

# HISTORY OF LICHENOLOGY IN IRAN, WITH SOME ADDITIONAL LICHENS FROM GOLESTAN PROVINCE, (N. IRAN)

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Lichens form an important part of the biodiversity in some ecosystems, but little attention has been devoted to lichen biodiversity in Iran. The present paper in addition to reviewing lichenological progress in Iran, presents important records, one a new variety for the region. Based on fieldwork in Deraznow in the central Alborz of Golestan province, N Iran, 18 species are reported, of which four species and a subspecies are new to Golestan.

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## تاریخچه گلشنگ‌شناسی ایران و برخی گلشنگ‌های دیگر استان گلستان (شمال ایران)

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با آنکه گلشنگ‌ها بخش مهمی از تنوع‌زیستی برخی اکوسیستم‌ها را تشکیل می‌دهند، تا چندی پیش در ایران توجه ناچیزی به آنها اختصاص یافته‌بود. مقاله حاضر علاوه بر مرور پیشرفت گلشنگ‌شناسی در ایران، گزارش‌های مهمی از تنوع منطقه ارائه می‌دهد. بر اساس فعالیت میدانی در منطقه درازنو واقع در البرز مرکزی از استان گلستان (شمال ایران)، ۱۸ گونه گلشنگ شناسایی شده‌است که چهار گونه و یک زیرگونه آن برای اولین بار از این استان گزارش می‌شوند.

## Introduction

Iran with a surface area of ca 1,645,000 km<sup>2</sup>, is located in the northern temperate region and in the southwest of Asia between 25°-40'N and 44°-63'E. Systematic studies of the flora in Iran have their own particular excitement and challenge. Iran's different climatic conditions and its vast size provide the ecological context which allow a very varied flora to grow (Zohary 1973). Lichens form an important part of the microfloral biodiversity in Iran.

The research history of Iranian lichen flora can be divided into four periods. (1) 1830-1860: From the report on the manna lichen (Göbel 1830) until publication of the first survey of Iran's lichens (Buhse 1860). (2) 1892-1957: Increasing knowledge through numerous sporadic records and short papers (Müller 1892; Steiner 1896, 1910; Szatala 1940), culminating in the lichen list plus some identification keys by Szatala 1957. (3) 1965-1974: Investigations on lichens in N of Iran, especially from the Haraz valley by Weber (1965) and production of taxonomic revisions of particular relevance to Iran (eg. Wunder 1974; Egea

1989; Knoph 1990; Breuss 1998). (4) 2001 till now: Cooperation between Iranian scientists and European lichenologists resulting in the compilation of the first lichen checklist by Seaward et al. (2004); production and revision of an internet key to the Iranian lichen genera and some few species by Sipman in 2003 & 2007; the first lichen publications with Iranian principal authors: (Hadjmoniry et al. 2005; Sohrabi 2005); Sohrabi & Orange (2006); Sohrabi & Alstrup (2007); Haji Moniri & Sipman (2009) and books entitled, "Lichenology" (Haji Moniri 2008) and Lichens (Purvis, 2000 translated by Haji Moniri, 2009).

Golestan province with an area of c. 204,377 km<sup>2</sup> is located in the easternmost parts of south Caspian forests between 36°30'-38°15' N and 54°-56'E, and known as one of the most biotope rich areas in Iran.

So far its lichens are very poorly known, and the total lichen biodiversity and distribution of the lichen species in the province are still not known. The scarce information available can be found in 2 publications on the lichens of Golestan National Park (Sohrabi 2005a, Sohrabi & Sipman 2007) and in the revised checklist of lichenized, lichenicolous and allied fungi for Iran

(Seaward et al. 2008). The latter includes 590 species but includes no lichen record of Deraznow in them. The present paper contributes to a better knowledge of the lichen flora of the province.

### Material and Methods

23 specimens were collected by the author on 3<sup>th</sup> September 2007 at the following site:

Iran, Golestan province, Deraznow, central Alborz Mts., 2300- 2800 m elev. (Map 1). Deraznow, a country village, is located near Kordkooy, at 36°48'N and 54°8'E. This area that is a part of Jahan Nama Protected Area on southern highlands of Gorgan (Kiabi & Ghaemi, 2000), from north, south and east is delimited by Radkan deciduous montane forest, Kordkooy town, and the village of Yazdan Mahalleh (Mozaffarian 2005).

The climatic condition in the province is influenced by three different air masses, Mediterranean, Khazari and Siberian (Parsa 1978). According to a climatic classification by the De Martonne method, Deraznow has three corresponding types of climate, Mediterranean, semi-wet and wet (Hutez 1970; Jafari & Akhiani 2008; Anonymous 1991).

The geological history of this area can be traced as far back as Cambrian Period (Aghanabati 2004) and formation of almost all of the high mountains can be attributed geologically to Jurassic era and they are known as Lar formation in Iran (Fürsich et al. 2005).

The investigated area is geographically located between two main phytogeographic regions including boreal or Euro-Siberian region (Hyrcanian province) and Irano-Turanian region (Kopetdagh-Khorassan province and Alborz). Some of the flowering plants in the flora include: *Acer monspessulunum* L., *Acer velutinum* Boiss., *Acer cappadocicum* Gled., *Petasites hybridus* (L.) P. Gaertn., *Arabis caucasica* Willd. subsp. *caucasica*, *Cardamine bulbifera* (L.) Grantz, *Fagus orientalis* Lipsky, *Quercus castaneifolia* C. A. Mey., *Quercus macranthera* Fisch. & C. A. Mey. ex Hohen., *Corydalis angustifolia* (M. Bieb.) DC., *C. chionophila* Czernjak., *C. marschalliana* (Pall.) Pers., *Paeonia wittmanniana* Hartw. ex Lindl., *Primula heterochroma* Stapf, *Anemone caucasica* Willd. ex Rupr., *Viola rupestris* F.W. Schmidt, *V. sieheana* W. Becker, *V. suavis* M. Bieb., *Ornithogalum sintenisii* Freyn, *Scilla gorganica* Speta, *Gagea confusa* A. Terr., *G. lutea* (L.) Ker-Gawl. (Jafari & Akhiani, 2008).

Geomorphologically, the fertile soils of the area are composed of sand (44%), silt (42%) and clay (14%) with some minerals containing K (758 p.p.m), P (40.6



Map 1. Geographical situation of Deraznow area (URL:<http://www.mpo-kh.ir>).

p.p.m), organic C (1.7%), Cu (0.5 p.p.m), Zn (2.2 p.p.m), Mn (2.3 p.p.m), Fe (3.6 p.p.m). The texture of the soil is "L" type with pH=7. The average yearly rainfall is about 369.9 mm, and the average yearly temperature is 14.7 °C (Anonymous 1991).

Air dried specimens were examined for morphological and chemical identification by using standard reagents (K, I and C) and microscopic techniques (Purvis et al. 1992; Orange et al. 2001).

### Results and Discussion

Among the samples collected from the wet lands in the area, 18 epiphytic (mostly on *Acer*, *Quercus* species and *Fagus orientalis*), saxicolous and terricolous species have been identified so far. In the list below, species are arranged in alphabetical order. The 4-digit numbers indicate voucher specimens deposited in FUMH. Some of them have reviewed in H and NBM herbaria. Identifications were made using the floras and separate papers indicated in the list of the references. The main identification guides used were Purvis et al. (1992); Hale (1979); Runemark (1956) and Nash et al. (2002 & 2004). The species marked with \* are new to Golestan province. The most important record is *Rhizocarpon geographicum* subsp. *tinei*, that has been collected only from Razavi Khorasan province, Mashhad-Dehbar, 1600 m (Haji Moniri, Kamyabi & Fryday, in press). Although most of the other species are widely distributed in Iran, collections of are nevertheless significant because they indicate range and

permit a greater understanding of diversity of the microflora.

*Anaptychia ciliaris* (L.) Körber ex A. Massal., alt. 2300-2400 m, on broad-leaved trees, # 3018, 3019 & 3020.

*Candelaria aurella* (Hoffm.) Zahlbr., alt. 2500 m, on soil, # 3005.

*Candelaria concolor* (Dicks.) Stein, alt. 2300-2400 m, on broad-leaved trees, # 3003.

*Cladonia pyxidata* (L.) Hoffm., alt. 2500 m, on soil, # 3000.

\* *Collema subflaccidum* Degel., alt. 2500 m, on mosses, # 3014 (Fig. 1).

*Lecanora allophana* (Ach.) Nyl., alt. 2300-2400 m, on broad-leaved trees, # 3021.

*Lecanora muralis* (Schreber) Rabenh., alt. 2500 m, on calcareous rock, # 3022.

*Lobaria pulmonaria* (L.) Hoffm., alt. 2500 m, on broad-leaved trees, # 3002.

*Parmotrema perlatum* (Huds.) Choisy, alt. 2300-2400 m, on broad-leaved trees, # 3006.

\* *Peltigera monticola* Vitik., alt. 2500 m, on soil and mosses, # 3012 & 3013 (Fig. 2).

*Peltigera rufescens* (Weiss) Humb., alt. 2500 m, on soil, # 3011.

*Ramalina farinacea* (L.) Ach., alt. 2300-2400 m, on broad-leaved trees, # 3016.

*Ramalina sinensis* Jatta, alt. 2300-2400 m, on broad-leaved trees, # 3001.

\* *Rhizocarpon geminatum* (L.) DC., on calcareous rock, # 3007 (Fig. 3).

*Rh. geographicum* s. lat. [*Rh. geographicum* subsp. *lindsayanum* (Räsänen) ined.; *Rh. riparium* subsp. *lindsayanum* (Räsänen) J. W. Thomson], alt. 2800 m, on siliceous rock, # 3005.

\* *Rhizocarpon geographicum* subsp. *tinei* (Tornab.) Clauzade & Cl. Roux, alt. 2800 m on siliceous - calcareous rock, # 3007 (Fig. 4).

*Usnea lapponica* Vain., alt. 2500 m, on broad-leaved trees, # 3010.

\* *Xanthoria candelaria* (L.) Th. Fr., alt. 2500 m, on broad-leaved trees, # 3004 (Fig. 5).

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Fig. 1. *Collema subflaccidum*.

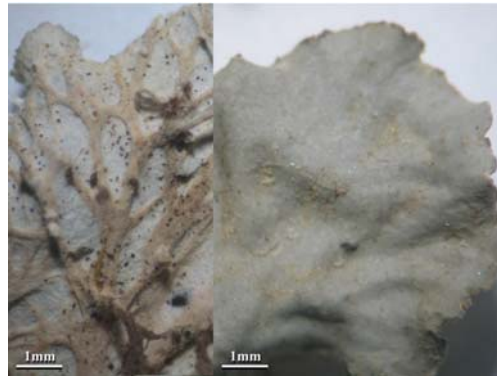


Fig. 2. *Peltigera monticola*.



Fig. 3. *Rhizocarpon geminatum*.



Fig. 4. *Rhizocarpon geographicum* subsp. *tinei*.

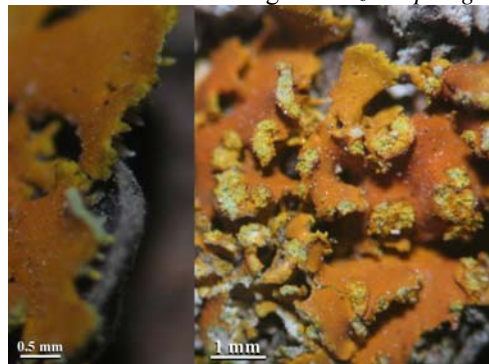


Fig. 5. *Xanthoria candelaria*.

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