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Specific Features of the Vegetative and Soil Cover Dynamics in the Semiarid Pasture Ecosystems Influenced By Grazing.

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ABSTRACT

Preservation of biological resources, especially biodiversity, is a compelling issue in any region of the world, including West Kazakhstan. Excessive grazing is one of the most negative anthropogenic ecological factors that have a great impact on biodiversity. A decrease in biological productivity of the communities and biodiversity occurs due to overgrazing, consequently leading to desertification. The semiarid zone of West Kazakhstan is one of the regions with particularly dramatic negative effects of livestock overgrazing on the ecosystems. Grazing pressure promoted pasture degradation in the region, bringing the pastures of sheep farms into the most critical state. There is an urgent matter of optimization of grazing pressure on the semiarid pasture ecosystems through the development of adaptive technologies for sustainable exploitation of pasture ecosystems, which should provide accelerated recovery and increased productivity of the ecosystems, and improve the environment of people in the semiarid regions of Kazakhstan. In the course of the studies, the contemporary state of the semiarid pasture lands has been determined. The results of the study prove the viability of moderate exploitation of pasture lands (grazing up to 65-75%). In case of extensive pasture exploitation, changes in floristic composition and productivity, as well as deterioration of agrochemical and agrophysical properties of the soil cover of the pastures.

Keywords: pasture ecosystems, monitoring, grazing, floristic composition, productivity, soil cover, agrochemical properties, agrophysical properties.

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INTRODUCTION

Study background

Herbivorous mammals play a great part in the dynamics and functioning of ecosystems, largely determined by their trophic activity. Apart from direct extraction of primary production, they have a significant indirect impact on the whole natural complex of the environment. The most prominent influence on structure and productivity of vegetation is caused by hoofed mammals in open pasture ecosystems, where, as known, the numbers of domestic or wild hoofed animals can rise to dramatic values. Such ecosystems are marked for the dominance of herbaceous vegetation, and they always suffer fairly high levels of trophic impact (Morozova, 1972; Nechaeva, 1980; Abaturov 1984; Bananova, 1992; Magomedov, 1995; McNaughton, 1979; Crawley, 1983; Olson, 1985, etc.).

In the course of evolution, the relations between vegetation and its natural consumers have been developing in such way that vegetation was adapting to constant extraction of certain share of its production. Furthermore, the rate of extraction of pasture vegetative production by herbivorous organisms is limited, regulated by a range of complex ecological and physiological mechanisms that determine continuous sustainable existence of the phytophages-plants system. In the wild, if the extraction is over limits, it usually leads to a decrease in pasture production, which affects the state and numbers of the consuming population (Abaturov, 1984; Begon *et al.*, 1989). Due to such mechanisms, the population of wild phytophages in natural open pasture ecosystems is regulated through the amount of available production, sufficient for a certain number of animals (Voronov, 1975; Abaturov, 1984).

When it comes to grazing of livestock, things are different. Natural mechanisms of population control do not apply to domestic animals. The livestock population, deliberately maintained by man, is able to exploit the environmental resources so extensively that it can lead to major transformations in the vegetative community, completely changing its appearance; to the substitution of native community species by weeds, low- and non-palatable plant species. The changes in the vegetative cover can be so dramatic that sometimes such communities become virtually unsuitable for economic use and cannot be restored.

Considering current situation, caused by unrestricted and uncontrolled grazing, this is a matter of current interest. Therefore, today the studies of livestock grazing and its consequences attract close attention. Such projects, apart from scientific importance, are of great practical relevance. With knowledge of initial pasture production, rate of vegetation growth, and its tolerance to external factors, one can control the livestock grazing, thus maintaining highly productive state of the pasture ecosystems.

Historically, West Kazakhstan has been developing as a cattle-breeding region, which it remains today. Animal husbandry constitutes a considerable part of the agricultural sector of the region, due to the structure of cultivated land – most territories are used as pasture lands and hayfields. Summer distant-pasture stock breeding, the leading sector of the economy of the region until 1990s, with no proper attention paid to the grazing regulations, has become the main cause for the land degradation. The demise of most state farms that had been focusing on distant-pasture sheep and stock breeding led to reallocation of livestock in favor of private sector with no major changes in numbers, to a decrease in winter cattle drive, and, consequently, higher stocking at very limited winter pastures and longer grazing at summer ones.

Motivation for the choice of the research line

Grazing of hoofed mammals is a historically formed continuous form of animal influence on the pasture vegetation.

Wild and domestic ungulates, being essential elements of pasture ecosystems, promote their sustainable functioning at certain historically formed “average” burden levels, limiting natural processes of succession, which lead to transformations of communities (Nechaeva *et al.*, 1979; Abaturov, 1984; Titlyanova, 1992; Vera, 2000).

As early as in the beginning of the 20th century I.K. Pachoskii (1921) noted the positive effects of moderate animal grazing on pasture vegetation. Specifically, he proved that grazing stoppage, as well as low-

level grazing, is accompanied by substitution of typical forb-grasses vegetation of steppes, which leads to expansion of weeds and a decrease in forage value of the vegetation. He identified 5 stages of vegetation cover degradation caused by grazing for Volga fescue-feather grass and southern forb-Volga fescue-feather grass steppes: 1 – insufficient grazing, 2 – moderate grazing, 3 – feather grass extinction, 4 – decline of Junegrasses, 5 – pasture stage, weed-dominated (Polygonum, Ceratocarpus, etc.). Today major concepts of the grazing of ungulates as a powerful environmental-forming factor are well developed. Depending on grazing species, pasture type, manner of exploitation, natural and climatic zone and so on, grazing of hoofed animals has different consequences, leading to either deprivation or improvement and stabilization of the state of ecosystems. Within semi-arid vegetation communities, native pasture vegetation at moderate levels of grazing pressure includes different species of wormwood, Kochia, sedges, as well as grasses *(Leymus ramosum, Stipa cappilata, Agropyron desertorum)* and different ephemeral plants. Increasing grazing pressure promotes gradual extinction of perennial sod grasses, reduction of species composition and prevalence of wormwood along with the ephemeral complex, in which bulbous meadow-grass plays a significant part. At the final stage of degradation, associations, ultimately dominated by several non- or low-palatable species (mostly annual plants), are formed (Nechaeva, 1954; Yarullina, 1985; Miroshnichenko, 1994; Kumar & Bhandari, 1992).

Structural changes in the vegetation cover of semideserts highly depend on the duration of pasture exploitation. For instance, it was proved that annual spring exploitation of pastures (for 4 years) leads to rapid deprivation of sedges and ephemeral plants, which are replaced by low-palatable and weed species. In case of summer grazing, the population of small grasses increases within the first three years. Further summer grazing, especially in case of high pressure at arenaceous pasture lands, induces formation of barchans, whereas at firm soils – plant destruction and infestation of pastures by non-palatable weed species. Constant winter exploitation of pastures leads to increasing numbers of sedges and dropout of annual plants, especially members of forbs (Nechaeva & Shamsutdinov, 1990). Along with structural alterations in the vegetation cover of pastures, grazing of hoofed animals results in considerable changes of production weight. It is assumed that productivity decreases over the pasture degradation. This sort of beliefs often derives from the assessment of productivity changes through residual phytomass at a pasture, “which does not present the productivity of vegetation, as, in case of pasture ecosystems, it does not include the share of plant production, which is utilized by animals and thus is not considered by the researcher” (Abaturov, 1984).

At the same time, excessive trampling can be devastating for soils. Due to increasing burden, the areas of bare soil expand, rock is exposed, and biological cycle of matter is disrupted. Light soils broken by hooves are deflated and degenerate (Kotenko, 1993; Zalibekov, 2000; Gasanova, 1996; Usmanov, 1996).

It is also generally thought that severe trampling of heavy soils leads to compaction of soil surface and consequent deterioration of its water characteristics. For instance, water permeability decreases many times (Brown & Shuster, 1969). In case of light chestnut soils, higher grazing burden results in reduction of the A horizon and higher bulk density of the B horizon (Zalibekov, 2000). It is also accompanied by increased runoff. Cattle grazing at heavy loams of semideserts of Northern Caspian Sea region (Dzhanybek experimental station) leads to certain compaction over the whole soil stratum to a depth of more than 1 m (Abaturov, 2001).

Studies of the impact of exploitation modes on the vegetative and soil cover of the semi-arid pastures can contribute to the solution of the problem of sustainable exploitation of natural pasture ecosystems, providing accelerated recovery and increased productivity of the ecosystems, and improved environment of people in the semiarid regions of Kazakhstan.

METHODS

Current study was performed in West Kazakhstan Agrarian-Technical University named after Zhangir khan in 2015-2016 (Uralsk, the Republic of Kazakhstan).

In order to accomplish the objectives, yield measurement and monitoring observations of the changes in species composition, in cenopopulation structure of the pasture ecosystems over the seasons (spring, summer, autumn), feeding capacity evaluation, characterization of natural and man-induced transformation of pastures were performed by the monitoring network at the ecological series gradient at semiarid pastures of West Kazakhstan Region (Zhanakala District). To obtain reliable conclusions on spatial and temporal dynamics of vegetation, the ecological series were set at the most common territory of current landscape, which allowed

analyzing the alterations of all conjugated elements, including the rate of economic use (grazing as decreasing factor). The series were chosen at the pastures with different levels of anthropogenic impact (from the most disturbed places, such as wells, sheep shelters, winter huts, to less altered territories, including conservation areas).

In the course of studies, great attention was paid to the influence of extraction of the annual increment of the weight of tops by grazing at zone-typical pastures. For this purpose, transects 100 x 50 m in size were made. Grazing was performed in the beginning, in the middle, and in the end of spring, in summer, and in autumn.

Grass stand grazing was carried out according to the plan: 1. Total 100% grazing of annual increment of pasture plants; 2. Moderate grazing – 65-75% of annual increment of pasture plants. Total (100% of annual increment) and moderate (65-75% of annual increment) grazing was performed during all time periods: in the beginning, in the middle, and in the end of spring, in summer, and in autumn.

The following observations were performed during the studies of the grazing influence on the pasture ecosystems: phenological observations; changes in the species compositions of the pasture stand of grass; age structure of the cenopopulation; changes in the forage mass productivity over the years and the seasons; changes in agrophysical and agrochemical soil properties caused by grazing.

Soil samples of A_1 and B_1 horizons were obtained. The following parameters of the samples were measured: humus (Tyurin-TsINAO's technique, GOST 26213-91), labile P_2O_5 compounds (I. Machigin-TsINAO's technique, GOST 26205-91), absorbed bases (B. Pfeffer's technique), soil grading (pyrophosphate technique).

RESULTS AND DISCUSSION

Specific features of the dynamics of pasture ecosystems influenced by grazing

In the course of evolution, the relations between vegetation and its natural consumers have been developing in such a way that vegetation was adapting to constant extraction of certain share of its production. At the same time, it is currently well known that the rate of extraction of pasture vegetative production by herbivorous organisms is limited and regulated by a range of complex ecological and physiological mechanisms that determine continuous sustainable existence of the phytophages-plants system. In the wild, if the extraction is over limits, it usually leads to a decrease in pasture production, which affects the state and numbers of the consuming population. Due to such mechanisms, the population of wild phytophages in natural open pasture ecosystems is regulated through the amount of available production, sufficient for a certain number of animals [39-41].

When it comes to grazing of livestock, things are different. Natural mechanisms of population control do not apply to domestic animals. The livestock population, deliberately maintained by man, is able to exploit the environmental resources so extensively that it can lead to major transformations in the vegetative community, completely changing its appearance; to the substitution of native community species by weeds, low- and non-palatable plant species. The changes in the vegetative cover can be so dramatic that sometimes such communities become virtually unsuitable for economic use and cannot be restored.

Considering current situation, caused by unrestricted and uncontrolled grazing, this is a matter of current interest. Therefore, today the studies of livestock grazing and its consequences attract close attention. Such projects, apart from scientific importance, are of great practical relevance. With knowledge of initial pasture production, rate of vegetation growth, and its tolerance to external factors, one can control the livestock grazing, thus maintaining highly productive state of the pasture ecosystems.

The studies on the influence of grazing modes in the dynamics of pasture ecosystems were performed in 2015 in the Zhanakala country district. These territories are used as summer and spring-autumn pasture lands. Their productivity ranges from 2-4 to 5-6 dt/ha. There are many sites of tramped vegetation, infested by thorny grasses, due to overgrazing. The studies of the grazing influence on the vegetation changes were conducted at three sites with different grazing intensity: 100% total grazing (heavy burden), 60-70% moderate grazing (average burden), and 50% mild grazing (low burden).

Floristic composition of the experimental sites

During the last 10 years, mild grazing mode (30-40% grazing) has been maintained at the pasture site that used to be under severe influence of animals. Typical grasses *(Stipa, Festuca* and others) are absent there, only few specimens of *Agropyron desertorum* are present. Floristic diversity consists of 9 background species, including many forbs.

There are 11 most common background plant species at the site of moderate grazing. Perennial grasses, such as *Stipa capillata, Agropyron desertorum, Leymus ramosus,* are typical here.

The lowest plant diversity is observed at the site of total 100% grazing – 9 background species, mostly low-palatable and weed plants (*Artemisia austriaca, Alyssum turkestanicum*, *Chenopodium album, Ceratocarpus arenarius,* etc.). In spring, ephemeral plants germinate at all three sites. The assessment of floristic similarity of the sites shows that the grazed sites (moderate and total grazing) are the most compatible (similarity coefficient 66.1%), whereas the site of mild grazing and the site of total grazing were the least similar (53.06%).

Changes in the vegetation structure at the experimental sites under grazing

Along with the ephemeral plants, *Artemisia lerchiana* prevails at all the three sites in spring (in the end of April), increasing its share of the grass stand composition with growing grazing pressure. At 100% occurrence rate at all the sites, the number of *Artemisia lerchiana* tufts was almost three times higher at the pasture with total grazing, compared to the site of mild grazing. Consequently, wormwood projective cover degree turns out to be twice as high (40%) at the site of heavy burden (100% grazing) as at the other two sites (20%).

It should be noted that increased burden leads to lower total projective cover of plants in phytocenoses: 85% at the site of mild grazing, 70% – at the site with moderate burden, and 60% – at the site with heavy burden, which is visually perceptible.

Exploitation mode also influences the abundance of the ephemeral plants. Annual ephemeral grasses *Poa bulbosa,* just like wormwood, increase (3-5 times) their share in the composition of the pasture phytocenoses with growing burden. Other species, increasing their share with growing burden, include *Ceratocarpus arenarius* and *Tanacetum achilleifolium,* whose population is 4-5 times higher at the heavy used pasture compared to the other experimental sites.

Festuca valesiaca reacts negatively to increasing burden. Direct correlation between the share of *Festuca valesiaca* in the grass stand and the burden is well pronounced. The population and the abundance of this species decrease with growing burden. The share of *Festuca valesiaca* in case of mild or moderate exploitation modes ranges from 3.07 to 1.43, whereas in case of total exploitation this parameter equals 0. In the middle of June, two layers are observed at the pasture with moderate burden: the upper layer, reaching 27-39 cm, dominated by *Stipa capillata* and more rarely *Agropyron desertorum,* and the lower layer, up to 10-12 cm, formed by *Artemisia lerchiana,* with the projective cover of 35%.

At the site of mild grazing *Artemisia lerchiana* and *Artemisia austriaca,* together with *Kochia prostrata,* form a single-layer community, up to 38-45 cm high, and their total projective cover increases to 40%.

No prominent layers are observed at the site of total grazing, as well, the projective cover of *Artemisia lerchiana* and *Artemisia austriaca* rises to 50% with the average grass stand height of 16-18 cm. Total projective cover did not vary between the three sites, due to the expansion of wormwood over the extinction of other species. By this time, the ephemeral plants have vanished from the grass stand composition. In autumn (in the end of September), total projective cover at the site of moderate exploitation was reduced to 60% due to the shedding of some part of the wormwood leaves.

At the site of total use, it was equal to 40%, with *Artemisia lerchiana* and *Artemisia austriaca* accounting for 37%. The number of vegetative plants of *Artemisia lerchiana* and *Artemisia austriaca* has

become almost twice as low at all three sites by the end of the vegetation period. Direct correlation between the share of the pasture grass stand and the grazing intensity was observed in case of *Kochia prostrata.* Along with rather high numbers and occurrence at the moderate pasture, only occasional specimens were present at the heavy-burden pasture (Table 1).

Table 1. Numbers (units/0.25 m^2) and occurrence (%) of the background plant species in summer under different modes of pasture exploitation in the semidesert territories of WKR, 2015

Plant species	Mode of pasture exploitation					
	Mild 30-40%		Moderate 60-70%		Total 100%	
	numbers	occurence	numbers	occurence	numbers	occurence
Agropyron desertorum	-	-	0.95	48.88	-	-
Artemisia lerchiana	1.97	100	2.22	100	3.49	100
Artemisia austriaca	0.85	30.19	1.15	44.12	2.07	88.05
Ceratocarpus arenarius	0.21	15.55	0.11	11.11	0.41	29.99
Leymus ramosus	-	-	0.52	35.55	-	-
Chenopodium álbum	-	-	-	-	0.23	17.77
Stipa capillata	-	-	0.51	37.77	-	-
Kochia prostrata	0.44	31.01	0.9	56.66	-	-
Festuca valesiaca	0.41	29.99	0.32	25.55	-	-

By the end of vegetation, secondary emergence of some ephemeral plants was observed at all sites, especially at the site of total grazing.

Changes in the production of communities influenced by grazing

The highest phytomass production at the pasture with heavy burden was observed in the end of April, during massive emergence of the ephemeral plants, and was equal to 1.28 dt/ha. *Poa bulbosa* accounted for the largest share of the production. Later the production decreased to 1.15 dt/ha in summer and 0.42 dt/ha in autumn.

At the site of mild grazing and at the pasture with moderate burden, where the part of the ephemeral plants is insignificant, the highest production was observed in the middle of June, equal to 7.33 and 5.25 dt/ha respectively. By the middle of summer, the production at the site of moderate exploitation becomes minimal (4.60-5.75 dt/ha) due to the vanishing of forbs and drying of grasses. The production of current sites in autumn was equal to 3.28-2.51 dt/ha. In spring, the highest weight of grasses is formed at the pasture with total grazing (2.04 dt/ha), whereas the lowest – at the site of mild grazing (0.38). By the middle of the first summer month, the grass share of the total production at these two sites decreases to zero, as the annual grasses, the only ones participating in the production, completely dry out by this time.

At the pasture with moderate grazing, perennial grasses play the major part in the pasture production in summer, generating up to 2.98 dt/ha. They almost completely dry out by the end of summer, as well. Certain increase in the green weight – 0.54 dt/ha – is observed with the onset of autumn rains and the secondary vegetation of grasses. Forbs are the only plants participating in the summer production at the site with mild exploitation, as well as at the site with total exploitation. Summer production maximum is almost completely determined by the development of steppe forbs, going up to 5.75 dt/ha and becoming almost two times lower (3.25 dt/ha) by the end of summer. The main part of the production of forbs in autumn falls on *Artemisia lerchiana* and *Artemisia austriaca* – 2.99 dt/ha.

At the site of moderate grazing, the production of forbs over the whole period of vegetation was equal to 4.60 dt/ha in spring, 5.25 dt/ha in summer and 2.51 dt/ha in autumn. At the site of total exploitation spring production of forbs was higher than in any other season, equal to 1.28 dt/ha. By the beginning of summer, it had decreased to 1.15 dt/ha and remained at the rate of 0.42 dt/ha until the end of vegetation. High phytomass production at the site of total exploitation is the result of increasing weight of non-palatable or well adapted to grazing plants, mainly prevailing in the area.

The influence of pasture pressure on the parameters of light chestnut soils of semidesert areas

The main form of physical soil degradation, observed at heavily used pastures, is compaction of the root habitable layer. In certain ecosystems disruption (deformation) of soil consistency and changes in structural and aggregate composition are noted. Dehumification, dramatic decrease in humus content under grazing, is typical for steppe geosystems. According to the results of these studies, the destruction of soil cover is the next stage after the destruction of vegetative cover at extensively used pasture lands. The decreasing tolerance of soil cover inevitably leads to erosion advancing. Certain soil properties, preeminently water, physical and thermal characteristics, as well as the degradation of vegetative cover, are the reason for the changes in the soil humous state.

It is well known that overgrazing has a negative impact on the soil properties. The soils of degraded pasture lands are marked by increased density and slightly decreased aggregation properties. The results of our studies show that the dynamics of the soil properties depends on the burden rate of the pasture phytocenoses.

Humus content, density and structure are the most general characteristics of the soil condition. Therefore, we used soil humus content, density and structure as indicator values. The changes in soil density, structure and humus content were observed at the pasture sites with different grazing modes.

According to the results of our research, humus content in light chestnut soils of semideserts also depends on the exploitation mode of the pasture ecosystems. Close correlation between the plant biomass supply and the physical properties of soil at the experimental sites was also observed within the examined semi-arid ecosystems. Under mild grazing, humus content in the 0-10 cm horizon of light chestnut soils was 1.40%, increasing pressure on the pasture phytocenosis was accompanied by decreasing humus content, equal to 1.32% (in case of moderate exploitation) or 0.88% in case of 100% total grazing. Similar data were obtained during the analysis of soil samples from the 10-20 cm layer. Increasing grazing pressure led to decrease in humus content from 0.89 to 0.68% in the underlying soil horizons (Table 2).

Table 2. Agrochemical and agrophysical characteristics of light chestnut soils of semidesert areas under different grazing rates, 2015

Characteristics	Soil layer, cm	Grazing rate		
		Mild 30-40%	Moderate 60-70%	Total 100%
Humus content, %	0-10	1.40	1.32	0.88
	10-20	0.89	0.75	0.68
Labile phosphorus, mg/100g	0-10	1.35	1.18	0.84
	10-20	1.39	1.22	0.87
Exchangeable sodium, mg-eq/100g	0-10	0.95	1.43	2.13
	10-20	0.82	1.35	1.88
Density, g/cm^3	0-10	1.38	1.35	1.45
	10-20	1.40	1.40	1.41
Soil grading, %	0-10	82.2	85.5	73.6
	10-20	88.1	84.4	65.8

One of the limiting factors of soil fertility in the semidesert areas is phosphorus content. In the course of our studies in 2015, we analyzed the content of labile phosphorus under different rates of pasture exploitation. The results of chemical analysis of the soil samples from the 0-10 cm and the 10-20 cm layers from 3 types of pasture lands show the decreasing tendencies in the labile phosphorus content in light chestnut soils under increasing grazing pressure. For instance, in case of mild grazing, the content of labile phosphorus in soil at the levels of 0-10 cm and 10-20 cm was 1.18 mg/100 g and 1.22 mg/100 g respectively. In case of moderate grazing (up to 60-70%), the content of labile phosphorus in the layers of 0-10 and 10-20 cm was decreased by 0.14 mg/100 g and 0.17 mg/100 g compared to mild grazing, and was equal to 1.18 mg/100 g and 1.22 mg/100 g respectively. A further burden increase to 100% grazing leads to a decrease in the labile phosphorus content by 0.51 mg/100 g in the layer of 0-10 cm and by 0.87 mg/100 g in the layer of 10-20 cm.

The soil density of the 0-10 cm layer at the pasture sites ranges from 1.35 to 1.45 g/cm^3 depending on the grazing mode. Soil density increases with higher grazing pressure. The highest soil density of the 0-10 cm layer is observed at the site of total 100% grazing (1.45 g/cm^3). Soil density dynamics depends on the depth. The most significant changes are observed in the upper layers (0-5 cm). Soil density at the lower level (10-20 cm) virtually does not change. The content of valuable structural aggregates in soil of the pasture sites with mild or moderate grazing varies from 82.2 to 85.5%. At the level of 10-20 cm, the values of this parameter are slightly higher, ranging from 84.4% to 88.1%. However, at the last pasture site with total grazing the content of valuable structural aggregates in soil drops to 73.5% within the 0-10 cm layer and to 65.8% within the 10-20 cm layer.

Moderate and average grazing pressure has no influence on the soil texture. However, excessive exploitation leads to loss of a considerable part of valuable structural aggregates. Soil texture degradation at the site of total grazing can be explained by the decreasing proportion of the underground phytomass and by the fact that, in case of 100% grazing, the activity of the root systems of plants promotes lesser accumulation of soil humus, which induces the aggregation formation.

Deteriorating physical and chemical properties, in turn, lead to an increase in the content of exchangeable sodium in soil, indicating salinisation and promoted alcalinisation of soils. While in the 0-10 layer of soils at the mildly exploited pasture site the content of exchangeable sodium was 0.95 mg-eq/100 g, the transition to higher grazing rate (up to 60-70%) increased the content of exchangeable sodium by 50.5%, and in case of 100% grazing – up to 124%. We observed similar changes in the content of exchangeable sodium during the analysis of the samples from the 10-20 cm layer.

CONCLUSION

Summing up what has been said, moderate (65-75% grazing) pasture exploitation is advisable for the pasture ecosystems of the semidesert areas of West Kazakhstan in order to prevent the processes of degradation. Heavy pasture exploitation leads to changes in floristic composition and production. High phytomass production at the site of total exploitation is the result of increasing weight of non-palatable or well adapted to grazing plants, mainly prevailing in the area. Moderate and average grazing pressure has no influence on the soil texture. Heavy exploitation of the pasture ecosystems results in deterioration of agrochemical and agrophysical properties of the soil cover.

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