Lichen flora of the eastern Mojave Desert: Blackrock Arizona, Mojave County, Arizona, USA

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Abstract -- Based on field identifications and collections made at several sites near Black Rock Road (extreme northwestern Arizona) the authors report 25 genera and 43 lichen species. These numbers are very similar to collections reported from similar sites in the Mojave Desert of Southeastern California (24 genera and 40 species). Collections from a gypsiferous site include two previously unreported taxa.

Keywords -- Lichens, Mojave Desert, Arizona

Introduction

Previous work -- Only limited reports concerning the lichen flora of the Mojave Desert, in the southwestern United States, are available. Hasse (1913) listed a number of lichens for the Mojave Desert in his treatment of the lichen flora of Southern California. A checklist of lichen species for the Sweeney Granite Mountains Desert Research Center, consisting of 63 lichen species (35 genera), was published by Doell (1999). Recently, 40 lichen species in 24 genera were reported from

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two sites in the California Mojave Desert by Knight et al. (2002). A soon to be published paper from Snow Canyon, Washington County, Utah will report on the lichens from the northern limit of the Mojave Desert particularly at its point of contact with the Great Basin and Colorado Plateau geologic provinces. In this study, we further extend our study of Mojave Desert lichens by investigating a site located near the eastern border of the Mojave Desert, along Blackrock Road in the extreme northwestern corner of Arizona.

Previous studies have noted some unique attributes of the Mojave lichen flora. Biological soil crusts of the Mojave Desert are not as species rich or abundant as comparable terricolous communities in the Great Basin and Colorado Plateau (Johansen et al. 2001). In those rare instances when corticolous and lignicolous lichens are found, they occur chiefly on Blackbrush (*Coleogyne* ramossissima) and Creosote bush (*Larrea tridentata;* (Hasse 1913). Knight et al. (2002) also noted that due to the intense summer light and heat compounded by extreme drought conditions typical of the Mojave Desert saxicolous lichen communities are commonly best developed on the north facing aspects of rock outcrops,

particularly basalt.

Study area -- Lichens were identified/collected in the general vicinity of Blackrock Road, 1.6 km south of the Utah-Arizona border, in Mojave County, Arizona (elevation 1058 m; 36º 58.552' North Latitude; 113º 38.650' West Longitude). Identifications were made from specimens occurring on Kaibab and Moenkopi rock outcrops, soil, and bark/wood of Creosote shrubs. The fieldwork phase of this project was conducted in a flat open shrubland along Blackrock Road progressing upslope into a vegetated drainage with abundant rock outcrops.

Vascular plants -- The flat, lower portion of the study area was dominated by Creosote bush (*Larrea tridentata*) of various ages and Ephedra (*Ephedra nevadensis*). Shrub interspaces were occupied mainly by annual species including Downy Brome (*Bromus tectorum*), Ripgut Brome (*Bromus rubens*), and Filaree (*Erodium cicutarium*). Upper areas were dominated by Barrel cactus *(Ferocactus spp.)*, Cholla (*Opuntia echinocarpa*), Broomsnake weed (*Guitierrezia sarothrae*), Range Ratny (*Krameria parvifolia*) and White Ambrosia (*Ambrosia dumosa*). The shrub inter-space contained the same

basic group of annuals found in the flat area, although specific locations where cattle have not been able to graze, because of slope or rock cover, some perennials still persist. These perennials include Desert Marigold (*Baileya multiradata*), (*Hilaria rigidula*), Indian ricegrass (*Oryzopsis hymenoides*), and winterfat (*Ceratoides lanata*). Other less common vascular plants at this site include (in alphabetical order): *Amsinckia spp., Aristida purpurea, Baileya multiradiata, Brickellia atractyloide, Bromus diandrus, Bromus tectorum, Calochortus flexuosus, Ceratoides lanata, Chrysothamus spp., Echinocactus spp., Encelia frutescens, Eriogonum inflatum, Eriogonum fasciculatum, Erioneuron pulchellum, Grayia spinosa, Gutierrezia sarothrae, Hilaria rigida, Krameria parvifolia, Opuntia spp., Oryzopsis hymenoides, Poa secunda, Sarcobatus vermiculatus, Sphaeralcea ambigua,* and *Tridens muticus.*

Materials and Methods

Identification of specimens -- Lichen samples were identified/collected from several substrates, including limestone, conglomerate rock, soil and the bark at the base of Creosote (*Larrea tridentata*) shrubs.

Specimens were identified using standard lichen keys and taxonomic treatises. Those specimens, which could not be identified in the field, were collected and returned to the laboratory where they were further studied and compared with herbarium material. Standard chemical spot tests and TLC analysis were used to finalize species identifications. Lichen specimens collected during the fieldwork phase of this project are deposited in the Herbarium of Nonvascular Cryptogams at Brigham Young University (BRY) in Provo, Utah, USA.

Organization of lichen species list -- Relative abundance and substrates are listed after each species. Our scale of relative abundance is rare<common<abundant. Relative abundance was evaluated according to the following scale: rare = 1-2 encounters, common = 3-9 encounters, and abundant ≥ 10 encounters.

Taxonomic Checklist

ACAROSPORA BULLATA. Locally common on rock.

ACAROSPORA FUSCATA. Common to abundant on rock.

ACAROSPORA NODULOSA var. NODULOSA. Rare to locally common on gypsiferous soil. Note: this taxon is

gypsifilous and extremely rare in the western United States; most likely it is a new record for the state of Arizona.

ACAROSPORA PELTASTICA. Rare on rock.

ACAROSPORA STRIGATA. Common to abundant on rock.

ASPICILIA CALIFORNICA. Rare on gypsiferous soil.

ASPICILIA DESERTORUM. Rare to locally common on rock.

CALOPLACA DECIPIENS. Rare on rock.

CALOPLACA SAXICOLA. Rare to locally common on rock.

CANDELARIELLA DEFLEXA. Rare on bark of Creosote shrubs.

CANDELARIELLA ROSULANS. Common to abundant on soil over rock.

CANDELARIELLA VITELLINA. Common or rock.

COLLEMA FUSCOVIRENS. Rare on shaded, vertical surfaces of rocks.

COLLEMA TENAX. Locally common on open soil surfaces in inter-shrub spaces.

DERMATOCARPON MINIATUM. Rare to locally common on shaded, vertical surfaces of rocks.

ENDOCARPON PUSILLUM. Rare on open soil surfaces in inter-shrub spaces.

FULGENSIA BRACTEATA. Locally common on open soil surfaces in inter-shrub spaces.

LECANORA ARGOPHOLIS. Rare to locally common on rock.

LECANORA GAROVAGLII. Rare to locally common on rock.

LECANORA MURALIS. Rare to locally common on rock.

LECANORA VALESIACA. Rare on rock.

LECIDEA TESSELATA. Locally common on rock.

LECIDELLA STIGMATEA. Rare to locally common on rock.

LOBOTHALLIA ALPHOPLACA. Rare to locally common on rock.

LOBOTHALLIA PRAERADIOSA. Rare on rock.

PELTULA OBSCURANS. Locally common on soil.

PHAEOPHYSCIA KAIRAMOI. Rare on soil over rock; found only on shaded, vertical surfaces.

PHYSCIA CAESIA. Rare on shaded, vertical surfaces of rocks.

PLACIDIUM SQUAMULOSUM. Locally common on soil over rock or on open soil surfaces in inter-shrub spaces.

PLEOPSIDIUM CHLOROPHANUM. Common to abundant on vertical rock surfaces.

PLEOPSIDIUM FLAVUM. Locally common on rock.

PSORA CEREBRIFORMIS. Rare on open soil surfaces in inter-shrub spaces.

PSORA CRENATA. Locally common to abundant on soil surfaces in upper rocky areas.

PSORA DECIPIENS. Locally common to abundant on soil surfaces in upper rocky areas and at gypsiferous site.

PSORA TUCKERMANII. Rare to locally common on soil and soil over rock in upper rocky area.

SQUAMARINA LENTIGERA. Rare on gypsiferous soil surfaces.

STAUROTHELE AREOLATA. Rare to common on rock.

THYREA CONFUSA. Rare to locally common on rock.

TONINIA SEDIFOLIA. Rare on soil over rock or on open soil surfaces in inter-shrub spaces.

XANTHOMENDOZA FALLAX. Locally common on bark of Creosote shrubs.

XANTHOPARMELIA AJOENSIS. Rare on rock.

XANTHOPARMELIA PLITTII. Rare to locally common on rock.

XANTHORIA ELEGANS. Rare to locally common on rock.

Discussion -- The Black Rock Road lichen community intergrades between the Snow Canyon community and the more distinctly Mojave Desert communities in Southern California. Several previously unreported species were found at the Black Rock site largely due to the gypsiferous soil area. New reports from the gypsiferous site, include –*Acarospora nodulosa* var. *nodulsa,* and *Squamarina lentigera. Psora*

crenata also represents a new report for the Mojave Desert. *Xanthoparmelia ajoensis* is also a new to the Mojave Desert but certainly its occurrence at the Black Rock Road site falls within its predicted range.

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