

# ЛИШАЙНИКИ — LICHENS

## Lichens from Absheron Peninsula of Azerbaijan

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**Abstract.** The article presents comprehensive data on the lichens of Absheron Peninsula. A list of 150 species and 4 varieties is provided. The material was collected in 34 localities. 45 species are new to the studied area, and two species are new to Azerbaijan — *Anaptychia elbursiana* (Szatala) Poelt and *Polysporina lapponica* (Ach. ex Schaer.) Degel. The basis of flora is represented by *Lecanorales* order (88 species). The leading positions belong to the families *Teloschistaceae* (28 species), *Lecanoraceae* (26), *Ramalinaceae* (25), and *Physciaceae* (18). Crustose lichenes prevail (104 species). The greatest variety is shown by the corticolous lichens comprising 73 species.

**Keywords:** lichens, diversity, Azerbaijan, Absheron Peninsula.

## Лишайники Абшеронского полуострова Азербайджана

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**Резюме.** В статье приведены подробные сведения о лишайниках Абшеронского полуострова. Список включает 150 видов и 4 разновидности из 34 местонахождений. Среди выявленных видов 45 являются новыми для исследуемой территории, два вида — *Anaptychia elbursiana* (Szatala) Poelt и *Polysporina lapponica* (Ach. ex Schaer.) Degel. — новыми для Азербайджана. Основу флоры составляет порядок *Lecanorales* (88 видов). Ведущее место по числу видов занимают семейства *Teloschistaceae* (28 видов), *Lecanoraceae* (26), *Ramalinaceae* (25) и *Physciaceae* (18). Преобладают накипные лишайники (104 вида). Наибольшим разнообразием представлены эпифитные лишайники, включающие 73 вида.

**Ключевые слова:** лишайники, разнообразие, Азербайджан, Абшеронский полуостров.

**Study area.** Absheron Peninsula nestles on the western coast of the Caspian Sea and extends into the sea more than 60 km. Geographically it represents continuation of the southeast extremity of the Main Caucasian Range. The Peninsula is washed by nonfreezing warm waters of the Caspian Sea on three sides (north, east and south) and on the west it is protected by high mountains of the Main Caucasian Range. The area relief is

hilly, consisting of foothill plains and low mountains. In the landscape of Absheron there is a horizontal zone, along a young sandy plain and further of coastal rocks, while in the centre there are dry steppe and semi-desert vegetation types. One of the main elements of the relief formation of the place are mud volcanoes, which affect its surface structure and the regime of ground waters. The altitude close to the shore is 28 m below sea level, and the maximum elevation in the north-west is 293 m above sea level (Yusifov *et al.*, 2007).

Located at the base of the peninsula are the industrial city of Sumgait on the northern coast, and the city of Baku, the capital of Azerbaijan, on the southern coast. Baku is surrounded by nearby villages (Mardakan, Shuvalan, Bilgah, Pirshaga, Zyk, etc.).

Climate of the peninsula is dry subtropical. Winter is very often frostless and snowless, the summer months are hot and dry, with sunny, warm periods in autumn and spring. The annual mean temperature is 14.5 °C, with maximum in July or August (+27...+36 °C), and minimum in January (–1...+5 °C). The annual mean rainfall fluctuates within 200–250 mm.

The soils are very diverse. The coastal strip has sandy as well as grey-brown soils. Brown soils are prevailing; in some places they are saline. To notice, the soil of large gardens and parks of Baku city was transported from other regions of republic.

Plant diversity is represented with semi-desert type vegetation. The main ecological plant groups are those of sandy shores, ephemeral subtropical ones, vegetation of saline deserts and rocky outcrops (Allakhverdiev, 1991).

The Absheron Peninsula has a remarkably diverse geology that has great impact in formation of rich lichen cover in the peninsula. The first published data on lichens of the Absheron date back to the early 20<sup>th</sup> century, and are based on specimens collected in the area (Elenkin, 1901, 1905; Smolenskiy, 1929; Oxner, 1940). More extensive and interesting reports of lichen diversity were published in two remarkable publications by Barkhalov (1940, 1983). Three new taxa, viz. *Aspicilia grossheimii*, *Xanthoparmelia desertorum* and *Lecania ephedrae* were described from the peninsula by various authors. Such species as *Ramalina lacera*, *R. maciformis* and *Seirophora villosa* were recorded in Azerbaijan for the first time in this area. In the early 1980s, the list of lichen species known from Absheron Peninsula reached 49 taxa.

Between 1980 and 1986 the lichens of Absheron were studied and presented as a PhD thesis by S. M. Alverdiyeva (1987). Her list comprises 160 species belonging to the 7 orders, 24 families and 48 genera. Among them, 130 taxa were new for Absheron, 6 for Azerbaijan and 4 for the Caucasus.

Absheron Peninsula is the main industrial center of the republic. Industrialization and urbanization have had considerable impact on the environment and have also been affecting the biodiversity of the peninsula. In the last 10 years the lichen diversity of this natural region of the republic has been systematically and comprehensively investigated. The objective of present study is to present a check-list of lichens of the Absheron Peninsula based on authors' collections, literature and herbarium records.

**Materials and methods.** Lichens were collected in 34 localities during field trips in 2003–2013. The localities included forest plantations, parks, valley, limestone rocks and diverse soils. Specimens are kept in the Lichenological herbarium, Institute of Botany, National Academy of Sciences of Azerbaijan, Baku (BAK). Optical equipment and test solutions were used for examination of the specimens. Microscopic sections of the thalli and fruiting bodies were made by hand and observed under Motic digital light microscope (B1 series). The specimens were examined in water, and using 10 % KOH solution (K), saturated  $\text{Ca}(\text{ClO})_2$  solution (C) and water solution of potassium iodide (KI).

In the article the taxa are arranged alphabetically, followed by collection localities and substrates. The nomenclature follows recent literature (e. g., Blanco *et al.*, 2004; Eriksson, 2006; Kirk *et al.*, 2008) and the Index Fungorum database (Index..., 2013).

**List of taxa.** The asterisk (\*) indicates new records, and the black dot (●) indicates rare species for Azerbaijan (known from one to three localities).

**Acarospora nodulosa** (Dufour) Hue var. **reagens** (Zahlbr.) Clauzade et Cl. Roux — vicinity of Baku, soil (Elenkin, 1901).

●**A. schleicheri** (Ach.) A. Massal. — vicinity of Baku, soil (Elenkin, 1901).

**Alyxoria varia** (Pers.) Ertz et Tehler — Mardakan arboretum, bark of *Ligustrum vulgare* L. (Alverdiyeva, 1987).

**Anaptychia ciliaris** (L.) Körb. ex A. Massal. var. **ciliaris** — Sumgayit, Altıgach, bark of trees (Barkhalov, 1983); Jeyranbatan reservoir, bark of trees, 10.06.1982, BAK.

var. **melanosticta** (Ach.) Boist. — Zarat station, moss cover (Barkhalov, 1983).

**A. crinalis** (Schleich.) Vezda — Shuvalan settlement, bark of tree (Barkhalov, 1983).

**A. desertorum** (Rupr.) Poelt — Gobustan, rock, moss cover (Alverdiyeva, 1987).

\*●**A. elbursiana** (Szatala) Poelt — Gobustan, rock, moss cover, 03.07.2004, BAK.

**A. setifera** (Mereschk.) Räsänen — Shuvalan settlement, bark of trees (Barkhalov, 1983).

**Arthonia patellulata** Nyl. — Baku, Botanical garden, bark of *Prunus domestica* L., 22.09.1982, BAK.

**A. punctiformis** Ach. — Baku, Botanical garden, bark of *Diospyros* sp., 05.06.1982, BAK; Mardakan arboretum, bark of *Acer* sp., 30.07.1982, BAK.

**A. radiata** (Pers.) Ach. — Mardakan arboretum, bark of *Ligustrum vulgare*, 30.07.1982, BAK.

• **Arthopyrenia analepta** (Ach.) A. Massal. — Baku, Botanical garden, bark of *Prunus domestica*, 05.06.2005, BAK.

**A. cerasi** (Schrad.) A. Massal. — Baku, Botanical garden, bark of *Melia* sp., 18.03.1983, BAK.

**A. punctiformis** (Pers.) A. Massal. — Baku, Botanical garden, bark of *Diospyros* sp., 05.06.1982, BAK.

**Arthrosporum populorum** A. Massal. — Baku, Botanical garden, bark of *Prunus spinosa* L., 03.06.1982, BAK; Mardakan settlement, bark of *Morus nigra* L., 30.06.1982, BAK.

• **Aspicilia grossheimii** Oxner — Mardakan settlement, limestone soil (Oxner, 1940).

**A. reticulata** Rehm — vicinities of Zira, Shuvalan, Pirshaga settlements, stones (Alverdiyeva, 1987).

**Bacidia arceutina** (Ach.) Arnold — Baku, Botanical garden, bark of *Cercis siliquastrum* L., 03.06.1982, BAK.

**B. auerswaldii** (Hepp ex Stizenb.) Mig. — vicinity of Baku, bark of tree, 23.09.1982, BAK.

**B. biatorina** (Körb.) Vain. — vicinity of Mardakan settlement, bark of *Ulmus* sp. (Alverdiyeva, 1987).

**B. friesiana** (Hepp) Körb. — Mardakan settlement, bark of *Morus nigra*, 30.06.1982, BAK.

**B. polychroa** (Th. Fr.) Körb. — vicinity of Mardakan settlement, bark of trees, 03.06.1982, BAK.

**Bilimbia sabuletorum** (Schreb.) Arnold — vicinity of Baku, rotten stubsold stumps, 23.09.1982, BAK.

**Caloplaca arenaria** (Pers.) Müll. Arg. — vicinity of Zykha settlement, limestone, 12.07.1982, BAK.

**C. aurantia** (Pers.) Hellb. — Baku, Botanical garden, vicinities of Zykha and Nardaran settlements, stones (Barkhalov, 1940, 1983).

**C. caesiorufa** (Ach.) Flagey — Baku, Botanical garden, bark of *Prunus armeniaca* L. (Alverdiyeva, 1987).

**C. cerina** (Hedw.) Th. Fr. — Jeyranbatan reservoir, bark of trees, 28.04.1985, BAK.

**Caloplaca chalybaea** (Fr.) Müll. Arg. — Gobustan, vicinity of Sangachal, limestone, 07.07.2008, BAK.

**C. citrina** (Hoffm.) Th. Fr. — Baku, Botanical garden, stones (Alverdiyeva, 1987).

**C. coronata** (Kremp. ex Körb.) J. Steiner — vicinity of Zira settlement, limestone (Alverdiyeva, 1987).

**C. ferruginea** (Huds.) Th. Fr. — Baku, Botanical garden, stones (Barkhalov, 1940); vicinities of Zira settlement, stones (Alverdiyeva, 1987).

**C. flavorubescens** (Huds.) J. R. Laundon — Baku, Botanical garden, stones (Barkhalov, 1940); vicinities of Zykha and Nardaran settlements, stones (Barkhalov, 1983); vicinity of Zira settlement, stones, 03.07.1983, BAK.

- C. flavovirescens** (Wulfen) Dalla Torre et Sarnth. — vicinity of Baku, rocks, 12.07.1982, BAK.
- C. granulosa** (Müll. Arg.) Jatta — vicinity of Zira settlement, stones (Alverdiyeva, 1987).
- C. lactea** (A. Massal.) Zahlbr. — vicinity of Zira settlement, limestone, 30.07.2006, BAK.
- C. paulsenii** (Vain.) Zahlbr. — vicinity of Mardakan settlement, limestone, 30.07.2006, BAK.
- C. pyracea** (Ach.) Th. Fr. — Gobustan, bark of *Olea europaea* L., *Pinus brutia* Teneor (Alverdiyeva, 2001).
- C. saxicola** (Hoffm.) Nordin — Baku, Botanical garden, limestone (Alverdiyeva, 1987).
- **C. teicholyta** (Ach.) Steiner — Baladjary settlement, limestone (Barkhalov, 1983); Shuvalan settlement, limestone (Alverdiyeva, 1987).
- C. variabilis** (Pers.) Müll. Arg. — Baku, Botanical garden, limestone (Barkhalov, 1983).
- C. verruculifera** (Vain.) Zahlbr. — Pirallakhi island, limestone (Alverdiyeva, 1987).
- Candelariella aurella** (Hoffm.) Zahlbr. — Gobustan, rock (Alverdiyeva, 2001).
- C. vitellina** (Hoffm.) Müll. Arg. — vicinity of Zykht settlement, stones, 12.07.1982, BAK.
- Catapyrenium cinereum** (Pers.) Körb. — vicinity of Baku, ground (Barkhalov, 1969).
- Cetraria aculeata** (Schreb.) Fr. [= *Cetraria steppae* (Savicz) Kärnefelt] — Sumgayit, near Altiagach, Shabran and Jalagan villages, soil (Barkhalov, 1969).
- C. ericetorum** Opiz — Sumgayit, Altiagach, soil (Barkhalov, 1983).
- Chrysothrix candelaris** (L.) J. R. Laundon — Bilgah settlement, bark of *Morus nigra* (Alverdiyeva, 1987).
- C. chlorina** (Ach.) J. R. Laundon — vicinity of Mardakan settlement, bark of tree (Alverdiyeva, 1987).
- Circinaria affinis** (Eversm.) Sohrabi — Absheron, salty soil (Alverdiyeva, 1987).
- C. calcarea** (L.) A. Nordin, Savić et Tibell — Pirallakhi island, stones, 12.07.1984, BAK.
- C. contorta** (Hoffm.) A. Nordin, Savić et Tibell — Shuvalan settlement, stones (Barkhalov, 1983); Mardakan settlement, stones, 30.07.1982, BAK.
- C. elmorei** (E. D. Rudolph) Owe-Larss., A. Nordin et Sohrabi — Besh Barmag mountain (Barkhalov, 1983); Buzovna settlement, limestone, 15.07.1981, BAK.
- **C. esculenta** (Pall.) Sohrabi — Buzovna settlement, clay soil (Alverdiyeva, 1987).
- Cladonia convoluta** (Lam.) Anders — Sumgayit, vicinity of Altiagach, Pirakushkul, H; Taghiyev station, Shabran, Chalaghan, sandy-limestone soil (Barkhalov, 1969).
- C. foliacea** (Huds.) Willd. — Shabran, along the river Gilgilchay, soil (Barkhalov, 1983).
- C. rangiformis** Hoffm. — vicinity of Shabran, sandy-limestone soil (Barkhalov, 1983).
- C. subrangiformis** Sandst. — Altiagach, soil (Barkhalov, 1983).

**Cliostomum griffithii** (Sm.) Coppins. — Bilgah settlement, bark of *Pinus brutia*, 03.07.1982, BAK.

**Collema crispum** (Huds.) F. H. Wigg. — vicinity of Baku, vicinity of Shubany, clay soil (Barkhalov, 1969).

**C. cristatum** (L.) F. H. Wigg. — Zira settlement, soil, 12.07.1982, BAK.

**C. fuscovirens** (With.) J. R. Laundon — Gobustan, rocks (Grossheim, Sakhokia, 1931).

**Cresponea chloroconia** (Tuck.) Egea et Torrente — Bilgah settlement, bark of *Cercis siliquastrum*, 03.07.1982, BAK.

**Diplostemma alboatrum** (Hoffm.) Flot. — Mardakan arboretum, bark of *Melia* sp.; Bilgah settlement, bark of *Acacia* sp. (Alverdiyeva, 1987).

**D. epipolium** (Ach.) Arnold. — vicinity of Zira settlement, limestone (Alverdiyeva, 1987).

**Diploschistes gypsaceus** (Ach.) Zahlbr. — Yashma station, soil (Barkhalov, 1940); Gobustan, vicinity of Sangachal, soil (Alverdiyeva, 2001).

**Endocarpon adscendens** (Anzi) Müll. Arg. — Shabran, vicinity of Zarat station, Besh Barmag mountain, sediments above the rock (Barkhalov, 1969).

**Fulgensia bracteata** (Hoffm.) Räsänen — vicinity of Mardakan settlement, soil (Alverdiyeva, 1987).

**F. fulgens** (Sw.) Elenkin — vicinity of Baladjary, vicinity of Nardaran, soil (Barkhalov, 1983); Gobustan, soil (Alverdiyeva, 2001).

●**Lecania alexandrae** Tomin — Bilgah settlement, bark of *Pinus eldarica* Medw., 03.07.2006, BAK.

**L. cyrtella** (Ach.) Th. Fr. — Baku, Botanical garden, bark of *Pyrus* sp. (Alverdiyeva, 1987).

**L. dubitans** (Nyl.) A. L. Sm. — Baku, Mardakan arboretum, bark of *Olea europaea* (Alverdiyeva, 1987).

●**L. ephedrae** Elenkin — Balakhani settlement, bark of tree (Elenkin, 1905).

**L. erysibe** (Ach.) Mudd — Zira settlement, stones, 03.07.1982, BAK.

**L. fuscella** (Schaer.) A. Massal. — Mardakan arboretum, bark of *Pistacia vera* L., 30.07.2006, BAK.

**L. hyalina** (Fr.) R. Sant. — Baku, Botanical garden, bark of *Gleditsia caspia* Desf.; Mardakan arboretum, bark of tree (Alverdiyeva, 1987).

**L. koerberiana** J. Lahm — Baku, Botanical garden, bark of *Cercis siliquastrum*, 04.10.1982, BAK; Mardakan arboretum, bark of *Amygdalus communis* L., 03.07.1982, BAK.

**L. naegellii** (Hepp) Diederich et Van den Boom — Mardakan arboretum, bark of *Pistacia vera*, 07.07.1982, BAK.

**L. nylanderiana** A. Massal. — Zykha settlement, stones, 12.07.1982, BAK; vicinity of Buzovna settlement, stones, 05.08.1985, BAK.

**L. prasinoides** Elenkin — vicinity of Jeyranbatan reservoir, bark of trees, 12.07.1982, BAK.

**L. triseptata** (Vain.) Zahlbr. — Baku, Botanical garden, bark of *Fraxinus* sp. (Alverdiyeva, 1987).

**L. turicensis** (Hepp) Müll. Arg. — Zira settlement, limestone, 03.07.1983, BAK; Pirshaga settlement, limestone, 10.08.1982, BAK.

**Lecanora allophana** (Ach.) Nyl. — Baku, Botanical garden, bark of trees (Alverdiyeva, 1987).

**L. argentata** (Ach.) Malme — vicinity of Mardakan settlement, bark of *Acacia dealbata* L. (Alverdiyeva, 1987).

**L. argopholis** (Ach.) Ach. — vicinity of Baku, stones (Barkhalov, 1983).

**L. carpinea** (L.) Vain. — Baku, Botanical garden, bark of *Acer* sp. (Alverdiyeva, 1987).

**L. cenisia** Ach. — vicinity of Baku, stones (Barkhalov, 1983).

**L. chlarotera** Nyl. — Baku, Botanical garden, bark of trees (Alverdiyeva, 1987).

**L. crenulata** Hook. — vicinity of Baku, stones (Barkhalov, 1983); Zira settlement, stones, 03.07.1983, BAK.

**L. dispersa** (Pers.) Röhl. — Baku, Botanical garden, bark of *Fraxinus* sp., *Persica vulgaris* Mill. (Alverdiyeva, 1987).

**L. expallens** Ach. — Baku, Botanical garden, bark of *Acer* sp. (Alverdiyeva, 1987).

**L. frustulosa** (Dicks.) Ach. — vicinity of Baku, stones (Barkhalov, 1983).

**L. hagenii** (Ach.) Ach. — vicinity of Baku, bark of *Ligustrum vulgare*, *Fraxinus* sp., 18.04.1983, BAK.

**L. intumescens** (Rebent.) Rabenh. — Baku, bark of *Sapindus* sp.; Mardakan settlement, bark of *Celtis* sp., 10.05.1982, BAK.

**L. meridionalis** H. Magn. — Bilgah settlement, bark of trees; Mardakan arboretum, bark of *Celtis* sp. (Alverdiyeva, 1987).

**L. persimilis** (Th. Fr.) Nyl. — vicinity of Baku, bark of *Fraxinus* sp., *Melia* sp., 16.07.1982, BAK.

**L. piniperda** Körb. — vicinity of Bilgah settlement, bark of trees (Alverdiyeva, 1987).

**L. populicola** (DC.) Duby — vicinity of Baku, bark of *Celtis* sp. (Alverdiyeva, 1987).

**L. pulicaris** (Pers.) Ach. — vicinity of Jeyranbatan reservoir, bark of trees; Bilgah settlement, bark of *Ficus carica* L.; Mardakan arboretum, bark of *Olea* sp. (Alverdiyeva, 1987).

**L. saligna** (Schrad.) Zahlbr. — vicinity of Baku, bark of *Morus nigra* (Alverdiyeva, 1987).

**L. sambuci** (Pers.) Nyl. — Baku, Botanical garden, bark of *Acer* sp. (Alverdiyeva, 1987).

**L. scrupulosa** Ach. — Baku, Botanical garden, bark of *Fraxinus* sp.; Jeyranbatan reservoir, bark of *Ligustrum* sp. (Alverdiyeva, 1987).

**L. subintricata** (Nyl.) Th. Fr. — Baku, Botanical garden, bark of *Prunus avium* L. (Alverdiyeva, 1987).

**L. subrugosa** Nyl. — Baku, Botanical garden, bark of *Acer* sp. (Alverdiyeva, 1987).

**Lecidella euphorea** (Flörke) Hertel — Baku, Botanical garden, bark of *Prunus spinosa*, 14.09.1982, BAK; Zagulba settlement, bark of *Olea europaea*, 15.04.1983, BAK.

**Lepraria incana** (L.) Ach. — vicinity of Baku, bark of *Robinia* sp. (Alverdiyeva, 1987).

**Leptogium gelatinosum** (With.) J. R. Laundon — near Zarat station, Besh Barmag mountain, 05.09.1935, A. Oxner, BAK; vicinity of Shuvalan settlement, 15.08.1981, BAK; vicinity of Zira settlement, soil, 03.07.1983, BAK.

**Leptorhaphis lucida** Körb. — Baku, Botanical garden, bark of *Prunus spinosa*, 30.06.1982, BAK.

**Megalaria laureri** (Hepp ex Th. Fr.) Hafellner — Zagulba settlement, bark of *Morus nigra*, *Ailanthus altissima* (Mull.) Swingle, 15.04.1983, BAK.

**Melanohalea olivacea** (L.) O. Blanco et al. — Jeyranbatan reservoir, bark of *Fraxinus* sp., 28.04.1983, BAK.

**Opegrapha rufescens** Pers. — Baku, Botanical garden, bark of *Ligustrum vulgare* L., 30.07.1982, BAK.

**Oxneria fallax** (Hepp ex Arnold) S. Y. Kondr. et Kärnefelt — Baku, Botanical garden, bark of *Ailanthus altissima* (Алвердиева, 1987).

**Peltigera rufescens** (Weiss) Humb. — vicinity of Baku, Sumgayit, vicinity of Al-tiaqach, soil (Barkhalov, 1969).

**Phlyctis argena** (Spreng.) Flot. — Baku, Botanical garden, bark of *Celtis* sp. (Al-verdiyeva, 1987).

**Physcia adscendens** (Fr.) H. Oliver — Baku, Botanical garden, Mardakan arboretum, Jeyranbatan reservoir, bark of trees (Alverdiyeva, 1987).

**P. aipolia** (Ehrh. ex Humb.) Fűrnr. — Baku, Botanical garden, bark of *Fraxinus* sp. (Alverdiyeva, 1987).

**P. dimidiata** (Arnold) Nyl. — Shabran, near station Zarat, Besh Barmag mountain, bark of trees and stones (Barkhalov, 1969).

**P. leptalea** (Ach.) DC. — Bilgah settlement, bark of *Morus nigra* (Alverdiyeva, 1987).

**P. stellaris** (L.) Nyl. — Mardakan arboretum, bark of tree (Alverdiyeva, 1987).

**P. tenella** (Scop.) DC. — Mardakan settlement, bark of tree (Smolenskiy, 1929).

**P. tribacia** (Ach.) Nyl. — Mardakan settlement, rock (Smolenskiy, 1929).

**Physconia grisea** (Lam.) Poelt — Gobustan, Kichikdash mountain (Barkhalov, 1969); Mardakan arboretum, bark of *Celtis* sp. (Alverdiyeva, 1987).

\*●**Polysporina lapponica** (Ach. ex Schaer.) Degel. — vicinity of Gobustan, rock, 03.07.2004, BAK.

**Porina aenea** (Wallr.) Zahlbr. — Baku, Botanical garden, bark of *Diospyros* sp., 15.09.1981, BAK; Mardakan arboretum, bark of *Robinia* sp. (Alverdiyeva, 1987).

**Psora decipiens** (Hedw.) Hoffm. — Sumgayit, Dizavarchay River valley, soil (Barkhalov, 1969); Gobustan, vicinity of Sangachal, soil (Alverdiyeva, 2001).

**Ramalina fraxinea** (L.) Ach. — vicinity of Jeyranbatan reservoir, bark of *Fraxinus* sp., 28.04.1985, BAK.

●**R. lacera** (With.) J. R. Laundon — Urunos island, soil (Barkhalov, 1969).

●**R. maciformis** (Delise) Bory — vicinity of Baku, near Zaqluba settlement, rock (Barkhalov, 1969).

**R. polymorpha** (Lilj.) Ach. — vicinity of Baku, silicate rock (Barkhalov, 1983).

**Rinodina archaea** (Ach.) Arnold — Baku, Botanical garden, bark of *Olea europaea* (Alverdiyeva, 1987).

**R. conradii** Körb. — vicinity of Bilgah settlement, bark of *Melia* sp. (Alverdiyeva, 1987).

**R. pyrina** (Ach.) Arnold — Baku, Botanical garden, bark of *Fraxinus* sp., 14.07.1982, BAK.



**Romularia lurida** (Ach.) Timdal — Zarat station, soil (Barkhalov, 1983); Gobustan, vicinity of Sangachal, soil (Alverdiyeva, 2001).

**Rusavskia elegans** (Link) S. Y. Kondr. et Kärnefelt — Zira settlement, limestone (Alverdiyeva, 1987).

**Sarcogyne regularis** Körb. — Zyk settlement, stones (Alverdiyeva, 1987).

**Seiophora lacunosa** (Rupr.) Frödén — near Balakhani village (Elenkin, 1901); Shabran, Darakend, salty soil (Barkhalov, 1969).

**S. villosa** (Ach.) Frödén — near Alyat station, bark of tree (Voronov, 1915).

**Squamarina cartilaginea** (With.) P. James var. **cartilaginea** — vicinity of Baku, soil (Barkhalov, 1983).

**S. gypsacea** (Sm.) Poelt — vicinity of Baku, soil (Elenkin, 1901).

**S. lentigera** (Weber) Poelt — Mardakan settlement (Alverdiyeva, 1987); Gobustan, vicinity of Sangachal, vicinity of Khizy, soil (Alverdiyeva, 2001).

**Tephromela atra** (Huds.) Hafellner var. **atra** — vicinity of Baku (Barkhalov, 1983); vicinity of Zira settlement, Mashtaga, limestone (Alverdiyeva, 1987).

**Tonia sedifolia** (Scop.) Timdal — Gobustan, vicinity of Sangachal, soil (Alverdiyeva, 2001).

• **Tornabea scutellifera** (With.) J. R. Laundon — near Baladjari station; vicinity of Shuvalan settlement, rock (Barkhalov, 1969).

**Verrucaria apatela** (A. Massal.) Trevis. — Mardakan settlement, limestone (Alverdiyeva, 1987).

**V. fuscella** (Turner) Winch — Zira settlement, stones, 03.07.1983, BAK.

**V. muralis** Ach. — vicinity of Mardakan settlement, limestone, 30.07.1982, BAK.

**V. viridula** (Schrad.) Ach. — vicinity of Baku, stones, 26.04.1983, BAK.

**Xanthoparmelia camtschadalis** (Ach.) Hale — vicinity of Pirekeshkul settlement, Gobustan, soil (Barkhalov, 1983).

**X. desertorum** (Elenkin) Hale — vicinity of Pirekeshkul settlement, soil (Barkhalov, 1983).

**X. ryssolea** (Ach.) O. Blanco et al. — near Pirekeshkul settlement, soil (Barkhalov, 1969, 1983).

**Xanthoria calcicola** Oxner — Bilajar station; vicinity of settlements Zyk, Mardakan, Nardaran, Shuvalan, hard rocks (Barkhalov, 1940).

**X. candelaria** (L.) Th. Fr. — Baku, Botanical garden, bark of *Celtis* sp. (Alverdiyeva, 1987).

**X. parietina** (L.) Th. Fr. — everywhere, bark of trees, stones (Alverdiyeva, 1987).

**X. polycarpa** (Hoffm.) Th. Fr. ex Rieber — Zagulba settlement, bark of tree (Barkhalov, 1983).

**Discussion.** Since the first data on lichens from Absheron were published, the number of lichen species found in the area and publications on lichens of the peninsula has increased considerably (Barkhalov, 1969). This study also differs from a previous one by Alverdiyeva (1987) and reports several newly collected species for the Absheron Peninsula and two new taxa for Azerbaijan. The taxonomic arrangement in the previous study was made according to Poelt (1973). New collections as well as

taxonomic and nomenclatural reorganizations of the orders *Lecanorales* and *Ostropales* have resulted in considerable changes in the list of taxa as compared to Alverdiyeva (1987).

As a result of current study, 150 species and 4 varieties have been recorded. *Anaptychia elbursiana* and *Polysporina lapponica* are new for Azerbaijan. *Anaptychia elbursiana* and *Tornabea scutellifera* are rare and endangered species included in the second edition of the Red Data Book of plants and fungi of the Republic of Azerbaijan (Azyarbayzhan..., 2013). In addition to the two mentioned, rare species found in one or two localities in Azerbaijan are *Anaptychia desertorum*, *Arthopyrenia analepta*, *Lecania alexandrae*, *Ramalina lacera* and *R. maciformis*. Special attention is deserved by *Aspicilia grossheimii*, being an endemic species of Absheron.

Most of the lichens belong to the order *Lecanorales* (88 species, 60 %) that are attributed to 8 families and 26 genera. Other orders such as *Acarosporales*, *Arthoniales*, *Ostropales*, *Peltigerales*, *Pertusariales*, *Pleosporales*, *Teloschistales* and *Verrucariales* are represented with minor number of taxa. The families with the greatest species number are *Teloschistaceae* (28 species), *Lecanoraceae* (26), *Ramalinaceae* (25), *Physciaceae* (18), *Hymeneliaceae* (7), *Parmeliaceae* (6) and *Verrucariaceae* (6); the others include from 1 to 4 species.

*Caloplaca cerina*, *Circinaria calcarea*, *Physcia adscendens* and *Xanthoria parietina* are the most common species in Absheron and distributed on various substrates. The last two of them are also widespread in Azerbaijan.

Three ecological groups can be defined within recorded taxa. The highest number of taxa (73) was recorded among corticolous lichens. In the Absheron Peninsula corticolous species represent 49 % of all lichens. The species belonging to the genera *Caloplaca* and *Lecanora* are widespread in other regions of the republic. Saxicolous lichens have been found on limestones — 40 species (27 %) and on other types of rocks — 8 species (5.3 %). They are not common species in Absheron. In comparison with other ecological groups, fewer species are related to terricolous group found on soil and sandy substrates, being represented by 29 species (19 %).

Species were also grouped by growth forms. The crustose form comprises 104 species. The richest genera are *Bacidia*, *Caloplaca*, *Circinaria*, *Lecania*, *Lecanora* and *Verrucaria* with totally 67 species. There are 24 foliose species, with dominating genera *Physcia* and *Xanthoria* (totally 11 species). The fruticose species are few, belonging to the genera *Anaptychia*, *Cetraria*, *Cladonia*, *Teloschistes*, *Tornabea* and *Xanthoparmelia*.

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