

PN-II-ID-PCE-2007-1/ID 676
*The study of the local population of sheep raised in the North-East of the country,
for meat improving production*
2008 RESEARCH REPORT

**Executive Unit for Financing the Higher Education and University Researches
(UEFISCSU)**

Programme: PN-II-ID-PCE-2007-1

Project type: Exploratory research - IDEAS

Project code: ID 676

**Financing: State budget – National Plan of Research, Development and
Innovation - II**

Contractor: University of Agricultural Sciences and Veterinary Medicine - Iasi

**Topic: *The study of the local population of sheep raised in the North-East of the
country, for meat improving production***

Project manager: Prof. dr. PASCAL CONSTANTIN

2008 RESEARCH REPORT (single stage)

Summary:

Introduction

Material and method

Results of investigations and discussion

Conclusions

Bibliography

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for meat improving production
2008 RESEARCH REPORT**

Introduction

The aim of these researches was practical and economical ways identification for increasing reproduction function. There were two major aspects: the puberty inducing for using female lamb to reproduction in first autumn and using natural factors influence for heats inducing and synchronizing to adults' sheep. The biological material was Merinos from Palas, Karakul from Botosani and Turcana sheep. For puberty artificial inducing, young sheep was sheared about 40 days before mate and reproduction ram have been introduce in flock. The results show us for body weight in mate moment significant differences ($p > 0.01$) just between Merinos from Palas and Karakul from Botosani sheep groups. The obtained differences for mate age and for calving age were insignificant for all groups for $p > 0.01$. The study of natural factors what have a influence of heats inducing and synchronizing to adults' sheep was made in 2 consecutive years, between July 10th and July 20th, when light and dark report is very close or is higher than 1/1. In this period, belated, semibelated and semiprecocious races can have sexual heats with a minimal possibility. The 54.28% sheep have heats from initial reproduction group from more precocious race, Merinos from Palas. 37.14% sheep were mated to Karakul from Botosani and 45.71% were mated to Tzurcana (semibelated races). The researches show us, also, the over season fecundity what was determined to semibelated local populations, the closely values to more precocious race (Merinos from Palas) (84.61% and 71.42%, for each studied year, to Turcana and 81,25% and 86,66% to Karakul from Botosani). The value and the level of obtained results demonstrate the possibility of young using since first year and justify the profitableness of heats inducing in over season.

MATERIAL AND METHOD

The biological material was Merinos from Palas, Karakul from Botoșani and Țurcană young and adult sheep. Researches had the aim to identification of ways and of practical and economical possibilities to intensification of reproduction function. For this aim, two aspects had studied:

- inducing of puberty and using young sheep to reproduction since them first autumn;
- the role and natural factors influence, especially light period, in the start of heats to adult sheep.

In first case, for inducing of puberty on artificial way there was ensure the maintenance, microclimate conditions and necessary nutritional requests to optimal parameters. In these conditions, the body growth in first life months of young sheep wasn't affected. Also, about 40 days before reproduction, the young female sheep have been shear and there have been introduced reproduction rams.

In the second case, the influence of natural factors in the start of heats to adult sheep, for increasing the data specifying and for final results, researches have been made in same intervals in two consecutive years. The all races have been studied in same photoperiodic rhythm, in June 10 – July 20, when the light/dark report is very nearly or higher than 1/1, when the possibilities as belated, semibelated and semiprecocious races to have sexual heats are minimal. For the first 14 days, the sheep have been kept on the grassland, when the day light is 16 hours. Then, step by step, the light period have been reduce after 8 days to 11 hours and 30 minutes to all lots. Further on, for the rest 18 days, the studied lots have been have same daily light program 11 hours and 30 minutes, and finally, there have been introduced reproduction rams in lots.

The used methods have been specified for these determinations. There have been used directly observations on body weight to the reproduction and the calving moments. Also, the results were prelucrated and interpreted. Data have been centralized and statistical analyzed and there have been used Fisher and Tukey tests to determined differences and them signification.

RESULTS AND DISCUSSION

It is known the estrus (heats) is manifested to sheep and goats throughout the year to tropical and under tropical zones, where the vegetation is abundance. In Romania, where climate is temperate, the reproduction activity is sharing in tow seasons depending on day light period [38, 43, 44]. First season, the principal, is autumn when the light decrease to 1:1 light/dark report and the second season is in spring months when the light increase to 1:1 light/dark report. The reproduction is seasonal and this is a specie characteristic inherited from wild forms. This is prove for domestication process unfinished in useful way for breeder [3, 4, 5, 9, 28, 30]. Now, in animal rising is important to identification of extension possibilities for reproduction season to sheep and goats for a larger period [4, 5, 9, 28, 30].

The germinal cycle period, sexual heats period and gestation period to sheep allow organization two calving/year, if lactation anoestrus is eliminated through lambs' artificial rising. As a rule, to this specie, after calving is a long anoestrus period, without heats, because maternal factors (lactation anoestrus) and climatic factors (seasonal anoestrus). The both factors groups are more important for bio-economical efficiency to sheep rising. Those using in sense and to breeder wanted intensity is a heavy practice because them effects can overlap in many periods.

Puberty and heats artificial inducing to young sheep. The optimal age and weight for the first reproduction to young sheep varies very much intra and inter races. The optimal age is considered to be between 6-8 months to majority races (Dyrmundson and Haresing, quoted by C. Pascal [33]), but it can put off till 18 months. Also, there are situations when some young female sheep proceed from later calving can calve to 4-6 months.

The obtained results until now [14, 15, 16, 20, 22, 30, 31, 33, 35, 38, 44] show sheep reproduction is without negative effects when the young sheep have a body growth minimum 60-70% from adult sheep to Merinos and 50-60% to prolific races and to meat English races. Other researches show females proceed from twins calving achieve the puberty to an elder age and to lower body weight [7, 12, 13, 21, 25, 30, 34].

The body growth determination of young females' sheep from studied lots is based on body weight to reproduction and calving moments (table 1). The average body weight was over 70% to reproduction moments to all studied lots. This is a request for an early using to reproduction of young females.

The body weight to reproduction moment is different between all lots, with significant differences ($p > 0,01$) between Merinos from Palas and Karakul from Botosani lots. The age of sheep to reproduction moment and to the calving moment is insignificant differences between the study lots. These differences and them significations show there are differences between intra and inter races for body weight to the reproduction moment.

Researches about the influence of gestation about body growth rhythm of pregnant young sheep have to base the body weight to reproduction and calving moments. Results show us the body weight isn't affected even when the young sheep are use to the reproduction in the first them life year. The higher body weight increase between reproduction and calving was to Merinos from Palas lot which the body live weight evaluated since $41,965 \pm 0,931$ kg to reproduction moments to $49,305 \pm 0,474$ kg to calving moments. The analyze of obtained result proved young females' sheep can use to reproduction since them first life year if they have a good body growth.

Tabel 1 Age and weight of young females to reproduction and calving

Lot	Total number (heads)		Statistics	Body weight (kg)		Sheep age (days)	
	For covering	Covering		Reproduction	Calving	Reproduction	Calving
Merinos from Palas	45	14	$\bar{X} \pm s \bar{x}$	$41,965 \pm 0,931$	$49,305 \pm 0,474$	$278,855 \pm 1,91$	$427,085 \pm 9,456$
			S	2,6547	2,321	11,844	34,256
			V%	7,3104	5,544	9,652	13,514
			minimum	37	45	268	411
			maximum	49	55	312	465
			h^2	$0,259 \pm 0,033$			
Karakul from Botoșani	44	9	$\bar{X} \pm s \bar{x}$	$35,398 \pm 0,425$	$42,051 \pm 0,333$	$298,440 \pm 1,333$	$439,530 \pm 3,119$
			S	3,455	3,455	11,878	25,131
			V%	6,322	5,154	11,545	7,331
			minimum	32	37	275	410
			maximum	45	51	325	466
			h^2	$0,244 \pm 0,125$			
Țurcană	45	11	$\bar{X} \pm s \bar{x}$	$37,644 \pm 0,763$	$44,021 \pm 0,322$	$283,541 \pm 3,714$	$434,207 \pm 9,533$
			S	2,441	2,541	14,854	45,855
			V%	5,358	4,522	12,874	6,787
			Minim	33	38	278	430
			Maxim	48	54	311	461
			h^2	$0,251 \pm 0,531$			

The females' body weight to reproduction moment and obtained results after reproduction motivate intra race variability depend on body weight which has a higher influence than age about sexual maturity installation. If we study the young female sheep percent which had heats and which have been used since first autumn we can see different values depend on races. Thus, to Merinos from Palas, from young sheep total number, 15 females had heats and have been to covering, means 31,11%. For the other lots, the young female sheep percent which had heats and have been to covering since first autumn is 20,45% to Karakul from Botosani race and 24,44% to Turcana race (fig. 1)

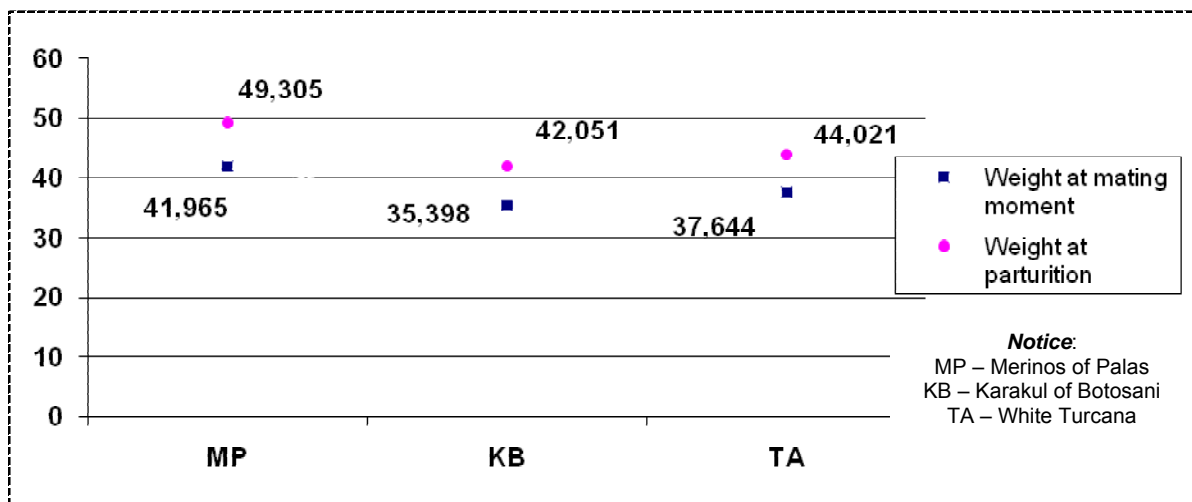


Fig. 1. Body weight (kg) evolution on gestation period to analyzed lots

**The study of the local population of sheep raised in the North-East of the country,
for meat improving production
2008 RESEARCH REPORT**

The obtained data show, also, the sheep age used to covering is different depend on race. Thus, young females' sheep from Merinos from Palas had average age lower ($278,855 \pm 1,91$ days), Karakul from Botosani females lot had average age higher with 20 days ($298,440 \pm 1,333$ days), and Turcana females lot had average age $283,541 \pm 3,714$ zile. The registered differences show differences between races for precocity, too.

Using the obtained results we can calculate the heritability coefficient for first estrus. The lower value for h^2 (the higher is $0,259 \pm 0,033$ to Merinos from Palas) we can conclude the age of first covering has a decrease genetically determination and external factors are very important in sexual precocity expression. For same parameter, Bashin, quoted by M. Mochnacs [30], have been find $0,256 \pm 0,048$ value.

Also, there are differences between races for gestation total period, too. This was the lowest value to Karakul from Botosani young sheep lot (141 days), lower with 7 days than Merinos from Palas lot and lower with 9 days than Turcana young sheep gestation total period.

The traditional age to first calving is 550-730 days. If this age can be reduce with 20-30% through puberty inducing, the effort is justified even few females are used to reproduction since them first life year. This fact has remarkable economical effects and good influences because the process of amelioration is acceleration with increase prolificacy of each female from reproduction lot and made shorter period between generations.

Photoperiodic influence about sheep reproduction function. At this specie, like goats also, the reproduction is determined by genotype/environment interaction. The environment is represented especially by day light period-photoperiodic, and other factors like nutrition, temperature, humidity, social factors etc. Photoperiodic information (light or obscurity) is received by sheep to eyes level through retina and is transmitted by nervous way till to pineal gland (epiphysis) which secretes melatonin hormone [1, 7, 9, 17, 19, 26, 27, 36, 40].

Through hypothalamus and hypophyses, secreted period and secreted melatonin quantity depending on night period have influence about sexual hormones (FSH and LH) excretion [1, 2, 3, 9, 18, 37, 41, 42, 44].

Based on these findings and scientifically arguments, the experimental protocol for inducing heats in extra season has next phases:

- long days simulation, in this case long day means day with light more than 12 hours, corresponding to late spring-summer months;
- short days simulation, in this case short day was in that period when sheep stay into the light less than 12 hours, corresponding autumn-early spring months.

The sheep lots have been observed permanently and have been establish in short time, the manifestation of first sexual cycles to some of them sheep. In first 7 days, 19 Merinos from Palas females had heats, means 54,28% from initial lot. The results are good to both other lots: to Karakul from Botosani, 37,14% sheep have been covered after first cycle and 45,71% to Turcana lot (table 2). The higher values to Merinos from Palas can be due to the higher precocity characteristically to this race. Also, to this race, the fecundity in these two years was superior to other two local races.

Thus, in 2005, from total number sheep which had heats, 36 females have been covered and have been pregnancy, means 94,44%. In 2006 (second studied year), same reproduction index was higher with 0,68%. In both situations, the specificity values for fecundity are normal in our study, because they are in specialty literature limits [15, 30, 34, 43].

Table 2 Situation of sexual cycles manifestation and of fecundity

Race	Total sheep (n)	2005				2006			
		Total sheep covered to first heats		Fecundity		Total sheep covered to first heats		Fecundity	
		n	%	n	%	n	%	n	%
Merinos Palas	65	36	55,38	34	94,44	41	63,07	39	95,12
Karakul from Botoșani	65	25	38,46	21	84,00	29	44,61	23	79,31
White Țurcană	65	29	46,15	25	82,75	28	43,07	25	89,28

In the form lot of sheep breed from Karakul from Botosani, in 2005, after the imposed light program, it was noticed that were in heat and 38,46% from the lot were fertilized, in 2006 number of fertilized sheep in the lot increases to 44,61%. Due to this data it was noticed that fecundity percent it was higher in 2005 than in the next year.

In the lot formed from adult sheep belonging to Turcana breed it was noticed in 2005 that 46,15% of all were in heat and were fertilized, of them give birth to offspring 82,75%. In the next year number of sheep in heat decreases due to photoperiodic to 43,07% the fertility increases to 89,28%.

After analyzing all the data it is confirmed that reproduction of sheep is directly determinate by natural factors, from this point to increase the productivity and biological efficiency on sheep exploitation it is required to use all the possibilities that can increase fertility on local breeds.

In Romania were made several researches on other breeds of sheep and the influence of photoperiodic was based on progressive maintenance of sheep on cold pen, organizing mostly night grazing and pulling the sheep in the shade during hot summer days.

As a result of this procedure came in heats 35,10%[30] of lot between the 25 of Julie and 30 of August. From this point of view our data indicate the same results, but with greater efficiency on all lots, proving that on sheep reduction of day light during the year up to 1/1 increases breeding efficiency. Results are different according to different breeds.

Because of this researches were made on several breeds that were in the same program of exposure on day light and we find that seasonal estrus is on reverse relation with day light exposure. This physiological process is determinate by thyroid function which is influenced by heats and light and as a direct outcome it is reduced thyroxin excretion [1, 2, 6, 7,

**The study of the local population of sheep raised in the North-East of the country,
for meat improving production
2008 RESEARCH REPORT**

8, 10, 23, 39]. To fall when daylight and temperature decreases this physiological process straighten, this is the reason why on most of the breeds sexual period is during the seasons when daylight decreases, from Julie to September – October.

The effected researches prove that adults' sheep, indifferently by characteristically precocity, there can obtain covered and calving in extra season using photoperiodic like principal factor for heats cycles starting.

CONCLUSIONS

1. 20-31% young sheep from those three studied lots have been having heats since them first life year without affected body growth. In this case, puberty and heats artificial inducing to young sheep is bio-economical justified.

2. Between lots are significant differences for the body weight, to the covered moment. The body weight evolution wasn't affected during pregnancy to the young female sheep and this fact proves using to covered the young female sheep since first life year isn't uncommendable.

3. The heritability coefficient determined for first covered age is lower ($h^2 = 0,259 \pm 0,033$), so it's genetically determination is decrease. In this situation, is very clear the external factors are very important in sexual precocity expression.

4. The traditional age to first calving is 550-730 days. If this age can be reduce with 20-30% through puberty inducing, the effort is justified even few females are used to reproduction since them first life year. This fact has remarkable economical effects and good influences because the process of amelioration is acceleration with increase prolificacy of each female from reproduction lot and made shorter period between generations.

5. Researches show us the local populations which are semi belated, in same conditions, have values nearly by Merinos from Palas (a precocious race) for heats and fecundity manifestation in extra season. In this case, inducing heats in extra season is economical justified.

6. Decreasing day light period for 20 days there are created conditions for increasing gonadotrophic hypophyses hormones content and ovulation process starting and, implicitly, estrus.

7. The length and localization of reproduction season in one year are very variable between races, so, the reproduction season is a character with a high hereditary control.

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PN-II-ID-PCE-2007-1/ID 676

*The study of the local population of sheep raised in the North-East of the country,
for meat improving production*

2008 RESEARCH REPORT



Herd of Turcana sheep breed in Romania



Youth sheep of breed Merinos of Palas

PN-II-ID-PCE-2007-1/ID 676

*The study of the local population of sheep raised in the North-East of the country,
for meat improving production*

2008 RESEARCH REPORT



Herd of Merinos of Palas sheep in Romania



Herd of Karakul of Botosani sheep in Romania