

## RESEARCH ON THE EVOLUTION OF THE GROWTH PROCESS AT THE TZURCANA SHEEP WITH THE PATERN BREEDS VENDEEN AND WHITE OF CENTRAL MASSIF

Cornel FRUJINĂ<sup>1</sup>, Iulian VLAD<sup>2</sup>, Ion CĂLIN<sup>2</sup>, Marius MAFTEI<sup>2</sup>,  
Ion RĂDUCUȚĂ<sup>2</sup>, Daniela IANIȚCHI<sup>2</sup>

<sup>1</sup>Payment Agency for Intervention in Agriculture – Pitesti branch Domnești County of Argeș

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd,  
District 1, Bucharest, Romania

Corresponding author email: vladiul@yahoo.com

### Abstract

*Research on growth performance, weight, daily average enrichment recorded on hybrids of the native Tzurcana breed with the two paternal breeds of French Vendéen and White of Central Massif were the objective of study and analysis of this paper. The study was conducted from the spring of 2018 on the sheep private farm of the County - Olt on the 180 females sheep, of which 30 were of the Vendéen breed to track the performance of the pure breed in our country. The other 100 females were cross with the two races to obtain F1 hybrids with Vendéen and BMC, and 50 were considered a control group of the pure Tzurcana native breed. All animals were subjected to control of calf weight  $W_0$  at 30 days of age  $W_1$  at 70 days  $W_2$  and  $W_3$  at 98 days of age. The results high lighted both the net superiority of the meat and the adaptability of the Vendéen paternal breed to the semi-intensive exploitation system towards Tzurcana; the prolificity was 140% versus 103% and a net average net increase of 72 g/day in females and 94 g/day in males in the first month of 90 g/day in both sexes in the 2nd month of growth respectively 91 g/day in females and 87g/day in males in the third month of growth. It is evident both the superiority of the pure paternal breed and the crossbreed obtained from the breeds with the breeds mentioned, regarding the assimilation-conversion capacity and the different growth rate in stages compared to the native breed, but between the crossbreeds the results are relatively similar to the small difference.*

**Key words:** Vendéen and Tzurcana hybrid, White of Central Massif and Tzurcana hybrid, body weight, average daily gain.

### INTRODUCTION

World production of meat was 45 million tonnes in 1950 and in 2010 it exceeded 300 million tonnes over 6 times and in only 16 years reached 317 million tonnes more than 7 times as market demand. Is it only a sign of the well-being of the modern world, or only a demand for the demise of the explosion? World average per capita consumption is 34.6 kg/head, while the US dollar is over 126.6 kg/head (according to FAO 2009 and OECD 2016).

The situation of sheep flocks worldwide is different due to a series of criteria related to the geo-climatic conditions of the vegetation consumption of the products of meat especially being considered at the moment the most volatile due both to the very high price and to the quite fluctuation large as production but also macro-amplitude.

In Romania, a sheep population of 10150 thousand heads is ranked 3rd at EU 28 level, with an upward trend in livestock after the 10 years of post accession MS, compared to other member states where the number of Tzurcana sheep is over 70% and for the meat product requires a selection of a rustic breed and hybridization (after INS 2018).

Thus also imported meat breeds from different states with tradition to improve performance at F1 cross of the native breed. The growing requirement for export of sheep's youth has led to the need for domestic sheep flocks with meat breeds such as Vendéen and White of Central Massif.

### MATERIALS AND METHODS

We have followed and analyzed the results of the crossbreeding between the native Tzurcana

native mutts of the native breed with two paternal breeds of sheep imported from the spring of 2018 from France by Vendeen and Alba from the Central Massif, but also of a 30-breed Vendeen females of pure breed, in the private farm that was the subject of this study. Imports were made at the level of the Federation of Mountain Sheep Breeders of Romania F.O.R. with the aim of improving the meat performance of the Tzurcana and Tsigia breeds at the level of regional associations. Thus, a total of 50 dc animals were monitored. 25 females and 25 male Vendeen cross with Turcana, 50 animals, from which 25 females and 25 males with Alba of the Central Massif, of a control lot of 50 and 25 plus 25 pure Turcana but also of a lot of only 30 heads of 15 females and 15 males of the pure Vendeen breed, exploited under the same conditions of the semi-intensive system on the farm.

They were recorded once with the control weighing scale from the breeding and the earning of the products and subsequently the control over the three major growth phases, respectively; 30 days, 70 days and 98 days or 14 weeks. All records and calculations were determined and statistically assured to determine the differences between the cross F1 groups and the pure breeds on the growth trend and the homogeneity of the groups by age group.

## RESULTS AND DISCUSSIONS

Numerous studies have been conducted on both the local Turcana breed by numerous researchers and many other paternal breeds for milk and especially for meat made to improve the performance of obtaining a better classing that can fit into the European classification grille. Only for the past thirty years have we witnessed massive imports of males especially for meat such as Norwegian White, German Blackhead, Texel, Hampshire Down, Dorper, Charollaise, White of the Central Massif, Vendeen, Suffolk, but also for milk Friza, Lacaune, Sarda, Assaf, Awassi, which, unfortunately, may have been empirically used but also exploited without a specific result, which only brought to a certain mosaic of mating without respecting a certain program of improvement and planning according to the

zoning of the breeds at national level or with a specific improvement goal.

However, in the last two decades, in some private units and in the resorts, some good results of the breeding of our Tzurcana breed, which holds more than 72% of the herd, with various other breeds meat or meat whose authors have shown better hybrid performance with good skills in the exploitation of the cross of these breeds as (Gavojdian et al., 2011).

They were recorded. to capture different stages of milk feeding that are more of a lactogenic potential for product growth potential, with a major maternal effect after the weaning transition and switching to ruminant feeds here, with the *degree of precocity* and last close to delivery date to about 100 days for meat performance whose most important parameters are the average daily increase.

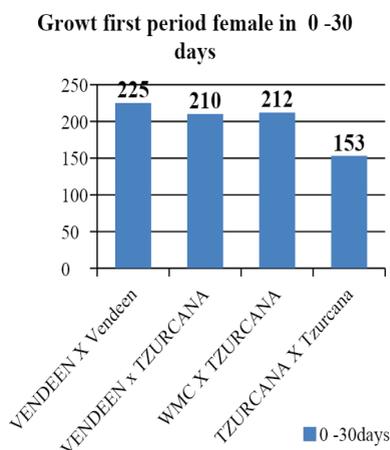


Figure 1. Evolution of a.d.g. in first period of young females sheep.

Although we are talking about different gender differences of different prolificities not typical of the breeds in the country of origin except for the Vendeen to which the graves of the twins produced, although not in the majority or with the same parity in all the metiers, have been traced, these few specimens were added to observe the differences in weight between single and twin meats since the breeding in both variants of the crossbreeding crosses.

The prolificity obtained in purebred Vendeen females was 140% while in Turcana only 102% and the Tzurcana female that were pooled are not much bigger than the differences of only

106% in the Vendeen females and 104% to those with WMC (White of Central Massif), but we still talk about different sexes or genres of both cross and race. Thus, in the meadows with the WMC breed the sexual parity is 6% higher in favor of the males, 56-44 and in the meadows with Vendeen there were only 52 males in 48 females, and in the pure Vendeen race the parity was still in favor of males from 54 to 46 females.

Average body weight at birth and differences between the crosses obtained. In the Tzurcana breed, we can not speak of female fetuses in the present case, so that we can consider the weights of the maternal race almost similar; of  $2.96 \pm 0.1$  kg with a CV of 15.02% in females, and in males of  $3.2 \pm 0.19$  kg having a 21% CV being quite high, comparable to those of the cross with Vendeen of 2.88 kg of twin and male twins of 3.16 kg or in the White of Central Massif (WMC), where the weights of the lambs from the fetuses are the following  $2.85 \pm 0.14$  kg in the females twin and  $3.24 \pm 0.12$  kg in twin males (Table 1).

We can say that the breeds are more homogeneous in both breeds, without much variability within the group, by sexes comparable to the maternal breed, which in males for example exceeds 20 percentage points, typical of the rustic breed without a more rigorous selection.

The calf weights of single cross of the Tzurcana and Vendeen breed are differentiated between genres or sexes where females have an average weight of  $4.34 \pm 0.12$  kg with a CV of 6.89% in males of  $4.81 \pm 0.15$  kg with a 7.81% CV, and in WMC (White of Central Massif), we recorded a single weight for single product in females of  $4.39 \pm 0.14$  Kg with a CV of 8.2 % and in males of  $4.92 \pm 0.15$  kg with a 5.91% CV with relatively homogeneous groups and single products.

Although there are very few differences between race groups between grammars in contrast to Vendeen cross and the native breed are considered very significant differences of 1.35 kg in females and 1.61 kg in males and those with WMC of 1.43 in females and 1.7 in males, results that show extra performance from the start of the calving.

The elements of differentiation of body weights between the Tzurcana native breed and the pure Vendeen breed exploited under the same

conditions demonstrate the net superiority of a specialized breed that had in the group of females in females of  $3.39 \pm 0.1$  kg and in males  $3.7 \pm 0.04$  kg and in simple breeds of  $5.15 \pm 0.12$  kg in females and  $5.39 \pm 0.13$  kg in males with a coefficient of variation below 10%, good homogeneity within the group but and a lesser differentiation on sexual dimorphism (Table 1).

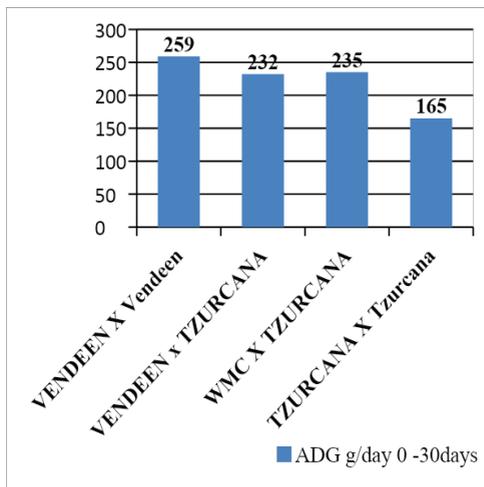


Figure 2. Evolution of ADG in first period of young males sheep



Figure 3. Vendeen pure breed young sheep at 30 days

In Fig. 4 all the results of the cross between Tzurcana with Alba of the Central Massif and Vendeen, as well as the products of the pure Tzurcana and Vendeen breed, are presented in a synthetic way to compare the degree of combinability but also the way they respond to the degree of acclimatization and how they respond to the operating conditions native.

Table 1. Evolution of weight sheep pure breed to Vendeen and Tzurcana and cross Tzurcana with WMC and Vendeen

BREED/ CROSS F1	Number of animals	Weight to Parturition W0				Weight 1	Weight 1	Weight 2	Weight 2	Weight 3	Weight 3
		Parity by sex	Twin ♀	Twin ♂	Single ♀	Single ♂	0-30 days	0-30 days	30-70 days	30-70 days	70-98 days
<b>VENDEEN x Vendeen</b>	15 ♀	3,39		5,15		11,87		22,40		30,15	
Pure Breed	15 ♂		3,70		5,39		12,37		23,44		31,48
The Av. Daili Gain						225	259	265	275	276	285
<b>TZURCANA x Tzurcana</b>	25 ♀			2,96		7,56		14,57		19,87	
Pure Breed	25 ♂				3,20		8,21		15,77		21,40
ADG						153	165	175	185	185	198
<b>VENDEEN x Tzurcana</b>	25 ♀	2,88		4,34		10,58		19,83		26,40	
Cross F1	25 ♂		3,16		4,81		10,98		21,33		28,71
ADG						210	232	231	238	240	260
<b>WMC x Tzurcana</b>	25 ♀	2,86		4,39		10,78		20,43		27,63	
Cross F1	25 ♂		3,24		4,92		11,82		21,88		29,37
ADG						212	235	240	250	255	265

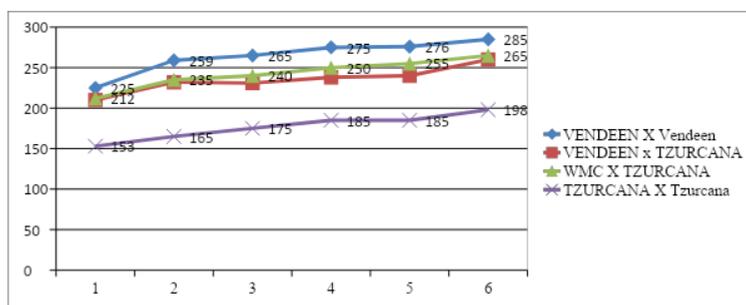


Figure 4. Evolution of ADG in growth period of young sheep

Average body weight at birth and differences between the methods obtained. In the Tzurcana breed, we can not speak of female effect in the present case, so that we can consider the weights of the maternal race almost similar; of  $2.96 \pm 0.1$  kg with a CV of 15.02% in females, and in males of  $3.2 \pm 0.19$  kg having a 21% CV being quite high, comparable to those of the cross with Vendeen of 2.88 kg of twin and male twins of 3.16 kg or in the White of Central Massif (WMC) where the weights of the lambs from the fetuses are the following  $2.85 \pm 0.14$  kg in the females twin and  $3.24 \pm 0.12$  kg in twin males. We can say that the breeds are more homogeneous in both breeds, without much variability within the group, by sexes comparable to the maternal breed, which in males for example exceeds 20 percentage points, typical of the rustic breed without a more rigorous selection. The calf weights of single cross of the Tzurcana and Vendeen breed are differentiated between sexes

where females have an average weight of  $4.34 \pm 0.12$  kg with a CV of 6.89% in males of  $4.81 \pm 0.15$  kg with a 7.81% CV, and in WMC (White of Central Massif), we recorded a single weight for single product in females of  $4.39 \pm 0.14$  kg with a CV of 8.2% and in males of  $4.92 \pm 0.15$  kg with a 5.91% CV with relatively homogeneous groups and single products (Fig. 5).

Although there are very few differences between race groups between grams in contrast to Vendeen cross and the native breed are considered very significant differences of 1.35 kg in females and 1.61 kg in males and those with WMC of 1.43 in females and 1.7 in males, results that show extra performance from the start of the calving (Fig. 6).

The elements of differentiation of body weights between the Tzurcana native breed and the pure Vendeen breed exploited under the same conditions demonstrate the net superiority of a specialized breed that had in the group of

females in females of  $3.39 \pm 0.1$  kg and in males  $3.7 \pm 0.04$  kg and in simple breeds of  $5.15 \pm 0.12$  kg in females and  $5.39 \pm 0.13$  kg in males with a coefficient of variation below 10%, good homogeneity within the group but and a lesser differentiation on sexual dimorphism.

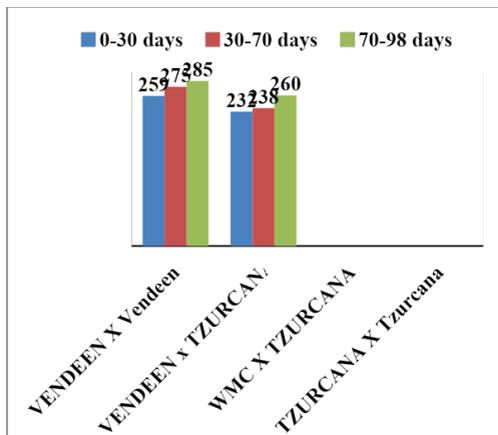


Figure 5. Evolution in a.d.g. of cross and pure young sheep of Tzurcana and hybrid with Vendeen

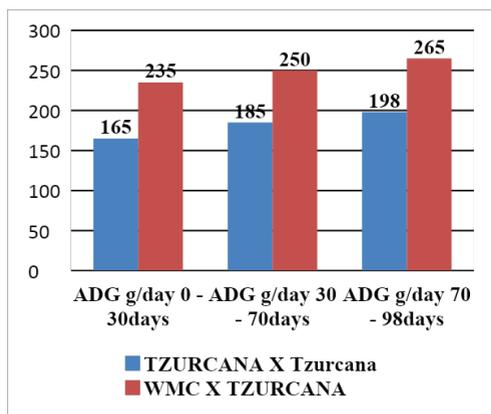


Figure 6. Evolution in a.d.g. of cross and pure young sheep of Tzurcana and hybrid with WCM

Average body weights at first control W1 weights at 30 days and differences between cross obtained of young sheep reveal the onset of lambs growth as a primordial genetic effect, but especially the maternal effect, especially on maternal lactogenic capacity in the first month of life in Vendeen young who had in females an average weight  $11.87 \pm 0.35$  kg with a CV of 11.83% and in males of  $12.37 \pm 1.13$  kg with a 15.8% CV and in the Vendeen meadows with

Tzurcana at the first control in females registered a weight of  $10.58 \pm 0.15$  kg with a 7.3% CV and in males of  $10.98 \pm 0.22$  kg with a 8.64% CV and pure breed Tzurcana of only  $7.56 \pm 0.14$  kg with a CV of 9.3% in females and  $8.21 \pm 0.12$  kg with a 7.4% CV.

The differences between Ven x Tzu hibrid with pure paternal race Vendeen in the first month of life were -1.3 kg for females and -1.4 kg for males, and for pure Tzurcana the females are 3.02 kg in females and 2.77 kg males with extra performance for the production of meat.

Daily average spores are and are the primary and important indicator of selection, so after other authors the same types of crosses performances are different in manners; In the first 21 days at the Tzu x Vendeen cross, Borzan et al. in 2017 registered a 330 g increase quite high in total compared to the one registered by us on the whole lot of only 220 g a day. The average daily gains are more synthetic in the Figures 4 and 5 below with the differences between the paternal breed and its hibrid with Tzurcana and in the figure 6 there are also the differences of the domestic breed with another paternal race of White of Central Massif for meat. Making comparisons of the finds found by the same author, Borzan et al. in 2017 in the WCM with Tzurcana, where we recorded average spores of 250 g/day/group in the first 21 days and in our study we found average values of 224 g/day in the first 30 days of growing different from other authors such as Vlaic et al. in 2009 (cited by Gavojdian et al., 2011), 2010, 2012 with the hibrid between Tzurcana and Norwegian White.

The second W2 weighing at 70 days has a double significance related to the phenomenon of young sheep's growth of the maternal lactogenic potential but also of the precocity of the paternal races and cross, namely a particularity of how the transition to the dry feed and the precocity printed by the imported breed, the way of adapting to them in our case of the Vendeen breed in front of the exploitation conditions on the farms and the national farms.

Weight weights in female Vendeen ovine females averaged  $22.4 \pm 0.29$  kg with a CV of 5.15% and in males of  $23.44 \pm 0.45$  kg with a CV of 7,5%, and Vendeen cross with Tzurcana at the first control in females weighing  $19.83 \pm$

0.35 kg with a 8.7% CV and in males  $21.33 \pm 0.17$  kg with a 4.6% CV and a pure breed Tzurcana of only  $14.57 \pm 0.3$  Kg with a CV of 10.8% for females and  $15.77 \pm 0.26$  kg for a 5.8% CV, and in the second stage of growth, the paternal breed is detached with another growth rate, the increases of which are increased over the cross with Tzurcana maternal races over 27 g/day in the first stage with 37 g/day in the second and over 25 g/day in the last up to 98 days, the aspect is found in previous charts no. but also through a good adaptation of the differences between native breeds.

Average weights recorded by Borzan et al. (2017) on the same group of cross by Ven x Tzurcana in females at 50 days, were  $18.6 \pm 0.86$  kg and in males  $19.03 \pm 0.71$  kg while at WMC X Tzurcana at the entire 50 - day group it was  $19.98 \pm 4.48$  kg, compared to our results at Ven X Tzurcana in females at 70 days were 19.83 kg and in males of 21.33 kg and WMC x Tzurcana in females at 70 days was 20.43kg and in males of 21.88 kg, where our results are much weaker as performances compared to periods of time or stages at similar.

At the last weighting scale W3 performed on the farm, the following ovine youth weight gains are recorded, the differentiations of which are somewhat similar to those of other authors who tracked both the Tzurcana breeding phenomenon, especially for meat (Gavojdian et al., 2011; Borzan et al., 2017) as well as racial combining modalities for certain imports, but especially for meat hybrids.

The study of average enrollments over periods of 0 to 50 days - 70 days and 98 days performed by many authors such as Borzan et al. (2017) on the same groups of cross by Ven X Tzurcana in females at 90 days were  $25.42 \pm 1.39$  kg and in males  $26.31 \pm 1.66$  kg while at WMC x Tzurcana for the whole lot at 90 days it was  $28.48 \pm 4.38$  kg versus the results recorded at Ven x Tzurcana in females at 98 days were  $26.4 \pm 0.35$  kg with a CV 4.6% and in males of  $28.71 \pm 0.32$  kg with a CV of 5.2% and WMC x Tzurcana in females at 98 days was  $28.73 \pm 0.25$  kg with a CV of 4.8 and in males of  $21.4 \pm 0.34$  kg but a 6.72% CV with fairly homogeneous lots considering a CV below 10% in general.

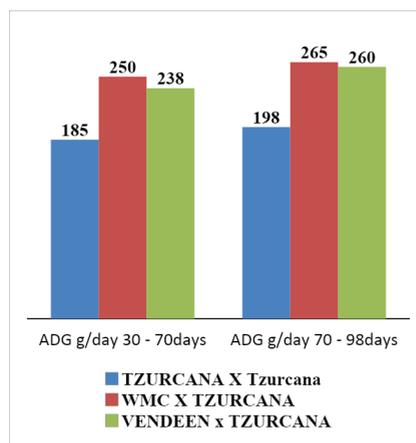


Figure 7. Evolution in ADG of cross and pure young sheep of Tzurcana and hybrid with Vendeen

Studies by Gavojdian et al. (2011) reported an increase of 229.46g (0-28 days) and 168.5 g at (0-240 days) in the German Blackhead cross with Tzurcana and in the Tzurcana cross with the Norwegian White obtained the average growths between 0-60 days 0-120 days and 0-160 days of 199,89g, and 181,18g and 168,18 g of the pure Tzurcana breed of only 167,65g of 159,35 g and 151.1 g/day, and our maternal outcomes were 159.4 g/day in the 0-30 days of lactation period of 175.6 g/day in the 0-70 days and 178 g/day in the 0-98 days considered as much better growth results but also with some homogeneities regarding the degree of variability within the analyzed groups.

The results according to the increases, followed by the groups of cross but also the two major stages that take into account the maternal effect, gave the following values considered as general averages that outline not just the visible decrease of the growth rate but a better adaptation through clear results the growth performance from the first stage to the 70 days and 100 days respectively for all cross but especially for the Vendeen breed are 246,34 g females with 255.12 g and males 257.14 g with 266.22 g at Vend x Tzurcana in females 221.41 g with 225.2 g in male 236.14 g with 244.8 g, at WMC x Tzurcana are 230.4 g females with 236.8 g, in 242.5 g males with 249.6 g, and in pure breed native breeds in females 161.12 g with 172.14 g and in males of 179.57 g with 185.7 g mentioned above lot.

## CONCLUSIONS

Mean values recorded at control weights and calculation on average mid-point increment estimates from one to 30 days, at 70 days, and at 98 days of the Tzurcana sheep young and the Vendeen cross and WCM have highlighted both the superiority of the pure Vendeen breed on the degree of adaptation of its prolificity and the weight to calving and other meat performances to all parameters analyzed.

Also, the same superior performance to the Tzurcana native breed was also demonstrated in the Tzurcana cross with the Vendeen breed and the White of Central Massif breed which, through the hardships recorded and the increases of the last two stages, clearly demonstrates a continuous evolution of almost constant growth and very good possibility of crossing or combining with the two French breeds, with the specification and requirement to ensure balanced nutrition conforming to the requirements of the food regulations and not the extensive type.

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## REFERENCES

- Borzan, M.M., Pașca, I., Dărăban, St., Cozma, V., Pusta, I., Cimpean, A., Bogdan, L., Mihaiu, M.L., Bagita, C., Bota, C.L., Matte, G.A. (2017). Obtaining the Lamb - Good practice guide and results. Cluj Napoca, RO: Risoprint Publishing House.
- Gavojdian, D., Sauer, M., Pădeanu I., Tripona, I., Sauer, I.W. (2011). Growth performance evaluation in F1 Hampshire Down X Tzurcana lambs reared in Low Input System. *Scientific Papers: Animal Science and Biotechnologies*, 44(2), 379-382.
- Gavojdian, D., Sauer, M., Păcală, N., Pădeanu, I., Voia, S. (2011). Improving growth rates in Tzurcana indigenous sheep breed using German Blackheaded Mutton rams. *Scientific Papers: Animal Science and Biotechnologies*, 44(2), 376-378.
- Vlad, I., Maftai, M., Pogurschi, E., Defta, N., Ianitchi, D., Cărătuș Stanciu, M. (2018). Study regarding morpho-productive traits in Teleorman's Blackhead sheep in the South Eastern region of Romania. *Scientific papers Series D Animal Science*, LXI(2), 173-176.
- Vlad, I., Maftai, M., Ianitchi, D., Stanciu, M., Fița, A. (2014). Partial result of morpho-productive characteristics of Alpina french goats breed in the South of Romania. *Scientific Papers Seria D. Animal Science*, LVI,277-282.
- „Chifre cles 2016” Institut de L`elevages „Production ovine - Lait et Viande – Confederation Nationale de l`elevage” C.N.E.
- AGRI-SHEEP-PRODUCTION@europa.eu
- <http://www.madr.ro>
- Eurostat statistics.2018
- [www.INS.2018.ro](http://www.INS.2018.ro)
- OECD Viande 2017-2026
- FAOSTAT 2018.