

Representatives of the alien species of the family Amaranthaceae Juss., Asteraceae Dumort. and Poaceae Juss. in the flora of Azerbaijan

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Abstract: Based on the analysis of field materials collected during our field trips in 2017-2021, literature data and specimens stored at the Herbarium Fund of the Institute of Botany, a list of alien representatives from the families Amaranthaceae Juss., Asteraceae Dumort. and Poaceae Juss. found on the territory of Azerbaijan has been compiled. It was established that the family Poaceae, represented by 10 genera and 15 species (21.74%) of the total alien flora of Azerbaijan), Asteraceae - 8 genera, 13 species (18.5%), Amaranthaceae - 2 genera, 8 species (11.4%). Most of the plants are herbaceous annuals with seed propagation. Most of the species, especially xenophytes were brought to the territory of Azerbaijan unintentionally. In ecological terms, according to the moisture factor, most could be distinguished in the following ecological groups: 21 species to the mesophytic, 13 species to the xeromesophytes and 4 species to the hygromesophytes. Some species – *Amaranthus retroflexus*, *A. albus*, *Ambrosia artemisiifolia*, *Erigeron canadensis*, *E. annuus*, *E. bonariensis*, *Xanthium strumarium*, *X. spinosum*, *Digitaria violascens*, *D. horizontalis*, *Paspalum dilatatum* should be considered the most dangerous, occupying natural and semi natural communities or migrating and naturalizing in disturbed habitats. The species listed above are introduced into forest, meadow, and shrub communities and at present, they are components of the herbaceous layer in these communities. *Siegesbeckia orientalis*, *Tanacetum vulgare*, *Bromus carinatus*, *B. catharticus*, *Chloris virgata*, *Pennisetum alopecuroides*, previously mentioned in the literary sources of Azerbaijan, were not found by us. The biological features of the

identified plants (short life cycle, high endurance, seed propagation, the ability to adapt to new or stressful environmental conditions) ensure their successful introduction into local ecosystems. Based on the frequency of occurrence and abundance of alien plants in introduction places, the invasive role was considered and the status of invasiveness was determined. Most alien plants are characterized by the method of introduction as xenophytes and ephemeroxytes by their role in phytocoenose.

Keywords: *biomorph, distribution, hygromorph, introduced species, invasive species, life forms, species diversity, native*

INTRODUCTION

Most alien plants have the ability to compete with native species, successfully adapt to new conditions, rapidly spread and naturalize [Arianoutsou, Bazos, Christopoulou et al., 2021; Morente-López et al., 2023]. Biological invasions affect biodiversity worldwide at various scales [Manchester, Bullock, 2000]. Recently, much attention has been paid to negative effects of alien species on resident communities and functioning of invaded ecosystems [Byers, 2002; Blood, 2001]. Invasive species are major element of global change and are contributing to biodiversity loss, ecosystem degradation, and impairment of ecosystem services worldwide [Pyšek et al., 2004]. In Europe, there are a number of programs for invasion in Europe (Ecology and manuscript checked for linguistic Management of Alien Plant Invasions), NEOBIOTA (Towards a Synthesis), BIOLIEF (Biological invasions and ecosystem functioning), DAISIE (Delivering Alien Invasive Species in Europe).

How does the negative impact of alien species manifest itself? Researchers note the following qualities of these plants: they compete with native species, simplify the structure of phytocenoses, act as new host plants for various parasites and pathogens, hybridize with native species, and displace native species from natural phytocenoses [Vinogradova, 2018]. The rate of settlement of ordinary plants is estimated, according to

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various sources, from 2 to 370 m/year; data on alien representatives indicate up to 167 km/year [Pyšek, Hulme, 2005]. However, not all alien plants, entered a new territory and new living conditions, are capable of exerting an active influence on the native flora. Some do not go beyond the new habitat, others disappear after a certain time or remain as single specimens and are not able to have any negative impact on the local vegetation. Therefore, alien plants are given a certain invasive status.

The current research is devoted to the study of species diversity, distribution and the establishment of the invasive status of alien plants from *Amaranthaceae* Juss., *Asteraceae* Dumort. and *Poaceae* Juss. occurring in the territory of Azerbaijan.

MATERIAL AND METHODS

The material and objects of the study were alien representatives of the families *Amaranthaceae* Juss., *Asteraceae* Dumort. and *Poaceae* Juss., growing in the Lesser and Greater Caucasus (within Azerbaijan), the lowland and mountainous parts of the Lankaran region, the Kura-Araz lowland and the Absheron coast. At the preliminary cameral stage of the study, literary sources [Flora of Azerbaijan, 1950-1961; Conspectus of the flora of Azerbaijan, 2011] and herbarium specimens stored at the herbarium (BAK) Institute of Botany were studied for species of non-native origin. A preliminary list of alien representatives of the studied families was compiled.

Field research was carried out using route methods in the vicinity of villages with an inspection of household plots, agrophytocoenoses, plantations, road edges, highways, railways and other areas disturbed by human activity. The scope of the survey also included intact and undisturbed meadow, forest, shrub, psammophyte-littoral, wetland natural communities. To determine the activity and degree of threat to local communities of invasive plants, their abundance and frequency of occurrence in their localities were established [Afonin et al., 2014].

When granting the invasive status to the plant, the principles and terminology generally accepted in Europe were guided [Shroeder, 1969; Pyshek et al., 2004; Vinogradova et al., 2010]. The history of the terminological dictionary, which includes the concept of "invasive species" is diverse. The most popular are the following terms: archaeophytes and neophytes by the time of introduction, xenophytes, xenoergasiophytes, ergaziophytes by the way of introduction [Shroeder, 1969;

Vinogradova et al., 2010]. They can be distinguished by the role in phytocenosis: ephemeroxytes, colonophytes, epekophytes, agriophyte [Vinogradova et al., 2010]. In the western terminology, such definitions of the status of invasiveness as casual alien plants, invasive plants, naturalized plants and the analogue of agriophytes – transformers are also widely used [Pyšek, Richardson, 2010].

Establishing the status of alien plants in our studies was carried out taking into account the following approach: xenophytes – foreign plant species which have recently been found in other geographical areas, ruderal and segetal habitats; xenoergasiophytes – occupy an intermediate position between xenophytes and ergaziophytes; ergaziophytes – primarily accepted as cultured plant, later occupied the territory; ephemeroxytes – plants that occur in any places, but in 1-2 years if they cannot multiply then disappear; colonophytes – species spread in one or several anthropogenic habitat; epekophytes – biological species that are dangerous to the biodiversity, distributed as a result of human activity; agriophytes – species that are largely occupy natural ecosystems and rapidly distributed.

Based on these statuses, adventive plants were divided into invasive plants that pose a real threat or are prone to sudden renewal in places of introduction, and potentially invasive plants that currently do not pose a threat, but require periodic monitoring. In the work, the names of the species are given according to the "Flora of Azerbaijan" [1950, 1952, 1961], taking into account "The World Flora online". In the presented article, botanical - geographical areas are abbreviated as following: 1. Samur-Devechi lowlands (Sam.-Dev. low.), 2. Caspian seaside lowlands (Casp. Seaside low.), 3. Guba part of the Greater Caucasus (Gub. GC), 4. Eastern (AZ) Greater Caucasus (east. GC), 5. Western (AZ) Greater Caucasus (west. GC), 6. Alazan-Ayrichay valley (Alaz.-Ayrich.), 7. Bozgir plateau (Boz. pl.), 8. Gobustan (Gob.), 9. Absheron (Absh.), 10. Kur plain (Kur pl.), 11. Kur - Araz lowlands (Kur-Araz low.), 12. Northern (AZ) Lesser Caucasus (north. LC), 13. Central (AZ) Lesser Caucasus (centr. LC), 14. Southern (AZ) Lesser Caucasus (south. LC), 15. Nakhchivan plain (Nakh. pl.), 16. mount. part of Nakhchivan (mount. Nakh.), 17. Lankaran plain (Lank. pl.), 18. mount. part of Lankaran (mount. Lank.), 20. Diabar/Diabar.

RESULTS AND DISCUSSION

Analysis of the compiled list (Tab. 1) showed that

the Poaceae family is characterized by the largest number of invasive species, which includes 10 genera and 15 species, which, in terms of species diversity, is 21.7% of the entire invasive flora of Azerbaijan. The family Asteraceae includes 8 genera, 13 species (respectively 18.5%). The Amaranthaceae family is represented less diversely by 2 genera, 8 species (11.4%). It should be noted that the dominance of the families Asteraceae and Poaceae is characteristic of the entire flora of Azerbaijan [Flora of Azerbaijan, 1952-1961]. In relation to biomorphs, the main part of plants, 26 species are herbaceous annuals with seed

propagation (Amaranthaceae 100%, Asteraceae 100%, Poaceae 24.4%). In relation to ecomorphs, according to the moisture factor, the predominant group are plants of the mesophytic ecological series, of which the main share falls on eumezophyte (Amaranthaceae 62.5%; Asteraceae 61.5 %; Poaceae 61.5%), the main proportion is species of American origin, mainly from North America (Amaranthaceae 100%, Asteraceae 61.5%, Poaceae 27.7%).

It was established that out of 36 studied species of all three families - more than half of 23 species (63.8%) are xenophytes, i.e. introduced into the local flora

Table 1. Alien representatives of *Amaranthaceae*, *Asteraceae*, *Poaceae* in Azerbaijan.

| Species name / Family | Life form | Native range | Distribution in Azerbaijan |
|---|-----------|--|--|
| 1 | 2 | 3 | 4 |
| <i>Amaranthaceae</i> Juss. | | | |
| <i>Alternanthera sessilis</i> (L.) R.Br. ex DC. | Annual | Southern America | Lank. pl. |
| <i>Amaranthus retroflexus</i> L. | Annual | Northern America | In all the botanical-geographical areas |
| <i>A. albus</i> L. | Annual | Northern America | Boz. pl., Alaz.-Ayrich., west. GC, Kur-Araz low., Absh., mount. Nakh., Lank. pl., mount. Lank. |
| <i>A. hybridus</i> (L.) Thellung | Annual | Northern America | Cultivated as an ornamental plant in Guba part of GC, eastern GC, Absh., Lank. pl., mount. Lank. |
| <i>A. blitoides</i> S. Watson | Annual | Northern America | Absh. |
| <i>A. cruentus</i> L. | Annual | Southern America | Cultivated in the parks of large cities |
| <i>A. viridis</i> L. | Annual | Tropics, subtropics and moderately warm regions of the world | Kur-Araz low., Absh., central LC. |
| <i>A. spinosus</i> L. | Annual | Northern America | Eastern GC.[Abdiyeva et al., 2021]. |
| <i>Asteraceae</i> Dumort | | | |
| <i>Ambrosia artemisiifolia</i> L. | Annual | Northern America | west. GC, Boz.pl., Absh., north. LC. |
| <i>A. trifida</i> L. | Annual | Northern America | GC (AZ) |
| <i>Cyclachaena xanthifolia</i> (Nutt.) Fresen | Annual | Northern America | Alaz.-Ayrich. East. GC In 2018, a new habitat was discovered in the Oguz district (village Fil-fil), in the vicinity of the Shahdag National Park. and in 2021 on the territory of the Botanical Garden, Baku (Absheron) |
| <i>Erigeron annuus</i> (L.) Desf. | Annual | Northern America | It occurs almost throughout Azerbaijan, from the lowland to the middle mountain belt |
| <i>Erigeron canadensis</i> L. | Annual | Northern America | west. GC, Casp. seaside low., Lank. pl. |
| <i>Erigeron bonariensis</i> L. | Annual | Southern America | GC, Lank. pl. |
| <i>Symphyotrichum graminifolium</i> (Spreng.) G.L. Nelsom | Annual | Southern America | GC (AZ) |
| <i>Symphyotrichum subulatum</i> var. <i>Squamatum</i> (Spreng.) S.D. Sundb. | Annual | Southern and Central America | GC, north. LC, Nakh. pl. |
| <i>Galinsoga parviflora</i> Cav. | Annual | Southern America | GC, north. LC, Nakh. pl. |
| <i>Siegesbeckia orientalis</i> L. | Annual | Primary area unknown | GC, Lank. pl. |
| <i>Tanacetum vulgare</i> L. | Annual | Northern America | noth. LC., centr. LC. |
| <i>Xanthium strumarium</i> L. | Annual | Northern America | GC, LC, Kur-Araz low., Lank. pl., Nakh. pl. |

| 1 | 2 | 3 | 4 |
|---|-----------|---|---|
| <i>Tanacetum vulgare</i> L. | Annual | Northern America | noth. LC., centr. LC. |
| <i>Xanthium strumarium</i> L. | Annual | Northern America | GC, LC, Kur-Araz low., Lank. pl., Nakh. pl. |
| <i>X. spinosum</i> L. | Annual | Northern America | GC, LC, Kur-Araz low., Lank. pl., Nakh. pl. |
| <i>Poaceae</i> Barnhart | | | |
| <i>Arthraxon hispidus</i> (Thunb.) Makino (Griseb.) | Annual | East and Southern Asia | Lank. pl. |
| <i>Arundo donax</i> L. | Perennial | Primary area unknown | Kur-Araz low., Kur low., Boz. pl., Lank. pl. |
| <i>Beckmannia syzigachne</i> Fernald | Perennial | Primary area unknown | Lank. pl. |
| <i>Bromus carinatus</i> Hook. et Arn. | Perennial | North America | GC, mount., Lank. pl. |
| <i>B. catharticus</i> Vahl. | Annual | South America | GC (AZ) |
| <i>Chloris virgata</i> Sw. | Annual | America (USA and Mexico) | Absh. |
| <i>Digitaria ciliaris</i> (Retz.) Koeler | Annual | North and South Asia | Lank. pl. |
| <i>D. horizontalis</i> Willd. | Annual | Iz native to tropical regions of the Americas | Sam.-Dev. low., Lank. pl., Nakh. |
| <i>Eleusine indica</i> (L.) Gaertn. | Annual | It is native to tropical Asia | Absh., north. LC, Lank. pl. |
| <i>E. tristachya</i> (Lam.) Lam. | Annual | North, Central and South America | Lank. pl. |
| <i>Elymus canadensis</i> L. | Annual | North America | GC, Kur - Araz low. |
| <i>Paspalum dilatatum</i> Poir. | Perennial | South America | GC, Kur pl., Kur-Araz low., Lank. pl. |
| <i>P. thunbergii</i> Kunth ex Steud. | Perennial | Central Asian | GC, Kur-Araz low Lank. pl., mount. Lank. |
| <i>Pennisetum alopecuroides</i> (L.) Spreng | Perennial | Eastern, Southern-Eastern Asia | Absh. |
| <i>Sorghum halepense</i> (L.) Pers. | Perennial | Native to Asia and northern Africa | Guba part of GC, east GC, Casp. seaside low., Absh., Kur - Araz low., south. LC, Nakh. pl., Lank. pl. |

unintentionally. At the same time, in the Amaranthaceae family they make up 37.5%, Asteraceae 76.9%, Poaceae 66.7% (Fig. 1a). Assessment of the status according to the role of alien plants in the habitats showed that 18 (50%) out of 36 species are ephemerophytes (Fig. 1b), i.e. occur in places of introduction for several years, after which they either stop to reproduce and then disappear, or are so low-active that they do not pose a particular threat to native plants and natural vegetation. Species with this status are distributed among families as follows - Amaranthaceae 50.0%, Asteraceae 30.7%, Poaceae 66.6%. The next group is epecohytes - species dangerous to the local flora, actively spreading as a result of human activities and are just beginning to develop slightly disturbed and undisturbed natural ecosystems. The next group is epecohytes - species dangerous to the local flora, actively spreading as a result of human activities and are just beginning to occupy slightly disturbed and undisturbed natural ecosystems. In the Amaranthaceae family, their number was 2 species (25% of the total number of alien representatives of the family), Asteraceae - 4 species (30.7%), Poaceae - 10 species (66.6%). It should also

be noted that 3 species from the *Asteraceae* family have a dual status. This is *A. artemisiifolia* with the status of ephemerophyte/agriophyte and *X. strumarium*, *X. spinosum* with the status of epecohyte/agriophyte. *A. artemisiifolia*, despite its aggressiveness, is still sensitive to environmental conditions and prefers fertile, moist soils. Perhaps it is this factor that limits the expansion of the range of ragweed to neighboring botanical-geographical regions of Azerbaijan with a drier and hotter climate and poor quality soil conditions. Sometimes this plant is found in garden plots of the coastal strip of Absheron. This plant comes here along with the imported soil. However, over time, the hot desert climate of the area reduces the vitality of the ragweed and eventually it dies. *X. strumarium*, *X. spinosum* with epecohyte/agriophyte status are very aggressive plants that have become active in the last 15 years. They are tolerant to moisture regime, soil salinity and climatic conditions. In connection with climate warming, they begin to actively occupy new ecological niches, move from the foothills to the upper mountain belt.

Thus, most of the alien representatives of the families are potentially invasive plants (25 species, 69.4%). They

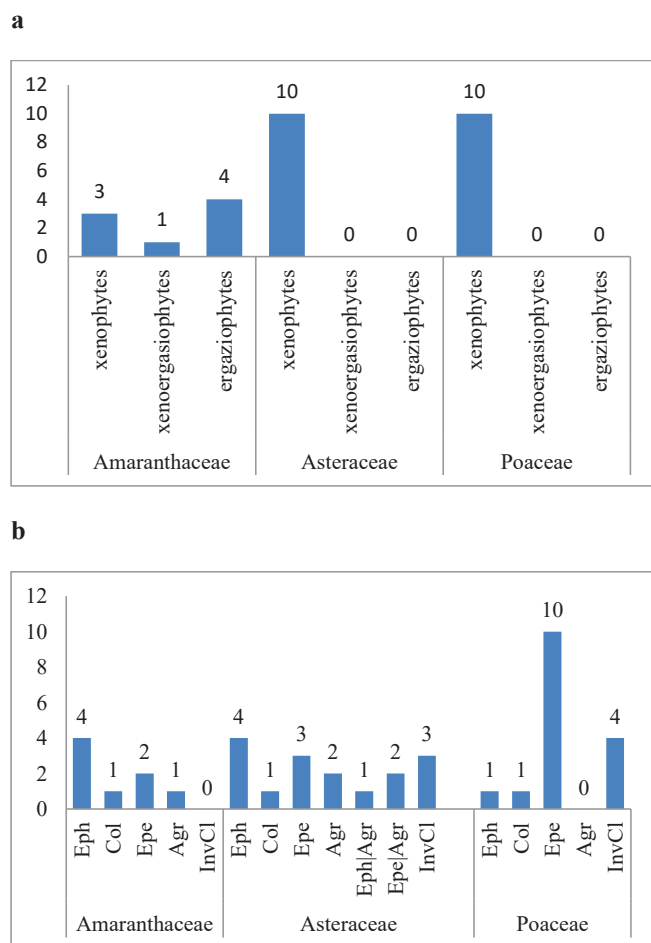


Figure 1. The ratio of alien species in the families Amaranthaceae, Asteraceae, Poaceae according to the method of introduction into the local flora and their role in phytocenoses: a) X-axis – status according to the method of introduction into the local flora; Y-axis – number of species; b) X-axis – status by role in phytocenosis; Y-axis – the number of views. Conditional abbreviations: Eph – ephemeroxytes, Co – colonophytes, Epe – epekophytes, Agr – agriophytes, Eph/Agr – ephemeroxytes / agriophytes, Epe/Agr – epekophytes / agriophytes, InvCl – Invasive status should be clarified.

do not go beyond their habitats, some are characterized by instability characteristic of ephemeroxytes. Some plants from this group were not found during reconnaissance and route studies. Despite this “positive” state, it should still be noted that 10 dangerous representatives have been identified – *Amaranthus retroflexus*, *A. spinosus*, *Ambrosia artemisiifolia*, *Erigeron canadensis*, *E. annuus*, *E. bonariensis*, *Xanthium strumarium*, *X. spinosum*, *Digitaria violascens*, *Paspalum dilatatum*,

manifesting themselves as agriophytes or epicophytes. All of these invasive plants are now introduced into many natural communities – *A. retroflexus*, *A. spinosus*, *E. canadensis*, *E. bonariensis*, *X. strumarium*, *X. spinosum* – found in coastal communities; *A. retroflexus*, *E. canadensis*, *E. annuus*, *E. bonariensis* – in forest communities; *Digitaria violascens*, *P. dilatatum* – in roadside shrub communities. Some *E. canadensis*, *E. annuus*, *E. bonariensis* were found in the forest area of the Zagatala State Reserve (Zagatala district), *E. canadensis* – on the outskirts of the forest area of the Ismayilli State Reserve (Ismayilli district). *E. annuus* was also found in meadow cenoses in contact with the Shahdag National Park (Oghuz district).

The study showed that most representatives of Amaranthaceae, Asteraceae and Poaceae were brought to the territory of Azerbaijan unintentionally, i.e. are xenophytes. Some species of alien flora, such as *Siegesbeckia orientalis*, *Tanacetum vulgare*, *Bromus carinatus*, *B. catharticus*, *Chloris virgata*, *Pennisetum alopecuroides* during our long-term research were not found by us in the distribution, which are indicated in the “Flora of Azerbaijan” and “The conspectus of the flora of Azerbaijan”. This does not allow us to properly name the exact status, and yet, given their alien origin, we consider it possible to accept them as potentially invasive plants and continue searching in other districts of the republic.

Unfortunately, when studying alien flora, we face certain difficulties associated with establishing the exact time and vector of penetration of invasions into local ecosystems. The reason for this is the low density or absence of herbarium specimens and the lack of literature data from previous decades on a particular alien species. In the Caucasus and, in particular, in Azerbaijan, some alien species, having settled in the local flora 100-200 or more years ago, have now formed wide areas and correspond to the term “naturalized alien species” [Litvinskaya, Abdiyeva, 2016].

Most of the species are hardy herbs that are able to grow in a variety of habitat types, including disturbed areas such as garbage dumps, abandoned gardens, roadsides, stone fences, etc. In various districts of the republic they are a troublesome weed in agricultural areas, pastures, orchards. In those districts, it is also a serious environmental weed in disturbed sites, secondary forests, along forest edges, and around water troughs. The north-western and southern districts (Zagatala, Balakan, Gakh, Lankaran, Astara districts) are especially susceptible to their impact.

There is an increase in invasions of aggressive naturalized neophytes of North American origin from the genera *Ambrosia* L., *Erigeron* L., *Xanthium* L. It has been established that these plants are found in the most ecologically different communities - from heavily disturbed ruderal ones at the first stage of restorative succession to slightly disturbed or undisturbed by humans (seaside, forest, meadow, shrub). The carriers of these plants are mainly grazing and pasturing cattle, wind and water flows. Analyzing the places of localization of invasions, we drew attention to the fact that the centers of their habitat are the territories of Azerbaijan bordering on Georgia and Russia (Greater Caucasus), as well as the Lankaran lowland. It should be noted that it is these territories that are characterized by good moisture supply (numerous river network, a sufficient amount of annual precipitation) and species migrating from neighboring countries get the opportunity to successfully adapt to new conditions, which is confirmed by the predominance of species of the mesophytic ecological series. Along with natural and climatic conditions, these territories have vast areas occupied by plantations of tobacco, rice, tea, cotton, which also gives us reason to believe that some xenophyte species penetrate along with imported agricultural seeds. For example, this is confirmed by the presence of the majority of cereals – hygromesophytes of Asian origin in rice and tea plantations of the Lankaran group of regions. As for such arid zones as the agrarian Kura-Araz lowland and Absheron, penetration into this part of invasions occurs together with agricultural seeds, as well as driven cattle. As is known, since ancient times, in the animal husbandry of Azerbaijan, there was a practice of using low-lying areas for grazing in winter, where cattle were driven from the summer pastures of the Greater Caucasus. In recent years, mass construction of summer cottages has been taking place on the territory of Absheron. The poor and saline soil does not allow the cultivation of some ornamental species. In this regard, soil is imported here from the territories of the northern part of the country. As a result, new adventive plants *Ambrosia artemisifolia*, *Erigeron annuus* and others still appear in Absheron on a single basis. However, here they manifest themselves as ephemerophytes.

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Azərbaycanın florasında *Amaranthaceae* Juss., *Asteraceae* Dumort. və *Poaceae* Juss. fəsilələrinə aid yad mənşəli bitki növləri

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2017-2021-ci illərdə aparılan ekspedisiyalar əsasında toplanılmış çöl materiallarının təhlili, eləcə də ədəbiyyat və AR ETN Botanika İnstitutunun Herbari fondunda saxlanılan nümunələr əsasında *Amaranthaceae* Juss., *Asteraceae* Dumort. və *Poaceae* Juss. fəsilələrinə aid Azərbaycanda yayılan yad mənşəli bitki növlərinin siyahısı tərtib edilmişdir. Müəyyən edilmişdir ki,

Poaceae fəsiləsi 10 cins və 15 növ (Azərbaycanın ümumi yad mənşəli floranın 25.7%-i), *Asteraceae* 8 cins, 13 növ (18.6%) və *Amaranthaceae* fəsiləsindən isə 2 cins, 7 növ (11.4%) ilə təmsil olunub. Bitkilərin əksəriyyəti toxumla çoxalan, birillik otlardır. Bu növlərin əsas hissəsini Azərbaycan ərazisinə məqsədli gətirilməyən ksenofitlər təşkil edir. Ekoloji baxımdan rütubət amilinə görə bütün növlər aşağıdakı ekoloji qruplara aiddir: mezofitlər (21 növ), kseromezofitlər (13 növ), hiqromezofitlər (4 növ). Ümumi tədqiq olunan növlərdən *Amaranthus retroflexus*, *A. albus*, *Ambrosia artemisiifolia*, *Erigeron canadensis*, *E. annuus*, *E. bonariensis*, *Xanthium strumarium*, *X. spinosum*, *Digitaria violascens*, *D. horizontalis*, *Paspalum dilatatum* hal-hazırda təbii və yarımtəbii qruplaşmalara daxil olan və ya antropogen təsirə məruz qalan ərazilərə miqrasiya edən və təbiiləşən bitkilərdir ki, bunlar da öz növbəsində olduqca təhlükəli hesab edirlər. Yuxarıda sadalanan növlər meşə, çəmən və kolluq icmalarına daxil olmuşlar və indi onlar ot bitkilərinin bir hissəsidir. Bu birliklərin ot təbəqəsinin tərkibini təşkil edir. Azərbaycan mənbələrində əvvəllər qeyd edilən *Siegesbeckia orientalis*, *Tanacetum vulgare*, *Bromus carinatus*, *B. catharticus*, *Chloris virgata*, *Pennisetum alopecuroides* tərəfimizdən aşkar edilməmişdir. Müəyyən edilmişdir ki, bitkilərin bioloji xüsusiyyətləri (qısa həyat dövrü, yüksək dözümlülük, toxumla çoxalması, yeni və ya stresli ekoloji şəraitə uyğunlaşma qabiliyyəti) onların yerli ekosistemlərə daha yaxşı daxil olmasını təmin edir. Yad növlərin müxtəlif fitosenozlarda rastgəlmə tezliyi və bolluğu əsasında onların invazivlik statusları araşdırılıb. Azərbaycana daxil olma vasitəsinə görə, yad bitkilərin əksəriyyəti ksenofitlər və fitosenozlarda roluna görə isə efemerofitlərdir.

Açar sözlər: *biomorfi, yayılma, hiqromorfi, introduksiya, invaziv növlər, həyat formaları, növ müxtəlifliyi, aborigen*

Чужеродные виды семейств *Amaranthaceae* Juss., *Asteraceae* Dumort. и *Poaceae* Juss. во флоре Азербайджана

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На основе анализа полевых материалов, собранных во время наших экспедиционных поездок в 2017-2021 гг., данных литературы и гербариев Гербарного фонда Института Ботаники МНО АР, составлен список чужеродных представителей из семейств *Amaranthaceae* Juss., *Asteraceae* Dumort. и *Poaceae* Juss. произрастающих на территории Азербайджана. Установлено, что семейство *Poaceae* характеризуется наибольшим количеством чужеродных растений, представленных 10 родами и 15 видами (25.7% всей чужеродной флоры Азербайджана), *Asteraceae* 8 родами, 13 видами (18.6%) и *Amaranthaceae* с 2 родами, 8 видами (11.4%). Большинство растений - травянистые однолетники, размножающиеся семенами. Основная часть видов были завезены на территорию Азербайджана непреднамеренно, т.е. являются ксенофитами. В экологическом отношении по фактору влажности все виды относятся к мезофитному экологическому ряду: мезофиты (21 вид), ксеромезофиты (13 видов), гигромезофиты (4 вида). Из представителей семейств 11 представителей *Amaranthus retroflexus*, *A. albus*, *Ambrosia artemisiifolia*, *Erigeron canadensis*, *E. annuus*, *E. bonariensis*, *Xanthium strumarium*, *X. spinosum*, *Digitaria violascens*, *D. horizontalis*, *Paspalum dilatatum* следует считать наиболее опасными, в

настоящее время занимающими естественные и полустественные сообщества или мигрирующие и натурализующиеся в нарушенных местообитаниях. Перечисленные выше виды интродуцированы в лесные, луговые и кустарниковые сообщества и в настоящее время они входят в состав травянистых слоя в этих сообществах. *Siegesbeckia orientalis*, *Tanacetum vulgare*, *Bromus carinatus*, *B. catharticus*, *Chloris virgata*, *Pennisetum alopecuroides*, ранее упоминается в литературных источниках Азербайджана, нами не обнаружены. Биологические особенности выявленных растений (короткий жизненный цикл, высокая выносливость, семенное размножение, способность приспосабливаться к новым или стрессовым условиям внешней среды) обеспечивают их успешное внедрение в местные экосистемы. На основании частоты встречаемости и обилия в местах заноса рассмотрена инвазионная роль и определен статус инвазивности чужеродных растений. Большинство заносных растений по способу заноса характеризуются как ксенофиты, а по роли в фитоценозах - эфемерофиты.

Ключевые слова: биоморфа, распространение, гигроморфа, интродукция, инвазионные виды, жизненные формы, видовое разнообразие, аборигены