

Lichens from three mountain sites in Khorasan provinces, Iran, including four species new to Iran

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Abstract – 46 Species of lichenized fungi are reported from Kopet Dagh and Ala Dagh in northern Khorasan and Razavi Khorasan, Iran. Among these *Diplotomma pharcidium*, *Lecanora subrugosa*, *Rinodina zwackhiana* and *Seiophora austroarabica* are newly recorded for Iran and eight species newly for the respective provinces. A north-eastern element in the Iranian lichen flora is postulated, including *Anaptychia roemeri* and *Seiophora orientalis*.

Lichenized fungi / new records / *Diplotomma* / *Lecanora* / *Rinodina*

INTRODUCTION

The first lichens from the Northeast of Iran were mentioned by Szatala (1940, 1957). Lichenological investigations of this region were continued later by Haji Moniri, the first results of which were published in Seaward *et al.* (2004), Hadjmoniry *et al.* (2005) and Haji Moniri and Seaward (2006). By 2008, approximately 250 lichen species in c. 85 genera have been recorded from the three Khorasan provinces in the northeast of Iran (Seaward *et al.*, 2008). More recent additions were provided by Haji Moniri and Sipman (2009), Haji Moniri and Kukwa (2009) and Haji Moniri *et al.* (2009).

Here we present additional lichen information from the Kopet Dagh (loc. from north of Bujnurd to Mozduran) and Ala Dagh (loc. west of Bujnurd) mountains (Fig. 1). Localities A and B are situated in the Irano-Touranian biogeographic region with prevalently steppe vegetation (Rashed *et al.*, 1982-1987). Locality C is influenced by the humid Caspian climate which caused formation of diverse vegetation types (Akhani, 1998; Joharchi and Akhani, 2006).

MATERIALS AND METHODS

Material for studying was sampled in the following 11 localities by the first author during favourable seasons in 2004-2005.

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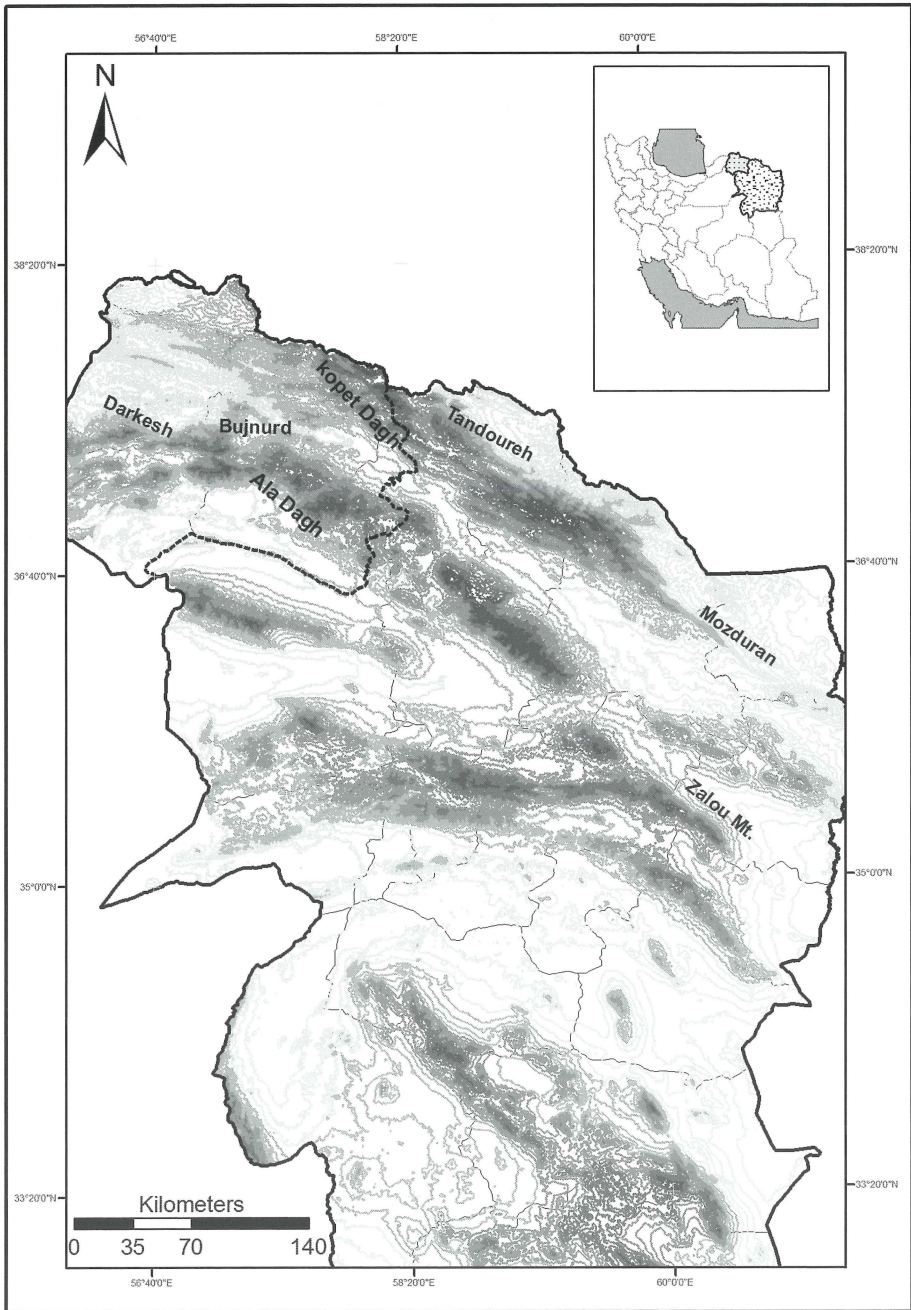


Fig. 1. Location of the Khorasan provinces (URL: [http:// www. ncc.org.ir](http://www.ncc.org.ir)) with collection areas.

- A. Razavi Khorasan province, Salehabad road, Derazaab, Zalou Mt., 1250-1300 m, 10.3.2004
- B. Razavi Khorasan province, Kopet Dag, Tandoureh National Park: B1. Shekaraab, 2200 m, 9.5.2004; B2. Tivan, 2300 m, 10.5.2004; B3. Chelmir, 1290 m, 10.5.2004; B4. Ghanbarali Mt., 2340 m, 26.10.2004; B5. Alibolagh Rd, 1360 m, 27.10.2004
- C. Northern Khorasan province, Ala Dag, Darkesh Reserved Region: C1. Darvishparan, 1100 m, 14.3.2005; C2. Nargesli, 2450 m, 15.3.2005; C3. Ghareaghaj, 1415 m, 29.3.2005; C4. Gollak, 1158 m, 29.3.2005; C5. Nale-e biaab, 1130 m, 30.3.2005

Specimens were studied using standard light microscopy. Microscopic preparations were made from hand sections and mounted in water, 10% potassium hydroxide or Lugol's solution. Measurements of anatomical characters were made in water at 100-1000× magnification. The original material is deposited in the first author's private herbarium, duplicates in B.

The standard works used for identification were Smith *et al.* (2009), Nash *et al.* (2002, 2004, 2007) and Wasser & Nevo (2005); for special groups were consulted: Brodo (1984), Giralt (2001), Kurokawa (1962), Sliwa (2007) and Vitikainen (1994).

RESULTS

Added are locality code (see above), substrate, Haji Moniri collecting number and herbaria where deposited. Species new to Iran are marked by **, species new to the provinces by *.

Acarospora cervina (Ach.) A. Massal. – B3, calcareous rock, 1812 [hb. Haji Moniri, B]; B4, calcareous rock, 1841 [hb. Haji Moniri], det. K. Knudsen.

**Acarospora laqueata* Stizenb. – B5, calcareous rock, 1879 [hb. Haji Moniri, B]

Anaptychia ciliaris (L.) Körb. – C1, broad-leaved trees, 1974 [hb. Haji Moniri, B]; C2, *Quercus castaneifolia*, 1896, 1898, 1900, 1934, 1935 [hb. Haji Moniri, B]; C3, *Quercus castaneifolia*, 2008 [hb. Haji Moniri, B].

Anaptychia desertorum (Rupr.) Poelt – A, *Pistacia atlantica*, 1740 [hb. Haji Moniri, B]; B5, broad-leaved trees, 1874 [hb. Haji Moniri, B].

Anaptychia roemerii Poelt – A, *Pistacia atlantica* & rock, 1731 [hb. Haji Moniri, B]; B1, *Thuja orientalis*, 1764 [hb. Haji Moniri, B].

Anaptychia setifera (Mereschk.) Räsänen – C3, *Rosa canina*, 1982 [hb. Haji Moniri, B], broad-leaved trees, 1965, 1966 [hb. Haji Moniri, B].

Caloplaca biatorina (Trevis.) J. Steiner – B4, calcareous rock, 1842 [hb. Haji Moniri, B].

Caloplaca cerina (Ehrh. ex Hedw.) Th. Fr. – C2, *Quercus castaneifolia*, 1916 [hb. Haji Moniri]; C3, *Rosa canina*, 1984 [hb. Haji Moniri, B], 2008 [hb. Haji Moniri].

Caloplaca chalybaea (Fr.) Müll. Arg. – B4, calcareous rock, 1828 [hb. Haji Moniri].

**Caloplaca pyracea* (Ach.) Th. Fr. – C2, *Quercus castaneifolia*, 1916 [hb. Haji Moniri].

Caloplaca variabilis (Pers.) Müll. Arg. – B4, calcareous rock, 1842a [hb. Haji Moniri, B]; C1, calcareous rock, 1987 [hb. Haji Moniri].

- Candelariella aurella* (Hoffm.) Zahlbr. – B4, calcareous rock, 1842 [hb. Haji Moniri]; C2, calcareous rock, 1890 [hb. Haji Moniri].
- Collema auriforme* (With.) B.J. Coppins & J.R. Laundon – B4, soil, 1847 [hb. Haji Moniri, B].
- Collema cristatum* (L.) Weber ex F. H. Wigg. – B5, soil, 1884 [hb. Haji Moniri, B].
- Diploschistes ocellatus* (Fr.) Norman – C2, calcareous rock, 1888 [hb. Haji Moniri, B].
- **Diploschistes scruposus* (Schreb.) Norman – C2, calcareous rock, 1944 [hb. Haji Moniri, B].
- ***Diplotomma pharcidium* (Ach.) M. Choisy – B4, wood, 1836 [hb. Haji Moniri, B].
- Lecanora allophana* (Ach.) Nyl. – C2, bark, 1910 [hb. Haji Moniri, B].
- **Lecanora carpinea* (L.) Vain. – C2, *Quercus castaneifolia*, 1916 [hb. Haji Moniri].
- **Lecanora dispersa* (Pers.) Röhl. – B1, calcareous rock, 1774 [hb. Haji Moniri]; C2, bark, 1913 [hb. Haji Moniri, B]; C4, *Quercus castaneifolia*, 2008 [hb. Haji Moniri].
- ***Lecanora subrugosa* Nyl. – C2, *Quercus castaneifolia*, 1916 [hb. Haji Moniri].
- Lecidea tessellata* Flörke – B4, calcareous rock, 1843a [hb. Haji Moniri, B]; B5, calcareous rock, 1853 [hb. Haji Moniri, B].
- Lecidella carpatica* Körb. – B1, calcareous rock, 1744 [hb. Haji Moniri].
- Lecidella euphorea* (Flörke) Hertel – C2, *Quercus castaneifolia*, 1916 [hb. Haji Moniri]; C4, *Quercus castaneifolia*, 2008 [hb. Haji Moniri].
- **Lecidella stigmatea* (Ach.) Hertel & Leuckert – B4, calcareous rock, 1830, 1834 [hb. Haji Moniri], 1843b [hb. Haji Moniri, B].
- Lobothallia radiosa* (Hoffm.) Hafellner – C2, calcareous rock, 1945 [hb. Haji Moniri, B].
- Parmelina tiliacea* (Hoffm.) Hale – C2, mosses, 1894 [hb. Haji Moniri, B].
- Peltigera monticola* Vitik. – B5, soil, 1883 [hb. Haji Moniri, B].
- Peltigera praetextata* (Flörke ex Sommerf.) Zopf – A, soil, 1699 [hb. Haji Moniri, B].
- Physcia adscendens* (Fr.) H. Olivier – C4, *Quercus castaneifolia*, 2008 [hb. Haji Moniri].
- Physcia stellaris* (L.) Nyl. – A, *Pistacia atlantica*, 1740 [hb. Haji Moniri]; C1, broad-leaved trees, 1952 [hb. Haji Moniri, B]; C3, broad-leaved trees, 1988a [hb. Haji Moniri, B].
- Physcia tribacia* (Ach.) Nyl. – B5, mosses, 1856 [hb. Haji Moniri, B].
- Physconia distorta* (With.) J.R. Laundon – C3, *Rosa canina*, 1984 [hb. Haji Moniri, B].
- Physconia perisidiosa* (Erichsen) Moberg – C3, broad-leaved trees, 1988 [hb. Haji Moniri, B].
- **Placidium pilosellum* (Breuss) Breuss – C3, soil, 1845 [hb. Haji Moniri, B].
- Pleurosticta acetabulum* (Neck.) Elix & Lumbsch – C2, mosses & *Quercus castaneifolia*, 1912 [hb. Haji Moniri, B].
- Rinodina dubyana* (Hepp) J. Steiner – B2, calcareous rock, 1790a [hb. Haji Moniri, B].
- Rinodina guzzinii* Jatta – B4, calcareous rock, 1842a [hb. Haji Moniri, B].
- ***Rinodina zwackhiana* (Kremp.) Körb. – B4, calcareous rock, 1840a [hb. Haji Moniri], det. M. Giralt.
- Romularia lurida* (Ach.) Timdal – C5, soil, 2020 [hb. Haji Moniri, B].
- **Seiophora orientalis* Frödén – B5, broad-leaved trees, 1878 [hb. Haji Moniri, B].
- ***Seiophora austroarabica* (Sipman) Frödén – B1, soil, 1747 [hb. Haji Moniri, B]; B5, soil, 1871b [hb. Haji Moniri, B]; C2, *Quercus castaneifolia*, 1890, 1933 [hb. Haji Moniri, B].

- Toninia candida* (Weber) Th. Fr. – B, soil, 1817 [hb. Haji Moniri, B].
Toninia diffracta (A. Massal.) Zahlbr. – A, soil, 1712 [hb. Haji Moniri, B].
Tornabea scutellifera (With.) J.R. Laundon – C2, *Quercus castaneifolia*, 1888 [hb. Haji Moniri], 1893, 1946 [hb. Haji Moniri, B], 1947, 1970, 1973, 1990, 1992, 1994 [hb. Haji Moniri]; C4, broad-leaved trees, 2002 [hb. Haji Moniri, B].
Xanthoria elegans (Link) Th. Fr. – A, calcareous rock, 1711 [hb. Haji Moniri, B]; B4, calcareous rock, 1848a [hb. Haji Moniri, B].

DISCUSSION

The 45 species listed include 4 species not reported before from Iran, viz. *Diplotomma pharcidium*, *Lecanora subrugosa*, *Rinodina zwackhiana* and *Seiophora austroarabica*. The first three are crustose lichens belonging to groups which are poorly known in Iran. The *Seiophora* species is a fruticose, conspicuous lichen unusual in the genus while being sorediate on the lower side near the tips. In addition, 9 species are newly recorded for the respective provinces: *Acarospora laqueata* Stizenb. (Razavi Khorasan), *Caloplaca pyracea* (Ach.) Th. Fr. (Northern Khorasan), *Diploschistes scruposus* (Schreb.) Norman (Northern Khorasan), *Lecanora carpinea* (L.) Vain. (Northern Khorasan), *Lecanora dispersa* (Pers.) Sommerf. (Northern Khorasan), *Lecidella stigmatea* (Ach.) Hertel & Leuckert (Razavi Khorasan), *Placidium pilosellum* (Breuss) Breuss (Northern Khorasan), *Rinodina guzzinii* Jatta (Razavi Khorasan), *Seiophora orientalis* Frödén (Razavi Khorasan).

The listed species do not represent an exhaustive treatment of the lichen biodiversity of the sites, but many samples remain unidentified. The listed species rather reflect the availability of adequate treatments for identification and is consequently biased on macrolichens, while common lichen genera like *Acarospora* and *Aspicilia* are much underrepresented.

Due to the strong recent increase in lichen collecting activity in Iran, the available collections in particular of macrolichens are becoming more representative as to distribution, and it becomes tempting to speculate about the presence of a north-eastern element in the Iranian lichen flora. Two macrolichen species from the above list, viz. *Anaptychia roemerii* and *Seiophora orientalis*, may belong to it. Each is by now known from several specimens, all from NE Iran only. They have a further distribution in Central Asia and seem to reach their SW limit in Iran (Poelt & Wirth, 1968; Frödén & Litterski, 2005).

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REFERENCES

- AIDANI M., 2004 – Floristic studies of the Darkesh Reserved Region in the NW of Khorasan Province. M.Sc. Thesis, Islamic Azad University, Tehran.
AKHANI H., 1998 – Plant Biodiversity of Golestan National Park. *Stapfia* 53: 411 p.
BRODO I.M., 1984 – The north American species of the *Lecanora subfusca* group. In: *Beiträge Zur Lichenologie*, Festschrift J. Poelt (H. Hertel & F. Oberwinkler, ed): pp. 64-174.

- FRÖDÉN P., LITTERSKI B., 2005 — Two new species of Seirophora from central Asia. *Graphis scripta* 17: 22-26.
- GIRALT M., 2001 — The lichen genera *Rinodina* and *Rinodinella* (lichenized Ascomycetes, Physciaceae) in The Iberian Peninsula. *Bibliotheca Lichenologica* 79: 9-143.
- MONIRY H.M., FALLAHIAN F. & MAASSOUMI A., 2005 — Lichens from Khorasan province, Iran. *Folia Cryptogamica Estonica* 41: 55-57.
- HAJI MONIRI M., SEAWARD M.R.D., 2006 — *Teloschistes*, a lichen genus new to Iran. Proceedings of the IV Balkan Botanical Congress at Sofia, Bulgaria, June 2006, p. 77.
- HAJI MONIRI M., SIPMAN H.J.M., 2009 — Lichens from two nature reserves in NE Iran. *Willdenowia* 39: 199-202.
- HAJI MONIRI M., KUKWA M., 2009 — Additions to the Lichen Biota of Iran. *Mycotaxon* 110: 155-161.
- JOHARCHI M.R., AKHANI H., 2006 — Notes on the flora of Iran 6: Eight new plant records from Iran collected from Khorassan and Golestan provinces (NE Iran). *Rostaniha* 7 (2): 132-141.
- KUROKOWA S., 1962 — A monograph of the genus *Anaptychia*. *Nova Hedwigia* 6: 108 p.
- MONIRI H.M., KAMYABI S., FRYDAY M., 2009 — *Rhizocarpon saurinum* new to Asia, and other reports of *Rhizocarpon* species from Razavi Khorasan Province, Iran. *Mycologica Balcanica* 6: 89-92.
- MONIRY H.M., FALLAHIAN F. & MAASSOUMI A., 2005 — Lichens from Khorasan province, Iran. *Folia Cryptogamica Estonica* 41: 55-57.
- NASH T.H., RYAN B.D., GRIES C. & BUNGARTZ F., 2002 — Lichen Flora of The Greater Sonoran Desert Region. Arizona State University, Tempe, Arizona. USA. VI: 532 p.
- NASH T.H., RYAN B.D., DIEDRICH P. & GRIES C., 2004 — Lichen Flora of The Greater Sonoran Desert Region. Arizona State University, Tempe, Arizona. USA. VII: 742 p.
- NASH T.H., RYAN B.D., DIEDRICH P., & GRIES C., 2007 — Lichen Flora of The Greater Sonoran Desert Region. Arizona State University, Tempe, Arizona. USA. VIII: 567 p.
- POELT J., WIRTH V., 1968 — Flechten aus dem nordöstlichen Afghanistan gesammelt von H. Roemer im Rahmen der Deutschen Wakhan-Expedition 1964. *Mitt. Bot. Staatssamml. München* 7: 219-261.
- RASHED M.H., AYATOLLAHI M., JOHARCHI M.R., AKBARZADEH M. & SAFAVI H., 1982-87 — Khorasan vegetation, A report on plant collection and identification of Khorasan province, Ferdowsi University of Mashhad, 1: 590 p.
- SEAWARD M.R.D., SIPMAN H.J.M., SCHULTZ M., MAASSOUMI A.A., HADJMONIRY M. & SOHRABI M., 2004 — A preliminary Lichen Checklist for Iran. *Willdenowia* 34: 543-576.
- SEAWARD M.R.D., SIPMAN H.J.M. & SOHRABI M., 2008 — A revised checklist of lichenized, lichenicolous and allied fungi for Iran. *Sauteria* 15: 459-520.
- SIPMAN H.J.M., 2002 — Lichens of mainland Yemen. *Willdenowia* 32: 127-135.
- SLIWA L., 2007 — A revision of the *Lecanora dispersa* complex in North America. *Polish Botanical Journal* 52 (1): 1-70.
- SMITH C.W., APTROOT A., COPPINS B.J., FLETCHER A., GILBERT O. L., JAMES P.W. & WOLSLEY P.A., 2009 — The lichens of great Britain and Irelands. The British Lichen Society, London. 1 006 p.
- SZATALA Ö., 1940 — Pp. 521-533. *In*: K. H. Rechinger et al., Ergebnisse einer botanischen Reise nach dem Iran. *Annalen des naturhistorischen Museum in Wien* 50: 410-536.
- SZATALA Ö., 1957 — Prodrömus einer Flechtenflora des Irans. *Annales historico-naturales musei nationalis Hungarici* VIII: 101-154.
- VITIKAINEN O., 1994 — Taxonomic revision of *Peltigera* (lichenized *Ascomycotina*) in Europe. *Acta Botanica Fennica* 152: 1-96.
- WASSER S.P. & Nevo E., 2005 — *Lichen-forming, lichenicolous, and allied fungi of Israel*. A. R. A. Gantner Verlag K.-G., Rugeell. 385 p.