V-B. On siliceous rock.
Thallus effuse, K+ yellow (without pre-treatment in HCl).

1. Thallus dark gray-black to brown-black, verrucose-papillate, thick, limited by black, radiate hypothallus. Apothecia numerous, to 1 mm, immersed then elevated and almost stipitate; disc black, epruinose; thalloid margin exterior olive-brown, interior yellowish, I- or with a thin line I+ blue; hypothecium cloudy; epihymenium olive-brown; hymenium 100 um, I+ bluish green or reddsih brown; paraphyses 1.5 um, not moniliform, but with constrictedly septate cells 4-5 x 2 um.. Spores and pycnospores unknown. Hymenium 125 um. Areolae partly scattered or contiguous, papilliform; cortex of thick-walled paraplectenchyma. Medulla K+ yellow. On siliceous rock. Arctic. .....A. mastoidea

1. Thallus pale, or dark but then brownish, not blackish, not verrucose-papillate. 2

2. Thallus ashy gray (when intact; often appearing very pale or white spotted due to destruction of the cortex), densely rimose-areolate, moderately thick, broadly expanded; areoles angular, subplane to depressed convex, sometimes strongly convex; sterile ones 0.2-0.3(-0.5) mm diam.; fertile ones to 1.4 mm. Hypothallus scarcely developed. Cortex 10-20(-30) um thick, ± transparent, the upper 5-7 um yellowish brown; epinecral layer to 20 um. Algae 7-12 um; algal layer ca. 100 um thick. Apothecia numerous to very numerous, usually dispersed and 1(-2) per areole, rarely subconfluent and then angular; disc 0.5-1(-1.2) mm diam., black, epruinose, concave and crateriform, or becoming subplane; proper margin persistent, rather thick, dark; thalline margin thin, prominent, and dark. Spores poorly developed, broadly ovoid to subglobose or subangular, to (10-)14-20 x (7-)9-12(-14) um. "Hypothecium" 20-30 um. Hymenium (60-)100-110(-125) um. Epihymenium dirty brown to olive brown. Paraphyses strongly coherent, simple, distinctly spetate but scarcely moniliform, ± thickened towards tips when well developed. Pycnidia infrequent; pycnospores 15-20(-23) um long. Medulla K+ yellow, P+ yellow; cortex K-, P-. On siliceous rock. Greenland; Alberta (rare); NW Nevada. [This may be an illegitimate name--the basionym was published as "ad int.", with "Lecanora subdepressa listed as a possible synonym]. .....A. arctica (Lynge) Oxner

2. Thallus brownish gray to yellowish or olive-gray or yellow-ochraceous. Spores 11-22 x 7-12 um, 8 per ascus. Mostly eastern boreal-arctic and north temperate. 3

3. Thallus yellow-ochraceous. Spores (10-)15-17 x 10-12 um. Hymenium 100-115 um. Thallus suborbicular, ca. 3 cm diam., moderately thin, soft, well covering the substrate; areoles separated by deep cracks, subplane to depressed convex, not radiating, toward periphery rather regularly tessellate, towards center coverd by apothecia; surface yellow-ochre; abuptly limited; hypothallus not visible. Apothecia numerous to crowded, often several per areole and becoming confluent, 0.5-1.0 mm diam., round to often angular from mutual pressure, immersed, then ± elevated; disc rather open, black, epruinose, subplane; margin thick, persisent, entire. "Hypothecium" hyaline. Epithecium brown, inpsersed. Paraphyses coherent, the tips scarcely to slightly thickened, distinctly septate (submoniliform in K). Asci saccate to pyriform; spores often not developed, broadly ovoid to subglobose, 15-17 x 10-12 um. Pycnidia unknown.

Medulla K+ yellow. Hymenium I+ blue then sordid red and asci dirty bluish brown. On basalt. Greenland. .....A. narssaquensis

3. Thallus grayish or brownish. 4

4. Spores mostly over 9 um wide. Thallus usually dark. 5

4. Spores under 9 um wide. 6

5. Spores 13-17(-22) x 9-10(-13) um. Thallus thin to very thin (to 0.2-0.3 mm in center, less towards margin), smooth, continuous, becoming slightly rimose-areolate to undulating, usually without discrete areoles. Apothecia with distinct proper margin. Pycnopsores (14-)17-25 x 0.7-1.0 um. Thallus usually dark, brownish gray to gray-yellow brown or dark green-gray, often glossy; prothallus delimiting, blackish or inconspicuous. Cortex 25-30(-35) um. Algae 6-10 um; algal layer 35-60 um, continuous. Apothecia numerous and usually crowded, crater-like to emergent; discs round, 0.3-0.45 mm diam., black, plane to concave; thalline exciple absent; proper margin prominent, very even. Subhymenium 30-40(-65) um. Hymenium (90-)100-110(-125) um. Epithecium ± dark olive or olbive brown. Paraphyses rather indistinct, ± branched towards the tips, submoniliform. Spores 8/ascus, broadly ellipsoid. Medulla P+ orange, K- or K± yellow (stictic and ± norstictic acids, ± unknown terpenoid). On moist siliceous rocks in streams or woodlands, especially in shaded situations. Eastern U.S. and Canada. Frequent, at least in Ontario. Hasse's material from southern California is described as having a K- thallus and spores 24-28 x 16 um; it is probably another species (see Key V-C). .....A. laevata

5. Spores (often poorly developed) to (14-)17-30 x (7-)13-16(-21) um. Thallus somewhat thick (0.4-0.5 mm), cracked to warted-areolate. Apothecia without distinct proper margin. Pycnospores 6-12(-14) x 1 um. Thallus pale bluish, brownish or dark gray (usually ± dark according to Esnault), often rough, matt; to 20 cm diam., generally wide-spreading; areoles continuous, slightly concave to flat or ± convex, occasionally ± subsquamulose in the center of thallus, irregular to rounded, 0.3-1(-2) mm wide, often uneven with distinct edges, prothallus when present gray or black, delimiting. Cortex ca. 10-30 um. Algal layer 30-70 um, regular, continuous. Apothecia variable, very irregular, 1-5 per areole, 0.2-0.8(-1) mm diam., at first crater-like, sometimes becoming emergent; thalline exciple evident from an early stage, thin, entire, but rarely prominent; disc black, epruinose or almost, becoming expanded. Hymenium 120-200 um; subhymenium 30-60 um; hypothecium not visible. Paraphyses branched and anastomosed, moniliform; epihymenium N+ green. Asci (4-)6-8-spored; Spores broadly ellipsoid to ± globose. Cortex and medulla K+ yellow, P+ yellow, with stictic acid. On nutrient-rich siliceous rocks, especially by lakes and seashores and on bird-perching stones, also on walls, etc. ..... A. caesiocinerea v. subdepressa

6. Thallus moderately thick (ca. 0.6-0.7 mm), usually yellowish white or gray to light olive gray or bluish gray, but sometimes deep gray or very dark; areolate to areolate or verrucose with lobed to subsquamulose or ± bullate verrucae in older portions. Apothecia 1-5 per areole, often confluent and irregular, remianing ± immersed, not craterform; discs 0.2-0.6(-1.0) mm diam., sometimes lightly pruinose; thalline margin thin, entire to flexuous, smooth, distinct, persistent, pale, usually little prominent. Thallus smooth to very rough; areoles 0.4-1 mm across. Hymenium ca. 100 um. Epihymenium greenish, N+ green. Paraphyses monilliform. Exciple I+ blue.

Spores ellipsoid, 14-20 x (7.7-)10-12 um, 8 per ascus. Pycnospores 14-17(-22) um long. On siliceous rock. Frequent. Common, northeastern and Great Lakes area. .....A. verrucigera (typical, stictic acid strain)

6. Thallus thin (0.2-0.3 mm), dark brown-gray, rimose-areolate to somewhat verrucose; effuse, broadly expanded, at least 2-4 cm across; areoles contiguous; marginal areoles plane to slightly concave, generally with a punctiform apothecial primordium; central areoles 0.3-0.5(-0.8) mm diam., irregularly convex, irregular in shape with distinct or indistinct crackes; surface matt, often concealed by aptoehcia; hypothallus dark or indistinct. Cortex ca. 25 um thick, the upper 7-9 um dark olive; cells 4-5(-6) um. Algae 8-17 um; algal layer 40-50 um thick. Apothecia frequent, immersed then prominent, solitary or occasionally two united, soon filling up the areoles which then become thicker, ca. 0.3 mm; disc 0.3-0.5 mm diam., orbicular, black, plane, smooth; thalline margin thin, persistent, concolorous with thallus. Paraphyses firmly coherent, 1.5 um thick, with (2-)3-4 subglobular cells towards the tips. Excipulum I+ dark blue. Hymenium 80-85 um. Epithecium dark brownish or dark olive to brown. Spores rarely developed, 15-17 x 7-8.5 um. On gneiss. Resembles A. verrucigera but thallus is thinner, darker and less verrucose, and spores slightly smaller. On gneiss. Maine. .....A. tristiuscula