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RESEARCH ON THE IMPROVEMENT OF THE MEAT PRODUCTION IN THE ROMANIAN TELEORMAN BLACK HEAD SHEEP BY CROSSING WITH MEAT BREEDS

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Abstract: In Romania the main direction of sheep breeding was until two decades ago, wool production, while the milk and meat productions were left in the background. After the 1990s, particularly after the accession of Romania to the European Union, sheep production redirected toward milk and meat production focusing on the identification of the most adequate techniques to increase these productions. One solution to restore this sector is to produce suckling lambs or fat lambs, competitive on the foreign markets. Within this context, the objective of our paper, part of a larger program, is to use industrial crosses to improve meat production in the local sheep breeds. We present here the results of crossing the local Teleorman Black Head (TBH) with imported meat rams: Suffolk and German Black Head (GBH). The studies monitored the performance of the (milk) hybrids F1 compared to the local breed lambs. 60 lambs assigned to three groups (20 lambs per group) were weaned at 2 months, when control slaughtering was used to determine: the slaughter house and commercial yield, proportion of carcass parts, proportion of butchery parts, meat to bone ratio for each part, carcass measurements, chemical composition of the meat, fatty acids and cholesterol included. At birth, the local breed lambs had 4.77 kg and a gain of 0.253 kg and reached 18.31 kg at slaughter. GBH hybrids lambs weighed 4.76 kg at birth, a gain of 0.277 kg and reached 20.63 kg at slaughter; Suffolk hybrids lambs weighed 5.36 kg at birth, 0.322 kg daily weight gain and 24.92 kg at 2 months. The slaughterhouse yield, the meat to bone ratio and carcass dimensions were better in the hybrids than in the local breed. The Suffolk and German Black Head rams transmitted to their progeny a higher speed of growth, a conformation specific to the meat breeds and a better dressing in muscles, a higher slaughter yield and a better meat to bone ration than the local breed lambs.

Key words: crossing, lamb meat production, local breed

Introduction

For the efficient production of sheep meat crossing is recommended as rearing strategy for the commercial farms. As reproduction practice, doesn't presume the random mating of the breeds; rather, crossing presumes the systematic use of breeds for the production of special progenies *(Freking, 2004)*. For instance, a crossing program with a terminal ram presumes the use of a male with superior traits which increases carcass quality of the commercial lambs. All the progeny from such crossing are marketed for meat *(Abdullah, 2008; Zgur, 2003)*. Crossing providers two advantages compared to the pure breed rearing: the heterosis effect and the complementarities of breed aptitudes. Heterosis, or the "hybrid vigour" is the superiority of the hybrid progeny compared to the average superiority of its parents. Complementarities refer to the fact that there are no perfect breeds and that each breed has strong points and weak points. In a systematic crossing program the breeds are mixed in order to balance the positive and negative aspects of each breed involved in crossing.

Our purpose is to improve the meat production of the local Teleorman Black head sheep by crossing with rams from the specialised meat breeds.

Given these aspects, the purpose of our experiment was to study the rearing performance and the carcass traits in F1 hybrid (suckling) lambs from cross of Teleorman Black head (TBH) ewes and Suffolk rams and with the German Black Head (GBH) rams. The performances of Suffolk sheep are impressive: ewes with bodyweight up to 80 kg and rams with bodyweight up to 120 kg. The breed is widespread in England and in many other countries around the world; it is a meat breed reputed for the fast growth speed and for the outstanding meat quality. Suffolk rams were used in many crossing designs for the production of meat hybrids *(Font Furnols, 2006; Leymaster, 1981, 1993)*.

The black head German meat sheep counts over 300,000 animals in Germany, 13,000 being registered into the herd-book. It is spread in central Germany. It's formation started in 1870 in northern Germany by a complex cross of the British short-hair meat breeds Hampshire, Oxfordshire, Shorpshire and Suffolk, followed by a vigorous selection. Today it is the second sheep breed in Germany in terms of population (17%). It achieves high performances, it is precocious but demanding, requiring cultivated pastures and free access to concentrate feeds. It resembles to its forming breeds, but it has dark brown hair on the head (compared to black in the Suffolk) and naked mandible and maxillary (short hairs in Hampshire and Oxfordshire). The disadvantages of this breed are the shorter body and the low milk production. The body is properly developed, height of 65 cm and body weight of 70-85 kg for the ewes and 75 cm and 110-135 kg for the rams. The growing lambs have a very high daily gain, 420-450 g and 60% slaughter yield. The sheep produce 4-5 kg wool annually with 30-35 microns finesses, 7-8 cm fleece length

and 48-50 washing yield. An important trait of these breed is its high prolificacy, 180-200%, the reproductive precocity (the young ewes enter reproduction at 10-12 months) and the very long mating season *(Pajor, 2004)*.

Materials and Methods

The research was conducted in the experimental farm of INCDBNA, where the Teleorman Black head sheep were assigned to three groups. The ewes from the first group were mated to a local ram, the ewes from the second group were mated to a Suffolk ram, while the ewes from the second group were mated to a German Black Head (GBH) ram. The studies monitored the growth performance and carcass characteristics in F1 hybrid nursing lambs compared to the local breed. Sixty lambs were assigned to three groups (20 lambs per group) and were weaned at the age of 2 months when control slaughtering was performed and the slaughterhouse and commercial yields were calculated; carcass measurements were performed and the meat to bone ratio was calculated, as well as the chemical composition of the meat, the fatty acids and cholesterol level, separately for each group. During the nursing period the lambs were weighed periodically, up to weaning. The carcasses were cut according to the French method which uses the following parts leg, loin, rack, shoulder, flank and neck.

Results and Discussion

Table 1 shows the weight gain of the experimental animals during the nursing period. Lamb weight at birth was higher in the hybrids with Suffolk, compared to the other breeds which had similar body weights. The differences between the weight at birth are significant between the hybrids with Suffolk and the local breed and between the hybrids with Suffolk and the German breed. At the age of one month, the differences persisted, but the local lambs scored a slight advantage over the GBH hybrids. At the age of two months, when they were slaughtered, the Suffolk hybrids had the highest weight, followed by the GBH hybrids, which were 2.32 kg heavier than the local breed. Significant differences were noticed only between the Suffolk hybrids and the local breed. The Suffolk hybrids had an average daily weight gain of 0.322±0.020 kg during the two experimental months, the GBH hybrids had an average daily weight gain of 0.277±0.022 kg, while the local lambs had an average daily weight gain of 0.253±0.015 kg. The Fisher test was used to test the significance of the differences between the average daily gains, which showed that the differences were significant.

Table 1. Weight gain of the lambs from birth to weaning (2 months)

Items	Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%
Weight at birth, kg	4.770±0.139*	12.742	5.364±0.109*	7.617	4.760±0.175*	15.120
Weight at one month, kg	13.400±0.682	23.321	15.032±0.858	21.351	13.176±0.924	28.915
Weight at two months, kg	18.305±0.712*	17.819	24.921±1.400*	21.011	20.629±1.525	25.033
Weight gain, kg	13.532±0.687	23.244	19.558±1.104	26.877	15.869±1.163	30.205
Average daily weight gain, g/day	0.253±0.015	27.773	0.322±0.020	23.392	0.277±0.022	32.515

Fifteen lambs were slaughtered after weaning, five from each group. Table 2 shows the slaughtering results. The yield was higher in the Suffolk hybrids (49.027%) than in the GBH hybrids (48.761) and than the local breed lambs (47.212 %), the differences existing in the commercial yield too. The Fisher test showed that the differences were not significant.

Table 2. Live weight, slaughtering yield and proportion of the different carcass parts

Items		Teleorman Black head n=5		F1 hybrids (Teleorman Black head x Suffolk) n=5		F1 hybrids (Teleorman Black head x German Black head) n=5	
		$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%
Live weight. kg		21.42±0.928	9.694	25.5±0.375	2.917	21.720±0.487	5.016
Carcass weight. kg		10.14±0.653	14.420	12.7±0.040	0.642	10.180±0.449	9.881
Slaughtering yield %		47.212±1.381ns	6.544	49.027±0.747	3.000	48.671±1.806	8.295
Commercial yield %		51.752±1.364ns	5.897	54.455±0.833	3.048	52.920±1.804	7.621
Head	kg	0.899±0.061	14.992	1.010±0.048	9.667	0.877±0.013	3.411
	%	4.184±0.136	7.293	3.956±0.149	7.579	4.042±0.059	3.295
Organs	kg	0.976±0.069	15.928	1.220±0.072	11.892	0.922±0.023	5.669
	%	4.539±0.167	8.224	4.788±0.295	12.333	4.249±0.109	5.782
Full digestive tract	kg	4.891±0.285	13.030	5.050±0.268	10.616	5.013±0.542	24.182
	%	22.978±1.562	15.205	19.772±0.798	8.076	22.965±2.195	21.378
Hide	kg	2.556±0.130	11.378	2.801±0.165	11.797	2.283±0.164	16.131
	%	11.943±0.374	7.009	10.971±0.536	9.771	10.501±0.706	15.037
Legs	kg	0.572±0.034	13.149	0.688±0.014	4.177	0.587±0.015	5.764
	%	2.665±0.076	6.432	2.700±0.096	7.137	2.702±0.011	0.987
Losses	kg	1.3±0.202	33.706	2.021±0.079	7.860	2.075±0.145	15.708
	%	6.286±0.951	33.841	7.938±0.379	9.550	9.518±0.528	12.416

After slaughter the carcasses were left to dry for 24 hours, and then specific carcass measurements were performed: large trunk length, small trunk length, inner length of the leg, outer length of the leg, carcass width at the leg, thorax width, breast width, thorax depth, thorax perimeter, thigh perimeter. Table 3 shows that all length dimensions are larger at the local breed lambs than at the hybrid lambs, while the width dimensions (carcass width at the leg, thorax width, breast width) are larger in the hybrid lambs. The largest differences were noticed for the thigh perimeter: 56.25±0.750 cm in the Suffolk hybrid lambs and 52.8±0.860 cm in the GBH hybrids, compared to 35.5±3.49 cm in the local Teleorman Black Head lambs. The carcass dimensions of the GBH hybrids are slightly smaller than those of the Suffolk hybrids, but higher than those of the local breed.

Table 3. Specific carcass measurements (cm)

Items	Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%
Large trunk length	66.4±1.122	3.780	62.75±0.946	3.016	62.4±1.666	4.179
Small trunk length	54.4±2.064	8.484	54.5±0.957	3.513	52.8±1.067	4.521
Inner length of the leg	27.2±1.392	11.450	21.25±0.478	4.505	22.2±0.374	3.768
Outer length of the leg	43.2±1.019	5.278	39.5±0.645	3.268	38.2±1.240	7.264
Carcass width at the leg	17.0±2.129	28.005	19.5±0.288	2.960	18.8±0.200	2.378
Thorax width	16.5±0.387	5.248	20.25±0.629	6.213	18.4±0.244	2.976
Breast width	14.4±0.244	3.803	17.0±0.408	4.802	15.8±0.663	9.387
Thorax depth	22.5±0.547	5.443	22.75±0.250	2.197	21.4±0.509	5.327
Thorax perimeter	58.2±1.199	4.610	63.0±0.816	2.592	59.0±1.414	5.359
Thigh perimeter	35.5±3.485	21.955	56.25±0.750	2.666	52.8±0.860	3.643

The differences noticed between the carcass dimensions of the three groups are due to the hybrid Suffolk and German Black Head rams specialised in meat production. The conformation of the meat breeds is brevimorphic and it is characterised by a stronger development of the width and depth of the animals, the body having the shape of a cylinder, with well developed muscles. These traits of the ram have been passed on to its progeny.

After measurements were performed, the carcasses were cut according to the French method which uses the following parts leg, loin, rack, shoulder, flank and neck (Table 4).

Table 4. Proportion of the butcher parts

Items		Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
		$\bar{x} \pm S_{\bar{X}}$	CV%	$\bar{x} \pm S_{\bar{X}}$	CV%	$\bar{x} \pm S_{\bar{X}}$	CV%
Leg	(kg)	2.742±0.207	16.922	2.493±0.019	1.557	1.716±0.060	7.911
	(%)	31.518±1.005	7.1359	37.94±0.530	2.797	34.09±0.558	3.664
Loin	(kg)	0.626±0.056	20.201	0.430±0.015	6.976	0.414±0.027	14.677
	(%)	7.155±0.205	6.426	6.96±0.412	11.856	8.18±0.253	6.931
Rack	(kg)	1.027±0.075	16.458	0.748±0.031	8.486	0.622±0.037	13.386
	(%)	11.848±0.503	9.499	11.59±0.367	6.332	12.30±0.263	4.795
Shoulder	(kg)	1.721±0.0818	10.626	1.042±0.043	8.262	0.898±0.021	5.349
	(%)	19.916±0.496	5.572	16.15±0.467	5.794	17.89±0.553	6.923
Flank	(kg)	1.753±0.175	22.387	1.233±0.055	9.013	0.919±0.082	19.958
	(%)	20.048±1.263	14.095	19.16±0.658	6.872	18.08±0.945	11.690
Neck	(kg)	0.830±0.066	18.006	0.555±0.045	16.241	0.477±0.026	12.460
	(%)	9.515±0.172	4.058	8.20±0.706	17.237	9.45±0.271	6.412

The Suffolk hybrids have the largest hock, followed by the GBH hybrids. The GBH hybrids have the largest proportions of rack and loin (premium parts), while the local lambs have the largest proportions of shoulder and flank (second quality parts).

Each butcher part was deboned and the proportion of meat and bone and the meat to bone ratio were calculated for the entire carcass. Tables 5 and 6 show the results.

Table 5 shows that the proportion of meat in the main region, leg, is larger in the Suffolk hybrids (77.08±0.516%), followed by the GBH hybrids (72.22±1.315); the same can be noticed for the rack and loin, where the meat percentage is higher in the hybrids than in the local breed. The secondary butcher parts, the shoulder and flank, have slightly higher meat percentages in the local breed than in the hybrids.

Table 5. Meat and bone proportion of the butcher parts

Breed			Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
			$\bar{x} \pm S_{\bar{X}}$	CV%	$\bar{x} \pm S_{\bar{X}}$	CV%	$\bar{x} \pm S_{\bar{X}}$	CV%
Leg	meat	(kg)	1.952±0.1510	17.301	1.893±0.038	4.073	1.242±0.064	11.533
		(%)	71.22±1.463	4.593	77.08±0.516	1.340	72.22±1.315	4.073
	bones	(kg)	0.790±0.072	20.606	0.563±0.012	4.444	0.474±0.011	5.501
		(%)	28.78±1.463	11.365	22.92±0.516	4.506	27.78±1.315	10.588
Loin	meat	(kg)	0.415±0.043	23.190	0.318±0.020	12.696	0.296±0.025	19.088
		(%)	65.96±1.773	6.012	70.44±1.048	2.977	71.13±1.618	5.088
	bones	(kg)	0.211±0.016	17.365	0.133±0.004	7.225	0.118±0.003	7.090
		(%)	34.04±1.773	11.651	29.56±1.048	7.093	28.87±1.618	12.537
Rack	meat	(kg)	0.553±0.034	13.810	0.443±0.018	8.379	0.367±0.030	18.769
		(%)	54.24±2.707	11.159	59.07±2.103	7.121	58.70±1.668	6.353
	bones	(kg)	0.474±0.054	25.615	0.308±0.021	14.206	0.255±0.010	8.985
		(%)	45.76±2.707	13.229	40.93±2.103	10.275	41.30±1.668	9.031
Shoulder	meat	(kg)	1.273±0.062	10.915	0.755±0.033	8.769	0.641±0.023	8.132
		(%)	73.97±0.850	2.571	72.18±0.928	2.573	71.31±1.077	3.379
	bones	(kg)	0.448±0.026	13.313	0.290±0.007	5.075	0.257±0.006	5.771
		(%)	26.03±0.850	7.306	27.82±0.928	6.677	28.69±1.077	8.398
Flank	meat	(kg)	1.359±0.161	26.482	0.955±0.051	10.823	0.691±0.072	23.376
		(%)	76.80±1.942	5.654	76.87±1.621	4.218	74.83±1.555	4.647
	bones	(kg)	0.394±0.020	11.610	0.285±0.012	8.474	0.228±0.016	16.159
		(%)	23.20±1.942	18.715	23.13±1.621	14.018	25.17±1.555	13.816
Neck	meat	(kg)	0.528±0.033	14.229	0.349±0.033	18.997	0.335±0.030	20.355
		(%)	64.05±1.737	6.066	65.67±1.074	3.271	69.86±3.168	10.141
	bones	(kg)	0.302±0.0362	26.788	0.181±0.012	13.953	0.142±0.013	21.214
		(%)	35.95±1.737	10.807	34.33±1.074	6.256	30.14±3.168	23.511

The meat to bone ration for the entire carcass is 2.19:1 in the local lambs, 2.42:1 in the GBH hybrids and 2.68:1 in the Suffolk hybrids (Table 6), which shows that the meat to bone ratio is better in the hybrid lambs.

Table 6. Meat to bone ratio

Items	Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
	$\bar{x} \pm S_{\bar{X}}$	CV%	$\bar{x} \pm S_{\bar{X}}$	CV%	$\bar{x} \pm S_{\bar{X}}$	CV%
Meat to bone ratio	2,193±0,132	13.14	2.683±0.063	4.713	2.427±0.169	15.570

No significant differences in meat quality (Table 7) were determined between the three groups after the chemical analyses of the meat were performed.

Table 7. Chemical composition of the meat

Specification	Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%
DM (%) 65ºC	35.250±1.863	11.8223	39.830±0.834	4.190	35.476±2.708	17.068
DM(%) 103ºC	94.930±1.006	2.3701	91.213±2.121	4.691	94.412±0.422	0.999
(%) CP	49.570±4.0132	18.103	40.235±5.551	27.595	43.978±4.181	21.256
(%) EE	39.548±4.079	23.065	42.988±3.771	17.546	45.372±4.832	23.811
(%) Ash	2.788±0.181	14.519	2.055±0.140	13.628	2.636±0.212	12.012

All groups of animals had the same profile of fatty acids (table 8): Lauric acid, Miristic acid, Miristoleic acid, Palmitic acid, Palmitoleic acid, C17:0 , C17:1, Stearic acid, Oleic Trans acid, Linoleic acid, Linolenic acid, Conjugated Linoleic acid, Arachidonic acid. The meat from the hybrid lambs had a higher level of polyunsaturated fatty acids (Linoleic, Linolenic, Conjugated Linoleic, Arachidonic), which means that this meat is healthier due to the content of omega 3 and omega 6 fatty acids.

Table 8. Fatty acids and cholesterol profile in the lambs

Specification	Teleorman Black head		F1 hybrids (Teleorman Black head x Suffolk)		F1 hybrids (Teleorman Black head x German Black head)	
	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%	$\bar{x} \pm S_{\bar{X}}$	Cv%
Cholesterol g%g	0.204±0.151	104.74	0.137±0.012	17.800	0.212±0.023	24.503
Lauric g%g EE	1.120±0.170	21.46	0.320±0.103	72.033	0.324±0.064	44.492
Miristic g%g EE	9.445±1.155	17.29	9.733±0.231	5.310	8.952±0.562	14.034
Miristoleic g%g EE	1.335±0.315	33.36	0.968±0.063	14.529	0.962±0.063	14.690
Palmitic g%g EE	27.090±1.570	8.19	27.803±0.565	4.546	27.018±0.400	3.474
Palmitoleic g%g EE	3.520±0.370	14.86	2.708±0.145	11.954	2.650±0.271	22.861
C17:0 g%g EE	1.030±0.030	4.11	1.223±0.049	8.859	1.300±0.036	6.178
Decaheptenoic g%g EE	1.160±0.090	10.97	0.693±0.044	14.265	0.702±0.060	19.043
Stearic g%g EE	10.110±0.840	11.75	11.875±0.598	11.257	12.440±0.942	16.935
Oleic Trans g%g EE	1.275±0.015	1.66	1.168±0.471	90.188	1.664±0.408	54.840
Oleic Cis g%g EE	35.820±3.450	13.62	31.258±0.664	4.751	31.458±1.692	12.028
Linoleic g%g EE	3.975±0.445	15.83	4.493±0.283	14.097	4.596±0.196	9.542
Linolenic g%gEE	0.580±0.120	29.26	1.125±0.080	15.975	1.118±0.078	15.613
Conjugated Linoleic g%g EE	0.265±0.005	2.66	0.550±0.036	14.771	0.524±0.061	25.978
Arachidonic g%g EE	1.565±0.453	39.30	1.078±0.129	26.709	1.152±0.159	30.840
Other fatty acids g%g EE	2.830±1.020	50.97	2.363±0.280	26.469	2.486±0.567	51.013

Conclusion

The local lambs weighed 4.77 kg at birth, had a daily weight gain of 0.253 kg, reaching 18.31 kg at slaughter; the hybrids with CNG weighed 4.76 kg at birth, had a daily weight gain of 0.277 kg reaching 20.63 kg at slaughter; the hybrids with Suffolk weighed 5.36 kg at birth, had a daily weight gain of 0.322 kg and reached 24.92 kg body weight at two months. The average daily weight gain during the nursing period was higher in the hybrid lambs than in the local breed lambs.

The slaughtering yield, the commercial yield and the meat to bone ratio were also higher in the hybrid lambs compared to the local breed lambs.

The carcass measurements have shown that the width and depth of the carcasses were higher in the hybrid lambs than in the local lambs, while the lengths were higher in the local lambs.

This experiment proved that the Suffolk and German Black Head meat rams transmitted to their progeny a higher speed of growth and the specific conformation of the meat breeds, with a better dressing of muscles particularly in

the higher quality buthcer parts, the leg and rack, a better slaughter yield and a better meat to bone ration than the local Teleorman Black Head lambs.

Istraživanje o unapređenju proizvodnje mesa rumunske teleorman crnoglave ovce ukrštanjem sa mesnatim rasama

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Rezime

U Rumuniji, glavni pravac u ovčarstvu do pre dve decenije, proizvodnja vune, dok su proizvodnja mleka i mesa bile u pozadini. Nakon 1990-tih, a posebno nakon pridruživanja Rumunije Evropskoj Uniji, ovčarstvo se usmerilo na proizvodnju mleka i mesa, fokusirajući se na odredjivanje odgovarajućih tehnika za povećanje ovih proizvodnji. Jedno rešenje za obnovu ovog sektora je bila proizvodnja jagnjadi ili tov jagnjadi, koji će biti konkurentan na stranim tržištima. U ovom kontekstu, cilj našeg rada, koji predstavlja deo jednog većeg programa, jeste korišćenje industrijskog ukrštanja za unapređenje proizvodnje mesa lokalnih rasa ovaca. U radu su predstavljeni rezultati ukrštanja lokalne teleorman crnoglave ovce (TBH) sa uveženim ovnovima: safolk i nemačka crnoglava rasa (GBH). U studiji je praćena proizvodnja mleka kod hibrida F1 u poređenju sa lokalnim rasama. 60 jagnjadi, podeljeno u tri grupe (20 jagnjadi u grupi), su odbijeni u uzrastu od 2 meseca, i na kontrolnom klanju su odredjivani klanični i komercijalni randman, udeo delova trupa, udeo partija/mesarskih delova, odnos mesa i kostiju u svakom delu trupa, mere na trupu, hemijski sastav mesa, masne kiseline i holesterol. Jagnjad lokalne rase su na rodjenju imala telesnu masu 4.77 kg i prirast od 0.253 kg i dostigla su telesnu masu pred klanje od 18.31 kg. Melezi sa GBH su imali telesnu masu na rođenju od 4.76 kg, prirast od 0.277 kg i dostigla su telesnu masu pred klanje od 20.63 kg; melezi sa safolk rasom su na rodjenju imala telesnu masu od 5.36 kg, 0.322 kg dnevni prirast i masu pred klanje od 24.92 kg u uzrastu od 2 meseca.

Klanični randman, odnos mesa i kostiju i dimenzije/mere na trupu su bile bolje kod meleza nego kod lokalnih rasa. Ovnovi safolk rase, kao i neamački crnoglavi ovnovi su na svoje potomstvo preneli osobinu bržeg porasta, konformaciju koja je specifična za mesnate rase i bolji randman/ prekrivenost mišićima, veći klanični randman i bolji odnos meso/kosti nego lokalne rase.

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