Lichens of the Granite Mountains, Sweeney Granite Mountain Desert Research Center, Southwestern Mojave Desert, San Bernardino County, California

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Abstract. 75 species representing 40 genera of lichens, lichenicolous and a lignicolous fungus are reported from the Granite Mountains in the southwestern Mojave Desert. Acarospora arenaria H. Magn. is reported new for California.

INTRODUCTION

The Granite Mountains and its alluvial fans are in the Mojave Desert in eastern San Bernardino County, in the southwest corner of the Mojave National Preserve. They range in height from the summit of Granite Mountain (2100 meters, 6800 feet) to the open desert near the Kelso Dunes (700 meters, 2200 feet) with a total area of 22000 ha (85 sq. miles). Average temperatures range from a July maximum of 33º C (92º F) to a December minimum of -1º C (30º F). Snow fall is common in the winter months. Average annual precipitation is 22 cm (8.9"). The study area was confined to the Sweeney Granite Mountain Desert Research Center which is part of the University of California Reserve system (http://nrs.ucop.edu/Sweeney-Granite.htm) which encompasses the highest part of the Granite Mountains and its canyons and alluvial fans and has a total area of 3626 ha (14 sq. miles).

An excellent vascular flora of the Granite Mountains was recently published by J.M. André (2006) reporting 499 taxa from the range with only 8% of the flora consisting of exotics. Pinyon pine (Pinus monophylla Torrey & Fremont) and Utah Juniper (Juniperus osteosperma Carrier) are common at higher elevations and were the only phorophytes for a rather depauperate corticolous lichen flora. The lower canyon supported a diverse and spectacular flora with 12 species of cacti and two species of Yucca. A number of common western North American annuals and perennials are well-represented including Astragalus (10 taxa), Camissonia (10 taxa), Eriogonum (19 taxa), Gilia (12 taxa) and Phacelia (13 taxa).

METHOD

Collecting was subjective and qualitative, included all lichen habitats in the area, and over thirty hours were spent exploring the mountains and canyons. Specimens were determined using the Lichen Flora of the Greater Sonoran Region [Nash et. al 2002, 2004, and 2007 (2008)] and herbarium specimens. Thin-layer chromatography (TLC) was performed on a small number of specimens by James C. Lendemer (NY), including all Lecanora and Lecidea specimens. Because of discrepancies between our species lists and the species list of an earlier foray by the California Lichen Society (Doell et. al. 1999) specimens of some collections from that foray were supplied by Shirley Tucker from the herbarium of the Santa Barbara Botanical Gardens (SBBG) and a few of these specimens have been included in our checklist for completeness. Most specimens of lichenicolous fungi were examined by Javier Etayo and Jana Kocourková (PRM) but only 6 taxa were identifiable to currently described species (Etayo et al. 2007). The other specimens have been
reserved for separate study. The checklist is arranged alphabetically by genus then species. Authorities and
numbers following each entry are those of the author unless otherwise indicated. All specimens are
deposited in the herbarium of the University of California, Riverside (UCR) unless otherwise
indicated. Specific location data for specimens can be accessed on the UCR Lichen database at
http://sanders5.ucr.edu/lichensflat_index.php through the ASU lichen collections search engine at
http://seinet.asu.edu/seinet/collections/selection.jsp. All saxicolous species were collected from granite
unless otherwise stated.

**TAXONOMIC CHECKLIST**

**Acarospora arenacea** H. Magn. — 8055. This is actually a lichenicolous fungus, occurring on an
unknown host. This is a new report for California. The species will be revised in a paper on
lichenicolous *Polysporina* by Knudsen & Kocourková *(in prep.*).

**Acarospora badiofusca** (Nyl.) Th. Fr. — 4439, 7977, 7999. Common on slopes.

**Acarospora bullata** Anzi — 9403.1 (S). Rare.

**Acarospora macrospora** (Hepp.) Bagl. — 8017. Rare on decomposing granite in wash (Knudsen 2007).

**Acarospora nevadensis** H. Magn. — 4386. Rare. Specimen epruinose. If pruinose, the species is
similar looking to *A. strigata* but KC+pink cortex from presence of gyrophoric acid (see Knudsen 2007).

**Acarospora obpallens** (Nyl. ex Hasse) Zahlbr. — 4404. Infrequent.


**Acarospora strigata** (Nyl.) Jatta — 4446, 4476. Infrequent.


**Aspicilia desertorum** (Kremp.) Mereschk. — 4430, 4448.1, 8011. Common.

**Buellia chloroleuca** Körb. — 4396. Rare on Juniper wood and bark, 1520 m. C- and
UV- with low xanthone concentrations.

**Buellia dispersa** A. Massal. — 4417, 7991.2. Common.

**Buellia punctata** (Hoffm.) A Massal. — 4392, 8048.2. Common on decorticated conifer wood above
1500 m.

**Buellia sequax** (Nyl.) Zahlbr. — 4472, 8025. Frequent.

**Buellia venusta** (Körb) Lettau — 4431.2, 4458, Tucker 36264B (SBBG). Common.

**Caloplaca cerina** (Ehrh. ex Hedwig) Th. Fr.— 4402. Rare on decorticated juniper wood at 1588 m.

**Caloplaca crenulatella** (Nyl.) Oliv. — 4419, 7984. Common.

**Caloplaca durietzii** Magn. — 4393, 4394. Common on juniper wood and bark above 1500 m.

**Caloplaca nashii** Nav.-Ros., Gaya & Hladun — 4429.2, 4389, 8006. Common.

**Caloplaca cirrhata** (Hoffm.) Th. Fr. — 8047. Rare.

**Candelariella aurella** (Hoffm.) Zahlbr. — 4390. Common.

**Cercidospora caudata** Kernst. — Tucker 36277 on unknown *Caloplaca* thallus at Cove Springs,
(SBBG)(Etayo et. al. 2007). The species is common on *Caloplaca squamosa* and *C. subsolata* and is treated here as *C. caudata sensu stricto* and more similar to the ascospores of *C. epicarphinea* (Nyl.) Grube & Hafellner.

**Cercidospora macrospora** (Uloth) Hafellner & Nav.-Ros. 9399 (NY) 9410 (PRM). Frequent on thallus of *Lecanora muralis*.

**Collema cococphorum** Tuck. — 8056. Common on soil.

**Collema crispum** (L.) Weber ex F.H. Wigg. — 8033, on decaying granite; Tucker 36225 &
36226B (Det. by Matthais Schultz, SBBG). Infrequent on soil, often with *C. coccophorum*.

**Dermatocarpon americanum** Vain. — 4431.1, 8028.2. Common.

**Dimelaena thysanota** (Tuck.) Hale & W.L. Culb. — 4406, 7981. Common at higher elevations.


**Lecanora garovaglii** (Koerb.) Zahlbr. — 7990, 8050. Common but rarely fully developed in mixed saxicolous communities.
Lecanora muralis (Schreb.) Rabenh. – 4448.2. Common.

Lecanora saligna (Schrad.) Zahlbr. – 4409. Common on deciduous juniper wood above 1500 m.

Lecidea hassei Zahlbr. – 7980. Rare. This species contains schizopeltic acid and is almost impossible to determine by morphology in some populations because of pigmentation variations in the ecotype of Lecidea laboriosa in southern California. Det. By J. C. Lendemer.


Lecidea tessellata Florke – 4424, 4382. Common at higher elevations.

Lecidella stigmatea (Ach.) Hertel & Leuck. – 4432. Common.


Lichenostigma subradians Hafellner, Calat. & Nav.-Ros. – 9397 (PRM, NY), 9403.2. Common on Acarospora socialis and collected on A. bullata.


Lobothallia praeradiosa (Nyl.) Hafellner – 4444. Infrequent.

Melanohalea elegantula (Zahl.) O. Blanco et al. – 4412, 4449, 4480. Common.

Miriquidica scotopholis (Tuck.) B.D. Ryan & Timdal – 7991.1. Infrequent.

Muellerella pygmea (Körb.) D. Hawksw. var. pygmea – 9395. Rare on Acarospora species (PRM).

Myococalicum subtile (Persoon) Szatala – 4410. Rare on decidated juniper wood at 1588 m.

Peltigera rufescens (Weiss) Humb. – Bratt 11296 (SBBG) Rare on moss.

Peltula euploca (Ach.) Poelt. – 4467, 7993. Common in drainages and washes.

Phaeophyscia sciastra (Ach.) Moberg – 4427, 7994. Common.


Physcia dubia (Hoffm.) Lettau – 4436. Frequent in washes on north slopes

Physconia isidiigera (Zahlbr. ex Herre) Essl. – 4395, 8048.1. Infrequent on decidated juniper wood and rock above 1558 m.


Polyspora lapponica (Ach. ex Schaer.) Degel.– 4388, 4428, 7982, 9405, 9409 (PRM, S), 9412 (PRM); Tucker 36264A (SBBG). Common on crustose lichens.

Psora tuckermanii Timdal – 8005. Common on decaying granite in wash

Rhizocarpon disporum (Naegli ex Hepp) Mull. Arg. – 4423, 7987, Common.


Rinodina juniperina Sheard – 4391.1, 4397, 4425. Common on juniper bark above 1500 m. Verified by Sheard.

Sarcogyne species #1– 4426.1, 7976, 8054. Common taxon throughout area, currently under study by the author. This is one of several probably undescribed North American taxa.

Sarcogyne privigna (Ach.) A. Massal. – 4434, 4471, 8028, 9391 (PRM, S), 9407 (S), Common.


Toninia ruginosa (Tuck.) Herre ssp. ruginosa Timdal – 4441, 8016, 8022. Common on crumbling granite and soil in shaded washes.

Toninia tristis (Th. Fr.) Th. Fr. – 4479. Rare on soil.

Det. by Javier Etayo Not enough material to determine to subspecies.

Toninia sedifolia (Scop.) Timdal – 8032. Frequent in washes on decaying granite.

Umbilicaria phaea Tuck. – 9411. Frequent.

Verrucaria fuscoatraoides Servit – 4477. Rare. Second collection from Mojave Desert (Knudsen & La Doux 2006).


Verrucaria compacta (A. Massal.) Jatta – 8001; Tucker 36218A (SBBG). Common.
Conclusions

The lichens of the Mojave Desert are spread thin and the diversity is low compared to lichen communities in other areas of Southern California. Most lichens are restricted to washes and north slopes or occur at higher elevations above 1300 meters. Many species are rare and another thirty hours of collecting, particularly at higher elevations and in washes, will probably discover another 10-20 species that are rare in the study area. We collected 75 species in 40 genera of lichens and lichenicolous fungi and a lichenicolous fungus Mycocalicium subtile. Collecting can be quite frustrating: we could not find fertile specimens of the one or two Heppia species that occurred on soil. The saxicolous genus of microfungi Lichenothelia was represented by at least three taxa, all unfortunately rare, and more specimens are needed for identification.

Many species we found in the Granite Mountains are common in the southwestern Mojave Desert like Acarospora socialis, Aspicilia desertorum, Lobothallia alpophlaca, Phaeophyscia sciastra, Placidium acarosporoides, P. squamulosum, Polyspora lapponica, Rhizocarpon disporum, and Verrucaria compacta (Knudsen and LaDoux 2005 & 2006; Knight et. al. 2002) At higher elevations above 1500 meters a number of montane species occur like Buellia chloroleuca, Lecanora garovagliai, L. saligna, Lecidea tessellata, Melanohalea elegantula, and Xanthomendoza fallax. Another element of the lichen flora more common in Arizona and Nevada is Acarospora nevadensis, Caloplaca duriezii, Lecanora argopholis, Physcia dubia, Rhizoplaca peltata, and Rinodina juniperina. Many mountain ranges in the southwestern Mojave Desert in southern California are rich in carbonate substrates. A few calcareous species occur on decaying granite in washes like Acarospora macrospora, Caloplaca crenulatella, Psora tuckermanii, and Toninia sedifolia.

The Mojave Desert has an area of approximately 57,000 km² (22,000 sq. miles) in Arizona, California, Nevada and Utah of Basin and Ridge topography. The washes and mountain ranges have been generally left unexplored for lichens and we expect many more interesting surveys and discoveries in the future. We plan to return to the Granite Mountains for further collecting of taxa new to science discovered in our original surveys.

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