

## MEAT PRODUCTION OF THE SIMMENTAL AND BLACK-AND-WHITE BREEDS IN THE REPUBLIC MOLDOVA

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### Abstract

*Reforms that took place in Moldovan agriculture after 1990 in the privatization and division of small plots of arable land caused the abolition of collective farms, zootechnical complexes in cattle breeding and raising for reproduction. There was created a disastrous situation in cattle industry. The proportion of reproductive cattle reached a dangerous level (approximately 1% of all livestock in the republic) which cannot fully restore the number of livestock breeds and genetic renovation of cattle in R. Moldova. There are imported young bulls for breeding and to create new farms which causes capital outflow to foreign countries. Improving cattle breeding activities are practically zero, there is not record of origin and youth development for breeding, production and quality of milk of cows, primary material. The selection is conducted randomly but not on the basis of productive potential because of that. Under these conditions degradation of populations of cattle breeds is happening in the country, which will be necessary to restore for enormous investments. Research has shown that local populations of Simmental and Black-and-White steers have good qualities for intensive breeding and effective meat production.*

**Key words:** cattle, Simmental, Black-and-White, meat, production

### INTRODUCTION

Currently development of human society is characterized by a population explosion. Population growth is increasing faster. There is an increasing demand for food, especially meat products. According to FAO data for 2003 - 2005, over 848 million inhabitants of the world suffered from malnutrition. Currently it is considered that more than 40% of the total population is in such a situation. In economically developed countries standards of living are becoming higher, and consumption of meat product is increasing. Increase in demand for food in developing countries results in the growth of wages and living standards of population.

In this context the extensive raising of cattle increased scientific and technical concerns. There is not as much increase in efficiency, but substantial growth of productivity by improving cattle breeds, breeding technologies and exploitation of livestock. As classical methods of cattle breeding are becoming less able to meet demand for animal products, they are replaced by intensive forms of production

based on agricultural achievements of contemporary science and technology.. Breeding and exploitation of cattle in economically developed countries is becoming more industrial, it is using mechanical and even automated methods, modern technologies for breeding, feeding and supporting, while using an increasingly valuable biological material. Consequently it is necessary to perform an analysis of cattle breeding for consumption.

### DATA AND METHOD OF RESEARCH

Research on cattle breeding in the Republic Moldova was made based on statistical data analysis and summary of publications of researchers in economics and agriculture animals. Perspective of development of that activity was developed in accordance with national economic development strategy for 2008-2015. It was taken into account that currently cattle breeding, milk and meat production volume is mostly in households. They used results of statistical surveys conducted by the National Bureau of Statistics about agricultural

activity of small agricultural producers in Moldova in 2009 on a sample consisting of 2332 households.

Analysis of meat production and adaptively for intensive growth and feeding of the Simmental and Black-and-white (new Moldavian type) breeds, and researches were conducted in special farms for meat production in county Florești. Both groups of animals were bred and supported under similar conditions. Using traditional breeding methods there were found body mass index, specific consumption of food, the results of slaughter, carcass and meat quality, economic efficiency of production of young animals.

## RESULTS AND DISCUSSIONS

**Analysis of development of livestock industry.** Main branch of the livestock sector in Moldova is breeding cattle. Cattle are the main provider of milk and meat, both for household consumption and as raw material for food industry enterprises. About 91% of world milk production and 30% of consumption of meat is obtained from cattle. 90% of the hides used in the leather industry is obtained from cattle. Each cattle produce on average 10 tons of manure per year. Note that 40% of organic material used to feed cattle returns to the soil in the form of organic fertilizer extremely necessary to maintain and improve soil fertility. It is

important to note that comparing with chemical fertilizers; manure is cheaper and does not produce soil and environmental pollution. Under conditions of increasing prices of energy resources (fuel) and mechanisms used in agriculture, cattle can be used as tractive force, particularly in individual households. Cattle effectively feed on green forage used in food industry. The main purpose of breeding of cattle in Republic of Moldova is milk and meat producing, which are valuable products to feed people and valuable raw material in dairy and meat industry. Although mass privatization of land and agricultural holdings in the Republic of Moldova ended more than eight years ago, the current situation did not change much better in comparison with the end of reforms in 2000.

The livestock industry in R. Moldova had the highest degree of development during the years 1989-1990. During these years there have been indications of highest performances in using cattle, their productivity and overall production of milk and meat. In the coming years because of the failed agrarian reform there has been a slowdown of all branches of agriculture, including cattle breeding sector, the segment of this sector in global agriculture, and the economic indicators of production of milk and meat. After 1990 there were significant changes in cattle breeding industry. See table 1.

Table 1 Dynamics of livestock and cattle productivity indicators

	Year					% comparing to 2009		
	1990	1995	2000	2005	2009	1990	1995	2000
The number of cattle in all categories of households, thousands of heads	1061	644	394	331	218	20,5	33,9	55,3
including cows, thousands of heads	395	342	269	231	160	40,5	46,8	59,5
Annual production of milk from a cow, kg	3975	2919	2179	3018	2743	69,0	93,8	125,9
Total milk production, thousand tons	1511	761	574	659	543	35,9	71,4	94,6
daily average weight gain, g	515	223	217	321	325	63,1	145,7	149,8
Annual production of beef (slaughter weight), tons	114,3	42,3	18,0	15,6	10,6	9,3	25,1	58,9

**Feeding the young bulls during the experimental period.** Primary basic forage used for feeding young bulls were hay,

silage, and green fodder, natural and cultivated in form of fodder and grain mixes concentrates. = (tab. 2).

Table 2 Consumption and nutritional value of fodder, an average per capita, kg

Indicators	Breed	
	Black-and-white	Simmental
Fodder consumed:		
Milk substituent	56,7	56,4
Fodder concentrates	929	947
Green fodder	111	105
Succulent fodder	2269	2138
including silage	814	798
Roughage, total	1001	1032
including hay	735	763
including granuls	319	322
The nutritional value of forage consumed, nutritional units	2170	2183
Digested protein per 1 nutritional unit, g	123	123

There was no significant difference between the Simmental and Black-and-White breeds in regards to the consumption of certain types of fodder. The calves of Black-and-White breed ate more green and succulent fodder, and those of Simmental breed ate more roughage and grain. However, there was no statistical evidence of difference between those two groups on specific types of fodder consumption ( $P < 0.90$ ). The nutritious value of portions and content of

digestible protein during the experiment was similar in both groups.

Index numbers of increasing body mass of experimental young bulls which characterizes the increase in weight from birth to 16 months, when experimental animals were slaughtered, are presented in table. 3.

A more accurate picture of changes in weight of steers can be obtained on the basis of determining the absolute growth rate (tab. 4).

Table 3 The dynamics of body mass  $M \pm m$ , kg

Steer age	Breed	
	Black-and-White	Simmental
Birth	43,6 $\pm$ 3,2	42,4 $\pm$ 3,1
6 months	176,3 $\pm$ 4,7	169,8 $\pm$ 5,7
9 months	238,4 $\pm$ 6,8	236,4 $\pm$ 7,6
12 months	309,2 $\pm$ 7,5	308,6 $\pm$ 8,5
16 months	418,5 $\pm$ 8,1	426,7 $\pm$ 11,4

Table 4 Dynamics of absolute growth rate, g

Steer age	Breed	
	Black-and-White	Simmental
0-6 months	737	708
6-12 months	738	771
6-12 months	911	984
0-16 months	781	801

Up to 6 months Black-and-White steers grew more intensively than Simmental. Subsequently, Simmental steers had higher indicators compared with others in the absolute growth rate. Especially there is a big difference

in the average daily body weight gain took place between 12 to 16 months in both experimental groups, which can be explained by the high level of feed consumption.

During the entire period of the experiment, the breed Simmental had a faster growth of young cattle, but the difference between groups was statistically uncertain ( $P < 0.90$ ). At the age of 15 months according to body conformation index between all experimental groups, there are some differences caused by age-related changes.

Black-and-White steers have inherited specific body conformation of breeds specialized in the production of milk to a greater extent than Simmental breed. It results from age-related changes

The main indicators that characterize the production of meat from experimental young bulls at the age of 16 months are presented in table. 5.

Table 5 Results of slaughter,  $M \pm m$ , kg

Indicators	Breed	
	Black-and-White	Simmental
Weight at 16 months, kg	413±7,9	429,0±8,2
Weight before slaughter, kg	384,0±7,5	400,6±7,9
Carcass weight, kg	215,0±5,3	225,3±5,7
Carcass yield, % (?) yeild (?)	56,0	56,3
Visceral fat weight, kg	6,3±0,04	7,0±0,05
Visceral fat yield, % (?)	1,6	1,7
Carcass weight and fat, kg	221,3±5,6	232,3±6,0
Slaughter yield, % (?)	579,6	57,9

The results of analysis indicate that the Simmental steers exceeded those of Black-and-White by main quantitative index. Simmental steers produced carcasses that are heavier than those of Black-and-White by 10.3 kg (4.8%). The difference between the groups was statistically significant ( $P > 0.90$ ). Simmental steers, comparing to Black-and-

White, accumulate more visceral fat with the difference between the groups reached 11.1%. Upon completion of the process of feeding, steers from both groups had high ratios of mass and slaughter carcasses. Characteristic of morphological composition of meat of different types and inesculent parts in of carcasses are presented in table 6.

Table 6 Characteristic of morphological composition of carcass

Indicators	Breed	
	Black-and-White	Simmental
Weight of half carcass, kg	105,2±1,9	111,8±2,1
Edible portion of a half carcass, %	80,1±1,5	79,2±1,8
Including high quality meat, %	11,6	10,4
Including meat of the first quality	29,9	27,5
Including meat of the second quality	38,6	41,3
The inedible part of the carcass, %	19,9±0,4	20,8±0,5
Including tendons, %	1,2	1,2
Including bones, %	18,7	19,6

There are small differences between experimental groups for the morphological composition of carcasses and certain categories of meat. The Simmental steer carcasses contained more bones (by mass) and fewer muscles. The Black-and-White steer carcasses contained more meat of high and first quality than Simmental carcasses. Vice versa the Simmental breeds predominate with meat of high quality with

subcutaneous and intermuscular fat.. The carcasses of steers from both groups contained an equal amount (by weight) of the tendons removed from boning.

The results of studying of the chemical composition and caloric value of an average sample of meat from the bone and long back muscle of experimental young cattle are presented in the table 7.

Table 7 Chemical composition and caloric value of meat

Indicators	Breed	
	Black-and-White	Simmental
Average carcass meat samples		
Chemical composition, %:		
Total moisture	78,6	76,8
Dry matter, including:	21,4	23,2
fat	2,2	4,0
protein	17,5	17,6
mineral matter	0,9	0,9
Caloric value of 1 kg of meat, MJ	4003	4698

Between Simmental and Black and White breeds there are some differences in chemical composition and caloric value of meat. Samples taken from carcasses of Simmental steers contained more dry matter, primarily due to a higher content of intermuscular and intramuscular fat, which influenced the chemical composition of meat samples from the long back muscles. However, the fat content and calorie value in meat samples from Simmental breeds were higher than in the meat of Black-and-White breeds by 1.8 and 1.2 times respectively. The above indicators of samples of meat from the long back muscle exceeded only by 1.4 and 1.1 times.

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