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STUDY OF PRODUCTIVE PERFORMANCE IN THE PINZGAU BREED EXPLOITED IN THE DORNELOR BASIN, SUCEAVA COUNTY

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Abstract

The paper aims to highlight the productive performance of the Pinzgau breed exploited in the Dornelor Basin, Suceava County. In this sense, a herd of 12 head of cattle, belonging to the Pinzgau breed, was studied, both the red variety and the black variety, which were followed by the productive performances at the ascendancy and descent of the nucleus from the farm. Also, the parameters regarding the quality of milk obtained from the studied cattle were analyzed. The ancestry of the studied herd is valuable with productions in the mother (M) of 5496 kg of milk, 4.22% fat and 3.39% protein, in the mother of the father (MT) of 5562 kg of milk, with 4.095% fat and 3.45% protein , and in the mother's mother (MM) of 5613 kg milk with 4.21% fat and 3.49% protein. The milk production in the offspring had an increasing evolution as follows: on total lactation 5922 Kg milk in lactation I and 6474 Kg milk in lactation II, and on normal lactation of 4820 Kg milk in lactation I and 4843 Kg milk in lactation II with average values of 4.26% fat and 3.24% protein in lactation I respectively 3.91% fat and 3.29% protein in lactation II. Regarding the quality of the milk, it had an average value of 86,000 thousand / ml milk in the total number of somatic cells (NCS) which shows us a quality milking, in hygienic conditions, respectively keeping the milk after milking in hygienic conditions, which shows the farmer's care for the cattle on the farm.

Key words: *cattle farm, Dornelor Basin, improvement program, mountain area, Pinzgau.*

INTRODUCTION

The breeds of old native animals, which were formed on the Romanian territory, have the advantage of having a special genetic structure, acquired through natural selection, which ensures an extraordinary adaptability to environmental conditions, manifested by reproductive capacity, disease resistance and recovery plant resources, being clearly superior to modern breeds. For these reasons they are considered a valuable reservoir of genetic resources, necessary to support the continuous evolution of domestic animal populations. In animal husbandry, the care for the protection and conservation of endangered breeds has been attributed to the National Agency for Animal Husbandry, subordinated to the Ministry of Agriculture and Rural Development.

On this occasion, the breeds of cattle, horses, sheep, pigs and birds were constituted, which constitute the national genetic heritage that must be protected and conserved by applying some basic rules, deduced from the science of population genetic.

MATERIALS AND METHODS

In order to highlight the productive performances of the Pinzgau cattle breed, exploited in the Dornelor Basin, Suceava County, a herd of 12 heads was studied, both from the red variety and from the black variety (Dorna cow). On this biological material, the productive performances at ascendancy and descent were followed, respectively the quantity of milk (kg), fat (%), fat (kg), protein (%), protein (kg), fat plus protein, on total lactation and normal, but also on several lactations. Milk quality indicators such as NCS (thousands/ml), fat (%), protein (%), lactose (%), urea (%), casein (%), pH (%) were also analyzed. When ascending the herd, the same indicators were analyzed for mother (M), father's mother (MT) and mother's mother (MM). The primary data were taken from the Genealogical Register of the Breed (www.registregenealogice.ro), were systematized, processed and interpreted by methods specific to such research ($\bar{X}$, ± s, s, V%, p significance test, confidence interval). The analysis and interpretation of the results was

correlated with the numerous observations made directly on the farm. Raising the genetic potential and productivity of cattle populations, while optimizing farming technologies in small and medium-sized family farms, proper management and economic management, are important ways to increase profitable milk and meat production.

RESULTS AND DISCUSSIONS

The Pinzgau breed is a breed of cattle formed in the Pinzgau region near Salzburg, Austria, and bred for mixed milk and meat production. The Pinzgau breed (Figure 1) is characterized by the red-chestnut color that covers the whole body, except for a white stripe from the withers, along the spinal cord, to the head of the sternum. Body weight ranges from 400-600 kg in cows and 850-1,100 kg in bulls. Pinzgau cattle are mainly raised in mountain areas. In Romania this breed was first introduced in Bucovina, when this region was in the Austrian Empire. The Dorna cow (black variety) (Figure 2) is a variety of the Pinzgau de Transilvania (Pinzgau red) breed, being spread in the north of Moldova (Vatra Dornei, Câmpulung Moldovenesc, Gura Humorului). The Dorna cow differs from the Pinzgau breed from Transylvania both morphologically and productively. Thus, the color is mottled black with white, with the same pattern as the white speck. The waist is 1-2 cm smaller, and the massiveness is more pronounced. Under similar operating conditions, the Dorna cow produces higher milk production, with a higher fat and protein content. Precocity, fecundity and longevity are superior to the red Pinzgau breed. Resistance to mastitis, quantified by the number of somatic cells, could be included in the breeding program, but without being mandatory, at least in a first phase. Ensuring proper maintenance conditions, even imposing a minimum standard of well-being in individual households, would have the effect of reducing environmental variation and increasing the value of heritability, which would streamline selection for udder health (Popa et al., 2021).

Figure 1. Pinzgau de Transilvania - red variety
Note: original picture

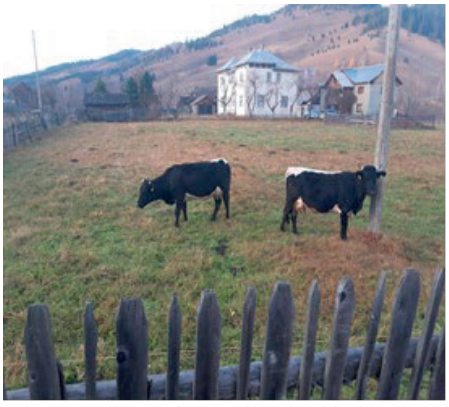

Figure 2. Pinzgau de Transilvania - black variety
Note: original picture

The Pinzgau breed from Transylvania is specific to subsistence farms, of low productivity, in the mountain area (Dragănescu, 2006). The Pinzgau breed from Transylvania is suitable for extensive and intensive exploitation. The improvement process aims to increase body weight (500-550 kg), improve the productive potential for milk production (over 4500 kg milk/lactation, with 4% fat) and meat. In order to survive, the breed must improve its characteristics (mechanical milking, production potential), in order to adapt at least to the requirements of organic farms, if not commercial ones in the mountain area (Drăgănescu, 2006).

In the analyzed animals, we studied the parameters of milk production in the ancestry of the studied cattle (mother, father's mother and mother's mother), offspring and the quality of milk production. The statistics on milk production by the number of Pinzgau cattle from Transylvania are given in Table 1.

Table 1. Statistics on milk production by the ascendancy number of Pinzgau cattle

Ascendancy	Character	n	$\overline{X}$	$\pm s_{\bar{x}}$	s	V%	Minimum	Maximum
Mother	Milk (kg)	12	**5496.58**	159.69	553.183	10.064	4200	6378
	Fat (%)	12	**4.22**	0.062	0.214	5.086	3.94	4.67
	Fat (kg)	12	231.25	7.466	25.864	11.184	177	266
	Protein (%)	12	**3.39**	0.059	0.204	6.011	3.12	3.77
	Protein (kg)	12	186	6.397	22.161	11.914	144	214
	Fat+Protein (kg)	12	417.25	13.604	47.125	11.294	321	479
Father's mother	Milk (kg)	12	**5562.25**	171.374	593.658	10.673	4012	6374
	Fat (%)	12	**4.09**	0.069	0.237	5.8	3.7	4.43
	Fat (kg)	12	227	8.005	27.729	12.216	151	257
	Protein (%)	12	**3.45**	0.058	0.2	5.806	3.12	3.76
	Protein (kg)	12	191.42	7.627	26.421	13.803	129	225
	Fat+Protein (kg)	12	422.58	15.46	53.554	12.673	280	473
Mother's mother	Milk (kg)	12	**5613.42**	161.55	559.625	9.969	4356	6466
	Fat (%)	12	**4.21**	0.077	0.268	6.359	3.9	4.83
	Fat (kg)	12	236.08	8.735	30.258	12.817	173	300
	Protein (%)	12	**3.49**	0.05	0.172	4.913	3.12	3.76
	Protein (kg)	12	195.67	6.019	20.852	10.657	155	229
	Fat+Protein (kg)	12	434	14.514	50.277	11.585	328	525

It was reported that in the mother (M) milk production was 5496 kg with 4.22% fat and 3.39% protein, in the father's mother (MT) 5562 kg milk with 4.095% fat and 3.45% protein, and in the mother's mother (MM) of 5613 kg of milk with 4.21% fat and 3.49% protein.

Therefore, the ancestry to the Pinzgau breed for the studied herd, has values of milk production within the limits of 5400-5600 kg of milk, with 4% fat and is a valuable ascendant with high genetic and phenotypic potential. The statistics of milk production in the descendants of Pinzgau cattle are presented in Table 2. Table 2 presents the productive parameters for the offspring of the studied herd. We find that milk production has an upward evolution on the total lactation 5922 kg milk in lactation I and 6474 kg milk in lactation II, and in the normal lactation of 4820 kg milk in lactation I and 4843 kg milk in lactation II. The quality of milk had average values of 4.26% fat and 3.24% protein in lactation I and 3.91% fat and 3.29% protein in lactation II (Table 2). The obtained productions are very good for this breed, bred and exploited in the Dornelor Basin, but they are lower values than the values obtained at the ancestry of the studied herd. It is recommended to make a more rigorous selection of the Pinzgau breed in order to obtain superior productions, reaching 5800 kg of milk/ lactation. This breed is a disease-resistant breed, capitalizes very well on the fodder in the mountain area, there are no difficulties in their reproduction and it is recommended for farmers for exploitation (V. Maciuc, 2006).

Table 2. Statistics on milk production in the descendants of Pinzgau cattle

Lactation	Character	n	$\overline{X}$	$\pm s_{\bar{x}}$	s	V%	Minimum	Maximum
The first total lactation	Duration of lactation (days)	14	506.14	65.426	244.801	48.366	245	1046
	Milk (kg)	10	**5922.2**	784.41	2480.521	41.885	3445	12644
	Fat (%)	10	**4.36**	0.169	0.533	12.228	3.74	5.09
	Fat (kg)	10	252.5	31.872	100.788	39.916	151	518
	Protein (%)	10	**3.27**	0.051	0.162	4.963	3.09	3.61
	Protein (kg)	10	191.5	25.871	81.81	42.721	101	412
The first normal lactation	Duration of lactation (days)	12	305	0	0	0	305	305
	Milk (kg)	10	**4820.5**	255.92	809.29	16.789	3781	6149
	Fat (%)	10	**4.26**	0.15	0.474	11.11	3.76	4.93
	Fat (kg)	10	206.8	11.92	37.694	18.227	179	303
	Protein (%)	10	**3.24**	0.052	0.165	5.085	3.09	3.61
	Protein(kg)	10	156.8	9.379	29.66	18.916	119	222
The second total lactation	Duration of lactation (days)	12	397.17	42.193	146.162	36.801	283	666
	Milk (kg)	11	**6474.27**	668.944	2218.635	34.268	3745	10277
	Fat (%)	11	**3.93**	0.133	0.441	11.237	3.21	4.66
	Fat (kg)	11	262.82	25.536	84.692	32.225	168	387
	Protein (%)	11	**3.28**	0.052	0.174	5.296	3.09	3.72
	Protein (kg)	11	220.82	23.507	77.964	35.307	152	382
The second normal lactation	Duration of lactation (days)	10	305	0	0	0	305	305
	Milk (kg)	10	**4843.1**	289.227	914.617	18.885	3254	6505
	Fat (%)	10	**3.91**	0.143	0.452	11.561	3.2	4.66
	Fat (kg)	10	189.9	14.411	45.572	23.998	111	268
	Protein (%)	10	**3.29**	0.055	0.173	5.275	3.09	3.71
	Protein (kg)	10	159.5	9.572	30.27	18.978	108	212
	Milk/day(kg)	12	14.71	0.895	3.1	21.066	7	19.7

Regarding the quality of milk production in the offspring of Pinzgau cattle, the results obtained are shown in Table 3. The number of somatic cells (NCS) thousand/ ml) in milk (Table 3) was 86,000/ml milk, which means that it falls in quality I according to the rules of the EU ICAR guideline, the percentage of fat was 4.34% and the percentage of protein was 3.25%. These results are very good for the breed under study, because it is a high quality milk.

Table 3. Statistics on the quality of milk production in the descendants of Pinzgau cattle

Character	**n**	$\overline{X}$	$\pm s_{\bar{x}}$	**s**	**V%**	**Minimum**	**Maximum**
Number of somatic cells (thousand/mililiter)	12	**86.08**	2.33	8.073	9.378	71	98
Fat (%)	12	**4.34**	0.15	0.518	11.949	3.74	5.09
Protein (%)	12	**3.25**	0.045	0.154	4.749	3.09	3.61
Lactose (%)	13	4.5	0.24	0.867	19.281	1.65	4.92
Urea (%)	13	29.23	0.995	3.586	12.268	23	36
Casein (%)	13	26.08	0.515	1.858	7.125	24	29.5
PH (%)	13	6.68	0.016	0.056	0.843	6.6	6.78
Milk/day (kg)	12	**14.71**	0.895	3.1	21.066	7	19.7

Regarding the number of somatic cells (NCS) indicating the quality of milk, it should be noted that this indicator had values in the range of a minimum of 71,000/ml milk and a maximum of 98,000/ml. There are very good values that highlight a robust breed constitution and a quality milking technology. The percentage of milk fat had an average value of 4.34%, with limits between 3.74% and 5.09%. The percentage of protein had an average value of 3.25%, with limits between 3.09 and 3.61%. These results are very good, the milk obtained from the studied cattle is of superior quality. One of the modern practices for profit in cattle is the extension of the biotechnology of artificial insemination by using material from bulls with superior breeding value in the direction of milk and meat production (Nistor-Anton & Maciuc, 2019).

In order to support the breeders of this breed of cattle in Romania, in the period 2015-2018 the ADER 5.2.3 project was started, within the Research - Development Station for Cattle Breeding Tg. Mureş which had the following objectives:

- The use of animal genetic resources in critical condition, in danger of extinction, the saving from extinction of the genetic fund of the local Pinzgau breed and the conservation of the genetic fund through a minimum number of specimens;
- Ensuring female and male breeding animals for households that want to resume the tradition of raising this breed.
- We report some activities carried out within this project:
- The study on the formation of the breed and its spread on the territory of our country and internationally;
- Identifying the existing herds, acquiring and merging 25 female and male Pinzgau de Transilvania heads at the resort farm, in order to establish the breed conservation nucleus and arrange the accommodation spaces;
- Preparation and endowment of a laboratory in the farm of the resort for natural mounting and harvesting of semen from the bulls of Pinzgau breed;
- Harvesting, processing and storage of seminal material;
- Registration of milk production, meat production and their quality;
- Suitability of the Pinzgau de Transilvania breed for mechanical milking;
- Dissemination of the results obtained by organizing a national symposium, publishing a brochure and a book on the conservation of the genetic background of the breed, its growth and exploitation in a semi-extensive system (ADER Project 5.2.3, 2018). Cattle value and transform efficiently into milk and meat natural resources (pastures, meadows, agricultural by-products), as well as different residues, participate in the intensification and profitability of traditional households both through the productions we obtain, but also through the mountain product. It also represents an important source of convertible currencies (through the export of meat, meat and milk products, live animals, frozen semen (MSC) and frozen embryos) (Ciocan-Alupii & Maciuc, 2019). The milk law project aims to regulate the marketing of dairy products, to increase consumer confidence in domestic dairy products and to eliminate falsified products (Coman et al., 2019). One of the modern practices for profit in cattle is the extension of the biotechnology of artificial insemination by using material from bulls with superior breeding value in the direction of milk and meat production.

CONCLUSIONS

From the study, the following conclusions can be drawn:

1. The ancestry of the studied herd is valuable with productions in the mother (M) of 5496 kg of milk, 4.22% fat and 3.39% protein, in the mother of the father (MT) of 5562 kg of milk, with 4.095% fat and 3.45 % protein, and in the mother's mother (MM) of 5613 kg milk with 4.21% fat and 3.49% protein.

2. The milk production in the offspring had an increasing evolution as follows: on the total lactation 5922 kg milk in lactation I and 6474 kg milk in lactation II, and on normal lactation of 4820 kg milk in lactation I and 4843 kg milk in lactation II with average values of 4.26% fat and

3.24% protein in lactation I and 3.91% fat and 3.29% protein in lactation II.

3. Regarding the quality of the milk obtained, the total number of somatic cells had an average value of 86,000 thousand / ml milk which shows us a quality milking, in hygienic conditions, respectively keeping the milk after milking in hygienic conditions, which shows the farmer's care for the cattle on the farm.

4. The Pinzgau de Transilvania breed capitalizes very well on the natural meadows in the mountain area, is resistant to weather and diseases specific to cattle, has a number of udder defects and has good skills for meat production.

5. It is necessary to develop an improvement program for this breed, which has productive potential.

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