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NEW SPECIES OF *NIEBLA* (RAMALINACEAE) FROM WESTERN NORTH AMERICA

P.A. Bowler & R.E. Riefner, Jr.

Department of Ecology and Evolutionary Biology; Museum of Systematic Biology, University of California, Irvine, California 92717 U.S.A.

P.W. Rundel

Environmental Biology Division, Laboratory of Biomedical and Environmental Sciences, University of California, Los Angeles, Los Angeles, California 90024 U.S.A.

J. Marsh & T.H. Nash, III

Department of Botany, Arizona State University, Tempe, Arizona 85287-1601 U.S.A.

ABSTRACT

Five new species of *Niebla* (Ramalinaceae) are described and a key to the North American taxa is presented. New species include **Niebla ceruchoides** Rundel & Bowler, **Niebla isidiaescens** Bowler, Marsh, Nash, & Riefner, **Niebla laevigata** Bowler & Rundel, **Niebla polymorpha** Bowler, Marsh, Nash, & Riefner, and **Niebla procera** Rundel & Bowler. Geographic ranges, habitat, and ecological notes are given for the five new taxa.

KEY WORDS: *Niebla ceruchoides, Niebla isidiaescens, Niebla laevigata, Niebla polymorpha, Niebla procera*, western North America, California, Baja California

INTRODUCTION

The genus *Niebla* occurs in western North America along the coast from Washington to Baja California Sur, México, as well as on the Channel Islands and islands adjacent to Baja California, and includes saxicolous, terricolous, and corticolous taxa (Rundel & Bowler 1977; Rundel, Bowler, & Mulroy 1972). The taxonomy of the group has not been well understood, and the lack of a key to the North American species has hampered consistent identification. The North American taxa all have black-chambered pycnidia and most species are aligned with either a homalioid lineage characterized by distinctive chondroid strands in the medulla or a ceruchoid affinity with a fluffy medulla lacking well formed chondroid strands. This study is part of a series on the genus, and describes five new species, as well as providing a key to the described taxa.

Most North American *Niebla* taxa can be arranged into two broad groups: (1) the "ceruchoid" group (with *N. ceruchis* [Ach.] Rundel & Bowler as a typical member) with a terpenoid chemistry and lacking in well developed chondroid strands, and (2) the "homalea" group (with *N. homalea* [Ach.] Rundel & Bowler as a typical member) with a more diverse chemistry including divaricatic, sekikaic, barbatic, protocetraric, or salazinic acids, and having conspicuous strands of chondroid material in the medulla. The *Niebla homalea* group includes the saxicolous *N. homalea* (divaricatic, barbatic, or sekikaic acids) and *N. josecuervoi* (Rundel & Bowler) Rundel & Bowler (salazinic acid), as well as their ground dwelling, bushlike morphologies, and the terricolous *N. pulchribarbara* (Rundel & Bowler) Rundel & Bowler (protocetraric acid). *N. isidiaescens* Bowler, Marsh, Nash, & Riefner is the isidiate derivative of *N. homalea*. It is saxicolous and is easily separated by the conspicuous coralloid isidia extending the length of the blades. The ceruchoid group includes the corticolous and polymorphic *N. ceruchis* and the sorediate *N. cephalota* (Tuck.) Rundel & Bowler. Saxicolous species include a group which are primarily cylindrical in cross-section and another species, *N. laevigata*, with a strongly flattened blade superficially resembling compressed morphologies of *N. homalea*, although *N. laevigata* has a terpenoid chemistry and lacks medullary chondroid strands. Saxicolous taxa in this group include *N. combeoides* (Nyl.) Rundel & Bowler, the longer, subpendulous *N. procera* Rundel & Bowler, and the short, inflated *N. robusta* (R.H. Howe) Rundel & Bowler. *Niebla cedroensis* is a recently described species (Marsh & Nash 1994) which is endemic to Cedros Island and the adjacent coast of Baja California. It is a plant which is easily separated due to its characteristically pale color and the large size it achieves. *Niebla polymorpha* is a saxicolous species with a broad ecological range, allowing it to occur further inland than any of the other ceruchoid chemistry taxa. The ceruchoid lineage taxa contain (-)-16α-hydroxykaurane, with variable occurrences of zeorin, bourgeanic acid, and less frequently salazinic acid. A tuberculate species *in ed.*, endemic to the Morro Bay area in California, is remarkable in

the group by having a single chondroid strand in the medulla and terpenoid chemistry.

Key to the North American Species

1. Thallus sorediate. ..... *N. cephalota*

1. Thallus esorediate. 2

    2. Corticolous. ..... *N. ceruchis*

    2. Saxicolous or terricolous. 3

3. Thallus blades flattened with angular edges. 4

3. Thallus blades cylindrical (not flattened) without distinct edges. 9

    4. Within the medulla individual chondroid strands evident in cross section of blades. 5

    4. Within the medulla individual chondroid strands absent (but agglutinated hyphae forming a central cylinder may be present). 8

5. Medulla P+ red; California to Baja California. 6

5. Medulla P-; Baja California only. 7

    6. Medulla K+ yellow turning dark red (salazinic acid present); primarily saxicolous. ..... *N. josecuervoi*

    6. Medulla K- (protocetraric acid present); terricolous. ..... *N. pulchribarbara*

7. Thallus isidiate. ..... *N. isidiaescens*

7. Thallus not isidiate. ..... *N. homalea*

    8. Branches strap-like, strongly flattened in cross section; cortex typically smooth, plane. ..... *N. laevigata*

    8. Branches not strap-like, irregularly prismatic in cross section; cortex typically rough, irregularly ridged. ..... *N. polymorpha*

9. Mature thallus caespitose; blades short (3 cm). 10

9. Mature thallus becoming subpendulose; blades long (to 8 cm). 13

    10. Thallus spongy (compressible); branch tips blunt. ..... *N. robusta*

    10. Thallus not spongy (solid); branch tips pointed. 11

11. Secondary branching absent; apothecia terminal. ..... *N. combeoides*

11. Secondary branching present, initiated basally; apothecia subterminal to terminal. 12

12. Thallus isidiose-papillate, not forming dense cushions; branch tips rarely bifurcate; endemic of Morro Bay, California. .... *N. sp. nov.* (*in ed.*)

12. Thallus not isidiose-papillate, forming dense cushions; branch tips typically bifurcate; occurring in both California and Baja California. ..... *N. ceruchoides*

13. Cortex shiny, often maculate, yellow green; widely distributed in California and Baja California. ..... *N. procera*

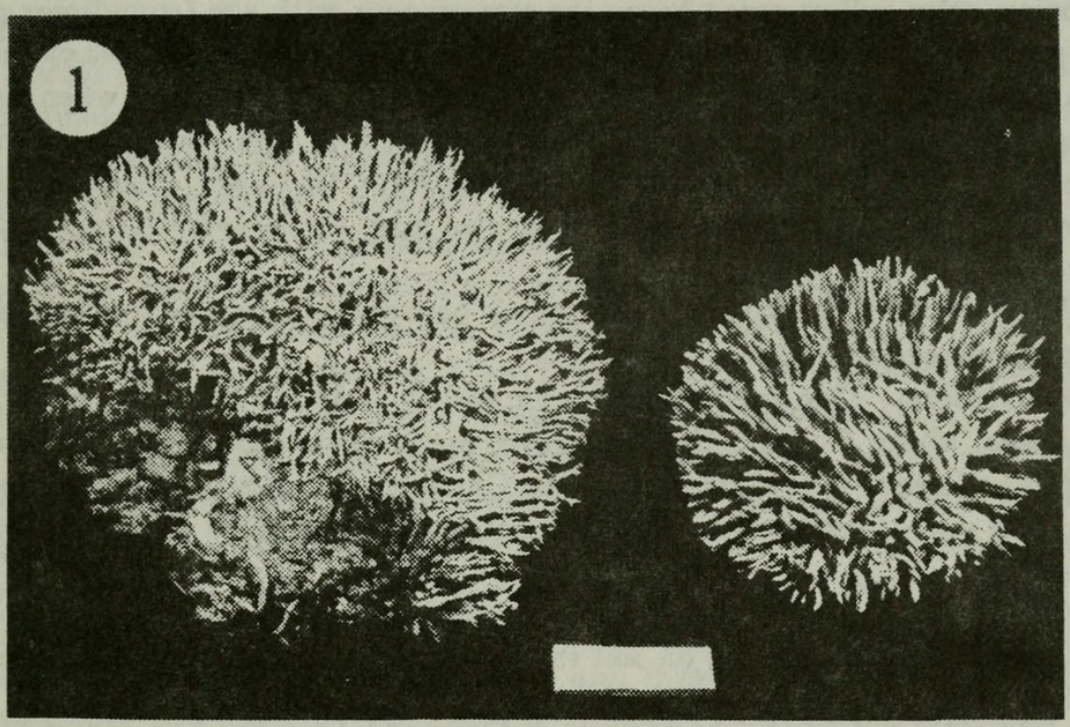
13. Cortex dull, not maculate, light yellow, becoming whitened frequently; an endemic of Cedros Island and the adjacent mainland. *N. cedroensis*

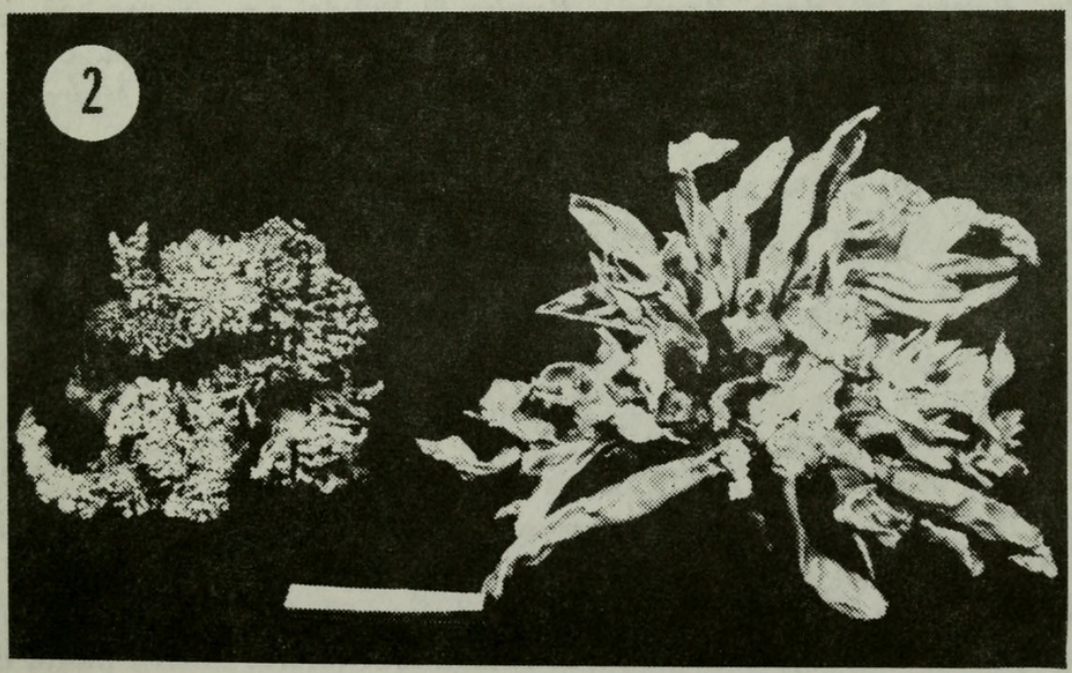
Taxonomy of the New North American *Niebla* Species

Niebla ceruchoides Rundel et Bowler, *sp. nov.* (Figure 1). *Ramalina ceruchoides* Magn. *in* Bendz, Sant., & Wachtm., Acta Chem. Scand. 9:1185. 1965. (*nomen nudum*). *Desmazieria ceruchoides* (Magn.) Follm. & Hun., Willdenowia 5:208. 1968. (*nomen nudum*). *Niebla ceruchoides* Rund. & Bowler, *in ed.*, *in* Riefner, Phytologia 67(3):255. 1989. (*nomen nudum*). TYPE: U.S.A. California. Ventura Co.: On exposed outcrops along W. Portrero Road near Lewis Road, ca. 5 km from the ocean, *Riefner 89-388* (ASU); Isotypes: IRVC,COLO,WIS.

Thallus saxicolus vel irregulariter terricolus, fruticosus, erectus, cladinaformus, caespitosus, usque ad 6 cm altus. Rami cylindricalus, <1.0(-1.5) mm lati, staminei, dense et intricate ramosus, apicem divaricatus. Cortex rigidus, medulla alba. Apothecia concavus, usque ad 7 mm diam., alba, rara, subterminalus vel terminalus. Sporis 3-4 × 10-13 μm, unisepatus. Pycnidia negra. Acidum (-)-16α-hydroxykaurane, ± bourgeanicum, zeorin, usnicum, vel triterpeneus ignotum continens.

Thallus usually saxicolous, occasionally terricolous, cladinaform, densely branched, bushlike, resembling a small cushion plant. Branches subcylindrical to cylindrical, usually less than 1.0(-1.5) mm in diameter, mats 2-3 cm tall





Figures 1-2. Figure 1 (above). The type specimen of *Niebla ceruchoides*, *Riefner 89-388* (ASU). Figure 2 (below). A representative specimen (left) of *Niebla isidiaescens*, *Riefner 92-61* (IRVC) and a representative specimen (right) of *Niebla polymorpha*, *Riefner 87-61a* (IRVC). Bar = 1 cm.

(to 6 cm). Densely branching, branch tips divaricate as in some *Cladina* morphologies; color yellow-green becoming stramineous with age (sometimes pale gray-green in the field), cushion texture spiny. Branches more or less cylindrical, smooth or weakly fasciated. Cortex rigid when dry, cracking when bent. Medulla white, dense. Apothecial discs concave, to 7 mm, pale, uncommon, subterminal, but near the branch tips. Spores 3-4 × 10-13 μm. Black pycnidia borne on the attenuate branch tips, otherwise rare. Pycnospores straight, 3 × 1 μm.

Chemistry: (-)-16α-hydroxykaurane, ± bourgeanic acid, zeorin, unidentified triterpenes, usnic acid.

Distribution: This species occurs in widely isolated localities from Mt. Tamalpais, Marin County, California into northwestern Baja California and Guadalupe Island. It is abundant on the Channel Islands along the California coast, and also on Cedros Island off the northwestern coast of Baja California, México.

Habitat: This species occurs in widely isolated patches on coastal rocks, cliff faces, or less commonly on soil in sites with extensive exposure to wind and fog.

Representative Specimens Examined: MEXICO. Baja California: Punta Banda, *Bowler 20* (Herb. Rundel), *Bowler & Rundel s.n.*, November, 1972 (Herb. Rundel), *Bowler s.n.*, November, 1970 (Herb. Rundel); Guadalupe Island, *Weber & McCoy L-36641* (COLO); Sonorobampa Canyon, *Mulroy s.n.*, June, 1974 (Herb. Rundel); 40 km S of San Quintín and N of El Rosario, *Marsh 5370* (ASU); San Quintín, *Marsh 6350* (ASU); 31°33′30″N, 116°42′W, *Nash 25,196* (ASU); Cedros Island, north end, *Marsh 7232* (ASU); *Marsh 7263* (ASU); *Marsh 7337* (ASU); Marsh 7338 (ASU).

U.S.A. California: Los Angeles Co.: Santa Catalina Island, *Weber & Santesson L-42800* (UC, Herb. Rundel); *Santesson 17303a, 17303b* (UPS); Empire Landing area (Rippers Cove), *Marsh 6599* (ASU); Hamilton Beach NW of Avalon, *Marsh 6653* (ASU); Lands End on western end of Island, sub-isidiate, *Marsh 6612* (ASU); Lands End, *Marsh 6602* (ASU), *Marsh 6605* (ASU). San Clemente Island, *Santesson 17946, 17977, 18038* (UPS). Marin Co.: Mt. Tamalpais, *Riefner 85-717* (IRVC). Orange Co.: San Joaquin Hills, *Rundel s.n.* (Herb. Rundel); Aliso Canyon, *Gittens 8365* (Herb. Rundel), *Rundel s.n.* (Herb. Rundel), *Bowler s.n.*, 29 March 1987 (Herb. Bratt). Santa Barbara Co.: Santa Cruz Island, *Schuster 37b* (COLO), *Bratt 2307* (Herb. Bratt); Santa Rosa Island, *Nash 33,103* (ASU); South Point, *Marsh 6916* (ASU); lower portion of Cañada Lobos, *Marsh 6878* (ASU); lower end of Old Ranch Canyon, fertile, *Marsh 6818* (ASU); Santa Barbara Island, *Bratt 4827, 3720, 3635* (Herb. Bratt). San Luis Obispo Co.: Beach N of Hearst Castle, *Denison 30733* (OSU). Ventura Co.: 6 km N of Newbury Park, *Weber S1727, S1727A* (COLO,UPS); E of Camarillo State Hospital, *Malachowski 1* (Herb. Rundel); W Portrero Rd. 5 km from ocean, *Riefner 89-388* (ASU,IRVC,COLO,WIS).

Sorediate form: U.S.A. California: Santa Barbara Co.: Santa Barbara Island, *Bratt 4813, 3660, 4872, 5171, 3722, 3707* (Herb. Bratt).

Niebla ceruchoides resembles a cushion plant or bryophyte in habit, and is cladinaform in appearance, particularly accentuated by the dense mat-like form it takes and the bifurcate branch tips occurring in some Cladinae. The cushion-like growth form with thin branches and a compact mat of branch tips makes it well adapted to fragmentation and vegetative reproduction. It is usually sterile. Most cladinaform lichens are fistulose, however, *N. ceruchoides* has solid, medulla-filled branches even though it superficially resembles a *Cladina* in growth form and branching. Its spiked, bushlike form makes it resemble a miniature hedge-hog, and it is a compact fog and moisture trap.

This species description formally establishes a taxon known until now by the nomen nudum *Desmazieria ceruchoides.* The name *Ramalina ceruchoides* was first used by Santesson in field notes from Chile (R. Santesson, personal communication). This name was subsequently cited by Bendz, *et al.* (1965) in a study of the species' chemistry, with the notation that it was not yet a formally described taxon. The new and invalid combination *Desmazieria ceruchoides* was made by Follmann & Huneck (1968) in the erroneous belief that the species was validly published. Neither Magnusson nor anyone else did in fact describe the taxon.

Niebla ceruchoides is a species which requires fog, is nearly invariably found in northwest facing exposures, and often lies at the lower level of the *Niebla* zone. It frequently occurs at the lip of a cliff or on rocks situated to receive direct exposure to onshore fog bearing breezes as much as 8 km inland, such as the western Santa Monica Mountains, Ventura County. Its occurrence on soil is an expression of its tolerance within its microhabitat, as it occurs abundantly on several substrates in these habitats; its preferred habitat is rock or loess soils, but it can exist on adjacent rocky soils. This species' growth form makes it a well adapted strainer for airborne moisture, and it also serves as a seed and germination trap for some cliff dwelling vascular plants such as *Dudleya* spp. (Riefner & Bowler 1994).

This species occurs in valleys along coastal southern California and northwestern Baja California. In these habitats it is extremely abundant at some localities, for example, on Santa Rosa Island.

Niebla isidiaescens Bowler, Marsh, Nash, et Riefner, *sp. nov.* (Figure 2). TYPE: MEXICO. Baja California Sur: 3.5 km along road to Punta Abreojos from Highway 1, on a hill at 120 m, *Marsh 6142* (ASU).

Thallus saxicolus, caespitosus, similus ad *Niebla homalea* (Ach.) Rundel & Bowler, rami straminea vel flavo-virentes, applanati vel subcylindricalus, vel 1.2 cm lati, 3.5 cm longus, isidia marginalia

et laminalia. Cortex rigidus, medulla ad strandus. Apothecia rara, subterminalus, disc usque ad 7 mm. Sporis 10-14 × 3-4 μm. Pycnidia negra. Acidum sekikaicum vel divaricatum, usnicum, triterpenes continens.

Thallus saxicolous, fruticose, shrublike, flattened or subcylindrical branches similar to *Niebla homalea* in variability, to 1.2 cm in breadth (usually less than 0.5 cm) and 3.5 cm in length, branching laterally from straplike blades or unbranched from smaller cushion-like tufted thalli; color yellow-green. Branches solid, flattened or subcylindrical, smooth, with abundant coralloid isidia extending the length of the branches on both the blade surfaces and on the blade edges with varying degrees of density. Isidia tips blunt. Cortex rigid, similar in anatomy to *N. homalea* consistently with chondroid strands embedded in the white medulla. Apothecia rare, disc up to 7 mm diameter. Spores uniseptate, 10-14 × 3-4 μm, usually straight, rarely gently curved. Pycnidia black, uncommon on some plants, common on others. Pycnospores straight, 4.5-6.0 × 1.5 μm.

Chemistry: Sekikaic or divaricatic acids, usnic acid, triterpenes.

Distribution: The Channel Islands off California, Santa Monica Mountains, Ventura County on the mainland, and northwestern Baja California from San Quintín south to central Baja California Sur, and Cedros Island.

Habitat: This is a saxicolous species occurring on outcrops and rocks in open maritime scrub habitats.

Representative Specimens Examined: Divaricatic acid race: MEXICO. Baja California: San Quintín, Cerro Kenton, *Marsh 6326, 6325* (ASU). Baja California Sur: 3.5 km along road to Punta Abreojos from Hwy 1, fertile, *Marsh 6130, 6128, 6139, 6155* (ASU); 152 km on road turnoff 2.4 km to Puerto Neuvo, Vizcaíno Península, *Marsh 4258, 4262a, 4261, 4263* (ASU); 1.6 km E of Bahía Tortuga, *Marsh 4277a* (ASU); 31 km W of San Ignacio, *Nash 26,147* (ASU); 31 km W of San Ignacio, *Marsh 4394a* (ASU).

U.S.A. California: Los Angeles Co.: Santa Catalina Island, Lands End, *Marsh 6611, 6618, 6614* (ASU); ridge above Blue Cavern Point, *Marsh 6625, 6628, 6633* (ASU).

Sekikaic acid race: MEXICO. Baja California Sur: 31 km W of San Ignacio, *Marsh 4301, 4395* (ASU).

U.S.A. California: Los Angeles Co.: Santa Catalina Island, Lands End, *Marsh 6604* (ASU). Ventura Co.: Conejo Mountain, *Riefner 92-61* (IRVC).

Additional specimens (chemistry not examined): MEXICO. Baja California: Cedros Island, north end, *Marsh 7293, 7296, 7299, 7300, 7348* (ASU).

Niebla isidiaescens is the isidiate species pair taxon of *N. homalea*. It is rarely fertile and is extremely variable in its morphology. The coralloid isidia are blunt and are easily broken away from cortex surfaces.

Niebla laevigata Bowler et Rundel, *sp. nov.* (Figure 3). TYPE: U.S.A. California: San Luis Obispo Co.: On exposed rock in fog stream zone of Coon Creek Canyon at Moñtana de Oro State Park, *Riefner 87-394* (ASU).

Thallus saxicolus, fruticosus, rami applanati, 2.5 cm lati, rigidus usque ad 5(-6) cm altus. Rami flavo-virentes, ramifacatio rara. Medulla alba, non strandus continens. Sporis 10-14 × 4-5 μm, uniseptatus. Acidum (-)-16α-hydroxykaurane, zeorin, ± bourgeanicum, usnicum continens.

Thallus saxicolous, fruticose. Branches strongly compressed and flattened, external cortex smooth and far less ridged than in the *Niebla homalea* group. Lacinae to 2.5 cm wide and 5(-6) cm long, commonly 1 cm broad and 2.5 cm in length, usually as straplike, flat, unbranched blades, though in aberrant forms it can be wider and less smooth. Branches arising as a tuft from a basal plate; color light yellow-green to green, usually blackened basally, texture smooth to gently ridged. Branches solid, cortex very rigid, friable, cracking when bent, usually smooth, occasionally reticulate ridged. Cortex a thick palisade formation overlying a thinner supportive layer, chondroid strands absent in the medulla. White deposits of crystalline (-)-16α-hydroxykaurane present along cortical cracks. Medulla white, fluffy, and lacking the chondroid strands which are conspicuous in the *N. homalea* group. Apothecia common, primarily terminal, often clumped on the terminal margins of blade apices, disc concave, often curled inward and lobed, whitish, up to 8 mm in diameter but usually much smaller (4 mm). Spores 10-14 × 4-5 μm, straight to gently curved; rarely strongly curved. Black chambered pycnidia present, particularly on the terminal half of the blade, along the margins and on any ridges which occur. Pycnospores straight, 4.0-5.5 × 1 μm.

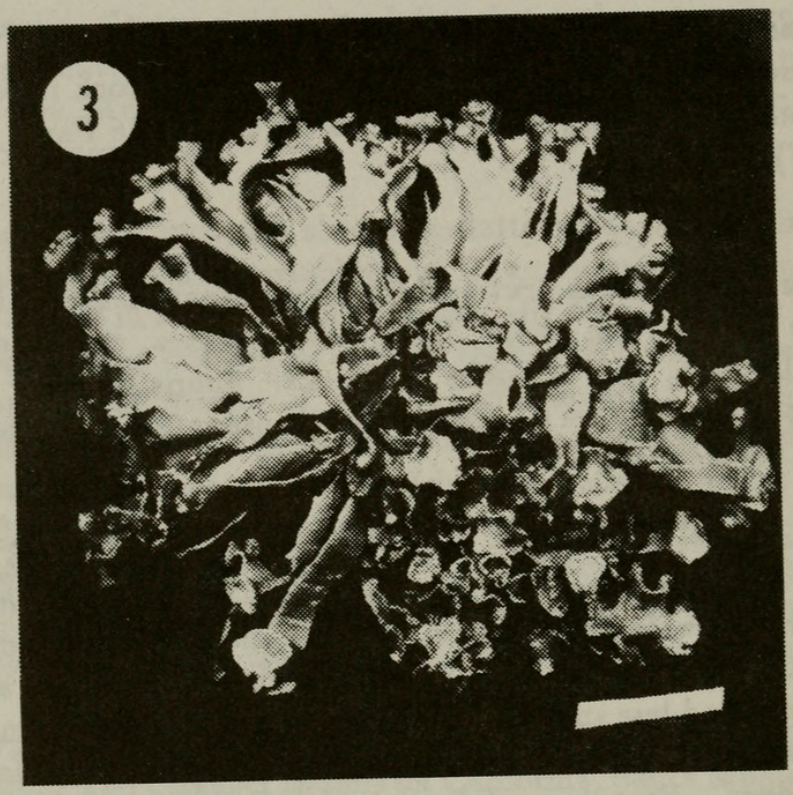
Chemistry: (-)-16α-hydroxykaurane, zeorin, + bourgeanic acid, usnic acid.

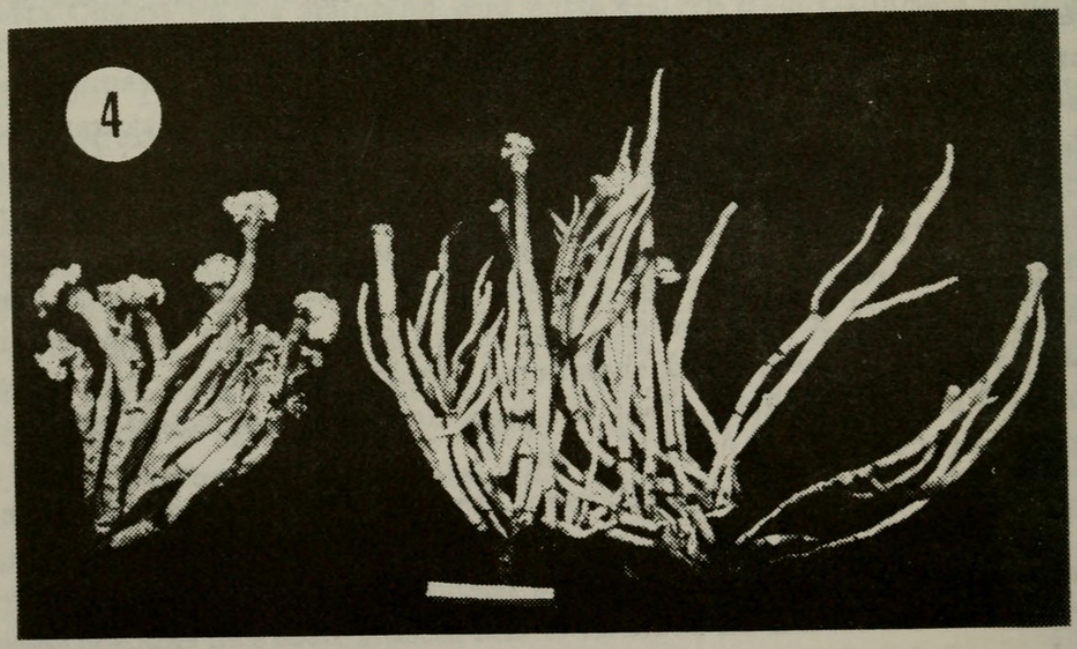
Distribution: From San Francisco to northwestern and central Baja California, including Vizcaíno and Cedros Island.

Habitat: Saxicolous on boulders or cliff faces in sites well exposed to coastal onshore wind and fog.

Representative Specimens Examined: MEXICO. Baja California: Punta Banda, *Bowler 28*; Los Arbolitos, *Bowler s.n.*, November, 1970 (Herb. Rundel); *Bowler s.n.*, 25 November 1970 (Herb. Rundel), *Nash 4907* (ASU); 6 mi S of Miller's Landing, *Nash 9006* (Herb. Rundel); San Quintín, thalli observed by P.A. Bowler.

U.S.A. California: Alameda Co.: Berkeley Campus, *Howe s.n.*, 1873 (UC). Los Angeles Co.: Santa Catalina Island, *Hasse 209* (FH), *Hasse s.n.*, 1906 (US), *Santesson 17304* (UPS), *Weber & Santesson L-42799* (COLO), *St. John*





Figures 3-4. Figure 3 (above). The type specimen of *Niebla laevigata*, *Riefner 87-394* (ASU). Figure 4 (below). The type specimen of *Niebla procera*, *Riefner 87-100* (ASU). Bar = 1 cm.

s.n., 22 August 1971 (Herb. Rundel). Marin Co.: Willow Camp, *Parks s.n.*, 1972 (H,UC). Monterey Co.: *Farlow s.n.*, 1885 (UC); Willow Creek, *Rundel 3730, 3732* (Herb. Rundel); Pt. Lobos State Reserve, *Bratt 3788* (Herb. Bratt). Santa Barbara Co.: Santa Barbara Island, *Bratt 3634, 4816, 3637, 5172, 3717, 4851, 4821* (Herb. Bratt); Santa Cruz Island, *Bratt 1599* (Herb. Bratt); San Nicolas Island, *Foreman L-44286* (COLO); Anacapa Island, middle island, *Goeblich s.n.*, 1963 (UC); Santa Rosa Island, East Point, *Marsh 6813* (ASU), N slope above Channel, *Marsh 6934* (ASU). San Diego Co.: San Diego, *Palmer s.n.*, 1888 (H).

Niebla laevigata superficially resembles *N. homalea*. It is both morphologically and chemically distinct, however. It can commonly be distinguished in its northern reaches by its unridged, smooth, shiny, bright yellow thallus, differing from the typically ridged, plated, angular, and dull cortex of *N. homalea*. In northwestern Baja California (Punta Banda), the species has a more ridged blade, but its lanceolate appearance makes it easily separable from *N. homalea*, from which *N. laevigata* is also ecologically separated in local microhabitats. For example, *N. homalea* occurs in a far broader range in elevation than *N. laevigata*, which is restricted to low elevation, ocean-facing saxicolous exposures. Thalli of *N. homalea* may have a bright yellow and shiny surface, but they still retain a plated surface. *Niebla laevigata* usually arises from a blackened base as discrete unbranching blades from a basal attachment point, while *N. homalea* usually branches and frequently has marginal proliferations, not present in *N. laevigata*.

Although it may be locally abundant, *Niebla laevigata* is known from widely scattered localities on the coast from central California and the Channel Islands to northwestern Baja California. It occurs with *N. homalea* in these localities, but its ecological habitat is typically distinct. This species is usually low in the supralittoral *Niebla* zone at about the same height and exposure as *N. robusta*. Rarely *N. laevigata* occurs inland where low inversion fogs funnel through canyons and valleys.

Niebla laevigata is anatomically very similar to *N. homalea*, although it possesses a terpenoid chemistry indicating a ceruchoid lineage (Bowler 1981). *Niebla robusta* has a much thicker supportive tissue. Both *N. laevigata* and *N. robusta* lack large chondroid strands in the medulla, while all saxicolous chemomorphs of *N. homalea* have them.

Niebla laevigata occurs in scattered localities on coastal bluffs in California, the California Channel Islands, and along coastal northwestern and central Baja California, and on islands such as Cedros Island along the coast of Baja California.

Niebla polymorpha Bowler, Marsh, Nash, et Riefner, *sp. nov.* (Figure 2). TYPE: U.S.A. California: Los Angeles Co.: Santa Catalina Island,

Marsh 6206 (ASU).

Thallus saxicolus, caespitosus, rara ramosus. Rami irregulariter compressi vel applanati, usque ad 6 mm lati. Cortex rigidus, flavo-virentes, medulla alba sans strandus. Apothecia terminalus, frequentia ad triplets, disc usque ad 5 mm diam. Sporis (10-) 12-14(-15) × 3.0-3.5(-4.0) μm. Acidum bourgeanicum, (-)-16α-hydroxykaurane, zeorin, ± salazinicum, usnicum continens.

Thallus saxicolous, clumped and tufted, branching relatively sparse. Branches irregularly compressed sometimes flattened to 6 mm in width, the surface crinkled and irregularly lacunose. Cortex greenish-yellow. Medulla white, without well developed embedded chondroid strands. Apothecia primarily terminal, often in triplets. Disc cupped and pale greenish-white, to ca. 5 mm in diameter. Spores uniseptate, (10-)12-14(-15) × 3.0-3.5(-4.0) μm, straight or slightly curved. Pycnidia black, primarily situated along the ridged areas of the blades. Pycnospores straight, 4-5 × 1.5 μm.

Chemistry: Bourgeanic acid, (-)-16α-hydroxykaurane, zeorin, ± salazinic acid, usnic acid.

Distribution: Ventura County, California south into northwestern Baja California, México.

Habitat: *Niebla polymorpha* is saxicolous, occurring on boulders and cliffs. It is often the most inland and xeric species of this coastally influenced or associated genus group.

Representative specimens examined: U.S.A. California: Los Angeles Co.: Santa Catalina Island, Above Fisherman's Cove, *Marsh 6502* (ASU), Lands End, *Marsh 6606* (ASU). Orange Co.: Aliso Canyon, *Gittins 8366* (Herb. Rundel), Aliso Creek, *Riefner 87-61a* (IRVC). Ventura Co.: Conejo Mtn., *Riefner 92-80.*

Niebla polymorpha most closely resembles a deformed *N. robusta* which has smaller spores of 10-12 μm, inflated, rounded branches, and larger urn-shaped apothecia. *Niebla polymorpha* occupies the more xeric zones inland from the immediate coast and is associated with divaricatic acid and barbatic acid populations of *N. homalea.*

Niebla procera Rundel et Bowler, *sp. nov.* (Figure 4). TYPE: U.S.A. California: San Luis Obispo Co.: Found on rock outcrops in high marsh at Morro Bay State Park, *Riefner 87-100* (ASU).

Thallus saxicolus, fruticosus, subpendulosus. Rami straminei, cylindricalus vel subcylindricalus, 1-2(-4) mm lati, usque ad 8 cm altus. Cortex rigidus, medulla alba. Apothecia terminalus vel subterminalus, disc concavus vel convexus, usque ad 6 mm diam.

Sporis rectis, 11.0-12.5(-13.0) × 3.5(-4.0) μm. Pycnidia negra. Acidum (-)-16α-hydroxykaurane, ± zeorin, ± salazinicum, terpenes, ± usnicum continens.

Thallus saxicolous, fruticose, subpendulous in large plants. Branches cylindrical or sub-cylindrical (slightly angular), 1-2(-4) mm in diameter, to ca. 8 cm in length, sparingly branching, occasionally with short lateral branchlet proliferation, the branchlets from the major branches often perpendicular to the branch axis. Branch apices pointed. Color greenish-yellow, with black spots of necrotic tissue, branches often blackened on one side. Branches solid and stiff, unridged and without the angular plates found in the *Niebla homalea* group. Cortex rigid, friable and smooth, and cracking when bent, similar to *N. robusta*. Apothecia common, terminal or subterminal, either single or clustered. Disc concave to convex and frequently lobed, whitish to tan, up to 6 mm in diameter. Thallus usually blackened around the base. Medulla white, lacking chondroid strands. Spores straight, 11.0-12.5(-13.0) × 3.5(-4.0) μm. Black-chambered pycnidia present, but less numerous than in many other *Niebla* species. White fluffy deposits of (-)-16α-hydroxykaurane are present in most herbarium specimens. Black-chambered pycnidia laminal and subterminal, but not as abundant as in many other Nieblae. Pycnospores straight, 4.0 × 1.5 μm.

Chemistry: (-)-16α-hydroxykaurane, ± zeorin, ± salazinic acid, terpenes, fatty acids, ± usnic acid.

Distribution: Coastal Baja California, Cedros Island, Guadalupe Island, coastal south and central California, and the Channel Islands.

Habitat: Coastal rocks and cliffs along the immediate seashore.

Representative Specimens Examined: MEXICO. Baja California: Guadalupe Island, *Palmer s.n.*, 1889 (US); *Weber & McCoy L-36505* (COLO); Colina del Suroeste at San Quintín Bay, *Bowler s.n.*, 28 March 1971 (Herb. Rundel); San Quintín, *Marsh 6341, 6349, 6348, 6350a, 6307, 6346* (ASU); Cedros Island, north end, *Marsh 7266, 7255* (ASU). Baja California Sur: 3.5 km along road to Punta Abreojos from Hwy 1, hill 60-260 m, *Marsh 6133, 6131, 6140, 6155* (ASU).

U.S.A. California: Los Angeles Co.: San Miguel Point, *Grigarick & Schuster L-53661* (CANL); Santa Catalina Island, Lands End, *Marsh 6624* (ASU). Monterey Co.: *Weber 8245* (COLO), *Weber 8245A* (DUKE); Willow Creek, *Rundel s.n.* (Herb. Rundel); No locality, *Eisen s.n.*, 1874 (US). Santa Barbara Co.: San Miguel Island, *DeSmith 1319* (Herb. Bratt); Santa Rosa Island, lower portion of Cañada Lobos, *Marsh 6880, 6879* (ASU); pass along the main road just SE of Black Mountain, *Marsh 6716* (ASU); South Point, *Marsh 6915* (ASU); Santa Cruz Island, bluff top south of Forney Cove, *Bratt 5291* (Herb. Bratt, IRVC).

Niebla procera resembles the maculate form of *N. ceruchis*, but can be

distinguished by its much larger size, stiffer cylindrical branches, and its occurrence on saxicolous rather than corticolous substrates. It has a combeoid cortex (with *N. combeoides* as a typical member) and lacks thick medullary chondroid strands, as do nearly all of the ceruchoid lineage taxa. This characteristic species appears to be most closely related to *N. robusta*, and inhabits its coastal rocks and cliffs which lie below the *N. homalea* zone and above the splash zone of the supralittoral sensu Ryan (1988). It occurs south along coastal northwestern Baja California to San Quintín, Cedros Island, and Punta Arbeojos in Baja California Sur. This is a saxicolous species usually found near the ocean in exposures experiencing coastal fog.

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