

THE EVALUATION OF MILK PRODUCTION FOR THE TIGAIE BREED WHICH IS RAISED IN DIFFERENT TRADITIONAL PARTS OF ROMANIA

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Abstract

The purposes of the research were to assess the real potential of the Tigaie breed for milk production and the identification of the improvement ways of the production. The biological material used for evaluation was represented by growing herds which were exploited in three Romanian counties in which the growing of this breed is an action with old traditions. The quantitative milk production was appreciated based on monthly check-ups, the used method was the official one used in Romania and in the UE, named the A₄ method. During the lactation more successive check-ups were planned, for equal periods of 30 days, and for determining the total milk production obtained for each period, the Fleishmann method was used. The obtained results after applying successive reviews indicate the existence of obvious differences between the batches. These differences are significant statistically speaking for $p < 5\%$, the only distinguished exception being of + 0.54 l obtained between Vrancea and Vaslui counties, which is unimportant for the considered significant limit. The completion of the research and the statistical processing of the dates indicate the fact that the Tigaie breed must be subjected to a more extensive program for milk production, aspect which would make it more efficient.

Key words: Romanian sheep, Tigaie, sheep for milk production (milk sheep)

INTRODUCTION

Breeding sheep for milk production has become a main activity of Romanian farmers. The studies show that over 45% from the annual income obtained for each sheep from production is obtained as a result of the capitalization of milk production [7, 8, 20, 21, 24, 29]. Milk is an important raw, which is used to obtain traditional produces or different types of cheese. In this context, starting activities sustained by the evaluation of lactogen potential which is characteristic to the Tigaie breed, in order to improve, is a topical activity. The Tigaie breed owns 35% of the race structure was from Romania, being raised in different traditional parts situated in hilly areas and plateaus from Romania.

MATERIAL AND METHODS

The researched biological material was represented by Tigaie sheep, adult categories which formed the production core, raised and exploited in private farms from the counties Bacău, Vaslui and Vrancea, from the North-East part of Romania. To evaluate the milk production, the same base method was applied to the control activities which were made to each milking from the control day. The determination of the obtained quantity of milk from each sheep was made with the help of an electronic scale, being expressed in kg.

The quantitative production was estimated based on monthly check-ups, and the method which was used was the official Romanian one, respectively A₄. During lactation, six successive check-ups were planned, at equal intervals of 30 days. To determine the milk production which was obtained for each interval, the Fleishmann method was used.

The total milk quantity, expressed in liters, was determined in the lactation period as it follows:

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$$SM = I_0M_1 + I_1 \left(\frac{M_1 + M_2}{2} \right) + I_2 \left(\frac{M_2 + M_3}{2} \right) + \dots + I_{n-1} \left(\frac{M_{n-1} + M_n}{2} \right) + I_n M_n$$

where:

SM = sum in ml;

M = milk quantity (in ml) from the control day;

I_1, \dots, I_n, I_{n-1} = intervals between the controls expressed in days;

I_0 = intervals expressed in days between the birth day and the control day.

For the obtained results to be eloquent, from each county were randomly selected three batches, each with over 200 milk sheep.

RESULTS AND DISCUSSIONS

All the activities which refer to the evaluation activity were planned to be made during the grazing period.

The evaluation of the genetic potential for milk production at the studied Tigaie sheep was based on technical activities specific to quantitative control. To have terms of comparison, for the milk production control modern methods were applied, recognized and used not only in our country, but through Europe as well.

Milk production control is the main technical activity which is the base for the

evaluation of exploited animals for milk production. In the European countries, the actions of milk production control is made is the ones from the Mediterranean area, and is used for the flocks raised in different exploitation system. In these countries, milk production is determined using recommended methods by the International Committee for Animal Recording (ICAR).

The registration of milk production for sheep flocks must be made using specific methods. The coded ones A, B, C and E are considered to be the official ones [2, 5, 6, 9, 12, 11]. Each method has various applying ways (table 1). To evaluate the productive potential, during the researches, technical instructions specific to the A₄ control method were used.

Table 1 Productive control methods at sheep recommended by ICAR

Control duration (hours)	Interval between two controls (days ± 10%)	Used symbol	Recommended method
24 (2 controls/day)	30	4	A/B/C/D
24 (3 controls/day)	36	5	A/B/C
24 (2 controls/day)	42	6	A/B/C
24 (2 controls/day)	30	T	AT/BT/CT/ET
24 (2 controls/day)	30	C	AC/BC/CT/EC

The made productive control from July highlights the fact that the productive level is significantly reduced compared with the anterior period. Usually this is also the biological tendency, but obtaining daily average values of 0.19 kg of milk, from an effective relative big, should warn the breeder on the quality biological material which is used.

In the case in which the effectives were the object of the productive control, starting

with the moment when the milk production level goes under 200g/day, other controls which were planned are stopped. But, taking into consideration that the planned activities are for evaluation and research purposes, the productive control went one. In table 2 are presented statistically processed values of the obtained results from check-ups 2 and 3 for the research batches which are raised in the zoo-technical units from Bacău County.

Table 2 The average values of milk production for the controlled effective from Bacău county (kg)

Specification	L1		L2		L3		Average on total effective		
	C2	C3	C2	C3	C2	C3	C2	C3	
\bar{X}	0.16	0.16	0.21	0.21	0.19	0.19	0.24	0.19	
$\pm s \bar{X}$	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	
V %	28.64	28.64	50.86	50.86	56.88	56.88	39.77	45.12	
s	0.046	0.046	0.106	0.106	0.106	0.106	0.077	0.021	
Limits	Minimum	0.07	0.07	0.03	0.03	0.07	0.07	0.03	0.04
	Maximum	0.24	0.24	0.39	0.39	0.49	0.49	0.49	0.65

Analysing the dates highlights the decrease tendency of the productive level, but in an accelerated rhythm, maybe because of the prolonged drought which made the green mass to decrease. Compared to the C2 control, the average milk value decreased with 5% during the two periods of control. The productive

differences between batches are significant for $p < 1\%$ only between batches L1 and L2 and L1 and L3. Regarding the obtained results from C3, the differences between batches are not statistically significant for the considered threshold.

Table 3 The difference and the significance of the difference between the batches from Bacău

Specification (C2)	Difference \pm	Statistical significance
L1 – L2	+0.09	** - F (9.0550) > Fa (7.5976) for 0.01
L1 – L3	+0.07	** - F (13.0575) > Fa (7.8228) for 0.01
L2 – L3	-0.02	N.S. - F (0.5213) < Fa (4.1596) for 0.05
Specification (C3)	Difference \pm	Statistical significance
L1 – L2	+0.09	N.S. - F (2.0500) < Fa (4.1959) for 0.05
L1 – L3	+0.07	N.S. - F (0.5788) < Fa (4.2596) for 0.05
L2 – L3	-0.02	N.S. - F (0.3225) < Fa (4.1708) for 0.05

Note: C2- control 2; C3- control 3

The daily average values of milk production, between the limits 0.16 kg and 0.23 kg of milk, obtained for each milking from the control day show that the Tigaie breed must make the objective of a sustained selection project to improve this production. The determined level for milk production for this breed is close as value to other values quoted in the scientific literature for the same breed and for the same period [13, 16, 17, 18, 21, 22, 23, 26, 27]. To improve the lactogen potential the conduct of some efficient selection activities are necessary. To practice the selection for the breed favours the change of the frequency genes which induce the creation of new phenotypes with superior milk production, but presents the drawback that the necessary time to satisfy the proposed objectives is longer (Sandu Ghe). Also, by selection, some poor qualities can be improved such as the shape and the size of the mammary gland, a more quick elimination of the milk content, etc. Nevertheless the selection for milk production must be approached from bred to breed according to their specific, to the main

exploiting direction, as well as other factors. The breeder must finalize correctly the priorities and after that, in relation to these particularities more alternative ways can be found which gradually induce the genetic progress in the future generations.

From Vrancea County, three Tigaie batches were included in the evaluation. The making of the productive control in the period in which the sheep were maintained on the pasture, indicates superiority for this character compared to the batches from the other counties. Compared to the average milk production obtained by the batches from Bacău, when the C2 control was made, for the sheep from Vrancea County this character presents an average superior value with 41.46%. Comparing the obtained results at the C3 control indicates the fact that from the batches from Vrancea is obtained an average daily production higher with only 13.64%. This reduction of the constant differences between the average milk production obtained at the C2 and C3 controls is explained by the fact that the last control was

made in August, when the prolonged drought shows its effects, and the high thermal daily values (over 36 °C) create a real discomfort for the sheep. The reducing of average daily production from 0,24 kg to 0,19 hg (table 4) for the batches from Bacău and from 0,41 kg to 0,22 kg for those from Vrancea (table 5) sustain the affirmation from above and confirms the fact that for expressing the productive level, the environment factors

play an important part. From all the climatic factors, temperature and humidity are the most important, and if we take into consideration the fact that the speciality studies [1, 3, 4, 9, 11, 14, 15, 18, 19, 25] states that the lactogenesis process is evolving normally when the temperature is between +5°C and 21°C, the observed situation is justified.

Table 4 Average milk production values at the controlled effectives from Vrancea County (kg)

Specification	L4		L5		L6		Average total effective		
	C2	C3	C2	C3	C2	C3	C2	C3	
\bar{X}	0.38	0.22	0.40	0.22	0.45	0.23	0.41	0.22	
$\pm s \bar{X}$	0.04	0.04	0.02	0.03	0.02	0.02	0.02	0.02	
V %	36.60	57.07	22.01	50.68	19.33	39.57	15.92	27.92	
s	0.139	0.127	0.088	0.111	0.087	0.090	0.065	0.062	
Limits	Minimum	0.11	0.05	0.20	0.03	0.30	0.07	0.11	0.03
	Maximum	0.71	0.43	0.53	0.41	0.61	0.39	0.71	0.43

Table 5 Difference and difference signification between the batches from Vrancea county

Specification (C2)	Difference ±	Statistical significance
L4 – L5	- 0.02	N.S. - F (0.1964) < Fa (4.2100) for 0.05
L4 - L5	+ 0.07	N.S. - F (2.7125) < Fa (4.1959) for 0.05
L5 – L6	+ 0.05	N.S. - F (2.4123) < Fa (4.2100) for 0.05
Specification (C3)	Difference ±	Statistical significance
L4 – L5	0.00	N.S. - F (0.001454) < Fa (4.259677) for 0.05
L4 - L5	+0.01	N.S. - F (0.026587) < Fa (4.241699) for 0.05
L5 – L6	+0.01	N.S. - F (0.052249) < Fa (4.210008) for 0.05

Note: C2- control 2; C3- control 3

At the effectives from Vaslui County the approximate same situation is observed, namely the reduced daily average values which affect directly the economics of the exploitation. The fact that between the batches from this county the statistical differences are not significant indicates a certain uniformity of the peculiarities on which milk production depends.

Nevertheless we must also remark the fact that the decrease of the daily average level of milk production between the controls C2 and C3 was of 22.5%, and for the batches from Bacău was of 20.24%. The highest decrease of the milk production level was at the flocks from Vrancea, where between the two successive controls is found a decrease of about 50%.

Table 6 Average milk production values at the controlled effectives from Vaslui County

Specification	L7		L8		Average on daily effective		
	C2	C3	C2	C3	C2	C3	
\bar{X}	0.37	0.28	0.43	0.34	0.40	0.31	
$\pm s \bar{X}$	0.03	0.03	0.03	0.03	0.01	0.02	
V %	27.48	41.74	24.91	30.65	14.49	22.52	
s	0.101	0.115	0.106	0.104	0.058	0.070	
Limits	Minimum	0.24	0.14	0.27	0.17	0.24	0.14
	Maximum	0.55	0.53	0.61	0.59	0.61	0.59

Table 7 Difference and difference signification between the batches from Vaslui county

Specification (C2)	Difference ±	Statistical significance
L7-L8	+0.06	N.S. - F (1.8892) < Fa (4.2793) for 0.05
Specification (C3)	Difference ±	Statistical significance
L7-L8	+0.06	N.S. - F (2.2871) < Fa (4.2596) for 0.05

Note: C2- control 2; C3- control 3

Overall, for the controlled sheep effective, the average level determined for milk production indicate a superiority of the effective from Vaslui County, also as a consequence of insurance of better maintenance conditions assured during the specific time period. As long as the farmers will not understand that the applying of inadequate practices and the negligence of the productive control actions will not generate a genetic process, the situation will not change. Maybe the actions from this field should be intensified and the obtained results presented in professional associations which activate in this field.

Where the situation allows it, the amelioration process can be hurried using specific crossing schemes, but to obtain performances, the sheep must also benefit from stimulate feeding conditions no matter what the chosen amelioration method is. Or

this aspect is neglected by the farmers and in absence of deficit regarding the daily nutritional requirement, very reduced daily productions are obtained, often under 200 g at only 4 moth from calving. In countries where the zonal amelioration is a part of the national amelioration system and is offered a higher attention for the maintenance conditions and feeding, at the same period as the moment of calving, the lactation curve is still in the ascending phase [12, 21, 26, 29].

The estimation of the total milk production for the controlled effective was made using the Fleishman calculating method, the obtained results being presented in a centralized way in table 8. From the result analysis we find that the best productive performance was obtained from the sheep effectives which were controlled in Vaslui County (figure 1).

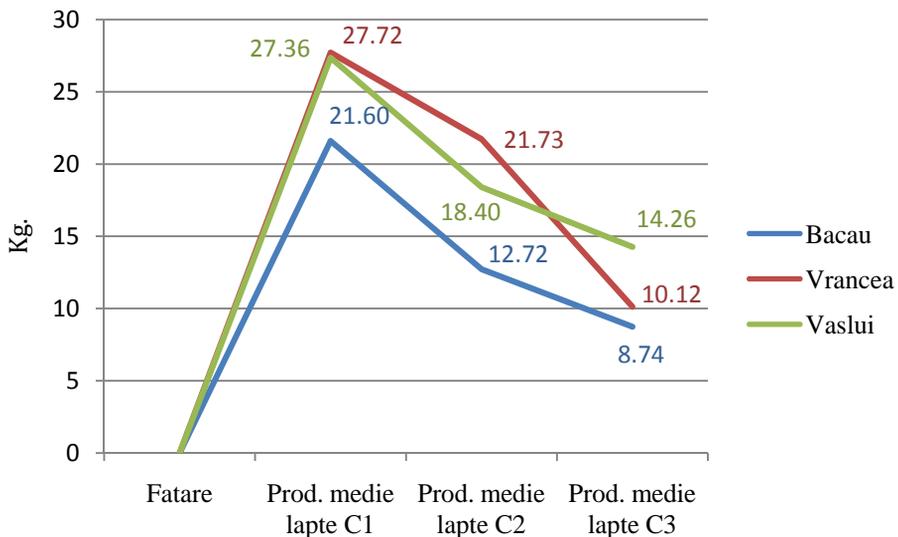


Figure 1 Lactation curve for the studied populations

In this situation, the productive level is superior with about 28.30% compared to the average total production obtained in the same

lactation from sheep which are in the zoo-technical exploitations from Bacău County.

Table 8 Estimation of milk total production for Tigaie sheep from the research area (kg)

Batch	Average milk production C1	Average milk production C2	Average milk production C3	Total average milk production
Bacău	21.60 ± 0.18	12.72 ± 0.54	8.74 ± 0.19	43.03 ± 0.36
Vrancea	27.72 ± 0.25	21.73 ± 0.19	10.12 ± 0.44	59.48 ± 0.23
Vaslui	27.36 ± 0.36	18.40 ± 0.33	14.26 ± 0.65	60.02 ± 0.35

The differences between the batches are statistically significant for $p < 5\%$, exception being the difference of only + 0.54 l obtained

between the effectives from Vrancea and Vaslui, which is statistically insignificant for the considered significance threshold.

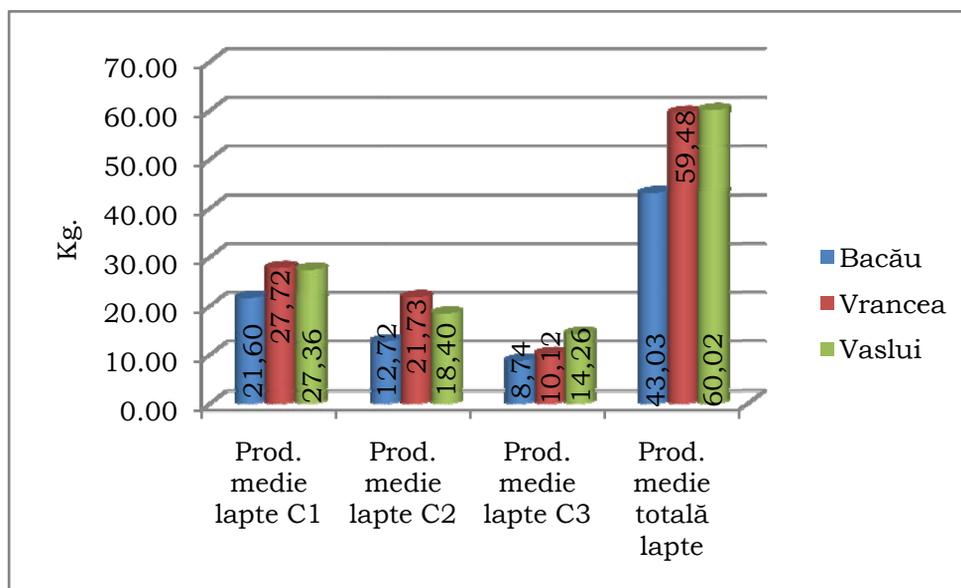


Figure 2 Average milk of population from the research area

Table 9 Difference and difference significance between total average milk productions obtained in the same lactation period

Specification (C2)	Difference ±	Statistical significanc
BC – VN	- 16.45	*** for 0.05
BC - VS	+ 16.99	*** for 0.05
VN – VS	+ 0.54	N.S. – for 0.05

Note: BC=Bacău; VN=Vrancea; VS=Vaslui

Genetically speaking, the activity and the role of genes to transmit the quantitative characters on which milk production depends are very poorly studied. Regarding this aspect the decisions about the amelioration of

this appropriation can only be taken indirectly, considering the production dates of cow milk [11, 13]. To remove this aspect inflicts that, to improve the sheep milk production, to proceed when applying the

familiar selection and to take into consideration the fact that it is possible for the depression to inbreed and the heterosis to manifest in the case of milk quantity, but not in the case of chemical composition. Actually, taking into consideration the actual improvement level of the breed and its performances, it would be more indicated that the improvement should be based on a characteristic association of the production and reproduction.

In these conditions, keeping the Tigaie sheep at an actual productive level cannot present the best solution, because a breed or a population which does not satisfy economically can be subdued to partial or total replacements. In this situation, the conduct of the planned researches within these research activities have the role to obtain technical information which will be used in management programs to identify optimum solutions of improvement of the productions and profitability of the Tigaie breed. The research activity is important and because of the fact that the sheep of this breed represent 98% of the total effective of sheep from the exploitations situated in the Central Moldavian Plateau.

To facilitate the raising of the lactogen potential, a more ample productive control action should be triggered, for all the Tigaie sheep from the Central Moldavian Plateau, to identify the most valuable effectives. Among them, it would be indicated that the sheep from the batch to be maintained in shelter using in their alimentation an optimum feed mix constituted from green mass and concentrated supplements. Where the pasture surfaces are improved, the grazing batch version can be applied, and to assure the collateral nutrition requests with a certain productive level, it is also required the administration of collateral supplements. Without doubt, applying these technological variants, and also of other technical-management measures, the Tigaie sheep aptitude for milk production will be gradually developed, aspect which will facilitate an increase of milk production and also an increase of meat or wool production.

CONCLUSIONS

1. The milk production control highlights the fact that, starting with July, the productive level is significantly decreased compared with the previous period, the lactation curve entering a descending slope.

2. Form the effectives from Bacău County, compared with the C2 control, the average value of milk production has been reduced during the third control with 5%.

2.1. The productive differences between the batches researched in Bacău County are significant for $p < 1\%$, but only between batches L1 and L2 and L1 and L3.

2.2. The average daily level of milk production which are between the limits 0.16 kg and 0.23 kg of milk, obtained at all milking from the control day show that the Tigaie breed must be included in a selection process for the improvement of production.

3. Compared to the average milk production obtained from the batches in Bacău, during the C2 control, the effectives from Vrancea present a higher average value with 41.46%, aspect which is due to better conditions assured for the flocks.

4. The comparison of the dates obtained from the C3 control indicates the fact that from the effective from Vrancea County it is obtained an average daily production higher with only 13.64%.

5. The diminution of the average daily production from 0.24 l to 0.19 l at the effectives from Bacău, and from 0.41 l to 0.22 l at the effectives from Vrancea, confirm the fact that in for expressing the production level, the environment factors play an extremely important part.

6. The decrease of the average daily level of milk production between the controls C2 and C3 was of 22.5% for the batches from Vaslui County, due to the prolonged drought and to the extremely high temperatures.

7. For the total sheep effective controlled, the average level determined for milk production indicates a superiority for the ones from Vaslui County, maybe also as a consequence of assuring better maintenance conditions during the time interval.

8. The appraisal of the total milk production indicates that the best productive

performance was obtained from the sheep controlled in Vaslui County, which present a superior level with about 28.30%, compared to the average total production obtained during the same lactation from the sheep from the zoo-technical exploitation situated Bacău County.

9. The differences between the batches are statistically significant for $p < 5\%$, exception making only the difference of + 0.54 kg obtained from the effectives from Vrancea and Vaslui, which is statistically insignificant for the threshold.

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