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SCIENTIFIC BASES FOR THE USE OF SOME FODDER PLANTS DISSEMINATED IN HIGH MOUNTAINOUS AREAS IN NAKHCHIVAN

©*Mammadli T.*, Nakhchivan State University,
Nakhchivan, Azerbaijan, turan12beyemmed1948@gmail.com
©*Babayeva S.*, Nakhchivan State University, Nakhchivan, Azerbaijan
©*Bayramov B.*, Nakhchivan State University, Nakhchivan, Azerbaijan

НАУЧНЫЕ ОСНОВЫ ИСПОЛЬЗОВАНИЯ НЕКОТОРЫХ КОРМОВЫХ РАСТЕНИЙ, РАСПРОСТРАНЕННЫХ В ВЫСОКОГОРНЫХ РАЙОНАХ НАХИЧЕВАНИ

©*Маммадли Т. Б.*, Нахичеванский государственный университет,
г. Нахичевань, Азербайджан, turan12beyemmed1948@gmail.com
©*Бабаева С. Р.*, Нахичеванский государственный университет, г. Нахичевань, Азербайджан
©*Байрамов Б. С.*, Нахичеванский государственный университет,
г. Нахичевань, Азербайджан

Abstract. The presented article provides extensive information on the use of some fodder plants common in the high-mountainous flora of the Nakhchivan. As an object of research, the highlands of Sharur, Shahbuz, Julfa, Ordubad, Babek and Kengerli districts were mainly studied. The conducted research allows to define important features characteristic for fodder plants, widespread in these territories. Forage plants form the basis of direct connection between crop and livestock production. The investigated various fodder plants, besides being valuable fodders, have taken a wide place in production due to a number of positive economic and biological properties. For the purpose of research, chemical composition of fodder plants and their fodder qualities were determined. Also, the chemical composition of 38 important forage species belonging to different species distributed in the flora of Nakhchivan in the course of numerous research and studies conducted by us, in percentage ratio, as well as other uses of these species are mentioned in the article mentioned. Thus, the study of fodder plants distributed in high mountainous areas is considered as an important scientific basis for identifying the directions of utilization of these plants.

Аннотация. Дается обширная информация об использовании некоторых кормовых растений, распространенных в высокогорной флоре Нахичевани. В качестве объекта исследования в основном изучались высокогорья Шарурского, Шахбузского, Джульфинского, Ордубадского, Бабекского и Кенгерлинского районов. Проведенные исследования позволяют определить важные особенности, характерные для кормовых растений, распространенных на этой территории. Кормовые растения составляют основу прямой связи между растениеводством и животноводством. Исследованные кормовые растения, помимо того, что являются ценными кормами, заняли широкое место в производстве благодаря ряду положительных хозяйственно-биологических свойств. С целью исследования были определены химический состав кормовых растений и их кормовые качества. Также приводится химический состав 38 важных кормовых видов, распространенных во флоре Нахичевани в процентном соотношении, а также другие направления использования этих видов. Таким образом, изучение кормовых растений, распространенных в высокогорных

районах, рассматривается как важная научная основа для выявления направлений использования этих растений.

Keywords: forage, highland, substance, species.

Ключевые слова: корм, высокогорье, вещество, вид.

The chemical composition of fodder plants was studied for the purpose of the research. During the research, plant raw materials collected from the local flora were transferred to the chemical laboratory of the Ministry of Agriculture of Nakhchivan Autonomous Republic, and the fodder quality of plants was studied together with it. The results obtained are presented below [1, 3--7, 9, 11].

Nettle dicot — *Urtica dioica* species contains 8% chlorophyll, vaccinia, 0.6% vitamin C, formic, pantothenic acids, carotenoids, caffeic, ferulic and p-coumaric acids, histamine, acetylcholine and other substances have been found. The leaf contains 170 mg% ascorbic acid, 20 mg% carotene, vitamins B, K. In 100 g nettle contains 41 mg iron, 1.3 mg copper, 8.2 mg manganese, 4.3 mg boron, 2.7 mg titanium, 0.03 mg nickel and other substances present, which is high for a fodder plant. The first rosette leaves of *U. dioica* are harvested in early spring, i.e. March-April, and cooked into dishes. This plant is used by the local population for cooking roasts, qutab (Qutab is an Azerbaijani flat bread. It is in the shape of crescent and is filled with a variety of ingredients), dovga (Azerbaijani yogurt herbs soup). Also as a medicinal plant its leaves are used for gastrointestinal diseases, leaf juice — for urolithiasis and gallstone disease, clear infusion of leaves — for bleeding, etc. is used as [14].

Chaerophyllum bulbosum [L.](#) is an indispensable plant. Chemical analyses were carried out on the green above-ground part of the plant for use in fodder. The plant yielded 14.5-18% protein, 4-5% fatty oil, 12-13% non-nitrogenous extractives, more than 30% ash, 24.1% cellulose, and up to 3% total nitrogen.

Daucus carota [L.](#) root contains 2.0% fatty oil, sugar (4.5-15%), iron, phosphorus and calcium salts, trace elements — cobalt, copper, boron, iodine, etc. found. Essential oil is obtained from all organs of the plant. The amount of essential oil in the seeds is 7.5%. The main composition of the oil is geranyl acetate (60%) and geraniol (12-14%). The essential oil obtained from the root of the plant contains α - and β -pinene, aliphatic aldehydes of formic and acetic acid. The substance geraniol, obtained from the plant, has antibacterial activity.

Fodder qualities of *Heracleum trachyloma* were studied by S. S. Ibadullaeva [5, 6].

Pimpinella rhodantha Boiss., collected during the research in the upper mountain-forest belt of Shahbuz and Ordubad districts, in the flowering phase in meadows behind the forest, the chemical composition of the raw material of the plant contains 8-9% protein, more than 4% fat, 29% cellulose and more than 51% non nitrogenous extractive material. An essential oil of 0.4% was obtained from transparent false jeera. The plant is used as a food additive because of its aroma. The chemical composition of essential oil obtained from seeds and flowers of false jeera is known from literature.

Laser trilobum (L.) Borkh. ex G.Gaertn., B.Mey. & Scherb. is one of the plants whose essential oil we buy. The root of the plant yielded 0.18-0.21% of essential oil, while the stem yielded 0.26-0.30%. The maximum amount of essential oil was in the flower: 1.7-2.1%. The aromatic essential oil of the plant is emerald green in colour. The essential oil can be used against intestinal worms. The plant has been introduced into the local flora and has achieved good results. Therefore, it is considered appropriate to reintroduce the plant to pastures and hayfields.

Chamaescidium acaule (M. Bieb.) Boiss. It was collected and studied in different parts of Gunnut-Kapichik district. During the study period it contained 12.8% ash, 14.1% protein, 3.5% fat, 28.8% fibre and 40.8% nitrogen-free extractive matter. The above-ground part of *Malva sylvestris* contains about 22% protein, 15% protein, more than 6% fat, 48% nitrogen-free extractive substances and 13% fibre, which indicates the high fodder value of this plant [12].

It was found that in the flowering period *Galium tenuissimum* M. Bieb. contains 12% ash, 16.7% protein, 13.4% protein, 4.5% fat, 28.1% cellulose and 38.7% nitrogen-free extractives.

There is no information in the literature on either the fodder or medicinal value of *Stachys inflata* Benth. However, during the monitoring it was observed that the plant was eaten by sheep and goats on pastures in early spring and autumn, and during ethno botanical studies it was collected those villagers drank it as a medicinal tea for fever. Chemical composition (% by dry weight): ash 10.4%, protein 0.7%, protein 2.6%, fat 4.3%, cellulose 34.5%, nitrogen-free extractive substances up to 48%.

The plant is not eaten during certain phases of vegetation (beginning of flowering and fruiting). However, in early autumn it is eaten in sufficient quantity by cattle. Therefore, its fodder value has been studied. People boil and drink this plant for fever in animals, and the fever quickly subsides. A detailed study of the chemical composition of the plant is planned for the future.

Galium spurium L. has average fodder qualities by its chemical composition. Its chemical composition (% by dry weight): ash 11.1%, protein 10.7%, protein 9.6%, fat 2.3%, cellulose 24.5%, nitrogen-free extractive substances 51.9%. According to I.V. Larin et al. data, 100 kg of green mass of false dilgana contains 79.4 fodder units. At the beginning of the flowering period it is well eaten by cattle. The colouring substance is obtained from the root.

Large horse gall — *Arctium lappa* L. The green mass contains 87.4% water, 14.6% ash, 18.4% protein, 15.4% protein, 1.5% fat, 22.3% fibre, 43.2% nitrogen-free extractive substances. It also contains small amounts of alkaloids and essential oils.

Arctium transcasicum Sosn. ex Grossh. Its chemical composition is somewhat different from horse manure. It contains 14.4% ash, 11.5% protein, 9.7% protein, 4.1% fat, 25.7% fibre, 4.3% nitrogen-free extractive substances. The leaves contain 30 mg of vitamin C. An alkaloid has been found in its leaves and flowers. The root of the young plant contains 75% inulin, essential oil, sap and bitter substances.

It is used in folk medicine for a number of diseases. The plant contains inulin, protein, vaccines, phenolic acids, potassium, calcium, flavonoids, lignans, ascorbic acid, alkaloids, etc. There In its seeds was found arctiin, which is a lignan glycoside.

Artemisia lercheana Weber ex Stechm. According to the results of chemical analysis it was found that the green mass of the plant in the first period of vegetation contains 20-22% protein, 6-7% essential oil, 25-30% fibre and more than 40% of non-nitrogenous extractive substances.

Wormwood bitter - infusion and solid extract of the plant *Artemisia absinthium* L. has choleric, soporific and appetising properties, this property is widely used in folk medicine, α - and β -thujones, tulyl alcohol, etc. includes. The bitter flavour of wormwood is due to the bitter sesquiterpene lactones absinthine and anabsinthine [15].

Lanceolate leaf - samples of lanceolate leaves of *Plantago lanceolata* L. collected in April contained 12.8% ash, 18.4% protein, 5.8% oil, 11.0% cellulose and 52.2% non nitrogenous extractives.

Plantago major L. Plantain has been used as a medicine since ancient times. It is especially used between the hands to treat boils and closed purulent wounds on the skin. The plant has also been tested in scientific medicine. On examination of the literature, it is found that pectin substance is present in all the organs of the plant. The leaves contain saponins, aucubin and catalpol iridoid glycosides, acteoside and plantalosite. Up to 20 per cent of pectin substance is also found. Its seeds contain fatty oils, steroidal saponins, pectins, sugars and other found items. Other organs of the plant contain benzoin, salsyl, jasmine, chlorozene, cinnamon, coffee, etc. there are acids. Among flavonoids, quercetin, apizenin, shield baicalein and others are found. Medicines derived from plants are used in the treatment of diseases of the gastrointestinal tract, including acute and chronic gastritis, gastric and duodenal ulcers.

Achillea millefolium L. is a plant of high fodder value up to the flowering stage. The chemical composition of a sample of common oleander collected from an altitude of 2000 m at the budding stage (in % of absolute dry matter): ash — 13.5, protein — 19-55, fat — 3.90, fibre — 22.45, nitrogen, free extractive substances — 41.05%.

It is known from the literature that oleanders are essential oil plants. Besides being a common high-growing forage plant, it is also a flowering plant. Its composition is also rich in nutrients. Since it produces essential oil, it is used in the production of spirits and liqueurs. It is also used as a medicinal plant [10, 13, 30-34].

The seed contains 2.1 per cent fat. Even because of the pungent odour, animals are not very willing to eat it. However, the essential oils of these plants have antimicrobial properties, so adding colouring agents to dry grass will improve feed quality and protect animals from infectious diseases.

Achillea setacea Waldst. & Kit. in the flowering stage according to the chemical composition of absolute dry matter (in %): ash 7.25-21, protein 10.05-9.70, fatty oil 2.84-2.67, fibre 32.78-33.93 and nitrogen-free extractive substances. found 47.06-44.79, which is a satisfactory indicator from the forage point of view [8].

Stephen's bitter gourd — *Taraxacum stevenii* (Spreng.) DC. The amount of protein in bitter gourd harvested in Shahbuz district is 18.7-25.0%, fibre — 14.8-26.5%. It is moderately eaten by animals.

Hairy dock — *Leontodon hispidus* L. develops very quickly after grazing, chemical analysis shows that during the vegetation period this plant contains 18.6% protein, 13.8% protein, 14.7% ash, 18.8% cellulose, 3.8% oil, 44.1% nitrogen-free extractive substances. According to some literature, the protein content is higher.

From the study of the chemical composition of Caucasian geranium — *Geranium albiflorum* Ledeb. species, it can be seen that it contains about 11% protein, about 3% fat and about 30% fibre. These indicators show that white geranium is a valuable fodder plant.

The stem and leaves of *Doronicum macrophyllum* Fisch. ex Hornem. and *Doronicum oblongifolium* DC. contain 5.7-5.8% oil, the same as *Doronicum oblongifolium*. The chemical composition of leaves and stems of *Doronicum oblongifolium* shows that the leaves have 2.2 times more ash, 2 times more protein and 2.5 times less fibre than the stem of the plant. The amount of fatty oils in the leaves and stems of the plant is the same. This plant is readily eaten by animals [2].

The fresh leaves of *Helianthemum lasiocarpum* Jacques & Herincq taste like fresh cucumber and are used in cooking. Its roots and leaves contain vaccines. During the flowering period, 61.9 mg% of vitamin C was found in mulberry leaves.

Chemical analysis of the sample collected in the flowering phase of *Centaurea cheiranthifolia* var. *purpurascens* (DC.) Wagenitz shows that it contains (by absolute dry matter) 8.5% ash, 12.3% protein, 3.2% fat, 27.6% cellulose and 49.3% non-nitrogenous extractive substances.

Galium verum L. in the flowering onset phase contained 10.4% ash, 13.8% protein, 3.5% oil, 30.3% cellulose and 42% non nitrogenous extractives. It has medium fodder qualities as compared to true dilganada in these respects. It contains 173 mg% vitamin C at the beginning of the flowering period and 33.5 mg% at the end of flowering.

In the vegetation stage of the field sedge *Cirsium arvense* (L.) Scop. it contains 82-87% of water. In young plants the amount of protein is high and fibre is low. The plant raw material contained 8.1% protein, 28.4% cellulose, 10% ash, 6.1% oils and 47.4% non-nitrogenous extractive substances. The plant contains vitamins C and A. Foreign literature indicates that wild gooseberry contains the alkaloid sirzin. The seeds of the plant contain 2.72% oil.

The dried herb of *Campanula rapunculoides* L. bellflower contained 9.9% ash, 11.3% protein, 2.9% cellulose and 51% non nitrogenous extractives. It was observed that the leaf contained 108 mg% vitamin C.

The dried herb of three-toothed bellflower contains 10% ash, 13.5% protein, 4.9% fat, 20.6% fibre, 51% non nitrogenous extractives. It is well and sometimes perfectly eaten by large and small horned animals as green and dry grass on pasture.

Capsella bursa-pastoris (L.) Medik. is a plant eaten by the local population. Bird is eaten raw, soaking it in weak vinegar. In folk medicine, decoction of the plant is drunk for uterine bleeding and

uterine atony, good results are obtained. It contains phylloquinone, ascorbic acid, fumar, malic acid, citric acid, diosmin, rutin, flavonoids, choline, acetylcholine, tyramine, histamine amines. Medicines derived from plants are used to dilate blood vessels, reduce blood pressure, etc. is used in diseases [2].

Field horsetail — infusion and wet extract of *Rumex confertus* Willd. in medicine for colitis, enterocolitis, babacillin, rectal fissures, etc. is used in diseases. Sources indicate that up to 4% of anthraquinone derivatives are collected in the roots of the plant. In addition, its raw materials contain caffeic acid, resins, phylloquinone, flavonoid nepodine, etc. are available.

Rumex alpinus L. is one of the species whose chemical composition has been studied. 220s in the flowering phase. gives up to Feed unit of 1 kg of plant is 0.25, protein — 28g, Ca — 2.9g, P — 0.65g. In addition, the plant is rich in vitamin C. Infusion and liquid extract of avicular highlander are effective in uterine bleeding, inflammation of the uterus, papillary haemorrhage, etc. is used in diseases. The above-ground part of the plant contains flavonoid avicularin, silicon compounds, carotene, ascorbic acid, vaccine substances, etc.

Bistorta carnea (K. Koch) Kom. species was introduced by us as a fodder plant in the experimental farm of the Institute of Bioresources of Nakhchivan branch of ANAS. When the plant reaches 164-167 cm in height, it is recommended to be supplied for silage. The plant is rich in protein. It has been established that the chemical composition of the sample collected from subalpine meadows of Ordubad district in the flowering phase of eastern mountain grass — *Bunias orientalis* L. contains more than 18% protein, more than 2% fat and more than 42% non nitrogenous extractive substances, 30.4% cellulose.

It was found that the plant has high fodder qualities until the flowering stage, and at this time its chemical composition (in % of absolute dry matter) is protein 2.5 %, nitrogen — free extractive substances 49.6%, fibre 28.5% and ash 7.2%. The green leaves of the plant contain a large amount of vitamin C and the seeds contain oil. The leaves and pods are eaten raw or cooked. It is a good flowering plant.

Common oregano — *Origanum vulgare* L. The green mass of the plant contains up to 1.2% essential oil. Its main components are phenol, thymol and its isomers. In some regions, the sweet-smelling blackberry plant is also called gilermarza. Guilmarza is especially used as a food additive for meat dishes. It is also used for medicinal purposes. A decoction of the herb is used as an expectorant for acute and chronic bronchitis. It also contains ascorbic acid, colouring agents and pigments.

Thus, the above-mentioned flora of the Nakhchivan Autonomous Republic does not fully reflect forage plants distributed in the high mountains. In our further studies other fodder plants distributed in the mentioned territories will be comprehensively studied.

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