COMPARATIVE MORFOLOGICAL CHARACTERISTICS IN BALŢATA ROMÂNEASCĂ CATTLE BREED, RAISED IN APUSENI AREA (HUNEDOARA AND ALBA COUNTY)

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Abstract. The present study describes comparatively the morphological characteristics of Bălţata Românească breed from different farms from Hunedoara and Alba Countys raised in Apuseni area. This native breed is found to be the most suitable cattle breed, both for meat and for milk production. From the analysis of the morphological characteristics of the cows exploited in the studied farms we can conclude that the cattle herds have good, even very good, which provides a favorable biological platform for their productive life; Body indices calculated from biometric measurements indicate a harmonious development, the studied animals being well-proportioned, with a constitution that fits them into the mixed morpho-productive type.

Keywords: Bălţata Românească, native breed, farm, morphological characteristics

INTRODUCTION

Bălţata Românească is an improved native breed, which resulted from the absorption crosses of the Simmental breed and Sura de Stepă. The first imports of this cattle were made in 1860 from Austria, and massive imports were made from Switzerland after 1882. Over the time, the "simmentalization" action has led to the absorption of the Sura de Stepă breed in the area of its expansion, in the end the new breed Bălţata Românească, presenting some attributes similar to the Simmental breed, but distinguished by its own characteristics.

Due to the skills that this breed meets, it has spread in the plateau and hill areas of Transylvania, Banat and the northwest of the country, at the level of 1996 about 34.60% of the total number of cattle exploited in the country, was represented by this breed. Precocious breed, achieves full maturity at 4-4.5 years, and breeding maturity at 17-22 months. The economic life is 8-9 lactations and even more, with duration of 270-330 days and with a birth rate of 85% (Onaciu, 2013).

Milk production of the active population ranges between 2700-4500 kg, with 3.6-3.9% fat content. Compared to the data published in literature, the potential for milk production of the breed is also underlined by the results obtained on the cows belonging to the official control of the production, respectively those recorded in the genealogical registers. In this respect, it is worth mentioning that for the cows from the territorial register, the milk production is 4421 kg with 3.83% fat content and 169.64 kg of pure fat, and with those registered in the state genealogical register, it is 4797 kg of milk, with 3.84% fat content and 184.35 kg pure fat (Mironeasa et al., 2011; Onaciu et al., 2015).

Parallel to the characteristics of milk production, the breed is distinguished by its meat features. Depending on the fattening system applied, the youth achieves a daily average accumulation rate of 0.9-1.2 kg with a specific consumption between 5.2 and 6.5 U.N./kg. At the age of 14-15 months, a body mass greater than 500 kg can be achieved under normal conditions; the young reproductive heifer easily achieve a body mass of 170-200 kg at the age of 6 months; 290-310 kg at the age of 12 months and 420-450 kg at 18 months;

respectively 500-550 kg at 24 months (Velea and Muresan, 2012a, b; Cârcu et al., 2010a, b; Jurco et al., 2013).

The aim of this study was the measurement of morphological characteristics of dairy cattle for improvement of production capacity, reproduction and management of breeding in different farms from the Apuseni Mountains area.

MATERIAL AND METHODS

The researches were made on dairy cows from the main breeds grown in Transylvania, the Apuseni Mountains area. The studied biological material consists of cows enrolled in official production control. The researches were carried out on dairy farms from Hunedoara and Alba Counties from Transylvania.

Alba County farms description. Three farms located in Alba County were subjected to analysis of measuring the morphological characteristics of dairy cows. Farm number 1 (Oneţ Vasile) has a total of 16 heads of Bălţată Românească taurine, structured as follows: milk cows - 10 heads; heifers - 2 heads; female youth 12-18 months -1head; female youth 6-12 months – 1head; female youth 0-6 months - 2 heads. Farm number 2 (Zgaiba Elena) has a total number of 31 heads of Bălţată Românească taurine : milk cows – 16 heads; heifers – 5 heads; female youth 12-18 months – 3 heads; female youth 6-12 months – 3 heads; female youth 0-6 months - 4 heads. Farm number 3 (Costea Nicolae) has a total number of 19 heads of Bălţată Românească taurine : milk cows – 10 heads; heifers – 3 heads; female youth 12-18 months – 2 heads; female youth 6-12 months – 2 heads; female youth 0-6 months - 2 heads. Every farm has stone and wood stable, hay storage, cultivated land, pasture and meadow of different surfaces. Technical equipment includes: tractors (U445DT, U650), trailer, plow, harrow and mower.

Hunedoara County farms description. Three farms located in Hunedoara County were also subjected to measurements of the morphological characteristics of dairy cows.

Farm number 4 (Achim Ioan) has a total of 16 heads of Bălţată Românească taurine, structured as follows: milk cows - 10 heads; heifers - 2 heads; female youth 12-18 months - 1head; female youth 6-12 months – 1head; female youth 0-6 months - 2 heads. Farm number 5 (Buruiană Sorin) has a total number of 32 heads of Bălţată Românească taurine : milk cows – 20 heads; heifers – 4 heads; female youth 12-18 months – 3 heads; female youth 6-12 months – 2 heads; female youth 0-6 months - 3 heads. Farm number 6 (Demian Dorina) has a total number of 14 heads of Bălţată Românească taurine : milk cows – 10 heads; heifers – 1 head; female youth 12-18 months – 1 head; female youth 6-12 months – 1 head; female youth 0-6 months - 1 head. Every farm has stone and wood stable, hay storage, cultivated land (corn, wheat, alfalfa, potatoes, and vegetables), pasture and meadow of different surfaces. Technical equipment includes: tractors (U445DT, U650), trailer, plow, harrow and mower.

Biological material and work methodologies. In order to analyze the morphological characteristics of Bălţata Românească cows from the Apuseni Mountains, the research were carried out at a number of 6 representative farms from 2 counties (Hunedoara and Alba) included in this area and having a total number of 128 heads (76 milk cows), structured as follows:

- in Hunedoara County - 3 farms with a total of 62 heads (40 milk cows subjected to measurements).
- in Alba County - 3 farms with a total of 66 heads (36 milk cows measured for their morphological characteristics).

Measurements registered in the study were as follows:

- Height at withers was measured with the zoometer, giving indications of proportionality;
- Height at crupper was measured with the zoometer, indicates the height of the posterior train related to the anterior one;
- Trunk oblique length was measured with the zoometer and gives us indications on body shape;
- Crupper width was measured with the compass;
- The thoracic perimeter was measured with the ribbon. This gives us indications on body development as a whole and on the development of the chest cavity.
- The height (depth) of the chest was measured with the zoometer and is used to appreciate the development of the chest.
- Cheast width was measured with the zoometer and it serves both in the assessment of body development as a whole and in the development of the chest cavity.
- Body mass was determined by weighing.

Corporal indices were also determined: index of the lateral corporal format (ilcf); trunk side index (tsi); index of the thorax depth (itd); robustness index (ri); difference of height index (dhi); massive index (mi); basine-pectoral index (bpi); index of caudal corporal format (iccf).

RESULTS AND DISCUSSIONS

Because the number of individuals on a farm does not allow an objective presentation of the morphological characteristics according to the lactation rank, we chose to present the average of the total number of cows in each farm and a complete presentation of the lactating average of the herd studied at the level to each county.

Morfologic characteristics of Bălţata Românească breed raised in Alba County

Average values, error, deviation and estimated variability of the main body dimensions measured in three farms from Alba County are presented in Table 1. Table 2 presents the main body indices, determined on the basis of biometric measurements for the same animals.

Table 1

Average values and estimated variability of main body dimensions, measured on dairy cows from Alba County

Statistics	Height at withers (cm)	Height at crupper (cm)	Trunk oblique length (cm)	Chest perimeter (cm)	Chest depth (cm)	Chest width (cm)	Crupper width (cm)	Corporal mass (cm)
Farm 1 (n=10)								
Mean (X)	**130.40**	**133.60**	**157.20**	**189.20**	**66.80**	**50.60**	**53.10**	**559.00**
Error (sX)	1.45	1.83	**1.72**	2.64	0.95	1.16	1.18	21.56
Deviation (s)	4.58	5.78	**5.43**	8.36	3.01	3.66	3.73	68.18
Variation(V%)	3.51	4.32	**3.46**	4.42	4.51	7.23	7.02	12.20
Min.	124	126	**149**	177	62	45	46	470

Max.	139	145	**165**	204	72	56	58	690
Farm 2 (n=16)								
Mean (X)	**133.13**	**136.44**	**160.56**	**193.00**	**69.06**	**51.31**	**53.31**	**589.06**
Error (sX)	1.33	1.70	**1.75**	2.10	0.88	0.63	0.60	19.02
Deviation (s)	5.30	6.79	**6.99**	8.38	3.51	2.52	2.39	76.07
Variation(V%)	3.98	4.98	**4.36**	4.34	5.08	4.92	4.48	12.91
Min.	125	127	**147**	179	64	47	49	475
Max.	146	152	**177**	212	76	57	58	770
Farm 3 (n=10)								
Mean (X)	**131.70**	**134.80**	**158.30**	**190.30**	**67.40**	**50.70**	**53.50**	**566.00**
Error (sX)	1.33	1.62	**1.81**	2.21	0.98	0.47	0.54	18.09
Deviation (s)	4.22	5.12	**5.72**	6.98	3.10	1.49	1.72	57.19
Variation (V%)	3.20	3.80	**3.61**	3.67	4.60	2.95	3.21	10.10
Min.	126	128	**151**	179	62	48	51	500
Max.	139	145	**168**	202	73	53	56	670

Table 2

Average values (cm) and estimated variability (%) of main body indices, determined on the basis of biometric measurements made on dairy cows from Alba County

Statistics	ilcf	tsi	itd	ri	dhi	mi	bpi	iccf
Farm 1 (n=10)								
Mean (X)	**120.57**	**42.49**	**51.21**	**120.33**	**102.43**	**427.55**	**95.32**	**39.73**
Error (sX)	0.57	0.27	0.20	0.56	0.33	11.72	0.93	0.63
Deviation (s)	1.80	0.85	0.64	1.76	1.05	37.06	2.94	1.98
Variation (V%)	1.49	1.99	1.26	1.46	1.02	8.67	3.08	4.99
Min.	118.25	41.51	50.00	117.61	100.78	379.03	88.46	35.11
Max.	123.26	44.03	52.24	123.64	104.32	496.40	98.25	41.73
Farm 2 (n=16)								
Mean (X)	**120.60**	**43.01**	**51.86**	**120.22**	**102.45**	**441.09**	**96.24**	**39.09**
Error (sX)	0.36	0.24	0.25	0.45	0.34	9.83	0.34	0.19
Deviation (s)	1.44	0.95	1.02	1.80	1.36	39.30	1.37	0.74
Variation (V%)	1.19	2.21	1.96	1.50	1.33	8.91	1.43	1.91

Min.	117.60	40.49	49.62	116.56	100.00	380.00	94.23	37.96
Max.	123.02	44.72	53.33	122.98	104.35	527.40	98.28	40.46
Farm 3 (n=10)								
Mean (X)	**120.20**	**42.58**	**51.16**	**120.23**	**102.34**	**429.01**	**94.78**	**39.71**
Error (sX)	0.58	0.36	0.38	0.74	0.44	9.71	0.35	0.40
Deviation (s)	1.84	1.14	1.21	2.33	1.41	30.72	1.11	1.27
Variation (V%)	1.53	2.67	2.37	1.94	1.37	7.16	1.17	3.20
Min.	116.92	40.99	49.21	118.07	100.00	391.47	92.73	37.68
Max.	123.85	44.38	52.99	124.53	104.32	482.01	96.23	42.31

ilcf - index of the lateral corporal format; tsi - trunk side index; itd - index of the thorax depth; ri - robustness index; dhi - difference of height index; mi – massive index; bpi - basine-pectoral index; iccf - index of caudal corporal format;

Morfologic characteristics of Baltata Românească breed raised in Hunedoara County

Average values, error, deviation and estimated variability of the main body dimensions measured in three farms from Hunedoara County are presented in Table 3. Table 4 presents the main body indices, determined on the basis of biometric measurements for the same animals.

Table 3

Average values and estimated variability of main body dimensions, measured on dairy cows from Hunedoara County

Statistics	Height at withers (cm)	Height at crupper (cm)	Trunk oblique length(cm)	Chest perimeter (cm)	Chest depth (cm)	Chest width (cm)	Crupper width (cm)	Corporal mass (kg)
Farm 4 (n=10)								
Media (X)	**132.90**	**135.50**	**160.30**	**194.00**	**69.70**	**51.20**	**54.30**	**598.70**
Eroarea (sX)	1.12	1.21	1.36	2.17	0.63	0.70	0.68	18.99
Deviația (s)	3.54	3.84	4.30	6.86	2.00	2.20	2.16	60.05
Variația (V%)	2.67	2.83	2.68	3.54	2.87	4.30	3.98	10.03
Min.	127	130	152	182	66	48	50	487
Max.	136	140	166	201	72	54	58	665
Farm 5 (n=20)								
Media (X)	**137.15**	**140.00**	**164.95**	**199.35**	**71.05**	**52.35**	**55.65**	**659.25**
Eroarea (sX)	0.86	0.89	1.47	1.73	0.77	0.48	0.49	13.26
Deviația (s)	3.83	4.00	6.56	7.75	3.44	2.16	2.21	59.32
Variația (V%)	2.79	2.86	3.98	3.89	4.84	4.12	3.97	9.00
Min.	129	133	152	184	63	48	50	560
Max.	144	149	178	212	76	56	60	770

Farm 6 (n=10)								
Media (X)	**133.50**	**135.90**	**161.70**	**195.10**	**69.70**	**51.40**	**54.80**	**609.10**
Eroarea (sX)	1.17	1.22	1.56	1.95	0.82	0.73	0.80	16.85
Deviația (s)	3.69	3.84	4.92	6.15	2.58	2.32	2.53	53.29
Variația (V%)	2.76	2.83	3.04	3.15	3.71	4.51	4.62	8.75
Min.	128	130	154	185	65	47	50	535
Max.	139	143	170	204	73	55	58	690

Table 4

Average values (cm) and estimated variability (%)of main body indices, determined on the basis of biometric measurements made on dairy cows from Hunedoara County

Statistics	ilcf	tsi	itd	ri	dhi	mi	bpi	iccf
Farm 4 (n=10)								
Mean (X)	**120.63**	**43.49**	**52.45**	**121.02**	**101.96**	**449.69**	**94.30**	**40.08**
Error (sX)	0.53	0.29	0.17	0.80	0.39	10.78	0.63	0.42
Deviation (s)	1.69	0.93	0.53	2.53	1.23	34.10	2.00	1.33
Variation (V%)	1.40	2.13	1.01	2.09	1.20	7.58	2.12	3.31
Min.	117.91	42.17	51.85	116.46	100.00	383.46	90.57	38.46
Max.	123.44	45.57	53.73	125.32	103.70	488.97	96.43	42.65
Farm 5 (n=20)								
Mean (X)	**120.24**	**43.07**	**51.79**	**120.87**	**102.08**	**479.91**	**94.10**	**39.75**
Error (sX)	0.44	0.27	0.35	0.40	0.29	6.79	0.61	0.21
Deviation (s)	1.96	1.22	1.58	1.80	1.30	30.36	2.74	0.95
Variation (V%)	1.63	2.83	3.05	1.49	1.27	6.33	2.91	2.39
Min.	116.67	40.13	48.09	116.67	100.00	431.30	87.27	37.59
Max.	123.61	45.45	54.35	124.07	104.29	534.72	98.21	41.48
Farm 6 (n=10)								
Mean (X)	**121.12**	**43.10**	**52.20**	**120.66**	**101.80**	**455.58**	**93.83**	**40.32**
Error (sX)	0.47	0.27	0.25	0.44	0.41	8.70	0.85	0.42
Deviation (s)	1.48	0.87	0.78	1.40	1.30	27.52	2.70	1.33
Variation (V%)	1.22	2.01	1.50	1.16	1.27	6.04	2.88	3.30
Min.	119.26	41.72	50.39	118.40	100.00	414.73	89.66	38.46
Max.	123.48	44.72	53.33	122.89	103.88	496.40	98.15	43.28

ilcf - index of the lateral corporal format; tsi - trunk side index; itd - index of the thorax depth; ri - robustness index; dhi - difference of height index; mi – massive index; bpi - basine-pectoral index; iccf - index of caudal corporal format;

CONCLUSIONS

The analysis of the main body dimensions, measured on the dairy cows, exploited in the studied farms in Hunedoara and Alba County, highlights the following aspects:

- The average values of the body dimensions traced in the cows studied in Hunedoara County reveal a medium-sized flock (HG = 135.71 cm, HC = 138.37 cm) with an average body weight of 641.54 kg which is falls within the minimum required weight limit for this breed (650-700 kg). It is also noted a good breast development that has an average width of 52.15 cm as well as the width of the croup on the hip with an average of 55.37 cm.

- The average values of the body dimensions followed on the farms studied in Alba County reveal a median height (HG = 132.85 cm, HC = 136.19 cm) with an average body weight of 589.75 kg which is well below the minimum required weight limit for this breed (650-700 kg).

From the analysis of the morphological characteristics of the cows exploited in the studied farms we can conclude that the cattle herds have good, even very good, which provides a favorable biological platform for their productive life. Body indices calculated from biometric measurements indicate a harmonious development, the studied animals being well-proportioned, with a constitution that fits them into the mixed morpho-productive type.

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