the researches 97 bulls and 68 cows were taken under consideration. Data consisted of: breed, age, live weight, carcass weight and EUROP classification. For calculating income value of cows and fattening bulls market prices from 2010 year were used. Significant influence of the breed on live weight as well as carcass weight were reported. Cow and bulls of montbeliarde breed characterized by heavier live body weight, better dressing rate as well as much better results of EUROP classification. Therefore, average value of cow and bulls of montbeliarde breed was significantly higher if compared to Polish Holstein-Friesian.

Keywords: culled cows, fattening bulls, Montbeliarde breed, Polish Holstein-Friesian breed

INTRODUCTION

The main factor affecting the income from dairy cows are: cow's yield, herd size, milk price as well as production costs [Parzonko 2003, Mańko et al. 2005, Mańko 2005a, b; Księżak and Bojaszczuk 2007, Sass 2007, Ziętara 2007]. Nevertheless, milk sale isn't the only source of income from dairy enterprise. Additionally, for the dairy breeders, significant source of income comes from calves and culled cows sale.

Unstable situation on the milk market can affect economy of small and middle farms. To provide financial stability dairy farmers should diversify their sources of income. Often, in those farms, during downturn on milk market, breeders turn into beef (bulls fattening).

The most popular cattle breed in Poland is Polish Holstein-Friesian breed (PHF), which was produced by gens repression of our native Polish Black and White Lowland cows inseminated with pure Holstein-Friesian bulls. Incorporation of the gens of Holstein-Friesian breed to Polish dairy cow population, beside the improvement of cows' dairy

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performance, caused distraction of their beef traits, which were well established in our native cows. Despite the fact that Holstein-Friesian bull characterized by better growth ability than Black and With Lowland ones, price paid to producers was significantly lower because their poorer musculing [Pasierbski and Romer 1978, Reklewski et al. 1985, Ziemiński 1993, Guliński and Litwińczuk 2000].

Since it have been first imported in 1995, French Montbeliarde (MO) cattle become more and more popular among Polish breeders and producers [Gołębiewski 2010]. Montbeliarde cows are mainly use for dairy purposes, however also characterize by high both fattening and beef abilities [O.S. Montbeliarde 2010]. Calves, steers and culled cows of the breed can be valuable stock for beef industry [Mikšík et al. 1996, O.S. Montbeliarde 2010]. In comparison to Holstein-Friesian, Montbeliarde bulls characterized by higher daily gains, carcass capacity, as well as higher share of most valuable carcass parts [Golda et al. 1988, 1989].

MATERIALS AND METHODS

During study data that allowed to asses beef performance of fattening bulls and culled cows were gathered. Information of 97 bulls [13 MO and 86 PHF], at age of 18 months and 68 culled cows [20 MO and 48 PHF] were collected. Data consisted: tag identification number, breed, age, slaughtering category, live weight, carcass weight and EUROP classification. Statistical analysis involved all beef traits as well as economic indicators [PASW 2009].

For calculation of market values of culled cows and bulls market prices from first quarter of 2010 year published on Portal Hodowcy [2010], were used. Individual market value of each bull and culled cow was calculated in relation to their live weight, carcass weight and EUROP classification.

Statistical analysis of studied traits was conducted by ANOVA: $Y_{ij} = \mu + A_i + e_{ij}$; where: Y_{ij} – studied trait, μ – statistic mean, A_i – breed (1MO; 2 – PHF), e_{ij} – random error.

Analysis of muscle assessment distribution involved Chi^2 test.

RESULTS AND DISCUSSION

During the study compared parameters of EUROP classification, live weight, carcass weight as well as carcass yield MO and PHF fattened bulls and culled cows.

Reported, significant influence of breed on both live and carcass weight of studied animals (Table 1). Average MO cows characterized by 55.31 kg heavier body than PHF cows ($P \leq 0.05$). Moreover, lower live weight of PHF cows determinated their carcass weight, which was lower than in MO cows ($P \leq 0.05$). The difference between carcass weight of cows of both breed was 28.1 kg. However, there weren't any significant differences between both breeds of cows in dressing percentage.

There was also observed significant influence of breed on live and carcass weight of fattened bulls (Table 1). Live weight of MO was by 71.6 kg higher than PHF ones. Chla-

dek et al. [2005], comparing beef performance fattened bull of MO and Czech Pied, reported that bulls of French breed characterized by better daily gain than Czech Pied. However, Mikšík et al. [1996], Šubrt et al. [1997] and Šubrt and Mikšík [2002], stated, that there wasn't significant differences between daily gain of MO and Czech Pied slaughtered at the same age. MO bulls also characterized by superior carcass yield if compared to PHF (by 2.9 percentage point). Mikšík et al. [1996], reported that there wasn't any differences between dressing yield of MO and Czech Pied bulls. Also Warzecha et al. [1995], comparing beef performance of MO and Fleckhieh bulls didn't report any differences. Higher live weight as well as better carcass yield of MO bulls determinate their higher dressing percentage (by 55.67).

Table 1. Least Square Mean of live body weight, carcass weight and dressing percentage cows and bulls of both breeds

Tabela 1. Średnie najmniejszych kwadratów dla masy żywej, masy tuszy oraz wydajności rzeźnej krów i buhajów obu ras

Trait Cecha	Breed – Rasa					
	PHF			MO		
	N	LSM	Se	N	LSM	Se
Culled cows – Krowy						
Live weight, kg Masa żywa, kg	48	608.04a	12.58	20	663.35a	19.49
Carcass weight, kg Masa tuszy, kg	48	293.39a	7.38	20	321.49a	11.43
Dressing percentage, % Wydajność rzeźna, %	48	48.13	0.43	20	48.28	0.66
Fattened bulls – Buhaje						
Live weight, kg Masa żywa, kg	13	565.46A	16.14	84	636.62A	6.35
Carcass weight, kg Masa tuszy, kg	13	293.78A	9.99	84	349.45A	3.93
Dressing percentage, % Wydajność rzeźna, %	13	51.94A	0.48	84	54.85A	0.19

Significance at: P≤0.05; A P≤0.01.
Istotność: P≤0,05; A P≤0,01.

There was also significant differences in EUROP classification between culled cows of both breed (Table 2). Mo cows characterized by better carcass muscularity if compared to PHF. All evaluated cows were qualified to 3 EUROP classes: R, O and P and there weren't any cow in top 3 EUROP classes (S, E and U). In group of cows qualified to R class reported 10% of MO and non PHF. In O class classified the most of studied cows (over 57% PHF nad 80% MO). To the worst EUROP class P qualified over 42% of PHF cows and only 10% of MO.

There were any significant differences between studied cows in carcass fatness. The most Mo cows were qualified to 2 and 3 class [80%] and 87.51% of PGH cows qualified to first tree classes.

Table 2. EUROP classification of culled cows
Tabela 2. Klasyfikacja EUROP wybrakowanych krów

Trait Cecha	Breed – Rasa				Significance Istotność
	PHF		MO		
	N	%	N	%	
Classification by muscling Klasa umięśnienia					
R	0	0.00	2	10.00	
O	27	57.45	16	80.00	
P	20	42.55	2	10.00	P = 0.05
Total Razem	47	100.00	20	100.00	
Classification by fating Klasa otłuszczenia					
1	11	22.92	2	10.00	
2	14	29.17	7	35.00	
3	17	35.42	9	45.00	
4	4	8.33	2	10.00	P = 0.588
5	2	4.17	0	0.00	
Total Razem	48	100.00	20	100.00	

Significant differences between compared breeds was observed during EUROP classification of fattened bulls (Table 3). Similarly as cows, MO bulls characterized by better muscling than PHF. All analyzed bulls' carcasses were qualified to two classes R and O. Significantly ($P \leq 0.05$) more carcasses of MO than PHF bulls were qualified to R class (by 14.19 percentage point).

Authors also reported significant superior of MO bulls carcass fatness if compared to PHF ($P \leq 0.01$). All exanimated carcasses were qualified to first EUROP fat classes: 1,2 and 3. The most of MO carcasses were qualified to 2 class (92.31%), and rest of them characterized by minimal fat content (class 1). In report to PHF bulls carcasses only slightly above 1% of carcasses were qualified to 1 class, and over 30% of all were qualified to 3 class. According to Warzecha et al. [1995], carcass of Fleckvieh bulls characterized by better muscling and comparable to MO bulls fatness. However, Mo bulls characterized better both muscling and fatness than Czech Pied [Chladek et al. 2005]. Schreus et al. [2008], reported that some parameters of MO muscle fibers were comparable with those observed in beef breed.

Analyzed parameters of beef performance as: live and carcass weights, dressing percentage and EUROP classification were used to calculate market values of each culled cow and bull (Table 4). It was reported that market value of MO culled cows was by 238.86 PLN higher than PHF ($P \leq 0.05$). However, there weren't any significant differences between live weight unit price between both breeds. Greater differences were observed during analysis of similar economic parameters in bulls. Total income generated by MO bull, accounting its EUROP classification was by 526.76 PLN higher than PHF ($P \leq 0.01$). Average live weight unit price which producer revived for MO bulls was by 0.27 PLN higher than for PHF.

Table 3. EUROP classification of fattening bulls
Tabela 3. Klasyfikacja buhajów według EUROP

Trait Cecha	Breed – Rasa				Significance Istotność
	PHF		MO		
	N	%	N	%	
Classification by fatness Klasa umięśnienia					
O	83	98.81	11	84.62	P = 0.048
R	1	1.19	2	15.38	
Total Razem	84	100.00	13	100.00	
Classification by fatness Klasa otłuszczenia					
1	1	1.19	1	7.69	P = 0.004
2	54	64.29	12	92.31	
3	29	34.52	0	0.00	
Total	84	100.00	13	100.00	

Table 4. Least Square Means of income value and live weight unit price of culled cows and fattening bulls
Tabela 4. Średnie najmniejszych kwadratów dla przychodu całkowitego oraz ceny jednostkowej za żywiec wybrakowanych krów i buhajów

Trait Cecha	Breed – Rasa			
	PHF		MO	
	LSM	Se	LSM	Se
Culled cows – Krowy wybrakowane				
n	48		20	
Total income value, zl Przychód całkowity, zł	2230.12 a	512.08	2468.98 a	415.59
Live weight unit price, zl Cena jednostkowa za żywiec, zł	3.64	0.43	3.70	0.25
Bulls – Buhaje				
n	84		13	
Total income value, zl Przychód całkowity, zł	2823.95A	223.52	3350.71A	366.08
Live weight unit price, zl Cena jednostkowa za żywiec, zł	4.99A	0.19	5.26A	0.17

Significance at: at P≤0.05; A P≤0.01.
Istotność: P≤0,05; A P≤0,01.

Summaries MO cattle comparing to PHF characterized better beef performance, what strongly determined higher beef market value of bulls and culled cows. It also confirmed that Mo can be an interesting alternative for PHF breed especially in farms of less intensive production systems. Dual-purpose character of French breed may increase economic efficiency in those farms.

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PORÓWNANIE CECH UŻYTKOWOŚCI MIĘSNEJ OPASÓW I WYBRAKOWANYCH KRÓW RASY MONTBELIARDE ORAZ POLSKIEJ HOLSZTYŃSKO-FRYZYJSKIEJ ORAZ ICH WPŁYW NA WIELKOŚĆ PRZYCHODU Z ICH SPRZEDAŻY

Streszczenie. Celem niniejszej pracy było porównanie wyników oceny użytkowości mięsnej opasów i wybrakowanych krów rasy montbeliarde i polskiej holsztyńsko-fryzyjskiej oraz ustalenie ich wpływu na wielkość przychodu uzyskiwanego z ich sprzedaży. W badaniach wykorzystano dane dotyczące 97 buhajów oraz 68 krów obu ras. Dane uwzględniały: rasę, wiek, kategorię rzeźną, masę żywego zwierzęcia oraz tuszy, klasyfikację EUROP. Do obliczenia przychodu uzyskiwanego z wybrakowanych krów oraz opasów wykorzystano ceny rynkowe z 2010 r. Stwierdzono istotny wpływ rasy zarówno na masę żywą, jak i masę tuszy badanych buhajów oraz wybrakowanych krów. Krowy i buhaje rasy montbeliarde charakteryzowały się zarówno wyższą masą ciał, lepszą wydajnością rzeźną, jak i lepszymi wynikami klasyfikacji EUROP. Dlatego przeciętna cena uzyskiwana za krowy i opasy tej rasy była istotnie wyższa w porównaniu z bydłem rasy phf.

Słowa kluczowe: krowy wybrakowane, opasy, rasa montbeliarde, rasa polska holsztyńsko-fryzyjska

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