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COMPARISON OF BODY MASS AND SOMATOMETRIC DATA OF DAMS OF THE BOHEMIAN PIED CATTLE AND CROSSES WITH THE RED HOLSTEIN AND AYRSHIRE BREED

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Abstract

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In all the three lactations the body mass was the highest in the Bohemian Pied X Red Holstein (CR) cattle (i.e. 532.53, 572.17 and 605.25 kg, respectively), followed by dams of the Bohemian Pied cattle (C) (i.e. 508.97, 542,81 and 575.74 kg, respectively) and the Bohemian Pied X Ayrshire hybrids (CA) (i.e. 482.83, 503.35 and 520.69 kg, respectively). The differences in body mass among the groups investigated in the individual lactations were statistically highly significant.

Ten somatometric data were investigated. The average values on the 1st lactation were the highest in CR crosses, with the exception of a bigger shank circumference in group C (i.e. 18.84 cm). These values were the lowest in CA crosses. In the 3rd lactation, the average body measurements were again the highest in CR crosses, only the width of chest and shank circumference were smaller as compared with group C. In CA crosses, the values of all the body measurements were the lowest. Crossing with the Red Holstein cattle was positively manifested in an enlargement of the body frame and improvement of the shape of the pelvis.

Body mass, somatometric data, Bohemian Pied cattle, crosses of Bohemian Pied cattle with the Holstein and Ayrshire breeds.

Many authors have studied the relationships among the body measurements, body mass and milk efficiency with regard to the sequence of lactation. S u c h á n e k et al. (1972) reported that the live body mass of CA crosses of the F_1 generation and F_{10} generation on the 3rd lactation was 522 - 540kg, and 531-640 kg, respectively, i.e. 24-44 kg and/or 6 - 9 kg less than in their herd mates of the Bohemian Pied cattle. L á n y i (1978) found that the average live body mass of imported Finnish Ayrshire cows was 434, 466 and 484 kg for the 1st, 2nd and 3rd lactations, respectively. S u c h á n e k et al. (1981) compared the body mass of the crosses with the Red Holstein breed;

the body mass of the crosses was higher by 10 - 12 kg as compared with the Bohemian Pied breed. P o l e s and G o l d a (1981) found that the body mass of crosses with 25% of the Red Holstein breed was by 9 and/or 21 kg higher after the first calving. S u c h á n e k (1982) reported that the body mass of CR crosses on the 1st lactation was 538 kg, i.e. by 22 kg higher than in herd mates of the Bohemian Pied breed. The average body mass of adult CR 25 crosses was 630 kg. S u c h á n e k and U l r y c h (1982) observed that the body mass of dairy cows, crosses with the Ayrshire breed, in the 1st lactation was lower by 2 - 13 kg as compared with dairy cows of the Bohemian Pied breed. No significant differences between the crosses with the Red Holstein and dairy cows of the Bohemian Pied breed were observed. B o t t o and K a r i k a (1976) proved that milk yield was the highest in cows of the Slovak Red Pied breed whose body mass was 650 - 700 kg, height at withers 136 cm and diagonal length of trunk 165 - 166 cm.

S u c h á n e k et al. (1978) observed that the height at withers was higher by 0.8 cm and the shank circumference smaller by 0.4 cm in the CR crosses after the first calving. P o l e s and G o l d a (1981) compared the body measurements of the CR 25 crosses with herd mates of the Bohemian Pied breed and their results were similar. Comparisons of the body measurements of F_1 crosses (Slovak Pied X Holstein-Friesian breeds) with cows of the Slovak Pied breed showed that the crosses were taller, their chest larger, with a weaker skeleton and lower fleshing of the legs (K l i m e n t et al. 1979). In the body framework of the crosses a marked shift towards the milk type was thus observed.

W o o d et al. (1980) found a positive correlation among milk production, milk composition (proteins, fat, lactose) and the size of dairy cows in Friesian and Ayrshire cattle.

R u s s e l (1982) performed an experiment to investigate the effect of gravidity and sequence of lactations on the growth of Ayrshire cows in the 1st and 2nd lactations. In three-month intervals, 12 body measurements were studied which were significantly affected by the sequence of lactation, including the time of parturition; the average retardation of growth was 3%. In the post-parturition period growth stopped especially in the width measurements. Calving which occurred earlier that at the average age affected the intensity of growth very unfavourably and brought along the risk of irregular and complicated parturitions.

Materials and Methods

Investigations of this part of the research task were carried out under routine conditions of management in the School Agricultural Enterprise of the University of Veterinary Science in Nový Jičín, this enterprise being chosen for the verification and use of the genetic pool of foreign dairy breeds from crossing with the Bohemian Pied breed. The task was carried out as a comparative experiment with 3 groups of dams: Bohemian Pied breed (C = 48), Bohemian Pied X Red Holstein crosses with a 50% proportion of blood (CR = 62) and Bohemian Pied X Ayrshire crosses with a proportion of blood ranging from 25% to 53.25% (CA = 65). All the groups were concentrated to one farm to ensure identic environmental conditions. The high-pregnant heifers were housed in a barn for testing primiparae and for the 2nd and 3rd lactations they were transferred to a large-scale cow-shed with short stanchions and grated dunging pit.

The live body mass and body measurements of the cows were recorded every second month after calving; the body measurements were recorded in the 1st and 3rd lactations and the live body mass in the 1st, 2nd and 3rd lactations. The following somatometric data were recorded: height at withers, depth of chest, width of chest, hook-bone width, width of pelvis, pin-bone width, length of pelvis, diagonal length of body, circumference of chest and shank in cm. These data were elaborated and tested using routine methods of variation statistics.

Nutrition of these groups of animals was based on standard feed rations. Feeding of the dairy cows was organized respecting the finishing of body growth and development, milk efficiency, live body mass and stages of the reproduction cycle according to the Czechoslovak Standard.

Tab. 1. Live body mass of dairy cows of the compared groups (in kg)

group	number of animals	$\bar{x}$	s	$s_{\bar{x}}$	v %	min.	max.
after 1st calving							
CR	83	532.53	35.66	3.91	6.70	449	615
C	64	508.97	26.74	3.34	5.25	450	562
CA	82	482.83	27.87	3.08	5.77	408	530
after 2nd calving							
CR	70	572.17	37.04	4.43	6.47	515	660
C	43	542.81	27.55	4.20	5.08	460	600
CA	57	503.35	26.06	3.45	5.18	450	560
after 3rd calving							
CR	57	605.25	38.36	5.08	6.34	535	695
C	31	575.74	38.07	6.84	6.61	520	650
CA	48	520.69	24.64	3.56	4.73	450	560

Tab. 2. Evaluation of live body mass of dairy cows of the individual breeding groups according to sequence of lactations

indicator	F-test value	F-test significance	groups compared	t-test value	t-test significance
live body mass in the 1st lactation	53.58	++	CR : C	4.385	++
			CR : CA	9.906	++
			C : CA	5.684	++
live body mass in the 2nd lactation	74.27	++	CR : C	4.451	++
			CR : CA	11.748	++
			C : CA	7.241	++
live body mass in the 3rd lactation	79.29	++	CR : C	3.423	++
			CR : CA	13.022	++
			C : CA	7.704	++

++ $P<0.01$

Tab. 3. Body measurements of dairy cows of the individual breeding groups in the 1st lactation

group	number of animals	$\bar{x}$	s	$s_{\bar{x}}$	in %	min.	max.
height at withers in cm							
CR	83	130.42	3.41	0.37	2.62	121	137
C	64	126.30	2.44	0.31	1.93	126	133
CA	82	122.94	2.53	0.28	2.06	115	129
depth of chest in cm							
CR	83	65.90	2.04	0.22	3.10	61	71
C	64	62.70	2.11	0.26	3.37	57	68
CA	82	62.26	1.83	0.20	2.93	56	66
width of chest in cm							
CR	83	45.11	2.39	0.26	5.29	40	51
C	64	44.27	2.40	0.30	5.42	38	50
CA	82	43.82	2.69	0.30	6.14	37	51
hook-bone width in cm							
CR	83	50.52	1.74	0.19	3.44	47	55
C	64	47.98	2.58	0.32	5.37	43	53
CA	82	47.51	1.51	0.17	3.17	44	50
width of pelvis in cm							
CR	83	48.01	2.42	0.27	5.04	44	53
C	64	46.17	2.06	0.26	4.46	42	51
CA	82	45.54	1.62	0.18	3.55	42	49
pin-bone width in cm							
CR	83	33.06	1.70	0.11	5.15	30	38
C	64	31.47	1.59	0.20	5.06	28	35
CA	82	30.68	1.44	0.16	4.69	27	33
length of pelvis in cm							
CR	83	53.90	1.93	0.21	3.58	50	58
C	64	51.94	1.71	0.21	3.30	48	56
CA	82	50.79	1.58	0.17	3.10	47	54
diagonal length of body in cm							
CR	83	167.87	6.31	0.64	3.76	149	183
C	64	165.91	6.84	0.86	4.13	153	189
CA	82	162.54	7.39	0.82	4.55	150	185
circumference of chest in cm							
CR	83	189.53	5.90	0.65	3.12	175	208
C	64	185.61	5.49	0.69	2.96	175	198
CA	82	182.90	5.28	0.58	2.89	171	198
shank circumference in cm							
CR	83	18.45	0.66	0.07	3.60	17	20
C	64	18.84	0.71	0.09	3.78	18	21
CA	82	17.90	0.58	0.06	3.22	17	19

Tab. 4. Evaluation of body measurements of dairy cows of the individual breeding groups in the 1st lactation

indicator	F-test value	significance	groups compared	t-test value	significance
height at withers	140.23	++	CR : C	8.129	++
			CR : CA	15.933	++
			C : CA	8.026	++
depth of chest	79.70	++	CR : C	9.226	++
			CR : CA	12.011	++
			C : CA	1.351	-
width of chest	11.13	++	CR : C	2.102	+
			CR : CA	3.242	++
			C : CA	1.041	-
hook-bone width	21.28	++	CR : C	7.073	++
			CR : CA	11.796	++
			C : CA	1.362	-
width of pelvis	31.43	++	CR : C	4.844	++
			CR : CA	7.668	++
			C : CA	2.067	+
pin-bone width	47.57	++	CR : C	5.739	++
			CR : CA	9.632	++
			C : CA	3.116	++
length of pelvis	57.80	++	CR : C	6.377	++
			CR : CA	11.278	++
			C : CA	4.183	++
diagonal length of body	12.51	++	CR : C	1.787	-
			CR : CA	4.953	++
			C : CA	2.802	+
circumference of chest	29.08	++	CR : C	4.087	++
			CR : CA	7.553	++
			C : CA	3.002	++
circumference of shank	41.05	++	CR : C	3.435	++
			CR : CA	5.610	++
			C : CA	8.756	++

\+ $P<0.05$, ++ $P<0.01$

Results

Tab. 1 gives a survey of the live body mass of dairy cows of the individual breeding groups according to the sequence of calving. The CR crosses had the highest live body mass in all lactations of all the groups compared; this body mass reached 532.53, 572.17 and 605.25 kg after the 1st, 2nd and 3rd calving, respectively. In group C the values were 508.97, 542.81 and 575.74 kg, respectively. The CA crosses always had the lowest body mass, i.e. 482.83, 503.35 and 520.69 kg after the 1st, 2nd and 3rd calving, respectively. Comparisons showed that the differences in live body

Tab. 5. Body measurements of dairy cows of the individual breeding groups in the 3rd lactation

group	number of animals	$\bar{x}$	s	$s_{\bar{x}}$	in %	min.	max.
height at withers in cm							
CR	57	133.40	3.50	0.46	2.62	126	141
C	31	129.81	3.50	0.62	2.66	125	136
CA	48	124.92	2.73	0.39	2.19	118	131
depth of chest in cm							
CR	57	62.72	2.27	0.30	3.26	64	73
C	31	66.94	2.09	0.38	3.13	63	72
CA	48	65.15	2.17	0.31	3.33	59	70
width of chest in cm							
CR	57	48.68	2.70	0.36	5.54	44	56
C	31	48.90	2.56	0.50	5.23	44	54
CA	48	46.71	2.93	0.42	6.27	40	54
hook-bone width in cm							
CR	57	53.75	1.58	0.21	2.94	50	58
C	31	51.84	2.17	0.39	4.19	46	57
CA	48	51.13	1.52	0.22	2.98	48	55
width of pelvis in cm							
CR	57	48.96	2.33	0.31	4.76	45	58
C	31	48.10	2.23	0.40	4.64	45	53
CA	48	46.40	1.25	0.18	2.70	43	50
pin-bone width in cm							
CR	57	34.95	2.02	0.27	5.78	33	45
C	31	33.94	1.56	0.28	4.61	32	38
CA	48	32.38	1.50	0.22	4.62	30	38
length of pelvis in cm							
CR	57	55.77	2.14	0.28	3.84	51	61
C	31	54.32	1.94	0.35	3.57	51	59
CA	48	52.77	1.64	0.24	3.10	50	56
diagonal length of body in cm							
CR	57	173.49	6.28	0.38	3.62	156	185
C	31	171.26	5.91	1.06	3.45	159	188
CA	48	165.31	6.22	0.90	3.76	155	178
circumference of chest in cm							
CR	57	199.60	5.96	0.79	2.99	187	220
C	31	196.03	6.44	1.16	3.29	181	211
CA	48	188.50	5.00	0.72	2.65	179	197
circumference of shank in cm							
CR	57	18.91	0.68	0.09	3.61	17	21
C	31	19.65	0.74	0.13	3.78	18	22
CA	48	18.29	0.70	0.10	3.86	17	20

Tab. 6. Evaluation of body measurements of dairy cows of the individual breeding groups in the 3rd lactation

indicator	F-test value	significance	groups compared	t-test value	significance
height at withers	87.63	++	CR : C	4.564	++
			CR : CA	13.529	++
			C : CA	6.903	++
depth of chest	56.47	++	CR : C	5.575	++
			CR : CA	10.396	++
			C : CA	3.591	++
width of chest	8.52	++	CR : C	0.368	-
			CR : CA	3.554	++
			C : CA	3.368	++
hook-bone width	31.98	++	CR : C	4.763	++
			CR : CA	8.542	++
			C : CA	1.697	-
width of pelvis	21.45	++	CR : C	1.664	-
			CR : CA	6.766	++
			C : CA	4.271	++
pin-bone width	27.66	++	CR : C	2.389	+
			CR : CA	7.234	++
			C : CA	7.921	++
length of pelvis	30.79	++	CR : C	3.100	++
			CR : CA	7.868	++
			C : CA	5.913	++
diagonal length of body	23.05	++	CR : C	1.608	-
			CR : CA	6.614	++
			C : CA	4.177	++
circumference of chest	63.88	++	CR : C	2.573	+
			CR : CA	10.122	++
			C : CA	5.754	++
circumference of shank	34.22	++	CR : C	4.652	++
			CR : CA	4.519	++
			C : CA	8.085	++

\+ $P<0.05$, ++ $P<0.01$

mass among the groups of breeds in the individual lactations were statistically highly significant (Tab. 2).

The body measurements of the dairy cows of the breeding groups were investigated in the 1st and 3rd lactations. Tab. 3 gives a survey of body measurements in the 1st lactation. Ten somatometric data were studied. The average values of all the body measurements were the highest in the group of CR crosses (with the exception of the shank circumference where the average values were higher in group C), while the lowest values were found in CA crosses. Tab. 4 gives a statistical evaluation of this 1st lactation.

Differences in these indices among the groups are all statistically highly significant. The differences were insignificant only in the depth of chest, width of chest and hook-bone width between group C:CA. The difference in the average values of the diagonal length of body between groups CR and C was also insignificant.

Tab. 5 gives the body measurements of the dairy cows of the breeding groups in the 3rd lactation, the average values of differences of all the indices being the highest in the group of CR crosses, with the exception of the width of chest and shank circumference where the average values were higher in group C.

Tab. 6 evaluates the body measurements of dairy cows on the 3rd lactation. Differences in the body measurements among the groups were highly significant in the majority of indices under study. The differences in the width of chest, width of pelvis and diagonal length of body between groups CR and C were insignificant. The difference in the average values of the hook-bone width between groups C:CA was also significant.

Discussion

The live body mass in the respective age categories is very important in improvement crossing from the point of view of milk and meat efficiency. That is why we directed our investigations at this factor and carried out comparisons within the breeding groups. In all the three lactations the highest body mass was reached in the CR crosses, followed by dams of the Bohemian Pied breed and CA crosses. On the 1st lactation, the CR crosses reached an average body mass of 532.53 kg, what was 23.56 kg more than group C; the CA crosses reached 26.14 kg less than group C. These findings are nearly the same as the data published by S u c h á n e k (1982) in CR crosses as compared with the herd mates of group C while the values of the differences found in the present study in the CA crosses are two times higher than those given by S u c h á n e k and U l r y c h (1982) who found that the difference between groups CA and C was 2 - 13 kg. The authors further observed that the differences in the live body mass between the CR crosses and herd mates of group C were not significant. Within the three groups investigated in the present study, the differences in the 1st lactation were found to be highly significant. In the 2nd lactation, too, the body mass increased in all the three groups and the differences in the average body mass among the groups were highly significant. In the 3rd lactation, where the average body mass was the highest in accordance with the finishing of growth and development, the body mass of CR crosses was 605.25 kg, what is 29.51 kg higher than in group C; the body mass of CA crosses was 55.05 kg lower than in group C. S u c h á n e k et al. (1972) found that the live body mass in CA crosses in the 3rd lactation was 24 - 44 kg lower than in the herd mates of group C. The difference in body mass between CA crosses and group C as found in the present study was 11 kg higher in favour of group C. The differences in live body mass in the 3rd lactation in all the groups were also found to be highly significant.

In order to find the differences in the body framework, the authors aimed at investigations of the body measurements in the 1st and 3rd lactations in all the three groups studied. W o o d et al. (1980) proved a positive correlation between the size of the dairy cow and its milk yield and milk composition in Friesian and Ayrshire cattle. That is why the purpose of the present comparative study was to investigate 10 somatometric data and to

compare them within the framework of the three groups studied. In the 1st lactation, the values of the investigated body measurements were the highest in CR crosses and the lowest in CA crosses. In group C, these values ranged between the values of these two groups of CR and CA crosses, with the exception of the shank circumference in group C which was 0.39 cm higher than that of the CR crosses. Most of the differences in body measurements among the groups on the 1st lactation were statistically significant or highly significant. Only the differences in the diagonal length of body between the CR crosses and group C were not significant as well as the differences in the depth and width of chest and the hook-bone width between group C and CA crosses in the 1st lactation. S u c h á n e k et al. (1984) compared the body measurements of the CA and CR crosses in the 1st lactation after correlation to a uniform age of 900 days and they observed individual deviations from genotype C. On the basis of their findings the authors evaluated the crossing with Holstein cattle favourably because it had a positive effect on increasing the body framework, increasing the width and shape of the pelvis, decreasing the shank circumference and improving the shape of the udder. K l i m e n t et al. (1977) compared the F_1 generation of CR crosses with herd mates of the Slovak Red Pied breed and they found that in the crosses the height at withers was 3.3 cm higher ($\bar{x}$ = 132.5 cm) and the shank circumference 9 cm lower ($\bar{x}$ = 18.8 cm). P o l e s and G o l d a (1981) compared the body measurements of CR crosses with their herd mates of group C. On the 1st and 3rd lactations the height at withers of the crosses was 0.8 - 2.7 cm more, their body was 0.1 and/or 1.2 cm longer, the chest 0.8 and/or 0.5 cm deeper, the pelvis was 0.2 and/or 0.7 wider, the chest circumference was 0.1 and/or 2.8 cm smaller and the shank circumference 0.4 and/or 0.1 smaller.

The values of all the body measurements of the breeding groups investigated in the present study were the highest on the 1st lactation. In group C the height at withers was 126.30 cm, in the CR crosses it was 4.12 cm more and in the CA crosses 3.36 cm less than in the herd mates of group C. The depth of chest of group C was 62.70 cm, in group CR 3.20 cm higher and in CA crosses 0.44 cm lower than in group C. The depth of chest reached 44.27 cm in group C, in CR crosses this value was 0.84 cm higher and in CA crosses 0.45 cm lower than in group C. The hook-bone width, width of pelvis and pin-bone width in group C reached 47.98, 46.17 and 31.47 cm, respectively, in CR crosses these differences being 2.54, 1.84 and 1.59 cm higher, respectively, and in CA crosses 0.47, 0.63 and 0.79 cm lower, respectively, as compared with herd mates of group C. The length of pelvis in group C was 51.94 cm, in CR crosses the difference was 1.96 cm higher and in CA crosses 1.15 cm lower as compared with group C. The diagonal length of body in group C was 165.91 cm, in CR crosses it was 1.96 cm more and in CA crosses 3.37 cm less than in group C. The chest circumference in group C was 185.61 cm, this value being 3.92 cm higher and 2.71 cm lower in the CR and CA crosses, respectively. The highest value of the shank circumference was found in group C, i.e. 18.84 cm; in the CR and CA crosses it was 0.39 and 0.94 cm lower, respectively.

When we compare data found in group C with the data given by S u c h á n e k et al. (1984) we can state that there are no marked differences in the majority of body measurements. Within the three breeding groups investigated in the present study, however, the differences in the body measurements were higher than in those given by S u c h á n e k et al. (1984), the CR crosses always reaching the highest values of body measurements. These findings prove that the body framework of the CR crosses is

larger and that in their exterior shape they come close to the dual purpose efficiency type with a predominating milk efficiency.

Investigations of the body measurements of our breeding groups in the 3rd lactation, when body growth and development are presumably finished, showed that values of most of the body measurements were higher in CR crosses as compared with group C and the CA crosses. Only the value of the width of chest was 0.22 cm higher and that of the shank circumference 0.74 lower as compared with group C. The values of the body measurements were the lowest in CA crosses; their body framework was the smallest when compared with the other groups.

B o t t o and K a r i k a (1976) reported that the diagonal length of body and height at withers in the Slovak Pied cattle was 165 - 166 and 136 cm, respectively; when compared with our group C, the former value was 5.26 cm less and the latter 6.19 cm more. The present authors reported that dairy cows with a larger body framework and higher body mass reached the highest milk production; that is the reason why they recommended that, in the process of improvement of the Slovak Pied breed, it would be necessary to concentrate on increasing the body framework and body mass. This conclusion is in full accord with the present results of the improvement of Bohemian Pied cattle with Red Holstein because the CR crosses had the largest body framework, body mass and the highest milk production in all the three lactations. When comparing the body measurements of dairy cows of the Bohemian Pied breed with the standard according to the Czechoslovak Standard ČSN 466105 differences were found, i.e. 5.19 cm lower in the height at withers, 6.03 cm higher in the chest circumference and 0.35 cm lower in shank circumference. These comparisons show that the body framework of the dams the Bohemian Peid breed used in the present experiment was somewhat smaller.

Srovnání tělesné hmotnosti a somatometrických údajů plemenic českého strakatého skotu a kříženek s plemenem ayrshirským a červeným holštýnským

Na všech třech laktacích dosáhly kříženky českého strakatého s červeným holštýnským skotem (CR) vždy nejvyšší tělesnou hmotnost (I. 532,53 kg, II. 572,17 kg, III. 605,25 kg), pak následovaly plemenice českého strakatého skotu (C) (I. 508,97 kg, II. 542,81 kg, III. 575,74 kg), a kříženky českého skotu s ayrshirským (CA) (I. 482,83 kg, II. 503,35 kg, III. 520,69 kg). Rozdíly v živé hmotnosti mezi všemi sledovanými skupinami na jednotlivých laktacích byly statisticky vysoce významné.

Z deseti zjišťovaných somatometrických údajů na I. laktaci, kromě většího obvodu holeně u skupiny C (18,84 cm), dosáhly kříženky CR nejvyšších průměrných hodnot. Nejmenší hodnoty těchto ukazatelů vykázaly kříženky CA. Na III. laktaci opět kříženky CR dosáhly nejvyšších průměrných hodnot tělesných rozměrů, pouze v šířce hrudi a obvodu holeně byly tyto hodnoty nižší ve srovnání se skupinou C. Kříženky CA dosáhly u všech tělesných rozměrů hodnot nejnižších. Přikřížení červeného holštýnského skotu se projevilo příznivě ve zvětšení tělesného rámce a zlepšení tvaru pánve.

Сопоставление веса тела с соматометрическими данными племенных маток чешской пестрой и помесей с айширской и красной гольштейнской породами

На всех трех стадиях лактации помесь чешского пестрого племени с красной голыштейнской породой (CR) отличалась всегда самым большим весом (1. 532,53 кг, П. 572,17 кг, Ш. 605,25 кг), дальше следовали племенные матки чешской пестрой породы (C) (1. 508,97 кг, П. 542,81 кг, Ш. 575,74 кг) и помесь чешской породы с айширской (CA) (1. 482,83 кг, П. 503,35 кг, Ш. 520,69 кг). Разница живого веса между всеми исследуемыми группами на всех стадиах отдельных лактаций отличалась выразительной статистической значимостью.

Из десяти выябляемых соматометрических данных на стадии 1 лактации помимо большей окружности большеберцовой кости группы C (18,84 см) помесь CR достигла самых высоких средных величин. Минимальными величинами данных показателей отличались помеси CA. На стадии Ш лактации помесь CR достигла опять максимальных средних величин размеров тела, только ширина груди и окружность большеберцовой кости были по сравнению с группой C меньше. Помесь CA отличалась самыми низкими величинами размеров тела. При скрещивании красной гольштейнской породы нашло благоприятное отражение увеличение рамок тела и улучшение формы таза.

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