

Notes on the Lichens and Allied Fungi of British Columbia. II

TREVOR GOWARD

Herbarium, Department of Botany, University of British Columbia, Vancouver, British Columbia V6T 2B1, Canada¹

PAUL DIEDERICH

Musée National d'Histoire Naturelle, Marché-aux-Poissons, L-2345 Luxembourg, Luxembourg

ROGER ROSENRETER

Bureau of Land Management, 3380 Americana Terrace, Boise, ID 83706

Abstract. Based on field studies and herbarium research, 46 species of lichens and lichenicolous fungi are reported new to British Columbia. The following 15 species are documented for Canada for the first time: *Agonimia tristicula*, *Catapyrenium daedaleum*, *Cladonia luteoalba*, *Collema auriforme*, *Dactylospora lobariella*, *Fulgensia desertorum*, *Massalongia microphylliza*, *Pannaria ahlneri*, *Peltula euploca*, *Physcia callosa*, *Psora montana*, *Sticta wrightii*, *Usnea wirthii*, *Vestergrenopsis clacina*, and *Xanthoparmelia planilobata*. An additional nine species are new to North America north of Mexico: *Acrosyphus sphaerophoroides*, *Biatoropsis usnearum*, *Hawksworthiana peltigericola*, *Leptogium brebissonii*, *L. schraderi*, *Lichenochora thallina*, *Scutula miliaris*, *Sphaerellothecium araneosum*, and *Trapelia corticola*.

Recent herbarium studies and field work in British Columbia have brought to light several lichen species that are new to the province, including a number of species also new to Canada or North America. The following list supplements the checklist of Noble et al. (1987), and continues the series initiated by Goward and Thor (1992).

In the following list lichenicolous fungi are denoted by an asterisk (*).

ACROSYPHUS SPHAEROPHOROIDES Lévillé—The ecology of this widespread, but apparently rare, lichen was recently summarized by Tibell (1984), who characterized it as occurring over rock in alpine habitats. Though the ecology of one of the two British Columbia specimens conforms with this description, the other, cited below, occurred "on top of and more or less encrusting the dead leader of a stunted Sitka Spruce, alone in a fen bordering a lake" (Jim Pojar, in litt.). The present report extends the known range of *A. sphaerophoroides* in the northern hemisphere from 43°N (Hokkaido) to 54°N; in North America it was previously known only from Mexico (Tibell 1984). New to North America, north of Mexico: Iskheenickh River Basin, Amoth Lake, 70 km NE Prince Rupert, 420 m, 54°47'N, 129°36'W, Pojar s.n. (H, UBC, UPS).

AGONIMIA TRISTICULA (Nyl.) Zahlbr.—This lichen appears to be rather common as an epiphyte of moss over calcareous outcrops in drier portions of the southern interior of British Columbia. In western North America it was previously reported only from Colorado (Anderson 1962), though an additional specimen was seen by us from Oregon (Goward 90-144). New to Canada: Okanagan River Basin, 1 km W Osoyoos, 500 m, 49°02'N, 119°27'W, Goward 91-402 (UBC).

ANAPTYCHIA SETIFERA Räsänen—Though presently known from only two localities in British Columbia, *A. setifera* is nevertheless a dominant epiphyte of *Picea* in the lower valley of the Tatshenshini River, where it is apparently favored by wind-blown lime dust originating from the adjacent floodplain. In western North America this species was previously reported (as *A. kaspica* Gyelnik) only from Alaska (Krog 1968). No lichen substances were detected by TLC. New to British Columbia: Tatshenshini River Basin, near confluence with Basement Creek, 200 m, 59°27'N, 137°27'W, Goward 92-531 (CANL, UBC).

ASPICILIA REPTANS (Looman) Wetm.—This is a rather common species of treeless windswept ridges at lower elevations in the semiarid interior of British Columbia. The local material conforms well with the type specimen in wis (McCune, pers. comm.). Previous reports in western North America are from Idaho (McCune, unpubl.), North Dakota (Wetmore

¹ Present address: Edgewood Blue, Box 131, Clearwater, British Columbia V0E 1N0, Canada.

1985), Oregon (Christy, unpubl.), Saskatchewan (Looman 1962), and Utah and Wyoming (St. Clair et al. 1993). New to British Columbia: Okanagan River Basin, Okanagan Mountain Provincial Park, Commando Bay, 350 m, terricolous over exposed silt terrace, 49°42'N, 119°42'W, *Goward 92-222* (UBC).

**BIATOROPSIS USNEARUM* Räsänen—This cosmopolitan lichenicolous heterobasidiomycete is common over much of its range (Diederich & Christiansen 1993). It forms pale pinkish to dark brown convex gall-like basidiomata on the thallus of various *Usnea* species. New to North America: Thompson River Basin, 0.5 km S Philip Creek, 650 m, parasitic on *Usnea lapponica* s.l., 51°52'N, 120°01'W, *Goward 91-13* (UBC).

CATAPYRENIUM CINEREUM (Pers.) Körber—See the discussion under *C. daedaleum*. The specimen reported here was terricolous over an alpine limestone outcrop. New to British Columbia: Alsek River Basin, 18 km N confluence with Tatshenshini River, 1,100 m, 59°44'N, 137°45'W, *Goward 92-476* (UBC).

CATAPYRENIUM DAEDALEUM (Krempelh.) B. Stein—The specimen upon which the present record is based was previously reported (Goward & Thor 1992) as *C. cinereum*; the determination was revised by O. Breuss. Thomson (1989) comments on the morphological resemblance of these two species. Previous records of *C. daedaleum* from western North America are from Colorado and Wyoming (Thomson 1989), as well as from Utah (St. Clair et al. 1993). New to Canada: Thompson River Basin, Cook Creek, mossy south-facing slope above Surprise Lake, 1,700 m, 52°10'N, 119°20'W, *Goward 79-1427* (GOWARD).

CATAPYRENIUM SQUAMULOSUM (Ach.) O. Breuss—This species was recently reported as new to British Columbia on a specimen from Wells Gray Provincial Park (Goward & Ahti 1992). Dr. O. Breuss subsequently examined the material and referred it to "*Psora* s.lat." The following specimen was, however, assigned by Dr. Breuss to *C. squamulosum*. New to British Columbia: Fraser River Basin, 25 km SW Williams Lake, terricolous over limestone summit of Doc English Bluffs, 700 m, 51°55'N, 122°07'W, *Goward 81-2163* (UBC).

CHAENOITHECA CINEREA (Pers.) Tibell—Though previously reported for North America from Ontario and Michigan (Tibell 1980), *C. cinerea* was overlooked by Egan (1987) in his checklist of North American lichens. The British Columbia material is corticolous over *Populus trichocarpa* in a humid, old-growth conifer forest in the Interior Cedar-Hemlock Zone. New to British Columbia: Thompson River Basin, S end of Clearwater Lake, near boat launch, 650 m, 52°08'N, 120°12'W, *Goward 79-1395* (GOWARD).

CLADONIA LUTEALBA Wheldon & A. Wilson—Based on Wilson and Wheldon (1909), the author citation is usually given as "*C. lutealba* A. Wilson & Wheldon," though actually the first valid description appeared two years earlier in Wheldon and Wilson (1907). This is a primarily sterile, nonpodetate species, easily recognized by its large revolute squamules and fine, pale lemon-yellow spongy tissue (Stenroos 1990). The local material contained usnic, barbatic, and 4-*O*-demethylbarbatic acids (TLC). In North America *C. lutealba* has previously been reported from Alaska (Dahl & Krog 1970), Idaho (Stenroos 1990), and Montana (DeBolt & McCune 1993). The material cited below is representative of two localities in the south-central interior of British Columbia. Both specimens were collected from mossy rock crevices. New to Canada: Columbia River Basin, Kokanee Glacier Provincial Park, Joker Creek, 1,500 m, ca. 49°50'N, 117°10'W, *M. Bell & J. Davison s.n.*, 1957 (UBC).

COLLEMA AURIFORME (With.) Coppins & Laundon—The present material conforms well with authentic European specimens but the record is nevertheless suspect owing to a possible error in labeling; Macoun's collections are notorious in this regard (Godfrey 1977). In North America, *C. auriforme* was previously reported only from Alaska (Degelius 1974). New to Canada: Vancouver Island, Victoria (Burnside Road), *J. Macoun s.n.*, 1893 (CANL).

**DACTYLOSPORA LOBARIELLA* (Nyl.) Hafellner—This lichenicolous ascomycete is known from several different species of *Lobaria*. The present material occurred on *L. pulmonaria*. In North America *D. lobariella* has previously been reported only from the state of Virginia (Hafellner 1979). New to Canada: Skeena River Basin, 16 km NE Terrace, Cleanza Creek Provincial Park, humid coniferous forest, 50 m, 54°35'N, 128°23'W, *Goward 91-1049* (UBC).

ENDOCARPON PALLIDUM Ach.—This species was reported from British Columbia by Henssen 1963b but inadvertently omitted from both the British Columbia and North American checklists.

FULGENSIA DESERTORUM (Tomin) Poelt—This is a calciphilous terricole hitherto recorded in North America from Colorado (Poelt 1971), Idaho (McCune, unpubl.), and Arizona and Utah (St. Clair et al. 1993). The British Columbia material is fertile and contains two-celled spores. New to Canada: Okanagan River Basin, Okanagan Mountain Provincial Park, Commando Bay, 350 m, terricolous over exposed silt terrace, 49°42'N, 119°42'W, *Goward 92-216* (UBC).

**HAWKSWORTHIANA PELTIGERICOLA* (D. Hawksw.) U. Braun (Syn.: *Ramularia peltigericola* D. Hawksw.)—This rare hyphomycete occurs on various *Peltigera* species. It was previously reported only from the British Isles and Luxembourg (Diede-

rich et al. 1988). New to North America: Thompson River Basin, S end Clearwater Lake, 700 m, over *P. praetextata* in open, mixed forest, 52°16'N, 120°14'W, Goward 79-1383 (UBC).

HEPPIA LUTOSA (Ach.) Nyl.—This lichen is widely distributed in temperate North America. Wetmore (1971) reported it from all western states except Idaho, Oregon, and Washington, but including Alaska, where it is known from a single locality. In Canada it was previously reported only from Saskatchewan (Looman 1962). The specimen cited below is representative of two localities in the semiarid southern interior of British Columbia. New to British Columbia: Thompson River Basin, 5 km E Kamloops city center, 450 m, 50°40'N, 120°11'W, *Rosentreter* 6349 (SRP, UBC).

HYPOCENOMYCE CASTANEOCINEREA (Räsänen) Timdal—Though previously reported in North America only from Arizona and Washington (Timdal 1984), *H. castaneocinerea* is common in humid portions of British Columbia, where it colonizes charred wood. New to British Columbia: Vancouver Island, Stamp River Falls, 200 m, 49°20'N, 125°55'W, Goward 91-628 (UBC).

***ILLOSPORIUM CARNEUM** Fr.—This common and widespread hypohymenete occurs on various *Peltigera* species. The following record, on *P. didactyla*, is representative of several collections from southern British Columbia. In Canada *I. carneum* has previously been reported from Ontario (Hawksworth 1979). New to British Columbia: Squamish River Basin, Whistler, 700 m, 50°08'N, 123°00'W, Goward 90-1271b (GOWARD).

LECANORA MUGHICOLA Nyl.—This lichen was reported for British Columbia by Brodo et al. (1987) but did not appear in the British Columbia checklist of Noble et al. (1987).

LECANORA PERSIMILIS (Th. Fr.) Nyl.—This lichen was previously reported for British Columbia by Brodo et al. (1987) but did not appear in the British Columbia checklist of Noble et al. (1987).

LECIOPHYSA FINMARKICUM Th. Fr.—This is primarily an arctic species (Thomson 1984), notwithstanding that Ryan (1985) recently reported it from northern Washington. The British Columbia material derives entirely from the northwestern portion of the province, where this species is apparently rather common over moist limy soils at subalpine elevations. New to British Columbia: Tatshenshini River Basin, over exposed heath, opposite confluence with Basement Creek, 900 m, 59°28'N, 137°30'W, Goward 92-553 (UBC).

LEPTOGIUM BREBISSENI Mont.—This species is anomalous among the local *Leptogium* in possessing a very thick, gelatinous thallus more reminiscent of *Collema* than of *Leptogium*. The material cited below, from *Rhamnus purshiana*, is representative of

two collections from the very humid outer coast of British Columbia. New to North America: Vancouver Island, Ucluelet, 5 m, 48°55'N, 125°35'W, Goward 83-230 (UBC).

LEPTOGIUM SCHRADERI (Ach.) Nyl.—This tiny, heavily wrinkled, essentially fruticose species appears to be a rare lichen of mossy soil in the semiarid southern interior of British Columbia. Though Egan (1987) considers previous reports of *L. schraderi* for North America to be erroneous, P. M. Jørgensen (in litt.) assures that the present record is correct. New to North America: Okanagan River Basin, slope above Waterdog Lake, E Osoyoos Lake, 350 m, 49°04'N, 119°26'W, Goward 91-214 (UBC). An additional specimen has been seen by us from Utah (*Rosentreter* 6505, UBC).

***LICHENOCHORA THALLINA** (Cooke) Hafellner—This ascomycete is very common in Europe on *Phaeophyscia orbicularis*, but has also been collected on *Physcia* as well as on other species of *Phaeophyscia*. The present record, from *Phaeophyscia sciastra*, represents a new host for this species. New to North America: Thompson River Basin, N shore of Murtle Lake, 1,000 m, 52°06'N, 119°40'W, Goward 78-704a (UBC).

***LICHENOSTICTA ALCICORNARIA** (Lindsay) D. Hawksw.—This common coelomycete occurs on *Cladonia*, and was previously reported for North America (Newfoundland) by Keissler (1910). The present record is from *C. bacillaris* Nyl. New to British Columbia: Fraser River Basin, Richmond (Burns Bog), ca. 30 m, 49°10'N, 123°20'W, Goward 82-238 (UBC).

MASSALONGIA MICROPHYLLIZA (Nyl. ex Hasse) Henssen—Originally described from California (Hasse 1913), *M. microphylliza* has not hitherto been reported outside that state (Henssen 1963a). Its occurrence in the semiarid southern Okanagan Valley of British Columbia suggests that it may be more widespread than previously thought. Whereas previous material was collected over soft sandstone (Henssen 1963a), the two collections from British Columbia occurred on thin soil over rock. New to Canada: Okanagan River Basin, near Wolfcub Creek, 400 m, 49°11'N, 119°28'W, Goward 91-210a (UBC).

PANNARIA AHLNERI P. M. Jørg.—Though rather common over conifer twigs along the humid inner north coast of British Columbia, *P. ahlneri* has hitherto been reported for North America only in the east (Jørgensen 1978). New to Canada: Skeena River Basin, 7 km NW of Kispiox, near Date Creek, 450 m, 55°19'N, 127°47'W, Goward 91-936 (UBC).

PELTULA EUPLOCA (Ach.) Ozenda & Clauz.—According to Wetmore (1971), *P. euploca* has a primarily "arid southwestern distribution in North America"; it is also known, however, from southwestern Idaho (McCune, unpubl.), eastern Wash-

ington (Rosentreter, unpubl.), and central Washington (Wetmore 1971). In British Columbia it appears to be restricted to the southern portions of the semiarid Okanagan Valley, where it is rather rare over south-facing vertical granitic outcrops. New to Canada: Okanagan River Basin, Mud Lake, S Vaseux Lake, 340 m, 49°14'N, 119°32'W, *Goward 91-367* (UBC).

PHAEOPHYSCIA HISPIDULA (Ach.) Essl.—The present material consists of two specimens, one from mossy soil over a cliff face, and the other from *Salix*. These appear to represent different subspecies, i.e., subsp. *hispidula* and subsp. *limbata* Poelt respectively. In western North America *P. hispidula* was previously reported from Arizona, Colorado, New Mexico, and South Dakota (Esslinger 1978), as well as from Utah (Nash & Sigal 1981). New to British Columbia: subsp. *hispidula*: Fraser River Basin, 30 km W Quesnel, 340 m, 52°58'N, 122°47'W, *Goward 81-1537* (UBC); subsp. *limbata*: Liard River Basin, Toad River, 700 m, 58°51'N, 125°15'W, *Goward 82-1390c* (UBC).

PHYSICIA CALLOSA Nyl.—Thomson (1963) characterized *P. callosa* as a "distinctly western species, ranging from Colorado south to Texas and west to California and Oregon." The present record, based on two specimens, extends that range north into the semiarid southern Okanagan valley of British Columbia, where it is rare over sheltered granitic outcrops. New to Canada: Okanagan River Basin, Mud Lake, S Vaseux Lake, 340 m, 49°14'N, 119°32'W, *Goward 91-365* (UBC).

POELTINULA CEREBRINA (DC.) Hafellner—This lichen was tentatively reported from British Columbia by Brodo et al. (1987) but did not appear in the ensuing British Columbia checklist (Noble et al. 1987).

PSORA MONTANA Timdal—This western North American endemic was previously reported from Colorado, Montana, Oregon, Utah, Washington, and Wyoming (Timdal 1986). The specimen cited below is representative of several collections from the semiarid interior of British Columbia, north to 52°N. Though chemically consistent with *P. montana*, much of this material is morphologically very close to *P. pacifica* Timdal (Timdal, in litt.). New to Canada: Okanagan River Basin, SE of Osoyoos on S slopes of Anarchist Mountain, ca. 800 m, 49°02'N, 119°23'W, *Goward 90-522* (UBC).

PSORA RUBIFORMIS (Ach.) Hook.—Notwithstanding that earlier reports of this species in British Columbia appear to have been based on misidentified specimens of *P. nipponica* (Zahlbr.) G. Schneider, recent collections from the northwestern corner of the province clearly belong to *P. rubiformis*. In western North America *P. rubiformis* was previously reported from Alaska, Colorado, and the Yukon

(Timdal 1986). New to British Columbia: Tatshenshini River Basin, unnamed mountain N of Sediments Creek, ca. 1,600 m, 59°43'N, 137°19'W, *Goward 92-965* (UBC).

***SCUTULA MILIARIS** (Wallr.) Trevisan—This ascomycete is common in Europe on various *Peltigera* species. In British Columbia it has been collected on *P. canina* (present record) and *P. lepidophora*. New to North America: Thompson River Basin, near Helmcken Falls (Murtle River), 700 m, 51°57'N, 120°11'W, *Goward 80-598* (UBC).

SOLORINELLA ASTERISCUS Anzi—Though widespread in Europe (Ahlner 1949), *S. asteriscus* was hitherto reported in North America only from southwestern Alberta (Bird 1973). The specimen cited below is representative of two collections from the semiarid southern interior of British Columbia. Both occurred over silt in undisturbed grassland communities. New to British Columbia: Thompson River Basin, 5 km E Kamloops, Valleyview, 450 m, 50°40'N, 120°11'W, *Rosentreter 6354* (SRP, UBC).

***SPHAERELLOTHECIUM ARANEOSUM** (Rehm ex Arnold) Zopf—This ascomycete forms a superficial dark brown mycelium on the thalli of several unrelated groups of lichens, including, for example, *Ochrolechia* and *Parmelia* s.l. The perithecia measure only about 50 µm in diameter, and may therefore be difficult to observe. In British Columbia *S. araneosum* has been observed on *Xanthoparmelia coloradoensis* (present record), *X. cumberlandia*, and *X. wyomingica*: all of these represent new hosts for this species. New to North America: Thompson River Basin, 15 km WNW Kamloops city center, Dewdrop Range, 1,000 m, 50°47'N, 120°34'W, *Goward 88-120* (UBC).

STICTA WRIGHTII Tuck.—This is primarily an Asian species (see Wei 1992), previously reported in North America only from coastal Alaska (Krog 1968). It may be characterized as an ascending, non-sorediate, nonisidiate species, with a green photobiont, a K- upper cortex, and somewhat lobulate lobe margins. According to Yoshimura (1974), the Japanese material also gives a K+ medullary reaction, though in the local material the medulla is clearly K-. On the other hand, Gyelnik (1931) reports that the upper cortex in this species is K+ yellow! The single British Columbia specimen comes from the east-central interior, where it occurred over *Tsuga heterophylla* in an open old-growth forest. New to Canada: Fraser River Basin, 80 km NW McBride, Slim Creek, ca. 800 m, 53°39'N, 121°12'W, *Goward 92-1214* (UBC).

TONINIA CANDIDA (Weber) Th. Fr.—In North America *T. candida* is restricted to the western states and provinces, having been reported by Timdal (1991) from Alberta, Arizona, Colorado, Montana, Nevada, New Mexico, South Dakota, Utah, and

Wyoming. Though previous reports for British Columbia were considered unreliable by Noble et al. (1987), *T. candida* does in fact occur here over limestone outcrops in semiarid regions. New to British Columbia: Chilcotin River Basin, 25 km SW of Williams Lake on Doc English Bluff, ca. 675 m, 51°55'N, 122°07'W, *Goward 81-2150* (UBC).

TONINIA TRISTIS (Th. Fr.) Th. Fr.—The local material represents subsp. *asiae-centralis* (Magnusson) Timdal, which was recently reported to be widespread in western North America, from Alaska and the Northwest Territories to New Mexico and Arizona (Timdal 1991). The two British Columbia specimens were collected from limestone outcrops in the semiarid southern interior. New to British Columbia: Chilcotin River Basin, 25 km SW of Williams Lake on Doc English Bluff, ca. 675 m, 51°55'N, 122°07'W, *Goward 81-2157b* (UBC).

TRAPELIA CORTICOLA Coppins & P. James—This lichen, the only corticolous member of its genus, was previously reported from western Europe (Coppins & James 1984; Tønsberg 1992), Macaronesia, and Chile (Purvis et al. 1992). The single British Columbia specimen was corticolous over *Picea sitchensis* in an open, forested, seaside meadow. New to North America: Vancouver Island, Brooks Peninsula, outlet of Naspardi Creek, 0–10 m, 50°07'N, 127°37'W, on *Picea sitchensis*, *Thor 9937* (s).

TRAPELOPSIS VIRIDESCENS (Schrader) Coppins & P. James—This is a colonizer of decaying wood. In western North America it was previously reported from Alaska and Arizona (Brodo 1968), as well as California (Tucker & Jordan 1978). New to British Columbia: Clearwater River Basin, southern Wells Gray Provincial Park, Placid Lake trail, 700 m, 51°56'N, 120°06'W, *Rosentreter 6320* (SRP).

UMBILICARIA APRINA Nyl.—Though apparently rare throughout its range, *U. aprina* has been reported from every continent except Australia (Elvebakk & Tønsberg 1992). In North America it was previously reported from Baffin Island in the Northwest Territories (Hale 1954). The single British Columbia specimen, from a somewhat sheltered siliceous boulder bed above treeline, conforms well with the Baffin Island material, which was later described by Llano (1956) as var. *halei* Llano. Subsequent authors, however, have stressed the morphological heterogeneity of *U. aprina* (e.g., Hestmark 1990). New to British Columbia: Liard River Basin, 3 km E of Summit Lake, ca. 1,850 m, 58°37'N, 124°50'W, *Goward 82-1287* (UBC).

UMBILICARIA CINEREORUFESCENS (Schaerer) Frey—This is a taxonomically somewhat problematic lichen (Llano 1950): several British Columbia specimens were seen which might be interpreted as transitional between *U. cinereorufescens* (pruina sparse) and *U. vellea* (L.) Ach. (pruina dense). The specimen

cited below, from a rock outcrop in the alpine zone, is perhaps the most convincing local record. *Umbilicaria cinereorufescens* was previously reported in North America from Alaska, Arizona, and the Yukon (Thomson 1984). New to British Columbia: Liard River Basin, near Kutcho Creek, 1,600 m, 58°15'N, 128°38'W, *Rosie 543* (CANL).

USNEA WIRTHII Clerc—This lichen was recently reported from western North America by Clerc and Diederich (1991), who characterized it as occurring along the Pacific coast "from southern California to Washington State." The specimen cited below is representative of about a dozen British Columbia collections, north at least to the Queen Charlotte Islands (Brodo, pers. comm.). New to Canada: Vancouver Island, Ucluelet, sheltered bay, ca. 5 m, 48°55'N, 125°32'W, *Goward 82-1800* (UBC).

VESTERGRENOPSIS ELAEINA (Wahlenb. in Ach.) Gyelnik—This lichen was previously reported from North America on the basis of a single specimen from Alaska (Thomson 1984). However, it appears to be rather common over intermittently wetted siliceous and calcareous rock at alpine and subalpine elevations in extreme northwestern British Columbia. New to Canada: Tatschenshini River Basin, Range Lake, 1,100 m, 59°52'N, 137°50'W, *Goward 92-871* (UBC).

XANTHOPARMELIA PLANILOBATA (Gyelnik) Hale—The British Columbia specimens conform chemically and morphologically with *X. planilobata*, differing only in having slightly broader lobes and a more densely rhizinate lower surface than was described for that species by Hale (1990). The specimen cited below is representative of two collections from the semiarid interior of the province. New to Canada: Okanagan River Basin, S slope of Anarchist Mountain, ca. 500 m, 49°01'N, 119°24'W, *Goward 90-942* (UBC).

ACKNOWLEDGMENTS

We are grateful to the following people for identifying or verifying part of the material reported in this paper: Teuvo Ahti (*Cladonia*), Othmar Breuss (*Catapyrenium*), Brian Coppins (*Agonimia*, *Trapelia*), Per Magnus Jørgensen (*Leptogium*, *Pannaria*), Bruce McCune (*Aspicilia*, *Fulgensia*), Thomas Nash (*Xanthoparmelia*), Leif Tibell (*Acrosocyphus*, *Chaenotheca*), Einar Timdal (*Hypocenomyce*, *Psora*, *Toninia*), and Cliff Wetmore (*Heppia*, *Trapeliopsis*). Further thanks are due to: Teuvo Ahti and Bernard Goffinet (for performing TLC on a number of specimens); Marianne Baatz, Jim Pojar, Göran Thor, and Katharina Wulff (for placing specimens at our disposal); Pak Yau Wong (for translation); and Teuvo Ahti, Ernie Brodo, Bruce McCune, and two anonymous reviewers (for commenting on the manuscript).

LITERATURE CITED

- AHLNER, S. 1949. Contributions to the lichen flora of Norway. I. *Solorinella asteriscus* Anzi new to Scandinavia. Svensk Botanisk Tidskrift 43: 157–162.

- ANDERSON, R. A. 1962. The lichen flora of the Dakota sandstone in north-central Colorado. *THE BRYOLOGIST* 65: 242-261.
- BIRD, C. D. 1973. Species collected in Alberta on the first 1971 foray of the American Bryological and Lichenological Society. Part I. Introduction and lichens. *THE BRYOLOGIST* 76: 388-402.
- BRODO, I. M. 1968. The lichens of Long Island, New York: a vegetational and floristic analysis. *New York State Museum and Science Service Bulletin* 410: 1-330.
- , W. J. NOBLE, T. AHTI & S. CLAYDEN. 1987. Lichens new to North America from the flora of British Columbia, Canada. *Mycotaxon* 28: 99-110.
- CLERC, P. & P. DIEDERICH. 1991. *Usnea virithii* Clerc new to North America and the British Isles. *Lichenologist* 23: 405-407.
- COPPINS, B. & P. W. JAMES. 1984. New or interesting British lichens V. *Lichenologist* 16: 241-264.
- DAHL, E. & H. KROG. 1970. On the distribution of *Cladonia luteoalba*. *Nytt Magazin for Botanikk* 17: 143-144.
- DEBOLT, A. & B. McCUNE. 1993. Lichens of Glacier National Park, Montana. *THE BRYOLOGIST* 96: 192-204.
- DEGELIUS, G. 1974. The lichen genus *Collema* with special reference to the extra-European species. *Symbolae Botanicae Upsaliensis* 20: 1-215.
- DIEDERICH, P. & M. S. CHRISTIANSEN. 1993. *Biatoropsis usnearum* Räsänen, and other heterobasidiomycetes on *Usnea*. *Lichenologist* (in press).
- , E. SERUSIAUX, A. APTROOT & F. ROSE. 1988. Lichens et champignons lichénicoles nouveaux ou intéressants pour la flore de la Belgique et des régions voisines. IV. *Dumortiera* 42: 17-35.
- EGAN, R. S. 1987. A fifth checklist of the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. *THE BRYOLOGIST* 90: 77-173.
- ELVEBAKK, A. & T. TØNSBERG. 1992. Additions to the lichen flora of Svalbard. *Graphis Scripta* 3: 140-147.
- ESSLINGER, T. L. 1978. Studies in the lichen family Physciaceae. II. The genus *Phaeophyscia* in North America. *Mycotaxon* 7: 283-320.
- GODFREY, J. D. 1977. Notes on Hepaticae collected by John Macoun in southwestern British Columbia. *Canadian Journal of Botany* 10: 2600-2604.
- GOWARD, T. & T. AHTI. 1992. Macrolichens and their zonal distribution in Wells Gray Provincial Park and its vicinity, British Columbia, Canada. *Acta Botanica Fennica* 147: 1-60.
- & G. THOR. 1992. Notes on the lichens and allied fungi of British Columbia. I. *THE BRYOLOGIST* 95: 33-37.
- GYELNIK, V. 1931. De Stictaceis nonnullis. *Feddes Reportorium* 29: 420-428.
- HAFELLNER, J. 1979. *Karschia*. Revision einer Sammelgattung an der Grenze von lichenisierten und nichtlichenisierten Ascomyceten. *Nova Hedwigia* 62: 1-248.
- HALE, M. E. 1954. Lichens from Baffin Island. *American Midland Naturalist* 51: 233-264.
- . 1990. A synopsis of the lichen genus *Xanthoparmelia* (Vainio) Hale (Ascomycotina, Parmeliaceae). *Smithsonian Contributions to Botany* 74: 1-250.
- HASSE, H. E. 1913. Lichens of Southern California. Contributions to the U.S. National Herbarium 17: 1-132.
- HAWKSWORTH, D. L. 1979. The lichenicolous Hypohymycetes. *Bulletin of the British Museum of Natural History (Botany)* 6: 183-300.
- HENSSEN, A. 1963a. The North American species of *Massalonia* and generic relationships. *Canadian Journal of Botany* 41: 1331-1346.
- . 1963b. The North American species of *Placynthium*. *Canadian Journal of Botany* 41: 1687-1724.
- HESTMARK, G. 1990. Thalloconidia in the genus *Umbilicaria*. *Nordic Journal of Botany* 9: 547-574.
- JØRGENSEN, P. M. 1978. The lichen family Pannariaceae in Europe. *Opera Botanica* 45: 1-123.
- KESSLER, K. VON. 1910. Einige bemerkenswerte Flechtenparasiten aus dem Pinzgau in Salzburg. *Österreichische botanische Zeitschrift* 60: 55-61.
- KROG, H. 1968. The macrolichens of Alaska. *Norsk Polarinstitut Skrifte* 144: 1-180.
- LLANO, G. A. 1950. A monograph of the lichen family Umbilicariaceae in the western hemisphere. *Navexos P-831*. Office of Naval Research, Washington, D.C.
- . 1956. New Umbilicariaceae from the western hemisphere, with a key to genera. *Journal of the Washington Academy of Sciences* 46: 183-185.
- LOOMAN, J. 1962. Some lichens of Saskatchewan. *THE BRYOLOGIST* 65: 294-304.
- NASH, T. H. & L. L. SIGAL. 1981. Preliminary study on the lichens of Zion National Park, Utah. *Journal of the Arizona-Nevada Academy of Science* 16: 46-50.
- NOBLE, W. J., T. AHTI, G. F. OTTO & I. M. BRODO. 1987. A second checklist of the lichens and allied fungi of British Columbia. *Syllogus* 61: 1-95.
- POELT, J. 1971. Über einige für Nordamerika neue Flechten. *THE BRYOLOGIST* 74: 154-158.
- PURVIS, W., B. J. COPPINS, D. L. HAWKSWORTH, P. W. JAMES & D. M. MOORE. 1992. *The Lichen Flora of Great Britain and Ireland*. London.
- RYAN, B. D. 1985. Lichens of Chowder Ridge, Mt. Baker, Washington. *Northwest Science* 59: 279-293.
- ST. CLAIR, L. L., J. R. JOHANSEN & S. R. RUSHFORTH. 1993. Lichens of soil crust communities in the intermountain area of the western United States. *Great Basin Naturalist* 53: 5-12.
- STENROOS, S. 1990. *Cladonia luteoalba*—an enigmatic *Cladonia*. *Karstenia* 30: 27-32.
- THOMSON, J. W. 1963. The lichen genus *Physcia* in North America. *Nova Hedwigia* 7: 1-172.
- . 1984. *American Arctic Lichens. 1. The Macrolichens*. New York.
- . 1989. Additions and a revised key to *Catapyrenium* in North America. *THE BRYOLOGIST* 92: 190-193.
- TIBELL, L. 1980. The lichen genus *Chaenotheca* in the Northern Hemisphere. *Symbolae Botanicae Upsaliensis* 23(1): 1-65.
- . 1984. A reappraisal of the taxonomy of Caliciales. *Nova Hedwigia* 79: 597-713.
- TIMDAL, E. 1984. The genus *Hypocenomyce* (Lecanorales, Lecideaceae), with special emphasis on the Norwegian and Swedish species. *Nordic Journal of Botany* 4: 83-108.
- . 1986. A revision of *Psora* (Lecideaceae) in North America. *THE BRYOLOGIST* 89: 253-275.
- . 1991. A monograph of the genus *Tonia* (Lecideaceae, Ascomycetes). *Opera Botanica* 110: 1-137.
- TØNSBERG, T. 1992. The sorediate and isidiate, corticolous crustose lichens in Norway. *Sommerfeltia* 14: 1-331.
- TUCKER, S. C. & W. P. JORDAN. 1978. A catalog of California lichens. *Wasmann Journal of Biology* 36: 1-105.
- WEI, J.-C. 1992. An enumeration of lichens in China. Beijing.
- WETMORE, C. M. 1970[1971]. The lichen family Hep-

- piaceae in North America. *Annals of the Missouri Botanical Garden* 57: 158-209.
- . 1985. Lichens of Theodore Roosevelt National Park. *Mycotaxon* 32: 241-249.
- WHELDON, J. A. & A. WILSON. 1907. *The Flora of Lancashire*. Eastbourne.
- WILSON, A. & J. A. WHELDON. 1909. A new lichen, *Cladonia luteoalba*, from Lancashire. *Transactions of the Liverpool Botanical Society* 1: 6-7.
- YOSHIMURA, I. 1974. *Lichen flora of Japan in colour*. Osaka.