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Biomorphs and ecological groups of the wild ornamental flora in the Northern-Eastern part of Azerbaijan (South Caucasus) with a focus on Guba-Gusar region

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Abstract: The article characterizes the biomorphological and ecological properties of wild ornamental plants in the Guba-Gusar region of the Greater Caucasus. The analysis of the biomorphological spectrum revealed 51 species (29.6%) of rhizomatous polycarpics, 20 species (11.6%) of taproot monocarpics, 9 species (5.3%) of taproot polycarpics, 4 species (2.3%) of rhizomatous monocarpics, 19 species (11.1%) of tuber-root polycarpics, 20 species (11.6%) of bulbous polycarpics, 22 species (12.8%) of fibrous monocarpics, 8 species (4.6%) of trees, 10 species (5.8%) of shrubs, 5 species (2.9%) of tall shrubs or low-growing trees, 4 species (2.4%) of shrubby liana. Also registered are groups of biomorphs by the position and method of protecting renewal buds in an unfavorable period (cold or dry), including phanerophytes (28 species, 16.2%), hemicryptophytes (65 species, 37.8%), cryptophytes (57 species, 12.8%), therophytes (22 species, 12.8%). Among the ecological groups, the mesophytes dominated with 123 species (71.6%). In the flora of the Guba-Gusar region, three invasive species *Ailanthus altissima* (Simarobuaceae), *Robinia pseudoacacia* (Fabaceae) and *Acalypha australis* (Euphorbiaceae) occur, two of which, *A. altissima* and *R. pseudoacacia*, we supposed as intentionally introduced due to their decorative properties.

Keywords: *cenoses, ecological group, heliophytes, life form, mesophytes, sciliophytes, xerophytes*

INTRODUCTION

Biodiversity is a complex concept that includes genetic, taxonomic, phylogenetic, and ecological aspects. However, species richness, which is just one dimension of biodiversity, has become the most widely used measure of biodiversity and its changes [Hillebrand et al., 2017]. Understanding the diversity and distribution of plants and fungi is crucial for developing effective conservation and restoration strategies, as well as evaluating the effects of climate change and human activities [Stohlgren et al., 2005; Antonelli et al., 2024]. The plant environment consists of a combination of abiotic and biotic stresses, and plant responses to these stresses are equally complex. Climate change also affects plants and contributes to the dynamics of their development. It has been shown to provoke a range of ecological responses, notably rapid shifts in plant distribution, often moving poleward and to higher elevations in response to temperatures. Nevertheless, it is still unclear whether the shifts in plant distribution are accompanied by corresponding changes in their climatic niches [Oishy et al., 2025]. Also, critical gaps remain in our understanding of how climate change affects soil and plant dynamics, particularly regarding the long-term consequences of extreme weather on soil structure, porosity, and microbial interactions [Gelybo et al., 2018].

With the acceleration of globalization, many plant species have moved away from their natural habitat without human intervention and formed persistent populations outside [Pyšek et al., 2004; Ren et al., 2009; Guisan et al., 2017; Zang et al., 2022]. The vast majority of these species pose no ecological or economic threat and some of them have received the status of invasive species.

Wild ornamental species are plants that grow in the wild, have decorative qualities such as bright flowers, interesting foliage, or attractive fruits. These plants do not require special care from humans and can be used for landscaping and landscape design of territories [Seitz et al., 2022]. This plant group includes trees, shrubs, herbs (perennials, biennials, annuals, and geophytes).

In the last ten years, wild flowering herbs have gained growing interest, and their potential for use as ground cover and landscaping has been extensively

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studied [Rey et al., 2019, Shulkina, 2022]. Indeed, natural lawns are more suitable for creating a landscape, are aesthetically pleasing, and require relatively little maintenance [Akdeniz, Yener, 2013]. They also help prevent the growth of unwanted weeds.

A key objective in bioecology and biomorphology is to understand the patterns of species abundance both within local plant communities and across broader geographic areas. It is well known that biomorphs are formed under specific environmental conditions, and their great diversity is the result of long-term evolution. According to I.G. Serebryakov [1964] the habitus develops in soil and climatic conditions as an expression of the plant adaptation to these conditions. Therefore, in our study, we chose an approach that characterizes not only the above-ground, but also the underground habitus of plants, as a indication of adaptation to soil conditions. [Serebryakov, 1962]. The identification of life forms taking into account the root system is also important. The root system of plants, as well as their above-ground part, performs an adaptive function of plant development [Krylov, 1984]. By extending both vertically and horizontally through soil layers, it facilitates the absorption of essential minerals, moisture, and nutrients [Prokopyev, 2001]. The composition of biomorphs within a specific flora indicates the living conditions of plants, with a shift in the ratio of biomorphogroups in the biomorphological spectrum reflecting greater adaptability of life forms to various living conditions.

Ecological indicator values are the most widely used and generally effective approach for habitat assessment [Zolotova et al., 2023]. In phytoindication, researchers frequently focus on ecological groups, which are defined as a collection of species with similar requirements for a particular ecological factor and comparable traits that have developed as a result of its influence on plant evolution. Ecological groups are distinguished by the attitude of organisms to one environmental factor (moisture, temperature, light, chemical properties of the habitat, etc.), but the boundaries between them are arbitrary, and there is a smooth transition from one ecogroup to another, which is due to the ecological individuality of each species [Shennikov, 1964; Mirkin et al., 2002]. Transition zones between biomes or biogeographical regions provide an excellent opportunity to study how species richness varies geographically in relation to the current environment. Exploring the different richness–environment relationships found in biogeographical transition zones could help develop a broader hierarchical theory of diversity and offer valuable insights for local biodiversity conservation strategies [Speziale et al., 2010, Di Biase et al., 2023].

Guba-Gusar region is considered one of the original floras of Azerbaijan [Aghayeva et al., 2020] which includes foothills, lower-middle mountain, high mountain, as well as subalpine, alpine, and subnival vegetation complexes [Tutayuk et al., 1961, Gadzhiev, 2002]. The flora of the region has been studied since the beginning of the last century, but most thoroughly over last 15–20 years: the objects of these studies were dendroflora [Asadov, 2008], herbaceous plants [Aghaeva et al., 2021], rare and endemic species [Red Book, 2023], as well as medicinal, and other economically useful plants [Gasimov, Muradov, 2017, Mekhtiyeva, 2024].

The tourism, economic, and business development of modern natural complexes [Huseynov, Aliyev, 2024], as well as climate change affecting Azerbaijan [Huseynov, 2015], provides a foundation for evaluating plant diversity, identifying trends in its changes, forecasting future developments, refining plant geographic mapping, clarifying the geography of plant diversity. Wild ornamental plants growing in the natural environment of the Guba-Gusar region also represent a risk group. Our monitoring has shown that these plants are often found in areas where cattle graze, where tourists visit and pick them, and where summer houses are built in proximity to their growth.

Some of them have medicinal properties and are collected by local populations before the fruiting phase, thus preventing their reproduction. As a result, a reduction in their range is occurring [Aghayeva, 2021]. It is obvious that in such conditions it is necessary to conduct a periodic inventory of the diversity of this group of plants, taking into account their taxonomic, biomorphological and ecological characteristics. The collected material will become the basis for studying the further dynamics of their diversity in the next future. This study aimed to analyze the biomorphs and ecological groups of wild ornamental flora of the north-eastern part of Azerbaijan (South Caucasus) with an emphasis on the Guba-Gusar region with an emphasis on their root system, and distribution patterns.

MATERIAL AND METHODS

Study area: The Guba and Gusar regions are situated at elevations ranging from 500 to 4,466 m above sea level on the southern macro-slope of the Greater Caucasus (Azerbaijan). These districts span various altitude zones, including foothills, low, middle, and high mountain regions, as well as subalpine and alpine habitats, making

them home to some of the country's most diverse flora.

Studied plants: Specimens were sampled between 2012-2024 and were identified by means of morphological diagnostic traits. The study included specimens of ornamental wild dendroflora species and herbaceous plants. Wild dendroflora refers to woody species that produce beautiful blooms in the spring and early summer, and are known for their appealing, colorful, or unique fruits during the summer and autumn. Among them, *Cornus mas* L., *Cotoneaster integerrima* Medik., *Cotinus coggygria* Scop., *Diospyros lotus* L., *Jasminum fruticans* L., *Lonicera caprifolium* L., *Pterocaria fraxinifolia* (Poir.) Spach, *Prunus divaricata* Ledeb., *P. domestica* L., *Punica granatum* L., *Pyracantha coccinea* M. Roem, *Tilia caucasica* Rupr., *Viburnum lantana* L. Wild ornamental herbs (excluding grasses) includes *Aster* L., *Arum* L., *Astragalus* L., *Anacamptis* Rich., *Bellis* L., *Cephalanthera* Rich., *Caltha* L., *Consolida* Gray, *Dryopteris* Adans., *Filipendula* Mill., *Fritillaria* Tourn. ex L., *Himantoglossum* Spreng., *Orchis* L., *Ophrys* L., *Ornithogalum* L. *Geranium* L., *Gladiolus* Tourn. ex L., *Iris* Tourn. ex L., *Gypsophila* L., *Stachys* L., *Psephellus* Cass., *Lilium* Tourn. ex L., *Tanacetum* L., *Tussilago* L., *Tulipa* L., *Inula* L., *Muscari* Mill., *Papaver* L., *Primula* L., *Echium* L., *Galega* Tourn. ex L., *Linum* L., *Silene* L., *Trifolium* Tourn. ex L., *Ranunculus* L., *Scilla* L., *Hypericum* Tourn. ex L. *Viola* L., *Verbascum* L. Plants were identified based on available literature and checklists of local floras [Karjagin, 1928; Flora... 1952–1961; Tutayuk et al., 1961]. The identified species were classified according to the up-to-date phylogenetic classification system of ferns and angiosperms [WFO, 2025].

The methodology of the work included the definition of life forms in accordance with the approaches and methods of I.G. Serebryakov [1962, 1964] and C.C. Raunkiaer [1934] systems. According to I.G. Serebryakov's classification, plant grouping is based on the lifespan of their above-ground axes (stems). This system categorizes plants into woody (trees, shrubs, and subshrubs), semi-woody (semi-shrubs and dwarf semi-shrubs), terrestrial polycarpic herbs (perennial herbs that flower multiple times), monocarpic herbs (plants that live for one to several years, flowering only once before dying), and aquatic herbs (amphibious, floating, and underwater herbs). The term "monocarpic plants" refers to plants that flower or produce fruit only once in their lifetime, while "polycarpic plants" describes those that flower and bear fruit multiple times throughout their lives. These terms can also be used to describe other life forms with similar reproductive patterns. In this case, the type of root system of plants was also taken into account, where the taproot has a pronounced vertical main root, bulbous and tuberous function similarly to the taproot type, rhizome (short-rhizome, long-rhizome) has a horizontally vegetatively mobile main root and a system of branched adventitious roots.

Classification by C.C. Raunkier [1934] is based on the location of renewal buds and the presence of adaptations for surviving unfavorable seasons of the year (in temperate and arctic latitudes – winter, in arid regions also summer droughts) and the division of species into phanerophytes that develop renewal buds, open or closed, located on vertically growing shoots high above the ground, higher than 30 cm and chamaephytes which have renewal buds close to the surface, not higher than 20-30 cm.

Ecological groups were distinguished based on the classical approach proposed by A.P. Shennikov [1964]. This is based on the collected field material and geobotanical descriptions of the habitats of species, taking into account the moisture regime (groundwater table, soil moisture, climatic conditions), lighting, soil fertility.

Plant communities were assessed on the basis of the dominant-determinant principle, i.e. in the plant community, a dominant and co-dominant species were identified, then the community was named according to the species name of the dominants and co-dominants (determinants).

The phenological stages of ornamental plants in the region were analyzed using data collected during the 2018 and 2024 observation periods. During different months of the year and decades of months, we took note of the mass vegetation (beginning of mass flowering, peak of mass flowering, beginning of mass fruiting and peak of fruiting, mass end of fruiting).

The altitude distribution of plants was recorded using a GPS navigator (Garmin eTrex 10 GPS Navigator). Statistical data processing was carried out in Excel (Microsoft Office LTSC Professional Plus 2021).

RESULTS

In the wild ornamental flora of the Guba-Gusar region, 172 species have been registered, belonging to 44 families and 96 genera, of which the families Rosaceae Juss. (22), Asteraceae Guerke (20), Orchidaceae Juss. (16), Violaceae Batsch (11), Papaveraceae Juss. (11) and Lamiaceae Martinov (8) predominate in terms of the number of species. Several genera were recorded with a single species (Tab. 1, Fig. 1).

Table 1. Taxonomic structure of the ornamental plant of Guba-Gusar region.

Orders	Families		Genera		Species	
	Number	%	Number	%	Number	%
Equisetales	1	2.27	1	1.1	1	0.6
Ericales	1	2.27	2	2.1	5	2.9
Apiales	1	2.27	1	1.1	2	1.7
Sapinales	1	2.27	1	1.1	1	0.6
Dipsacales	2	4.54	2	2.1	2	1.7
Celastrales	1	2.27	1	1.1	1	0.6
Polypodiales	1	2.27	1	1.1	1	0.6
Alesmatales	1	2.27	1	1.1	1	0.6
Liliales	1	2.27	4	4.2	4	2.3
Asparagales	4	9.1	18	18.7	32	18.6
Ranunculales	2	4.54	9	9.3	18	10.4
Saxifragales	1	2.27	1	1.1	1	0.6
Fabales	6	13.6	5	5.2	5	2.9
Rosales	1	2.27	10	10.4	22	12.8
Malpigiales	3	6.8	3	3.1	16	9.3
Geraniales	1	2.27	2	2.1	6	3.5
Malvales	1	2.27	2	2.1	2	1.7
Brassicales	1	2.27	2	2.1	5	2.9
Caryophyllales	1	2.27	3	3.1	5	2.9
Gentianales	3	6.8	3	3.1	4	2.3
Boraginales	2	4.54	4	4.2	6	3.5
Solanales	1	2.27	1	1.1	1	0.6
Lamiales	5	11.4	4	4.2	8	4.6
Asterales	2	4.55	15	15.6	23	13.4
20	**44**	**100**	**96**	**100**	**172**	**100**

Analysis of biomorphological effects according to I.G. Serebryakov [1964] taking into account root system revealed the following classification: rhizomatous perennial polycarpics 29.6%, taproot monocarpics 11.6%, taproot polycarpics 5.3%, rhizomatous monocarpics 2.3%, tuberous-rooted polycarpic plants 11.1%, bulbous polycarpics 11.6%, fibrous monocarpics 12.8% shrubby plants 5.8%, tall shrubs or low-growing trees 2.9%, shrubby liana 2.4%. These resultsindicates that herbaceous plants are the dominant life form, exhibiting a variety of root systems including short and long rhizomes, taproots, bulbs, and tubers (Tab. 2).

Based on Raunkier's classification, four types of biomorphs are identified: phanerophytes, hemicryptophytes, cryptophytes, and therophytes (Fig. 2). the perentage of phanerophytes and therophytes are similar (16.2% and 12.8%, respectively), while hemicryptophytes and cryptophytes dominate in terms of number and percentage of species (37.8% and 33.2%, respectively). The biological spectrum according to Raunkiär [1934] indicated the predominance of hemicryptophytes and cryptophytes, which is typical of moderately cold floras of the Holarctic, and is explained by the peculiarities of soil and climatic conditions corresponding to forest and meadow cenoses, as well as anthropogenically disturbed substrates.

Analyses revealed that herbaceous plants represent the majority of the wild ornamental flora in the Guba-Gusar region. Among the polycarpic herbs, rhizomatous herbaceous plants represent the dominant group, accounting for 29.6%. In our opinion, their prevalence is largely due to their root systems, which penetrate and spread across various soil layers. Examples of rhizomatous polycarpic plants include *Dryopteris filix-mas* (L.) Schott, *Geranium collinum* Stepan ex Willd., *Veronica longifolia* L., *Arum italicum* subsp. *albispatum* (Steven ex Ledeb.) Prime, *Cephalanthera grandiflora* Gray, and *Orchis caucasica* (Klinge) Soo. Among rhizomatous monocarpic species there are *Glaucium elegans* Fisch. & C.A. Mey., *Papaver arenarium* M.

Figure 1. Ornamental plants belonging to various families: Liliaceae (1. *Fritillaria lutea* Mill., 2. *Lilium monodelphium* Adams), Asparagaceae (3. *Muscari neglectum* Guss. ex Ten., 4. *Scilla sibericasubsp. caucasica* (Miscz.) Mordak) Orchidaceae (5. *Anacamptis pyramidalis* (L.) Rich., 6. *Orchis simia* Lam., 7. *O. purpurea* Huds., 8. *Platanthera chlorantha* (Custer) Rchb.), Iridaceae (9. *Crocus sativus* L.) Amaryllidaceae (10. *Galanthus caucasicus* Grossh.), Papaveraceae (11. *Papaver commutatum* Fisch., C.A.Mey & Trautv.), Ranunculaceae (12. *Pulsatilla albana* Bercht. & J.Presl.), Hypericaceae (13. *Hypericvum hirsutum* L.), Astreaceae (*Bellis sylvestris* Cirillo L., *Psephellus transcaucasicus* Sosn., *Serratula coronata* DC.), Rosaceae (17. *Rosa azerbaijanica* Novopokr. et Rzazade, 18. *Pyracantha coccinea* R.Roem., 19. *Crataegus germanica* (L.) Kuntze) Lythraceae (20. *Punica granatum* L.).

Table 2. Percentage of life forms of wild ornamental plants according to I.G. Serebryakov [1964].

Biomorphtypes	Absolute number of species	%
Herbs		
Rhizome perennial polycarpic plant	51	29.6
Taproot monocarpic	20	11.6
Taproot polycarpic	9	5.3
Rhizome monocarpic	4	2.3
Tuberous root polycarpic	19	11.1
Bulbous polycarpic	20	11.6
Fibrous monocarpic	22	12.8
Trees and shrubs		
Tree	8	4.6
Shrub	10	5.8
A tall bush or a low-growing tree	5	2.9
Shrub liana	4	2.4
Total	172	100

Bieb., *Acalypha australis* L., *Dianthus armeria* L., and *Melandrium boissieri* Schischk. Taprooted plants, which can access water from deeper soil layers, are more commonly associated with the ecological conditions of dry steppes and semi-desert regions.

Ecological groups mainly consisted of mesophytes, with 71%, followed by xeromesophytes with 19%, mesoxerophytes with 9% and hygrophytes with 1% (Fig. 3a).

In relation to light, most species 47% were heliophytes (Fig. 3b). The smallest number are shade-loving representatives 5% (Fig. 2b). Scioheliophytes, i.e. plants that tolerate both sunny and shady areas (*Rosa* L., *Crataegus* L., *Arum* L.) are predominantly forest species growing in forest clearings or forest edges (48%).

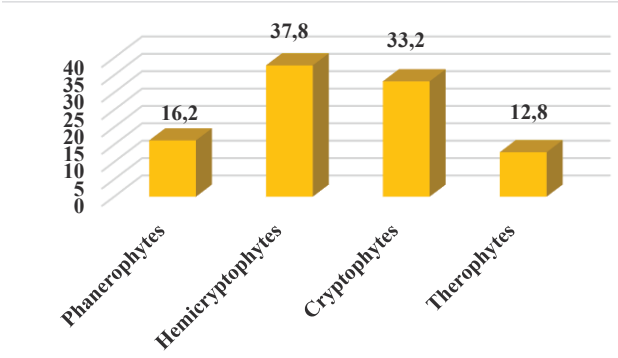

Figure 2. Percentage ratio of life forms of wild ornamental plants according to C.C. Raunkier [1934].

In relation to soil fertility, the ecogroups are dominated by eutrotrophs – nutrient-rich (83%), while mesotrophes were 14% and oligotrophs 3% (Fig. 3c).

As can be seen from Table 3, most of ornamental plants are located in the lower (21.5%), middle mountain (29.1%) and upper (18.1%) mountain belts.

The vast majority of species occur at more than one altitudinal range (*Crocus biflorus* Mill. subsp. *adamii*, *Galanthus alpinus* Sosnowsky, *Iris caucasica* M.Bieb., *Tulipa sylvestris* subsp. *australis* (Link) Pamp. (Syn.: *Tulipa biebersteiniana* Schult. & Schult. f.), *Nepeta amoena* Stapf, *Stachys byzantina* K.Koch. are distributed from the lower to the middle mountain belt (800-2000 m). *Caltha palustris* L., *Linum hypericifolium* Salisb., *Primula algida* Adams are also widespread and are typical for the subalpine and alpine zones. Species of the genus *Nepeta* L. are widespread from the plains to the subalpine zone (1800-2500 m). *Scutellaria* L. is rarely found in the low and middle mountain zones, but *Stachys* L. is mainly found in the low and rarely in the middle mountain zone. *Teucrium polium* L. is a plant of the middle mountain zone and subalpine (800-2500 m).

The wild flora of the Guba-Gusar region currently includes three alien species – one from North America and two from Central Asia: *Ailanthus altissima* (Mill.) Swingle (Simaroubaceae DC.), *Robinia pseudoacacia* L. (Fabaceae Juss.), and *Acalypha australis* L. (Euphorbiaceae Juss.). Among these, the first two are trees (phanerophytes) and mesoxerophytes, originally introduced to Azerbaijan for ornamental purposes in

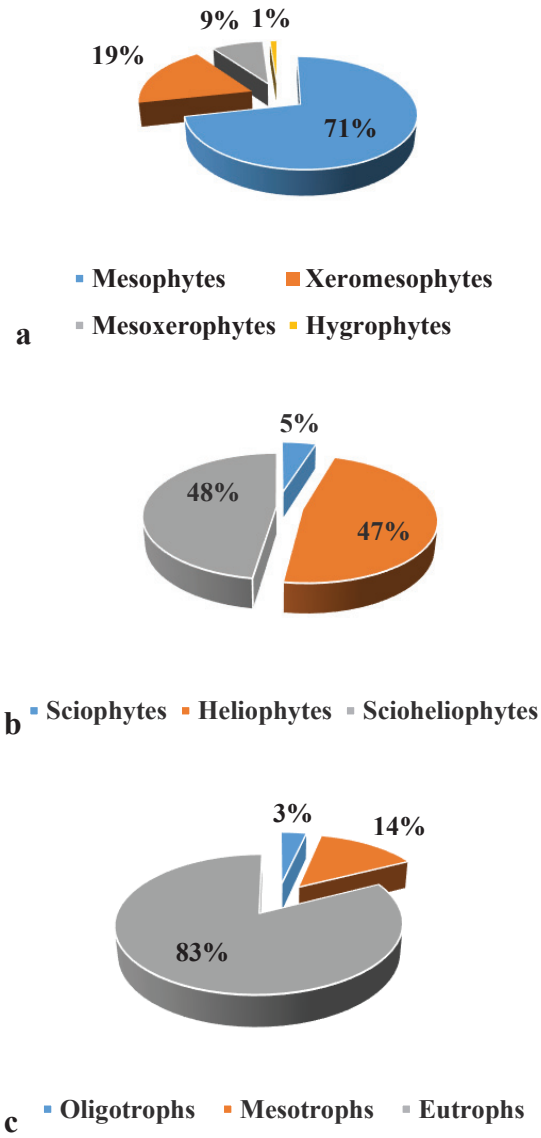

Figure 3. Ecological groups of wild ornamental plants in relation to soil moisture, light and soil fertility: a) groups in relation to soil moisture; b) groups in relation to light; c) groups in relation to soil fertility.

the mid-20th century and are now widely naturalized in the wild. In terms of their relationship to light and soil conditions, the three species differ slightly. *A. altissima*, a scioheliophyte, is adaptable to both oligotrophic and eutrophic soils, making it a potentially invasive and transformative species. In contrast, *R. pseudoacacia* favors well-lit environments, and its preferred habitats suggest it thrives on moderately fertile to highly fertile soils. The third species, *A. australis* is an herbaceous annual (therophyte). Based on our observations, it behaves as a mesophyte in terms of moisture requirements and as a scioheliophyte regarding light preference. It prefers fertile soil, which contributes to its status as a problematic weed in agricultural plant communities. However, this preference also restricts its spread to areas with poor or low-fertility soils [Abdiyeva, Litvinskaya, 2021].

It is well known that climate change (warming) has a significant impact on plant development. Observations of mass flowering have revealed noticeable differences in the shift among the main stages, i.e. beginning of vegetation, flowering, fruiting/end of fruiting (Tab. 4).

An analysis of the distribution patterns of ecological groups (Fig. 4) showed that with increasing altitude, the ratio of mesophytes, mesoxerophytes, xeromesophytes and hygrophytes changes. From an altitude of 800 m, mesophytes increases and mesoxerophytes steadily decreases. This is primarily due to changes in the amount of rainfall [National Atlas..., 2014]. At an altitude of 200-400 m it is 150-200 mm per year, while at an altitude of 800 m and above it reaches 600-1200 mm per year, as well as changes in the air temperature regime, the average July temperature in the foothill zone is +22 - +24°C, and in high mountain zone is +18 - +20°C.

About plants with different root systems, their dependence on soil type was assessed (Fig. 5).

Taproot annuals and perennials are more resistant

Table 3. Distribution of plants depending on altitude.

Altitudes (m above sea level)	Number of species	Species in %
Plain (200-400 m)	18	10.5
Foothills (400-800 m)	9	5.2
Lower mountain zone (800-1200 m)	37	21.5
Middle mountain zone (1200 -1800 m)	50	29.1
Upper mountain zone (1800-2000 m)	32	18.6
Subalpine(2000-2500 m)	15	8.7
Alpine(2500-3000 m)	11	6.4
Total	172	100

Table 4. Phenological timing of the development of ornamental plants.

Years	Months											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
2018												
2024												

Legend: winter dormancy; vegetation; flowering; flowering/beginning of fruiting; fruiting

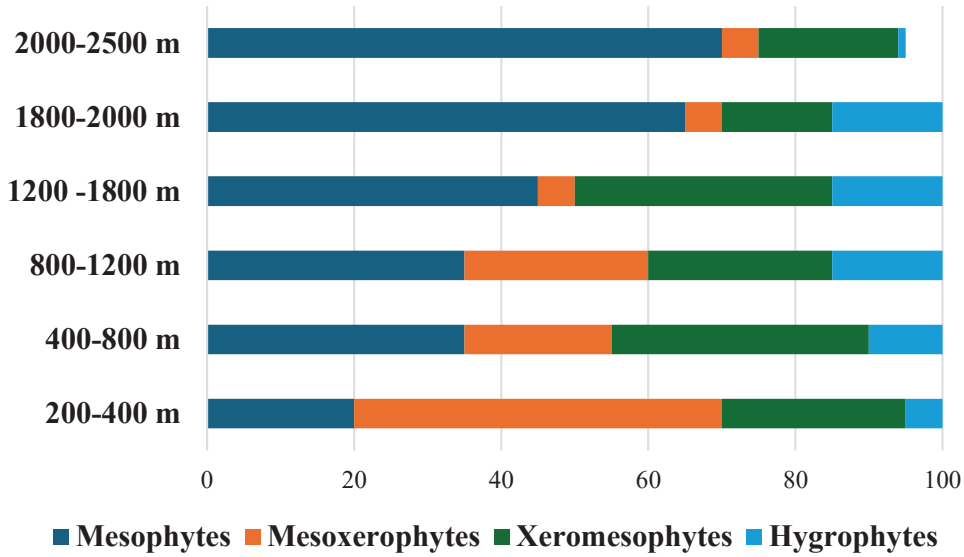

Figure 4. The ratio of ecological groups in relation to the water regime at different altitude levels. *X-axis* coordinate indicates the percentage of ecological groups, *Y-axis* coordinate indicates altitude above sea level.

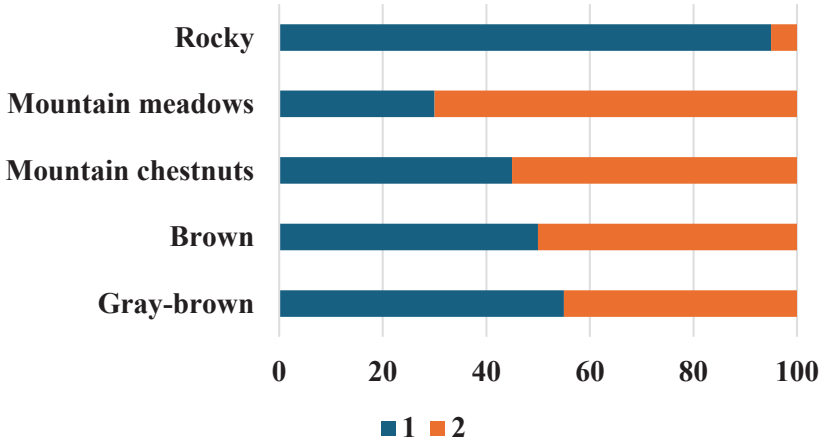

Figure 5. The ratio of plants by type of root systems depending on the characteristics of soil conditions. *X-axis* coordinate indicates the percentage of ecological groups, *Y-axis* coordinate indicates soil types. For simplicity, the root systems were divided into two groups: 1) taproot plants were those with vertical root development; 2) rhizome plants were those with horizontal roots.

to grey-brown and brown soils corresponding to flat, foothill, and partially lowland conditions. In contrast, rhizomatous annuals and perennials are more often found on chestnut mountain and meadow-mountain soils.

CONCLUSION

Thes study of the biomorphological and ecological traits of the wild ornamental flora in the Guba-Gusar region revealed that, overall, the distribution of biomorphs, ecomorphs, and ecological groups aligns with the region's topography, soil, and climate conditions, as well as the prevalence of its two primary vegetation types – forests and meadows. However, alien species such as *A. altissima*, *R. pseudoacacia*, and *A. australis* are increasingly being found in the wild flora, raising concerns due to their pronounced invasive potential. In our opinion, continued climate warming is likely to cause the mid-mountain zone to expand upward into the high-mountain zone, leading to a corresponding shift in the distribution of many plant species toward higher elevations.

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Quba-Qusar bölgəsi (Cənubi Qafqaz) nümunəsində Azərbaycanın şimal-şərq hissəsində yayılan yabanı dekorativ bitkilərin biomorfları və ekoloji qrupları

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Məqalədə Böyük Qafqazın Quba-Qusar bölgəsində yabanı bəzək bitkilərinin biomorfoloji və ekoloji xüsusiyyətləri səciyyələndirilir. Biomorfoloji spektrin təhlili nəticəsində 51 növ (29.6%) rizomalı polikarp, 20 növ (11.6%) milköklü monokarp, 9 növ (5.3%) milköklü polikarp, 4 növ (2.3%) rizomalı monokarp, 19 növ kökümsovlu polikarp, 20 növ (11.6%) soğanaqlı polikarp, 22 növ (12.8%) lifli monokarp, 8 növ (4.6%) ağac, 10 növ (5.8%) kol, 5 növ (2.9%) hündür kollar və 4 növ (%2) kolşəkilli lian müəyyən edilmişdir. Həmçinin, biomorf qrupları əlverişsiz şəraitdə (soyuq və ya quru) yeni qönçələrin mühafizəsi mövqeyinə və üsuluna görə fanerofitlər (28 növ, 16.2%), hemikriptofitlər (65 növ, 37.8%), kriptofitlər (57 növ, 12.8%), terofitlər (22 növ) qruplarına ayrılmışlar. Ekoloji qruplar arasında mezofitlər 123 növlə (71.6%) üstünlük təşkil etmişdir. Quba-Qusar bölgəsinin florasında üç invaziv növ *Ailanthus altissima* (Simarobuaceae), *Robinia pseudoacacia* (Fabaceae) və *Acalypha australis* (Euphorbiaceae) yayılmışdır ki, onlardan ikisi də *A. altissima* və *R. pseudoacacia* dekorativ xüsusiyyətlərinə görə məqsədli şəkildə introduksiya edildiyi düşünülür.
Açar sözlər: *senozlar, ekoloji qrup, heliofitlər, həyati forma, mezofitlər, silofitlər, kserofitlər*

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В статье дана биоморфологическая и экологическая характеристика дикорастущих декоративных растений Губа-Гусарской зоны Большого Кавказа. Анализ биоморфологического спектра выявил 51 вид (29.6%) корневищных поликарпиков, 20 видов (11.6%) стержнекорневых монокарпиков, 9 видов (5.3%) стержнекорневых поликарпиков, 4 вида (2.3%) корневищных монокарпиков, 19

видов (11.1%) клубнекорневых поликарпиков, 20 видов (11.6%) луковичных поликарпиков, 22 видов (12.8%) мочковатых монокарпиков, 8 видов (4.6%) деревьев, 10 видов (5.8%) кустарников, 5 видов (2.9%) высоких кустарников или низкорослых деревьев, 4 вида (2.4%) кустарниковых лиан. Также зарегистрированы группы биоморф по положению и способу защиты почек возобновления в неблагоприятный период (холодный или засушливый) – фанерофиты (28 видов, 16.2%), гемикриптофиты (65 видов, 37.8%), криптофиты (57 видов, 12.8%), терофиты (22 вида, 12.8%). Среди экологических групп преобладают мезофиты -123 вида (71.6%). Во флоре Губа-Гусарского региона встречены три инвазионных вида *Ailanthus altissima* (Simarobuaceae), *Robinia pseudoacacia* (Fabaceae) и *Acalypha australis* (Euphorbiaceae), два из них, *A. altissima* и *R. pseudoacacia*, которые оценены нами как преднамеренно интродуцированные ввиду их декоративности свойств.

Ключевые слова: *ценозы, экологическая группа, гелиофиты, жизненная форма, мезофиты, сцилиофиты, ксерофиты*