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PRODUCTIVITY OF SPRING-AUTUMN PASTURES IN MOUNTAINOUS AREAS IN NAKHCHIVAN

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ПРОДУКТИВНОСТЬ ВЕСЕННЕ-ОСЕННИХ ПАСТБИЩ В ГОРНЫХ РАЙОНАХ НАХИЧЕВАНИ

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Abstract. The article presents information about productivity of spring-autumn pastures in mountainous areas of Nakhchivan. Meadows of the territory of Günnut-Kapicik physical-geographical region, species composition and structure of multi-grass formation, indicators related to biochemical composition of meadows by plant formations, area of meadows by formations, productivity, Nutrition and capacity, productivity by botanical groups were studied in the conducted research. The article also studied the average three-year productivity in the main botanical groups for Babek, Shahbuz, and Ordubad districts.

Аннотация. Представлены сведения о продуктивности весенне-осенних пастбищ в горных районах Нахичевани. В проведенных исследованиях изучены луга территории физико-географического района Гюннут-Капичик, видовой состав и структура разнотравья, показатели, связанные с биохимическим составом лугов по формациям, площадь лугов по формациям, продуктивность, питание и емкость, продуктивность по ботаническим группам. В статье также изучена средняя трехлетняя продуктивность по основным ботаническим группам для Бабекского, Шахбузского и Ордубадского районов.

Keywords: mountain territories, grazing, productivity, plant formations, herbage.

Ключевые слова: горные территории, выпас скота, продуктивность, растительные формации, травостой.

Pasture areas of the studied physical-geographical region Günnut-Kapıcık are 55,349 ha, which are calculated separately for 6 administrative districts: the total area of spring-winter pastures in Sharur district is 5,777 ha, in Kangarli — 4,459 ha, 3,243 ha. ha in Babek respectively 9855 ha in

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Julfa, 14069 ha in Ordubad and 17946 ha in Shahbuz. As you can see, Shahbuz district is richer than other districts and this is due to the fact that in addition to pastures, the region also has a lot of pocosas. Information on pastures and meadows of the region is presented in Table 1 [1].

Degradation is also observed in meadows and grasslands of some districts of the region. The change of meadow and steppe groupings as a result of grazing is called pasture degradation. Depending on the type, quantity and duration of grazing, grazing has a different impact on the pasture.

Table 1

INFORMATION ON WEAVING SITES
IN THE PHYSICAL-GEOGRAPHICAL REGION OF GUNNUT-KAPICIK

Districts	*Pastures (ha)*		*Total by districts*
	Summer pasture	*Winter pasture*	
Sharur	1425	4352	5777
Kangarly	1180	3279	4459
Babek	2013	1230	3243
Julfa	5156	4699	9855
Ordubad	9049	5020	14069
Shahbuz	12926	5020	17946
Total by pastures	31749	23600	55349

Grazing affects grass cover in several ways: by directly eating the plant, by breaking it with hooves and by changing the soil regime. During grazing, the soil usually hardens and soil salinisation occurs as a result of water evaporation through capillaries. In sandy soils, wind erosion increases as a result of the decay of the grass cover, etc. All these negative processes are associated with unsystematic and excessive grazing on pastures [1, 2].

The areas of natural forage plants in the physical-geographical area of Gunnut Kapichik consist of spring and winter pastures used seasonally, hayfields and rural meadows used all year round. Lands in this category have slightly different aspects depending on their legal regime. Thus, summer and winter pastures remain in state ownership and are transferred to individuals and legal entities for short-term and long-term use. Bichenak and rural meadows were transferred to common use and retained in municipal property. The productivity of the main formations was studied both on municipal lands and on pasture plots of farms [8-10].

One of the formations frequently found in the area is a variety of herbaceous shrub. More than 30 species of higher plants have formed in its botanical composition, 5 of them belong to shrubs. Up to 10 are cereals, 2 species are legumes, and the rest are herbs (Table 2).

Table 2

SPECIES COMPOSITION AND STRUCTURE
OF THE HERBACEOUS FORMATION DISTRIBUTED IN THE GUNNUT-KAPICIK AREA

No	*Name of plants*	*Abundance (points)*	*Average height with sm*	*Phenological phase*
		Shrubs		
1	*Crataegus* L.	2-3	180-250	fruit
2	*Rubus* L.	1-2	90-100	//
3	*Rosa* L.	1-2	120-150	//
4	*Prunus cerasifera* Ehrh.	1-2	80- 100	//
5	*Pyrus* L.	2-3	100-130	//

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No	Name of plants	Abundance (points)	Average height with sm	Phenological phase
		Grains		
6	*Stipa hohenackeriana* Trin. & Rupr	3-4	10-15	seeding
7	*Poa bulbosa* L.	1-2	15-20	//
8	*Cynodon dactylon* (L.) Pers.	1-2	10-20	//
9	*Antennaria caucasica* Boriss.	1	20-25	//
10	*Bromus japonicus* Thunb.	1	10-15	//
11	*Phleum phleoides* L.	1	15-20	//
12	*Aegilops cylindrica* Host	1	10-15	//
13	*Hordeum vulgare* L.	1	20-15	//
		Legumes		
14	*Medicago constricta* Durieu	1-2	8-10	seeding
15	*Trifolium pratense* L.	1-2	5-10	//
		Various grasses		
16	*Heracleum trachyloma* Fisch. & Mey.	3-4	150-180	Full vegetation
17	*Chaerophyllum bulbosum* L.	2-3	60-80	//
18	*Urtica dioica* L.	1-2	50-60	//
19	*Stachys inflata* Benth.	3-4	20-25	//
20	*Daucus carota* L.	2-3	25-40	//
21	*Plantago major* L.	1	10-15	//
22	*Artemisia lercheana* Weber ex Stechm.	1	20-35	//
23	*Matricaria* L.	1	10-25	//
24	*Phleum phleoides* L.	1	10-20	//
25	*Teucrium chamaedrys* L.	1	10-20	//
26	*Cirsium vulgare* (Savi) Ten.	1	10-35	//
27	*Taraxacum* F.H.WIGG	1	10-20	//
28	*Calluna vulgaris* (L.) Hull	1	50-45	//
29	*Sambucus nigra* L.	1	10-30	//
30	*Cirsium* L.	1	10-35	//
31	*Achillea nobilis* L.	1 -2	10-15	//
32	*Centaurea iberica* Trevir. ex Spreng.	1 -2	10-15	//
33	*Centaurea fischeri* Schltdl.	1	10-20	//
34	*Alcea* L.	1	10-20	//
35	*Cichorium intybus* L.	1	15-25	//

In the second tier, white-grass from cereals and hemlock hardy from various cereals dominate in the second tier with 3-4 points, in the first tier hawthorn subdominates with 2-3 points. Average height of grass cover is 10-250 cm, average density 35-45%.

As a result of geobotanical studies, it has been established that the productivity of fodder plants common in the fields of rural meadows largely depends on the amount of precipitation, air temperature, soil fertility and technical condition of meadows. Of the vegetation, trees, cereals, legumes and most species of grasses are well eaten by animals in the early stages of vegetation. In addition to these plants, harmful and poisonous plants have also been observed in pastures, which are either not eaten by animals or eaten very poorly [6, 7, 11, 12].

As a result of the research, the biochemical composition of rangeland vegetation, productivity, forage base and capacity were determined. Some formations were studied separately and their example is reflected in Table 3. To determine the capacity of a pasture, it is important to know the

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aboveground dry mass of the formation, the forage unit and the amount of digestible protein. As shown in Table 3, the 147 ha lamina-diverse formation has 48.61 forage units and 5.34 kg of digestible protein per 100 kg of dry grass yield. The surface mass of this formation contains 10.8 % hygroscopic moisture, 10.42 % ash, 10.56 % protein, 2.89 % fat, 24.22 % cellulose and 50.13 % nitrogen-free extractive matter. Knowing the productivity of the formation and its fodder unit, it is possible to calculate the load per 1 ha of pasture according to the following formula [1].

$$T = \frac{MxY}{HxD}$$

T — number of cattle per 1 ha of pastures (per head); M — productivity of dry grass eaten by cattle per 1 ha of grazing (per centner); Y — fodder unit (in kg) in above-ground mass of pasture per 100 ha; fodder unit required per H-1 head of cattle per day (1.3 kg for small ruminants and 3.9 kg for cattle); D — number of days of grazing on pastures in 1 year (245 days are taken).

Table 3

INDICATORS RELATED TO BIOCHEMICAL COMPOSITION
OF PASTURE AREAS BY VEGETATION FORMATIONS (Limp – variety)

Sample number	*Total moisture*	*Hygroscopic moisture, in %*	*In absolute dry matter, in %*					*100 kg dry plant (kg)*	
			Ash	*Protein*	*Fat*	*Cellulose*	*AEM*	*Feed unit*	*Digestible protein*
7,12	21,78	10,56	11,42	10,64	2,81	24,92	50,13	48,61	5,34

Knowing the number of cattle per 1 ha of arable land and hectare of land, it is possible to calculate how many head of small cattle and how many head of cattle can be grazed on the plot (Table 4).

Table 4

AREA, PRODUCTIVITY, NUTRITION AND CAPACITY OF FIELDS BY FORMATION

Entity name	*Type of pasture*	*Areas within the boundaries*		*Surface mass productivity, c/ha*	*in 100 kg of food*		*Food reserve*			Network capacity (including head and cattle)	
		ha	*%*		*food unit*	*Absorbed protein*	*Food*	*Food unit*	*Absorbed protein*	*in 1 ha*	*In total area*
Topally-various grases	Shrub	147	15,45	4,7	48,61	5,34	673	398	46	0,3	123/44
Legume-various grasses	Steppe	155,7	16,98	5,1	58,05	7,03	731	411	49	0,4	124/46
Shiyavly-various grasses	meadow	297	22,8	8,9	76,34	8,67	982	605	64	0,7	170/67

Useful plants that are relatively widespread in winter pastures of the Gunnut-Kapidjik physical-geographical region are annual cereal grasses. Plants of the cereal family always develop well in early spring and form a mass of green fodder. On winter pastures located in the foothills, there are relatively few annual cereal grasses in the green grass cover that forms in spring. Instead, some annual herbaceous plants, which are considered valuable forage, make up the majority. Various species of Artemisia, characteristic of

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Artemisia pastures, are also of great importance in the formation of grass cover of winter pastures. Several species and varieties of Medicago, Esparset and Vicia of the Fabaceae family are also widespread in some pastures. However, since cereals and legumes are not the object of our study, we have conducted studies only on various grasses [3-5].

In Kengerlin and Sadarak districts winter pastures are formed mainly in desert vegetation. The vegetation of these pastures is very poor, the botanical composition consists mainly of shrubs, semi-shrubs and annual grasses with a short vegetation period [1].

On winter pastures of the district, semi-desert-type vegetation is more common than desert-type vegetation. Since they differ from desert-type plant groups in their growth, habitat conditions, botanical structure, chemical composition, biological and economic characteristics, forage quality is also different. As a rule, ephemerals are considered the main fodder of semi-desert pastures. They develop well and form dense vegetation on pastures, with vegetation covering up to 80-90 per cent of the land surface. Such areas are used not only as pastures and pastures, but also as natural mowing areas. Wormwood, ephemeral-dusty, shorangali-dusty semi-deserts occupy a large area in winter pastures. In contrast to winter pastures, summer pastures of the region are represented by a variety of perennial grasses in meadows, steppes and woodlands.

Table 5

PRODUCTIVITY OF THE GUNNUT-KAPICIK REGION
BY BOTANICAL GROUPS (2008-2010)

Years	*Botanical groups*	*Seasons*											
		Summer				*Autumn-Winter*				*Spring*			
		15.VI—15 IX				*15.XI–20.II*				*1.III–15.V*			
		wet weight		*Food weight*		*Wet weight*		*Food weight*		*wet weight*		*Food weight*	
				wet	*dry*			*wet*	*dry*			*wet*	*dry*
		c/ha	*in-%*	*c/ha*	*c/ha*	*c/ha*	*in-%*	*c/ha*	*c/ha*	*c/ha*	*in-%*	*c/ha*	*c/ha*
2008	Grains	2,37	24	1,91	1,31	2,15	21	1,51	0,92	4,77	24	3,58	2,41
	Legumes	0,12	1	0,09	0,05	0,10	1	0,06	0,04	0,49	3	0,37	0,18
	Various-grasses	7,25	75	5,72	4,33	7,98	78	6,31	4,71	12,27	70	10,81	8,56
	Total:	9,74	100	7,72	5,69	10,23	100	7,88	5,67	17,53	100	14,76	11,15
2009	Grains	0,24	3,8	0,16	0,09	0,38	4,9	0,15	0,08	1,68	16,5	1,22	0,83
	Legumes	0,06	1	0,04	0,02	0,09	1,2	0,05	0,01	0,45	4,4	0,24	0,14
	Various-grasses	6,07	95,2	5,54	4,61	7,26	93,9	6,62	3,84	8,08	79,1	7,31	5,76
	Total:	6,37	100	5,73	4,72	7,73	100	6,82	3,93	10,21	100	8,77	6,73
2010	Grains	0,35	5,3	0,23	0,16	0,61	6,3	0,32	0,21	2,44	20,6	1,87	1,42
	Legumes	0,07	1	0,04	0,02	0,12	1,2	0,08	0,04	0,27	2,3	0,19	0,11
	Various-grasses	6,26	93,7	5,89	5,48	8,94	92,5	7,25	4,52	9,12	77,1	7,75	5,82
	Total:	6,68	100	6,16	5,66	9,67	100	7,65	4,77	11,83	100	9,81	7,35

The main elements of spring pastures of all plants are ephemerals and ephemeroids. Productivity of both winter and spring-summer pastures was studied by us in different years and regions. To determine the productivity, 10-15 sample areas were taken every month in the same plots and after dividing them into botanical groups (cereals, legumes, miscellaneous) wet and dry masses were determined [1].

In the summer season of 2008 the productivity of dry fodder mass was 5.69 c/ha, most of which was made by different breeds — 4.33 c/ha. The remaining parts were occupied by cereals -

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1.35 c/ha, legumes — 0.01 c/ha. In autumn-winter season productivity of dry fodder mass was 5,67 c/ha, of which different crops accounted for 4,71 c/ha, and cereals and legumes 0,0,96 c/ha. High productivity is observed in the associations in the spring season. The productivity of dry fodder mass in 2008 was 11.15 c/ha, of which 8.56 c/ha was accounted for by different breeds. Compared to 2009, there was an increase in yield in 2010 (4.72 c/ha in summer 2009, 5.66 c/ha in 2010, 3.93-4.77 c/ha in autumn and winter, 6.73-7.35 c/ha in spring). This was certainly due to climatic factors (temperature 14.6^0C in spring, 16.9^0C in autumn, 4.9^0C in winter; precipitation 1160 mm in spring, 477 mm in autumn, 907 mm in winter) [1].

Table 6

AVERAGE TRIENNIAL PRODUCTIVITY
IN THE MAIN BOTANICAL GROUPS BY DRY FODDER MASS IN BABEK DISTRICT

Botanical groups	*Summer*		*Autumn-Winter*		*Spring*	
	total weight of feed		*total weight of feed*		*total weight of feed*	
	c/ha	*in-%*	*c/ha*	*in-%*	*c/ha*	*in-%*
Grains	1,02	22,6	0,68	15,4	1,8	20,1
Legumes	0,05	1,2	0,32	7,2	0,32	3,6
Various-grasses	3,43	76,2	3,43	77,4	6,82	76,3
Total:	4,50	100	4,43	100	8,94	100

Table 7

AVERAGE TRIENNIAL PRODUCTIVITY
IN THE MAIN BOTANICAL GROUPS BY DRY FODDER MASS IN SHAHBUZ DISTRICT

Botanical groups	*Summer*		*Autumn-Winter*		*Spring*	
	total weight of feed		*total weight of feed*		*total weight of feed*	
	c/ha	*in-%*	*c/ha*		*c/ha*	*in-%*
Grains	0,13	2,5	0,19	3,7	1,08	15,4
Legumes	0,02	0,4	0,03	0,6	0,1	1,4
Various-grasses	4,98	97,1	4,9	95,7	5,83	83,2
Total:	5,13	100	5,12	100	7,01	100

Table 8

AVERAGE TRIENNIAL PRODUCTIVITY
IN THE MAIN BOTANICAL GROUPS BY DRY FODDER MASS IN ORDUBAD DISTRICT

Botanical groups	*Summer*		*Autumn-Winter*		*Spring*	
	total weight of feed		*total weight of feed*		*total weight of feed*	
	c/ha	*in-%*	*c/ha*		*c/ha*	*in-%*
Grains	0,17	3,17	0,37	6,60	0,97	11,69
Legumes	0,09	1,68	0,12	2,14	0,45	5,42
Various-grasses	5,1	95,15	5,12	91,27	6,88	82,89
Total:	5,36	100	5,61	100	8,3	100

Tables 6, 7 and 8 reflect the obtained information on yields of plant groups by year by region. As a result of the three-year study, the average yields of dry fodder mass by seasons in some associations are given. Looking at the tables, it can be seen that in all three regions (Babak, Shahbuz and Ordubad) the highest values in spring, summer and autumn-winter pastures belong to different grasses [1]. Thus, the above-mentioned does not fully reflect the productivity of spring-autumn pastures of the studied territories. In our further studies it is considered expedient to carry out research on other regions as well.

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