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Zh. B. Issaeva

Innovative university of Eurasia, Pavlodar, Kazakhstan.
E-mail: zhanetta.aysha@mail.ru

RATIONAL USE OF NATURAL PASTURES IN TERMS OF KORDAY DISTRICT

Abstract. Complex research was conducted on the rational use of natural pastures, through the seasonal use of foothill pastures in a particular area. On the basis of geobotanical survey, the farm areas were divided into seasons of their use with separation of plant associations. At seasonal use the account of productivity of natural herbage stands on seasons of year is carried out and the gain of live weight of animals for the pasture period is defined. It was found that the use of seasonal pastures provides more weight gain for studied animals compared to animals that graze in one place with an unsystematic manner of grazing. The research was conducted in 2015-2017 on the lands of "Batyr" farm in Korday district of Zhambyl region. The pasture lands of the farm consists of 5 independent sites and are located in 3 geographical areas: foothill-steppe, foothill-dry steppe and foothill-semi-desert. The total area of distant pastures is 4.200 hectares.

Keywords: pastures, natural herbage, natural areas, soil moisture, yield, animals.

Introduction. Pasture is the main feed of renewable vegetable resource. Our country ranks sixth in the world in terms of their area. In our Republic, hayfields and pastures occupy 188.9 million hectares and their share in agricultural land is 7.5 times greater than the area of arable land. Currently, about 48 million hectares in the country are degraded due to the unsystematic use of pastures and animal husbandry due to the limitation of the boundaries of the grazing area. As a result, there is a "failure" of pastures and a sharp decrease in the productivity of grass stands. The main area of degraded land is usually confined to human settlements, as the bulk of farm animals are in private use. At the same time, the concentration of cattle on these lands turns them into barren areas, as they have been grazing for decades without any regime of use [1-4].

Basically, the failure of these lands occurred due to the greater concentration of animals in a limited area, violation of the principle of seasonality and rotation of the used areas, non-compliance with the load of grazing, terms of use of land. In many districts and regions this issue is particularly relevant, because the increase in the number of livestock (animals grazed on pastures) per 1 hectare of feed area used is much faster than the increase in the gross forage stock of pastures. For this reason, the rate of loading of animals on watered pastures is increasing. This imbalance has led, in some cases, to difficulties in environmental and economic regulation in the pasture sector. In addition, at present, the main reason for the degradation of rangelands is the desire of society to obtain the highest possible income, which leads to unreasonably high volumes of extraction of natural resources that exceed the potential of nature itself [5, 6].

The modern state of pastures in the Republic is characterized, at one side, a progressive deterioration of productivity and quality of pasture forage, on the other – the maximum concentration of the livestock used site. For this reason, increased excessive intensive use of irrigated pastures, especially when well and when countryside array, without complying with the load and basic pasture turnover, which gradually broke the ecological balance that has led not only to reduction geed stock, but degrade land, the emergence of wind erosion and overgrowing weeds and not eat ability vegetation.

This study aims to solve problems through the use of science-based approaches of exploitation of pasture resources using distant pasture in a particular area. In this regard, the development of new forms of animal husbandry, vide licet cattle crossing to distant areas according to seasons in order to reduce degradation of pastures, is a promising direction of agricultural research and reflects the needs of the livestock industry in the republic.

Material and methods. The research was carried out in 2015-2017 on the lands of the peasant farm "Batyr" located in the rural district of Kenen, Korday district, Zhambyl region. Pasture lands of the farm consists of 5 independent sites and are located on 3 geographical zones: foothill-steppe (950 ha), foothill-dry steppe (1370 ha) and foothill-semi-desert (1880 ha). The total area of distant pastures is 4.200 hectares.

The works performed are as follows:

- determination of soil moisture reserves – 4 points, by drilling up to 0.5 m. Soil samples were taken by soil drill on 4 fixed sites, layer by layer 10 cm by thermostatic-weight method for seasons of the year: spring, summer and autumn in triple repetition;
- selection of soil samples on 4 fixed sites, layer by layer 10 cm to a depth of 50 cm, for agro-chemical analysis; determination of the volume mass of soil on 4 fixed sites, layer by layer 10 cm to a depth of 50 cm in triple repetition [7];
- plant height was determined before taking into account the yield of green mass by measuring 25 plants of each species; accounting of green mass yield of natural pastures was carried out on specific plant outlines for the grazing period in 10 m^2. The Botanical composition was taken into account by analysis of a trial sheaf weighing 1 kg at natural humidity in 2 - fold repetition [8-10];
- chemical composition of the fodder according to seasons was defined in the Institute's laboratory ("Kazakh Scientific Research Institute of Animal Breeding and Forage Production") by common methods;
- live weight gain of animals was carried out by weighing of the selected animals in the control and experimental groups (10 animals in each group) [11].

Results. Pasture lands of the project area are located in 3 zones in the conditions of vertical zonality, which distinguishes them by soils and vegetation cover. The pasture lands of "Batyr" farm consists of 5 independent sites:

The site 1 is located in the foothill-semi-desert zone (soil –ordinary grey-brownish) in the coordinate system N 43 27 17.8; E 074 55 46.2. Botanical study of the site has allowed to identify 3 independent plant associations: Ceratocarpus –Artemisia, Artemisia-ephemerae and Ephemerae -Artemisia.

The site 2 and 3 are located in the foothill-dry steppe zone (soil – light brown) with coordinates N 43 28 58.8; E 074 50 43.8. Botanical study of the site allowed to identify 4 independent plant associations: Festuca-variiherbetum, Festuca-Artemisia- variiherbetum, Stipa-Poa-Artemisia and Artemisia-Festuca.

The site 4 and 5 are located in the foothill steppe zone (soil – dark chestnut) with coordinates N 43 19 46.4; E 075 01 02.2. Botanical study of vegetation allowed to allocate 6 independent plant associations on the site: Onobrychis-Bromopsis-Festuca, Festuca-Poa-Carex, Gramineae-Erysimum, Onobrychis-Festuca-Poa-Bromopsis, Bromopsis-Alyssum-Secale and Bromopsis-Festuca-Onobrychis.

The site 6 located in the foothill-semi-desert zone in the coordinate system N 42 27 34.5; E 074 53 26.7. As a control variant, the lands of the settlement "Kenen" located in the foothill-semi-desert zone with Artemisia forage, with unsystematic and all-year free grazing pasture.

Based on the results of geobotanical studies conducted in 2015, distant pastures were divided according to their lifetime: pastures located in the foothill steppe area used in autumn, the foothill dry steppe pastures are used in summer and foothill semi-desert pastures are used in the spring time. At all of these distant areas were conducted grazing normalized experimental animals where the degree of grazing of the herbaceous layer accounted for 70% of the total weight.

In the course of the work, studies were carried out to determine soil moisture in all geographical areas, on selected plant associations – accounting for the harvest of natural grass stands and at the end of the pasture period – the increase in live weight of animals.

The research we carried out, concerning the determination of the total moisture reserve in the soil, showed that all the types of pastures in the spring time had a sufficient level of humidity suitable for the initial growth of grasses (table 1).

Table 1 – Soil water storage under the plants according to seasons, mm

Year	Season sampling, cm	Depth of sampling, cm	Pastures according their use			
			All year-round grazing	Spring grazing	Summer grazing	Autumn grazing
			Artemisia (foothill semi-desert zone) (control)	Artemisia-Ceratocarpus-Carex-Alyssum (foothill semi-desert zone)	Stipa-Poa-Artemisia (foothill dry steppe zone)	Poa-Onobrychis-Festuca- Carex-Alyssum (foothill steppe zone)
2015	Spring	0-30	20,3	25,7	39,5	50,4
		0-50	42,7	47,6	71,5	90,1
	Summer	0-30	17,1	20,7	27,4	21,9
		0-50	32,4	37,3	51,8	40,2
	Autumn	0-30	7,6	10,6	14,5	19,4
		0-50	21,3	24,2	32,1	35,5
2016	Spring	0-30	47,3	50,5	75,0	81,8
		0-50	78,2	86,2	122,5	139,4
	Summer	0-30	15,4	18,6	26,2	30,1
		0-50	30,1	34,9	43,9	51,0
	Autumn	0-30	11,4	13,0	16,6	22,4
		0-50	22,6	25,6	30,9	40,8
2017	Spring	0-30	44,8	50,8	52,1	75,3
		0-50	76,5	89,1	86,9	123,8
	Summer	0-30	14,2	17,2	19,3	27,6
		0-50	29,2	33,1	37,5	47,4
	Autumn	0-30	10,6	12,7	15,2	19,5
		0-50	20,5	24,5	28,9	36,5

So, in 2015, in spring, the total soil moisture content in the upper 0-30 cm layer in the control variant with year-round use was 20.3 mm, in the foothill-semi-desert zone - 25.7 mm, in the foothill-steppe zone - 39.5 mm and in the foothill-steppe zone - 50.4 mm. In the half-meter layer of soil, these indicators were respectively: 42.7; 47.6; 71.5 and 90.1 mm. The results obtained in determining the total reserves of moisture in the soil show that the best conditions for the accumulation of moisture in the spring period are created in the foothill-steppe zone. Here, the content of total moisture in the 0-30 cm soil layer is 30.1 mm higher than in the control variant of the experiment. In summer, the amount of soil moisture is somewhat reduced due to its use by plants for its growth and development. In this regard, the total moisture content in the soil in the 0-30 cm layer with unsystematic grazing was 17.1 mm, in the spring use area - 20.7 mm, in the summer use area - 27.4 mm and in the autumn section use - 21.9 mm. In the half-meter layer of soil, these figures were, respectively, 32.4; 37.3; 51.8 and 40.2 mm. By the fall, the soil moisture content throughout the soil profile continues to decrease and in the 0-50 cm soil layer on the control variant is 21.3 mm, the semi-desert zone is 24.2 mm, the foothill-dry steppe zone is 32.1 mm and the foothill-steppe zone - 35.5 mm.

At the end of the research (2017) in spring, the total soil moisture content in the upper layer of 0–30 cm was: in the control variant with unsystematic grazing - 44.8 mm, in the foothill-semi-desert zone - 50.8 mm, in the foothill the dry steppe zone is 52.1 mm and in the foothill steppe zone is 75.3 mm. In the half-meter layer of soil, these indicators were respectively: 76.5; 89.1; 86.9 and 123.8 mm. In the summer, this figure decreases slightly and amounts to 14.2 mm in unsystematic grazing, in the semi-desert it was at the level of 17.2 mm, in the steppe and steppe zones - to 19.3 to 27.6 mm. In the 0-50 cm layer, these

figures were respectively: 29.2; 33.1; 37.5 and 47.4 mm. By the autumn, the soil moisture content in the control variant with unsystematic grazing in the 0-30 cm layer was 10.6 mm, the semi-desert zone - 12.7 mm, the foothill-dry steppe zone - 15.2 mm, in the foothill-steppe zone - 19.5 mm. In the half-meter layer of soil, these figures were respectively: 20.5; 24.5; 28.9 and 36.5 mm.

The observation showed that the all-year pasture had a slightly lower level of the soil moisture during the moisture-accumulating period, than the pastures of spring, summer and autumn use. It should be noted that such minimal content of soil moisture in the treatment is linked with the fact that here the plant cover of the soil surface is very weak, and it is less than 50%, whereas in seasonal areas it is higher and ranges from 70 to 90%. In this context, in the foothill semi-desert zone with ordinary grey-brownish soil (control) the moisture accumulated in winter and early spring periods is used not only for the growth and development of the grass, but most of it is spent on physical evaporation from the soil surface. In addition, the total moisture content in the soil is greater in the foothill-steppe zone with Poa-Onobrychis-Festuca-Carex-Alyssum associations, compared with other variants of experience, which is logical. This is due to the fact that in the piedmont-steppe zone more precipitation falls due to the proximity of the mountains, and they are located at an altitude of 1350 meters above sea level, snow comes off the surface of pastures in mid-April. In addition, they are located on a dark chestnut soil; in the spring, the wetting of the soil along the moisture profile is more than 100 cm.

In 2015, on the control version of the experiment, the projective soil cover by the grass stand was between 30-35%. In the distant pastures, that is, in the spring pasture, this indicator was at the level of 50-55%, in the summer - 60-65% and in the autumn - 70-80%. At the end of studies (2017), on the distant sites, the projective soil cover by plants increased by 8-10%, due to the appearance of young shoots of growing plants, while in the control sites this indicator remained almost unchanged, remained at the same level.

In order to identify feed capacity of the used pastures, we have recorded yields of pasture herbage in the selected plant associations according to seasons (table 2).

Table 2 – Yield of pasture grass in the conditions of vertical zoning of the soil (average for the period of 2015-2017)

Natural area	Season using	Plant associations	Seasons of the year, c/ha		
			spring	summer	autumn
Foothill semi-desert	Control – all-year round use	Artemisia	7,9	4,1	3,9
	I area – spring use (spring pasture)	Ceratocarpus -Artemisia	13,7	7,1	8,3
		Artemisia-ephemerae	13,5	7,2	8,1
		Ephemerae -Artemisia	15,5	8,4	9,4
Foothill dry steppe	Area II – summer use (summer pasture)	Festuca-variiherbetum	17,8	19,6	12,1
		Festuca-Artemisia- variiherbetum	18,8	19,7	13,6
		Stipa-Poa-Artemisia	16,4	17,6	11,7
		Artemisia-Festuca	16,0	17,3	10,7
Foothill steppe	Area III – autumn use (autumn pasture)	Onobrychis-Bromopsis-Festuca	40,8	38,3	25,9
		Festuca-Poa-Carex	26,9	27,9	21,6
		Gramineae-Erysimum	37,1	37,9	24,3
		Onobrychis-Festuca-Poa-Bromopsis	33,5	34,9	23,2
		Bromopsis-Alyssum-Secale	30,1	31,4	20,2
		Bromopsis-Festuca-Onobrychis	32,1	33,2	21,4

Studying the yield of green mass of natural grass stands on average for three years showed that the maximum yield of pasture mass at the site of spring use in the piedmont-semi-desert zone provided the Ephemerae –Artemisia type of pastures, where it was 15.5 c/ha in spring, in summer - 8.4 c/ha and in autumn - 9.4 c/ha. In the area of summer use in the foothill-dry steppe zone, the highest yield of pasture mass was noted in the Festuca-Artemisia- variiherbetum type of pasture, where it was 18.8 c/ha in the

spring, 19.7 c/ha in the summer and 13.6 in the autumn. In the foothill-steppe zone, in the area of autumn use, the yield of pasture mass is higher on the vegetation contour consisting of Onobrychis-Bromopsis-Festuca vegetation, where it was 40.8 c/ha in the spring, 38.3 c c/ha in the summer and 25.9 c/ha autumn. At the same time, in the distant pastures the peak of the yield falls on the summer periods. In the control variant of the experiment with year-round use the lowest yield of pasture mass was obtained. Here, with Artemisia type of pasture, the yield of grasses was in the spring - 7.9 c/ha, in the summer - 4.1 c/ha and in the autumn - 3.9 c/ha.

Determination of pasture mass yields in the project area according to the seasons of the year showed that the maximum yield of the pasture mass at the site of spring use is provided by the Ephemerae - Artemisia type, at the site of summer use - Festuca-Artemisia- variiherbetum and on the site of autumn use - Onobrychis-Bromopsis-Festuca type. At the same time, in the distant pastures the peak of the yield falls on the summer periods.

A study of the chemical composition of herbage in associations for an average of three years showed that in the foothill-semi-desert zone the crude protein content was: 8.1% in spring, in summer - 7.3% and 6.1% in autumn. In the foothill-steppe zone they amounted from - 8.8; 7.9; 6.8%, and in the foothill-steppe zone - 9.1; 8.2; 6.9%, respectively. In the control variant of the experiment the content of crude protein was 7.4% in spring, 6.6% in summer and 5.6% in autumn (figure 1).

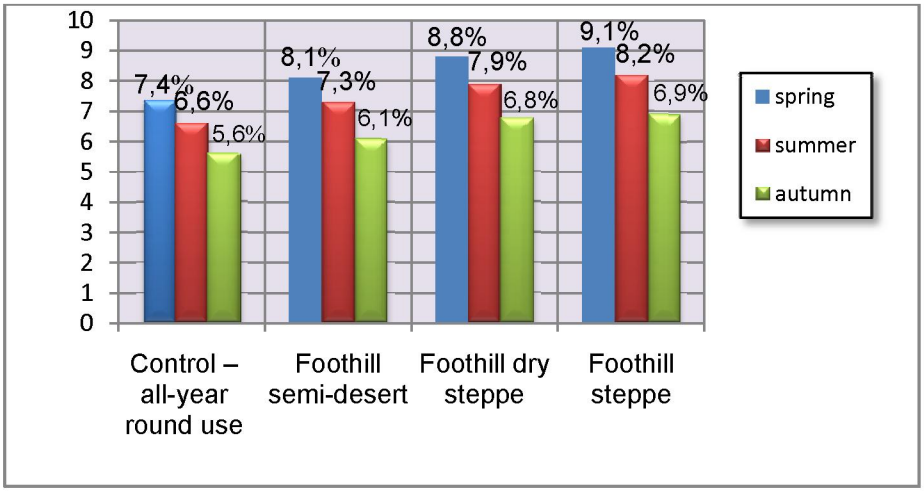

Figure 1 – Dynamics of change in protein content in pasture forage by seasons of the year, % (average for 2015-2017)

The obtained data showed that the content of crude protein in grass stands decreased from spring to autumn in the studied areas, except for the semi-desert zone. Here decrease in crude protein is observed only until august and in september there is an increase due to the rapid development of Artemisia.

The opposite tendency was observed for the cellulose content of herbage. In the spring period the content of cellulose in herbage from pastures in foothill semi-desert zone was 26.4%, in herbage from foothill dry steppe zone – 24.7% and in herbage from foothill steppe zone – 23.7%. At the end of investigations these indicators raised and were up to standard. The cellulose content of herbage – 29.1; 27.8 and 28.1% respectively (figure 2). In the control variant of the experiment, the amount of cellulose was 25.8% in spring, 27.3% in summer, and 28.7% in autumn.

The results for protein and cellulose content showed the following tendency: while the protein content decreased from spring to fall the cellulose content increased. The cellulose content reached the maximum value in September when grasses finished their development and became more thicker.

The economic assessment of seasonal use of pastures in the project area was carried out (table 3). To do this, in the spring were selected 2 groups of animals-analogues (experimental and control) three age groups: tupping rams, ewes of the 3rd year of life and lambs of the year of birth. The breed of sheep is – Kazakh fine-wool sheep [12]. In the spring, before the start of sheep grazing (starting indicators), the difference in live weight in the selected analogues on average for three years did not exceed 1.5 kg. The

control group was in the foothill-semi-desert zone on the lands of the settlement "Kenen" and grazed in a free manner, all year round in one place. Experimental group were grazing under the scheme, that is, on seasonal pastures.

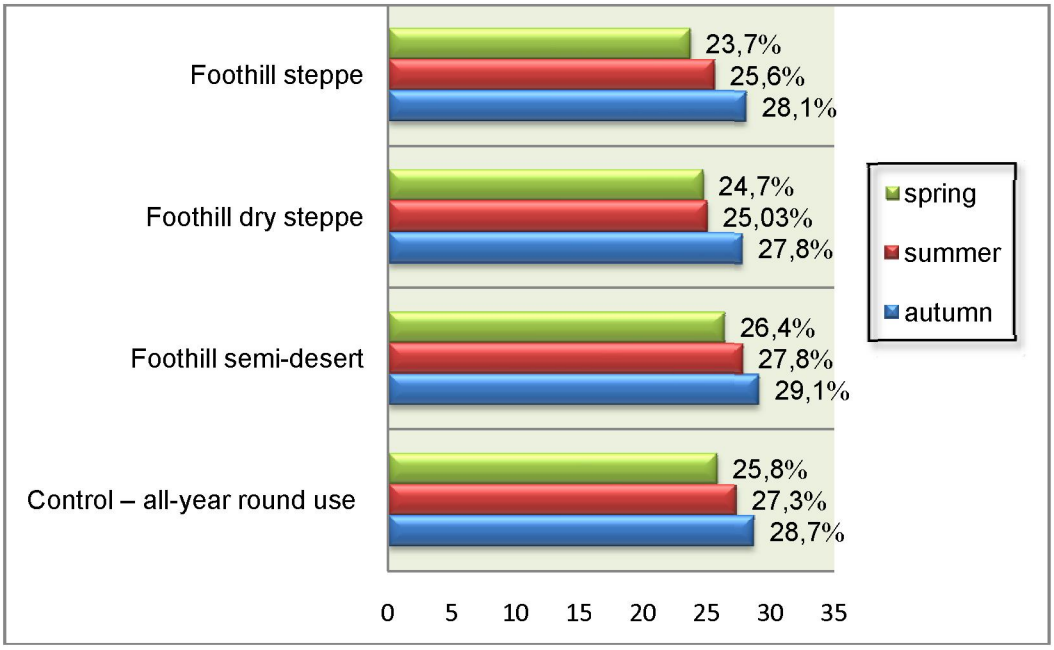

Figure 2 – Dynamics of cellulose content in herbage according to seasons, %
(average for 2015-2017)

Table 3 – The dynamics of the live weight of animals in the seasonal pastures, kg/head

Year	Season	The live weight of animals, kg/head					
		Tupping rams (n=10)		Ewes (n=10)		The lambs of this tear of birth (n=10)	
		experimental group	control group	experimental group	control group	experimental group	control group
2015	Spring	83.520±1.64	81.690±1.53	51.120±1.26	49.840±1.25	17.940±2.21	16.970±2.18
	Autumn	85.300±1.47	82.120±1.46	58.450±0.75	54.700±0.81	36.300±0.58	27.400±2.72
2016	Spring	81.340±0.67	81.410±0.72	48.320±0.83	49.100±1.03	14.80±2.46	14.600±2.60
	Autumn	86.370±0.60	83.740±0.81	59.100±0.67	55.000±0.39	38.800±0.72	31.950±1.12
2017	Spring	79.300±0.64	80.100±0.73	49.200±2.05	49.800±1.44	15.800±1.99	15.400±1.93
	Autumn	87.700±1.25	83.400±1.24	63.300±1.23	56.100±2.02	43.000±1.98	32.800±2.01
average for 2015-2017	Spring	83.380	81.060	49.550	49.580	16.180	15.650
	Autumn	86.450	83.080	60.280	52.260	39.360	30.720

Thus, from the obtained data it can be seen that a higher gain of live weight was obtained in the experimental group of animals where seasonal grazing was used on the pasture. Seasonal grazing for an average of three years of research at the end of the grazing period provided a gain in live weight of tupping rums at – 3.370 kg/head, in ewes on 8.020 kg/head and lambs of the current year of birth on 8.640 kg more than the control groups of animals that grazed haphazardly on the control pasture.

It should be noted that during the pasture period, the increase in live weight of animals in the experimental group in 2017 is higher than in previous years of the study. So if the increase in live weight in the experimental group in 2015 in tupping rams was 3.180 kg/head, in ewes – 3.750 kg/head and lambs of the current year of birth – 8.900 kg/head, in 2016 – 2.630; 4.100 and 6.850 kg/head, in 2017, these

indicators amounted to 4.30; 7.200 and 10.200 kilograms per head, respectively, compared with the control groups of animals. The increase in live weight gain in experimental groups of animals is due to the fact that in 2017, when grazing animals on seasonal sites, an intra-seasonal pasture turnover was used, in which virtually reduced three times unproductive (idle) movement of animals in search of food in the grazing area, is also sharply reduced trampling vegetation, and in addition completely eliminates the degradation of pasture area.

In addition, the experimental data show that during the pasture period the highest increase in live weight was provided by lambs of the current year of birth. On average, for three years of research during the grazing period, the increase in live weight of lambs of the current year of birth from spring to autumn was in the experimental group – 23.180 kg/head, and in the control group – 15.070 kilograms per head. Such high rates of live weight gain of lambs during the pasture period is mainly due to the increase in muscle mass. It should be noted that during the pasture period, the smallest increase in live weight of animals was noted in sheep-producers, which is natural, since they were additionally fed with concentrated feed in the winter months and they were well-fed in the spring, they also ran out of muscle growth.

Conclusion. Thus, the use of seasonal pastures provides more live weight gain of the studied animals compared to the animals that graze in one place with a free grazing.

Ж. Б. Исаева

Инновациялық Еуразия университеті, Павлодар, Қазақстан

ҚОРДАЙ АУДАНЫ ЖАҒДАЙЫНДА ТАБИҒИ ЖАЙЫЛЫМДАРДЫ ТИІМДІ ПАЙДАЛАНУ

Аннотация. Нақты аумақта тау бөктеріндегі жайылымдарды маусымдық пайдалану арқылы табиғи жайылымдарды ұтымды пайдалану бойынша зерттеулер кешенді жүргізілді. Геоботаникалық зерттеулер негізінде шаруашылық аумағы өсімдік қауымдастықтарын бөле отырып, оларды пайдалану мерзіміне бөлінген. Маусымдық пайдалану кезінде жыл мезгілдері бойынша табиғи шөптердің шығымдылығын есепке алу жүргізілді және жайылымдық кезеңде жануарлардың тірі салмағының өсуі анықталды. Жайылымдарды маусымдық пайдалануды қолдану жүйесіз тәсілмен бір жерде жайылатын жануарлармен салыстырғанда зерттелетін жануарлардың тірі салмағының артуын қамтамасыз етеді. Зерттеу 2015-2017 жылдары Жамбыл облысы Қордай ауданы "Батыр" шаруа қожалығының жерінде жүргізілді. Шаруа қожалықтың жайылым жерлері 5 дербес телімнен және 3 географиялық аймақта орналасқан: таубөктерлік-шөлейт, таубөктерлік-қуаң дала және таубөктерлік-дала. Шалғайдағы жайылымның жалпы аумағы 4200 гектарды құрайды.

Түйін сөздер: жайылымдар, табиғи шөптер, табиғи аймақтар, топырақтың ылғалдылығы, өнімділігі, жануарлар.

Ж. Б. Исаева

Инновационный Евразийский университет, Павлодар, Казахстан

РАЦИОНАЛЬНОЕ ИСПОЛЬЗОВАНИЕ ЕСТЕСТВЕННЫХ ПАСТБИЩ В УСЛОВИЯХ КОРДАЙСКОГО РАЙОНА

Аннотация. Комплексно проводились исследования по рациональному использованию естественных пастбищ, путем сезонного использования предгорных пастбищ на конкретной территории. На основании геоботанических исследований, территория хозяйства были разделены на сезоны их использования, с выделением растительных ассоциаций. При сезонном использований проведены учет урожайности естественных травостоев по сезонам года и определены прироста живой массы животных за пастбищный период. Установлено, что применение сезонного использования пастбищ обеспечивает больше прироста живой массы изучаемых животных по сравнению с животными, которые выпасаются в одном месте с бессистемным способом пастьбы. Исследования проводился в 2015-2017 годы на землях крестьянского хозяйства «Батыр» Кордайского района Жамбылской области. Пастбищные земли хозяйства состоит из 5-ти самостоятельных участков и расположены на 3-х географических зонах: предгорно-степной, предгорно-сухостепной и предгорно-полупустынной. Общая площадь отгонных участков составляет 4200 гектаров.

Ключевые слова: пастбища, естественный травостой, природные зоны, влажность почвы, урожайность, животные.

Information about author:

Issayeva Zhanetta, PhD, associate professor of department the "Agriculture and Bioresources" Innovative Eurasian university, Pavlodar, Kazakhstan; zhanetta.aysha@mail.ru; https://orcid.org/0000-0002-4182-3041

REFERENCES

[1] Meshetich V.N., Ayaganov A.B. Haymakings and pastures – recovery time has come // Agro Inform. 2013. N 4. 2 p.

[2] Kuliev T.M., Zhazylbekov N.A., Alimaev I.I., Kuliev R.T. Development Program of Livestock and Feed Production Industries of the Republic of Kazakhstan in the Context of Regions for the Period of 2012-2016. Almaty: Bastau, 2013. P. 14-19.

[3] Dyusenbaev Zh. To improve the efficiency pasture land // Kazakhstan truth. 2015. N 25(27901). 8 p.

[4] Bekturganova A.E., Mykhybayev M., Yermekbayev B. (2019) The rational land use of agricultural purpose in the land law of the republic of Kazakhstan // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 3, N 51. P. 5-10. https://doi.org/10.32014/2019.2224-526X.27 ISSN 2224-526X (Online).

[5] Rassomakhin I.T., Kucherov V.S., Kozhagaliyeva R.Zh. Ecological direction of assessment of fodder grounds of sukhostepny and semidesertic zones of Cisural area and Zavolzhye // Messenger of agricultural science of Kazakhstan. 2008. N 5. P. 32-35.

[6] Le Houerou H.H. Ecological management of arid grazing land ecosystem // IUCN. 2005. P. 45-49.

[7] Guide to field researches and mapping of soils. Soil shooting. Prod.: Academy of Sciences of the USSR. M., 1959. P. 299-303.

[8] Dospehov B.A. Metodika polevogo opyita. M.: Agropromizdat, 1985. 351 p.

[9] A methods of experiences on hayfield and pastures. M.: VIK, 1971. Part 1. 229 p.

[10] A methods of experiences on hayfield and pastures. M.: VIK, 1971. Part 2. 174 p.

[11] Ovchinnikov V.A. Methods of carrying out experienced works in animal breeding. M., 1976. 261 p.

[12] Zhumagaliyeva G.M., Kulatayev B.T. (2018) Productive and reproductive qualities of sheep of the Kazakh fine-wool breed // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 6, N 48. P. 81-86 https://doi.org/10.32014/2018.2224-526X.23 ISSN 2224-526X (Online).