

SOME PRODUCTION TRAITS OF THE NEW IMPORTED EAST-FRIESIAN SHEEP IN MACEDONIA**

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**Plenary invited paper

Abstract: Investigation of some production traits in two production years (2005, 2006) was carried out on East-Friesian sheep. Considerably ($P < 0.01$) higher milk production (346 lit.) in 2005, in comparison to 2006 (250 lit.) was registered. The duration of lactation is considerably ($P < 0.01$) greater in 2006 (264 days), compared to 2005 (232 days). The content of milk fat in the milk from this breed is in average 5.01%, i.e. 5.64%, for the two years consequently. The production of milk fat is 17.34 kg in 2005 and 14.11 kg in 2006. The percentage of proteins in our research, in average is 4.68% in 2005, i.e. 4.85% in 2006, while the production is 16.19, i.e. 12.12 kg. The number of obtained lambs per sheep is not considerably higher ($P < 0.05$) in 2005 (1.64 lambs) in comparison to 2006 (1.48 lambs). Almost all the examined factors (year, lactation, number of milk control) highly influence ($P < 0.001$) the daily milk production, with the exception of the year, which influences with a considerable importance ($P < 0.05$) the evening milk. In regard to the milk fat, statistically highly significant ($P < 0,001$) influence was established only of the number of sequence and the month of the milk control, while all the rest fixed factors (year, lactation, number of lambs) didn't influence significantly ($P > 0,05$) this component of milk. Except of the fats, all the examined factors influenced statistically highly significantly ($P < 0,001$) proteins in the milk, with an exception of the number of lambs, which did not influence considerably ($P > 0,05$) this component.

Key words: East-Friesian sheep, milk production, fat %, proteins %, fixed factors.

Introduction

The selection of the domestic population of sheep breed of Pramenka in

The selection of the domestic population of sheep breed of Pramenka in Republic of Macedonia (Ovcepolian and Sharplaninian strain) mainly is developed in a direction of increase of the production of milk. With that aim the East-Friesian sheep were imported, as one of the best dairy breeds of sheep in the world.

Most countries in the world have already imported this breed where it is used for obtaining a clear blood or for crossing with the domestic populations (*McKusick et al*, 2001, *Thomas et al*, 1999, *Mroczkowski et al*, 1999).

The presence of this breed in the Republic of Macedonia for the first time has been recorded in 1972 (when 100 sheep were imported), whereas the first research had shown a poor acclimatization capability of the breed, with which this sort is usually known in the world.

In March 2004, this breed was imported again to Macedonia, by an individual farmer from the village of Trubarevo, region of Skopje. The flock is under complete control of the Institute of Animal Sciences from Skopje.

Material and methods

As a material for examination we have taken the flock of the East-Friesian sheep, imported from the Netherlands, owned by an individual farmer from village of Trubarevo, Skopje. The research was carried out during two production years (2005 and 2006), in 2005 total of 53 sheep had been examined, while in 2006, 85 sheep. The sheep were at different age, i.e. in different lactations, the chemical content of the milk (fat % and protein %), and some parameters of the fertility (% of born lambs, % of twinning). The weaning of the lambs was done at the age of 60 days. The milking was done twice a day (morning and evening).

The quantity of the lactation milk was established using A4 method (*Barillet*, 1992), which implies measuring of the daily production of milk, in an interval of 28-34 days, between two controls. In most countries, members of ICAR, the milk control is done using this method. AT and AC methods are used in several countries, and the selective departments in France and Bulgaria use the so called D method (*Astruc et al*, 2000).

The duration of lactation was determined as a period (in days) from partus, up to that moment when the daily milk production upon a sheep drops under 100 milliliters. The chemical content of the milk has been examined with an assistance of the Milkoscan FT 6000, production of Foss electric, Denmark.

Rearing of sheep was different from the traditional system in Macedonia, that means the fodder at the farm was exceptionally from a barn (from a hand) without grazing, during the year. The sheep were fed manually during the whole year with roughage and concentrated food, (alfalfa, meadow hay and concentrate, barley, dry sugar leaves etc. The feeding was ad libitum.

The housing was in an excellent facility, with enough place outside, and the rearing of sheep and their health were at a satisfactory level during the whole year.

The influences of the main factors (year, lactation, test day, number of lambs born and month of control) were analyzed simultaneously for the traits of daily milk production - morning milking, evening milking, total daily milk yield, fat and protein percentage. The fixed model of SPSS with main effects only was used.

Results and discussion

Upon the controlled production characteristics, with the sheep of East-Friesian breed, in two production years (2005, 2006), considerably ($P < 0.01$) higher lactation milk production (suckling and commercial milk -346 lit.) in 2005 was recorded, in comparison to 2006 (250 lit.) (Figure 1). Taking into consideration that in the two production years the conditions were nearly the same, we should additionally examine which are the reasons which have led to reduction of the quantity of milk in 2006, in comparison with the previous year.

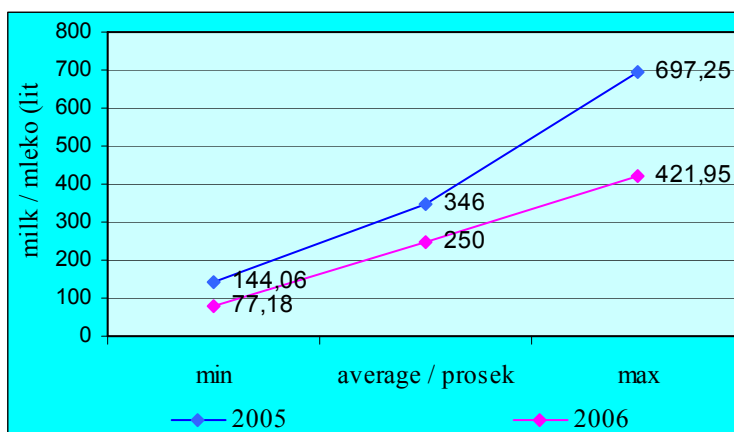


Figure 1. Average milk production, with min and max

The average daily milk production of examined sheep was 1.56 l. in 2005, i.e. 0.94 l. in 2006, with variations from 0.53 to 3.37 l. (2005) i.e. 0.42 up to 1.41 l. (2006).

The average production of commercial milk within sheep from East-Friesian breed in USA, according to *McKusick et al.* (2001) is 223 kg, and the average daily milk production 1.28 kg. The maximum daily milk production (so called peak milk production) within this breed, according to the very same authors in connection to the achieved method for weaned of lambs, is 2.93 kg.

Compared to our results, milk production (annual and daily) achieved in our experiment, especially in 2006, was higher than that established by *McKusick et al.* (2001). Significantly lower daily milk production has been established by *Mroczkowski et al.* (1999) and that was with crossbreeds of East-Friesian sheep and Poland merino in the first, second and third lactation: 0.40, 0.45 and 0.43 liters, consequently.

Comparing the production characteristics between the East-Friesian and Dorset breeds, *Thomas et al.* (1999) concluded significantly higher milk production at East-Friesian breed, which had longer lactation. Examining the production of milk, crossbreeds from three groups of sheep (in type of East-Friesian, in type of Blackheaded Plevan and crossbreeds of East-Friesian, Awassi and Blackheaded Plevan sheep), *Nedelcev et al.* (2003) consequently gained total lactation milk production of 214, 180 and 220 liters. The average daily milk production of the same group of sheep, according to the same author was 0,936; 0,762 and 0, 911 liters.

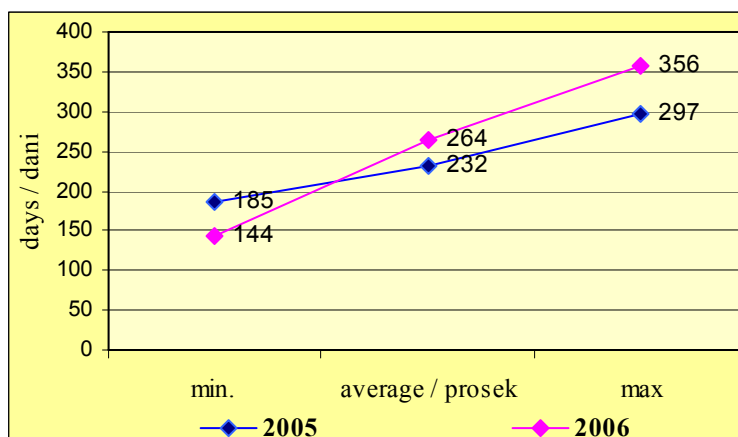


Figure 2 . The lenght of the lactation

The duration of lactation concluded upon the basis of the controlled 53 sheep in 2005, i.e. 85 sheep in 2006, is significantly ($P < 0.01$) greater in 2006 (264 days) than in 2005 (232 days) (Figure 2). The average duration of lactation of East-Friesian sheep in Poland, according to *Mroczkowski et al.* (1999) is 182 days.

Usually the more productive and dairy breeds of sheep have longer lactation than other sheep breeds (*Coop*, 1982). According to the same author, the duration of lactation within different breeds of sheep differs and it is firstly dependent on genetic predisposition of the breed, for production of milk. Also, milk production within the sheep, firstly depends on the duration of lactation.

The content of the milk fat of the East-Friesian sheep in our study is in average 5.01% i.e. 5.64%, for the two years sequentially (2005, 2006). According to the percentage of milk fat, the production of milk fat in kilograms has been concluded and the very same was 17.34 kg in 2005 and 14.11 kg in 2006.

Examining the content of milk fat of crossbreeds between Cigaja and three-breed rams (Northern-Eastern Bulgarian x Awassi and East-Friesian sheep), *Odjakova et al.* (2002) established the lowest fat (5.27%) on the 42nd day of lactation, whilst the highest (7.55%) on the 150-th day i.e. at the end of lactation. The average fat for whole lactation period in these crossbreeds is 6.95%. The same authors concluded average fat of 7.31% in breed Cigaja.

The fat percentage of milk of sheep of East-Friesian breed in the USA is 4.8 % (*McKusick et al.*, 2001). In 3 populations of sheep (sheep from the synthetic line X5M, crossbreeds between East-Friesian and meat Starozagorska and crossbreeds between Starozagorska and Blackheaded Plevenska sheep) consequently the following percentages of milk fat were established: 6.76, 6.74 and 7.20 % (*Nedelcev et al.*, 2003).

Learning about the mutual dependence of the somatic cells and milk fat in milk of East-Friesian sheep, *Jaeggi et al.* (2003), have found out the highest percentage of milk fat in the group of 100.000 - 1.000.000. More exactly in the groups with the somatic cell count upon the following sequence: <100.000, 100.000-1.000.000 and >1000.000. cells/ ml, the content of milk fat was 5.49, 5.67 and 4.86%, consequently.

According to *Mroczkowski et al.* (1999), the percentage of milk fat of crossbreeds of East-Friesian sheep and Polish merino, in the first, second and third lactation, is 6,5, 7,2 and 7,5%, consequently. The same authors concluded positive and significant correlation (connection) between the

content of fat and the size of the udder ($r = 0.32$).

Other udder traits (length, deepness, size, distance, and length of teats) were not in correlation with the production of milk fat. In East-Friesian sheep, *Thomas et al.* (1999), concluded an average percentage of milk fat 5.04% and total annual production of milk fat, 5.6 kg per sheep.

The percentage of protein in the milk from East-Friesian sheep in our research in average was 4.68% in 2005 i.e. 4.85% in 2006. The production of proteins was 16.19 kg in 2005 and 12.12 kg in 2006 year.

The number of obtained lambs per sheep was slightly higher ($P < 0.05$) in 2005 (1.64 lambs) in relation to 2006 (1.48 lambs). The sex presence of lambs is 46% with 54% (male : female) in 2005, and 55% with 45% (male : female) in 2006. From the born lambs in 2005, 47.2% are born as single, 41.5 % are twins and three lambs from single sheep are 11.3%. In 2006 these relation was single 54.1%, twins 43.5% and 2.4% triple lambs.

In this text we tried to establish the degree of influence of certain factors (year, lactation, number of milk control, fertility and month of control) on daily milk production (morning, evening and in total) as well as on the content of milk fat and proteins in the milk (Table 1). All of these, because the factors that influence the daily milk production are actually the very same factors which influence the entire lactation milk production (*Dimov et al.*, 2005).

According to table 1, almost all the examined factors influence with high significance ($P < 0.001$) the daily milk production. Only the year has an influence with no statistical significance ($P > 0.05$) on the morning milk in the two analyzed years (2005, 2006).

Table 1. Influence of some fixed factors upon the daily milk production at east-friesian sheep, F- statistics

Factor of influence	df	Milk production				
		morning	evening	total	fat, %	proteins, %
Year	1	2,246 ^{ns}	49,859***	25,464***	50,957***	0,038 ^{ns}
Lactation	4	6,260***	4,413**	5,716***	3,287*	2,223 ^{ns}
Test day	10	3,063***	4,048***	4,156***	12,368***	10,806***
No of lambs	2	1,440 ^{ns}	9,534***	4,491**	2,636 ^{ns}	1,908 ^{ns}
Month of control	10	18,769***	29,784***	34,800***	35,577***	50,129***
R - Koef. of determination		0.552	0.707	0.744	0.733	0.413

ns – non significant, * - $P < 0,05$, ** - $P < 0,01$, *** - $P < 0,001$

On the content of milk fat, statistically highly significant ($P < 0,001$) influence of the year and the number i.e. the sequence and month of the milk

control were established, while the number of lambs didn't influence significantly this component of the milk. With a difference of fats, the examined factors which influenced statistically high ($P < 0,001$) the proteins in the milk, within the examined population of sheep, were the test day and month of control, while the year, lactation, number of lambs did not influence significantly ($P > 0,05$) this component.

In general the studied factors influenced in a higher extent the evening, daily milk yield and the fat percentage ($R = 0.707-0.744$) while the morning daily yield and the protein content were influenced poorly ($r = 0.413-0.552$).

Conclusion

Based on realized research carried out on East-Friesian sheep during 2005 and 2006, the following conclusions could be made:

1. The sheep of East-Friesian breed have gained significantly higher milk production in 2005 (346 l.) in comparison to 2006 (250 l.).
2. The average content of milk fat in the milk from this breed is in average 5.01 % i.e. 5.64% for the two years sequentially (2005,2006).
3. The percentage of proteins in average is 4.68% in 2005 i.e. 4.85% in 2006.
4. The average fertility of sheep is insignificantly higher ($P < 0.05$) in 2005 (1.64 lambs) in relation to 2006 (1.48 lambs).
5. Most of the fixed factors (year, lactation, number of milk control, fertility and month of control) influenced significantly ($P < 0.001$) the daily milk production and content of the milk.

Besides that the results of our research compared to the production results of sheep of this breed obtained by other authors exceed especially those obtained in 2005, the fact that in 2006 we have obtained significantly lower milk production than the previous year, it is very early to bring up a general conclusion about the acclimatization of this breed in Macedonia.

NEKA PROIZVODNA SVOJSTVA NOVOUVEZENE ISTOČNO-FRIZIJSKE RASE OVACA U MAKEDONIJI

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Rezime

Cilj ovog rada je praćenje nekoliko važnih proizvodnih svojstava kod istočno-frizijske rase ovaca, koja je nakon 1972 god., u 2004 godini, opet uvezena u R. Makedoniju iz Holandije. U Republici Makedoniji odgajivanje ove rase (pre 35 godina), bilo je praćeno negativnim iskustvima, t.j. došlo je do uginuća celog stada. Tadašnja istraživanja bila su kratkotrajna i nekoordinisana i ukazivala su na slabu sposobnost aklimatizacije rase. Danas i pored takvih konstatacija, određeni farmeri koriste ovnove ove rase, radi ukrštanja sa domaćom populacijom ovaca (šarplaninski i ovčepoljski soj rase pramenke). Imajući u vidu da stado je uvezeno pre tri godine, kratak period onemogućava donošenje zaključaka o aklimatizaciji rase u Makedoniji. Imajući u vidu iskustava drugih zemalja, ova se rasa karakterizira slabom sposobnošću aklimatizacije, zbog čega ispitivanja ovog stada, a posebno stada sa melezima F1 generacije (istočno-frizijska x domaća populacija), trebalo bi produžiti i narednih godina, kako bi se mogao doneti zaključak o opstanku ove rase na teritoriji Republike Makedonije (bilo da se radi o grlima u čistoj rasi ili melezima).

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