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Biodiversity and productivity of some pasture areas of the small caucasus (Azerbaijan Republic)

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Abstract
The article presents information on the current state, capacity and productivity of pastures in some areas of the Lesser Caucasus (LC). In 2018-2019, during the monitoring assessment carried out in the territories of Shamkir, Samukh, Bozdag range, the amount of fodder intended was calculated based on the productivity of the distributed plants such as *Artemisia fragrans* (29,1 ± 1,29 kg/ha), *Hordeum leporina* (29,5 ± 0,8), *Achillea nobilis* (32,6 ± 1,25), *Salvia limbata* (37,9±1,08), *Atriplex tatarica* (23,2 ± 0,6),*Aegilops sylindrica* (43,7 ± 2,11), *Poa bulbosa* (36,9±1,0), *Atrophaxis spinosa* (25,5 ± 0,84), *Petrosimonia brachiata* (25,6±1,28), *Bifora testiculata* (18,4±1,46) and *Bidens tripartita* (28,7±1,80).

Keywords: lesser caucasus, pasture, productivity, plant cover

Introduction
The biological potential of pastures and hayfields is of great importance in agriculture. Thus, natural pastures and hayfields are used as pasture land. High-quality livestock productssuch as meat, milk, butter, etc. is produced at the expense of their fodder reserves. Hayfields, including winter pastures, also provide protection for other industrially important animals. Scientists consider the identification of the biological potential of the territories, as well as their mobilization on a scientific basis, to be a topical issue in the national economy [1].
One of the important issues is the systematic management of the process of using pastures and hayfields. Efficient and sustainable use of natural resources all over the world is one of the current issues of the day. Scientists see one of the main factors in the decline of plants in the irregular grazing of livestock [3, 5].
Thus, the results of studies carried out in the pastures and hayfields of the Lesser Caucasus prove that the process of vegetation, soil erosion and reduction of plants in the area continues more rapidly under the influence of complex ecological and anthropogenic factors [4]. Such cases occur not only in the arid areas of lowlands, but also in the steppes, dry mountain slopes (garigue, phrygana), mountain meadows, high mountain steppes and even water basin. This provides a basis for studying the pastures and productivity of the area.

Materials and Methods
The research was carried out in 2018-2019 in the botanical-geographical region of LC. In conducting geobotanical research works, generally accepted "Methodology of phenological observations in geobotanical research"[2],"On the method of determining the weight of grass stands by the height of the main mass and projective cover"[8], methods by Ramenski L.G. [6], Shennikov I.N. [7] and others have been used. Sampling areas are selected based on these methods, the size of the areas may vary depending on the dimension of the natural phytocenoses. In sample areas species composition, abundance, viability of plants, predominant species (edificator, dominant, subdominant, etc.), project cover, density, layerage of the vegetation were analysed and productivity and natural resources of phytocenosis, as well as different economic groups (feed, medicine, essential oil, wild food, etc.) are studied by weight method.Druden's 6-point scale is mostly used to study abundance.
The fodder lands of the region were studied on the basis of the "Methodology for the study of natural fodder lands".

Results and Discussions
Local plant types predominate in the study area. In humid hollows meadow and marsh plants are found. The most widespread are wormwood, wormwood-saltwort, saltwort, ephemeral vegetations which are found in the form of spots. A number of habitats and plant communities are rare and endangered in Azerbaijan. This includes tugai forests, many desert and semi-desert cenoses, and plant species which present in these cenoses such as Caspian melilot - *Melilotus polonicus* (L.) Pall. (*M. caspicus* Grun.), Shober niterbush - *Nitraria schobera* L.,Caspian lotus - *Nelimbium caspica* (DC.) Fisch., white water lily - *Nympha alba* L., peltate-leaved floating heart - *Nymphoides peltata* (S.G. Gmel.) O. Kuntze and etc. The semi-desert vegetation occupies a large area around Jeyranchol in the territory of Samukh. The physical and geographical conditions of the semi-deserts are

more favorable for the development of vegetation cover than the deserts. The amount of precipitation is low, mainly in spring and autumn. The drought period lasts 4-5 months. Seasonal variations are observed in the plant formations here. Thus, the vegetation cover begins to grow in the spring, the vegetation goes out in the summer, regenerated in the fall, and continues all winter. The vegetation of the grass cover and the changes that take place during these seasonal stages are proportional to the development of the desertification process. Cotton, alfalfa, partially gourds, vegetables, grapes are grown by irrigation in the areas where semi-desert crops are distributed.
Due to the development of irrigated agriculture, the area of these territories is declining from year to year. The productivity of pure ephemeral phytocenoses varies greatly over the years depending on climatic conditions. Wormwood-ephemeral semi-deserts in the area are used as pastures.
Currently, fragments of the desert landscape are also distributed in the study area as small clearings. Here saline clayey takyr-like and gravelly gypsous types of desert fragments are found. Their emergence and development was caused by the thinning of plant cover as a result of inefficient use of pastures in arid climates, washing of the top fertile layer of soil and its salinization. Desert-type vegetation is less common than semi-desert vegetation and found in the form of spots.
Depending on the salinity of the soil in the area there are perennial salt plants such as holocnemum, Caspian halostachys - *Halostachys caspica* (Pall.) C.A. Mey., and annual salt plants such as fleshy saltwort - *Salsola crassa* Bieb., branchy petrosimonia - *Petrosimonia brachiata* (Pall.) Bge. Desert plants differ from semi-desert plants in that the soil is more saline, annual ephemerals are less common, and the salt plants are sparse.Lerchian wormwood (*Artemisia lerchiana* Web.) is more prevalent here. Among the plants that make up the fodder reserve annual ephemerals, wormwood, denroid saltword, knotty saltword, etc. are widespread (Table 1).

Table 1: Species composition and structure of phytocenosis

№	Name of plants	Density	Height, cm	Phenophase	Tier	Life form
	Halostachysbelangeriana (Moq) Boiss.	4	Up to 350	Flower	I	small shrub
	Adonis flammeus Jacq.	2-3	10-50	Fruit	II	annual
	Tribulus terrestris L.	2	10-60	Flower	II	annual
	Suaeda microphylla Pall.	1-2	25-75	Flower	II	small shrub
	Atriplex tatarica L.	1-2	25-70	Flower	II	subshrub
	Halocnemum strobilaceum (Pall)Bieb.	2-3	10-50	Fruit	II	subshrub
	Salsola dendroides Pall.idr.	3	80-100	Flower	II	subshrub
	Petrosimonia brachiata (Pall.) Bunge	3	5-50	Fruit	III	annual
	Eromopirum triticeum Nevski	2-3	10-30	Fruit	III	annual
	Spinacia tetrandra Stev.	1-2	10-40	Fruit	III	annual
	Camphorosma lessingii Litv.	2-3	10-35	Fruit	III	subshrub
	Hordeum leporina (L.)Sternb.	2	10-40	Flower	III	annual
	Aegilops sylindrica Host	2-3	25-40	Fruit	III	annual
	Hedypnois cretica (L.) Dum.-Cours.	1-2	10-15	Flower	III	annual
	Koelpinia linearis Pall.	2	15-30	Fruit	III	annual
	Poa bulbosa L.	2	10-20	Fruit	III	perennial
	Ceratocarpus arenarius L.	3	5-25	Fruit	III	annual

By conducting a monitoring assessment in the study area, the amount of feed per head of livestock was calculated in feed units. Thus, in 2018-2019 in the study area, 11296,11 tons of feed unit falls on 976,138 heads of cattle and 55614,84 ton of feed units on 85382 small cattle, respectively. It has been determined that the available pasture area is much smaller than required.
Average weight of collected surface grass (*herbosum*) (kg) - $\sum V$ - 23, 16, 24, 27, 19, 21, 20, 25, 13, 26 = 214

square of the average weight- $\sum V^2$ - 529, 256, 576, 729, 361, 441, 400, 625, 169, 676 = 4762

$$M = \frac{214}{10} = 21{,}4 \quad C = \sum V^2 - \frac{(\sum V)^2}{n}, \; C = 4762 - \frac{(214)^2}{10} = 4762 - 4580 = 182$$

$$\sigma = \sqrt{\frac{C}{n-1}} = \sqrt{\frac{182}{10-1}} = \sqrt{\frac{182}{9}} = \sqrt{20{,}22} = 4{,}51 \; m = \frac{4{,}51}{\sqrt{10}} = \frac{4{,}51}{3{,}16} = 1{,}43$$

M $\pm$ m = 21, 4 $\pm$ 1, 43 kg/ha, $P = \frac{m}{M}100 = \frac{1{,}43}{21{,}4}100 = 6{,}7\%$

During the study the productivity of 10 plants on selected 15 stationary stations was calculated by analogy: *Artemisia fragrans* (29,1 $\pm$ 1,29 kq /ha); *Hordeum leporina* (29,5 ± 0,8); *Achillea nobilis* (32,6 ± 1,25); *Salvia limbata* (37,9±1,08); *Atriplex tatarica* (23,2 ± 0,6); *Aegilops sylindrica* (43,7 ± 2,11); *Poa bulbosa* (36,9±1,0);

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Thus, forage crops (green, dry) were evaluated, their productivity were studied in the main phytocenoses (wormwood, wormwood-ephemeral, saltwort, saltwort-ephemeral, annualsaltwort, barnyard grass and etc.) of winter pastures located in Shamkir, Samukh districts and around Bozdag range belonging to the lowlands of the LC. At the same time, it was established how many heads of cattle and small cattle (pasture load) can be kept per 1 ha of pasture area. It was found that in the current state of winter pastures, the green fodder yield of pastures varies between 3.8 and 8-12 cents/ha, and the dry fodder yield between 1.5-5 and 2.4-6.7 cents/ha. In 1 hectare of these pastures, it is possible to keep a minimum of 1-2, maximum 2-3 heads of large cattle and a minimum of 3-4, maximum 5-6 heads of small cattle during the season.

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