
The Annotated Lichen Checklist of San Nicolas Island, California, U.S.A.

Kerry Knudsen^{1*} Tim Wheeler^{2*} Eva Hodková¹ Jana Kocourková¹

¹Czech University of Life Sciences Prague, Faculty of Environmental Sciences,
Department of Ecology, Kamýcká 129, Praha - Suchbát, 165 00, Czech Republic.

²Division of Biological Sciences, University of Montana, Missoula Montana 59801.

¹Corresponding author's e-mail: knudsen@fzp.czu.cz

²Corresponding author's e-mail: timothybwheeler@gmail.com

Abstract: 136 lichens are reported from San Nicolas Island. Sequences for *Niebla ramosissima* and *Aspicilia aurantiaca* are published.

Keywords: Calciphytes, endemic species, island diversity, soil crusts, rare species

Introduction

San Nicolas Island in Ventura County is the farthest island from the California coast, 61 miles (91 km) from the mainland. Maps in scientific papers have become as obsolete as hardcopy flora books and journals. One can see the island on Google Maps and even zoom in on collecting sites using coordinates of collections in CNALH. But for security reasons some areas are blocked out. The island is owned by the U.S. Navy and used for military research and monitoring and is run by a revolving population of approximately 200 military personal. It is closed to the public. The island has a semi-arid Mediterranean climate with rain occurring mostly in the winter months and long dry summers with moderate temperatures averaging 64.7 °F (18.2 °C). Regular fog blankets the island. The island is small, 58.93 km² or 22.753 sq miles. The highest elevation is 907 ft (276 m). The topography is basically the flat tops of a series of marine terraces with deep eroded canyons. Due to previous overgrazing on the islands with sheep erosion is still a serious management problem. The island geology is mainly sandstone, mudstone, and shale, with some andesite outcrops as well as metavolcanic cobbles embedded in layers of mudstone and scattered on ridges and slopes by erosion. Exposed caliche is common surrounded with calcareous soil. Gypsum occurs in some areas. Many lichens that usually grow on rock were collected on hard consolidated soil, derived from sandstone. The common vegetation type is maritime bluff shrubs including the largest stand of *Leptosyne gigantea* on all of California's eight islands or on the southern California coast. Some non-native trees and shrubs are planted around navy buildings which supply substrate especially for macrolichens that do not usually grow on small shrubs. Discarded lumber scattered around the island is an important anthropogenic substrate. Soil crusts are common. 1870 collections from San Nicolas

Island are in North American herbaria (CNALH 2022). Collectors on San Nicolas Island include Blanche Trask, Charis C. Bratt, Shirley Tucker, Thomas H. Nash III, and the authors of this paper. The current list was prepared to aid future investigations of the lichen flora of San Nicolas Island.

Methods

The first author (K.K.) spent ten days on the island collecting in 2014 and 2015 and the second author (T.W.) joined him for five days of collecting in 2015. We covered most of the island in daily random explorations on foot, except for the extreme north end. Specimens were studied using standard microscopy and spot tests (Brodo et al. 2002). Identifications were done using the three volumes of the Lichen Flora of the Greater Sonoran Desert Region, except where other literature is cited (Nash et al. 2002, 2004, 2007). Lichen photographs by Tim Wheeler were taken with a Pentax K3 DSLR, mounted on a Stackshot rail, and combined in Helicon Focus. Field photographs were taken with an iPhone 6. For DNA extraction, amplification and sequencing see Knudsen et al. (2021). The collections of Tim Wheeler are in hb. Wheeler. The collections of Kerry Knudsen are property of SBBG lichen herbarium but are currently in the UCR lichen herbarium and will be moved to SBBG in 2022 and 2023. They can be checked on CNALH by specimen number during the transition.

Rare is determined by one or two collections, and the subjective opinion of authors. Infrequent is determined by less than five collections, and the subjective opinion of authors. Frequent is determined by five to eight collections, and the subjective opinion of authors. Common is determined by eight or more collections, and the subjective opinion of authors. The occurrence of lichens on other islands and in California is based on specimens in SBBG and in CNALH (2022). South or southern coast refers to coast from just north of the city of Santa Barbara to Mexican border. Central coast extends from Point Reyes to northern Santa Barbara County. Place names are based on Navy maps and signs.

Taxonomy Checklist

For the coordinates of collections if available and for more records see CNALH, the Consortium of North American lichen herbaria <https://lichenportal.org/cnalh/>. For keys, descriptions, substrate, more distributional data, discussions, and pictures of the lichens of San Nicolas Island see the three volumes of the Lichen Flora of the Greater Sonoran Desert Region (Nash et al. 2002, 2004, 2007) or other literature cited. For more pictures and information about the lichens of the Channel Islands see Brodo et al. (2001), Knudsen & Kocourková (2012), and Sharnoff (2014).

Acarospora nodulosa (Dufour) Hue

Notes. *Acarospora nodulosa* (syn. *A. reagens* Zahlbr.) is an obligate terricolous lichen with large rhizines. Though once abundant in soil crusts in Palm Springs area of southern California, it is now a rare or an extirpated species in southern California. The only known collection of this species from the eight Channel Islands was made on San Nicolas Island. The synonymy of *A. nodulosa* with *A. reagens* needs verification by molecular analysis.

Voucher. area adjacent environmental laboratory (NAVFAC) and in the gullies behind Tranquility Beach, 25 m, on soil, 5.i.1995, *T.H. Nash 38730* (ASU, det. K. Knudsen).

Acarospora socialis H. Magn.

Notes. This yellow species was described from the mountains of Catalina Island. It is rare on San Nicolas Island. It occurs on all the Channel Islands and in southern and central California along the coast (Knudsen & Kocourková 2021). On Santa Rosa Island it was collected growing on the wood

of a corral fence (Knudsen & Kocourková 2012). This is not to be confused with the broad concept of *A. socialis* in the Sonoran flora (Knudsen 2007; see Knudsen & Kocourková 2022).

Voucher. South edge of mesa, S of Peak 606, SE end of island, on rock, 27.v.1992, *S. Junak SN 947* (SBBG).



Acarospora socialis. Twin Towers Canyon, Wheeler 7103 (hb Wheeler).

Acrocordia conoidea (Fr.) Körb.

Notes. This is a rare species in southern California known only from San Nicolas Island and Crystal Cove State Park in Orange County.

Voucher. Uphill from NAVFAC Rd. and its dirt extension, W of Conservation Center, on shale, 5.i.1995, *S.C. Tucker 33725* (ASU, SBBG).

Arthonia lecanactidea Zahlbr.

Notes. This is a rare species that grows on *Lycium californicum*. It was described from collections by H. E. Hasse along the south coast near San Pedro in Los Angeles County (Knudsen & Kocourková 2012). It also occurs at Cabrillo National Monument in San Diego and on Catalina and West Anacapa Islands.

Voucher. Nafvac Rd, N of Conservation Center, on *Lycium californicum*, 1.i.1995, *S. Tucker 31930* (SBBG).

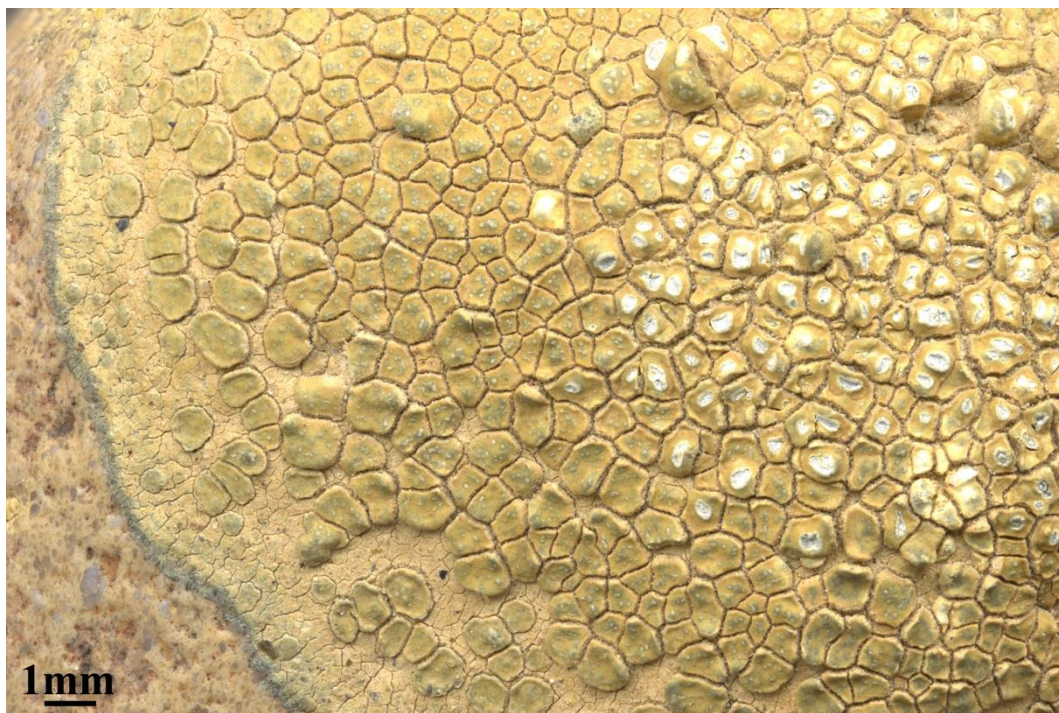
Arthonia pruinata (Pers.) Steud. ex A.L. Sm.

Notes. The species is probably infrequent on San Nicolas Island. The species is common on especially on large shrubs and trees on the Channel Islands and along central coast of California.

Voucher. Immediately E of commissary, 100 m, on planted pines, 7.i.1995, *T.H. Nash 38790* (ASU).



Arthonia pruinata. East Celery Canyon, Wheeler 6995 (hb Wheeler).



Aspicilia aurantiaca. West Twin Tower Canyon, Wheeler 7091 (hb Wheeler).

Aspicilia aurantiaca Owe.-Larss. & A. Nordin

Notes. This is the northern most collection in California of this distinctive *Aspicilia* verified by the first author. It is also known from San Clemente Island. It is rare on San Nicolas Island on cobbles. It occurs along the south coast from the Santa Monica Mountains to the Mexican border.

Voucher. South side east of Twin Tower, on metavolcanics cobbles, 233 m, 23.viii.2015, *K. Knudsen 17824* (SBBG) & *T. Wheeler 7091* (hb. Wheeler). nrITS: MW447387, mtSSU: MW424807, LSU: MW447401, MCM7: MW435335.

Bacidia coruscans S. Ekman

Notes. The species is common on native shrubs on San Nicolas Island. It occurs along the central coast of California and on Catalina, San Miguel, Santa Cruz, and Santa Rosa Islands. The species was described from San Miguel Island.

Voucher. East Mesa Canyon, 110 m, on dead desiccated piece of caudex of *Leptosyne gigantea*, 22.viii.2015, *K. Knudsen 17817* & *T. Wheeler* (SBBG).

Bibbya ruginosa* ssp. *pacifica (Timdal) Timdal

Notes. The species is probably frequent in soil crusts on San Nicolas Island. It occurs on Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands. It has a scattered distribution in California. This taxon was previously treated as a *Toninia* (Kistenich et al. 2018).

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, in soil crusts of calcareous soil, 4.vi.2014, *K. Knudsen 16781* (SBBG).

Buellia abstracta (Nyl.) Oliv.

Notes. The species is probably frequent on San Nicolas Island but under-collected. It occurs on all the Channel Islands and is common throughout southern California on siliceous rock including in the Mojave Desert in Joshua Tree National Park. It often is either lacking norstictic acid or with concentrations so low it can only be detected with thin-layer chromatography. The name *Buellia sequax* was misapplied to this taxon (Bungartz 2007).

Voucher. South side near Daytona Beach in sandstone ravines, 25 m, on sandstone, 3.vi.2014, *K. Knudsen 16746.2* & *W. Hoyer* (SBBG).

Buellia badia (Fr.) A. Massal

Notes. The species is probably infrequent on San Nicolas Island. The species is a lichenicolous lichen which eventually forms a brown independent thallus. It occurs on Catalina, San Clemente, Santa Cruz, Santa Rosa, and West Anacapa Islands. It is common in southern California. It sometimes is found in its juvenile non-lichenized stage as apothecia on the host.

Voucher. South side east of Twin Tower, 233 m, on *Aspicilia aurantiaca* on cobble, not yet forming an independent thallus, 23.viii.2015, *K. Knudsen 17827* & *T. Wheeler* (SBBG).

Buellia erubescens Arnold

Notes. The species was collected by H.E. Hasse on Catalina Island. It is usually a montane species (Bungartz 2007). Occasionally montane species can be found on the islands, propagated by wind, like *Lecidea oreophila* K. Knudsen & Kocourk. which is a high elevation species in the southern California mountains but occurs on the San Clemente Island (Knudsen et al. 2017).

Voucher. South side east of Twin Tower, 233 m, on old lumber, 23.vii.2015, *K. Knudsen 17822* & *T. Wheeler* (SBBG).

Buellia halonia (Ach.) Tuck.

Notes. The yellow species is frequent on San Nicolas Island. It occurs on all the Channel Islands and along the southern and central coast of California.

Voucher. West end, 150 m, on sandstone, 5.i.1995, *T.H. Nash III 38689* (ASU, determined by F. Bungartz).



Buellia halonia. Jackson Highway Badlands, Wheeler 6911 (hb Wheeler).



Buellia maritima. Jackson Highway Badlands Canyon, Wheeler 6930 (hb Wheeler).

Buellia maritima (A. Massal.) Bagl.

Notes. The species is frequent on San Nicolas Island. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands and especially along California coast from the Mexican border to San Simeon.

Voucher. West end, 215 m, on caliche, 2.vi.2014, *K. Knudsen 16707* (SBBG).

Buellia oidalea (Tuck.) Tuck.

Notes. The species is probably frequent on San Nicolas Island. This species is common on all the Channel Islands and along California coast on a variety of native and non-native vegetation.

Voucher. Immediately E of commissary, 100 m, on shrubs, 7.i.1995, *T.H. Nash III 38850* (ASU, determined by B. Ryan).

Buellia punctata (Hoffm.) Mass.

Notes. The species is common on San Nicolas Island and all the Channel Islands, except Santa Barbara Island, as well as throughout California. It needs revision (Bungartz 2007). For more discussion see Knudsen & Kocourková (2012).

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, on old wood posts, 4.vi.2014, *K. Knudsen 16790* (SBBG).

Buellia prospersa (Nyl.) Riddle

Notes. The species is frequent on San Nicolas Island but infrequent on San Clemente, San Miguel, Santa Rosa, and West Anacapa Islands and on the coast of Southern California.

Voucher. Southside, end of Theodolite Road, 225 m, on sandstone, 3.vi.2014, *K. Knudsen 16759.4* & *W. Hoyer* (SBBG).

Buellia stellulata (Taylor) Mudd

Notes. The species is frequent on San Nicolas Island and along the California coast to Sonoma. It is infrequent on Catalina, San Clemente, Santa Cruz, Santa Rosa, and West Anacapa Islands.

Voucher. Along Theodolite Road, 33.25°N 119.65°W, 260 m, 27.iii.2001, on sandstone, *C.C. Bratt 11995* (SBBG, det. F. Bungartz).

Buellia subdispersa Mig.

Notes. This is only known collection of this species in California.

Voucher. Along Shannon Road at the sand dunes, central mesa, 270 m, on caliche, 14.ii.1993, *C.C. Bratt 8149* (ASU, det. F. Bungartz).

Buellia tesserata Körb.

Note. This species is common on San Nicolas Island and occurs on the Channel Islands except for East and West Anacapa Islands. It occurs along California coast to Sonoma County.

Voucher. Below Twin Towers at edge of bluff, S side of island, 270 m, on sandstone, 27.iii.2001, *C.C. Bratt 7846* (ASU, SBBG, det. F. Bungartz).

Caloplaca stanfordensis H. Magn.

Notes. This species is common on shrubs on San Nicolas Island. It is rare on Catalina and East and West Anacapa Islands. It is common especially in central California. Ulf Arup (pers. comm.) thinks in California it is a complex of similar taxa needing further study.

Voucher. On north side, 29 m, on rough wood of small dead shrub, 4.vi.2014, *K. Knudsen 16813* (SBBG).



Buellia tessarata. Twin Tower Canyon, Wheeler 7104 (hb Wheeler).



Caloplaca standfordensis. East Celery Canyon, Wheeler 7034 (hb Wheeler).

Candelariella aurella (Hoffm.) Zahlbr.

Notes. This is a common species in California, especially on calcareous substrates, and should be common but is probably under-collected on San Nicolas Island. This species typically occurs on rock, but T.H. Nash III collected it on consolidated soil, which is quite hard on the island. It occurs on Catalina, San Clemente, San Miguel, Santa Cruz, and Santa Rosa Islands on calcareous rock.

Voucher. East end of island, below bluffs and above road from the barge landing, 20 m, on soil, 7.i.1995, *T.H. Nash III 38924* (ASU, det. M. Westberg).

Candelariella xanthostigma (Ach.) Lettau

Notes. This species often occurs as an infertile sorediate crust and may be under-collected on San Nicolas Island. It occurs on East Anacapa, San Miguel, Santa Cruz, and Santa Rosa Islands. It is infrequent in southern California.

Voucher. North side, 29 m, on rough wood at base of large *Lycium californicum*, 4.vi.2014, *K. Knudsen 16812* (SBBG).

Catillaria lenticularis (Ach.) Th. Fr.

Notes. This species is frequent on caliche on San Nicolas Island and rare on Santa Rosa Island on Monterey shale. It is rare species in southern California, most frequent in Santa Monica Mountains.

Voucher. Rim of south side, 247 m, on soft calcareous soil, 8.viii.2015, *K. Knudsen 17712 & T. Wheeler* (SBBG).

Chrysothrix granulosa G. Thor

Notes. On San Nicolas Island, this is one of the lichens collected on introduced shrubs or trees, near various Navy buildings. But it could be on native shrubs and under-collected. It is frequent on Catalina, San Clemente, San Miguel, Santa Cruz, Santa Rosa, and West Anacapa Islands, often on trees. It is common from Monterey County south to the Mexican border especially near the coast.

Voucher. Immediately E of commissary, on planted shrubs, 7.i.1995, *T.H. Nash III 38840* (ASU, det. T. Tønsberg).

Chrysothrix xanthina (Vain.) Kalb

Notes. This is only known on San Nicolas Island from a collection on an introduced pine but could be under-collected and growing on native shrubs, wood, or on rock. It occurs on Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands. It is common in southern and central California and occurs in the Sierra Nevada Mountains and mountains of southern California. For description see Kukwa & Knudsen (2011).

Voucher. Building between Jackson Highway and Theodolite Road, 268 m, on bark of planted *Pinus radiata*, 23.viii.2015, *K. Knudsen 17829 & T. Wheeler* (SBBG).

Cladonia pyxidata (L.) Hoffman

Notes. This species is rare in soil crusts and among moss on south side of the island. The current concept includes specimens identified in southern California as *C. chlorophaea* (Flörke ex Sommerf.) Sprengel. (Ahti & Stenroos 2013). It has been reported from all the islands. Many specimens of *Cladonia* in herbaria from the islands need revision especially at SBBG.

Voucher. South side, 71 m, in soil crust with *Lepraria xerophila*, 3.vi.2014, *K. Knudsen 16738.3 & W. Hoyer* (SBBG).

Cladonia pulvinella S. Hammer

Notes. This species is common in southern California and along the central coast. It occurs on all the Channel Islands except Santa Barbara Island. There was only one collection on San Nicholas Island, but it is probably under-collected. The current concept includes *Cladonia hammeri* Ahti. This taxon was confused in southern California with *C. nashii* Ahti until *hammeri* was made a synonym of *pulvinella* (Pino-Bodas et al. 2013).

Voucher. Top of L Canyon on north side, 137 m, well-established, forming a large biological soil crust, 24.viii.2015, *K. Knudsen 17831 & T. Wheeler* (SBBG).

Clavascidium lacinulatum (Ach.) M. Prieto

Notes. This is common species in California soil crusts but rare on San Nicholas Island. It occurs on Catalina, San Clemente, Santa Barbara, Santa Cruz, and Santa Rosa Islands.

Voucher. South side near Daytona Beach: sandstone ravines, 25 m, on soil, 3.vi.2014, *K. Knudsen 16751* (SBBG).

Cliostomum griffithii (Sm.) Coppins

Notes. The species is common on native and non-native vegetation on San Nicholas Island. It occurs on Catalina, San Miguel, Santa Cruz, Santa Rosa, and West Anacapa Islands. It is common along the southern and central California coast.

Voucher. Along Tufts Road, 150 m, on *Baccharis*, 7.i.1995, *T.H. Nash III 38779* (ASU, det. S. Eckman).

Collema coccophorum Tuck.

Notes. This species is common on San Nicholas Island in soil crusts. It occurs on San Clemente, San Miguel, Santa Cruz, and Santa Rosa Islands. It is common in soil crusts throughout southern California (Knudsen & Kocourková 2012).

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, on caliche-derived soil, 4.vi.2014, *K. Knudsen 16791* (SBBG).

Collema crispum (Hudson) Weber ex F.H. Wigg.

Notes. This species is probably common in soil crusts on San Nicholas Island, especially in soil around exposed caliche. It occurs on Catalina, San Miguel, Santa Barbara, Santa Cruz, Santa Rosa, and West Anacapa Islands. It is frequent in southern California along the coast with additional reports from the southern California mountains and Mojave Desert.

Voucher. Immediately E of commissary, 100 m, on soil, 7.i.1995, *T.H. Nash III 38831* (ASU, det. M. Schultz).

Cresponea chloroconia (Tuck.) Egea & Torrente

Notes. The species was collected only on introduced shrubs and trees near buildings on San Nicholas Island. It is probably infrequent on native shrubs on the island but under-collected. It was collected on Santa Rosa Island by T.H. Nash III. It is frequent along central coast of California especially on trees.

Voucher. Immediately E of commissary, 100 m, on shrubs, 7.i.1995, *T.H. Nash III 33843* (ASU, det. B. Ryan).

Dendrographa leucophaea (Tuck.) Darbish.

Notes. The species is common on San Nicolas Island on native and non-native vegetation and occasionally on rock. Large specimens are frequent on San Nicolas Island and impressive. It occurs on all the Channel Islands. It is common along the southern and central California coast.

Voucher. East of Celery Canyon and Heart Attack Hill Road, 85 m, on cactus, 21.viii.2015, *K. Knudsen 17792 & T. Wheeler* (SBBG).

Dimelaena radiata (Tuck.) Müll. Arg.

Notes. This species is common on San Nicolas Island and occurs on all the Channel Islands. It is common on southern and central coast of California. It's usually white and can be very pruinose in some specimens. Another morphotype is brown and mixed populations occur along the coast.

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, on cobble, 4.vi.2014, *K. Knudsen 16795* (SBBG).



Dendrographa leucophaea. East Celery Canyon, Wheeler 6989 (hb Wheeler).

Diploicia canescens (Dickson) A. Massal.

Notes. This species is common on native and non-native plants on the Channel Islands and on central coast of California. It can grow on rock in which case it forms often a much larger thallus.

Voucher. Native willow woodland in small canyon with year-round stream, on willow twigs, 4.vi.2014, *K. Knudsen 16779* & *W. Hoyer* (SBBG).

Diploschistes actinostomus (Ach.) Zahlbr.

Notes. This species is common on San Nicholas Island and occurs on all the Channel Islands except Santa Barbara Island. It is common in southern California and extends as far inland as Joshua Tree National Park in the Mojave Desert. It becomes less frequent along central coast of California.

Voucher. Top of canyon on south side, 217 m, on sandstone, 20.viii.2015, *K. Knudsen 17730* & *T. Wheeler* (SBBG).

Diploschistes caesioplumbeus (Nyl.) Vain.

Notes. In southern California, it is only known from single collections from San Nicholas Island and from the Santa Monica Mountains where it was probably extirpated by fire. It is rare in California.

Voucher. Down slope of Theodolite Road, on south-facing slope, 200 m, on sandstone, 6.i.1995, *T.H. Nash 38742* (ASU, det. T. Lumbsch).



Dimelaena radiata. Twin Tower Canyon, Wheeler 7105 (hb Wheeler).



Diploicia canescens. Jackson Highway Badlands Canyon, Wheeler 6943 (hb Wheeler).

Diploschistes diacapsis (Ach.) Lumbsch

Notes. The species is frequent on San Nicolas Island. It is especially well-adapted for growing on sandy soils and occurs on sandstone too. It occurs on all the Channel Islands except Santa Barbara and San Miguel Islands. It occurs along the southern and central coast of California.

Voucher. Back of prominent sand pit, SE end of Island, 312 m, on gray sandstone, 6.iv.1966, *R. Foreman L-44292* (ASU, det. T. Lumbsch).

Diploschistes muscorum (Scop.) R. Sant.

Notes. The species is infrequent on San Nicholas Island and parasitic on *Lepraria xerophila*. It can also be parasitic on *Leprocaulon americanum*. It occurs on all the Channel Islands except Santa Barbara Island. It is common in California and is usually parasitic on *Cladonia* species.

Voucher. Top of escarpment on southside, 214 m, parasitic on *Lepraria xerophila*, 2.vi.2014, *K. Knudsen 16722 & W. Hoyer* (SBBG).

Diplotomma alboatrum (Hoffm.) Flotow

Notes. The species is frequent on San Nicolas Island. It occurs on Catalina, San Miguel, Santa Cruz, and Santa Rosa Islands. It is frequent in California. T.H. Nash III collected it on wood in a calcareous area.

Voucher. Vicinity of the Cave of the Whales, 15 m, on wood, 5.i.1995, *T.H. Nash III 38727* (ASU, det. B. Ryan).

Diplotomma venustum (Körb.) Körb

Notes. The species is common on San Nicolas Island on calcareous rock and infrequent on Santa Rosa and San Miguel Islands. It is infrequent in California. The species can be a juvenile parasite on other crustose lichens.

Voucher. Between NAVFAC Rd. N of Conservation Center and beach, on rock, 5.i.1995, *S.C. Tucker 33692A* (ASU, det. F. Bungartz).

Endocarpon pusillum Hedw.

Notes. The species is common on San Nicholas Island in soil crusts. It can be pruinose. It occurs on all the Channel Islands except Catalina where we would expect it to be found. It is common in California.

Voucher. North side, 29 m, on soil with pruinose squamules forming crust with cyanobacteria, 4.vi.2014, *K. Knudsen 16808* (SBBG).

Flavoparmelia caperata (L.) Hale

Notes. The species is apparently rare on San Nicholas Island. It can grow on maritime shrubs wrapped around thin branches and is sometimes identified as *F. subcapitata*, a species concept that needs molecular support. It occurs on all the Channel Islands but San Clemente and Santa Barbara Islands. It is common in California.

Voucher. Near Twin Towers, 270 m, on fallen pine, 27.iii.2001, *C.C. Bratt 11949* (SBBG).

Gyalolechia bracteata (Hoffm.) A. Massal. **subsp. bracteata**

Notes. This species is rare on San Nicolas Island in soil crusts, but possibly under-collected. It is not known from any other of the Channel Islands. It is rare in California.

Voucher. North side, 29 m, in soil crust, 4.vi.2014, *K. Knudsen 16809.1* (SBBG).

Gyalolechia stantonii (W.A. Weber ex Arup) Søchting, Frödén & Arup

Notes. The species is infrequent on San Nicholas Island. It occurs on all the Channel Islands except San Clemente Island where it is expected. It is rare on California coast. It is usually on rock, but T.H. Nash III collected it on hard consolidated soil.

Voucher. Along Wilong Road west of Barge Landing (north shore), 50 m, on soil, 7.i.1995, *T.H. Nash III 38873* (ASU, det. C.M. Wetmore).



Gyalolechia stantonii. East Celery Canyon, Wheeler 6998 (hb Wheeler).



Gyalolechia stipitata. Jackson Highway Badlands Canyon, Wheeler 6918 (hb Wheeler).

Gyalolechia stipitata (Wetmore) Søchting, Frödén & Arup

Notes. The species is common on San Nicolas Island on native shrubs and occurs on all the Channel Islands except Anacapa and Catalina Islands. It is rare on California coast.

Voucher. Southside, end of Theodolite Road, 225 m, on twigs of dead shrub, 3.vi.2014, *K. Knudsen 16760* (SBBG).

Heterodermia erinacea (Ach.) W.A. Weber

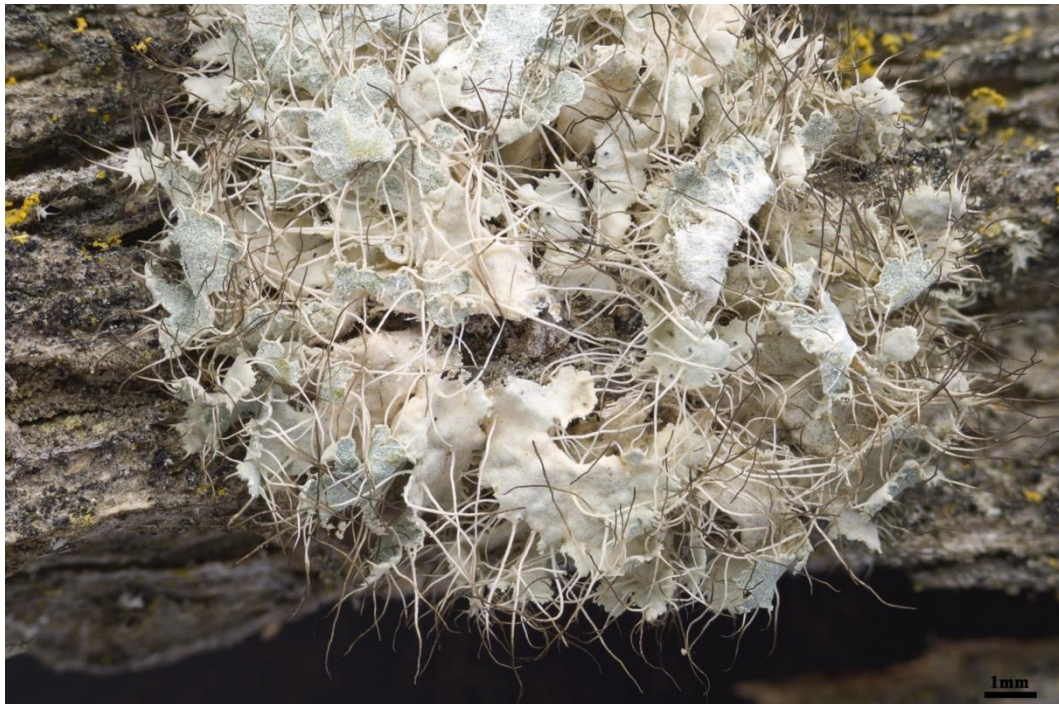
Notes. The species is probably infrequent and under-collected on San Nicolas Island. It is common on Santa Rosa Island and occurs on the other Channel Islands except San Miguel and Santa Barbara Islands. It is rare on California coast.

Voucher. Palms at Tufts Road, 150 m, on *Artemisia californica*, 6.v.1995, *J. Marsh 7837* (ASU, det. R. Moberg).

Heterodermia namaquana Brusse

Notes. The species is common on San Nicolas Island on native shrubs. It occurs on all the other Channel Islands, except Catalina and San Clemente Islands. It is frequent on the central coast of California. Along the southern coast it is only known from Point Loma in San Diego.

Voucher. Southside, end of Theodolite Road, 225 m, on twigs of native shrubs, 3.vi.2014, *K. Knudsen 16761.1* (SBBG).



Heterodermia namaquana. Jackson Highway Badlands Canyon, Wheeler 6919 (hb Wheeler).

Lecanactis californica Tuck.

Notes. The species is common on native plants on San Nicolas Island and occurs on all the other Channel Islands except Santa Barbara Island. The only collection from San Clemente Island is a historic collection by Blanche Trask. It is common along central coast. It is rare along the south coast of California. It occurs at Point Loma in San Diego.

Voucher. On north side north of old ranch house along coast, 200 m, on small twigs of *Artemisia nesiotica*, 3.vi.2014, *K. Knudsen 16769 & W. Hoyer* (SBBG).



Lecanactis californica. East Celery Canyon, Wheeler 6992 (hb Wheeler).

Lecania brunonis (Tuck.) Herre

Notes. *Lecania brunonis* is apparently infrequent on San Nicholas Island but may be under-collected. It occurs on all the Channel Islands and along the southern and central coast of California.

Voucher. South side, 71 m, on sandstone and consolidated soil, 4.vi.2014, *K. Knudsen 16732 & W. Hoyer* (SBBG).

Lecania chalcophila B.D. Ryan & Van den Boom

Notes. This species is endemic to San Nicolas Island. It occurs in soil crusts on often soft calcareous soils. It is common but scattered in distribution on the island.

Voucher. North side above Tranquility Beach near NAVFAC Rd., 25 m, 25.viii.2015, in calcareous soil crust, *K. Knudsen 17840 & T. Wheeler* (SBBG).

Lecania cyrtella (Ach.) Th. Fr.

Notes. The species is probably frequent on San Nicholas Island but under-collected on native shrubs. It occurs on the other Channel Islands, except Anacapa, Santa Barbara, and San Clemente Islands. It is especially common along the south coast of California and apparently infrequent on the central coast. All specimens seen from Channel Islands had 8 ascospores per ascus.

Voucher. Along Wilong Road west of Barge Landing (north shore), 50 m, on wood, 7.i.1995, *T.H. Nash 38884* (ASU, det. P. v. d. Boom).



Lecania dudleyi. Twin Towers Canyon, Wheeler 7102 (hb Wheeler).



Lecania dudleyi. Jackson Highway Badlands, Wheeler 6965 (hb Wheeler).

Lecania dudleyi Herre

Notes. The species is common on San Nicholas Island in soil crusts and on rock. It occurs on all the Channel Islands and along the southern and central coast of California. Some specimens can have atypical phenotypes.

Voucher. Top of escarpment on southside, 210 m, common in soil crusts, 2.vi.2014, K. Knudsen 16721 (SBBG).

Lecania franciscana (Tuck.) K. Knudsen & Lendemer

Notes. *Lecania franciscana* was treated as *Lecania subdispersa* (Nyl. ex B.D. Ryan) B.D. Ryan emed. B.D. Ryan (van den Boom & Ryan 2004). But the type of *subdispersa*, collected by H.E. Hasse in the Santa Monica Mountains, was the common lichenicolous fungus on *Lecania*, *T. subtalprum* Timdal. Thus, *Toninia subdispersa* (Nyl. ex Hasse) K. Knudsen was the oldest name for that lichenicolous fungus (Knudsen & Lendemer 2007). *Lecania franciscana* (Tuck.) K. Knudsen & Lendemer was found to be oldest name for the taxon treated as *L. subdispersa* by van den Boom & Ryan (Knudsen & Lendemer 2007). *Lecania franciscana* occurs on caliche and sandstone and occasionally on soil or other rock types along coast. It is common especially on San Nicholas and San Miguel Islands. It occurs on Catalina, San Clemente, Santa Barbara, Santa Cruz, and Santa Rosa Islands. It has been collected in scattered locations along the central and southern coast of California.

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, 2.vi.2014, on caliche, K. Knudsen 16785 (SBBG).

Lecania fructigena Zahlbr.

Notes. The species is probably frequent on San Nicolas Island. It occurs on all the Channel Islands and along the California coast. It is usually found close to shorelines, even the edge of the salt spray zone.

Voucher. South side, 71 m, on sandstone, 3.vi.2014, K. Knudsen 16726.2 (SBBG).

Lecania fuscella (Schaer.) Körb.

Notes. The species is infrequent on San Nicolas Island and along the California coast. It also occurs on East and West Anacapa, Santa Barbara, and Santa Rosa Islands and is often locally abundant.

Voucher. Between Celery Canyon and Heart Attack Hill Road, 117 m, on *Leptosyne gigantea*, 21.vii.2015 K. Knudsen 17790.2 & T. Wheeler (SBBG).

Lecania fuscelloides B.D. Ryan & Van den Boom

Notes. *Lecania fuscelloides* differs from *L. fuscella* in having smaller ascospores non-septate to 1 septate vs. 1 to 3 septate. It has been reported along California coast and on San Nicolas Island. We believe it is synonym of *L. fuscella*. Or *L. fuscelloides* is the name for specimens identified as *L. fuscella* in California if a molecular analysis finds the California taxon differs from the European and eastern African species. It often grows on *Leptosyne gigantea* on East Anacapa and on San Nicolas Islands. On both islands, specimens of *L. fuscelloides* are mixed with specimens of *L. fuscella*.

Voucher. Between Celery Canyon and Heart Attack Hill Road, 117 m, on *Leptosyne gigantea*, 21.vii.2015, K. Knudsen 17785 & T. Wheeler (SBBG).

Lecania hassei (Zahlbr.) W. Noble

Notes. The species is probably frequent on San Nicolas Island. *Lecania brattiae* is a synonym (Knudsen & Lendemer 2007). It is infrequent along the southern California coast and was originally described from the Santa Monica Mountains. It is rare along the central coast. It occurs on all the Channel Islands, except Catalina and San Clemente Islands. In Mexico it occurs on Guadalupe Island. Specimens vary from subsquamulose to squamulose and from brown to pale color as in picture.

Voucher. North side, 33.5 m, on quartzite pebbles, vii.2015, *T. Wheeler 7120.2* & *K. Knudsen* (hb. Wheeler).



Lecania hassei. West Nav-Fac Road, Wheeler 7120 (hb Wheeler).

Lecania naegelii (Hepp.) Diederich & v.d. Boom

Notes. The species is probably frequent on San Nicolas Island. It occurs on Catalina, San Clemente, San Miguel, Santa Cruz, and Santa Rosa Islands. It is frequent along the California coast. The taxon should probably be transferred to the genus *Thamnolecania* (Vain.) Gleyn. (Kistenich et al. 2018)

Voucher. Willow woodland around stream, 96 m, on willow bark, 4.vi.2014, *K. Knudsen 16771* (SBBG).

Lecania pacifica Zahlbr. ex B.D. Ryan & van den Boom

Notes. The species is probably frequent on San Nicolas Island. It has been identified from a few locations along the California coast and from Santa Barbara, Santa Cruz, and Santa Rosa Islands. It has an areolate thallus with an effigurate margin.

Voucher. Vicinity of the Cave of the Whales, 15 m, on rock, 5.i.1995, *T.H. Nash III 38724* (ASU, det. P. v.d. Boom).

Lecania rabenhorstii (Hepp) Arnold

Notes. The species is possibly rare on San Nicolas Island. H.E. Hasse never visited San Nicolas Island. The collection was collected and given to Hasse by the pioneer island botanist Blanche Trask, who did visit San Nicolas Island. This is a small *Lecania* and is easily overlooked but is apparently rare in California. It is rare on San Clemente Island and Santa Rosa Island and was collected once in the Santa Monica Mountains by H.E. Hasse.

Voucher. San Nicolas Island, *B. Trask s.n.* (ex hb. Hasse, ASU, FH, det. P. van den Boom).



Lecania pacifica. Jackson Highway Badlands Canyon, Wheeler 6936 (hb Wheeler).

Lecania turicensis (Hepp.) Müll. Arg.

Notes. The species is probably frequent on San Nicolas Island. It occurs on all the Channel Islands, except San Clemente Island. It occurs along the southern and central California coast.

Voucher. West end, 215 m, on caliche, 4.vi.2014, *K. Knudsen 16708* (SBBG).

Lecania toninioides Zahlbr.

Notes. This species is probably rare in soil crusts on San Nicolas Island as well as Santa Rosa and San Miguel Islands and along California coast due to past grazing. There is possibly an undescribed species on rock in southern California which can be misidentified as *L. toninioides* using the keys in the treatment by van den Boom and Ryan (2004).

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, on consolidated soil, 4.vi.2014, *K. Knudsen 16799* (SBBG).

Lecanographa brattiae (Egea & Ertz) Ertz & Tehler

Notes. The species is probably frequent on San Nicolas Island. It occurs on all the Channel Islands and in scattered locations along the southern and central coast relatively close to the seashore.

Voucher. Down slope of Theodolite Road, on south-facing slope, 200 m, on sandstone, 6.i.1995, *T.H. Nash III 38750* (WIS, det. D. Ertz).

Lecanographa dimelaenoides (Egea & Torrente) Egea & Torrente

Notes. The species is frequent on San Nicolas Island and occurs on all the Channel Islands but has not been collected on the California coast.

Voucher. South side near Daytona Beach in sandstone ravines, 25 m, on sandstone, 3.vi.2014, *K. Knudsen 16743* (SBBG).



Lecanographa dimelaenoides. West Mesa Canyon, Wheeler 6940 (hb Wheeler).



Lecanora albocaesiella. East Celery Canyon, Wheeler 7009 (hb Wheeler).

Lecanora albocaesiella B.D. Ryan & T.H. Nash

Notes. The species was described from San Nicolas Island where it is common. It is rare on Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands and along the southern coast of California.

Voucher. South side near Daytona Beach in sandstone ravines, 25 m, 3.vi.2014, on sandstone, *K. Knudsen 16743* (UCR).

Lecanora caesiorubella Ach.

Notes. The species was collected on non-native trees. It may be infrequent on the island because this species is most often found on oaks and large woody shrubs. It occurs on Catalina, San Miguel, Santa Cruz, and Santa Rosa Islands. It is common in California.

Voucher. Immediately E of commissary, 100 m, on *Myroporum laetum*, 7.i.1995, *T.H. Nash 38813* (ASU).

Lecanora gangaleoides Nyl.

Notes. The species was collected on sandstone near the coast. It may be frequent on the island. It occurs on all the Channel Islands and is common in coastal California.

Voucher. West Mesa Canyon, 53 m, on sandstone, 22.viii.2015, *Wheeler 7056* (hb Wheeler).



Lecanora gangaleoides. West Mesa Canyon, Wheeler 7056 (hb Wheeler).

Lecanora horiza (Ach.) Linds.

Notes. The species could be frequent on San Nicolas Island because it can grow on native shrubs especially *Leptosyne gigantea*. It is infrequent on all the Channel Islands, except Santa Barbara Island. This species is infrequent in California but widespread.

Voucher. Native willow woodland in small canyon with year-round stream, 96 m, on dead palm fronds, 4.vi.2014, *K. Knudsen 16778* & *W. Hoyer* (SBBG).

Lecanora pacifica Tuck.

Notes. The species is probably infrequent on San Nicolas Island. It usually occurs on oaks, redwoods, and large woody shrubs. It was collected on San Nicolas on non-native plants near buildings. It occurs on all the Channel Islands, except Santa Barbara Island. It is common in California.

Voucher. Immediately E of commissary, 100 m, on shrubs, 7.i.1995, *T.H. Nash 38848* (ASU).

Lecanora simeonensis K. Knudsen & Lendemer

Notes. The species is probably rare or infrequent on wood on San Nicolas Island. It often occurs like the specimen below on wood fences and outdoor benches as sorediate infertile patches. It is rarely fertile. It occurs along the southern and central coast of California and on San Miguel Island on a redwood fence. For description and pictures see Lendemer & Knudsen (2006).

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, on wooden box, 4.vi.2014, *K. Knudsen 16800* (UCR, NY).

Lecanora cf. utahensis

Notes. This taxon was collected by C.C. Bratt and K. Knudsen on San Nicolas Island and in San Bernardino Mountains (Knudsen et al. 2017). These specimens do not produce isousnic acid as does *Lecanora utahensis* from Utah and Nevada and probably represents an undescribed taxon in need of further study.

Voucher. Top of escarpment on southside, 214 m, on sandstone, 2.vi.2014, *K. Knudsen 16719* (SBBG).

Lecidea fuscoatra (L.) Ach.

Notes. The species is infrequent on sandstone on San Nicolas Island. It is rare on Santa Cruz and Santa Rosa Islands. It is common species in California but rarely close to the coast. The thalli of island specimens are poorly developed compared to normal specimens.

Voucher. West end above south side, 71 m, on sandstone, 2.vi.2014, *K. Knudsen 16747* (SBBG).



Lecidella asema. Jackson Highway Badlands Canyon, Wheeler 6972 (hb Wheeler).

Lecidella asema (Nyl.) Knoph & Hertel

Notes. The species is probably common on sandstone on San Nicolas Island. It is common on all the Channel Islands and along the southern and central California coast. *Toninia nashii* is a rare pathogenic parasite on the species on San Miguel and Santa Rosa Island.

Voucher. West end, 150 m, on sandstone, 5.i.1995, *T.H. Nash III 38699* (ASU).

Lecidella euphorea (Florke) Hertel

Notes. The species may be infrequent on San Nicolas Island on at least non-native vegetation. It is more often collected on oaks and large woody shrubs. It occurs on Catalina and San Clemente Islands. *Lecidella elaeochroma* (Ach.) M. Choisy was common on Santa Cruz and Santa Rosa Islands. *Lecidella euphoria* is common in California especially in the mountains.

Voucher. Lower Celery Canyon, 1 m, on dry piece of lumber, 21.viii.2015, *K. Knudsen 17798 & T. Wheeler* (SBBG).

Lecidella stigmata (Ach.) Hertel & Leuckert

Notes. The species could be infrequent on sandstone on San Nicolas Island. It is rare on Catalina and West Anacapa Islands. It is common in California.

Voucher. Down slope of Theodolite Road, on south-facing slope, 200 m, on sandstone boulder, 6.i.1995, *T.H. Nash III 38745* (ASU, det. J.G. Knoph & Winkler).

Lepra amara (Ach.) Hafellner

Notes. The species is probably uncommon or at least overlooked on San Nicolas. It is also known from Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands. It occurs on sandstone.

Voucher. L canyon, 36 m, 24.viii.2015, *T. Wheeler 7112* (hb Wheeler).



Lepraria xerophila. Jackson Highway Badlands Canyon, Wheeler 6940 (hb Wheeler).



Lepraria xerophila. West Mesa Canyon, Wheeler 7066 (hb Wheeler).

Lepraria xerophila Tønsberg

Notes. The species is common on San Nicolas Island, often forming extensive soil crusts. It occurs on all the Channel Islands except East Anacapa. It is infrequent and scattered along the southern and central California coast, except in San Diego County where it is frequent. In unpublished pyrosequencing of the soil crusts formed on the island by *L. xerophila*, an exceptionally diverse community of algal and cyanobacteria taxa was discovered (N. Pietrasiak pers. comm.).

Voucher. South side, 71 m, forming extensive soil crusts, 3.vi.2014, K. Knudsen 16727 (SBBG).

Leprocaulon americanum Lendemer & Hodkinson

Notes. On San Nicholas Island, this species is probably frequent in soil crusts. It is often just leprose before it forms pseudopodetia and can be overlooked. It is known from all the Channel Islands except East Anacapa. It is frequent along the southern and central coast of California. The name *Leprocaulon microscopicum* is no longer valid. The European species is called by its oldest name *L. quisquiliare* (Leers) M. Choisy and does not occur on the Channel Islands or the California. Many specimens in herbaria need to be revised.

Voucher. Canyon E of Fuel tank, NE side, bank along canyon bottom, on soil, 29.iii.2001, C.C. Bratt 12071 (SBBG).

Micarea nitschkeana (J. Lahm ex Rabenh.) Harm.

Notes. This species is rare on San Nicolas Island, growing with *Lecanora simeonensis* on a wood box. It is also rare on San Miguel Island and in California.

Voucher. Slope above Jackson Highway with exposed caliche, 12 m, on wooden box covering valves, 4.vi.2014, K. Knudsen 16801 (SBBG).



Leprocaulon americanum. West Mesa Canyon, Wheeler 7065 (hb Wheeler).



Mobergia angelica. Jackson Highway Badlands Canyon, Wheeler 6939 (hb Wheeler).

Mobergia angelica (Stizenb.) H. Mayrh. & Sheard

Notes. This species is common on San Nicholas Island and occurs on all the Channel Islands. It occurs along the southern and central California coast.

Voucher. Upper West Mesa Canyon, 106 m, 22.viii.2015, *K. Knudsen 17812 & T. Wheeler* (SBBG).

Miriquidica verrucariicola (B.D. Ryan) K. Knudsen & Kocourk.

Notes. The species is a lichenicolous lichen and could be frequent on San Nicholas Island. It is a juvenile parasite on *Dimelaena radiata*, *Tephromela*, *Verrucaria subdivisa* and other crustose species, before developing an independent lichenized brown thallus. It is known from Catalina, San Clemente, Santa Cruz, Santa Rosa, and West Anacapa Islands. It is infrequent along the southern and central California coast. For a description see the synonym *Protoparmelia ryaniana* van de Boom, Sipman & Elix (van den Boom et al. 2007). For explanation of name change see Knudsen et al. (2015).

Voucher. South side east of Twin Tower, 233 m, on cobble, 23.viii.2015, *K. Knudsen & T. Wheeler 17826* (SBBG).



Miriquidica verrucariicola. L Canyon, Wheeler 7115 (hb Wheeler).

Myriolecis crenulata (Hook) Śliwa, Zhao Xin & Lumbsch

Note. This species occurs on calcareous rock and is frequent on San Nicolas Island. It is infrequent on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands. It is rare in California, except in the Cactus Flats area of the San Bernardino Mountains where it is common on dolomite. For key, pictures, and descriptions of this genus see Śliwa (2007).

Voucher. West mesa, 202 m, on consolidated soil, 2.vi.2014, *K. Knudsen 16712* (SBBG).



Myriolecis crenulata. Jackson Highway Badlands Canyon, Wheeler 6924 (hb Wheeler).

Myriolecis dispersa (Pers.) Šliwa, Zhao Xin & Lumbsch

Notes. This species is probably frequent on sandstone on San Nicolas Island. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands. Older identifications especially before 2007 need to be revised.

Voucher. West end, 150 m, 5.i.1995, on sandstone, *T.H. Nash III 38697* (ASU, det. L. Šliwa).

Myriolecis hagenii (Ach.) Šliwa, Zhao Xin & Lumbsch

Notes. This species is probably frequent on San Nicolas Island as it can occur on both shrubs and rocks. It is frequent on San Miguel, Santa Cruz, and Santa Rosa Islands. It is common in California. Like *M. dispersa*, it was often misidentified in the past.

Voucher. North side above Tranquility Beach near NAVFAC Road, 25 m, 25.viii.2015, on consolidated soil, *K. Knudsen 17841 & T. Wheeler* (SBBG).

Naetrocymbe herrei K. Knudsen & Lendemer

Notes. This species may be infrequent on San Nicolas Island. It was found at two different sites on the island. This species is rare on the central coast of California. It is known from a historical collection on Point Lobos in Monterey County and two sites in San Simeon State Park in San Luis Obispo County. For description and pictures see Knudsen & Lendemer (2009).

Voucher. Base of L Canyon, 40 m, on sandstone boulder, 24.viii.2015, *K. Knudsen 17837 & T. Wheeler* (NY, SBBG).

Niebla cephalota (Tuck.) Rundel & Bowler

Notes. The species is common on San Nicolas Island and on the Channel Islands except for Catalina and San Clemente Islands where it is infrequent. It is rare along coast south of Santa Barbara County. It is common on central coast.

Voucher. Along Wilong Road west of Barge Landing (north shore), 50 m, 7.i.1995, *T.H. Nash III* 38894 (ASU).



Naetrocymbe herrei. East Celery Canyon, Wheeler 7040 (hb Wheeler).

Niebla ceruchis (Ach.) Rundel & Bowler

Notes. The species is common on San Nicolas Island and is common on all the Channel Islands. It is rare along the California coast south of Santa Barbara County and is common on the central coast.

Voucher. Immediately E of commissary, 100 m, on shrubs, 7.i.1995, *T.H. Nash III* 38857 (ASU, det. P. Bowler).

Niebla homalea (Ach.) Rundel & Bowler

Notes. *Niebla homalea* is common on sandstone and metavolcanic cobbles on San Nicolas Island and occurs on all the Channel Islands. It is rare along the south coast of California south of Ventura County and common along the central coast. Bratt had specimens identified by Spjut from San Nicolas Island that got reidentified as *N. homalea* after Bowler & March (2004) was published. See Spjut (1996). For developments of Spjut's taxonomy see Spjut et al. (2020) and Jorna et al. (2021).

Voucher. Southside, end of Theodolite Road, 225 m, 3.vi.2014, on sandstone rock, *K. Knudsen* 16759.2 (SBBG).

Niebla ramosissima Spjut

Notes. The species is endemic on San Nicolas Island on soil rich in gypsum, forming large patches. It was considered a synonym of *N. homalea* (Bowler & Marsh 2004) and is annotated as *N. homalea* in some herbaria. In GenBank, its ITS is related in 95-96 percent range to three specimens of *N. homalea* in Gen Bank. Alone the phylogenetic data is inconclusive. We support it as a species based on field study. *Niebla ramosissima* was included in the IUCN Red List of Threatened Species in 2020 (Næsborg 2020). *Niebla ramosissima* is listed as Vulnerable under criteria D2. nrITS: (OM793054). For more information see Knudsen & Wheeler (2015).

Voucher. Ridge above L Canyon, 214 m, forming large biotic soil crusts, 24.viii.2015 *K. Knudsen 17834* & *T. Wheeler* [(SBBG, TLC, Lendemer, 2015: sekekaic acid (could also be homosekekaic acid)].



Niebla homalea, *Pertusaria flavicunda* and others on metavolcanic cobbles.



Niebla ramosissima and Kerry Knudsen.



Niebla ramosissima. Theodolite Canyon Road, Wheeler 7111 (hb Wheeler).



Opegrapha herbarum. West Nav-Fac Road, Wheeler 7122 (hb Wheeler).

Opegrapha herbarum Mont.

Notes. The species is common on native and planted vegetation and occasionally on rock. It occurs on all the Channel Islands. It is frequent along the central California coast.

Voucher. Willow woodland around stream, 96 m, abundant on willow bark, 4.vi.2014, *K. Knudsen 16771* (SBBG).

Opegrapha xerica Egea & Torrente

Notes. The species is frequent on native and introduced vegetation on San Nicolas Island. It is known from a few locations along the central coast of California.

Voucher. Along Wilong Road west of Barge Landing (north shore), 50 m, on shrub, 5.i.1995, *T.H. Nash III 38895* (ASU, det. D. Ertz).

Parmotrema perlatum (Huds.) M. Choisy

Notes. The species is apparently rare on San Nicolas Island growing on a metal box. It occurs on all the Channel Islands and is common in California.

Voucher. Along Jackson Highway, 258 m, on metal box, 20.viii.2015, *K. Knudsen 17747 & T. Wheeler* (NY, SBBG).

Pertusaria flavicunda Tuck.

Notes. The species is common on San Nicolas Island and on the Channel Islands except Santa Barbara Island. It is frequent along the southern and central coast of California.

Voucher. Below Twin Towers at edge of bluff South side, on rock, 26.v.1992, *C.C. Bratt 7848* (ASU, SBBG).



Pertusaria flavicunda. Jackson Highway Badlands Canyon, Wheeler 6950 (hb Wheeler).



Pertusaria occidentalis. East Celery Canyon, Wheeler 7048 (hb Wheeler).

Pertusaria occidentalis Bratt, Lumbsch & Schmitt

Notes. This species is possibly rare on San Nicolas Island. It is rare on San Miguel Island. For description and pictures see Schmitt et al. (2006).

Voucher. Below Twin Towers at edge of bluff South side, 270 m, on rock, 26.v.1992, C.C. Bratt 7855a (SBBG, det. I Schmitt & T. Lumbsch).

Phloeopeccania pulvinulina J. Steiner

Notes. The species is locally abundant on San Nicolas Island forming large patches on sandstone. It is rare in California known from Cathedral City in Riverside County in the Sonoran Desert and from Cactus Flats in the San Bernardino Mountains on the edge of the Mojave Desert (Knudsen et al. 2017).

Voucher. Top of canyon on south side, 217 m, forming large patches on sandstone, 20.viii.2015, K. Knudsen 17727 & T. Wheeler (HBG, SBBG, det. M. Schultz).

Physcia tenellula Moberg

Notes. This species is probably frequent on San Nicolas Island and can grow on rocks and native shrubs. It occurs on the other Channel Islands except San Miguel Island. It occurs along the south coast at scattered locations from San Diego to Santa Barbara County.

Voucher. Top of L Canyon on north side, 137 m, on sandstone, 23.viii.2015, K. Knudsen & T. Wheeler 17732.1 (SBBG).

Physconia isidiigera (Zahlbr. ex Herre) Essl.

Notes. The species is apparently rare on San Nicolas Island but could be under-collected. It occurs on all the Channel Islands except Santa Barbara Island. It is a common species in California.

Voucher. Top of canyon on south side, 217 m, on sandstone, 20.viii.2015, K. Knudsen 17833 & T. Wheeler (SBBG).

Placidium californicum Breuss

Notes. This species is probably frequent on San Nicolas Island in soil crusts. It was described from San Nicolas Island (Breuss & Bratt 2000). It is rare in California. It grows on calcareous soils at scattered locations in southern California including Rouse Ridge in the San Jacinto Mountains, the Sonoran Desert (Canebrake), and the Mojave Desert in the Clark Mountains. It occurs in soil at White Sands in the Chihuahuan Desert (specimens collected by N. Pietrasiak and identified by K. Knudsen).

Voucher. N side of San Nicolas Island, W of NAVFAC, Tranquility Beach, 25 m, on soil, 15.ii.1993, C.C. Bratt 8241 (ASU, SBBG, det. O. Breuss).

Placidium pilosellum (Breuss) Breuss

Notes. The species is probably frequent on San Nicolas Island in soil crusts. It is rare on Santa Cruz Island and in California. In southern California it occurs in the San Jacinto Mountains, and in the desert (Barstow, Ocotillo).

Voucher. Below Twin Towers at edge of bluff South side, 270 m, on rock, 26.v.1992, C.C. Bratt 8142 (ASU, SBBG, det. O. Breuss).

Placidium squamulosum (Ach.) Breuss

Notes. The species is frequent in soil crusts on San Nicolas Island. It occurs on Catalina, Santa Cruz, and Santa Rosa Islands. It is common in California.

Voucher. N side of San Nicolas Island, W of NAVFAC, Tranquility Beach, 25 m, on soil, 5.ii.1993, C.C. Bratt 8242 (ASU, SBBG, det. O. Breuss).



Polycauliona bolacina. Jackson Highway Badlands Canyon, Wheeler 6947 (hb Wheeler).

Polycauliona bolacina (Tuck.) Arup, Frödén & Søchting

Notes. The species is common on all the Channel Islands and along the southern and central California coast. On calcareous substrates it can become pruinose.

Voucher. South side near Daytona Beach, in sandstone ravines, 25 m, on sandstone, 3.vi.2014, *K. Knudsen 16740 & W. Hoyer* (SBBG).

Polycauliona candularis (L.) Frödén, Arup, & Søchting

Notes. The species is common on San Nicolas Island. It occurs on all the Channel Islands. It is rare along the coast south of Santa Barbara County.

Voucher. Native willow woodland in small canyon with year-round stream, 96 m, abundant on small twigs of willow, 4.vi.2014, *K. Knudsen 16778 & W. Hoyer* (SBBG).

Polycauliona ludificans (Arup) Arup, Frödén & Søchting

Notes. The species is frequent on San Nicolas Island. It occurs on all the Channel Islands and is common along the southern coast of California. It is rare on the central coast. Its type locality is Point Dume in the Santa Monica Mountains.

Voucher. Slope above Jackson Highway with exposed caliche, on calcareous soil, 129 m, 4.vii.2014, *K. Knudsen 16793* (SBBG).

Polycauliona luteominia (Arup) Arup, Frödén & Søchting **var. luteominia**

Notes. The species is common on San Nicolas Island. It occurs on all the Channel Islands and is common along the southern and central coast of California.

Voucher. Below Twin Towers at edge of bluff South side, 270 m, on rock, 26.v.1992, *C.C. Bratt 7839* (SBBG, determined by C.M. Wetmore).



Sandstone Community. Celery Canyon (hb Wheeler).

Polycauliona pollinarioides (L. Lindblom & D.M. Wright) Frödén, Arup, & Søchting

Notes. The species is frequent on San Nicolas Island. It also occurs on San Miguel Island. It has scattered locations along the central coast of California north to Sonoma County.

Voucher. Along Tuft Road, 150 m, on leaves and leaf bases of cultivated fan palms by buildings on Tufts Road, 6.1.1995, *S.C. Tucker 33785* (ASU, det. L. Lindblom).

Polycauliona tenax (L. Lindblom) Frödén, Arup, & Søchting

Notes. This species is probably common on San Nicolas Island. It occurs on the other Channel Islands, except Catalina, San Miguel, and Santa Rosa Islands. It is common in central and southern California.

Voucher. Area adjacent environmental laboratory (NAVFAC) and in gullies behind Tranquility Beach, 25 m, on *Lycium californicum*, 7.i.1995, *T.H. Nash 38680* (ASU, det. B. Ryan).

Polycauliona tenuiloba (L. Lindblom) Frödén, Arup, & Søchting

Notes. The species may be rare or infrequent on San Nicolas Island. This is only record from California verified by L. Lindblom.

Voucher. Along Tuft Road, 150 m, on leaves and leaf bases of cultivated fan palms by buildings on Tufts Road, 6.1.1995, *T.H. Nash III 3878a* (ASU, det. L. Lindblom).

Pseudothelomma ocellatum (Körb.) M. Prieto and Wedin

Notes. The species is rare on San Nicolas Island, collected infertile on a fencepost. It also was collected on Santa Cruz Island on a fencepost. It is rare in California.

Voucher. North side north of old ranch house, 30 m, on old fencepost, 3.vi.2014, *K. Knudsen 16767* (NY, det. J.C. Lendemer).

Pyrrhospora querneae (Dickson) Körb.

Notes. The species is probably frequent on San Nicolas Island but can be easily overlooked because it is usually an infertile sorediate crust. It occurs on all the Channel Islands and is common along the southern and central California coast.

Voucher. Slope above Jackson Highway with exposed caliche, 129 m, on wood of old wood fence post, on old fencepost, 4.vi.2014, *K. Knudsen 16800* (SBBG).

Ramalina canariensis J. Steiner

Notes. The species is common on native and introduced vegetation on San Nicolas Island. It is rare along the California coast and is usually found near the shoreline.

Voucher. Navy Gateway Inn, 200 m, on *Eucalyptus* bark, 3.vi.2014, *K. Knudsen 16752* (SBBG).

Ramalina farinacea (L.) Ach.

Notes. The species is possibly infrequent on San Nicolas Island. It occurs on all the Channel Islands except Santa Barbara Island. It is one of the common species of *Ramalina* in California.

Voucher. Immediately E of commissary, 100 m, on pine, 7.i.1995, *T.H. Nash 38808* (ASU).

Ramalina leptocarpha Tuck.

Notes. The species may be infrequent or rare on San Nicolas Island. It occurs on all the Channel Islands except Santa Barbara Island. The species is infrequent in California.

Voucher. Immediately E of commissary, 100 m, on shrubs, 7.i.1995, *T.H. Nash 38860* (ASU, det. H. Kashiwadani).

Ramalina menziesii Taylor

Notes. The species is rare on San Nicolas Island growing on some non-native shrubs and trees around buildings. Smaller specimens may be found on native shrubs. This is the state lichen of

California where it is common.

Voucher. Immediately E of commissary, 33.2583°N 119.4791667°W, 100 m, on shrubs, 7.i.1995, *T.H. Nash 38861* (ASU).

Ramalina sarahae K. Knudsen, Lendemer & Kocourk.

Notes. This species is rare on San Nicolas Island. It may be discovered to be frequent in the *Leptosyne gigantea* fields on the island. One collection was designated as a paratype from San Nicolas Island. The type location is on San Miguel Island where it is rare. It is not known from the other Channel Islands at this time or the California coast. For description and pictures see Knudsen et al. (2018). It is a member of the *Ramalina lacera* group and is common in Baja California and Baja Sur in Mexico, on the archipelago Cabo Verde in the Atlantic Ocean off the coast of Mauritania and in the Nambi desert (Spjut et al. 2020).

Voucher. North coast across Beach Road from West Mesa Canyon, 16 m, on *Leptosyne gigantea*, 22.viii.2015, *K. Knudsen & T. Wheeler 17813* (UCR, NY, paratypes).



Kerry Knudsen collecting in Mesa Canyon.

Ramalina subleptocarpha Rundel & Bowler

Notes. The species may be rare on San Nicholas Island. It occurs on all the Channel Islands and is common in California.

Voucher. Immediately E of commissary, 100 m, on shrubs, 7.i.1995, *T.H. Nash 38862* (ASU, det. H. Kashiwadani).

Rinodina santae-monicae H. Magn.

Notes. The species is probably rare on San Nicolas Island. It occurs on Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands. It is common in California and is often found on oaks.

Voucher. Twin Towers area on south side, 213 m, on old, discarded lumber, 23.viii.2015, *K. Knudsen 17820.2 & T. Wheeler* (SBBG, det. J. Sheard).

Sarcogyne arenosa (Herre) K. Knudsen & Standley

Notes. The species is rare on San Nicholas Island but may be under-collected. It often grows on sandstone and can even occur in soil crusts. It is rare on Catalina, Santa Cruz, and West Anacapa Islands. It is frequent in California south of San Francisco.

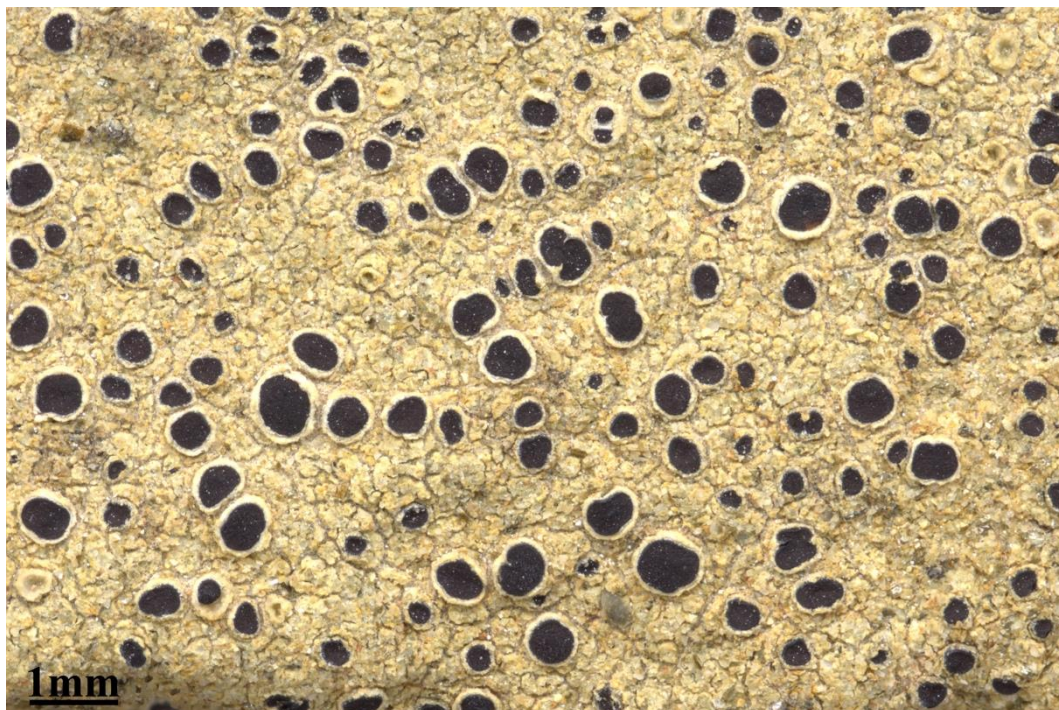
Rim of south side, 221 m, on soft sandstone, 20.viii.2015, *K. Knudsen 17735 & T. Wheeler* (SBBG).

***Sarcogyne* species**

Notes. The taxon was identified as *Sarcogyne regularis* and is probably frequent on San Nicolas Island. It is a rare species on San Clemente and Santa Rosa Islands. It is frequent in California on calcareous rock. It differs genetically from *Sarcogyne regularis* s. str. and from *Sarcogyne*

coeruleonigrans K. Knudsen, Kocourk. & Hodková, a species in western North America usually identified as *S. regularis* (Knudsen et al. in press). The taxon needs further study. We currently do not recognize *S. regularis* as occurring in North America.

Voucher. Along Wilong Road west of Barge Landing (north shore), 50 m, 7.i.1995, on sandstone, *T.H. Nash III* 38899 (MIN, WIS, det. K. Knudsen).



Sarcogyne arenosa. Twin Towers Canyon, Wheeler 7100 (hb Wheeler).

Sigridea californica (Tuck.) Tehler

Notes. The species is common on San Nicolas Island on introduced trees around buildings and on native vegetation. It occurs on Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands. It is common in California along the coast from San Diego to San Francisco. It is often found on *Eucalyptus* trees.

Voucher. Immediately E of commissary, 100 m, on wood, 7.i.1995, *T.H. Nash* 38830 (ASU, det. A. Tehler).

Seiophora californica (Sipman) Fröden

Notes. The species is probably common on native vegetation on San Nicolas Island. It occurs on San Miguel, Santa Barbara, and Santa Rosa Islands. It does not occur on the California coast.

Voucher. San Nicolas Island, south side east of Twin Tower, 233 m, on dead bush, 23.viii.2015, *K. Knudsen* 17825 & *T. Wheeler* (NY, SBBG).

Solenopsora crenata (Herre) Zahlbr.

Notes. The species is frequent in soil crusts on San Nicolas Island, but often in small amounts and can be easily overlooked. It occurs on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands. It is rare in California on the central coast.

Voucher. North side above Tranquility Beach near NAVFAC Road, 25 m, in large soil crusts 25.viii.2015, *K. Knudsen* 17838 & *T. Wheeler* (SBBG).



Sigridea californica. West Nav-Fac Road, Wheeler 7124 (hb Wheeler).

Thalloidima sedifolium (Scop.) Kistenich, Timdal, Bendiksby & S. Ekman

Notes. The species is common on San Nicolas Island. It also occurs on San Miguel Island and is expected on Sandy Point on Santa Rosa Island. It is common in calcareous areas in California. The taxon was previously treated as a *Toninia* (Kistenich et al. 2018).

Voucher. Along Wilong Road west of Barge Landing (north shore), 50 m, on sandstone. 7.i.1995, *T.H. Nash III* 38878 (ASU, det. E. Timdal).

Thelenella weberi H. Mayrh.

Notes. The species is rare on sandstone on San Nicolas Island, known only in California from a collection in 1966. It also occurs on Guadalupe Island in Mexico.

Voucher. SE corner of the island, 25 m, 4.vi.1966, *R. Foreman L-44275* (ASU, det. H. Mayrhofer).

Tephromela atra (Huds.) Hafellner

Notes. The species is common on sandstone on San Nicolas Island. It occurs on San Miguel, Santa Cruz, and Santa Rosa Islands. It is common in California.

Voucher. Upper West Mesa Canyon, 106 m, on sandstone, 22.viii.2015, *K. Knudsen 17807 & T. Wheeler* (SBBG).

Tephromela nashii Kalb

Notes. The species is less common than *Tephromela atra* on the San Nicolas Island. It occurs on Catalina, San Clemente, San Miguel, Santa Cruz, and Santa Rosa Islands. It is rare along the southern and central California coast.

Voucher. Area adjacent environmental laboratory (NAVFAC) and in gullies behind Tranquility Beach, 25 m, on sandstone, 7.i.1995, *T.H. Nash 38677* (ASU).



Seirophora californica. Jackson Highway Badlands, Wheeler 6920 (hb Wheeler).

Toniniopsis aromatica (Sm.) Kistenich, Timdal, Bendiksby & S. Ekman

Notes. The species is common on San Nicolas Island on caliche and in soil crusts. It occurs on San Miguel, San Clemente, Santa Barbara, Santa Cruz, and Santa Rosa Islands. This was previously treated as a *Toninia* (Kistenich et al. 2018).

Voucher. West end above south side, 71 m, on caliche, 2.vi.2014, *K. Knudsen 16701* (SBBG).

Usnea ceratina Ach.

Notes. The species is rare on San Nicolas Island. All *Usnea* collections on the island are known from single collections. It occurs on Santa Cruz and Santa Rosa Islands. It is frequent along the central coast of California.

Voucher. Base of L Canyon, near the road, 40 m, on *Lycium californicum*, 27.iv.1992, *C.C. Bratt 7967a* (ASU, SBBG, det. P. Clerc).



Tephromela atra. West Twin Towers Canyon, Wheeler 7095 (hb Wheeler).

Usnea esperantiana Clerc

Notes. The species is rare on San Nicolas Island. But since it often grows on maritime shrubs it may be frequent. It occurs on Catalina, San Clemente, Santa Cruz, and Santa Rosa Islands. It occurs along the central coast of California.

Voucher. Base of L Canyon, near the road, 40 m, on *Lycium californicum*, 27.iv.1992, C.C. Bratt 7967b (SBBG, det. P. Clerc).

Usnea parvula Motyka

Notes. This species is rare on San Nicolas Island. It is rare in California.

Voucher. West end, 33.83°N 119.55°W, 150 m, 5.i.1995, on shrubs, T.H. Nash III 38711 (ASU, det. P. Clerc).

Verrucaria calkinsiana Servít

Notes. *Verrucaria calkinsiana* is frequent on San Nicolas Island. It occurs on San Miguel, Santa Rosa, and West Anacapa Islands. It is common in southern California.

Voucher. East end of island, below bluffs and above road from the barge landing, 20 m, on sandstone, 7.i.1995, T.H. Nash III 38915 (ASU, det. O. Breuss).

Verrucaria furfuracea (B. de Lesd.) Breuss

Notes. This species is probably frequent on San Nicolas Island. It usually occurs on calcareous substrates. It is often sterile and is identified by its isidia. It occurs on San Clemente, San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands. It is frequent in southern California.

Voucher. Rim of south side, on sandstone, 221 m, 20.viii.2015, K. Knudsen 17728 & T. Wheeler (SBBG).

Verrucaria fuscoatroides Servít

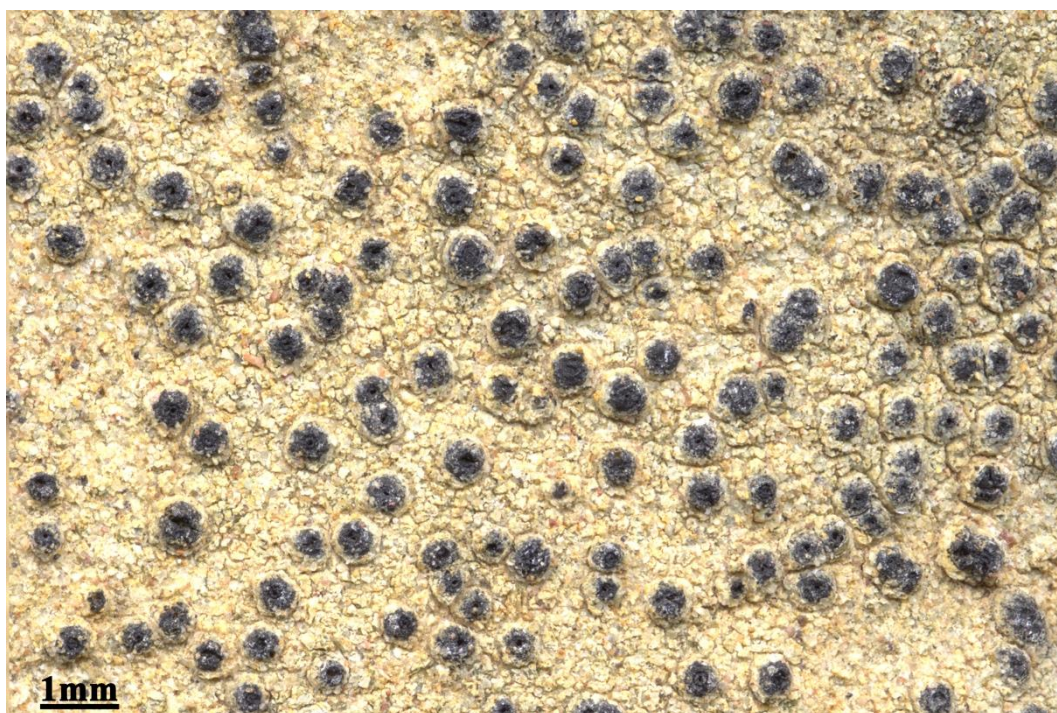
Notes. This species is possibly rare on San Nicolas Island. It is rare on Santa Cruz Island. It is frequent and widespread in southern California including in Joshua Tree National Park in the Mojave Desert.

Voucher. End of Theodolite Road, 225 m, on sandstone, 3vi.2014, *K. Knudsen 16765.2 & W. Hoyer* (SBBG).

Verrucaria mimicrans Servít

Notes. This species is common on San Nicolas Island. It occurs on San Miguel and Santa Cruz Islands. It is frequent in southern California.

Voucher. Area adjacent environmental laboratory (NAVFAC) and in gullies behind Tranquility Beach, 25 m, on sandstone, 7.i.1995, *T.H. Nash 38678* (ASU, det. O. Breuss).



Verrucaria mimicrans. East Celery Canyon, Wheeler 7038 (hb Wheeler).

Verrucaria muralis Ach.

Notes. This species is probably common on San Nicolas Island. It occurs on Catalina, San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands. It is frequent in California.

Voucher. Area adjacent environmental laboratory (NAVFAC) and in gullies behind Tranquility Beach, 25 m, on sandstone, 7.i.1995, *T.H. Nash 38680* (ASU, det. O. Breuss).

Xanthocarpia marmorata (Bagl.) Frödén, Arup & Søvting

Notes. The species is probably frequent on San Nicolas Island. It occurs on San Miguel, Santa Barbara, Santa Cruz, and Santa Rosa Islands. It is not known from the mainland of California.

Voucher. Shannon Rd at the sand dunes, central mesa, on caliche, 270 m, 14.ii.1993, *C.C. Bratt 8195A* (SBBG).



Xanthocarpia marmorata. West Mesa Canyon, Wheeler 7076 (hb Wheeler).

Conclusion

We report 136 lichens from San Nicolas Island. We estimate that ultimately the flora of the island could be as high as possibly 150–175 species, but with most of them being rare or infrequent. In ASU and SBBG are many specimens only identified to genus or need verification. Many of the canyons are unexplored for lichens, as well as large areas of the mesa tops and the shorelines. A lot of collecting was done near roads and cross-country hiking has yielded more results. In our experience on the islands, careful collection of crustose lichens leads to the discovery of many rare or infrequent taxa. We were unable to find any marine lichens on seashore rocks, though several species could be in the surf somewhere around the island. The species occurring on introduced trees also suggest that more species could have become established through wind carrying propagules or ascospores from Catalina and other islands and the mainland. Lichenicolous fungi have been rarely collected on the island and are currently only five species have been identified [*Arthonia molendoi* (Heufl. ex Franenf.) R. Sant., *Skyttea pertusariicola* Diederich & Etayo, *Stigmidium californicum* K. Knudsen & Kocourk, *S. epistigmellum* (Nyl. ex Vouaux) Kocourk. & K. Knudsen, and *Toninia subdispersa* (Nyl. ex Hasse) K. Knudsen]. Three allied fungi collected by lichenologists are known from the native vegetation [*Arthonia albopulvera* Nyl., *Distopyrenis americana* Aptroot, and *Naetrocymbe punctiformis* (Pers.) R.C. Harris]. More non-lichenized *Arthonia* on vegetation may be found, especially the rare *A. sudispuncta* Nyl ex Hasse which only grows on *Leptosyne gigantea*. An undescribed lichenized *Arthonia* taxon on caliche is deposited in the UCR. In Lund herbarium (LD) in Sweden are specimens of an undescribed *Haloplaca* from San Nicolas Island which is also common on the central coast of California (LUND, NY, SBBG). A lot more work needs to be done on the biodiversity of lichens, lichenicolous fungi, and allied fungi on San Nicolas Island.



Skyttea pertusariicola. West Twin Towers Canyon, Wheeler 7096 (hb Wheeler).

Acknowledgments

Tim Wheeler thanks Shirley Tucker (SBBG) for paying for his expenses. We thank Navy ecologist William Hoyer for helping us to explore the island. The work of Kerry Knudsen was financially supported by the grant “Environmental aspects of sustainable development of society” 42900/1312/3166 from the Faculty of Environmental Sciences, Czech University of Life Sciences Prague. The work of Eva Hodková and Jana Kocourková was financially supported by the grant of Ministry of Education, Youth and Sports of the Czech Republic, the program of international cooperation between the Czech Republic and U.S.A. for research, development, and innovations INTEREXCELLENCE, INTER-ACTION, no. LTAUSA18188.

Literature

- AHTI, T. & S. STENROOS. 2013. Cladoniaceae. 7–87. *In*: AHTI, T., S. STENROOS & R. MOBERG (eds.): Nordic Lichen Flora Vol. 5.
- BOWLER, P.A. & J.E. MARSH, 2004. *NIEBLA*. 368–380. *In*: T.H. NASH III, B.D. RYAN, P. DIEDERICH, C. GRIES, & F. BUNGARTZ (EDS.): Lichen Flora of the Greater Sonoran Desert Region, Volume 2. Lichens Unlimited, Arizona State University, Tempe, Arizona.
- BREUSS, O & C.C. BRATT. 2000. Catapyrenoid lichens in California. *Bulletin of the California Lichen Society* 7(2): 36–43.
- BUNGARTZ, F., A. NORDIN & U. GRUBE. 2007. *Buellia*. 113–179. *In*: T.H. NASH, III, C. GRIES & F. BUNGARTZ (EDS.): Lichen Flora of the Greater Sonoran Desert Region. Volume 3. Lichens Unlimited, Arizona State University, Tempe.
- BRODO, I.M., S. DURAN SHARNOFF & S. SHARNOFF. 2001. Lichens of North America. Yale University Press, New Haven & London.

- CNALH. Consortium of North American Lichen herbaria. <http://lichenportal.org/portal/> Accessed November 2018 and Feb. 2022.
- JORNA, J. + 17 AUTHORS. 2021. Species boundaries in the messy middle—A genome-scale validation of species delimitation in a recently diverged lineage of coastal fog desert lichen fungi. *Ecology and Evolution* 11(4):1–9.
- KISTENICH, S., E. TIMDAL, M. BENDIKSBY & S. EKMAN. 2018. Molecular systematics and character evolution in the lichen family Ramalinaceae (Ascomycota: Lecanorales). *Taxon* 67: 871–904.
- KNUDSEN, K. 2007 [2008]. *Acarospora*. 1–38. In: T.H. Nash, III, C. Gries & F. Bungartz. Lichen Flora the Greater Sonoran Desert Region, Vol. 3, Lichens Unlimited, Arizona State University, Tempe.
- KNUDSEN, K. & J. KOCOURKOVÁ. 2012. The Annotated Checklist of Lichens, Lichenicolous and Allied Fungi of Channel Islands National Park. *Opuscula Philolichenum* 11: 145–302.
- KNUDSEN, K. & J. KOCOURKOVÁ. 2020[2021]. The Real *Acarospora socialis*. *Bulletin of the California Lichen Society* 27: 41–46.
- KNUDSEN, K., J. KOCOURKOVÁ, E. HODKOVÁ, J. MALÍČEK & Y. WANG. 2021. *Acarosporaceae* of the Chihuahuan Desert: four Magnusson species saved from synonymy and a new yellow species. *The Bryologist* 124: 533–551.
- KNUDSEN, K., J. KOCOURKOVÁ, E. HODKOVÁ, J. MALÍČEK & Y. WANG. In press. *Acarosporaceae* of New Mexico: eight new species of *Acarospora* and *Sarcogyne*, Western North American Naturalist.
- KNUDSEN, K., J. KOCOURKOVÁ & T. WHEELER. 2015. *Protoparmelia ryaniana* is a synonym of *Lecanora verrucariicola*, which belongs in the genus *Miriquidica* (Lecanoraceae). *Opuscula Philolichenum* 14: 138–142.
- KNUDSEN, K. & J.C. LENDEMER. 2007. Studies in lichens and lichenicolous fungi: notes on some North American taxa. *Mycotaxon* 101: 81–87.
- KNUDSEN, K. & J.C. LENDEMER. 2009. *Naetrocymbe herrei* (Pleosporales; Ascomycetes), a new lichenized saxicolous species from the coast of central California. *Opuscula Philolichenum* 6: 59–64.
- KNUDSEN, K., J.C. LENDEMER, & J. KOCOURKOVÁ. 2018. *Ramalina sarahae* (Ramalinaceae), a new species from the Channel Islands of California, U.S.A. *The Bryologist* 121: 513–519.
- KNUDSEN, K., J.C. LENDEMER, M. SCHULTZ, J. KOCOURKOVÁ, J.W. SHEARD, A. PIGNIOLO & T. WHEELER. 2017. Lichen biodiversity and ecology in the San Bernardino and San Jacinto Mountains in southern California (U.S.A.). *Opuscula Philolichenum* 16: 15–138.
- KNUDSEN, K & T. WHEELER. 2015. *Niebla ramosissima*: an endemic of San Nicolas Island. *Bulletin of the California Lichen Society* 22: 33–36.
- KUKWA, M. & K. KNUDSEN. 2011. Notes on the identity of *Chrysothrix* populations (Arthoniales, Ascomycota) containing pinastric acid from southern and central California. *Mycotaxon* 116: 407–411.
- LENDEMER, J.C. & K. KNUDSEN. 2009. Two new usnic acid-containing species of *Lecanora* from western North America. *Opuscula Philolichenum* 6: 73–80.
- NÆSBORG, R. 2020. *Niebla ramosissima*. The IUCN Red List of Threatened Species 2020: e.T175709793A1757106773. <https://dx.doi.org/10.2305/IUCN.UK.2020-RLTS.T175709793A175710677.en>. Accessed on 17 February 2022.
- NASH III, T.H., B.D. RYAN, C. GRIES, & F. BUNGARTZ. 2002. Lichen Flora of the Great Sonoran Desert Region, Vol. 1, Tempe, Arizona: Lichens Unlimited, Arizona State University, 532 pp.
- NASH III, T.H., B.D. RYAN, P. DIEDERICH, C. GRIES & F. BUNGARTZ. 2004. Lichen Flora of the Greater Sonoran Desert Region, Vol. 2, Tempe, Arizona: Lichens Unlimited, Arizona State University, 744 pp.
- NASH III, T.H., C. GRIES, & F. BUNGARTZ. 2007 [2008]. Lichen Flora of the Greater Sonoran Desert Region, Vol. 3, Tempe, Arizona: Lichens Unlimited, Arizona State University, 567 pp.
- PINO-BODAS, R., T. AHTI, S. STENROOS, M.P. MARTÍN & A.R. BURGAS. 2013. Multilocus approach to species recognition in the *Cladonia humilis* complex (Cladoniaceae, Ascomycota). *American Journal of Botany* 100: 664–678.
- SCHMITT, I., T. LUMBSCH, & C. BRATT. 2006. Two new brown-spored species of *Pertusaria* from southwestern North America. *Lichenologist* 38: 411–416.
- SHARNOFF, S. 2014. A Field Guide to California Lichens. Yale University Press, New Haven & London.
- ŚLIWA, L. 2007. A revision of the *Lecanora dispersa* complex in North America. *Polish Botanical Journal* 52: 1–70.
- SPJUT, R. 1996. *Niebla* and *Vermilacinia* (Ramalinaceae) from California and Baja California. *Sida, Botanical Miscellany* 14: 1–208.

- SPJUT, R., A. SIMON, M. GUISSARD, N. MAGAIN & E. SÉRUSIAUX. 2020. The fruticose genera in the Ramalinaceae (Ascomycota, Lecanoromycetes): their diversity and evolutionary history. *MycKeys* 73: 1–68.
- VAN DEN BOOM, P.P.G. & B.D. RYAN. 2004. *Lecania*. 143–171. In: T.H. NASH III, B.D. RYAN, P. DIEDERICH, C. GRIES, & F. BUNGARTZ (EDS.): Lichen Flora of the Greater Sonoran Desert Region, Vol. 2. Lichens Unlimited, Arizona State University, Tempe, Arizona, pp.
- VAN DEN BOOM, P, H. SIPMAN, & J.A. ELIX (2007) 2008. *Protoparmelia*. 292–293. In: T.H. NASH, III, C. GRIES & F. BUNGARTZ. Lichen Flora of the Greater Sonoran Desert Region, Vol. 3, Lichens Unlimited, Arizona State University, Tempe.



Metavolcanic “outcrop” and Kerry Knudsen.



Niebla homalea, *Pertusaria flavicunda* and *Tephromela atra* on a metavolcanic cobble.