

Notes on some remarkable epiphytic lichens from Mazandaran province and a short history of lichenology in the Hyrcanian forest, N Iran

نکاتی در باره گل‌سنگ‌های اپیفیت مهم مازندران، همراه با تاریخچه کوتاهی از گل‌سنگ‌شناسی در جنگل‌های هیرکانی شمال ایران

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Abstract

چکیده

Nineteen species of mostly epiphytic lichens from the forests of Nowshahr and Royan located in Mazandaran province (N Iran) are reported. Three species, *Ochrolechia pallescens*, *Phaeophyscia confusa* and *Usnea longissima*, are newly reported for lichenized mycota of Iran and seven species are new to the province. Additionally, a short history of lichenological exploration in the Hyrcanian forest is discussed.

نوزده گونه گل‌سنگ عمدتاً اپیفیت از جنگل‌های نوشهر و رویان در استان مازندران (شمال ایران) گزارش می‌شود که از بین آن‌ها سه گونه *Ochrolechia pallescens*، *Phaeophyscia confusa* و *Usnea longissima* جدید برای مایکوتای گل‌سنگی ایران و هفت گونه نیز برای فهرست گل‌سنگ‌های استان به عنوان گزارش جدید ارائه می‌شود. همچنین، تاریخچه کاوش‌های گل‌سنگ‌شناسی در جنگل‌های هیرکانی به اختصار بررسی می‌گردد.

Keywords: Epiphytic lichens, history, Hyrcanian forest, Iran, Mazandaran, new records

واژه‌های کلیدی: گل‌سنگ‌های اپیفیت، تاریخچه، جنگل‌های هیرکانی (خزری)، ایران، مازندران، رکوردهای جدید

Introduction

Early lichen collecting in the central Hyrcanian forests was mainly done during floristic studies of Iranian vascular plants by European botanists. Buhse (1860) provided a list of lichens from the large area of the southern Caspian Sea, including Gilan, Mazandaran and Golestan provinces (N Iran), but also parts of the present-day Republics of Azerbaijan and Armenia.

Thus, from his list, only 28 lichen species originated from the Iranian part of the Hyrcanian forest. Bornmüller (1850–1860) and Haussknecht (1865–1870) collected lichens during their botanical explorations throughout the Hyrcanian forests, including Gilan, Mazandaran and Golestan provinces. Their collections were published by Rabenhorst (1871),

Steiner (1916), Gyelnik (1931) and Szatala (1940, 1957). According to Oxner (1946), Shelkovinkov visited N Iran in 1916 and made some lichen collections which were later examined by Oxner himself. His paper shows that, the bulk of the collection was from Kurdistan in west and northwest of Iran and only a single species was reported from Gilan province and another one from E Azerbaijan province.

A large number of lichen specimens were collected during the monumental project of Flora Iranica, coordinated by Karl Heinz Rechinger (Vienna, Austria). According to Lack (1987), Rechinger visited Iran in 1937 for the first time, but no precise information was given on the dates of his lichen collecting in Iran. Szatala (1940, 1957) studied the main part of his collections. Afterwards, Per Wendelbo (Bergen, Norway) collected some specimens, which were examined by Weber (1964). During a Finnish expedition to the West-Central Asia in 1972, lichens were collected by Uotila (Helsinki, Finland) in Mazandaran and Golestan provinces. A part of his collections was studied by Seaward *et al.* (2008) and Sohrabi & Sipman (2007).

Probst (Graz, Austria), Soják (Prague, Czech Republic) and Lambinon (Liège, Belgium), made some smaller collections in the forests of Mazandaran and parts of their material were published by Nimis & Tretiach (1997), Vězda (1978) and Ferraro *et al.* (2001), respectively. Probst also mentioned some lichens in an ecological study (Probst 1974) but most of his collections remained unexamined at GZU.

Recently, Seaward *et al.* (2004, 2008) published new records for Iranian lichens, including information from Mazandaran, Gilan and Golestan. Riahi & Valadbeigi (2004, 2005) briefly discussed a few species from Zirab district in Mazandaran province.

Since 1999, the first author has collected lichens in a variety of habitats in the Hyrcanian forests on several occasions. The specimens are preserved in his private herbarium [hb. M. Sohrabi] and partly published by: Sohrabi & Orange (2006), Ahti & Sohrabi (2006), Sohrabi *et al.* (2007) and Kukwa & Sohrabi (2008). Sohrabi (2009–2010) also compiled a preliminary online

lichen checklist of Mazandaran province which so far consists of 129 species. For comparison, the newest checklist for lichenized and lichenicolous fungi of Iran (Sohrabi *et al.* 2010) contains nearly 685 species.

The study area

The Hyrcanian forests cover the southern Caspian coastal plain and the northern slopes of the Alborz (also called Alburz or Elburz) mts. in northern Iran and the south-eastern part of the Republic of Azerbaijan. This summer-green broad-leaved forest reaches up to 2500 m (and occasionally to 2800 m) elevation and extends from east to west over an area of 1,900,000 ha (Sabeti 1994, Sagheb-Talebi *et al.* 2004). It shows a conspicuous altitudinal zonation (Sabeti 1994, Ramezani *et al.* 2008).

Alder and oak forests dominate up to ca. 1000 m. On moist soils common tree species are *Acer velutinum*, *A. cappadocicum*, *Alnus glutinosa*, *A. subcordata* (especially in valleys and riversides), *Fraxinus excelsior* ssp. *coriariaefolia*, *Tilia platyphyllos*, *Ulmus glabra* and *Diospyros lotus*. Associated shrubs are: *Mespilus germanica*, *Prunus divaricata*, *Vitis sylvestris* and lianas are: e.g. *Smilax excelsa* and *Hedera pastuchowii*. On well-drained soils of the plains, *Quercus castaneifolia*, *Carpinus betulus*, *Parrotia persica* and *Buxus hyrcana* predominate, accompanied by the evergreen *Laurocerasus officinalis*, *Ilex aquifolium* and *Ruscus hyrcanus*.

Beech forests dominate at altitudes between (700–1000 and 2000 m. Here *Fagus orientalis* and *Carpinus betulus* are dominant species accompanied by *Acer velutinum*, *A. cappadocicum*, *Tilia platyphyllos*, *Ulmus glabra*, *Cerasus avium*, *Taxus baccata*, *Fraxinus excelsior* ssp. *coriariaefolia* and *Sorbus torminalis*.

The higher slopes of the Alborz mts. at 2000–2500 (–2800) m are covered by sub-humid high-mountain oak forests with dominant *Quercus macranthera* and *Carpinus orientalis*, accompanied by *Fagus orientalis* (up to ca. 2350 m), *Acer campestre*, *A. hyrcanum*, *Viburnum lantana* and *Lonicera* spp.

Today, the lowlands have been turned almost completely into agricultural fields (especially rice

paddies and tea plantations) and citrus orchards. The foothills of the Alborz and its slopes still have an extensive forest cover which, however, is influenced by forestry, forest pasturage and uncontrolled logging (Sabeti 1994, Seifollahian *et al.* 2005, Ramezani *et al.* 2008).

The study area is located in the central Hyrcanian forests of northern Iran. Lichen specimens were collected in five separate localities, mainly in the forests of southern Nowshahr and Royan in Mazandaran province (Fig. 1).

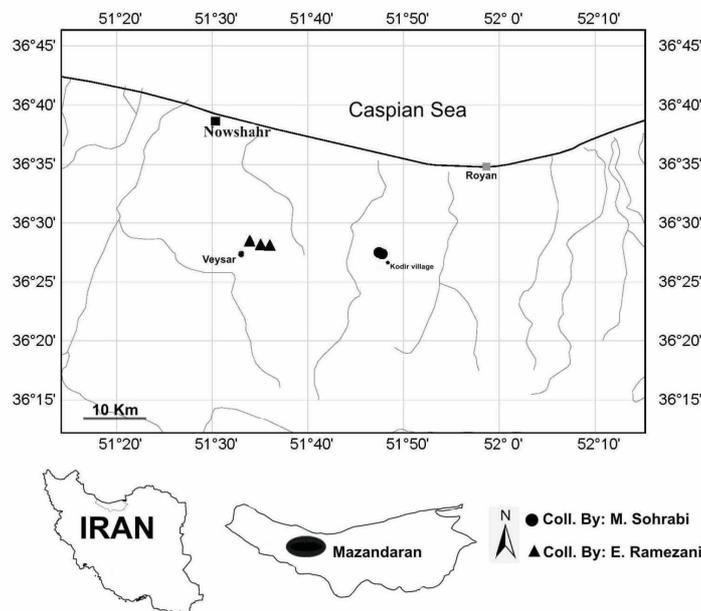


Fig. 1. Location of study area.

There are no climatic records available directly from the study sites. The nearest location with a weather station (Nowshahr, -20 m) has a mean annual temperature of 16.1° C, a mean temperature during the coldest month (February) of 2.3° C and a mean of the warmest month (August) of 29.2° C. Mean annual precipitation is 1,310 mm and mean annual minimum and maximum relative humidity is 75 and 95%, respectively (Ramezani *et al.* 2008). The bedrock in the highest elevations in the area consists predominantly of sandstone and siltstone, over which rendzina and brown earth soils have developed. In mid to low elevations, brown earth and occasionally pseudogley soils have formed over limestone (Forest, Range & Watershed Organization of Iran (FRWO), 1997a, b, 2002).

Below notes on morphology, history, ecological characteristics and general distribution in Iran are presented for 19 species. The presented characters are all

verified on the examined specimens unless otherwise stated.

Materials and Methods

The present paper is based on specimens collected by the second author in September 2004 around Veysar. Added are a few specimens collected by the first author in the surroundings of Kodir village in April and March 2002. The main collection of E. Ramezani is kept at the IRAN herbarium with some duplicates in the private herbarium of M. Sohrabi [hb. M. Sohrabi]. Some critical specimens from M. Sohrabi went for consultation to specialists and accordingly duplicates are deposited in the UPS and TNS.

All specimens were identified using light microscope and stereomicroscope and tested with usual reagents (K, C, KC, P, N and KOH/I). The following identification works were consulted: Ahti *et al.* (2007), Purvis *et al.* (1992) and Wirth (1995). The materials were

compared with authentic samples from the lichen herbarium of the Botanical Museum of Helsinki (H) where indicated. Secondary compounds of species were analyzed following Orange *et al.* (2001). The nomenclature follows mainly Santesson *et al.* (2004) and for some cases Vězda & Liska (1999). Taxa new to Iran are marked by an asterisk.

Distribution map of the examined species from Iran based on this study are presented at the Myco-Lich website (www.myco-lich.com) created by Sohrabi & Ghobad-Nejhad (2009–2010).

Results

Anaptychia crinalis (Schleich.) Vězda

New to Mazandaran. This species has so far been reported by Buhse (1860) and Sohrabi (2005a, 2005b) for Golestan province and by Szatala (1957) and Barkhalov (1975) for Gilan province. *Anaptychia crinalis* is widespread in Eurasia (Esslinger 2007). It can easily be confused with *A. setifera* Mereschk. and *A. ciliaris* (L.) Körb. but differs from both by producing very thin and linear thallus branches. Like *A. setifera*, it has a spinulose or ciliate apothecial margin and it is sometimes mistaken for this species. Molecular studies by Lohtander *et al.* (2008) have recently confirmed the segregation of these species.

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2350 m, 25 Sept. 2004, on *Pyrus* sp. & *Sorbus torminalis*, Ramezani D9b, D18, D15 [hb. M. Sohrabi]; *ibidem*, on *Quercus macranthera*, Ramezani *s.n.* [IRAN 12448].

Cladonia coniocraea (Flörke) Spreng.

In Iran, this species has so far been reported from two localities in Mazandaran and a single locality in Golestan (Ahti & Sohrabi 2006). The species is widespread in the Holarctic region and grows usually on rotting wood or mossy tree bases.

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on an old stump of *Quercus macranthera*, Ramezani D12 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12446].

Evernia prunastri (L.) Ach.

This species has so far been reported from Mazandaran (Szatala 1957) and Golestan (Seaward *et al.* 2004, Sohrabi 2005a, b, Szatala 1957, Sohrabi & Sipman 2007). It is also common in Arasbaran forest in NW Iran (Sohrabi, unpublished data). This is a widespread species that usually grows on trunks and twigs of deciduous trees, particularly oak. Brodo *et al.* (2001) call this species "Oak-moss lichen".

Specimens examined: Nowshahr, 2–3 km E of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on *Quercus macranthera*, Ramezani D8 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12444].

Lecanora thysanophora R.C. Harris

The first report of this species for Iran was published by Seaward *et al.* (2004) and it is until now known only from two localities in Mazandaran. Herein, we present one more locality for this species in Mazandaran.

This species is easily recognizable by its usually sterile, heavily sorediate thallus of more or less circular form, with fimbriate, whitish prothallus. Its chemical components include usnic acid, zeorin, often porphyritic acid and several species-specific terpenoids (Harris *et al.* 2000).

Specimens examined: Nowshahr, 3–4 km east of Veysar (Jamand), 36° 28.164'N/ 51° 35.092'E, 2100 m, 25 Sept. 2004, on *Fagus orientalis*, Ramezani D6 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12447].

Leptogium cyanescens (Rabh.) Körb.

This species was reported from Golestan and Mazandaran provinces by Seaward *et al.* (2004). It is widely distributed in temperate and subtropical regions on mossy trees and rocks or directly on trees or rocks (Hinds & Hinds 2007). This homoiomerous cyanolichen with Nostoc as photobiont is easily recognizable by its black foliose thallus, rounded, thin lobes and a bluish-gray upper surface which is frequently covered by morphologically variable isidia, which are cylindrical or

flattened and with a pale gray lower surface. Our examined specimen has no apothecia.

Specimens examined: Nowshahr, 2–3 km E of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on *Quercus macranthera*, Ramezani D11B [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12445].

***Lobaria pulmonaria* (L.) Hoffm.**

New to Mazandaran. *Lobaria pulmonaria* has hitherto been reported only twice from the northern forests of Iran. The first report was from Gilan by Szatala (1957: 112 as *Sticta pulmonaria*) and the second report by Seaward *et al.* (2004) from Golestan, near Kordkooy. Possibly, this species is relatively common at upper elevations of well conserved Hyrcanian forests, consisting predominantly of *Quercus macranthera* and *Fagus orientalis*.

Lobaria pulmonaria is a red-listed species in many European countries (e.g. Clerc *et al.* 1992, Randlane 1998). It is one of the best indicators for long habitat continuity (Snäll *et al.* 2005) and has been suggested as a signal species for rapid assessment of the conservational importance of forests in Northern Italy (Nascimbene *et al.* 2007).

Ethnolichenologically, *Lobaria pulmonaria* has been widely used as medicinal plant in Europe and North America (Brodo *et al.* 2001). However, our observations as well as by checking of relevant literature on Iranian medicinal plants, e.g. Najmabadi (1974) and Shokri & Safaian (1993), made clear that it has never been listed as medicinal plant in Iran.

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on *Quercus macranthera*, Ramezani D5 & D14 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12450], Nour, Royan, c. 20 km south of Royan, Kojour district, in the surrounding forest of Kodir village, 36° 27.392'N/ 51° 47.786'E, 1650 m, 03.04.2002, on *Quercus* sp., Sohrabi (359, 365, 938) & M. Mofid [hb. M. Sohrabi].

***Nephroma resupinatum* (L.) Ach.**

New to Mazandaran. This species was first recorded by Seaward *et al.* (2004) from Gilan. It is

widespread in the Northern hemisphere, from the temperate to the boreal zone and also known from the South Pacific (Wetmore & Nash 2002). It usually grows on trees and more rarely on rocks. This species is easily recognizable by its foliose thallus, with the cyanobacterium *Nostoc* as photobiont, a gray to grayish brown, dull upper side and a pubescent, pale brown to yellow-brown or whitish, densely tomentose lower surface with raised, white papillae and the absence of secondary metabolites.

Specimens examined: Nowshahr, 3–4 km east of Veysar (Jamand), 36° 28.164'N/ 51° 35.092'E, 2100 m, 25 Sept. 2004, on *Fagus orientalis*, Ramezani D4 [hb. M. Sohrabi]. 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on *Quercus macranthera*, Ramezani D19 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12453].

*** *Ochrolechia pallescens* (L.) A. Massal.**

New to Iran. This conspicuous crustose lichen is characterized by abundant, large apothecia (1–3 mm in diameter) with pinkish, whitish-pruinose disc and fairly thick and swollen margins. The relatively thick thallus with grayish to whitish-gray color has a negative C-reaction in the cortex part, but the apothecium discs have a positive reaction, C+ red, KC+ red. TLC: alectoronic, gyrophoric and variolaric acids. More information can be found in Messuti & Lumbsch (2000). Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on *Prunus* sp., Ramezani D20 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12457].

Additional examined specimens: Italy; Basilicata province, Potenza, N. Abhänge des Monte Pollino, piana dell Pollino NW Serra delle Ciavole, ca 1900 m, on *Pinus leucodermia* Antonie, 2. 06. 1979, Mayerhofer, in *Plantae Graecenses* No. 213 (H). Turkey; Hatay province (31), Amanos Dağı, NE of Dörtyol, c. 3 km SE of Ückoç, 36°58'N, 36°26'E, 1700 m, on bark of *Quercus cerris*. 29. VII 1990, John (in V. John: Lich. Anatolici Exs. No. 159, as *Ochrolechia szatalensis* Vers.) [H].

Parmelia sulcata Taylor

New to Mazandaran. Seaward *et al.* (2004) reported this species for the first time in Iran from the northern forests in Golestan. Sohrabi *et al.* (2007) reported it from E Azerbaijan. This species is widely distributed in Asia and Europe as well as in North America. In Iran, this is a conspicuous species on rocks in the lower alpine zone. Its thallus is whitish gray to shady gray, with imbricate lobes up to 2–4(5) mm wide. Soralia are very common, linear, marginal or laminal. Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on an old stump of *Quercus macranthera*, Ramezani D3a & D17b [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12456].

Parmelina tiliacea (Hoffm.) Hale

New to Mazandaran. This species has rarely been reported from the Hyrcanian forests. The oldest record was made by Buhse (1860) from a few localities in Golestan (formerly Estarabad). Seaward *et al.* (2008) reported it from Northern Khorasan. The species is common in Europe, northern Africa and western India and particularly common in the Mediterranean region of the Iberian Peninsula and Morocco (Argüello *et al.* 2007). *Parmelina tiliacea* is closely related to the Mediterranean taxon *P. quercina*, from which it differs by the abundant isidia. The fertile *P. quercina* and the isidiate *P. tiliacea* have been considered a species pair (Hale 1965). A recent molecular study, however, has revealed that each taxon is an own, monophyletic clade (Argüello *et al.* 2007). Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2370 m, 25 Sept. 2004, on an old stump of *Quercus macranthera*, Ramezani D3b [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12451].

Peltigera praetextata (Flörke ex Sommerf.) Zopf

This appears to be a common species in the Hyrcanian forests and it has been reported also from Arasbaran forest (NW Iran) (Seaward *et al.* 2008,

Sohrabi & Vitikainen, unpublished data). It is widespread in the Caucasus (Barkhalov 1983), Turkey (John 1996), Europe and North America (Vitikainen 1994). For full description see Vitikainen (1994).

Specimens examined: Nowshahr, 3–4 km east of Veysar (Jamand), 36° 28.164'N/ 51° 35.092'E, 2100 m, 25 Sept. 2004, growing at the base of *Fagus orientalis*, Ramezani D10 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12443].

*** *Phaeophyscia confusa*** Moberg

New to Iran. So far, *P. confusa* is known from East Africa and China (Moberg 1995: 322). It was originally described from Kenya by Moberg (1983). The species is characterized by its brown to brownish gray lobes without isidia and soredia. The lower surface is usually black and covered by dense rhizinae, mainly black to dark brown, well developed and often projecting beyond the margin. Apothecia are very common, with spores of the Pachysporaria-type, 18–27 × 8–15 µm. This species commonly occurs on bark of deciduous trees and rarely on rocks. Lichen substances (TLC) are absent.

Specimens examined: Nour, Royan, ca 20 km south of Royan, Kojour district, in the surrounding forest of Kodir village, 36° 27.392'N/ 51° 47.786'E, 1650 m, 03.04.2002, on moss growing on *Quercus* sp., Sohrabi (284) & M. Mofid [UPS, hb. M. Sohrabi].

Additional examined specimen: China; Yunnan, Chuxiong, Lufeng, Yipinglang (km-post 145.5 from Kunming), on *Catalpa fargesii* along the road, 1800 m, 27.IX 1987, Moberg 8131a [UPS, L-017654].

Physcia biziana (A. Masal.) Zahlbr.

New to Mazandaran. Seaward *et al.* (2004, 2008) reported this species from Golestan and E Azerbaijan. For diagnostic characters and spot test see Moberg (2002).

Specimens examined: Nour, Royan, ca 20 km to south of Royan, Kojour district, in the surrounding forest of Kodir village, 36° 27.392'N/ 51° 47.786'E, 1650 m, 03.04.2002, on *Quercus* sp.; Sohrabi (332, 289) & M. Mofid [UPS;

hb. M. Sohrabi].

Physconia distorta (With.) J.R. Laundon

New to Mazandaran. So far this species has been reported from Golestan and N Khorassan (Seaward *et al.* 2008). Morphology, anatomy and ecology of the specimen agree with Moberg (1995).

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2350 m, 25 Sept. 2004, on *Fraxinus coriariaefolia*, Ramezani D13 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12454].

Ramalina farinacea (L.) Ach.

Reported before from Iran by Szatala (1957), Seaward *et al.* (2004) and Riahi & Valadbeigi (2005). Goward (1999) mentioned six chemotypes of this species in British Colombia. The specimens cited below belong to Chemotype 1: protocetraric and usnic (trace) acids.

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2350 m, 25 Sept. 2004, on *Fraxinus coriariaefolia*, Ramezani *s.n.* [IRAN, 12455]; Nour, on the way from Kodir village to Kojour district, 36° 27.488'N/ 51° 47.433'E, ca. 2000 m, 3 April 2002, on *Crataegus* sp., Sohrabi (263, 340, 344) & M. Mofid [TNS; hb. M. Sohrabi]

Ramalina pollinaria (Westr.) Ach.

This species is one of the earliest reported lichen species from the Hyrcanian forests. It was first reported by Buhse (1860) from a locality in "Estarabad" (the current Golestan province). Seaward *et al.* (2004, 2008) have also reported this species from E Azerbaijan, Golestan and Mazandaran provinces. *Ramalina pollinaria* is a circumpolar species and little is known about its distribution in SW Asia. Several authors have reported this taxon from the Caucasus and Turkey (e.g. Barkhalov 1983, John 1996). Characteristic features are: the presence of diffuse soredia over the lobe margins, lobe tips and often the upper surface and the expanded, flap-like lobe tips (Goward 1999).

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2350 m, 25 Sept. 2004, on *Pyrus* sp., Ramezani *s.n.* [IRAN 12458]; Nour,

on the road from Kodir village to Kojour, 36° 27.488'N/ 51° 47.433'E, 2000 m, 03.04.2002, on *Pyrus* sp., Sohrabi (360, 477, 417) & M. Mofid [TNS, hb. M. Sohrabi].

Ramalina sinensis Jatta

This species has been reported from Golestan (Szatala 1957) and Mazandaran (Weber 1964). Additional reports from Golestan and Mazandaran were published by Seaward *et al.* (2004, 2008). Even though it is a common species in temperate and boreal regions of the northern hemisphere, *R. sinensis* is poorly known in SW Asia. It has been reported from the Caucasus (Barkhalov 1983). TLC: usnic acid only (minor compound).

Specimens examined: Nowshahr, 2–3 km east of Veysar (Jamand), 36° 28.497'N/ 51° 33.900'E, 2350 m, 25 Sept. 2004, on *Pyrus* sp., Ramezani D9a [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12459]; Nour, on the way from Kodir village to Kojour, 36° 27.488'N/ 51° 47.433'E, 2000 m, 03.04.2002, on *Crataegus* sp, Sohrabi (279) & M. Mofid [TNS, hb. M. Sohrabi].

Usnea articulata (L.) Hoffm.

This species is common at high altitudes in the Hyrcanian forests. It has been reported from the Caucasus (Barkhalov 1983) and Europe (Tõrra & Randlane 2007). It is also known from an isolated forest in Saudi Arabia (Kürschner & Ghazanfar 1998) and from East Africa. For detailed description, see Swinscow & Krog (1976).

Specimen examined: Nowshahr, 7–8 km east of Veysar (Jamand), 36° 28.106'N/ 51° 36.066'E, 1650 m, 31, 26 Sept. 2004, on *Quercus macranthera*, Ramezani D1 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12449].

* ***Usnea longissima*** Ach.

New to Iran. This species can be recognized by its pendulous and long to very long (1–1.5 to 3 m) thallus. *Usnea longissima* occurs on deciduous trees (particularly *Quercus* spp. and *Fagus orientalis*) at higher elevations in the Hyrcanian forests. So far, several chemotypes have been reported from Europe and East Asia (Tõrra & Randlane (2007). Diffractaic, evernic and barbatic acids

(all react K-, Pd-) seem to be the most common substances in *U. longissima* in Europe and North America (Halonen *et al.* 1998). The Iranian specimen contains two of the mentioned substances, diffractaic and evernic acids. This species is widely distributed in the Northern Hemisphere, having a circumboreal distribution pattern and occurring in humid forests, often near lakes or streams (Nimis 1993, Brodo *et al.* 2001, Törra & Randlane 2007). It also grows in the boreal coniferous region of Europe, Asia and North America (Ahti 1977). In the red data books of some European countries (e.g. Esseen *et al.* 1981, Ruoss & Clerc 1987), *U. longissima* is listed as extinct from the EU (Sérusiaux 1989) but it was recently rediscovered in Italy by Obermayer (1996). Tønsberg *et al.* (1996) reported it from the eastern part of southern Norway with some disjunct localities in Trøndelag and Sogn og Fjordane and listed it as one of the threatened lichens for Norway. For a detailed description see Halonen *et al.* (1998).

Specimens examined: Nowshahr, 7–8 km east of Veysar (Jamand), 36° 28.106'N/ 51° 36.066'E, 1650 m, 31, 26 Sept. 2004, on *Quercus macranthera*, Ramezani D1 [hb. M. Sohrabi], *ibidem*, Ramezani *s.n.* [IRAN 12452].

Additional examined specimen: Italy; Friuli, Alpe Carniche, Sauris, 30 km W of Tolmezzo, south side of Lago di Sauris, Bosco della Stua, 47°26'N, 12°43'E, 1100 m alt., MTB 9542/3, *Fagus-Abies-Picea*-forest, on twigs of *Abies alba*, 8 m above ground. 16.VIII.1994, leg./det. Möslinger, Wieser (1943) & Wilfling [H].

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