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## ETHNOBOTANICAL, BIOECOLOGICAL AND PHYTOCOENOLOGICAL ANALYSIS OF SPECIES OF THE GENUS *Chenopodium* L. IN ARID ZONES OF AZERBAIJAN

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## ЭТНОБОТАНИЧЕСКИЙ, БИОЭКОЛОГИЧЕСКИЙ И ФИТОЦЕНОЛОГИЧЕСКИЙ АНАЛИЗ ВИДОВ РОДА *Chenopodium* L. В АРИДНЫХ ЗОНАХ АЗЕРБАЙДЖАНА

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*Abstract.* The research was carried out in the arid regions of Azerbaijan in 2021-2023. The main goal of the research was to provide a bioecological and phytocoenological analysis of species of the genus *Chenopodium*, widespread as a weed plant, in the composition of coenosis, and to reveal the possibilities of use based on ethnobotanical surveys among the population. Floristic, phytocoenological, ethnobotanical methods were used during the research. It was determined that 15 species of the genus in Azerbaijan flora are more widespread in the plains and mid-mountain belt, mainly in the desert, semi-desert steppe vegetation, and in cultivated areas. During the surveys conducted among the local population, it became clear that only 10 species of the genus are used, of which 5 species are used only as wild vegetables, 3 species are used only for treatment in folk medicine, and one species — *Chenopodium album* is used by the population both as a medicinal plant and as a vegetable plant. It has been recorded that one species (*Chenopodium foliosum*) of the genus is used as a dye plant.

*Аннотация.* Исследования проводились в засушливых регионах Азербайджана в 2021–2023 годах. Основная цель исследований состояла в том, чтобы провести биоэколого-фитоценологический анализ видов рода *Chenopodium*, широко распространенных как сорные растения, в составе ценозов и выявить возможности использования на основе этноботанических обследований среди населения. При исследованиях использовались флористический, фитоценологический, этноботанический методы. Определено, что 15 видов рода во флоре Азербайджана более распространены на равнинах и среднегорном поясе, преимущественно в пустынной, полупустынной степной растительности, а также на окультуренных территориях. В ходе опросов, проведенных среди местного населения, выяснилось, что используются только 10 видов рода, из которых 5 видов используются только как дикорастущие растения, 3 вида используются только для лечения в народной медицине и один вид — *Chenopodium album* используется населением и как лекарственное, и как овощное растение. Было зарегистрировано, что один вид (*Chenopodium foliosum*) этого рода используется в качестве красильного растения.

**Keywords:** *Chenopodium*, arid zones, bioecology, phytocoenological analysis.

**Ключевые слова:** марь, аридные зоны, биоэкология, фитоценологический анализ.

In recent times, ethnobotanical studies towards discovering plants with food, medicine, fodder and other useful properties have become widespread. Ethnobotany is based on knowledge about plants that people have experimented with for many years. The collection and evaluation of this knowledge is important for the application of plants in various fields of industry.

280 species of the genus *Chenopodium* are distributed in the world flora. However, the taxonomic status of 221 of these species has been fully specified, while the status of the others has remained uncertain (<http://www.worldfloraonline.org>). In the territory of the republic, 14 species and 8 variations belonging to the genus *Chenopodium* were found in the “Flora Azerbaijan” [4], and 15 species [2] in recent studies.

It can be noted that the ethnobotanical use of species of the genus *Chenopodium* as wild vegetables, fodder and medicine has a long history and is of special importance [5; 6]. There is information about the presence of phenolic compounds, saponins, terpenes, and sterols in most species of the genus [7; 9]. This shows that plants can be used as antimicrobial, antiviral, antifungal, anthelmintic, antioxidant, immunomodulatory, etc. in the future [3].

The main purpose of the research was to reveal the ethnic usage methods of species of the *Chenopodium* genus widespread in the flora of Azerbaijan, and to analyze their bioecological and phytocenological characteristics.

#### *Materials and methods of research*

The research work was conducted in Tartar, Barda, Agjabedi, Shamkir, Zardab, Ujar and Samukh districts in 2021-2023. 256 specimens belonging to the genus *Chenopodium* in the Herbarium Fund of the Institute of Botany, MSE RA were analyzed, and their records were collected in the EXCEL program. Floristic and taxonomic analyses, geobotanical studies were conducted with reference to classical and modern fundamental works [10]. Life forms of plants were determined according to C. R. Raunkiaer [11] and T. I. Serebyakov [12], and ecological groups according to A. R. Shennikov [13].

Ethnobotanical studies were regularly conducted among the local population by questionnaire survey method. Data collected through direct interaction with local people and observations during visits were summarized [8]. Group meetings were held with people who had sufficient knowledge of local plants, and individual meetings were arranged with healers and plant sellers in villages to verify information.

#### *Results and their discussion*

During the expeditions, it was found that 15 species of *Chenopodium* genus are more widespread in the plain and middle mountain belt (photo). Most of the species are found as weeds in cultivated fields, roadsides, forestless arid areas, and pastures. The main plant groupings in which the species of the genus are distributed form coenoses as a dominant and subdominant in the *Glycyrrhiza glabra* - *Chenopodium foliosum* + *Artemisia szowitziana*, *Salsola dendroides* - *Artemisia meyeriana*-herbsetum, *Palirus spina christi* + *Salsola dendroides* – *Lactuca serriola* - *Chenopodium album*, *Glycyrrhiza glabra* + *Alhagi pseudoalhagi* - *Chenopodium album*, *Chenopodium album* + *Dysphania botrys* + *Medicago minima* + *Chenopodium vulvaria*, *Artemisia lerchiana* - *Chenopodium album* - *Hordeum leporinum* associations within tamarisk-saltwort-

camelthorn (*Tamarixeta-Salsoletum-Alhagiosum*), wormwood-saltwort-licorice (*Artemisieta-Salsoletum-Glycyrrhosum*), ephemeral - herbs (*Ephemereta-herbosae*) formations in deserts and semi-deserts, steppe vegetation.



Figure. The map scheme of the occurrence areas of species of the genus *Chenopodium* L. distributed in the territory of the Republic

During surveys among the local population it became clear that only 10 species of the genus have ethnic use (Table).

On the basis of ethnobotanical surveys conducted among the local population, it was found that young leaves and shoots of *Chenopodium album* L., *Ch. rubrum* L., *Ch. polyspermum* L., *Ch. murale* L., *Ch. urticum* L., *Ch. ambrosioides* L. species are used as food and also added to animal feed. The results of the surveys showed that the local population is little aware of the medicinal use of goosefoot species. Information has been collected that only *Chenopodium album* L., *Ch. vulvaria* L., *Ch. botrys* L., *Ch. hybridum* L. species have anthelmintic, anti-rheumatism and anti-cold effects (<http://www.worldfloraonline.org>).

*Chenopodium album* species is widely distributed in the territory of the republic from the lowlands to the middle mountain belts as a weed plant in gardens, orchards, plantations, roadsides, unused places, riverbeds, landfills.

*Ch. urticum* is found mainly in the plains, and in some cases in the mid-mountain belts in orchards, roadsides, and weedy areas.

*Ch. botrys* species is distributed almost everywhere in the republic, in lowlands, lower and middle mountain belts, at an altitude of up to 1800 m above sea level, in dry gravelly river beds, even in weedy areas and sandy areas.

*Ch.polyspermum* species is found in the territory of the republic mainly in lowlands and lower mountain belts, river plantations, orchards, forest clearings.

*Ch.hybridum* is found in orchards and weed areas from the plains to the mid-mountain belts.

*Ch.rubrum* species occurs in lower mountain zones, pasture areas in lowlands.

Table

BIOECOLOGICAL CHARACTERISTICS OF ETHNICALLY USED SPECIES  
 OF THE GENUS *Chenopodium* L.

Latin and Azerbaijani name of the plant	Life forms		Ecological groups (according to Shennikov)	Distribution by belts	Methods of use
	Serebyakov system	Raunkiaer system			
<i>Chenopodium album</i> L.- lambsquarter goosefoot	I	Th	X	P-MH	In folk medicine, a decoction and essence made from the roots and leaves of the plant is also used as a laxative, pain reliever, diuretic and expectorant. Young leaves and shoots of the plant are used as wild vegetables.
<i>Ch. botrys</i> L. – Jerusalem oak goosefoot	I	Th	X	LH-MH	A decoction made from the plant is used for headaches, colds and viral diseases, and also as an anthelmintic.
<i>Ch.foliosum</i> Aschers. – multifoliate goosefoot	Pere n. herb	Hc	X	P-HH	Red dye is obtained from the above-ground part of the plant
<i>Ch. polyspermum</i> L. – many-seeded goosefoot.	I	Th	Ms	P-LH	Young leaves as spinach or sparrowgrass are used in the preparation of dishes
<i>Ch. vulvaria</i> L. – stinking goosefoot.	I	Th	X	P-MH	Used in folk medicine for rheumatism, colds and nervous diseases.
<i>Ch. urbicum</i> L. – city goosefoot	I	Th	Ms	P-MH	After sweating, the young leaves and shoots of the plant are filtered and used instead of spinach in the preparation of roasts, dovga, puree, kata and other dishes
<i>Ch.rubrum</i> L. – red goosefoot	II	Th	X	P-MH	In some regions, young plants are used to prepare salad and borsch
<i>Ch.hybridum</i> L. – maple-leaved goosefoot	I	Th	X	P-MH	In folk medicine, infusions prepared from the above-ground part are used for treatment of cough, gastrointestinal diseases, diarrhea, arthritis, as well as in the treatment of eczema and wounds on the skin.
<i>Ch.murale</i> L.– nettle-leaved goosefoot	I	Th	XMs	P-MH	Young leaves are used for salads
<i>Ch.ambrosioides</i> L. – wormseed goosefoot	Pere n. herb	Hc	Ms	P-MH	The use of the species as a vegetable is possible only in the young vegetative period

Note: Th-therophyte; Hc-hemicryptophyte; Ms-mesophyte; X-xerophyte; XMs-xeromesophyte; P-plain; HH- high highlands; MH- middle highlands; LH- low highlands

*Ch.ambrosioides* is found in lowlands, sandy and weedy areas. In our republic, it is not used in folk medicine among the local population, but in several countries of the world it is used as an anthelmintic in the treatment of intestinal diseases, especially in worm diseases. Even essential oil is used in perfumery [1]. In West Africa, Nigeria, Senegal, Ghana, and Cameroon, the plant is used as

a tea, poultice, and infusion in folk medicine for inflammatory processes, as purgative in lung infections, pain reliever, and antifungal agent [9].

*Ch.foliosum* species is a very valuable dye plant. The species is found in dry riverbeds, weed areas, pastures and roadsides from lowlands to high mountain belts.

*Ch.vulvaria* is distributed in almost all regions of the republic, from the lowlands to the middle mountain belts, in the weedy areas, in orchards, in gardens, and in riverbeds.

*Ch.murale* is found in weed areas and roadsides in orchards from the lowlands to the mid-mountain belts.

As a result of ethnobotanical studies, it was found that 5 species of the genus *Chenopodium* are used only as wild vegetables, 3 species only for the purpose of treatment in folk medicine, and one species - *Chenopodium album* is used by the population as both a medicinal plant and a vegetable plant. One species of the genus is recorded as a dye plant (*Chenopodium foliosum*).

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