

NEW AND NOTEWORTHY LICHENS FROM THE SEMI-DESERT AREAS OF NORTH EAST IRAN

M. Haji Moniri & H. J. M. Sipman

Received 2017. 06. 25; accepted for publication 2017. 10. 11

Haji Moniri, M. & Sipman, H. J. M. 2017. 12. 30: New and noteworthy lichens from the semi-desert areas of North East Iran. -*Iran. J. Bot.* 23 (2): 140-144. Tehran.

Fifty- three lichens are reported from NE Iran based on samples collected in semi-desert areas. Four species are new to Iran (*Caloplaca albovariegata*, *Lecidea promixta*, *Rinodina afghanica* and *Schaereria fuscocinerea*) and 17 species are new to the north east of the country. Furthermore, new localities are reported for 32 species in the region.

Mahroo Haji Moniri (correspondence <m.h.moniri@mshdiau.ac.ir>), Department of Biology, Faculty of Sciences, Mashhad Branch, Islamic Azad University, Mashhad, Iran.- Harrie J. M. Sipman, Freie Universität, Botanischer Garden und Botanisches Museum Berlin-Dahlem, Berlin, Germany.

Key words: Lichenized fungi; biodiversity; new record; Iran

گل‌سنگ‌های جدید و قابل ملاحظه از نواحی نیمه‌بیابانی شمال‌شرق ایران
مهرو حاجی منیری: دانشیار گروه زیست‌شناسی، دانشکده علوم، دانشگاه آزاد اسلامی واحد مشهد
هاری زیمن: استاد باغ گیاه‌شناسی و موزه گیاه‌شناسی برلین - داهلم، آلمان
براساس نمونه‌های جمع‌آوری شده از نواحی نیمه‌بیابانی شمال‌شرق ایران، ۵۳ گل‌سنگ گزارش می‌شود. چهار گونه (*Caloplaca albovariegata*, *Rinodina afghanica*, *Lecidea promixta* و *Schaereria fuscocinerea*) برای اولین بار از ایران و ۱۷ گونه دیگر نیز از شمال‌شرق کشور معرفی می‌شوند. همچنین ۳۲ گونه از نواحی جدیدی واقع در شمال‌شرق گزارش می‌گردد.

INTRODUCTION

The documentation of the lichen diversity in Iran is a laborious job, because the country is a large and highly diverse and there exist no comprehensive identification keys that cover the lichen diversity of the region adequately. So far about 700 species are recorded (Seaward & al. 2008), including several new species (Valadbeighi & al. 2011a, b; Kondratyuk & al. 2013) and a new genus (Kondratyuk & al. 2014). No doubt this number is still far from the real lichen diversity of Iran in view of the mountainous nature of the country, where large areas are of difficult access.

In NE Iran nearly 40% of the currently known Iranian species have been found so far (Haji Moniri & al. 2009; Haji Moniri & Kukwa 2009; Haji Moniri & Sipman 2011; Haji Moniri & al. 2014). Recent years have seen a considerable increase in knowledge, due for a substantial part to co-operation with European experts (Haji Moniri & al. 2016; Breuss & Haji Moniri 2017; Sohrabi & al. 2017). This progress

brings a very challenging goal within sight: to provide a regional lichen flora of the northeast of the country. Here the results of further sampling for this goal are presented.

MATERIAL AND METHODS

The investigated material is collected on the eight localities listed below. Voucher specimens have been deposited in the private collection of the first author [HM] with partial duplicates in the herbarium of the Botanischer Garten und Botanisches Museum in Berlin (Germany) [B]. Specimens were investigated with standard morphological and anatomical methods and the color reaction of spot tests was used to recognize secondary metabolites (Smith & al. 1992; Orange & al. 2001). For the identification the literature cited in the references list was used (Gaya 2009; Giralt 2001; Krzewicka 2012; Nash & al. 2007; Šun & al. 2011; Śliwa 2007, Steiner & Mayrhofer 1987; Westberg & Sohrabi 2012; Wetmore 1994 and

Wunder 1974) and comparisons with reliably identified samples in the herbarium B were made. In critical cases specialists were consulted.

List of localities

I: Razavi Khorasan province, W of Torbat-e Heidarieh, Baig, Rudmaajan, 35°27'N/58°51'E, 1550 m, gardens with fruit trees near waterfall, 26.11.2011, leg. M. Haji Moniri & F. Hooshmand.

II: Razavi Khorasan province, Torqabeh, Azghad village, 36°16'N/59°24'E, 1100 m, gardens with fruit trees in water-rich narrow valley, 02.3.2013, leg. M. Haji Moniri.

III: Razavi Khorasan province, 20 km on road from Torbat-e Jam to Mashhad, Revenj, 35°11'N/60°2'E, 1250 m, steppe with rock outcrops, 14. 3.2013, leg. M. Haji Moniri & M. Abbasju.

IV: Razavi Khorasan province, Mashhad, Kuh-e-Ab-o-Barq, 36° 44' N/ 58°27' E, 1165 m, low mountain in the countryside with steppe, 22.3.2013, leg. M. Haji Moniri.

V: Northern Khorasan province, 5 km on route from Bojnurd to Esfarāyen, Asadli, 37°29'N/57°35'E, alt. 1820 m, mountain steppe with scattered trees, leg. M. Haji Moniri, 03.5.2013.

VI: Razavi Khorasan province, 34 km SW Dargaz, Cherlagh Valley, 37°28'N/58° 50'E, 1070 m, forest on wet valley bottom, 28.8.2013, leg. M. Haji Moniri & Z. Alizadeh.

VII: Razavi Khorasan province, 15 km on route from Dargaz to Quchan, Nokhandan, 37°30'N/58°59'E, 610 m, valley covered with gardens, 30.11.2013, leg. M. Haji Moniri.

VIII: Razavi Khorasan province, 45 km on route from Quchan to Dargaz, Kalatechenar, 37°29'N/59° 7'E, 950 m, wide valley with gardens, 13.12.2013, leg. M. Haji Moniri.

RESULTS AND DISCUSSION

List of the species

The roman numerals and four digit numbers refer to the localities from the list above and the collection numbers of M. Haji Moniri, respectively. The species which are marked by an asterisk (*) are new to Iran.

Anaptychia elbursiana (Szatala) Poelt – on calcareous rock: III, 3096 [HM, B].

**Caloplaca albovariegata* (B. de Lesd.) Wetmore – on calcareous rock: I, 3097 [HM, confirmed by Dr. J. Vondrak]. *Caloplaca albovariegata* is new to Iran. Previously known only from Western North America and originally described from New Mexico (Wetmore, 1994). According to Dr. Vondrak (pers. comm.) also known from Turkey, Kaiseri (Gokhan Halici, in prep.). For the distinction from the similar *Caloplaca*

austrcoreana S.Y.Kondr., L.Lökös et J.-S. Hur from South Korea see Kondratyuk & al. (2013). The species is probably more common in Iran than this single record suggests. More extensive sampling in other parts of the province is needed, as well as microhabitat studies, to improve the knowledge about its ecology (fig. 1).

C. juniperina Tomin – on bark of *Morus alba*: VII, 3113 [HM, confirmed by Dr. J. Vondrak].

C. kudratovii S.Y.Kondr., B. Zarei-Darki & J.S.Hur – on calcareous rock: II, 3135 [HM, B]. This species is described from the provinces Esfahan and Markazi in Iran and characterized by a wrinkled, areolate thallus without peripheral lobes (Kondratyuk & al. 2013).

C. molariformis Frolov, Vondrák, Nadyeina & Khodos. –on calcareous rock: I, 3101 [HM, B, herb. Vondrak]; III, 3084 [HM, herb. Vondrak]. This recently described lichen species (Vondrak & al., 2013) and *Immersaria iranica* appear to be widespread in the investigated semi desert areas, and many thalli have been found in particular in locality III.

C. monacensis (Leder.) Lettau – on bark of *Eucalyptus* sp: VIII, 3129 [HM]. Previously recorded for Iran by Kazemi & Safavi (2014) based on a collection from Mazandaran province, N Iran. However, the picture in this publication does not show the granulose thallus typical of *C. monacensis* and is more likely to represent *C. cerina* (Hedw.) Th.Fr.

C. scythica Khodos. & Söchting – on bark of *Eucalyptus* sp.: VII, 3116 [HM].

C. sororicida M. Steiner & Poelt – on *Caloplaca* (gr. *Pyrenodesima*) sp. on calcareous rock: III, 3085 [HM, det. Vondrak].

Candelariella rhodax Poelt & Vězda – on calcareous rock: III, 3134 [HM].

C. xanthostigma (Ach.) Lettau –on bark of *Morus alba*: VII, in 3113 (*C. juniperina*) [HM, det.Vondrak].

Immersaria iranica Valadb., Sipman & Rambold – on calcareous rock: III, 3138 [HM].

Lecanora juniperina Šliva – on bark: VI, 3121 [HM].

**Lecidea promixta* Nyl. – on calcareous rock: IV, 3109 [HM]; II, in 3138 (*Immersaria iranica*) (fig. 2; specimen no. 3109).

Oxnerella safavidiorum S.Y. Kondr., B. Zarei-Darki, L. Lökös et J.-S. Hur – on calcareous rock: V, 3107 [HM, det. Kondratyuk].

Phaeophyscia chloantha (Ach.) Moberg. – on bark: VI, 3126 [HM, B].

Placidium rufescens (Ach.) Breuss – on soil: III, 3140 [HM, B].

**Rinodina afghanica* M. Steiner & Poelt –on bark: VI, 3121 [HM] (fig. 3).

R. colobina (Ach.) Th.Fr. –on bark: VI, 3127 [HM].

R. mayrhoferi A. Crespo –on bark: VI, in 3129 (*C. monacensis*) [HM].

R. subnigra H. Magn. –on calcareous rock: V, 3104 [HM].

**Schaereria fuscocinerea* (Nyl.) Clauzade & Cl. Roux–on siliceous rock: III, 3148 [HM] (fig. 4; specimen from France, leg. Sipman 44072).

In addition, the following 32 species were found which have been recorded before from NE Iran: *Anaptychia desertorum* (III, IV, VI, VIII); *Arthonia lapidicola* (I); *Caloplaca aegyptiaca* (II); *C. decipiens* (III, VII); *C. persica* (VI); *C. transcaspica* (III); *C. variabilis* (III); *Candelariella antennaria* (VI, VII); *C. rosulans* (II); *C. viae-lacteeae* (VI); *Diplotomma pharcidium* (I, VI); *Lecania diplococca* (VIII); *L. polycycla* (I); *L. triseptata* (VI); *Lecanora albescens* (I, III); *L. crenulata* (I); *L. dispersa* (V, VI, VIII); *L. hagenii* (VI); *L. muralis* (IV); *L. perpruinosa* (I); *L. semipallida* (II); *Lecidea atrobrunnea* (III); *Lecidella carpathica* (I); *Megaspora rimisorediata* (VII);

Phaeophyscia orbicularis (VII); *Physcia adscendens* (VII); *P. stellaris* (VII); *Rhizoplaca melanophthalma* (III); *Rhizocarpon viridiatrum* (III); *Rinodina bischoffii* (I); *R. guzzinii* (V); *R. straussii* (III) (Haji Moniri and Sipman, 2009 & 2011; Haji Moniri & al. 2014).

The most noteworthy species in this list is perhaps *Candelariella viae-lacteeae*, of which a rich population was found in locality VI. It is only the second record of this species in NE Iran, while the locality of the first record, Taraghdar (Haji Moniri & al. 2011), is threatened by urbanization. This gives the newly discovered site a considerable value for the conservation of the species.

The large number of new records illustrates the need for further lichenological exploration in NE Iran. In particular, the provinces Razavi Khorasan and Northern Khorasan, well-known for their high biodiversity in comparison with surrounding areas, merit closer attention.

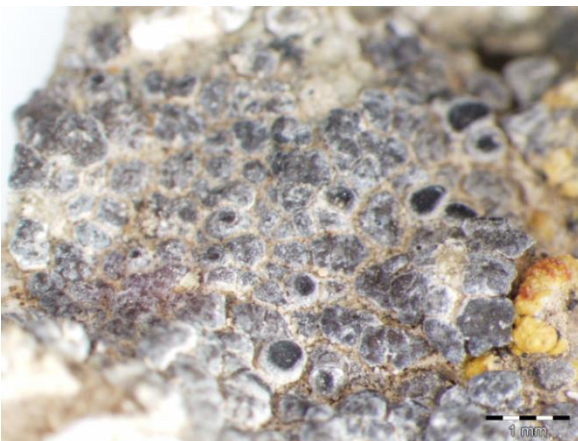


Fig. 1. *Caloplaca albovariegata*.

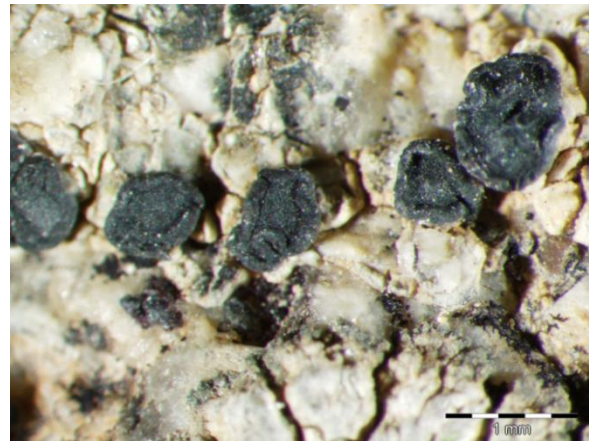


Fig. 2. *Lecidea promixta*.



Fig. 3. *Rinodina afghanica*.

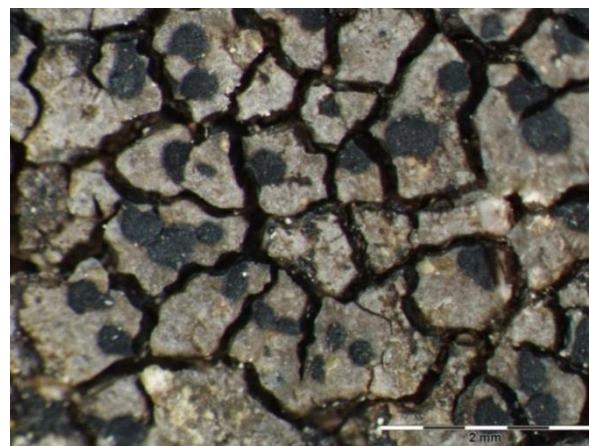


Fig. 4. *Schaereria fuscocinerea*.

ACKNOWLEDGMENTS

We are grateful to Dr. Jan Vondrak, (Czech Republic), Mireilla Giralt (Spain) and Dr. Sergey Kondratyuk (Ukraine) for their invaluable help with the identifications. Free accommodation of the first author during a research visit in B was generously provided by Prof. Th. Borsch, the Director of BGBM. M. H. M. would like to express her gratitude to Mahvash and Mehrdad Haji Moniri who organized field trips to the investigated areas.

REFERENCES

- Breuss, O., Haji Moniri, M. 2017: A new *Placopyrenium* species (Ascomycota: Verrucariaceae) from Iran. – *Herzogia* 30 (1): 177–181.
- Gaya, F. 2009: Taxonomical revision of the *Caloplaca saxicola* group (Teloschistaceae, lichen-forming Ascomycota). – *Bibliotheca Lichenologica* 101: 1–191.
- Giralt, M. 2001: The lichen genera *Rinodina* and *Rinodinella* (lichenized Ascomycetes, Physciaceae) in the Iberian Peninsula. – *Bibliotheca Lichenologica* 79: 1–143.
- Haji Moniri, M., Sipman, H. J. M. 2009: Lichens from two nature reserves in NE Iran. – *Willdenowia* 39: 199–202.
- Haji Moniri, M., Kamyabi, S. & Fryday, A. M. 2009: *Rhizocarpon saurinum* new to Asia, and other reports of *Rhizocarpon* species from Razavi Khorasan Province, Iran. – *Mycologia Balcanica* 6: 89–92.
- Haji Moniri, M. & Kukwa, M. 2009: Additions to the lichen biota of Iran. – *Mycotaxon* 110: 155–161.
- Haji Moniri, M., Jandaghi, M. & Masroomnia, M. 2011: A note on lichens in the vicinity of Mashhad (Razavi Khorasan, NE Iran). – *Iranian Journal of Botany* 17: 133–136.
- Haji Moniri, M. & Sipman, H. J. M. 2011: Lichens from three mountain sites in Khorasan provinces, Iran, including four species new to Iran. – *Cryptogamie, Mycology* 32 (2): 145–150.
- Haji Moniri, M., Sipman, H. J. M. & Schultz, M. 2014: New records of lichenized and lichenicolous fungi from Northeastern Iran. – *Herzogia* 27 (2): 367–376.
- Haji Moniri, M., Kondratyuk, S. Y. & van den Boom, P. P. G. 2016: *Lecania makarevicziae*, a new lichen species from Iran. – *Acta Botanica Hungarica* 58 (1–2): 69–73.
- Kazemi, S. S. & Safavi, S. R. 2014: Three new records of lichen species from Iran. – *Iranian Journal of Botany* 20 (2): 236–239.
- Kondratyuk, S. Y., Lökös, L., Zarei-Darki, B., Haji Moniri, M., Tchabanenko, S. I., Galanina, L., Yakovchenko, L., Hooshmand, F., Ezhkin, A. K. & Hur, J.-S. 2013: Five new *Caloplaca* species (Teloschistaceae, Ascomycota) from Asia. – *Acta Botanica Hungarica* 55 (1–2): 41–60.
- Kondratyuk, S. Y., Lökös, L., Kim, J. A., Kondratiuk, A. S., Jeong, M.-H., Zarei-Darki, B. & Hur, J.-S. 2014: *Oxnerella safavidiorum* gen. et spec. nov. (Lecanoromycetidae, Ascomycota) from Iran (Asia) proved by phylogenetic analysis. – *Acta Botanica Hungarica* 56 (3–4): 379–398.
- Krzewicka, B. 2012: A revision of *Verrucaria* s.l. (Verrucariaceae) in Poland. – *Polish Botanical studies*. Vol. 27: 143 p.
- Nash, T. H., Gries, C. & Bungartz, F. 2007: Lichen Flora of the Greater Sonoran Desert Region. Vol. III – Tempe: Arizona State University.
- Orange, A., James, P. W. & White, F. J. 2001: Microchemical methods for the identification of lichens. British Lichen Society. 101 pp.
- Śliwa, L. 2007: A revision of the *Lecanora dispersa* complex in North America. – *Polish Botanical Journal* 52 (1): 1–79.
- Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolsley, P. A. (eds.). 2009: The lichens of Great Britain and Ireland. – London: British Lichen Society.
- Sohrabi, M., Favero-Longo, S. E., Pérez-Ortega, S., Ascaso, C., Haghghat, Z., Talebian, M. H., Fadaei, H., de los Ríos, A. 2017: Lichen colonization and associated deterioration processes in Pasargadae, UNESCO world heritage site, Iran. – *International Biodeterioration & Biodegradation* 117: 171–182.
- Steiner, M. & Mayrhofer, H. 1987: Flechten aus Afghanistan- IV. Die Gattungen *Buellia*, *Dimelaena* und *Rinodina*. – *Nova Hedwigia* 45 (3–4): 315–326.
- Šun, J., Vondrák, J. & Söchting, U. 2011: Taxonomy and phylogeny of the *Caloplaca cerina* group in Europe. – *The Lichenologist* 43 (2): 113–135
- Valadbeigi, T., Sipman, H. J. M. & Rambold, G. 2011a: The genus *Immersaria* (Lecideaceae) in Iran, including *I. iranica* sp. nov. – *The Lichenologist* 43 (3): 203–208.
- Valadbeigi, T., Nordin, A. & Tibell, L. 2011b: *Megaspora rimisorediata* (Pertusariales, Megasporaceae); a new sorediate species from Iran and its affinities with *Aspicilia* sensu lato. – *Lichenologist* 43 (4): 285–291.
- Vondrák, J., Frolov, I., Řiha, P., Hrouzek, P., Palice, Z., Nadyeina, O., Halic, G., Khodosovtsev, A. & Roux, C. 2013: New crustose Teloschistaceae in

- Central Europe. – *The Lichenologist* 45 (6): 701–722.
- Westberg, M. & Sohrabi, M. 2012: A conspectus of the lichen genus *Candelariella* (Candelariaceae, Ascomycota) in Southwest Asia with emphasis on Iran. – *Nova Hedwigia* 95 (3-4): 531–546.
- Wetmore, C. M. 1994: The lichen genus *Caloplaca* in North and Central America with brown or black apothecia. – *Mycologia* 86 (6): 813–838.
- Wunder, H. 1974: Schwarzfrüchtige, saxicol e Sippen der Gattung *Caloplaca* (Lichenes, Teloschistaceae) in Mittel europa, dem Mittel meergebiete und Vorderasien. – *Bibliotheca Lichenologica* 3: 186 pp.