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B.N. Nasiyev, doctor of agricultural sciences, professor, corresponding member of NAS RK,
N.Zh. Zhanatalapov, master of agricultural sciences,
A.K. Bekkaliyev, master of agricultural sciences,
A.A. Voranbaeva, master student
Zhangir khan West Kazakhstan agrarian-technical university, Uralsk, Kazakhstan

STATE OF VEGETATION OF PASCUAL ECOSYSTEMS OF SEMIDESERTED ZONE

Abstract

The researches established the expediency of moderated (65-75% browsing) use of pastures. The change of floristic structure and efficiency, and also deterioration of agrochemical and agrophysical indicators of pastures soil cover was noted at the intensive use of pastures.

Keywords: Pastures, monitoring, browsing, floristic structure, soil cover, efficiency.

In the XX century arid ecosystems of Eurasia underwent intensive anthropogenous influence. In this connection, their efficiency decreased, valuable types of fodder plants disappeared from herbage, vulnerable ecosystems are exposed to degradation. Today there are 187 million hectares of pastures in the republic from which about 81 million hectares are used, thus, among the used pastures - 26 million hectares are degraded – generally these are pastures lying near the settlements [1, 2].

Numerous scientific searches and development of scientific institutions of agricultural and biological profile show that in order to support the ability of pastures to continuous seed and vegetative renewal and reproduction of necessary level of fodder resources, it is necessary to exploit them within ecological imperative. The first ecological precept of rational use of pastures is the observance of compliance principle of their natural capacity to the number of grazing animals. The long-term scientific researches carried out in the second half of the 20th century by scientists of different countries show that it is possible to withdraw from 25 up to 75% of elevated vegetable weight in various natural zones without prejudice to the subsequent efficiency of pastures [3, 4, 5, 6].

Thus, the main issues of ecologically steady maintaining of pasturable economy is the amount of withdrawal and frequency of herbage browsing. It is possible to withdraw 65-75% of annual gain of plants without prejudice to the renewal processes. Alienation of annual gain at this level creates natural favorable conditions for vegetative and seed renewal of plants, creates prerequisites for annual reproduction of vegetable weight and excludes possibility of ecological communications violation in vegetable community and thereof provides stability of all pasturable ecosystem.

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The researches purpose is the development of adaptive technologies of rational use of natural pasturable ecosystems providing accelerated restoration and increase of their efficiency, improvement of human's environment parameters in semidesertic zone of Kazakhstan.

Accounting of productivity and regime supervision of changes of specific structure, cenopopulation structure of pasturable ecosystems by the seasons, definition of forage capacity of pastures were carried out on the pastures of semidesertic zone of West Kazakhstan region (Zhangalinsky area) for the solution of objectives.

The transects of 100x50 m in size were established for the study of year gain alienation influence of elevated weight in the course of gazing on zonal typical pastures. The gazing was carried out at the beginning of spring, middle of spring, end of spring, in summer and in autumn. Schemes of herbages browsing: 1. Full 100% browsing of pasturable plants year gain; 2. Moderate browsing – 65-75% of pasturable plants year gain. Full (100% of year gain) and moderated (65-75% of year gain) browsing was carried out to all terms of browsing: at the beginning, middle, end of spring, in summer and in autumn.

The following accounts and supervision were carried out on the experiments on study the influence of gazing on pasturable ecosystems: 1) phenological supervision; 2) change of specific

composition of pastures herbage; 3) age structure of cenopopulation; 4) change of fodder weight productivity by years and seasons;

Grazing directly or through the soil influences composition of herbage, especially intensive and unregulated grazing. Its direct influence is that it suppresses one species of herbs, promotes growth of others. The cattle grazing significantly influences composition of herbage: reduces abundance of some high-stem types and promotes increase in quantity of cereals. The excessive grazing leads to herbages opening and domination of inedible and ground level leafy herbs [7, 8, 9].

Binomial, tripartite and four-membered communities which received the name of spotty or "dappled" steppes are characteristic for desertified pastures of semidesertic zone. The prevailing components of such lands are cereals (*Stipa capillata*, *S. sareptana*, *Festuca valesiaca*) and dwarf semishrubs (*Artemisia lerchiana*, *A. pauciflora*, *Camphorosma monspeliaca*, *Atriplex cana*).

Sheep's fescue feather-grass vegetation is more widespread in the territory of Zhangalinsky area. Fodder lands are presented by communities with domination of *Stipa lessingiana*, *S. capillata*, *S. pennata*, *Festuca valesiaca*, *Artemisia austriaca*. There are xerophytes in herbs: *Astragalus testiculatus*, *Crinitaria tatarica*, *C. villosa*, *Falcaria vulgaris*, *Phlomis pungens*.

Stipa sareptana, sheep's fescue (*Festuca valesiaca*), *Artemisia lerchiana* formations are also characteristic for pastures of semidesertic zone. *Stipa sareptana* formation is divided: *Artemisia lerchiana* - *Stipa sareptana* and *Stipa sareptana* - *Agropyron desertorum* associations.

There are typical steppe cereals with moderate browsing (65-75% of pasturable plants annual gain) on pastures site (*Stipa capillata*, *S. sareptana*, *Festuca valesiaca* and others), *Agropyron desertorum* meets only by several samples. Floristic variety is made here by 11 types, among them there are also many representatives of steppe herbs *Phlomis tuberosa*, *Astragalus longipetalus*, *Glycyrrhiza glabra*, *Tragopogon sp* and long-term cereals — *Stipa capillata*, *Agropyron desertorum*, *Puccinellia gigantea*.

Specific variety of plants the lowest on the site with intensive gazing (100% browsing of pasturable plants annual gain) - 9 types which are presented by generally low-eaten and weed types (*Artemisia taurica*, *Alhagi pseudoalhagi*, *Petrosimonia oppositifolia*, *Tribulus terrestris*, *Polygonum aviculare*, *Cynodon dactylon*, *Chenopodium album*, *Ceratocarpus arenarius* and others).

Ephemera plants develop in spring period on all sites. Ephemeroïds are quite various (*Poa bulbosa*, *Tulipa biebersteiniana*, *T. gesneriana*, *Ornithogalum fischerianum*, *Gagea bulbifera*, *Iris pumila*). Xerophile dwarf semishrubs prevail in herbage: *Artemisia austriaca*, *A. lerchiana*, *A. pauciflora*, *Kochia prostrata*, *Thymus marschallianus*, *Tanacetum achilleifolium*.

On 2 sites during spring period, along with ephemera plants, the main dominants are white wormwood or *Artemisia lerchiana* which in process of pasturable loading strengthening increases its participation in composition of herbage. So, at 100% of occurrence on all sites, the number of *Artemisia lerchiana* bushes on pasture with intensive loading are almost twice higher than on the site with moderate browsing.

The mode of use is also reflected on the abundance of ephemeral plants. Among ephemeral plants increasing participation in process of loading strengthening it is possible to note *Veronica praecox* and *Alyssum turkestanicum* which number on pasture with intensive use is 2-3 times more than on the site with moderate browsing.

Annual ephemeral plants, such as *Poa bulbosa* and *Tulipa biebersteiniana*, as well as wormwood, reduces its participation in pastures phytocenoses structure in the process of loading strengthening.

Two circles are allocated for the pasture with moderate loading in the middle of June: top - to 35-40 cm, presented by the dominant *Stipa capillata* and less often by *Agropyron desertorum*; and lower - to 14-18 cm, formed by *Artemisia lerchiana*, with projective covering of 40%.

On the site with moderate grazing of *Artemisia lerchiana* form together with *Kochia prostrata* single-tier community with the height to 40-47 cm, and their total projective covering increases to 45% here.

On the site of intensive grazing, layering is also not expressed, projective covering of *Artemisia lerchiana* increases to 50% with the average height of herbage - 18-22 cm.

In autumn, on the site with moderate use, general projective covering decreased to 62% due to the dumping of leaves some part by wormwood. On the site with 100% browsing it was 42%, and the share of *Artemisia lerchiana* was 38%. The number of vegetans species of *Artemisia lerchiana* by the end of vegetative period on both pastures decreased almost twice.

In comparison with *Artemisia lerchiana*, *Kochia prostrata* was presented by single samples on the pasture with 100% browsing.

The maximum production of phytoweight on the pasture with intensive loading was noted during the mass development of ephemeral plants and reached 1,92 c/ha. The major role as a part of production was played by *Bromus mollis*, *Poa bulbosa* and *Anisantha tectorum*. Further there is a decrease in efficiency to 1,35 c/ha until the end of vegetative period.

On the pasture with moderate loading where ephemeral plants do not play significant role, the maximum of production is noted at the beginning of June, respectively 9-12-6,05 c/ha. By the end of summer on the site with moderate use there is a decrease in efficiency to the minimum values that is connected with the loss of herbs representatives from vegetation structure and drying of cereals – 3,17-4,05 c/ha.

Projective covering of radical vegetation within 7,12-7,12% on the pastures with 100% browsing. Distribution of ruderal vegetation at the level of 3,05% was noted. Pastures have more footpaths of cattle that testifies to bigger loading and high extent of pastures trampling by farm animals. Modern efficiency from the potential is reduced (35,08-39,99%), stocks of forages are reduced to 13,11-14,75%. Ecosystem of these pastures is presented by short-term and derivative communities. Height of herbage is at the level of 17,32-22,96 cm.

On the pastures with 65-75% or moderate browsing, projective covering of radical vegetation is at the level of 29,82-32,28%. Fodder lands have extent of decrease in stocks of forages from 2,25 to 2,43%, and modern efficiency of pastures makes 87,92-92,40% of the potential. Long-derivative communities are widespread on the pastures, footpaths of cattle are absent. Height of herbage is at the level of 29,22-35,16 cm.

Thus, agroenvironmental monitoring which is carried out in the semidesertic zone of West Kazakhstan region defined a current state of vegetable and soil cover of pastures depending on the use modes. 100% or full browsing in comparison with 65-75% or moderate browsing leads to the change of floristic structure and efficiency of pastures vegetable cover of semidesertic zone.

REFERENCES

- 1 Nasiyev B.N., Zhiyengaliyev A. Monitoring of factors and processes of soil cover degradation of semidesertic zone fodder lands // Desertification of Central Asia: assessment, forecast, management: mat. of int. sci.pract. conf. / Institute of geography, Nazarbaev University. – Astana, 2014. – P. 374-378.
- 2 Ogar N.P. Transformation of vegetable cover of Kazakhstan in conditions of modern environmental management./ Institute of botany and phytointroduction. – Almaty, 1999. – 131 p.
- 3 Shamsutdinov Z.Sh. Long pasturable agrophytocenoses in arid zone of Uzbekistan. – Tashkent: FAN UzR, 2012. – 167 p.
- 4 Rodin L.E. Productivity of desert communities // Coll.: Resources of biosphere. – L.: Science, 1975. – Ed. 1. – 286 p.
- 5 Ivanov V.V. Steppes of West Kazakhstan in connection with dynamics of their cover. - M - L.: Science, 1958. – 292 p.
- 6 Rachkovskaya E.I. Short program-methodical note on route study of seral ranks of vegetable communities arising under the influence of economic activity of humans // Book: Program-methodical notes on biocomplex and geobotanical study of steppes and deserts of Central Kazakhstan. – M.-L., 1960. – P. 79-82.
- 7 Larin I.V. Grasscropping and pasturable economy. – L.: kolos. – 1969. – 549 p.
- 8 Zhang K, Zhao K. Afforestation for sand fixation in China. J. of arid environment, 2011, 16/ 1: - C. 3-10.
- 9 Nasiyev B., Tulegenova D, Zhanatalapov N, Bekkaliev A, Bekkalieva A. Specific Features of the Vegetative and Soil Cover Dynamics in the Semiarid Pasture Ecosystems Influenced By Grazing // Research Journal of Pharmaceutical, Biological and Chemical Sciences (ISSN09758585-India-Scopus). №7(4). – 2016. – p. 2465-2473.

ТҮЙІН

Зерттеулер жайылымдарды баппен (65-75% көлемінде малға жаю) пайдаланудың тиімділігін анықтады.

Жайылымдарды қарқынды (100% көлемінде малға жаю) пайдаланған күнде олардың өсімдіктер құрамы мен топырақ құрамы қатты күйзеліске ұшырайды.

РЕЗЮМЕ

Исследованиями установлена целесообразность умеренного (65-75% стравливание) использования пастбищ.

При интенсивном использовании пастбищ отмечено изменение флористического состава и продуктивности, а также ухудшение агрохимических и агрофизических показателей почвенного покрова пастбищ.