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Features of the vegetation cover of the natural fodder lands of southern Kazakhstan

Abstract: Results of the floristic analysis of a vegetation cover of southern pasturable lands (Zhambyl area, Chu area, Abay rural district) are being discussed. Key land soils and condition of vegetation, the floristic structure of fodder lands are defined. The distribution of species on major taxonomic groups considered. It was the analysis of familial range of flora. It was performed for the key area of pastures area which is located in the foothill-desert-steppe zone.

Key words: Republic of Kazakhstan, vegetation cover, key land, phytocenosis, soil, fodder lands

Introduction

According to the Institution of world resources, pasturable lands in the Republic of Kazakhstan cover 188 million hectares or 70 percent of all area. General part of the degraded lands makes more than 48 million hectares or 26 percent from total area [1]. The extensive pasturable economy which has the insufficient level of equipment is the main reason for degradation of lands and, as a rule, is unstable. Dry years or long cold winters have a bad influence on a condition of cattle, in this regard development of stable fodder providing is necessary [2].

Change of forms of ownership in agriculture led to uneven and irregular use of pastures. The repasture and a contamination of pastures in territories near settlements led to degradation of soils and vegetation, and it, in turn, led to decrease in stocks of forages that as a result leads to decrease in a standard of living of the population. In this regard detailed researches of a current state of pastures, identification of their anthropogenous degradation level as a basis for planning of actions for restoration and rational use are relevant [3].

The purpose of our researches in the last decade consists in periodic control of a condition of vegetation and soils of a key land on the southern pasturable lands of Kazakhstan, and also studying of floristic structure and dynamics of productivity of fodder grounds.

Materials and methods

In 2011 on pasturable lands of the area of our researches key land No. 19 was formed and, for more detailed characteristic of the prevailing vegetation associations and soils, PSEP No. 55, 56, 57 were formed as well. The land KU-19 is in 7 km to the northwest from the settlement of Abay near the bridge through Kuragata river on its left coast. The area of a key land made 1196 and, the scale of researches – 1:10 000; PSEP square – on 1 hectare everyone, the area of researches – 1:2000. Works are carried out with use of photoplans of scale 1:10 000.

During field researches on a key land 16 soil and botanical contours, are allocated for No. 55 PSEP – 8 contours, for No. 56 PSEP – 4 contours, for No. 57 PSEP – 6 contours, 6 soil cuts are put and described. From 5 main cuts (including from 3 cuts on PSEP) on the genetic horizons 19 tests on chemical and mechanical analyses are selected.

The land is located on the second above floodplain terrace of Shu river interfluve area of Shu-Kuragata. Relief is accumulative and erosive, barely billowy, with the low uvala and hilly rises complicated by eoloian processing. Valley of the river Kuragata has width up to 150 m and depth of erosive cutting of 2-3 m. The river flows from the South to the north along the western border of the land. The land was actively used in the past as the irrigated arable land under landings of mainly melon cultures. Along northern and

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eastern borders there is a channel, along it, and also along the river there are numerous ditches. Now they are dry and also not used. In work of definition of the general distribution of species of flora we used literary data [4-5]. At allocation of vital forms of plants we used the most known biomorphological classifications of K. Raunkiyer [6] and I.G. Serebryakova [7].

Results and their discussion

The territory of the key land located on pasturable lands of the Abay rural district belongs to a foothill and desert and steppe zone, a subband of gray soils of the light northern. Mechanical structure of soils – sandy, sabulous, barely loamy and middling loamy. The main type of a relief – barely billowy plain, absolute height is 439-446 m. The vegetation cover is presented by the semidesertic (desert and steppe) vegetation which is characterized by a wide circulation of desert semi-suffruticous and low-shrubby elements of flora, and steppe – firm-bunch grasses. The floristic list on materials of field inspection makes 92 species relating to 25 families and 74 classes.

From vital forms perennials prevail: grassy perennials (47 species), among them long-term vegetative (saltmarsh-grass, a feather grass, *Aeluropus*) and short-term vegetative (ephemeroids- onions, a sedge, a desert-candle). 4 species),of bushes is *Calligonum leafless*, *Hulthemia persica*, multiramose tamarisk and Lycium ruthenicum; 2 species of semi-bushes – *Kohia prostrata* and *Ceratoides Kraschenninnikovia*; low shrubs and semi-low shrubs, 1 type (*Convolvulus fruticosus* and *Artemisia terrae-albae*), a tree – 1 (*Elaeagnus oxycarpa*). 33 species are annual plants, biennials – 3 species (Table 1).

Table 1 – Quantity of species in the main families

	Name of a family	Quantity of the registered types, in total	including							
			grassy perennials	Annual plants	biennials	bushes	Low bushes	Semi-bushes	Semi low bushes	tree
	species in total	92	47	33	3	4	1	2	1	1
	including the main families:									
1	*Gramineae* Juss.	21	14	7						
2	*Chenopodiaceae* Vent.	12	1	9				2		
3	*Compositae* Giseke.	11	7	3					1	
4	*Cruciferae* Juss.	8	2	6						
5	*Leguminosae* Juss.	8	8							
6	*Polygonaceae* Lindl.	4	1	2		1				
7	*Liliaceae* Juss.	3	3							
8	*Umbelliferae* Juss.	3	2	1						
9	*Labiatae* Juss.	3	2	1						

15 species in vegetation community are dominants. By quantity of species in families prevail *Gramineae*- 21 species (22.8%), then 12 species from the *Chenopodioideae* family (13.0%), in the family *Compositae* 11 species (11.9%), *Cruciferae* and *Leguminosae* families – 8 species each, *Polygonaceae* family – 4 species, *Liliaceae*, *Umbelliferae* and *Labiatae* families-3 species each. Other families have 1-2 species. The ecological analysis of flora of the research land shows a wide expansion of xerophytes, xerohalophytes and mesohalophytes on the barely billowy plain, mesophytes along the Kuragata river.

Figure 1 – Ephemeral camel thorn's modification

Everywhere in the territory of the key there are landcommunities of group of the torgayot (383 hectares) and the camel thorn pastures (352 hectares) (Figure 1).

The group of the torgayot pastures includes torgayot-ephemeral, saltwort-ephemeral-camel thorn communities. Camel thorn pastures are presented by camel thorn – ephemeral, camel thorn-azhrek-ephemeral communities with ephemeral-camel thorn, ephemeral and ephemeral-*Poterium* modifications. Soils – pit-and-mount fixed sand, gray soils are usual light northern, mead gray soil light northern slightly alkalinized, slightly solonchak and middling solonchak and slightly loamy.

Dominants of communities – *Climacoptera oppositifolius* (torgayot) and camel thorn. In spring in herbage a large number ephemeral plants develop: meadow grass bulbous,cheat grass, desert alison, *Carex pachystylis*, *Eremopyrum triticeum*. In the summer ephemeral plants become dry and to their change comes numerous steppe xerophyte grasses: *Serratula dissecta*, *Heliotropium olgae* Bunge, *Lappula microcarpa*, *Allium caesium*, *Cousinia triflora* Schrenk. In autumn saltworts prevail: *Ceratocarpus arenarius* L., *Ceratocarpus utriculosus* Bluket, *Climacoptera lanatay*, *Camphorosma monspeliaca* L., and others. Aspect of herbage on the torgayot communities from bright green (spring) to lilac-brown with red impregnations (autumn). Aspect of the camel thorn communities from bright green to dark green with brown impregnations of the died-off ephemeral plants.

Artemisia terrae-albae-ephemeral communities are widespread in central and northern parts of a key land in contours 10.16. The area occupied by them is 141 hectares. They are dated for the increased plain elements and formed on mead gray-soil light northern slightly alkalinized sandy soils. They form complexes with camel thorn ephemeral, ephemeral camel thorn communities. It is singly among edificatorial vegetation to meet *Climacoptera lanata*, *Salsola paulsenii*, *Ceratoides Kraschenninnikovia, Stipa lessingiana*. The described communities belong to lands of spring summer autumnal use for a pasture of sheep, goats and horses.

In the southern part of the land in a contour 2 there is a calligonum-ephemeral-*Poterium* modification. They are met in a complex with camel thorn ephemeral communities.

Dominant – *Calligonum leafless*. Subdominants – ephemeral plants: *Taeniatherum crinitum*, *Alison desert*. Other: *Agropyrum fragile, Goebelia pachycarpa, Alhagi, Eryngium planum.*

Conclusion

Thus, in recent years in some contours there were considerable changes: so earlier in a contour six *Aeluropus* communities were widespread in a complex with *Climacoptera crassa* and absinthial ephemeral, now in a contour prevail saltwort-ephemeral-camel thorn communities in a complex with absinthial ephemeral camel thorn. In contours 8 and 15 instead of the *Artemisia terrae-albae* ephemeral communities modification of ephemeral-camel thorn and ephemeral-camel thorn-*Aeluropus* extended. Many fodder plants such as *Aeluropus*, *Artemisia terrae-albae* were forced out by annual saltworts and ephemeral plants which points to degradation of pastures. It is obvious that this consequence of a pasture of considerable quantity of cattle in the territory of the key land. Getting pastured from early spring to late autumn, and also moving to Kuragata river on a watering place they constantly bite and wear out plants and don't allow long-term herbs to grow. Change of climatic conditions has also great influence on efficiency of communities, in this regard the vegetation cover towards a xerophytisation significantly changed. But together with that, at the proper organization of pasture rotation system it is possible to restore vegetation and growth of perennial fodder plants.

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