

Original Article

Effect of fertilizing on the productivity of pregnant and lactating queens, growth and development of their offspring

Efeito da fertilização na produtividade de ovelhas grávidas e lactantes, crescimento e desenvolvimento de seus filhotes

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Abstract

An urgent problem in the agricultural science of livestock production is the adequate feeding of the queens of farm animals, in particular sheep kept on year-round pasture, especially in the second half of pregnancy and the first half of lactation. These periods are the most stressful, since the uterus does not receive enough necessary nutrients for the normal functioning of the body, embryonic and post-embryonic development of the offspring. In this regard, the purpose of our research was to increase the usefulness of the diet queens by carrying out additional feeding crushed barley with the inclusion of a mineral supplement developed taking into account the chemical composition of feed in Kazakhstan. To establish a nutrient deficiency in the diets of pregnant and lactating ewes, the botanical composition and the amount of food eaten were determined. pasture feed in basic farms typical of southeast Kazakhstan. Chemical compositions, nutritional value of pasture and grain crops feed installed using devices from the Swedish company FOSS: InfraXact, FIAstar 5000, KJELTEC, as well as taking into account generally accepted standards for feeding sheep of different sex and age groups. To increase the nutritional value of the diet ewes experimental groups were fed crushed barley in the amount of 0.4 kg, and animals of 2 experimental groups in its composition, also received mineral supplement "Agrovit" at the rate of 4 grams per head per day. In beginning of lactation about uterine 2 experimental groups peasant farms were superior by 2.45 - 2.20% by live weight over control analogues that grazed only on pasture. A similar dynamic continued to mid-lactation. Feeding pregnant and lactating ewes in the specified volume, and animals of 2 experimental groups, also mineral supplement contributed to an increase in the milk productivity of queens and the intensity of growth and development of their lambs, which is an important factor for obtaining and raising breeding young sheep.

Keywords: sheep, breed, crossing, genotype, live weight.

Resumo

Um problema urgente na ciência agrícola da produção pecuária é a alimentação adequada das rainhas dos animais de fazenda, em particular das ovelhas criadas em pastagens durante todo o ano, especialmente na segunda metade da gestação e na primeira metade da lactação. Esses períodos são os mais estressantes, pois o útero não recebe os nutrientes necessários para o funcionamento normal do corpo e para o desenvolvimento embrionário e pós-embrionário da prole. Nesse sentido, o objetivo de nossa pesquisa foi aumentar a utilidade da dieta das rainhas por meio da alimentação adicional de cevada triturada com a inclusão de um suplemento mineral desenvolvido levando em conta a composição química da ração no Cazaquistão. Para estabelecer uma deficiência de nutrientes nas dietas de ovelhas grávidas e em lactação, foram determinadas a composição botânica e a quantidade de alimento ingerido. As composições químicas e o valor nutricional da alimentação de pastagens e grãos foram analisados com equipamentos da empresa sueca FOSS: InfraXact, FIAstar 5000, KJELTEC, além de levar em conta os padrões geralmente aceitos para a alimentação de ovelhas de diferentes sexos e faixas etárias. Para aumentar o valor nutricional da dieta, os grupos experimentais de ovelhas foram alimentados com cevada triturada na quantidade de 0,4 kg, e os animais de dois grupos experimentais em sua composição também receberam o suplemento mineral "Agrovit" na proporção de 4 gramas por cabeça por dia. No início da lactação, as ovelhas dos dois grupos experimentais das fazendas de camponeses foram superiores em 2,45% a 2,20% em peso vivo em relação aos análogos de controle que se alimentavam apenas no pasto. Uma dinâmica semelhante foi observada até a metade da lactação. A alimentação de ovelhas grávidas e lactantes no volume especificado, e os animais de dois grupos experimentais, juntamente com o suplemento mineral, contribuíram para um aumento na produtividade de leite das rainhas e na intensidade de crescimento e desenvolvimento de seus cordeiros, o que é um fator importante para a obtenção e criação de jovens ovinos de raça.

Palavras-chave: ovelhas, raça, cruzamento, genótipo, peso vivo.

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1. Introduction

At present, the bulk sheep herds in Kazakhstan are concentrated in small-scale agricultural enterprises and personal farmsteads, where the resources of pasture and stall feed are limited. For sheep farming, which is based on grazing animals, the most difficult technologically are the winter and early spring periods, when the productivity of pasture land is low and daylight hours are short. Thus, in experiments conducted on sheep of the Kazakh fat-tailed coarse - wool and Ordabasin breeds second on average, animals ate half of the food contained only on pasture feed, respectively, 2.25 and 2.41 kg stern mass, which provided their needs for metabolic energy only at the level of 54.29 and 58.11%, in digestible protein - at 37.74-40.45% (Kormanovskaya, 1962).

Many years of scientific and production experiments carried out for pasture sheep breeding in many regions of Central Asia and Kazakhstan, incl. in the southeast of the republic indicate Deficiency of nutrients in sheep diets, especially in macroelements such as phosphorus, sulfur and the following microelements: cobalt, copper, iodine. According to scientists, when grazing sheep on winter pastures in many regions, they do not can cover even maintenance feed needs (Raetskaya et al., 1975). In this regard, the purpose of the research was to increase the usefulness of the diet queens by organizing additional feeding in the form of crushed barley and a mineral supplement developed taking into account the peculiarities of the chemical composition of feed in Kazakhstan.

The research results presented in this article are based on the characteristics of yield pastures, nutritional value and chemical composition of feed and are aimed at improving sheep feeding rations in the conditions of the South-East of the Republic of Kazakhstan during the most critical winter and early spring periods. For what the following works were carried out in the base farms “Merey” and “Zhanaidar and K”, typical for the Zhetisu region of the Republic of Kazakhstan: determination of specific weight of pasture vegetation by botanical composition; determination of the

amount of actually consumed pasture fodder in the periods of 2-half of suyagnosis and 1-half of lactation; feeding of ewe lambs of experimental groups with concentrate feeds and mineral additives in their compositions; evaluation of the results of feeding of ewe lambs of experimental groups by live weight and milk yield, in comparative aspect with analogs from control groups, and their young stock - by intensity of growth and development.

Considering the above, research aimed at increasing the productive qualities of sheep and resulting young animals due to replenishment of nutritional deficiencies substance in carrying out scientifically based food, are relevant and represent the opportunity to develop optimal diets for pregnant and lactating queens based on the use of pasture feed.

2. Materials and Research Methods

In the period from January 15 to June 15, 2023 in the conditions of peasant farms “Merey” (44.173057, 77.566341) and “Zhanaidar and K” (44.553501, 77.371870) of Jetisu region, according to the scheme (Table 1), scientific and production experiments were conducted on sheep of the breed Yetti Merino (44.173057, 77.566341). Meat Merino is the only breed bred in on these farms and in the area of productivity corresponding to the topic of the project, which involves conducting research on fine-wool sheep.

For scientific and production experiment in each of the above-mentioned farms, 90 heads of analogue ewes of the same physiological period were selected and added with additional signal tags. which using a random sampling method, they were distributed into three groups of 30 animals each. The ewes of the control group were kept only on pasture feed, and the sheep of both experimental groups, in addition to pasture feed, from January 15 to April 1 (75 days) received crushed barley in the amount of 0.4 kg for 1 goal/day. In the first three days, upon returning from pasture, the queens were divided into three groups using a split and a distribution gate using signal tags. Then

Table 1. Schemes of experience.

Peasant farm “Merey”		
Groups	n	Feeding rations for ewes
1- experimental	30	Pasture vegetation, crushed barley
2- experimental	30	Pasture vegetation, crushed barley + mineral additive “Agrovit”
Control	30	Pasture vegetation
Total	90	
Peasant farm “Zhanaidar and K”		
Groups	N	Feeding rations for ewes
1- experimental	30	Pasture vegetation, crushed barley
2- experimental	30	Pasture vegetation, crushed barley + mineral additive “Agrovit”
Control	30	Pasture vegetation
Total	90	
Total for 2 farms	180	

they were allowed into the pens, where feeders (crushed barley) were already placed in the feeders of the queens of the 1st experimental group, and in the 2nd experimental group - fertilizing + mineral supplement. Starting from the fourth day, the queens formed a strong conditioned reflex to feeding and dispersed into the pens.

Compound to the form of additive intended for feeding ewes of Agrovit gram/ton: iron – 2500, manganese – 2000, zinc – 2000, copper – 200, iodine – 100, cobalt – 100, selenium – 15.

The mass of the experimental groups of animals was determined by control weighing, sheep 3 times (at the beginning of the 2nd half of pregnancy, at the beginning and middle of lactation), lambs - 2 times (at birth and at the age of 2 months).

The milk production of ewes was determined using the indirect method of M.K. Kreuter and A.I. Goltsblat et al. (Goltsblat et al., 1988; Kreuther, 1977; Viktorov and Menkin, 1991), by multiplying the live weight gain of lambs in the first 20 days dairy nutrition by a factor of 5.

Feeding rations for queens were appreciated based on laboratory analysis the chemical composition of selected samples of winter grass (maturation period) and spring (lactation period) pastures, grain feed using devices from the Swedish company FOSS: InfraXact, FIAstar 5000, KJELTEC, also taking into account generally accepted feeding standards for sheep of different sex and age groups (Kalashnikov, 1985). About the price pastures, the yield and botanical composition of pasture vegetation in the context of farms and seasons of the year were also established.

In winter, one kilogram of natural mass of pasture vegetation on farms contained 0.43-0.44 feed units or 5.90-5.98 MJ of exchange energy, 28.02-29.11 g – digestible protein, 8.0-9.7 – calcium, 2.0-2.5 g – phosphorus. In the spring, respectively - 0.23-0.24 feed units or 2.72-2.85 MJ of exchange energy, 24.40-24.66 g – digestible protein, 20.0-21.0 g – calcium and 9.0-10.0 g – phosphorus.

The energy value of 1 kg of barley used to enrich the diets of the experimental groups of mothers of farms “Merety” and “Zhanaidar and K” amounted to 1.18-1.16 feed units or 11.23-10.95 MJ, the level of digestible protein - 72.62-66.61 g, Ca content, respectively, varied within 1.7-2.1, and P - 2.3-2.9 g. (Table 2).

Determination of the palatability of pasture forages and the level of provision for pregnant and lactating queens in nutrients was carried out using a method based on the use of chromium oxide (Cr_2O_3) (Zhazylybekov et al., 2008). To conduct research using this method, five heads of typical ewes were selected in each base farm, characterizing average parameters of the corresponding groups, s live weight 56.3 ± 0.3 - 60.5 ± 0.5 kg. This method makes it possible to avoid the complete collection of feces and the experiment on feed digestibility. Moisture, dry matter, protein, fat, nitrogen-free extractive substances (NFES), fiber, ash, phosphorus, calcium were determined in the feed according to the methods of the All-Union Institute of Animal Husbandry (Raetskaya et al., 1975). Chromium oxide was given once a day in a volume of 3 g per head of the queen.

Comparative grade economic efficiency and feeding of the experimental and control groups of queens was

carried out on the basis of establishing the fertility of the queens (the number of lambs received in terms of 1 queen, expressed as a percentage); safety (the ratio of lambs at the age of two months to all newborns, expressed as a percentage) and the increase in live weight of young animals from birth to two months of age.

Profit (cash revenue or its equivalent minus all costs, tg) and profitability (the ratio of profit to total costs, expressed as a percentage) are calculated By market prices: cost 1 kg live weight of young animals – 1100, ewes – 950 tenge; cost of 1 kg of formula feed (crushed barley) – 100 tenge. The feeding was carried out from January 15 to April 1 for 75 days. Daily consumption of mineral supplement – 4 g, the cost of 1 kg of mineral supplement “Agrovit” – 468 tg.

The resulting digital materials were processed using the Excel program. Statistical reliability (td) the differences between the compared groups were determined using the generally accepted formula (Kalashnikov, 1985).

3. Research Results

The dominant vegetation of the pastures of the peasant farms “Merety” and “Zhanaidar and K” located in the steppe-semi-desert zone in winter are wormwood (48 and 37%) and mixed grass (18 and 33%) - the period of dryness, and in spring, mixed grass (33.0 and 43.0%) and wormwood (30 and 29%) – the lactation period of sheep.

The average gross yield of dry mass of pastures in the farm “Merety” in winter period amounted to 2.7 c/ha, and in spring - 3.8 c/ha, in the farm “Zhanaidar and K” respectively 2.3 and 3.2 c/ha (Table 3, 4).

Ewes from January 15 to March 15, on average, they ate – 2.4-2.5, and from April 10 to May 15 6.5-7.0 kg pasture feed. Sheep of the control groups, which were traditionally kept only on pasture fodder, under-received nutrients and minerals, in particular, the level of metabolizable energy, crude and digestible protein in sheep of the farm “Zhanaidar and K” in the 2nd-half of suyagnosis were below the scientifically-based norms (Kalashnikov, 1985; Ovsyannikov, 1976; Zhazylybekov et al., 2008) by 10.31, 27.20 and 48.3%. The specified parameters in the peasant farm “Merety” were also below the norms by 7.81, 21.19 and 44.1% (Table 5).

Additional equipment to pasture feed for sheep mat about 1 and 2 - experimental groups 2 - half of the susceptibility crushed m barley, in the amount of 0.4 kg for 1 goat/day fully provided their energy needs, according to standards (Kalashnikov, 1985; Ovsyannikov, 1976; Zhazylybekov et al., 2008), designed for sheep meat and wool productivity. It should be emphasized that the needs of sheep in experimental groups “Merety” in crude protein during the periods taken into account were completely satisfied, and for digestible protein a deficit was established within 4.0-21.7%. For sheep of the experimental groups “Zhanaidar and K”, the lack of raw and digestible protein in the diet in the 2nd half of lactation was 5.9 and 27.8%, and in the 1st lactation period, respectively – 6.3 and 11.8%.

Sheep experienced and control groups of basic farms received calcium in their diets significantly above the norm. Macronutrient phosphorus deficiency at the level of

Table 2. Chemical composition and nutritional value of feed, in terms of natural humidity.

Name	Date the image was taken tsa	PV	GW	OB	NE	In natural form, %							Feed. units in 1kg	PP, g	OE MJ	EKE			
						Protein	Fat	Fiber	BEV	Sugar	Starch	Ash					Ca	R	Caro tin, mg
peasant farming "Merety"																			
Steppe forbs	15.01. 2023	19.32	5.55	23.8	76.2	6.62	2.94	25.98	33.16	1.33	0.00	7.50	0.97	0.20	19.69	0.43	29.11	5.90	0.59
Barley grain	25.11 2023	3.94	3.56	7.36	92.64	12.97	1.92	5.76	67.76	0.00	44.57	4.23	0.17	0.23	0.00	1.18	72.62	11.23	1.12
Steppe forbs (spring)	10.04. 2023	62.30	6.75	64.84	35.16	4.1	2.43	15.46	10.14	2.27	0.76	3.01	0.2	0.1	8.46	0.23	24.66	2.72	0.27
peasant farming "Zhanaidary and K"																			
Steppe forbs	15.01. 2023	20.31	5.01	24.3	75.7	6.37	2.91	25.66	34.55	1.20	0.00	6.22	0.80	0.25	20.32	0.44	28.02	5.98	0.60
Barley grain	25.11 2023	6.59	3.26	9.64	90.36	11.18	1.68	5.41	68.74	0.00	43.61	3. 35	0.21	0.29	0.00	1.16	66.61	10.95	1.09
Steppe forbs (spring)	10.04. 2023	61.99	5.22	63.97	36.03	4.07	1.38	14.16	13.21	2.28	0.95	3.21	0.19	0.09	8.97	0.24	24.40	2.85	0.28

Table 3. Characteristics of pastures of the farm “Merey”.

Season of the year	Botanical composition of grass stand, %		Gross dry mass yield, (c /ha)
Winter	sagebrush	48.0	1.30
	forbs	18.0	0.49
	fescue	15.0	0.40
	feather grass	10.0	0.27
	Teresken	9	0.24
	Total	100.0	2.7
Spring	forbs	33.0	1.25
	sagebrush	30.0	1.14
	fescue	16.0	0.6 1
	feather grass	10.0	0.38
	Teresken	11.0	0.36
	Total	100.0	3.8

Table 4. Characteristics of pastures of the farm “Zhanaidar and K”.

Season of the year	Botanical composition of grass stand, %		Gross dry mass yield, (c /ha)
Winter	sagebrush	37.0	0.85
	forbs	33.0	0.76
	fescue	15.0	0.34
	Teresken	9.0	0.21
	feather grass	6.0	0.14
	Total	100.0	2.3
Spring	forbs	43.0	1.38
	sagebrush	29.0	0.93
	Teresken	100	0.32
	fescue	11.0	0.35
	feather grass	7.0	0.2 2
	Total	100.0	3.2

14% was established only for the control group of queens “Zhanaidar and K”, and for all other groups the excess of norms was in the range of 2.9-59.1%.

In diets 1-experienced ewes and control groups of basic farms in about 2-half of the total iron content is lower than scientifically based norms, respectively, by 10.26-12.82 and 35.9-38.5%. The level of manganese provision of sheep in the 2nd half of lactation is practically within the normal range, and in the 1st half of lactation, excesses of 1.95-2.21 times are observed.

In the queens of the experimental groups, compared with the control ones, the level of metabolic energy supply increased by 19.91-28.06%, in raw and digestible proteins, respectively, by 13.55-24.7 and 12.69-22.34%, phosphorus by 2.04-26.11%.

In the diets of 1st and 1st ewes 2- experimental groups, in comparison with control analogues, the content of microelements, in particular, iron increased by 2.04-26.11%, zinc - by 11.23-36.13%, copper - by 8.4-15.5%,

manganese - by 4.5-14.41%, cobalt - by 8.39-67.2% and iodine - by 8.98-77.46%. However, in all (experienced and control) groups there is a deficiency of convertible protein (within 4.0-48.3%), zinc (within 3.6.2-48.27%), cobalt (within 2.8-71.2 1%) and iodine (within 77.1-7.3%).

The effectiveness of feeding pregnant and lactating queens, and especially with the inclusion of a mineral supplement in its composition, was manifested in a relatively low level of reduction in their live weight from the beginning of the 2nd half of pregnancy to the beginning of lactation. Thus, the decrease of this parameter in 1-, 2-experimental and control groups in the peasant farm “Merey”, respectively, amounted to 5.7, 4.05 and 6.5%. For the peasant farm “Zhanaidar and K” similar parameters had the following values: 4,8, 4,2 и 6,7%. The animals of the 2-experimental groups, which received the enriched diet, minimally reducing body weight, both to the beginning and to the middle of lactation by 1,94-2,53% exceeded the control ones and by 0,99-1,26% over their counterparts

Table 5. Nutritional content and chemical composition of the sheep diet, per 1 head.

Index	II half with softness						I half of lactation					
	peasant farming "Merety"			peasant farming "Zhanaidar and K"			peasant farming "Merety"			peasant farming "Zhanaidar and K"		
	1- experience	2- experience	control	1- experience	2- experience	control	1- experience	2- experience	control	1- experience	2- experience	control
	Norm						Standard					
Pasture feed, kg	2,5	2,5	2,5	2,4	2,4	2,4	23,53	23,53	19,04	22,90	22,90	18,52
Barley, kg	0,4	-	-	0,4	-	-	0,4	0,4	-	0,4	-	-
Premixed barley, kg	-	0,4	-	-	0,4	-	-	0,4	-	-	0,4	-
The diet contains												
Exchange energy, MJ	16,0	19,24	19,24	14,75	18,73	14,35	22,0	22,0	19,04	22,90	22,90	18,52
Security level, %	100	120,25	120,25	92,19	117,06	89,69	100	108,27	86,54	104,09	104,09	84,18
Cear substance, g	1700,0	2275,5	2275,5	1905,0	2178,2	1816,8	2200,0	2831,8	2461,2	2703,39	2703,39	2341,95
Raw protein, g	210,0	217,38	217,38	165,5	197,6	152,9	330,0	338,9	338,88	309,27	309,27	264,5
Security level, %	100	103,5	103,5	78,8	94,1	72,8	100	102,7	86,9	93,7	93,7	80,2
Digestible protein, g	130,0	101,82	101,82	72,77	93,9	67,25	210,0	201,67	172,62	185,24	185,24	158,6
Security level, %	100	78,3	78,3	55,9	72,2	51,7	100	96,0	82,2	88,2	88,2	75,5
Calcium, g	9,5	24,93	24,93	24,25	20,04	19,2	10,5	14,68	14,0	13,19	13,19	12,35
Security level, %	100	262,4	262,4	255,3	210,9	202,1	100	139,8	133,3	125,6	125,6	117,6
Phosphorus, g	4,5	5,92	5,92	5,0	7,16	6,0	6,8	7,92	7,92	7,01	7,01	5,85
Security level, %	100	131,5	131,5	111,1	159,1	133	100	116,5	102,9	103,1	103,1	86,0
Iron, mg	78,0	70,0	80,0	50,0	68,0	48,0	120,0	160,0	140,0	150,0	160,0	130
Security level, %	100	89,7	102,6	64,1	87,2	61,5	100	133,3	116,7	125,0	133,3	108,3
Zinc, mg	62,0	31,54	39,54	17,5	31,2	16,8	125,0	63,04	49,0	59,54	67,54	45,5
Security level, %	100	50,9	63,8	28,2	50,3	27,1	100	50,4	39,2	47,6	54,0	36,4
Med, mg	16,0	6,68	7,48	5,0	6,48	4,8	20,0	15,68	14,0	14,68	15,48	13,0
Security level, %	100	41,8	46,8	31,3	40,5	30,0	100	78,4	70,0	73,4	77,4	65,0
Manganese, mg	93,0	95,42	103,4	90,0	91,8	86,4	120,0	257,4	252	239,4	247,4	234,0
Security level, %	100	102,6	111,2	96,8	98,7	92,9	100	214,5	210,0	199,5	206,2	195,0
Cobalt, mg	0,75	0,329	0,729	0,225	0,320	0,216	1,24	0,476	0,372	0,461	0,861	0,357
Security level, %	100	43,9	97,2	30,0	42,7	28,8	100	38,4	30,0	37,2	69,4	28,8
Iodine, mg	0,63	0,238	0,638	0,15	0,232	0,144	0,98	0,508	0,42	0,478	0,878	0,39
Security level, %	100	37,8	101,3	23,8	36,8	22,9	100	51,8	42,9	48,8	89,6	39,8

Table 6. Economic efficiency of feeding queens (per 1 head).

Indicators	peasant farm "Merety"			peasant farm "Zhanaidar and K"		
	1- experience	2- experience	control	1- experience	2- experience	control
Growth in live weight of young animals from birth to 2 months, kg	14.04	14.59	13.96	13.57	13.94	13.08
Fertility, %	1.34	1.33	1.18	1, 29	1, 3 1	1.1 6
Safety, %	0.94	0.9 6	0.89	0.95	0.96	0.90
Growth in live weight of young animals, taking into account fertility and safety, kg	17.68	1 8.6 3	14.66	16.63	17.53	13.65
General superiority of young animals of experimental groups by live weight, kg	3.02	3.9 7	-	2.98	3.88	-
The superiority of the estimated revenue from the sale of young animals of the experimental groups over the control ones, tg	3322	4367	-	3278	4268	-
Superiority of queens in terms of live weight, kg	0.88	1.46	-	0.37	1.07	-
The superiority of the estimated revenue from the sale of queens, tg	836	1387	-	351.5	1016.5	-
The overall superiority of the estimated revenue from the sale of queens and young animals of the experimental groups	4158	5754.0	-	36 29.5	5284.5	-
The cost of concentrated feed, tenge	3560.0	3560.0	-	3560.0	3560.0	-
Total expenses of mineral additives "Agrovit" per 1 head of queens, kg	-	0.356	-	-	0.356	-
The cost of the mineral supplement "Agrovit" per 1 head of queens, tg	-	166.7	-	-	166.7	-
Total costs during the experiment per 1 goal, tg.	3560.0	3726.7	-	3560.0	3726.7	-
Profit, tenge	598.0	2027.3	-	69.5	1557.8	-
Profitability, %	16.80	54.40	-	1.95	41.80	-

from the 1-experimental groups. The sheep females of the 1-experimental group of the farm "Merety" were also 1.22-1.53% higher in live weight than their control counterparts, and in the farm "Zhanaidar and K" - by 0.67-1.04% (Figures 1-4).

In the context of the studied feeding rations, milk production is higher installed queens have 2 experienced groups. Thus, for the peasant farm "Merety", in comparison with analogs from other groups, they turned out to be more dairy by 4.2-8.03%. On the farm "Zhanaidar and K" the superiority amounted to 3.03-5.43%. In this case for the farm "Merety" the superiority of uteruses of 2-experimental groups over control counterparts is statistically reliable ($t_d = 2.619$; $P \geq 0.99$), and for "Zhanaidar and K" is close to a reliable value of $t_d = 1.67$. In the context of farms, high milk yield of uteruses was established in animals of experimental and control groups "Merety" by 4.2-7.5% than in coevals of "Zhanaidar and K".

Lambs of the experimental groups already at birth had a higher live weight. Young lambs from 2 experimental groups of the farm "Merety" exceeded their counterparts from the control group by 9.02%, from 1 experimental group - by 2.75%. Similar parameters for the farm "Zhanaidar and K" amounted to 4.7 and 2.88%. At the same time, the superiority of young stock of both base farms over their counterparts from the control groups is statistically reliable. For the peasant farm "Merety" - $t_d = 3.01$; ($P \geq 0.997$), for the peasant farm "Zhanaidar and K" - $t_d = 2.09$ ($P \geq 0.95$).

Experimental and control lambs groups from birth to 2 months of age had an identical milk type of feeding, however, the live weight of the first (17.5 and 18.81 kg) turned out to be higher, than the latter (17.0 and 17.73 kg). The superiority of young lambs of 2-experimental groups over control counterparts is reliable for the farm "Merety" - $t_d = 3.72$ ($P \geq 0.999$), for the farm "Zhanaidar and K" - $t_d = 4.09$ ($P \geq 0.9999$). Lambs of the 2-experimental group exceeded

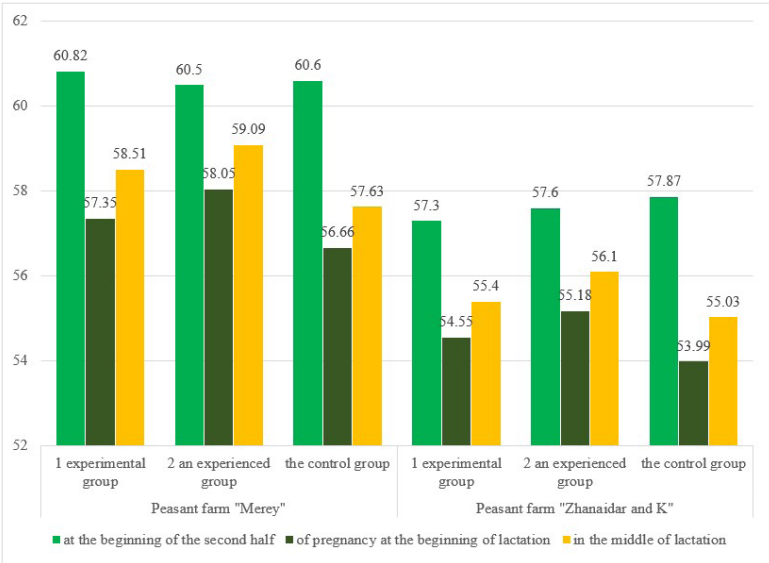


Figure 1. Live weight of sheep (n=30), kg.

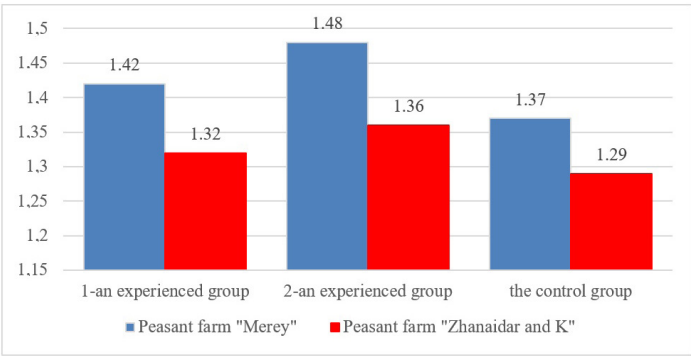


Figure 2. Milk content of ewes from 1 to 20 days of lactation (n=30), (liter/day).

their same-age counterparts from the 1-experimental and control groups in the peasant farm “Merety” at birth by 2.75 and 9.02%, and at 2 months of age, respectively, by - 3.24 and 6.09%. In the farm “Zhanaidar and K” the corresponding parameters amounted to 1.8-4.7 and 3.03-6.06%.

According to the difference of live weight gain of young lambs and sheep sows of experimental groups of farms “Merety” and “Zhanaidar and K” over control counterparts, the economic efficiency of feeding the sows was calculated (Table 6). In the farm “Merety” average live weight gain of lambs of 1 and 2 experimental groups exceeded the control counterparts, taking into account safety, from birth to 2 months in terms of 1 head of mothers, by 20.6 and 27.08%. In the farm “Zhanaidar and K” similar superiority amounted to 21.83 and 28.42%.

Profit from conducting feeding on 1 and 2 experimental groups of peasant farm “Merety” amounted to 598 and 2027.3 tg or 1.33\$ and 4.52\$ at the rate of national currency 448.15 tenge - 1 U.S. dollar. On the peasant farm “Zhanaidar and K” the corresponding parameters amounted to: 69.5 and 1557.8 tg or 0.155 and 3.48 \$.

Feeding the queens of the experimental groups ensured an increase in the profitability of raising lambs of the 1st and 2nd experimental groups by 1.95-16.80 and 41.80-54.40%, compared with control groups.

4. Discussion

Additional feeding of pregnant and lactating ewes with crushed barley, especially enriched mineral supplement, provided the metabolic energy needs of animals in the experimental groups at a higher level, in crude protein and other nutrients. Thus, the lack of nutrients, macro- and microelements, clearly manifested in the traditional diets of the control groups in the winter and early spring periods, significantly balanced due to the introduction of fertilizing.

Lactating and lactating uteri 2 experimental groups, received and lice a diet enriched in mineral composition and live weight, both at the beginning of lactation and in the middle of it were superior not only to the control ones, but also to their analogues from the 1st experimental group.

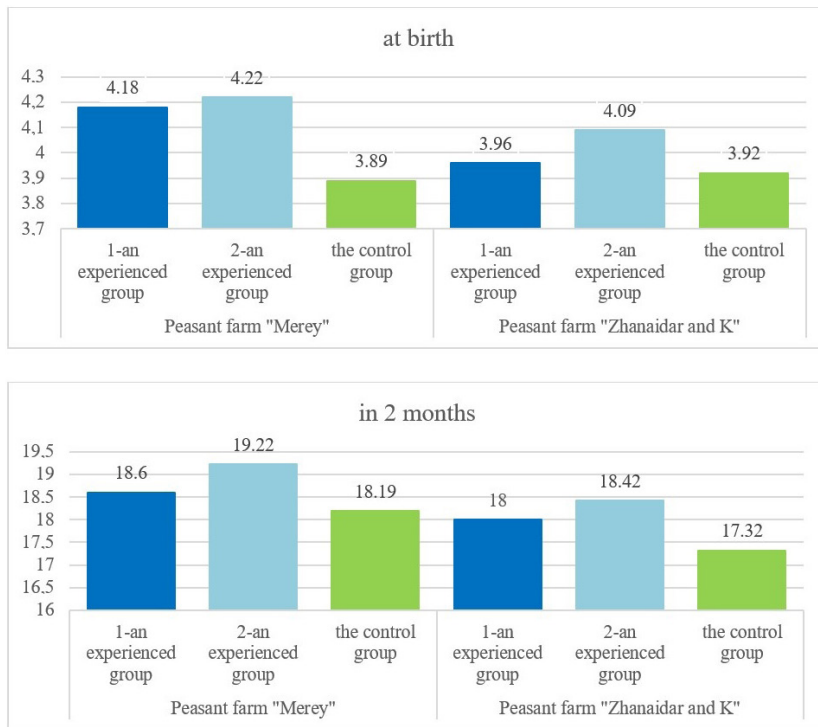


Figure 3. Live weight of sheep (n=20), kg.

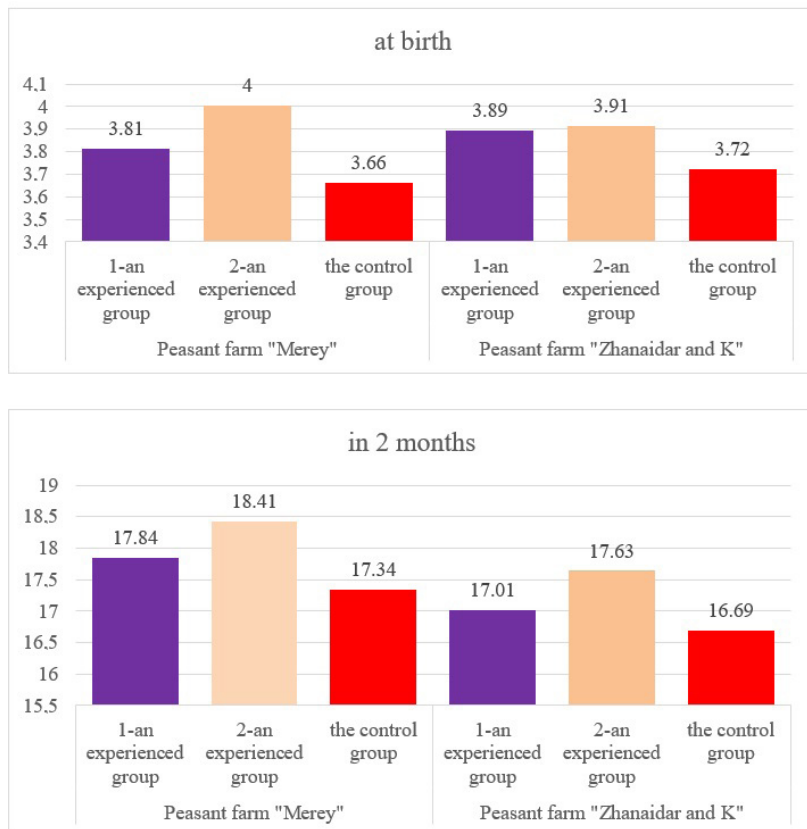


Figure 4. Live weight of the eggs (n=20), kg.

In the period from January 15 to April 1, a decrease in the live weight of queens was established, both in absolute and relative values, which is partly explained by their restoration body after lambing and a decrease in the weight of animals, respectively, the weight of the newborn offspring and amniotic fluid, on average by 8-10 kg. Recorded in control groups, the maximum reduction in live weight is a consequence of a more pronounced deficiency of nutrients and minerals in the organisms of the queens of these groups during the most intense periods, which indicates the advisability of feeding them with concentrated feeds with enrichment their mineral supplements, taking into account the chemical composition of local feed. Similar data were obtained from the results of early studies fine-fleece and semi-fine-fleece womb ah series of studies, in diets experimental groups which additionally introduced mineral supplements. At the same time, the superiority first over the control ones was also 4.7-11.9% in live weight, 2.9-15.5% in wool clipping, 10-30% in fertility and 7.6-12.7% in live weight of the offspring, which is also confirmed the correctness of the conclusion drawn from the results of our research (Aryngaziev, 1969; Minaev, 1975). Based on the results of the Research scientists have recommended the following standards of microelements per 1 kg of dry matter of the diet, mg: iodine - 0.3; cobalt - 0.7; copper - 10; manganese - 50-60 (Aryngaziev, 1969; Minaev, 1975; Rakishev, 1971; Saliev, 1968).

Use for feeding enriched mineral supplement crushed barley made it possible to better meet the nutritional needs of pregnant and lactating queens. Macro- and microelements included in the mineral supplement, apparently contributed to the activation of enzymes and hormones in body x uterus and increasing the digestibility of essential nutrients, thereby providing higher milk production of queens and intensive growth and development of young animals, creating favorable conditions for the maximum manifestation of their genetically determined productivity. The positive effect of the additional inclusion of crushed barley to the pasture feed of sheep at the rate of 300 g/head, in particular, an increase in the protein digestibility coefficient - 8.1, fat - 0.6, BEV - 10.4% was also noted by other scientists (Kuzembayuly et al., 2015; Lima et al., 2023; Muir et al., 2020; Pemyannikov, 1975; Round, 2000; Venediktov et al., 1992).

The high productivity indicators of the experimental groups obtained in our studies, based on the influence of the more contained in their diets balanced level of microelements that help increase the digestibility of nutrients (copper, iron) growth and development (manganese), functions of hormonal glands (iodine) and vitamin metabolism (cobalt). Similar studies were also carried out in Tajikistan, where sheep Gissar rock, sulfate and chloride salts and microelements copper, cobalt, iron were used as a mineral additive in the following volumes (per head per day), respectively: 9-13.5; 3-4.5; 15 mg for queens and 6.5; 2-3; 10 mg - for lambs up to 6 months of age. The superiority of the experimental group over the control group was 4.8-9.2% in live weight, fertility - 10-14%, milk production - 17.3-19.4%, wool clipping - 11.2-29.8%. Superiority has been established for rams,

as well as for live weight (8.1-15.2%) and in terms of the level of absorption of nitrogen, calcium and phosphorus, respectively, by 11.9; 6.4; 4.4%, also for trace elements - 40.6-52.5% (Saliev, 1968).

To form the body of the lamb, his normal height and development in the initial period of postembryonic ontogenesis, the milk production of the uterus is crucial, which depends on genetic factors, the lactation period and feeding and maintenance conditions, where the balance of the diet in mineral composition is a very important factor (Goltsblat et al., 1988; Pemyannikov, 1975).

The higher milk yield of mothers established in animals of experimental and control groups of the farm "Merey", than in coevals of the farm "Zhanaidar and K", are explained by genetic and paratypical factors, manifested in higher live weight of the former, as well as their relatively higher consumption of pasture fodder.

Reliable superiority of queens experimental groups for live weight and milk production over control peers, their lambs - in terms of live weight in the first half of lactation, obtained in the results of our and other studies, indicate the feasibility of using a proven mineral supplement and at a rate of 1-2% of the weight of crushed grain feed in the sheep diet.

Feeding the queens of the experimental groups, helping to increase the productivity of the queens and the growth and development of young animals, ensured an increase in the profitability of raising lambs of the 1st and 2nd experimental groups, respectively, by 1.95-16.80 and 41.80-54.40%, according to comparison with control groups.

5. Conclusion

In the conditions of the south-east of Kazakhstan, it is advisable to feed pregnant and lactating ewes kept on pasture concentrated feeds, enriched with mineral supplements taking into account the chemical composition of local feed. The costs of feeding are recouped by increasing the productivity and reproductive capacity of the queens, as well as the safety and intensive growth and development of the resulting lambs, which is especially important for raising breeding young animals.

To organize and conduct scientifically based feeding during the above intense physiological periods, ewes must be:

- in detail balanced diets taking into account the chemical composition and nutritional value of the feed actually eaten;
- the proportion of digestible protein was increased with the inclusion of good hay in the diet of pregnant and lactating queens in the amount of 0.6-1.2 kg;
- adjustments have been made to the composition of mineral additives taking into account the quality of pasture and stall feed in specific regions.

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