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Original Contribution

ECONOMIC EFFICIENCY OF FARMS WITH SHEEP OF THE AWASSI BREED IN BULGARIA

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ABSTRACT

A study was carried out on the economic efficiency of three herds of the Awassi breed for the period 2021-2023. The animals included in the study amounted to 986 animals in 2021, and 996 animals in 2023.

The results of the survey show that during the survey period, herd renovations were carried out at the rate of 32.4%. By the same percentage, the number of rams was reduced, which significantly exceeded those required for the herds and made production more expensive.

All natural indicators have been improved. Milk produced for the study period increased by 28.22%, but the established milk yield of 126 liters was below the requirements of the breeding program of 160 liters per milking period.

The fertility of the breed increased and reached values of 144% with the requirements set in the breeding program at 110%. The live mass of lambs for sale increased by 4%, but the purchase price increased by 37.49% per 1 kg.

On average, farm income increased by 33.35% and expenditure by 27.62%. The increase in costs was due to the higher prices of fodder, which, with the exception of alfalfa hay in the village of Tankovo, was purchased from other farms.

In 2021, minimal profit was realized, and in 2023, there was satisfactory profitability, but with a low value of income and expenses.

The results of the study prove that farmers experience a dire need of land for the production of animal feed.

Key words: sheep, milk, fertility, live weight, feed, income, costs, profit, profitability.

INTRODUCTION

The Awassi breed is one of the oldest dairy breeds in the world. It is believed to have been created by the Ashaki Bedouin tribe in the Euphrates River region. During the current stage, the breed is widely distributed both throughout the Arabian Peninsula and in many countries of Europe. The milk yield of breeding sheep is in the range of 400-500 liters, and the fertility is about 100% (1).

The Awassi breed was imported to Bulgaria in 1977 from Israel and Iraq. It was maintained in separate herds in pure condition, with a view to its use as a sire breed for the creation of dairy sheep breeding in our country (2-4).

In the breeding program of the Awassi breed in Bulgaria, it is stipulated that for a milking period of 120-150 days, 160 liters of milk will be obtained, and the fertility will be at least 110% (5). According to Tyankov et al. (2000) (6) in Bulgaria during the milking period, the controlled animals produced 126-150 liters of milk, and the fertility was within 105-110%. The breed has good acclimatization qualities and is superior to the East Friesian, but is prone to hoof diseases.

Stoilova (2021) (7) presents information about the best herd of the Awassi breed in Bulgaria, bred in the village of Belogradec, region Varna. Nazmi Madjar's farm has a flock of 600 Awassi sheep and the milk is processed in a mini-dairy

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registered under the Direct Selling Ordinance. The ewes produced about 2.5 liters of daily milk yield and over 300 liters of milk per milking period, which is very indicative of the genetic charge for high milk yield of the breed.

The Awassi breed is used in the schemes to create the Bulgarian dairy breed and especially in the Bulgarian milk synthetic population (SPBM). Information about the crosses of Bulgarian sheep breeds with Awassi rams is very scarce. Ivanova et al. (2015) (8) investigated the productive indicators of crosses of SPBM with Awassi, but did not find significant differences and a corresponding effect of the crossbreeding. In order to carry out a mass cross with the Awassi breed, a study of the effect of the use of the breed is necessary. No study on the economic results of raising purebred sheep of the Awassi breed and its crosses has been undertaken. Studies were done mostly on other dairy breeds such as SPBM, black-headed Pleven sheep, purebred Assaf and Lacaune and their crosses. (9-13). The authors found that feed has the largest relative share in the formation of the expenditure part, followed by labour and social security expenses.

The purpose of the present study is to evaluate the economic efficiency of sheep of the Awassi breed, bred in Bulgaria.

MATERIAL AND METHODS

The object of the study are three farms of the Awassi breed, grown in the village of Tankovo, Burgas region, the village of Krasnovo and the village of Isperihovo, Pazardzhik region. The total number of sheep included in the study in 2021 was 986, and in 2023 996, including 817 ewes, 156 ewe lambs and 23 rams.

The study covers the period of the years between 2021-2023, which is characterized by great dynamics in the fluctuation of prices of basic products, feed, labor and other auxiliary activities.

The revenue part is formed by the milk, lambs sold for meat and some additional products – sold culled sheep and manure. The purchase prices of the products and the income received on average from the dams for 2021-2023 have been indicated.

The cost part looks at the formation of the variable, fixed and total costs of the dam. The relative share of renovation animals and rams, from which no production is realized, but nevertheless represent expenses for the farm, has been added to the costs of managing the dams and the offspring.

The profit appears as a result quantity and represents a difference between income and expenses of the farms.

Profitability is a synthetic indicator and most objectively reflects the efficiency of production. The influence of feed prices on productivity is determined depending on the ways in which farms are supplied with concentrated and bulk feed. In this regard, the farms are divided into two groups, namely with partially produced on-farm fodder (mainly alfalfa hay) and concentrated fodder purchased from other producers (the farm in the village of Tankovo) and other groups with full purchase of all the main fodder, with Krasnovo and the village of Isperihovo).

The information required for the study was taken from the farm accounting books.
The data were processed using the mathematical-statistical method of the computer program Excel.

RESULTS AND DISCUSSION

Table 1 presents the number of sheep in the studied farms. The data shows that in the two years included in the study, the total number of sheep was almost unchanged. The number of the dams in 2023 was reduced by 4.28%, which was due to the greater culling of elderly and low-yielding ewes.

The increase in renovation ewes was significant - by 35.9%, which is an indicator of expanded reproduction and reduced renovation of the three herds. In 2023, the number of rams was reduced by 32.4% compared to 2021, when an excess number of rams were kept in the herds, especially in the village of Isperihovo. One ram in 2021 is assigned 28 ewes, with natural insemination load requirements of 50 dams. In 2023, one sire is expected to have 42 dams, which is a positive trend, but still far from the norm and leads to more expensive production.

Table 1. *Number of animals under selection control from the Awassi breed*

Farms by settlements	Farmers	2021				2023			
		ewes	(weaned) lambs	rams	total number	ewes	(weaned) lambs	rams	total number
Tankovo	Zhelyo Dimitrov	292	40	8	340	270	56	8	334
Krasnovo	Neli Rangelova	180	20	6	206	155	40	5	200
Isperihovo	Ilia Iliev	380	40	20	440	392	60	10	462
Total	Awassi	852	100	34	986	817	156	23	996

Table 2 presents information on the main natural parameters in sheep breeding, namely milk, fertility and live weight of lambs for sale. The purchase prices of milk and live weight in 2021 and 2023 are also indicated.

The data show that under Bulgarian conditions, the high-milk Awassi breed has low milk productivity, far below its genetic capabilities. The average milk yield for the three herds, which make up more than 50% of the animals of the breed under selection control for 2021, is 112 liters, and it is significantly higher in the herd in the village of Isperihovo.

In 2023, the average ewe milk yield increased by 22.22%, but still remains very low for the breed and below the requirements set in the breeding program.

The average milk yield of a dam established in the present study is much lower than that of the herd in the village of Belogradets, which is over 300 l. This is due to the low requirements in terms of feeding the sheep, the primitive farming technologies and the current low level of breed selection in the majority of herds under selection control.

Table 2. *Natural indicators and prices of products from the dams of the Awassi breed.*

Farms by settlements	farmers	2021					2023				
		milk		fertility	live weight		milk		fertility	Live weight	
		liters	average price	%	kg	average price	liters	average price	%	kg	average price
Tankovo	Zhelyo Dimitrov	102	1,30	131	25	5,50	128	2,00	160	26	10,00
Krasnovo	Neli Rangelova	80	1,30	140	22	6,50	90	2,18	140	24	12,00
Isperihovo	Ilia Iliev	154	1,45	118	25	8,00	160	2,10	132	25	10,00
Overall average	Awassi	112	1,35	130	24	6,67	126	2,09	144	25	10,67

The purchase price of milk in 2023 increased by 35.41%, which is a positive trend for the income from rearing the breed. One of the many important breeding traits is sheep fertility. There is ample evidence in the scientific literature that the Awassi breed is of low fertility. According to Tyankov et al. (2000) (13) breed fertility ranges between 105-110%. In our research, we found significantly higher fertility - for 2021, on average, 130%, and in 2023, 144%. The increase in the fertility of the sheep in the herd of the village of Tankovo, Nessebar municipality is particularly expressive - 160%.

The live weight of lambs for sale increased by only 4%, but the purchase price increased by 37.49%. There is a great interest in lamb meat, especially that of the Awassi breed. This is due to the very good taste qualities of the meat, which for many consumers satisfies their culinary preferences.

Table 3 presents data on feed prices in 2021 and 2023. The price of concentrate for a period of 2 years has increased by 22.22%, alfalfa hay by 21.88%, starter mix by 39.81%, and for hay with 50%.

Table 3. *Feed prices - BGN.*

Farms by settlements	Farmers	2021					2023				
		concentrated feed	alfalfa hay	concentrated mixture	hay	straw	concentrated feed	alfalfa hay	concentrated mixture	concentrated mixture	straw
Tankovo	Zhelyo Dimitrov	0,50	0,15	0,60	-	-	0,65	0,20	1,00	-	-
Krasnovo	Neli Rangelova	0,45	0,30	0,60	-	-	0,65	0,40	1,00	-	-
Isperihovo	Ilia Iliev	0,52	0,30	0,65	0,20	-	0,60	0,35	1,10	0,40	-
Total average price	Awassi	0,49	0,25	0,62	0,20	-	0,63	0,32	1,03	0,40	-

There are some differences in the prices of fodder with different ways of supplying the farms and especially of the alfalfa hay, which in the village of Tankovo belongs to the farm's own production.

On the Tankovo farm, with partial feed production (mainly alfalfa hay), the price of concentrated feed increased in 2023 by 23.08%, of self-produced alfalfa hay by 25% and of the concentrate mixture purchased from feed plants by 40%.

For farms with fully purchased fodder**,** (the village of Krasnovo and the village of Isperihovo) in 2023, the price of concentrated fodder (corn and barley) increased by 22.2%, of alfalfa hay by 21.01% and of the concentrated mixture purchased from feed mills by 40%.

A difference in feed prices between those with partially and those with fully purchased feed was observed only for alfalfa hay. In 2021, it is 50%, and in 2023, 46.67% higher in farms with hay purchased entirely from other farms. Data on the high prices of fodder purchased from other farms clearly shows the need for small farms that do not own arable land for fodder production.

Table 4 presents the main economic results of a dam of the Awassi breed for the analysed period.

Table 4. *Economic results of sheep breeding operations with the Awassi breed.*

Indicators	FARMS			
	Zhelyo Dimitrov	Neli Rangelova	Ilia Iliev	Farm average
2021				
Income - BGN.	377,50	365,00	511,50	418,00
Costs - BGN.	386,60	399,15	461,15	415,63
Profit - BGN.	-9,10	-34,15	+50,35	+2,37
Return on Revenue-%	-2,41	-9,37	+9,84	+0,56
Cost effectiveness-%	-2,36	-8,56	+10,92	+0,57
2023				
Income - BGN.	620,30	573,20	688,00	627,17
Costs - BGN.	559,85	542,91	620,00	574,25
Profit - BGN.	60,45	30,09	68,00	52,92
Return on Revenue-%	+9,70	+5,25	+9,89	+8,40
Cost effectiveness-%	+10,80	+5,54	+10,97	+9,22

The dam's yield for the period 2021-2023 average for the breed increased by 33.35%. This is due to the increased average productivity of the sheep and the higher purchase prices of the products intended for the market.

Costs also increased by 27.62% due to increased prices of feed, labour and all activities related to rearing the breed. In 2021, the minimal positive values of profit and profitability of income and expenses were established as average values for the breed. This is mainly due to the realized profit from the sheep in the village of Isperihovo, which has a higher level of selection compared to the other two farms. In 2023, the average gross profit for the breed increased significantly – by 95.52% and the profitability of all farms had positive values. This is due to the renovation of the flocks and the culling of all old and low-yielding sheep, the reduction of the number of rams, improved selection with the breed and higher purchase prices, however, without significant changes at the level of nutrition and breeding technology.

CONCLUSIONS

During the period 2021-2023, the renovation of the herds was carried out and reproduction was ensured at 32.4%. By the same percentage, the number of rams was reduced and a smaller number, but with the better fertile quality rams, were left for breeding.

All natural indicators have improved, but the realized milk yield of 126 liters was significantly below the 126 liters per milking period set in the breeding program. The fertility of the breed has been increased and reached values of 144% with requirements of 110%. The purchase prices of the products have increased, but along with this, a significant increase has also been established for the main fodders.

The dam's yield increased by 33.35% over the study period and expenditure by 27.62%. In 2021, a minimal profit was realized, and in 2023, satisfactory, but with low profitability values of income and expenses.

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