RESEARCHES REGARDING CHAROLAIS CATTLE BREED REARED IN THE N-E AREA OF ROMANIA

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Abstract

This paper presents some results obtained in a study on meat breed reared Charolaise in pedo-climatic conditions of N-E area of Romania and France. We followed the rearing conditions, meat characteristics and the most important selection heads indices."LUCOSDIOV" company in which was conducted this study, have a herd of 225 heads, of which 100 cows and 125 heads of youth of different ages. At birth calves had an average weight of 47.09 ± 0.701 kg, s = 5.332 kg, at 210 days 281.94 ± 5.84 kg, s = 34.581 kg and the average daily gain (ADG) was 1150.74 ± 22.291 g. Calving ease index (IFNAIS) at ascendancy of the first two generations had mean values ranking from 91.31 to 99.26, the lowest value occurring in father's father (FF) - 91.31. Also, synthetic index ISEVR at weaning had average ranking from 95.37 (MF) to 102.84 (FF) and precision (CD) had values between of 0.51 to 0.84. The values obtained by us on Romanian livestock are close to those obtained on livestock from France, namely: IFNAIS - 96.39 ± 0.241; ISEVR - 110.39 ± 0.156 and CD-0.86. The analyzed selection indexes had a genetic determinism (h^2) medium to strong, as follows: ISEVR- h^2= 0.26, IFNAIS- h^2= 0.28, ADG- h^2 = 0.45. The performed study on Charolaise meat breed raised in Romania showed that the animals had a very good body development confirming characteristic for meat breeds.

Key words: breed, Charolaise, meat characteristics, selection indices, Romania

INTRODUCTION

In France beef cattle are well represented by specialized race, Charolaise being on a top like number, genetic value and spreading.

Although it isn't a tradition in this direction, the activity of beef cattle breeding recorded a significant increase in the last years in Romania. This thing was possible by pure race cattle import and by extraordinary hybridizations number increase, using semen from specialized beef bulls.

Now in our country are valuable herds from Aberdeen Angus, Charolais, Limousine, Galloway, Wagyu races and hybrids of this or at another (Blanc Blue Belge, American Simmental) with local races [1, 6].

In an instable economy and with all administrative difficulties for animal imports and farm authorization, without some realistic and pragmatic information about breeding technology and without any form of organization for production capitalization, this evolution was surprising and it was possible by the passionate farmers' efforts [9, 12, 13].

Hence is necessary for such studies to know the farmers` problems and the results in the condition of our country. Using data of official control and from race Genealogic Book we conducted a study on animal genetic value imported in N-E of country considering principal selection indices and apply breeding technology.

MATERIAL AND METHODS

LUCOSDIOV society from Suceava where studies were conducted has 225 heads which 100 heads are cows and 125 heads youth of different ages. Studies were conducted on this 100 cows imported and their calves. They follow actual animal genetic value and after a statistic calculation was consider following selection indices: IFNAIS – calving ease index; CRsev – growing until weaning index; DMsev –

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muscular development at weaning synthetic index; DSsev – skeleton development at weaning index; ISEVR – weaning synthetic index; AVel –calving ability; ALait – nursing ability index; C.D.-index precision; IVMAT-synthetic index that combines the direct effects (IFNAIS, Crsev, Dmsev, Dssev) and maternal effects (Alait, Avel) [8].

In the first stage we calculated the mean and variability estimates to investigated characteristics and on the next stage to set genetic variability share in population, using the R.E.M.L. (Restricted Maximum Likelihood) method. This method is based on an iterative process of maximizing the function. This is based on an iterative process of function maximization.

Calculation techniques vary depending on the chosen optimization algorithm, but at each iteration cycle all require BLUP solutions for different effects model. This requires a large number of iterations until convergence is reached, but this is unavoidable if you want an effective evaluation. As a rule, be accepted as a convergence criterion a difference between the solutions from the last and penultimate iteration, smaller than one percent from the average registered values for respective indicator. In our case final convergence was 99.99% and iteration numbers was 2737.

Biometric model used has the following form [4, 7, 11]:

$J_{ijkl}=\mu+F_i+D_J+A_k+e_{ijkl}$

J_{ijkl}=performance "l" of individual "k" to the calving "j", in "i" farm.

μ =general average,

F_I="i" farm effect (fixed factor); i=1.

D_j=calving date effect "j" (fixed factor); j=1.

A_{ik}= additive genetic effect of the individual "k"; (randomly factor).

e_{ijkl}= measurement error associated with each performance.

It is a mixed model because it includes a random factor (animal) and two fixed factors (farm and calving date).

Were estimated mean and variability of the main indices of selection, heritability, phenotypic and genetic correlations between selection indices and results are summarized in tables and graphics.

Analysis and interpretation of results were correlated with the many observations made directly in farm.

RESULTS AND DISCUSSIONS

The stable are made from wood with free stalling. In each stable, cows have free access to paddock. The interior of the stable distinguish three functional areas: rest, movement and feeding [4].

Resting area is common space for cows. Animals enjoy the comfort features and interior space allotted per animal (7 m^2). As bedding, layer of straw is used, which is renewed every few days. Manure evacuation is mechanically. In summer cows are feeding by grazing (grazing period is between April to November) and in winter animals are feed with canned stock forage. All forages are produced in farm, hay, silage, etc.

After statistical processing (Table 1) showed that the average of calves' birth weight was 47.09 ± 0.901Kg, with limits between 37 and 59 Kg and a standard deviation of s=5.332 Kg, weight at 210 days have an average value by 281.94 ± 5.845 Kg with limits between 204 – 343 Kg, s=34.581, average daily gain have good results for this race in our country and was 1132.74 ± 22.291 g.

Weaning synthetic index (ISEVR) has an average value by 100.17±0.971 with an standard deviation of s=5.742 and synthetic index of maternal value has an average of 97.94±0.976 and s=5.775 for standard deviation.

Average for main treats analyzes indexes to the Charolaise cows ascendancy are showed in figure 1 and 2.

Looking calving ease index (IFNAIS) for the ascendance of first two generations we see that parturitions was pretty uniform in this first tow generation except paternal grandparents (TT) where parturitions were slightly difficult, with an index value of 91,31. Variability for this index was greater for the fathers, coefficient of variation being 10.76% and standard deviation s=10.5.

Growing index until weaning (CRsev) shows a uniform and intense ascending in weaning period, maxim value 96.49 being registered for parental grandmothers while parents have the same ascending with index value of 99.07(T) and 99.94(M).

Table 1 Medium values and variability estimates for analyzed traits to Charolaise race from N-E of Romania

SPECIFICATION	N	$\overline{X}$	$\pm s_{\overline{x}}$	S	V%	MIN.	MAX.
Weight to borne Kg	125	47.09	0.901	5.332	11.325	37	59
Weight to 210 days Kg	125	281.94	5.845	34.581	12.265	204	343
Average daily gain g	125	1132.74	22.291	131.875	11.642	850	1390
Synthetic index at weaning (ISEVR)	125	100.17	0.971	5.742	5.732	93	115
Synthetic index for maternal value (IVMAT)	125	97.94	0.976	5.775	5.896	88	110

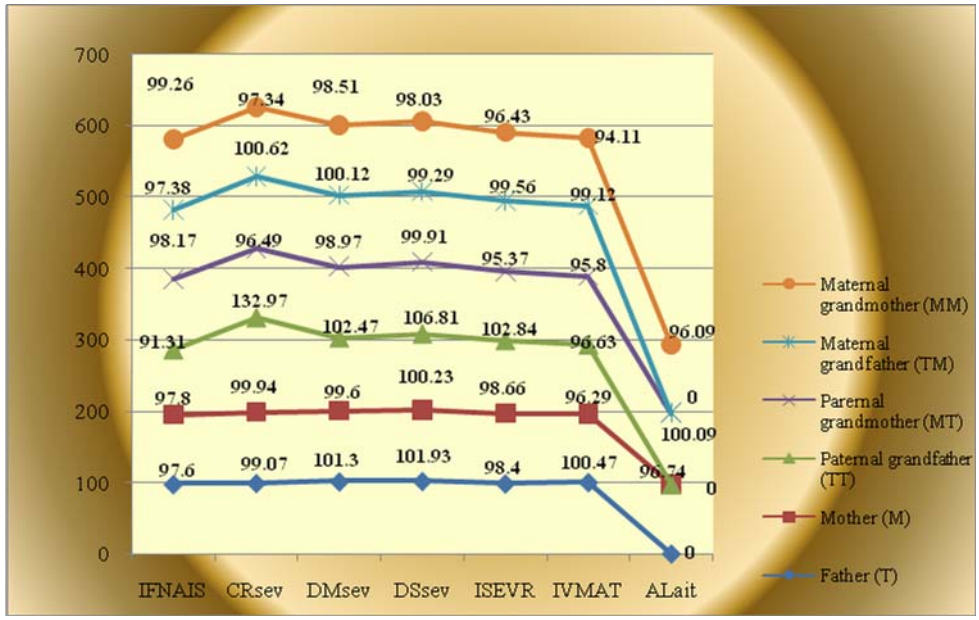

Figure 1 Averages values for selection index studied to ascendancy

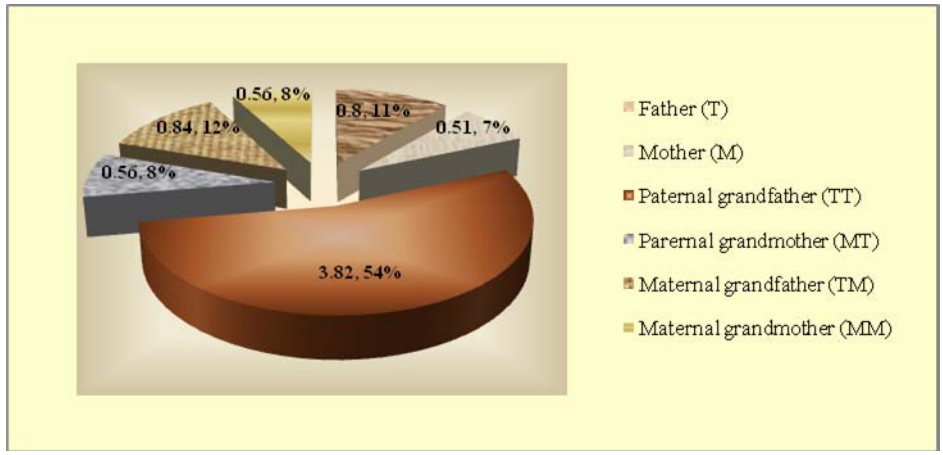

Figure 2 Average values for C.D. – index precision to ascendancy

From muscle development at weaning (DMsev) it is obvious that ascendency on pattern line (T, TT, TM) has a better muscle development, index value being superior to maternal line. It is a normal situation if we consider genetic difference for muscle development.

The same difference between sexes is obvious for skeleton development index (DSsev), paternal ascendancy being superior to maternal ascendancy. There is a stronger development of the paternal grandparents (TT) skeleton with the maximum index value of 106.81 and variability between 94 and 117.

The analysis of synthetic index at weaning (ISEVR) showed that the best treats were transmitted by paternal grandparents (TT), index value being 102.84 with a standard deviation of s=1.216 and variation limits between 88 and 114.

Precision for this index (CD) was the most good for maternal ascendancy (T and TM), with a value of 0.8, 0.84 while for maternal ascendancy were slightly higher of 0.5.

Analyzing the synthetic index that combines direct effects (IFNAIS, CRSEV, DMSEV, DSSEV) and maternal effects are found superior value for paternal line which shows a larger influence of males to meet treats transmission in descendants.

Notice a superior maternal skills for paternal grandmothers (MT) index value (ALait) being 100.09.

Using a rich literature and database published in Charolaise race Herd – Book in France we study the same indices fallowed for Romania studied herd. There were analysed 1294 Charolaise bulls from all races breeding departments, which have synthetic index at weaning over 104. The results are presented in table 2.

Table 2 Average and variability for main indices for analyzed traits to Charolaise race from France

Specification	n	$\overline{X}$	$\pm s_{\overline{x}}$	s	V%	Min.	Max.
Calving ease (IFNAIS)	1292	96.39	0.241	8.65	8.974	36	145
Growing until weaning (CRsev)	1293	108.51	0.152	5.455	5.027	91	127
Muscular development to weaning (DMsev)	1293	105.6	0.186	6.69	6.335	86	135
Skeleton development to weaning (DSsev)	1294	105.01	0.193	6.947	6.615	76	128
Synthetic index to weaning (ISEVR)	1294	110.82	0.156	5.614	5.066	104	137
Index precizion (CD)	246	0.86	0.005	0.072	8.379	0.74	0.99
Calving ability index (AVel)	305	98.28	0.461	8.047	8.188	69	119
Nursing ability index (ALait)	246	96.49	0.486	7.626	7.903	76	117
Synthetic index of maternal value (IVMAT)	245	106.22	0.415	6.502	6.121	93	131

After statistical processing resulted that value for average of the calving ease index was 96.39 ±0.241 and s=8.65 for standard deviation, those show a pronounced variability. Growing until weaning index (CRsev), muscular development (DMsev) and skeleton development (DSsev) has medium value that shows a very good corporal development. Frequency histogram for these properties fall studied population in a normal Gause distribution [10, 14, 16].

Synthetic index at weaning (ISEVR) has an average of 110.82 ± 0.165 and a standard deviation of s=5.614, values with a precision CD=0.86.

Analyzed population shows a big variability on the great genotypes selection favour, which contribute to the genetic amelioration of Charolaise population from France.

We also note maternal qualities to Charolaise race showed by indices value for parturition skills, nursing capacity and synthetic index for maternal value [10].

Average and variability values of beef traits for reproduction bulls show a very good development of beef skills, exposing well characteristic race type Charolaise with very favorable attributes for beef production.

Notice maternal superior skills of paternal grandmothers (MT), index value (ALait) being 100.09.

For genetic determinism of beef cows` qualitative traits, the literature shows the

complexity of this, appearance and traits control due to the mainly major genes.

In foreign literature is deeply address quantitative genetic studies for morphological traits and beef cattle skills but these studies are missing from our country literature, meat breeds being interesting recently, after quota installation.

Table 3 shows the coefficients of heritability values for analyzed characters to imported animals.

Examining the heritability coefficient values for analyzed characters to imported animals result that those have a different determination fund, as result of genetic interrelation for each traits and genotypes variability which form analysed animals genetic groups.

A common characteristic of traits heritability to Charolaise race is average of genetic determination degree for calving ease (h^2=0.23), synthetic index at weaning (h^2=0.26), growing until weaning (h^2=0.28), muscular (h^2=0.27) and skeleton development until weaning (h^2=0.25). At the same time for direct and maternal effects is a medium to high genetic determinism (h^2=0.35) but also for weight at calving (h^2=0.34) and in specially for average daily gain (h^2=0.45), values near to data mentioned in literature.

Table 3 Values of heritability coefficients (h^2) for analyzed traits to imported Charolaise

Trait	h^2	Additive variance	"Intralot" variance	Total variance
Weight to borne	0.34	0.6908	27.9003	28.5911
Weight to 210 days	0.37	141.9726	1086.2089	1228.1816
Average daily gain	0.45	1852.6726	15960.648	17813.321
ISEVR	0.26	0.3879	32.6702	33.0582
FNAIS	0.23	34.8237	741.2607	706.437
CRsev	0.28	1519.941	25611.677	24091.736
DMsev	0.27	14.9858	878.946	893.9318
DSsev	0.25	1.6725	954.4113	956.0837
C.D.	0.38	6.2048	258.3895	252.1848
IVMAT	0.35	117.3985	1002.0051	1119.4037

Table 4 Values of correlations coefficients between analyzed traits to imported Charolaise

Trait 1	Trait 2	Phenotypic correlation	Genotypic correlation	Environment correlation
Weight to 210 days	Average daily gain	0.89	0.93	0.88
Weight to 210 days	ISEVR	0.27	0.28	0.41
Weight to 210 days	IVMAT	0.44	0.32	0.47
Weight to 210 days	FNAIS	0.25	0.15	0.27
Weight to 210 days	CRsev	0.31	0.29	0.32
Weight to 210 days	DMsev	0.46	0.44	0.42
Weight to 210 days	DSsev	0.35	0.36	0.37
Weight to 210 days	C.D.	0.23	0.22	0.34
Average daily gain	ISEVR	0.32	0.38	0.31
Average daily gain	IVMAT	0.40	0.41	0.40
Average daily gain	FNAIS	0.08	0.11	0.07
Average daily gain	CRsev	0.35	0.37	0.45
Average daily gain	DMsev	0.28	0.29	0.30
Average daily gain	DSsev	0.25	0.24	0.28
Average daily gain	C.D.	0.34	0.23	0.45
ISEVR	IVMAT	0.83	0.62	0.87

Medium or high genetic determinism rate for analyzed indices shows genetic variability of female genetic material and high genetic variance between male reproducers. Obtained data can be a base in phenotypic selection for analyzed traits to studied animals, this is sustained by value of precision coefficient (h^2 =0.38), in case of these indices the

environment comes with a reduce intake in total variance determination.

Genetic, phenotypic and environmental correlations between analyzed indices were positive and different like intensity we can see it in table 4. Genetic, phenotypic and environmental correlations between weight to 210 days and average daily gain are high (between 0.88 and 0.93 %) and with IVMAT, FNAIS, CRsev, DMsev, DSsev was positive with medium to high intensity (0.25 – 0.46%). Between average daily gain and the same indicators correlations were positive and medium 0.25 – 0.41 %, except correlation with FNAIS which has a small value 0.07- 0.11 %. A strong link we found between selection indices ISEVR and IVMAT by 0.62-0.87%.

DISCUSSION

The results of this study show the genetic value of Charolaise race widespread in the entire world and with good results including Romania. Charolaise cows imported in N-E of country have a very good development characteristic to this beef race. For their good maternal qualities (maternal instinct, milk value) calves has a very good development with a high average daily gain and typical corporal conformation for a beef race. Charolaise is a docile race which makes it easy handling for the farmer [15, 16].

CONCLUSIONS

The study on the meat characteristics and traits for Charolaise race from Romania showed a very good development of beef characteristics.

Heritability estimates for analyzed traits widely varies with a medium genetic determinism for corporal weight, average daily gain, calving ease index, muscular development and maternal skills.

Genetic, phenotypic and environmental correlations (r_G, r_p, r_M) between analyzed index was positive and with different intensity.

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