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Ethnobotany

Results of Ethnobotanical Research Conducted on the Summer Pastures of the Ajara-Imereti, Arsiani, and Ajara-Shavsheti Ranges

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(Presented by Academy Member Vano Papunidze)

Abstract. This paper presents the results of ethnobotanical research carried out between 2022 and 2024 on the summer pastures of the Ajara-Imereti, Arsiani, and Ajara-Shavsheti Ranges. Ethnobotanical Research has been conducted in only a few villages in Ajara: Keda, Shuakhevi, and Khulo municipalities (Merisi, Uchkhiti, Dologani, Chvana, Gogadzeebi, Gomarduli, Pachkha). Our study represents the first systematic investigation into the species diversity of plants utilized by the population across the aforementioned mountain ranges. The aim of this research was to study the species diversity and utilization patterns of plants used by the population on the summer pastures of the Ajara-Imereti (Gomis Mta, Ghorjomi, DidAjara), Arsiani (Tetrobi, Ghmachala, Baricholo, Ghmani, Tsiplnari, Shuamta, Sari-Chairi), and Ajara-Shavsheti (Chirukhi, Velatebi, Macharelatebi) ranges. The study involved processing the obtained data, identifying the most frequently used species, investigating their phytochemical composition, and conducting phytocoenological research on their populations. Fieldwork conducted revealed that the population utilizes 70 species of wild flora on these pastures, including: 51 for medicinal purposes, 22 for food, 3 for construction, 3 for firewood, 6 for weaving, and 2 for dyeing. The four most frequently used species are: *Helichrysum graveolens* (Bieb.) Sweet, *Helichrysum plicatum subsp. polyphyllum* (Ledeb.) P.H.Davis & Kupicha, *Origanum vulgare* L., and *Thymus transcaucasicus* Ronniger. Among these, the populations of the rare species *Helichrysum graveolens* were studied and evaluated. Phytochemical screening was performed on the dried leaves and flowers of *Origanum vulgare*. Phenols, phenolic acids and flavonoids were isolated, their retention times on chromatograms were evaluated. © *2026 Bull. Natl. Acad. Sci. Georg.*

Keywords: Ajara, ethnobotany, summer pasture, plant use

Introduction

Ajara is one of the most distinguished regions in the Caucasus in terms of floral diversity and species richness per unit area, a result of its geographical location and climato-edaphic factors. It is bordered by the Lesser Caucasus and the Ajara-Trialeti mountain systems to the north, east, and south, while remaining open to the Black Sea to the west.

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Proximity to the sea results in high humidity and a warm climate (Kordzakhia, 1961). This floral diversity is particularly evident in Upper Ajara, where vegetation from forest, subalpine, and alpine zones is found.

Traditional ethnobotanical knowledge is best preserved among the elderly population of Upper Ajara (Bidzinashvili, 2011). While traditional ethnobotanical knowledge is still preserved in these areas, it remains vulnerable and is maintained by only a small portion of the population. as they typically do not induce allergies, chronic toxicosis, or teratogenic, mutagenic, and carcinogenic processes. Ethnobotanical issues are becoming increasingly relevant in the scientific community. Despite the abundance of synthetic drugs, the demand for plant-based raw materials is rising. The World Health Organization (WHO) recognizes the immense importance of centuries-old ethnobotanical experience (Bidzinashvili & Eradze, 2021). Ethnobotanical studies were carried out in some villages of Upper Ajara in 2020-21 (Bussmann et al., 2020) (Kazancı et al., 2021).

Materials and Methods

The research utilized methods of route expeditions, ethnobotanical surveys, and interviews. Species identification was carried out using Plants of Georgia Directory (Plants of Georgia Directory, 1964-1969) and the Guide to Plants of Ajara (Dmitrieva, 1990). Herbarium specimens were collected and are deposited in the Batumi Botanical Garden Herbarium (BATU). Latin names of plants follow the World Flora Online (World Flora Online, 2025) nomenclature. Population diversity and phytocoenological studies were conducted using the transect and quadrat methods. To study species frequency and coverage within the quadrats, the *Braun-Blanquet* scale was applied (Asanidze and Batsatsashvili, 2019) (Braun-Blanquet Survey Methods, 2024) The screening of *Origanum vulgare* for bioactive compounds was performed through qualitative reactions and thin-layer chromatography (flavonoids were studied using the \bm{AlCl_3} method at 510 nm; total phenols via the Folin-Ciocalteu method at 750 nm) (Wagner and Bladt, 2003) (Vachnadze et al., 2012).

Results

Based on the research, it was determined that inhabitants of the summer pastures utilize 70 species of wild flora, belonging to 58 genera within 29 families. Among the species used: Medicinal (51 species, 59%): 10 for cardiac issues, 4 as sedatives, 8 for the digestive system, 12 for kidney and urinary tract issues, 8 for colds and flu, 14 for skin diseases (wounds, warts, etc.), and 2 for malignant tumors; Food (23 species, 25%): 6 as potherbs (mkhaleuli), 3 for pickling, 7 for tea, and 7 for preserves and jams; Other uses: 3 for construction (3%), 3 for firewood (3%), 6 for weaving (7%), and 2 for dyeing (2%). The results are summarized in Fig. 1.

Of the studied species, 63 are gathered from forests and meadows, while 7 species are cultivated.

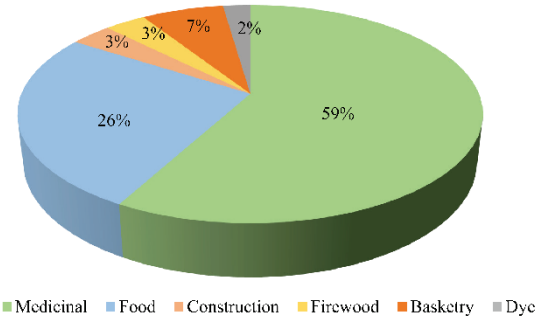

Fig. 1. Distribution of plants by usage.

Among the studied species, four are most widely used: *Helichrysum graveolens*, *H. plicatum subsp. polyphyllum*, *Origanum vulgare*, and *Thymus transcaucasicus*. According to the Guide to Plants of Ajara (Dmitrieva, 1990), *Helichrysum graveolens* is of rare occurrence. Its population status was assessed using transect and quadrat methods, applying the Braun-Blanquet scale for

Table 1. Species diversity of the *Helichrysum graveolens* population (2022)

Population	*Helichrysum graveolens*	
Quadrat №	**1**	
Quadrat size	1X1 m	
Observation period	06.08.2022	
GPS	N 41°29'44.956 E 42°30'27.156	
Altitude /m/	h=2102 მ	
Projective cover	100 %	
Species list (1X1m)	*Helichrysum graveolens*	4
	Cirsium hypoleucum	2
	Cirsium imereticum	2
	Alchemilla oxysepala	5
	Rumex sp.	+
	Geranium asphodeloides	+
	Trifolium pretense	2
	Clinopodium umbrosum	3

Table 2. Species diversity of the Helichrysum graveolens population (2023)

Population	*Helichrysum graveolens*	
Quadrat №	**1**	
Quadrat size	1X1 m	
Observation period	12.08.2023	
GPS	N 41°29'44.956 E 42°30'27.156	
Altitude /m/	h=2102 მ	
Projective cover	90 %	
Species list (1X1m)	*Helichrysum graveolens*	4
	Achillea setacea	+
	Poa annua	2
	Alchemilla oxysepala	5
	Sibalddia parviflora	+
	Geranium asphodeloides	+
	Trifolium pretense	2
	Clinopodium umbrosum	3

Table 3. Species diversity of the Helichrysum graveolens population (2024)

Population	*Helichrysum graveolens*	
Quadrat №	**1**	
Quadrat size	1X1 m	
Observation period	21.08.2024	
GPS	N 41°29'44.956 E 42°30'27.156	
Altitude /m/	h=2102 მ	
Projective cover	100 %	
Species list (1X1m)	*Helichrysum graveolens*	5
	Leucanthemum vulgare	+
	Poa annua	2
	Achillea setacea	3
	Poa pratensis	+
	Prunella vulgaris	+
	Trifolium pretense	2

coverage. Descriptions were conducted in pre-marked undisturbed areas where harvesting of the inflorescences did not occur. Thirteen species of herbaceous plants were recorded within the *Helichrysum graveolens* community. Observations from 2022–2024 showed that the number of individuals increased over the years, suggesting that this species is not currently threatened with extinction (Tables 1, 2, 3).

Screening of the leaves and flowers of *Origanum vulgare* for biologically active compounds was conducted at the Regional Chromatographic Center of Western Georgia Under the supervision of Professor A. Kalandia. Qualitative and quantitative analyses revealed that the leaves and flowers of the studied species contain phenols, phenolic acids, and flavonoids (Figs. 2, 3).

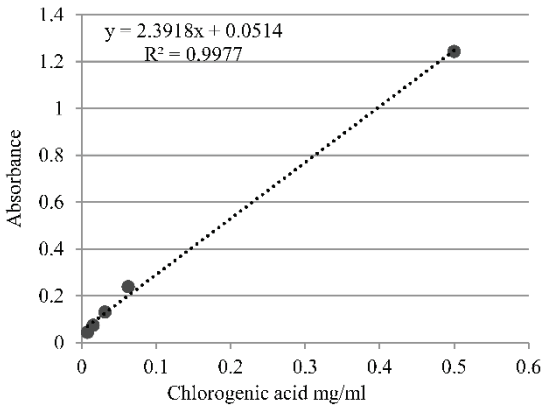

Fig. 2. Total phenolics (With Folin Ciocalteu reagent)-clorogenic acid calibration curve.

Fig. 2 presents the calibration curve for total phenols using the Folin-Ciocalteu reagent. A clear linear relationship (\bm{R^2 = 0.9977}) exists between chlorogenic acid concentration and optical density, confirming the reliability of the method. Fig. 3 shows the calibration curve for flavonoids (Aluminum Chloride method) using a quercetin standard (\bm{R^2 = 0.9992}), confirming high precision. Based on calculations obtained from calibration curves, the content of biologically active compounds in the samples was determined, and the numerical results are presented in Table 4.

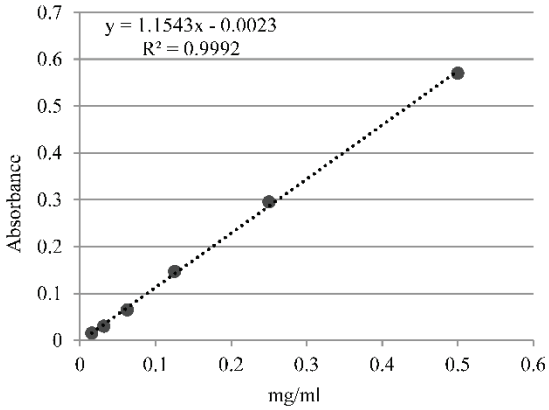

Fig. 3. Flavonoids (With ALCL3 reagent) – quercetin calibration curve**.**

The results indicate that Origanum vulgare leaves possess a higher content of total phenols (79.77%), phenolic acids (9.284%), and flavonoids (68.88%) compared to the flowers. This difference is reflected in antioxidant activity, with leaf extracts showing lower \bm{IC_{50}} values in both DPPH (1.15) and ABTS (1.28) tests. Phenolic compounds play a significant role in the antioxidant action of *Origanum vulgare*, marking it as a rich source of bioactive compounds.

Table 4. Phytochemical content of Origanum vulgare

Sample name	Total phenolics mg/g	Phenolic acids mg/g	Flavonoids mg/g	50% DPPH radical inhibition mg/sample)	50% ABTS radical inhibition mg/sample)
Leaf	79.77	9.284	68.88	1.15	1.28
Flower	6.75	2.811	12.79	6.16	25.67

Conclusions

In the studied summer pastures of the Ajara-Imereti (Gomis Mta, Ghorjomi, DidAjara), Arsiani (Tetrobi, Ghmachala, Baricholo, Ghmani, Tsiplnari, Shuamta, Sari-Chairi), and Ajara-Shavsheti (Chirukhi, Velatebi, Macharelatebi) ranges, inhabitants utilize 70 species of wild flora (58 genera, 29 families). These are primarily used for medicine, food, construction, fuel, weaving, and dyeing.

The most frequently used species were identified as *Helichrysum graveolens*, *Helichrysum plicatum subsp. polyphyllum*, *Origanum vulgare*, and *Thymus transcaucasicus*. While *Helichrysum graveolens* is rare, its population within its community (comprising 13 associated species) has shown an upward trend in numbers. Our data suggests the species is not currently facing an extinction threat.

Screening of *Origanum vulgare* confirmed high levels of phenols, phenolic acids, and flavonoids with significant antioxidant properties, establishing the plant as a valuable source of bioactive compounds.

ეთნობოტანიკა

აჭარა-იმერეთის, არსიანის და აჭარა-შავშეთის ქედების საზაფხულო საძოვრებზე ჩატარებული ეთნობოტანიკური კვლევის შედეგები

მ. დარჩიძე*, დ. ხარაზიშვილი*, ნ. ვარშანიძე*, ნ. მემიაძე**, ნ. ჯიჯავაძე**

** ბათუმის შოთა რუსთაველის სახელმწიფო უნივერსიტეტი, საბუნებისმეტყველო მეცნიერებათა და ჯანდაცვის ფაკულტეტი, ბიოლოგიის დეპარტამენტი, ბათუმი, საქართველო*
*** ბათუმის ბოტანიკური ბაღი, ადგილობრივი ფლორის და კონსერვაციის განყოფილება, ბათუმი, საქართველო*

(წარმოდგენილია აკადემიის წევრის ვ. პაპუნიძის მიერ)

ნაშრომში წარმოდგენილია აჭარა-იმერეთის, არსიანის და აჭარა-შავშეთის ქედების საზაფხულო საძოვრებზე 2022-2024 წლებში განხორციელებული ეთნობოტანიკური კვლევის შედეგები. ეთნობოტანიკური კვლევები აჭარაში მხოლოდ ქედის, შუახევისა და ხულოს მუნიციპალიტეტების ზოგიერთ სოფელში (მერისი, უჩხითი, დოლოგანი, ჭვანა, გოგაძეები, გომარდული, ფაჩხა) ჩატარდა. წარმოდგენილი ნაშრომის მიზანი იყო აჭარა-იმერეთის (გომის მთა, ღორჯომი, დიდაჭარა), არსიანის (თეთრობი, ღმაჭალა, ბარიჭოლო, ღმანი, წიფლნარი, შუამთა, სარი-ჩაირი) და აჭარა-შავშეთის (ჩირუხი, ველათები, მაჭარელათი) ქედების

საზაფხულო საძოვრებზე მოსახლეობის მიერ გამოყენებული მცენარეების სახეობრივი მრავალფეროვნების და გამოყენების თავისებურებების შესწავლა. კვლევა მოიცავდა მიღებული მონაცემების დამუშავებას, ყველაზე ხშირად გამოყენებული სახეობების გამოვლენას, მათი ფიტოქიმიური შემცველობისა და პოპულაციების ფიტოცენოლოგიურ შესწავლას. საველე სამუშაოების შედეგად გამოვლინდა, რომ საკვლევ იალაღებზე მოსახლეობის მიერ ველური ფლორის 70 სახეობა გამოიყენება, მათ შორის, 51 სამკურნალოდ, 22 საკვებად, 3 სამშენებლოდ, 3 საშეშედ, 6 საწნავად, 2 საღებავად. ყველაზე ხშირად 4 სახეობა გამოიყენება, ესენია: *Helichrysum graveolens* (Bieb.) Sweet, *Helichrysum plicatum subsp. polyphyllum* (Ledeb.) P.H.Davis & Kupicha, *Origanum vulgare* L. და *Thymus transcaucasicus* Ronniger. მათ შორის შესწავლილი და შეფასებულია იშვიათი სახეობის *Helichrysum graveolens*-ის პოპულაციები. ფიტოქიმიური სკრინინგი ჩატარდა *Origanum vulgare*-ს გამომშრალ ფოთლებსა და ყვავილებზე. გამოყოფილ იქნა ფენოლები, ფენოლკარბონმჟავები და ფლავონოიდები, შეფასებულია მათი ქრომატოგრამაზე შეკავების დრო.

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