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LIST OF BRYOPHYTES COLLECTED IN THE NORTHERN LAST CHANCE RANGE AND EUREKA VALLEY,  
DEATH VALLEY NATIONAL PARK

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ABSTRACT

A list of bryophytes occurring naturally in northern Death Valley National Park is presented. So far, 41 taxa have been documented, representing seven families and 24 genera. One species, *Jaffueliobryum wrightii*, is considered rare by the California Native Plant Society.

Key words: bryophytes, California, Death Valley National Park, Eureka Valley, Last Chance Range, liverwort, moss, rare plants.

INTRODUCTION

For most plant collectors, bryophytes—including mosses, liverworts, and hornworts—are easily and often overlooked. They tend to be small, lack colorful flowers or bracts, and frequently are tucked away under shrubs or in rock cracks. Even if they are noticed, some collectors are unaware of how to collect useful specimens. As a result, many areas, especially in the California deserts, have very few collections of mosses (James R. Shevock, CAS, pers. comm.).

While working to complete a checklist of vascular plants in the northern Last Chance Range and Eureka Valley, bryophytes were collected opportunistically. Additional information and a map of the study area are provided in the companion paper featuring the annotated checklist of vascular plants (Bell et al. 2021, this issue). Since there are many places where bryophytes could occur throughout the area, and not every habitat was thoroughly searched, this list is not necessarily comprehensive, but is intended to be a useful starting place for further documentation or land management decisions.

METHODS

Bryophyte specimens were collected by the author during 20 field days in 2017–2019 in Eureka Valley and the northern Last Chance Range (roughly the part of the range north of Ubehebe Crater and Marble 7559T). Specimens were sent to California Academy of Sciences (CAS), where they were identified by David Toren and James R. Shevock. Duplicates were retained at California Botanic Garden (RSA). The Consortium of North American Bryophyte Herbaria (<https://bryophyteportal.org/portal/>, accessed Mar 2021) was searched, and any taxa not collected by the author are included (8 specimens).

RESULTS AND DISCUSSION

In total, 130 specimens were collected. Along with the herbarium specimens, this represented seven families, 24 genera, and 41 species (Tables 1–2). Bryophytes were found in or near seeps, among gravel and pebbles in washes and on slopes, in rock cracks, and on boulder or cliff faces (Fig. 1–6). Many were growing in part or full shade, but a few were found in full sun. They are found at all elevations in the area and in all vegetation types, from creosote bush scrub to pinyon woodland. A list of species is presented in Appendix 1. Habitat information is included, since many bryophytes are specific to certain substrates or microhabitats.

Table 1. Families of bryophytes represented.

Family	Number of genera	Number of taxa
Pottiaceae	11	22
Bryaceae	5	6
Grimmiaceae	2	5
Funariaceae	2	3
Amblystegiaceae	2	2
Encalyptaceae	1	2
Brachytheciaceae	1	1

Table 2. Ten most speciose bryophyte genera. All other genera were represented by only one species in the area.

Genus	Number of taxa
<i>Syntrichia</i>	6
<i>Grimmia</i>	4
<i>Crossidium</i>	3
<i>Didymodon</i>	2
<i>Encalypta</i>	2
<i>Funaria</i>	2
<i>Gemmabryum</i>	2
<i>Microbryum</i>	2
<i>Pterygoneurum</i>	2
<i>Tortula</i>	2

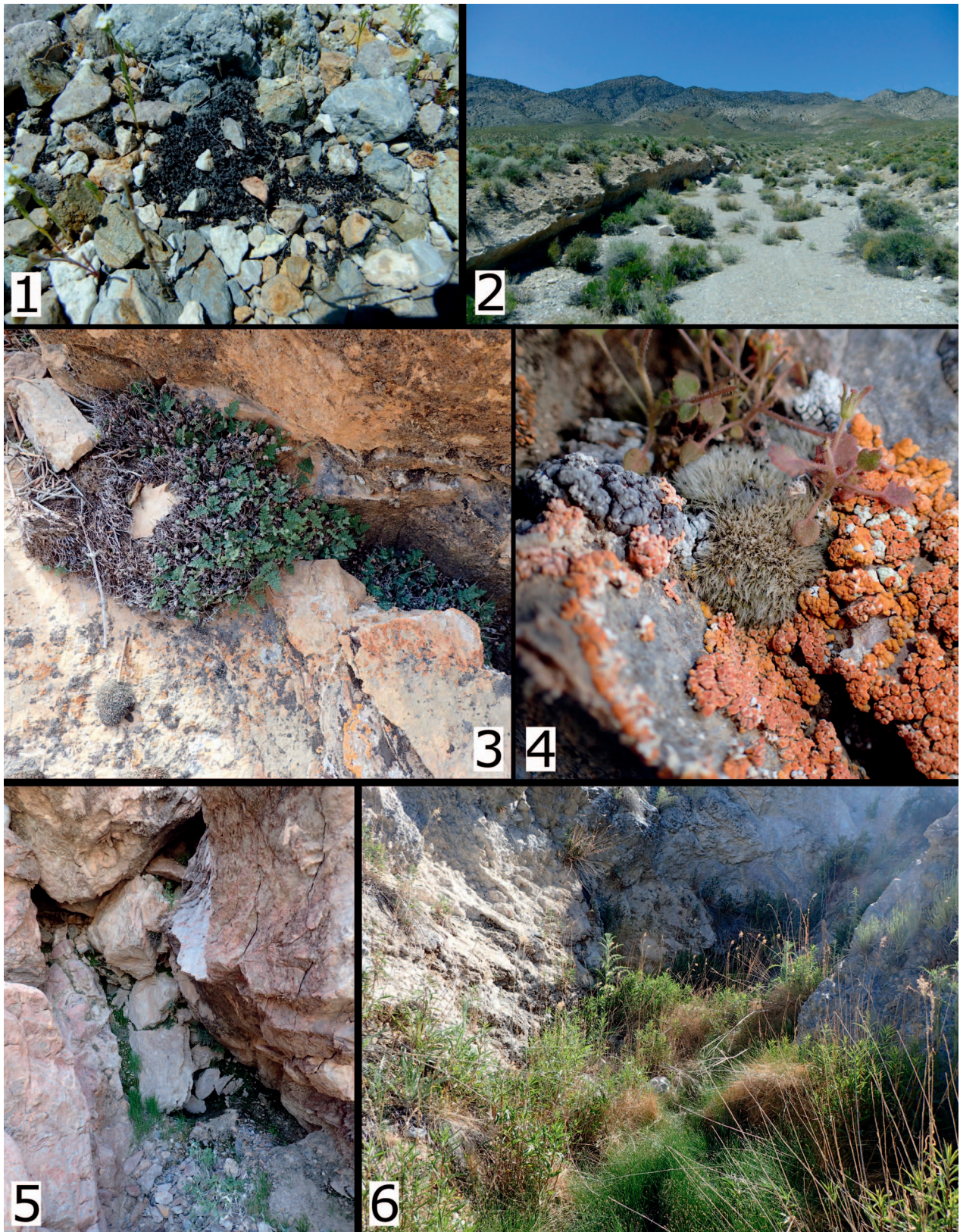


Fig. 1–6. Bryophytes and their habitats in the Last Chance Range.—1. *Syntrichia caninervis* growing in full sun among pebbles in a wash bottom (De Groot 8960).—2. Habitat of *S. caninervis* (De Groot 8960).—3. Limestone rock face with fern *Argyrochosma jonesii* (Maxon) Windham and a moss, likely a species of *Grimmia*.—4. *Jaffueliobryum wrightii* (De Groot 11136).—5. Damp shady grotto in a rocky canyon, with *Gymnostomum calcareum* (De Groot 10826) and *Trichostomum crispulum* (De Groot 10828).—6. Wet seep with *Didymodon tophaceus* (De Groot 11193).

*Excluded Taxon*

*Dicranodontium meridionale* E.B. Bartram (Dicranaceae) is represented by a single specimen: Last Chance Mountains, east of sand dunes at south end of Eureka Valley, elevation 1219 m (4000 ft), 08 Apr 1955, P. A. Munz 20576, NY. However, this is a Central American species, and would be out of place in arid mountains of the northern Mojave Desert. Therefore it is almost certainly a misidentification (B. Carter, pers. comm., July 2021). It would be useful if the original Munz specimen could be re-determined.

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## LITERATURE CITED

- BELL, H. L., S. J. DE GROOT AND S. E. SCHOENIG. 2021. Vascular plants of northern Death Valley National Park (Death Valley, Last Chance Range, and Eureka Valley), Inyo County, California. *Aliso* 39: 1–38.
- CALIFORNIA NATIVE PLANT SOCIETY [CNPS]. 2021. Rare plant program. Inventory of rare and endangered plants of California (online edition, v9-01 0.0). <https://www.rareplants.cnps.org> (27 July 2021).
- McKEE, E. H. 1985. Geologic map of the Magruder Mountain quadrangle, Esmeralda County, Nevada, and Inyo County, California. U.S. Geological Survey, Geologic Quadrangle Map GQ-1587, scale 1:62,500.
- AND C. A. NELSON. 1967. Geologic map of the Soldier Pass quadrangle, California and Nevada. U.S. Geological Survey, Geologic Quadrangle Map GQ-654, scale 1:62,500.
- NATIONAL GEOLOGIC MAP DATABASE. 2021. [https://ngmdb.usgs.gov/ngmdb/ngmdb\\_home.html](https://ngmdb.usgs.gov/ngmdb/ngmdb_home.html) (2017–2021).
- WRUCKE, C. T. AND K. P. CORBETT. 1990. Geologic map of the Last Chance quadrangle, California and Nevada. *U.S. Geological Survey Open-File Report OF-90-647-A*, scale 1:62,500. [https://ngmdb.usgs.gov/Prodesc/proddesc\\_18007.htm](https://ngmdb.usgs.gov/Prodesc/proddesc_18007.htm).

## APPENDIX 1

A list of bryophyte species is presented, along with microhabitat, substrate information, and the location where a representative voucher was collected. Rock types are from bedrock geologic maps of the area, available on the National Geologic Map Database (2021), particularly McKee (1985), Wrucke and Corbett (1990), and McKee and Nelson (1967). Rarity rankings are from the California Native Plant Society's Inventory (CNPS 2021), and rare taxa are marked with §. Distances labeled "air" are straight-line distances measured between a collecting site and the point referenced, usually using the GeoLocate Web application (<http://www.geolocate.org/web/WebGeoref.aspx>, accessed 2017–2021). Distances denoted "road" or "surface" follow road curves or the courses of washes, measured with a vehicle's trip odometer (in miles) or using GeoLocate.

## AMBLYSTEGIACEAE

- CONARDIA COMPACTA (C. Müll.Hal.) H. Rob. Elevation 1648 m (5405 ft). Slope ca. 30 degrees. Local aspect facing N08°W. Upper Cambrian Nopah Formation (dolomite). Pinyon woodland and Mojave desert scrub. Growing on damp/moist soil among *Solidago confinis* near base of outcrop. Filtered sun to part shade (due to aspect). Last Chance Range: limestone

outcrop along side of steep canyon, ca. 0.37 air km east-northeast of Last Chance Spring. *Sarah J. De Groot 9966* (CAS, RSA).

- DREPAÑOCLADUS ADUNCUS (Hedw.) Warnst. Elevation 1734 m (5690 ft). At the open fringes of the spring. South-facing, sedimentary, wet slope. Riparian herbaceous vegetation. Last Chance Spring (main spring above cabin). *Dana York 2734* (CAS).

## BRACHYTHECIACEAE

- BRACHYTHECIASTRUM COLLINUM (Schleich. ex Müll.Hal.) Ignatov & Hut-tunen. Elevation 2444 m (8020 ft). Shaded, north-facing crevice on a carbonate rock cliff, damp soil. Pinyon woodland and scrub. About 0.7 km south-southeast of Last Chance Mountain in a drainage above Eureka Valley. *Dana York 2368* (CAS).

## BRYACEAE

- BRYUM ARGENTEUM Hedw. Elevation 1582–1989 m (5188–6525 ft). Dry to damp sand, gravel and talus in canyon washes and cracks in rock outcrops. Aspect east to south. Quaternary alluvium, Miocene granite, upper Cambrian Dunderberg Shale member or Cambrian Nopah Formation. Desert scrub vegetation. Full sun to part shade. About 0.3 air km (0.2 mi) north of El Capitan mine shaft, ca. 9.0 road km (5.6 mi) north of Crater. *Sarah J. De Groot 11138* (CAS, RSA).
- GEMMABRYUM BRASSICOIDES J.R. Spence & Kellman. Elevation 1190 m (3902 ft). Broad sand and talus wash between rolling hills. Slight slope, facing N58°E. Quaternary older alluvium. Creosote bush scrub. Occasional on damp sandy soil at base of boulder. Part shade/filtered sun. Piper Mountain Wilderness: canyon draining into the Eureka Valley, ca. 5.6 air km (3.5 mi) northeast of Lime Hill, northeast tip of Inyo Mountains. *Sarah J. De Groot 11006* (CAS, RSA).
- GEMMABRYUM SUBAPICULATUM (Hampe) J.R. Spence & H.P. Ramsay. Elevation 1768 m (5800 ft). In a Joshua tree woodland with *Chrysothamnus*; under fallen branch among willows at spring. Last Chance Range; along Cucamongo Canyon at Willow Spring. *Eve Laeger 1130* (CAS).
- PLAGIOBRYOIDES VINOSULA (Cardot) J.R. Spence. Elevation 1734 m (5700 ft). Edge of a pinyon pine and Utah juniper woodland. On saturated soil. Last Chance Range, Last Chance Spring about 4 miles north of Big Pine Road. *James R. Shevock 21329* (CAS).
- PTYCHOSTOMUM PSEUDOTRIQUETRUM (Hedw.) J.R. Spence & H.P. Ramsay ex Holyoak & N. Pedersen. Elevation 1724 m (5655 ft). Throughout the meadow on an east-facing slope. Growing on moist soil. Herbaceous riparian vegetation. Last Chance Range, meadow at Last Chance Spring. *Dana York 2393* (CAS).
- ROSULABRYUM CAPILLARE (Hedw.) J.R. Spence. Elevation 1331 m (4366 ft). Narrow rock canyon at dry waterfall. Nearly vertical rock walls, and talus wash. Facing N15°E. Cambrian Bonanza King formation (marine sedimentary rock: gray limestone). Mojave desert scrub. Infrequent; in damp silty soil and pebbles in small alcove in rock face; more or less full shade. Last Chance Range: side canyon of unnamed canyon south-southeast of Crater, ca. 1.8 surface km (1.1 mi) south of Big Pine–Death Valley Road, along canyon wash. *Sarah J. De Groot 10790* (CAS, RSA).

## ENCALYPTACEAE

- ENCALYPTA INTERMEDIA Juratzka. Elevation 1331–2444 m (4366–8015 ft). Rock outcrops, cliffs, and canyons, sometimes with lichens. Slope from nearly flat to vertical. Aspect varies from east to north to west-facing. Often on limestone or dolomite, but also found on monzonite, shale, alluvium, siltstone, sandstone, or quartzite. Desert scrub to pinyon–juniper–Joshua tree–sagebrush woodland. Rare to frequent, usually in dry cracks in rock outcrops or cliffs, occasionally in damp sand at the base of a cliff. Mostly in part shade, but occasionally in full sun or full shade. Found at many locations in the Last Chance Range. Along ridge south of Last Chance Peak, ca. 1.4 air km (0.9 mi) southeast of White Top 8456T, ca. 0.17 air km southeast of 8250T. *Sarah J. De Groot 9955* (CAS, RSA).
- ENCALYPTA VULGARIS Hedw. Elevation 1107–1288 m (3630–4223 ft). Narrow rocky canyons, steep boulder-strewn washes. Slope flat to ca. 40

degrees, facing north to northeast. Limestone, dolomite, or monzonite. Desert scrub. Locally frequent, often in damp sand or gravel between boulders or in rock cracks, near washes or where water might run seasonally. Part shade. East slope of Last Chance Range, ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, then ca. 1.0 km southwest up slope of hills. *Sarah J. De Groot 10817* (CAS, RSA).

#### FUNARIACEAE

*ENTOSTHODON RUBRISSETUS* (E.B. Bartram) Grout. Elevation 1148 m (3765 ft). Canyon, narrow steep rocky wash drainage. Gray, white, and pink limestone outcrops, boulders, talus, and gravel. Local aspect S85°E. Ordovician Ely Springs dolomite. South-facing slope with creosote bush scrub, north-facing slope with *Purshia* scrub. Infrequent; in dry thin soil on bank between boulders and pebbles in wash bottom, under boulder overhang. East slope of Last Chance Range; ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, then ca. 1.0 km southwest into canyon. *Sarah J. De Groot 10808* (CAS, RSA).

*FUNARIA HYGROMETRICA* Hedw. Elevation 958 m (3141 ft). Alkaline seep on gentle hillside; slope 2–15 degrees, facing S32°W. Fine sand and clay soil, sometimes with white salt crust. Tertiary lacustrine deposits and Tertiary or Quaternary gravel. Growing in shallow water in wet seep area with *Eleocharis* sp. and *Polypogon monspeliensis*. Full to filtered sun. Sand Spring, north of Oriental Wash and east-northeast of Death Valley Road. *Sarah J. De Groot 8978* (CAS).

*FUNARIA MUHLENBERGII* Turner. Elevation 1068–1331 m (3504–4366 ft). Narrow canyons to broad washes, among boulders and rock outcrops and talus. Slope to nearly vertical, facing north-northeast to west-northwest. Cambrian Bonanza King formation and Ordovician Ely Springs dolomite. Mojave desert scrub, creosote bush scrub, or *Purshia* scrub. Infrequent to locally frequent; on damp to dry silt, sand, or pebbles. Nearly full sun to nearly full shade. Several sites in the Last Chance Range; side canyon of unnamed canyon south-southeast of Crater; ca. 1.8 surface km (1.1 mi) south of Big Pine–Death Valley Road, along canyon wash. *Sarah J. De Groot 10792* (CAS, RSA).

#### GRIMMIACEAE

*GRIMMIA ANODON* Bruch & Schimp. Elevation 1307–2540 m (4287–8331 ft). Outcrops, cliffs, canyons, boulders, talus slopes, and hillsides. Slope from about 15 degrees to vertical, facing east to north to northwest. Many substrates, including limestones, dolomites, chert, shale, monzonite, basalt cinders or flow, Quaternary alluvium, clay, sandstone, siltstone, or quartzite; sometimes with lichen. Desert scrub to pinyon–sagebrush–Joshua tree woodlands. Locally rare to common, in dry cracks on walls of boulders, outcrops, cliffs, or occasionally on thin soil. Sun to part shade. Many locations in the Last Chance Range and northern Eureka Valley. Along ridge south of Last Chance Peak, ca. 1.4 air km (0.9 mi) southeast of White Top 8456T, ca. 0.17 air km southeast of 8250T. *Sarah J. De Groot 9956* (CAS, RSA).

*GRIMMIA LAEVIGATA* (Brid.) Brid. Elevation 1341–1461 m (4399–4792 ft). Sand, gravel, talus, or boulders in washes or on hillsides. Slopes gentle to 15 degrees, facing northwest to northeast. Growing on Bonanza King dolomite or hornblende–augite monzonite. Creosote bush scrub. Growing in dry cracks or underhangs of boulders or outcrops, in partial to full shade. Northwest edge of Eureka Valley; rock outcrop north of Soldier Pass Canyon. *Sarah J. De Groot 9243* (CAS).

*GRIMMIA MOXLEYI* R.S. Williams. Elevation 1122 m (3680 ft). Canyon, narrow steep rocky wash drainage. Gray, white, and pink limestone outcrops, boulders, talus, and gravel. Slope facing N56°W. Ordovician Ely Springs dolomite. South-facing slope with creosote bush scrub, north-facing slope with *Purshia* scrub. Common; on dry walls of limestone boulders. Part shade. East slope of Last Chance Range; ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, then ca. 0.95 km southwest into canyon. *Sarah J. De Groot 10801* (CAS, RSA).

*GRIMMIA ORBICULARIS* Bruch ex Wilson. Elevation 1713 m (5618 ft). Slope 10 degrees, facing S80°E. Later Miocene granite (intrusive). Mojave

desert scrub. Occasional on dry cracks in wall of outcrop. Last Chance Range, igneous rock outcrop on ridge, ca. 0.38 air km south-southeast of Last Chance Spring. *Sarah J. De Groot 9968* (CAS).

*JAFFUELOBRYUM WRIGHTII* (Sull.) Thér. California Rare Plant Rank 2B.3 (2B: rare, threatened, or endangered in California but common elsewhere; .3: not very threatened in California; CNPS 2021). Elevation 1989 m (6525 ft). Local aspect S10°E. Narrow canyon with rock walls and steep talus banks. Narrow band of upper Cambrian Dunderberg Shale member, surrounded by upper Cambrian Nopah Formation (gray dolomite). Scrub vegetation. Rare, in dry crack in wall of gray-pink limestone rock outcrop. Sun to part shade. Last Chance Range, ca. 0.3 air km (0.2 mi) north of El Capitan mine shaft, ca. 9.0 road km (5.6 mi) north of Crater. *Sarah J. De Groot 11136* (CAS, RSA).

#### POTTIACEAE

*ANOECTANGIUM HANDELI* Schiffn. Elevation 1065 m (3492 ft). Rocky slope, 25 degrees, facing N06°W. Gray calcareous outcrops and talus. Boundary between Ordovician Palmetto Formation and Ordovician Ely Springs dolomite. Mojave desert scrub. On damp sandy soil with lichen in crack under rock outcrop overhang. Full shade and maybe a cooler temperature. East slope of Last Chance Range; ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, then ca. 1.0 km southwest up slope of hills. *Sarah J. De Groot 10820* (CAS, RSA).

*CROSSIDIUM CRASSINERVIUM* (De Not.) Jur. Elevation 1439 m (4719 ft). Gray (sharp) limestone outcrop on hillside. Slope ca. 35–60 degrees, facing S10°E. Cambrian Bonanza King dolomite. Desert scrub. Occasional in moist sandy soil in rock crack facing north-northeast. Part sun due to aspect/filtered light. Northeast Eureka Valley, just west of the mouth of Cucomungo Canyon, north side of Willow Creek drainage. *Sarah J. De Groot 11009* (CAS, RSA).

*CROSSIDIUM SERIATUM* H.A. Crum & Steere. Elevation 1766 m (5794 ft). Gray limestone outcrops and talus on east-facing slope. Local aspect southeast. Cambrian Bonanza King dolomite. Sparse Joshua tree woodland and desert scrub. Growing in damp sand in crack between rocks. More or less full sun. Last Chance Range; near road F1897(?), ca. 3.1 air km (1.9 mi) northeast of Crater (east fork of road). *Sarah J. De Groot 11100* (CAS, RSA).

*CROSSIDIUM SQUAMIFERUM* (Viv.) Jur. Elevation 1919 m (6295 ft). Wash and hillsides above it. Wash slope ca. 5 degrees, facing S15°W. Quaternary alluvium in wash; hills of Jurassic granitic rocks of the Sylvania Mountains Pluton (medium- to coarse-grained porphyritic biotite quartz monzonite). Pinyon–Joshua tree woodland. Frequent/scattered on damp sand and gravel on flat between shrubs. Part sun. Upper Cucomungo Canyon ca. 0.12 km southwest of California–Nevada state line. *Sarah J. De Groot 11030* (CAS, RSA).

*DIDYMODON TOPHACEUS* (Brid.) Lisa. Elevation 1401 m (4595 ft). Seep in steep narrow side canyon drainage. Area sloped 15 degrees, facing N10°E. Local aspect of microsite facing N18°W. Gray gravel and talus. Ordovician Pogonip group (gray limestone), surrounded by Quaternary older alluvium. Furnace Creek–Death Valley Fault Zone. Mojave desert scrub. Locally common/abundant, in wet sod in thin soil on rock face with seeping water, and at base of rock face. Full shade to filtered sun. Last Chance Canyon, ca. 7.1 air km (4.4 mi) southeast of Willow Spring, 2.6 air km (1.6 mi) south-southeast of confluence of Last Chance and Copper Canyons, 1.4 air km (0.85 mi) east-northeast of Last Chance Spring. *Sarah J. De Groot 11193* (CAS, RSA).

*DIDYMODON VINEALIS* (Bridel) R.H. Zander. Elevation 1116 m (3662 ft). Canyon, narrow steep rocky wash drainage. Gray, white, and pink limestone outcrops, boulders, talus, and gravel. Slope facing N56°E. Ordovician Ely Springs dolomite. South-facing slope with creosote bush scrub, north-facing slope with *Purshia* scrub. Occasional; in dry thin soil over limestone outcrop in wash bottom, on bank under overhang of boulder. Mostly full shade. East slope of Last Chance Range; ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, then ca. 0.96 km southwest into canyon. *Sarah J. De Groot 10809* (CAS, RSA).

- EUCLADIUM VERTICILLATUM** (Bridel) Bruch & Schimper. Elevation 1680 m (5512 ft). Limestone outcrops and gravel; with surface water. Slope 25–30 degrees, facing S42°W. Boundary between Miocene granite (light colored biotite aplite to coarse-grained quartz monzonite) and Upper Cambrian Nopah Formation (light to medium gray limestone, sometimes white). Riparian vegetation, surrounded by pinyon–juniper woodland. Occasional, on wet mucky sand and rock. Filtered sun, under *Muhlenbergia asperifolia*. Northeast Last Chance Range, hillside seep ca. 0.2 air km (0.1 mi) east-southeast of Last Chance Spring. *Sarah J. De Groot 11223* (CAS, RSA).
- GYMNOSTOMUM CALCAREUM** Nees & Hornschuch. Elevation 1122 m (3681 ft). Rocky canyon. Aspect S54°E. Limestone outcrops and talus. Ordovician Palmetto Formation. Mojave desert scrub. Locally frequent; on damp thin silt and rock in alcove behind dry waterfall. Shade. East slope of Last Chance Range; ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, canyon ca. 1.2 air km southwest of Death Valley Road. *Sarah J. De Groot 10826* (CAS, RSA).
- MICROBRYUM STARCKEANUM** (Hedw.) R.H. Zander. Elevation 1148 m (3765 ft). Canyon, narrow steep rocky wash drainage. Gray, white, and pink limestone outcrops, boulders, talus, and gravel. Area facing N63°E. Local aspect facing S85°E. Ordovician Ely Springs dolomite. South-facing slope with creosote bush scrub, north-facing slope with *Purshia* scrub. Infrequent; in dry thin soil on bank between boulders in wash bottom. Part shade. East slope of Last Chance Range; ca. 3.9 road km (2.4 mi) southeast of Crankshaft Junction, then ca. 1.0 km southwest into canyon. *Sarah J. De Groot 10807* (CAS, RSA).
- MICROBRYUM VLASSOVII** (Laz.) R.H. Zander [rhizoids bearing distinctive unicellular hemispherical excrescences]. Elevation 1582 m (5188 ft). Gravelly wash sloping ca. 15 degrees, facing S78°E. Quaternary alluvium below hill of Miocene granite: light-colored biotite aplite to coarse-grained quartz monzonite. Desert scrub. Growing in dry rock and gravel soil of wash, in full sun. Canyon ca. 3.9 air km (2.4 mi) east of Last Chance Mountain, ca. 1.0 air km (0.6 mi) southeast of Last Chance Spring; east side of Last Chance Range. *Sarah J. De Groot 8962B* (CAS).
- PTERYGONEURUM LAMELLATUM** (Lindb.) Jur. Elevation 1582 m (5188 ft). Gravelly wash sloping ca. 15 degrees, facing S78°E. Quaternary alluvium below hill of Miocene granite: light-colored biotite aplite to coarse-grained quartz monzonite. Desert scrub. Growing in dry rock and gravel soil of wash, in full sun. Canyon ca. 3.9 air km (2.4 mi) east of Last Chance Mountain, ca. 1.0 air km (0.6 mi) southeast of Last Chance Spring; east side of Last Chance Range. *Sarah J. De Groot 8962A* (CAS).
- PTERYGONEURUM OVATUM** (Hedw.) Dixon. Elevation 2491 m (8171 ft). White talus slope, ca. 25 degrees, facing due north. Local aspect N70°W. Upper and middle Cambrian Bonanza King dolomite. Pinyon woodland. Growing among talus on dry sand/loam soil and old grass stump. Part sun. Last Chance Range, north slope of White Top, ca. 0.2 air km north-northeast of White Top 8456T. *Sarah J. De Groot 9948* (CAS).
- SYNTRICHIA CANINERVIS** Mitt. Elevation 1035–2507 m (3396–8222 ft). Washes, bajadas, hillsides, outcrops, canyons, and cliffs. Slope from ca. 4 degrees to vertical; facing mostly northeast–north–northwest, but sometimes also west, east, or south. Found on many rock types: alluvium, dolomite, limestone, shale, chert, basalt cinders and flow, rhyolite, granite or monzonite, porphyry, etc. Creosote bush scrub, *Purshia* scrub, to pinyon–Joshua tree woodland. Locally infrequent to frequent, on thin dry or occasionally damp sand and gravel among pebbles or between rocks. Full sun to part shade. Last Chance Range, along road to El Capitan Mine ca. 1.3 road km (0.8 mi) north-northeast of Death Valley Road, at foot of hill ca. 0.6 km north-northeast of Crater. *Sarah J. De Groot 10786* (CAS, RSA).
- SYNTRICHIA MONTANA** Nees. Elevation 2350 m (7708 ft). Orange, tan, and gray rock outcrop along ridge, facing N05°W. Boundary between lower Cambrian Poleta Formation, middle member (dark green siliceous siltstone, red to white quartzite, and thin beds of gray limestone) and lower member (blue and orange limestone, commonly recrystallized). Pinyon–juniper woodland and desert scrub. Occasional/rare, on dry thin sand and leaf duff in cracks in rock outcrop. Part shade. Northern Last Chance Range, ridge on north slope 0.3 air km (0.2 mi) from summit 7990T, 2.4 air km (1.5 mi) south of Cucumungo Canyon, 3.0 air km (1.9 mi) southwest of Willow Spring. *Sarah J. De Groot 11301* (CAS, RSA).
- SYNTRICHIA NORVEGICA** F. Weber. Elevation 1615–1646 m (5300–5400 ft). On crevice of metamorphic rock outcrop, or limestone sandy soils under shrubs. Joshua tree woodland with *Artemisia tridentata*, *Ephedra nevadensis*, *Menodora*, and grasses. Last Chance Range, along Cucumungo Canyon west of Willow Spring. 28 Dec 2001. *Eve Laeger 1146* (CAS).
- SYNTRICHIA PRINCEPS** (De Not.) Mitt. cf. [poor material]. Elevation 1344 m (4409 ft). Granitic boulders and coarse sand on hill facing N18°W. Jurassic hornblende-augite monzonite of Joshua Flat. Growing in dry soil on tiny open flat area between boulders, with lichen. Shade most of the day. Infrequent. Northwest edge of Eureka Valley, rock outcrop north of Soldier Pass Canyon. *Sarah J. De Groot 9245* (CAS).
- SYNTRICHIA RURALIS** (Hedw.) Web. & Mohr. Elevation 1288–2475 m (4223–8117 ft). Rocky slopes and canyons. Slope 15–20 degrees, facing north to northeast to east. Growing on various rock types: Pliocene rhyolite flow, Miocene diorite, Jurassic hornblende-augite monzonite, Cambrian Bonanza King dolomite, upper Cambrian Dunderberg Shale member, or upper Cambrian Nopah Formation (gray dolomite). Mojave desert scrub to pinyon woodland. Rare to locally frequent, on dry sandy soil among pebbles, at bases of boulders, or on rock walls. Full to filtered sun. Canyon draining into the Eureka Valley, ca. 4.0 air km (2.5 mi) northeast of Lime Hill, northeast tip of Inyo Mountains. *Sarah J. De Groot 11001* (CAS, RSA).
- SYNTRICHIA VIRESCENS** (De Not.) Ochyra. Elevation 1341 m (4399 ft). Granitic boulders and coarse sand on hill facing N28°E. Slope here ca. 15 degrees. Jurassic hornblende-augite monzonite of Joshua Flat. Growing in dry sandy soil in crack between boulders. Part shade. Common. Northwest edge of Eureka Valley, rock outcrop north of Soldier Pass Canyon. *Sarah J. De Groot 9241* (CAS).
- TORTULA INERMIS** Bridel. Elevation 1138–1687 m (3734–5534 ft). Washes, banks, outcrops, and canyons. Slope from about 15–35 degrees, facing southeast, east, northeast, north, to northwest. Growing on various rock types: alluvium, Pliocene basalt flow, Miocene or Jurassic granite or monzonite, Ordovician Ely Springs dolomite or Pogonip limestone, Cambrian Bonanza King dolomite or limestone. Mojave desert scrub, *Purshia* scrub, or Joshua tree woodland. Infrequent to locally frequent, in moist to dry sandy soil or rock faces, sometimes under rock overhangs. Full shade to full sun. Last Chance Range, side canyon of unnamed canyon south-southeast of Crater; ca. 1.8 surface km (1.1 mi) south of Death Valley Road, along canyon wash. *Sarah J. De Groot 10788* (CAS, RSA).
- TORTULA MUCRONIFOLIA** Schwägr. Elevation 2540 m (8331 ft). White talus slope, ca. 25 degrees, facing N01°E. Upper and middle Cambrian Bonanza King dolomite. Pinyon woodland. Rare or occasional on dry sandy soil between limestone boulders. Mostly in shade. Last Chance Range, north slope of White Top, ca. 0.115 air km north-northeast of White Top 8456T. *Sarah J. De Groot 9950* (CAS).
- TRICHOSTOMUM CRISPULUM** Bruch. Elevation 1122–1531 m (3681–5021 ft). Rocky canyons and outcrops on slopes. Local aspect southeast, northeast, or northwest. Ordovician Palmetto Formation, Jurassic hornblende-augite monzonite, or Pliocene basalt flow. Mojave desert scrub. Occasional to locally common, on damp sand in rock cracks, alcoves, or grottoes. Full shade. Canyon draining into the Eureka Valley, ca. 4.0 air km (2.5 mi) northeast of Lime Hill, northeast tip of Inyo Mountains. *Sarah J. De Groot 10993* (CAS, RSA).
- WEISSIA LIGULIFOLIA** (E.B. Bartram) Grout [= *W. andersoniana* Zander]. Elevation 1280–1989 m (4200–6525 ft). Slot below dry waterfall, rock outcrops on hillsides, and narrow canyons. Slope to 60 degrees, facing north to northeast, or locally south if rock overhangs provide shade. Cambrian Nopah Formation dolomite, Bonanza King dolomite, or Dunderberg shale. Mojave Desert scrub. Rare to scattered, on dry to moist thin sand in cracks between rocks or on walls. Mostly in full or nearly full shade. Northeast Eureka Valley, just west of the mouth of Cucumungo Canyon, north side of Willow Creek drainage. *Sarah J. De Groot 11008* (CAS, RSA).