7.	*Centaurea*	20	*Trigonella*	16	*Rosa*	22
8.	*Rosa*	18	*Euphorbia*	14	*Poa*	19
9.	*Cirsium*	17	*Centaurea*	14	*Campanula*	16
10.	*Silene*	17	*Verbascum*	14	*Festuca*	15
11.	*Geranium*	17	*Ranunculus*	13	*Rubus*	14
12.	*Poa*	16	*Veronica*	13	*Stipa*	12

Заключение

Таксономический анализ выявил уровень видового богатства и неоднородный, смешанный характер флоры Нагорного Карабаха. Как в большинстве голарктических флор, спектр крупных 10 семейств составляют *Asteraceae, Poaceae, Fabaceae, Apiaceae, Rosaceae, Lamiaceae, Brassicaceae, Caryophyllaceae*, *Scrophulariaceae, Ranunculaceae,* а крупными родами флоры являются *Carex, Astragalus, Allium, Campanula, Trifolium, Ranunculus, Centaurea, Rosa, Cirsium, Silene, Geranium, Poa.* По результатам таксономического анализа установлено, что спектры крупных семейств и родов отдельных административных районов Нагорного Карабаха значительно отличаются друг от друга. Судя по всему, здесь, как и на территории Армении, проходит граница между крупными флористическими провинциями – Кавказской и Армено-Иранской. Флора северных районов Нагорного Карабаха стоит ближе к флоре Зангезура, то есть к кавказской флоре, а флора южных районов НК значительно более близка к флоре Мегри и имеет древнесредиземноморский характер. Становится очевидным необходимость продолжения исследований: с одной стороны, необходимо провести детальный сравнительный анализ флор отдельных районов НК, с другой – провести флороценологический анализ, проанализировать и сравнить флоры отдельных экосистем.

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ON THE ASPEN (*POPULUS TREMULA*) FORESTS IN ARMENIA

Data on distribution of aspen and its communities in Armenia is given. The results of field research on distribution and condition of the aspen forests carried out by the author in the north-west of Armenia are represented. The importance of further investigation and protection of this rare habitat type of Armenia is mentioned.

Populus tremula, aspen forests of Armenia, forest vegetation of Armenia

Ասատրյան Ա. Թ. Հայաստանի կաղամախու (*Populus tremula*) անտառների մասին: Բերվում են տվյալներ Հայաստանում կաղամախու և դրա համակեցությունների տարածման վերաբերյալ: Ներկայացված են հյուսիս-արևմտյան Հայաստանում կաղամախու անտառների տարածման և վիճակի շուրջ հեղինակի կողմից կատարված դաշտային հետազոտությունների արդյունքները: Նշված է Հայաստանում այս հազվագյուտ բնակմիջավայրի հետագա ուսումնասիրման և պահպանման անհրաժեշտությունը:

Populus tremula, կաղամախու անտառները Հայաստանում, Հայաստանի անտառային բուսականություն

Асатрян А. Т. Об осиновых (*Populus tremula*) лесах в Армении. Приводятся данные о распространении осины и ее сообществ в Армении. Представлены результаты полевых исследований автора по распространению и состоянию осиновых лесов в северо-западной Армении. Отмечена не-

обходимость дальнейшего изучения и охраны этого редкого в Армении типа местообитания.

Populus tremula, осиновые леса Армении, лесная растительность Армении

Populus tremula L. (aspen, Eurasian aspen) is a tree species, which distribution area includes mainly temperate and cool regions of Europe and Asia from British Isles to Kamchatka and stretches down to the Balkan Peninsula, Caucasus and Central Asia. The tree somewhere forms large monodominant communities, but more often occurs with small groves and as an inclusion to different types of deciduous and conifer forests. This tree has such vast distribution area due to its adaptability and flexibility – aspen grows well both in low and high temperatures, it is frost and heat resistant and feels good almost on all soil types; aspen tree grows rather fast and effectively reproduces by sprouts (Цепляев, 1961).

Aspen forests (*P. tremula* monodominant stands) is a rare habitat type in Armenia (habitat type and code in EUNIS classification system – "Anatolian aspen forests", G1.926 (Asatryan & Fayvush, 2013). In general, this tree occurs here with small groups or groves in different types of deciduous forest and rarely forms comparatively large communities. It is found on the altitudes of 1500 – 2400 m above sea level and mainly occupies higher mountainous and subalpine belts. According to the herbarium and literary data (Троицкий, 1939; Ярошенко, 1962; Мулкиджанян, 1964, 1966, 1967; Григорян, 1970; Гусян, 1987; Asatryan, 2013; Файвуш, 1983; Asatryan & Fayvush, 2013) the distribution area of aspen in Armenia covers the following floristic regions: Upper Akhuryan (Amasia, Akhuryan river gorge), Lori (Alaverdi, Stepanavan, near Saralanj village), Ijevan (Bazum, Gugarats and Miapor Mnt. Ranges), Aparan (Mnt. Arailer, Tsaghkunyats Mnt. Range), Gegham (Geghard), Sevan (Getashen), Yerevan ("Khosrov Forest" State Reserve), Darelegis (Darb River valley) and Meghri (near Vardanidzor village).

In the "Flora of Armenia" Y.I. Mulkijanyan writes: "The rather large aspen forests of Ashotsk (east of Dzorashen village) and Amasia regions (3 km north-west from Amasia town) are of particular interest for their location in vast steppe and meadow zones with no other natural forest around. Almost pure aspen forests in these areas are represented with large fragments of 1-30 hectares and more and located on 2100-2400m above sea level. The groves are formed with *P. tremula* var. *tremula* and *P. tremula* var. *villosa*, which differ well from each other by the leaf colour and pubescence although they are located close, but no mixed groves occur. The trees are 4-6m high, some specimens of *Betula pubescens, Quercus macranthera*, rarely *Ulmus elliptica* are found by the edges of aspen groves, as well as *Viburnum lantana, Lonicera caucasica, Daphne glomerata, Rosa sp., Rubus saxatilis, Cotoneaster integerrima, Rhamnus microcarpa, Spiraea hypericifolia*." (Мулкиджанян, 1966: 336-337). Researcher also writes, that aspen more often accompanies pine and becomes much more abundant on higher altitudes (Мулкиджанян, 1964). No doubt that he means here pine plantations of Ashotsk region, mentioned below. The largest known fragments of aspen forest in the north-west of Armenia (Ashotsk region) were discovered by Mulkijanyan in 1953 and visited again in 1962 (Мулкиджанян, 1964). Describing the distribution of *P.tremula* in the north of Armenia Mulkijanyan mentions, that the coppice aspen forests stretch from eastern slope of Javakhq Mnt. Range (upper reaches of Dzoraget river) to Akhuryan river gorge (near Krasar village), then aspen groves are found to north-west of Amasia and occur further to the south-east along the gorge formed with spurs of Bazum and Shirak mountain ranges down to Trchkan waterfall and further on towards Saralanj village area.

In the framework of the "Important Plant Areas of Armenia" project, supported by The Rufford Foundation we made trips to the above mentioned sites: in October of 2010 towards the aspen groves of Amasia and in July of 2014 towards the other sites of Shirak region, to which Mulkijanyan refers in his publications (Мулкиджанян, 1964, 1966). We explored the river Chichkan gorge driving all along it from Vardaghbyur down to Mets Parni villages - the area all along the spurs of Shirak Mountain Range and visited the deep Akhuryan river gorge driving from Amasia town to Krasar village.

The most well-known "Aspen groves of Amasia" site has a status of a Natural Monument, and was included in the list of the Important Plant Areas of Armenia (Asatryan & Fayvush, 2013). A group of about 15 closely located small aspen groves with the total area about 10 hectares, located in 3 km to the north-west of town Amasia on steep slopes of 35-40° and in gorges on the altitudes of 2000-2100 m above sea level. Both *Populus tremula* var. *tremula* and *P. tremula* var. *villosa* are found here. The trees are 6-8 m high, with the girth of 30-50 cm; the average age of the trees is about 40-50 years. The following tree and shrub species occur in the aspen woodlands with single specimens: *Salix caprea, Rosa spinosissima, Rubus idaeus, Quercus macranthera, Viburnum lantana, Lonicera caucasica, Prunus divaricata*. Lonely aspen trees and their groups between the groves indicate wider distribution of the aspen forest here in the past. Considerable number of woodland herbaceous plants and shrubs represented in the local flora also proves this statement. According to G. M. Fayvush (Файвуш, 1983) the groves have a character of a riverine habitat, despite they are quite far from rivers.

In past, it was, probably, larger woodland stretching along one of the tributaries of the river Akhuryan and covering surrounding hills. This site is referred as an ecosystem of scientific importance and interest for being the most isolated "Forest Island" in the highlands of Armenia. It is also mentioned as the only "island" of native woodland on the vast territories of Shirak and Ashotsk plateaus. The present condition of the groves is good, no any cut or damaged tree was found. Aspen reproduces quite well, a big number of root sprouts ensure vegetative reproduction of the species, but overgrazing affects negatively the reproduction in some parts of the area as it leads to soil erosion.

In the Chichkhan River gorge (Vardaghbuyr – Mets Parni direction) aspen forests cover the north-east slopes of the spurs of Shirak Mountain Range on the altitudes of about 1900-2300 m above sea level, mostly occupying the gorges and their sides. At the beginning of the route we could observe small aspen grove mixed with pine plantations. The pine trees were planted here some decades ago. Pure aspen groves of around 0,5-2 hectares total area cover soft relief slopes (25-40°) and on their upper limit they are being replaced with other trees: *Sorbus aucuparia, Betula sp., Acer trautvetterii* – remnants of subalpine elfin woodlands (photo)*. Then, on the way towards Trchkan waterfall the aspen forest fragments become larger (5-6 hectares) and cover steeper, somewhere rocky slopes (up to 60°). Aspen trees are taller here, up to 10 m high and girth of about 20-30 cm. The largest forest fragments there estimate up to 10 hectares of area each and are surrounded with smaller groves and single trees. Further to the south pure aspen forests are gradually being replaced with mixed tree communities, where *Sorbus aucuparia, Betula pubescens, Quercus macranthera* take up to 30-35% of the cover. The forest communities get more and more sparse and the role of the oak together with other deciduous tree species grows by the way down to Trchkan waterfall. The forest fragments near the waterfall are large, with lesser representation of aspen, but with bigger percent of younger aspen trees. Further along the route oak is getting dominant changing the aspen-other trees proportion from 50%-50% towards lesser percent of aspen by the end of the gorge. The rough observation shows that the estimated total area of aspen forests in this gorge is up to 120 hectares. Small groups of trees and single aspens between the forest fragments are the evidence of large, whole forest massif existed here in the past. The condition of these forests is good, no signs of felling were seen.

Another site visited was the deep gorge of river Akhuryan, which stretches through Ashotsk Plateau from Amasia to Mnt. Krasar – between Shirak and Upper Akhuryan floristic regions. This gorge is called by locals "Krasar Gorge". Part of it, holding the most of the aspen groves is included in the territory of "Arpilich" National Park. In the 2011-2015 Management Plan for "Arpilich" national park they are mentioned as botanical objects of conservation concern («Արփի լիճ» ազգային պարկի..., 2011).

Aspen groves may be seen on the north-western and south-eastern slopes of the gorge, which are rocky and somewhere very steep, up to 75-80°. The aspen trees start to appear on the steep south-eastern slope of the gorge on about 1km distance from Amasia. The trees are short, up to 1,5-2 m high, somewhere shrub-like, they grow in small groups or mixed with other trees and shrubs, such as *Padus racemosa, Viburnum lantana, Sorbus aucuparia*. Some aspen trees grow right on rocks. Further by the route the groves on the south-eastern slope become denser and the trees – taller creating a true forest look, also small groves formed with taller aspen trees appear on the north-western side of the gorge. The forest fragments on the north-western slope become larger and occur together with pine plantations along their upper line, further on the aspen forest is being replaced with pine plantations. The rough calculations show, that an estimated area of aspen communities in Akhuryan gorge is about 30 hectares. Despite certain pressure of grazing takes place here, the condition of aspen communities is good due to their location on steep rocks and slopes.

A trip was made also from Torosgjugh to Jradzor villages by the northern slopes of Shirak Mountain Range. These slopes are covered with quite dense post-forest shrubs with some trees among them. It makes one to guess, that forests used to cover vast areas on Ashotsk plateau in not so far past and that the aspen forest fragments of Amasia, Akhuryan and Chichkhan rivers' gorges are presumably the remnants of vast, whole forest massive.

Herbarium samples of *P. tremula*, collected on our trips from Akhuryan River gorge and the slopes of Shirak Mnt. Range have been submitted to the Herbarium of Institute of Botany of NAS RA (ERE 189131, 189132, 189133).

Some 1-5 hectares large aspen groves have also been observed in oak forest in one of the western gorges of Tsaghkunyats Mnt. Range on 2000-2400 m above sea level (near village Lusagjygh) during our trip in August of 2014.

Small aspen grove of "Khosrov Forest" State Reserve is of particular interest as it is surrounded with conifer woodland. *Juniperus polycarpos* is accompanied here with prickly cushion plant *Onobrychis cornuta* and some oak trees *(Quercus macranthera)* (Мулкиджанян, 1966).

* See color illustration pages

P. tremula communities of Armenia seem to be very similar to those, which V. Sukachev (Сукачев, 1934: 540) describes for mountains of Central Asia: "Aspen forests in the mountains of Central Asia are rare, but typical for some regions as, for example, on Dzungarian Alatau, on the northern slope of Zaili Alatau mountains and the basin of Issyk Kul lake. Small aspen groves there mostly found on the northern slopes and mark certain belt between forest-steppe and subalpine conifer forests.". The author mentions, that those are coppice forests, the trees never grow very high and their height reaches 10-15m with the girth of 20cm. The accompanying trees there are hawthorn (*Crataegus* sp.), apple-tree (*Malus* sp.), rowan (*Sorbus* sp.) and hackberry (*Padus racemosa*).

Thus, the aspen forests are mostly found in the north of Armenia: by the border between Shirak and Lori floristic regions and in the last one, as well as in Upper Akhuryan, Ijevan and Aparan floristic regions. They represent a rare habitat type in Armenia with small area of occupancy and require more detailed botanical investigation and protection.

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