Lichenized fungi of the Binaloud Mountains, NE Iran

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Abstract. During an ongoing investigation of Iran's lichen biota we explored two valleys in the Binaloud Mountains (west of Mashhad, Razavi Khorasan province). As a result, we report 57 species, including 18 species new to the province.

Key words: biodiversity, lichenized fungi, Razavi Khorasan

Introduction

Iran is a large country with a surface area of approximately 1.65 million square kilometers, and with a diverse lichen mycobiota. Taxonomic and floristic research during the last decade has resulted in two checklists (Seaward *et al.* 2004, 2008) and several regional accounts (Sohrabi & Sipman 2007; Haji Moniri & Kukwa 2009; Haji Moniri & Sipman 2009).

Razavi Khorasan province in northeastern Iran appeared to be of particular interest for lichens (e.g., Hadji Moniri & Seaward 2005; Hadji Moniry *et al.* 2005; Moniri *et al.* 2009a, b). A highlight is the discovery of *Leptogium trichophorum* P.M. Jørg. & Wallace, a predominantly East Asian species (Haji Moniri & Sipman 2009). In 2007, we continued its exploration with a visit to two valleys in the Binaloud Mountains.

The Binaloud Mountains are approximately 125 km long and form an extension of the Alborz Mountains that extend from northwestern to southeastern Iran (Zomorodian 2002). The areas investigated are in the southeast of Binaloud about 20 km west of Mashhad: Zoshk, at the head of Shandiz valley with a surface area of 37 km² (36°20' N, 59°11' E), and the nearby Kang Valley with a surface area 40 km² (36°19' N, 59°13' E) (Fig. 1). The average altitude above sea level is 1700–2000 m and the annual precipitation about 259 mm, falling during nine months of the year (September–June) (URL: www.ngdir.ir). Geologically, the area is composed of limestone, conglomerate, dolomite, shale and quartzite (Zomorodian 2002). The natural vegetation of the region has much changed due to grazing and apart from the cultivated land now the whole landscape consists of almost tree-less pasturage land. Gardens with trees are located in the valley bottoms, and arable fields higher up the slopes. The dominant phanerogam species are *Alyssum bracteatum* Boiss. & Buhse, *Amygdalus communis* L., *Asperula glomerata* (M. Bieb.) Griseb., *Descurainia sophia* (L.) Webb ex Prantl, *Ferula gummosa* Boiss., *Fraxinus excelsior* L., *Juglans regia* L., *Malva neglecta* Wallr., *Melica persica* Kunth, *Populus alba* L., *Rheum ribes* L., *Rhus coriaria* L., *Rosa canina* L., *Salix alba* L., *Sanguisorba minor* Scop., *Scariola orientalis* (Boiss.) Soják, *Silene swertiifolia* Boiss., *Urtica dioica* L. and *Varthemia persica* DC. (Rashed *et al.* 1982–1987).

Material & methods

269 specimens were collected during July and October 2007 at the following five sampling sites in the Razavi Khorasan province:

- (I): Zoshk, trail beside the Zoshk River, 1716–1738 m alt.
- (II): Zoshk, Gholgholi spring, 1785–1835 m alt.
- (III): Zoshk, end of the valley, 1840–1875 m alt.
- (IV): Kang valley, western slopes, 1725–1843 m alt.
- (V): Kang valley, eastern slopes, 1725–1843 m alt.

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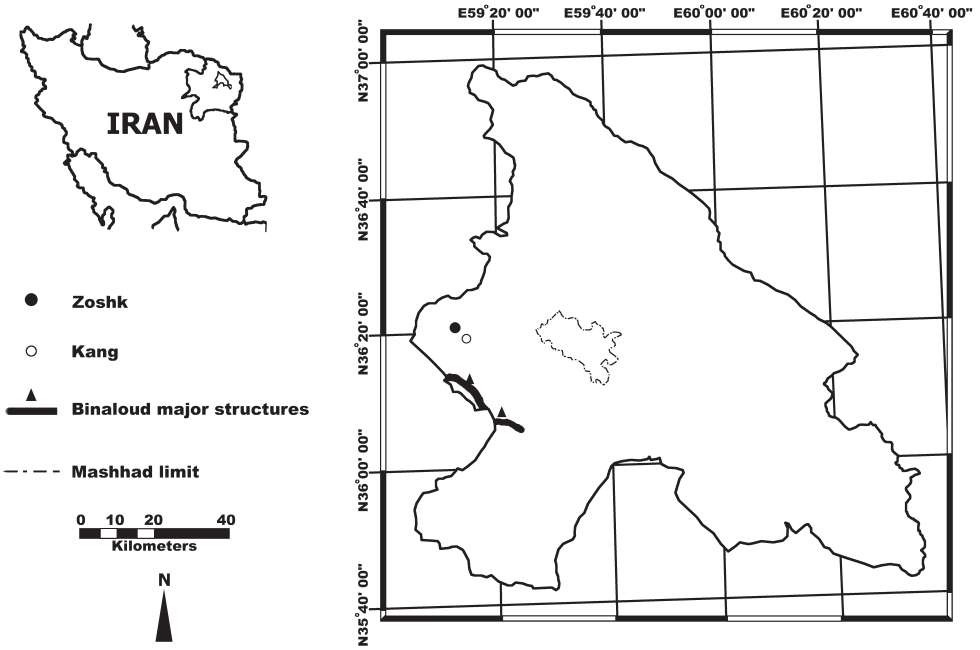

Fig 1. Map of the Razavi Khorasan Province, NE Iran, showing the position of the mountain range Binaloud and the investigated valleys (URL: http://www.mpo.kh.ir)

Specimens were air dried and identified using standard reagents for spot testing and fluorescence (Orange *et al.* 2001) and microscopic techniques. Vouchers are deposited in the first author's lichen collection, with some selected duplicates in B. Identifications were made using Purvis *et al.* (1992) and further literature given in the references (Vitikainen 1994; Nash *et al.* 2002–2007).

Results

So far 125 samples have been identified to species level representing 57 species belonging to 30 genera as listed below. These include 18 species new to the Razavi Khorasan province (*). They were reported before in Iran from Ardabil, East Azarbaijan, Esfahan, Fars, Golestan, Hormozgan, Kordestan, Lorestan and Mazandaran provinces (Szatala 1940, 1957; Seaward *et al.* 2004, 2008; Sohrabi & Sipman 2007). Because of the wide diversity and lack of adequate identification tools, 144 samples remained unidentified.

Abbreviations and symbols: Roman number = sampling site; 4-digit number = voucher specimen; underlined 4-digit number = duplicate specimen in B; collectors: MT = Mahboobeh Tavakoli; NN = Nafiseh Noferesti; SJM = Solmaz J. Mirasgari.

Taxa reported

Acarospora anatolica H. Magn. – (I) 2248, SJM; (IV) 2218, MT; (IV) 2348, NN; (V) 2379, NN; on calcareous rock.

Acarospora bullata Anzi – (III) 2292, SJM; (IV) 2143, MT; (V) 2356, NN; on calcareous rock.

**Acarospora macrospora* (Hepp ex A. Massal.) Bagl. – (IV) 2219, MT; 2368, NN; on calcareous rock.

**Anaptychia elbursiana* (Szatala) Poelt – (IV) 2160, 2210, MT; (V) 2346, NN; on soil and rock.

Anaptychia desertorum (Vain.) Vain. – (IV) 2147, MT; (V) 2345, NN; on *Populus alba.*

Aspicilia calcarea (L.) Körb. – (III) 2317, SJM; on calcareous rock.

Aspicilia cinerea (L.) Körb. – (III) 2308, SJM; on calcareous rock.

Aspicilia desertorum (Kremp.) Mereschk. – (I) 2209, 2243, 2286, SJM; (IV) 2145, 2171, MT; (V) 2396, NN; on calcareous and siliceous rock.

Caloplaca cf. *biatorina* (A. Massal.) J. Steiner – (III) 2293, SJM; 2148, MT; (V) 2352, NN; on calcareous rock.

Caloplaca cerina (Ehrh. ex Hedwig) Th. Fr. – (V) 2404, NN; on calcareous rock.

**Caloplaca decipiens* (Arnold) Blomb. & Forssell – (II) 2272, 2285, SJM; (IV) 2202, MT; (V) 2392, NN; on calcareous rock.

**Caloplaca persica* (J. Steiner) M. Steiner & Poelt – (IV) 2195, MT; 2378, NN; on calcareous rock.

Caloplaca variabilis (Pers.) Müll. Arg. – (II) 2196, 2279, SJM; (IV) 2149, MT; (V) 2388, NN; on calcareous rock.

Candelariella aurella (Hoffm.) Zahlbr. – (I) 2245, SJM; (IV) 2152, MT; (V) 2345, NN; on calcareous rock.
Candelariella vitellina (Hoffm.) Müll. Arg. – (II) 2263, SJM; (V) 2391, NN; on siliceous rock.
Collema auriforme (With.) Coppins & J.R. Laundon – (III) 2299, SJM; (IV) 2180, MT; on mosses and calcareous rock.
Collema tenax (SW.) Ach. – (III) 2324, SJM; on soil.
Dermatocarpon miniatum (L.) W. Mann – (II) 2260, SJM; (IV) 2155, MT; (V) 2343, NN; on wet rock.
Dimelaena oreina (Ach.) Norman – (III) 2314, SJM; (V) 2400, NN; on siliceous rock.
Diplotomma alboatrum (Hoffm.) Flot. – (II) 2288, 2307, SJM; on bark of *Fraxinus excelsior.*
**Fulgensia bracteata* (Hoffm.) Räs. – (I) 2255, SJM; (IV) 2201, MT; on soil.
Fulgensia fulgens (Sw.) Elenkin – (III) 2309, SJM; on mosses.
Fulgensia subbracteata (Nyl.) Poelt – (I) 2262, SJM; (V) 2370, NN; on soil and mosses.
Glypholecia scabra (Pers.) Müll. Arg. – (I) 2257, SJM; (IV) 2156, MT; (V) 2349, NN; on calcareous rock.
Lecanora argopholis (Ach.) Ach. – (I) 2249, SJM; on soil and mosses.
**Lecanora campestris* (Schaer.) Hue – (III) 2311, SJM; (V) 4401, NN; on calcareous rock.
Lecanora crenulata Hook. – (III) 2322, SJM; (IV) 2190, MT; 2348, NN; on calcareous rock.
Lecanora dispersa (Pers.) Sommerf. – (II) 2276, SJM; (IV) 2169, MT; (V) 2347, NN; on calcareous rock.
Lecanora garovaglii (Körb.) Zahlbr. – (I) 2251, 2387, SJM; (IV) 2182, MT; (V) 2351, NN; on calcareous rock.
Lecanora usbekica Poelt – (IV) 2206, MT; (V) 2399, NN; on siliceous rock.
**Lecidea tessellata* (Ach.) Flörke – (III) 2323, SJM; (IV) 2163, 2183, MT; on calcareous rock.
Lecidella carpathica Körber – (III) 2304, SJM; (IV) 2207, MT; (V) 2355, NN; on calcareous rock.
**Lobothallia praeradiosa* (Nyl.) Hafellner – (I) 2241, SJM; on calcareous rock.
**Peccania coralloides* (A. Massal.) A. Massal. – (V) 2346, NN; on calcareous rock; det. M. Schultz.
Peltigera monticola Vitik. – (IV) 2238, SJM; on soil.
Peltigera praetextata (Flörke ex Sommerf.) Zopf – (II) 2266, SJM; on soil.
**Phaeophyscia nigricans* (Flörke) Moberg – (IV) 2169, NN; on bark of *Salix alba.*
**Physcia albinea* (Ach.) Nyl. – (III) 2307, SJM; on calcareous rock.
Physcia tenella (Scop.) DC. – (V) 2360, NN; on bark of *Fraxinus excelsior.*
**Physcia tribacia* (Ach.) Nyl. – (III) 2313, SJM; (IV) 2222, MT; (V) 2347, NN; on bark of *Fraxinus excelsior* and calcareous rock.
**Placidium squamulosum* (Ach.) Breuss – (II) 2275, SJM; (IV) 2199, MT; (V) 2397, NN; on soil.
Protoparmeliopsis muralis (Schreb.) Rabenh. – (II) 2270, SJM; (IV) 2158, MT; (V) 2359, NN; on siliceous rock.
Psora decipiens (Hedw.) Hoffm. – (III) 2297, SJM; (V) 2389, NN; on soil.
Rhizocarpon disporum (Naeg. ex Hepp) Müll. Arg. – (III) 2303, SJM; on siliceous rock.
Rhizocarpon geminatum Körb. – (III) 2291, SJM; (IV) 2164, MT; (V) 2358, NN; on calcareous rock.
Rhizocarpon geographicum (L.) DC. – (II) 2274, SJM; (IV) 2189, MT; (V) 2371, NN; on siliceous rock.
Rhizocarpon viridiatrum (Wulfen) Körb. – (III) 2289, SJM; (IV) 2165, MT; (V) 2353, NN; on siliceous and calcareous rock.
Rhizoplaca melanophthalma (Ramond) Leuckert & Poelt – (I) 2254, SJM; (IV) 2166, MT; (V) 2350, NN; on siliceous and calcareous rock.
**Rhizoplaca peltata* (Ramond) Leuckert & Poelt – (I) 2252, 2263, SJM; (IV) 2188, MT; (V) 2372, NN; on calcareous rock.
Squamarina cartilaginea (With.) P. James – (III) 2315, SJM; on soil and mosses.
**Thallinocarpon nigritellum* (Lettau) P.M. Jørg. – (IV) 2200, MT; on siliceous rock; det. M. Schultz, sub *Lichinella.*
Toninia candida (Weber) Th. Fr. – (I) 2259, SJM; on soil.
Toninia diffracta (A. Massal.) Zahlbr. – (I) 2258, SJM; (IV) 2167, MT; (V) 2344, NN; on soil.
**Verrucaria lecideoides* (A. Massal.) Trevis. – (V) 2398, NN; on calcareous rock.
**Xanthoparmelia verruculifera* (Nyl,) O. Blanco *et al.* – (I) 2250, SJM; (IV) 2215, MT; (V) 2386, NN; on calcareous rock.
**Xanthoria candelaria* (L.) Th. Fr. – (IV) 2221, MT; (V) 2361, NN; on old lignum of *Salix alba.*
Xanthoria elegans (Link.) Th. Fr. – (III) 2316, SJM; (IV) 2216, MT; (V) 2394, NN; on calcareous rock.

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