Notes on the lichens of Newfoundland. 4. Alectoria

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Sixteen species of Alectoria are reported with certainty from the island of Newfoundland. A. canadensis Mot. (nom. inval.), A. fuscescens Geyn. var. fuscescens, A. glabra Mot., A. minuscula (Nyl. ex Arnold) Degel. and A. tenuis Dahl are reported from the island for the first time. A. americana Mot. and A. sarmantosa (Ach.) Ach. subsp. sarmantosa are by far commonest taxa. Special features for Newfoundland are that the normally arboreal A. americana and A. nidulifera Norrl. are relatively common as terricolous species in coastal heaths, and that the normally terricolous A. nigricans (Ach.) Nyl. is not uncommon as an epiphyte of conifers.

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The present account¹ is primarily based on the lichen collections made on the island of Newfoundland in 1956 by the senior author (see Ahti 1974). His main task during the excursion was to make a preliminary survey of the lichen resources of Newfoundland with special reference to their importance as food for caribou (Rangifer tarandus caribou). The species of the genus Alectoria are known to serve as significant food items for the Newfoundland caribou in wintertime (Ahti 1957, 1959, Bergerud & Nolan 1970, Bergerud 1972), and therefore this genus was collected more frequently than many other genera, particularly because it appeared from field observations that their taxonomic treatment would be difficult.

A small number of the specimens were identified in 1962 by the Polish specialist of the genus Prof. Józef Motyka, Lublin, who cited some of them in his synopsis of the genus Alectoria in North America (Motyka 1964). One new species, A. ambigua Mot., was described by him from Newfoundland on the basis of this material.

Early authors studying the lichen flora of Newfoundland (e.g. Eckfeldt 1895, Howe 1911, 1914) reported several species from the province, but because of the taxonomic and nomenclatural confusion that has prevailed in the genus, very many of these reports require verification. For this reason only a few of the more important literature records are cited. The earlier literature records will be comprehensively listed in the catalogue of the lichens of Canada which is being prepared at the National Museum of Natural Sciences, Ottawa. For descriptions of the Newfoundland species of Alectoria and other information on the genus in North America the forthcoming monographic treatment of Brodo & Hawksworth (1976) should be consulted.

Almost all the senior author's specimens were identified or confirmed by the junior author; Dr. Irwin M. Brodo also examined a number of collections. In addition, a number of Newfoundland specimens in various herbaria (BM, CANL, COLO, E, FH, M, MSC, NY, RO, US, WIS, ZT) were studied by Brodo and (or) Hawksworth, and some material in Helsinki (H) was identified by Ahti alone. The complete set of Ahti collections is deposited in the Botanical Museum, University of Helsinki (H), and rather large duplicate sets have been sent to the National Museum of Natural Sciences, Ottawa (CANL) and the herbarium of the Memorial University of Newfoundland, St. John's (NFLD). The ecological and other discussions were mainly prepared by the senior author.

Key to the Newfoundland species of Alectoria

This key covers only the Newfoundland taxa and morphotypes of these taxa known from

¹ This paper constitutes "Regional studies in Alectoria (Lichenes) III" in the junior author's series (II in Lichenologist 5: 181 – 261, 1972).
Thallus not closely adpressed to rock, usually exceeding 1 cm tall .................. 13
15(12). Thallus pendent; cortex K+ bright yellow, KC+ red, PD+ orange-red; thallus grey to greyish brown .......... A. capillaris
Thallus pendent, erect, caespitose, prostrate or decumbent; cortex K- or KF- yellow erect .... 14
14(13). Thallus ± erect, yellowish-grey to black, usually pale at the base, K- yellow, C- pink; PDr+ yellow; apices reflexed, pseudocyphellae white, raised, conspicuous .......... A. nigricans
Thallus not both erect and C- pink; K-, PD+ red or PD-; pseudocyphellae if present usually not conspicuous .... 15
15(14). Main branches of the thallus consistently blackened, with numerous grey to pale brown perpendicular side branches and apices; medulla PD+ red at least in parts .................. 16
Main branches not consistently blackened, lacking pale perpendicular lateral spinules and apices; medulla PD+ red or PD- .... 17
16(15). Thallus forming dense tufts; third order branches common and arising at right angles .......... A. bicolor
Thallus not forming dense tufts; third order branches sparse and usually arising at acute angles ........ A. tenuis
17(15). Thallus erect, often forming dense tufts, uniformly brown to dark brown, spinulose; medulla PD+ red .................. A. nidulata
Thallus prostrate or pendent, not tufted; medulla PD- or PD+ red .......... 18
18(17). Pseudocyphellae present, sometimes inconspicuous; medulla usually PD+ red at least in parts ........ 19
Pseudocyphellae absent; medulla PD+ red or PD- 11
19(18). Branches even in diameter; pseudocyphellae sparse, dark and depressed; thallus usually dark brown, pendent or prostrate; branching mainly isometric dichotomous, angles between the branches mainly obtuse .......... A. americana
Branches uneven in diameter; pseudocyphellae usually abundant, white and raised; thallus pale cervine brown, pendent; branching mainly anisometric dichotomous, angles between the branches mainly acute .......... A. canadensis

**List of species**

In the lists of localities only the administrative districts (e.g. Gander means Gander District) are given in detail (according to the 1955 division), while the actual collecting localities are indicated by numbers (1–79) which refer to the full list of collecting localities published by Ahti (1974). The number of each collecting locality is generally followed by Ahti’s specimen numbers in italics and in parentheses; if no number is given the record is based on a field identification. Unless otherwise stated Newfoundland means the island of Newfoundland alone (i.e. excluding Labrador and the French islands of St. Pierre and Miquelon).

**Alectoria americana** Mot. (incl. *A. ambigua* Mot.)

In Newfoundland A. americana shows a wide ecological amplitude and may be corticolous, lignicolous, tericolous or saxicolous. It is very common and abundant, even more abundant than A. sarmentosa, and occurs on various trees but most of the specimens are from Abies balsamea (26% records), Larix laricina (20%), Picea mariana (17%), and Betula (7%; B. papyrifera and B. alleghaniensis); it was also collected on Pinus strobus. Alectoria americana seems to be one of the most frequent lichens in the spruce-fir forests throughout the island, both in open stands and in rather dense stands, but it may be most abundant in moist situations along margins of treeless bogs and by lake shores.

It is also noteworthy that 16% of the specimens with habitat data are tericolous and 9% saxicolous. It is not uncommon in the wind-swept coastal heath communities, even far from forests, growing directly on soil, mosses, reindeer lichens or on the very densely growing ericaceous dwarf-shrubs (Kalmia angustifolia, Vaccinium spp.). It is never very abundant, however. One analysis of a heath stand with A. americana from Mt. Peyton was published by Aniti (1959: 39, plot 37; as Alectoria sp.). The records from the heath are from the localities 4, 5, 14, 23, 25b, 26, 30, 35, 49 and Bonavista. Only no. 49 represents the inland upland barrens (Mt. Peyton), while the others are near the coast in southeastern Newfoundland. On rocks A. americana grows occasionally both in the coastal regions and inland, mainly by shores or on other situations exposed to severe wind.

A. americana was first recorded from Newfound-land by Motyka (1960), who described the species citing one parasite without locality from the island (probably collected by Despréaux in 1828). It has been generally included in the polymorphic aggregate 'species' A. jubata (L.) Ach. In addition, Motyka (1964) described another new species, A. ambiguca Mot., based on five collections by Ahti from the island of Newfoundland – the type being from Cape Broyle (no. 582) – and one from Labrador; this morphotype had previously been given a herbarium name by Delise (FH). Most of the specimens are tericolous and somewhat different in habit from the common arboreal forms of A. americana and are more commonly fertile and more frequently PD+, but nevertheless they seem to represent the same species.

A. americana is normally esorediate but the specimens no. 5872 and Norris 3387 belong to the rare sorediate morphotype. A. americana seems to be the most important arboreal lichen in the diet of the Newfoundland caribou, although incorrectly called A. jubata by Ahti (1957, 1959), Bergerud (1972) and others. The local term is 'mallow' (Dugmore 1913).

A. bicolor (Ehrh.) Nyl.


A rare species found growing on the ground amongst dwarf-shrubs in maritime or mountain heaths. Represents the somewhat oceanic element in Newfoundland (cf. the world distribution map of Hawksworth 1972). Perhaps first reported from Newfoundland by Eckfeldt (1895) and Howe (1911) but their records may refer to A. nitidula, a species with which A. bicolor has frequently been confused.

A. canadensis Mot., nom. inval.


Collected from Abies balsamea and Picea mariana in rather dense and moist woods, which resemble very much the habitat of the original specimen of A. canadensis on the north shore of Lake Superior, Ontario, where it was collected by the senior author (Motyka 1964, Ahti 1964). In the field it was conspicuous.
because of the pale cervine brown colour in contrast to the darker brown tint of *A. americana*. It is possible that some specimens referred here to *A. americana* also represent *A. canadensis* as these taxa tend to ‘intergrade’ in Newfoundland and are often difficult to separate here. The status of *A. canadensis*, which is hardly specifically distinct from *A. americana*, will be discussed in detail and and its name validated by Brodo & Hawksworth (1976). No. 5991 represents a sorediate form of *A. canadensis*.

New to Newfoundland.

*A. capillaris* (Ach.) Cumb. (*A. implexa* auct. plur. p. p.)

*Humber East*: 67 (5910).

Found on *Abies balsamea* in dense forest. Certainly very rare, because it is probably avoiding the coastal and northern boreal regions as it appears to go in Europe. It has been reported from Newfoundland and Labrador since Eckfeldt (1895) and Hulting (1896), usually as *A. implexa*, but the records need verification, particularly as many North American lichenologists have incorrectly applied this latter name to *A. americana*.

*A. chalybeiformis* (L.) Gray

*Humber East*: 65 (558, 559).

Only found scattered on stones and a rock wall along the shore of the large Sheffield Lake. It cannot be common but is expected to grow in similar situations elsewhere, also along the sea shore – a characteristic habitat for this species in northern Europe. This species has been reported by several authors from Newfoundland since Stirton (1883), usually as *A. jubata* var. *chalybeiformis*, but all the early records are doubtful and may have arisen from confusion with *A. nidulifera* or prostrate *A. americana*.

Our specimens have already been published by Motyka (1964).

[Stagei (1873) Tuck.]

Reported by Lysaght (1971) from Banks’s collection, 1766, *sub A. jubata* var. *chalybeiformis* in BM, but this collection has been re-determined as *A. americana*.

*A. fuscescens* Gyeln. var. *fuscescens*


Very abundant on *Abies balsamea* in the localities 24 and 53, at the edge of a village and by a long-used lumber camp, in both places the forest is clearly being affected by man. Such habitats are characteristic of the species in much of Europe (e.g. Hawksworth 1972: 220). However, the other specimens are from *Larix laricina* or *Picea mariana* growing in lichen woodlands or in fen outside the immediate influence of human habitats. In general, the species seems to be rather uncommon and scattered in Newfoundland.

New to Newfoundland. Motyka (1964) cited one of our specimens as *A. glabra* and another as *A. positiva*.

*A. fuscescens* var. *positiva* (Gyeln.) D. Hawksw. [A. positiva (Gyeln.) Mot.]


On *Abies balsamea* and *Picea mariana*, locally abundant (especially at Clarenville, loc. 31) near human habitations, but generally rare.

First recorded for Newfoundland by Motyka (1964) who cited Ahti’s collections.

*A. glabra* Mot.


On *Larix laricina*, *Picea mariana*, and Pinus strobus in open, dry to wet woods, probably not common.

Motyka (1964) reported *A. glabra* from Newfoundland on the basis of three specimens collected by Ahti. However, here two of them are referred to *A. americana* and one to *A. fuscescens*. Therefore *A. glabra* is here reported as new to Newfoundland. It is not uncommon in western Canada but is much scarcer in the east.

[A. lanestris (Ach.) Gyeln.]

Reported from Newfoundland by Stizenger (1892), but only the specimen from Newfoundland named as ‘*A. jubata* var. *lanestris*’ in Stizenger’s herbarium (ZT no. 121) is *A. americana*.

*A. minuscula* (Nyl. ex Arnold) Degel.

*Grand Falls*: 60 (7740).

Only found on an open, windy rock outcrop at the summit of Hodges Hill (alt. ca. 550 m), where it was abundant.

Probably new to the island of Newfoundland.

*A. nadovorkiniana* Gyeln. [A. altaica (Gyeln.) Räss.]

*Placentia West*: 24 (565, 9186).
On *Abies balsamea* in dense coastal forest, sparse.

First recorded for Newfoundland by Bergé-Rud (1972: 920) as *A. altaica*, certainly very rare.

**A. nidulifera** Norrl.


About 50% of the specimens are from *Larix laricina*. This species is extremely common on this tree in Newfoundland, which is largely due to the fact that *A. nidulifera* is much more photophilous than *A. americana* and *A. sarmen-losa* and the larch stands consequently provide particularly suitable habitats for it. Solitary larches in bogs and heaths are often densely covered by *A. nidulifera*. In Ontario and northern Europe, for instance, it is a characteristic lichen of open pinewoods, but such woods are very rare in Newfoundland. It is surprising that not a single specimen was collected from *Picea mariana*, although it was observed as sparse on this tree. A few specimens are from *Abies balsamea*, *Pinus strobus*, *Betula papyrifera* and *Salix* spp. Only two specimens are from rocks, on which habitat it is found scattered also in Europe (Ahlner 1948: 20) and elsewhere in Canada. Eleven specimens are, however, from the ground vegetation of the coastal heaths (loc. 5, 9, 13, 14, 23, 26, 28) or the inland mountain heaths of Mt. Peyton (loc. 49). This kind of habitat is probably completely unknown for this species in Europe and elsewhere. A vegetation record of *Kalmia* — *Vaccinium* — *Cladonia* heath in Trinity North District including some *A. nidulifera* was published by Ahn (1959: 37, plot 53, as *A. sp.*). Near Cape Broyle *A. nidulifera* was found to be very luxuriant locally and thriving well on low-growing dwarf-shrubs and reindeer lichens in heaths.

Ahln (1948) discussed the distribution of *A. nidulifera* in northern Europe in detail. There the species seems to avoid the oceanic coastal areas of Norway and Ahln postulated that this is not so for climatic reasons but because the lichen has not yet been able to spread to the area beyond the mountains because it is an eastern postglacial immigrant. The fact that in Newfoundland *A. nidulifera* thrives very well in clearly oceanic conditions similar to those of northern Norway supports Ahln’s views. In addition, he suggested that in northern Europe *A. nidulifera* has a thermal northern limit, which almost coincides with the July isotherm 13°C. According to the senior author’s observations it behaves in a very similar way in Canada, at least in Newfoundland, Ontario and the Mackenzie District, where its front of abundant occurrence never reaches the true arctic or alpine timberline but only the southern half of the northern boreal subzone. The vast treeless coastal heaths of southeastern Newfoundland are not arctic but rather boreal.

Early American lichenologists used to call this species *A. chalybeiformis*, and under this name it was obviously reported from Newfoundland by Howe (1911), for instance.

No. 2538 has ascocarps, which are rather rare in *A. nidulifera*.

**A. nigricans** (Ach.) Nyl.


Scattered in the coastal and mountain heaths (cf. Ahn 1959: 37, plot 47), preferring situations exposed to severe wind and at upper elevations resembling true arctic-alpine vegetation (e.g., at summits of Hawke Hills). It represents the sparse arctic element in the coastal heaths (see Damman 1965: 380). In addition, a special feature in Newfoundland is that *A. nigricans* is fairly frequently encountered growing as an epiphyte on spruce and larch trees. Specimens from trees were collected from the localities 25b, 64, 66, 68, and 71, but it was also seen elsewhere. Some of the localities are far from the terricolous stands, the lichen being found on trees in central parts of open bogs and fens, as in the Humber East District. Unlike elsewhere, ascocarps are fairly frequent in *A. nigricans* in Newfoundland.

*A. nigricans* was probably first reported from the island of Newfoundland by Tuckerman
(1882). The invalid name A. boryana Del. (cf. Hawksworth 1972: 224) is based on fertile material of A. nigricans from Newfoundland (probably collected by Despréaux in 1828).

A. nitidula (Th. Fr.) Vain.


A fairly uncommon terricolous species of wind-exposed heath communities. Characteristic associates include Loiseleuria procumbens, Rhacomitrium lanuginosum, Cetraria nivalis, Sphaerophorus globosus, Cladonia boryi, and the reindeer lichens. It was also observed as an epiphyte of dead dwarf-shrubs (Kalmitia angustifolia, a.o.) in heaths. An analysis of a community with some A. nitidula (loc. 29) was published by Ahti (1959: 37, plot 59; as Alectoria sp.). A. nitidula represents the arctic element in the coastal and mountain heaths of Newfoundland (Damman 1965: 380).

A. nitidula has previously been recorded from Newfoundland at least by Damman (1965), Pollett & Meades (1970), Lysaght (1971) and Hawksworth (1972: Fig. 14).

A. ochroleuca (Hoffm.) Massal.

Trinity North: 34. – Fortune Bay & Hermitage: 36 (5779). – Burgeo & La Polle: 77 (7707, 9409); Rencontre West, Big Bay, 1949 Tuomikoski 1263 (H). – Dist. unknown: Hb. Lenormand (BM); 1828 Despréaux (FH).

Terricolous, very rare in the coastal heaths and scattered in the alpine vegetation of the Long Range Mts. Much rarer than A. nigricans.

Reported from Newfoundland by Tuckerman (1882) and others, but it has often been confused with A. sarmentosa subsp. vezillifera, which is more frequent in Newfoundland.

[A. pubescens (L.) R. Howe

Although there are some literature records of this species from Newfoundland (e.g., Eckett 1895, as Parmelia lanata), all of them probably refer to localities in Labrador, where this species is present. It may, however, be expected to occur in Newfoundland.]

A. sarmentosa (Ach.) Ach. subsp. sarmentosa

(A. luteola Mont. ex De Not.; A. subsarmentosa Stirt.)


Very common on trees in both open and fairly shady woods throughout the island. About 25% of the specimens are from Larix laricina, 20% from Abies balsamea and also 20% from Picea mariana. Additional phorophytes are Betula papyrifera, B. alleghaniensis, Pinus strobus, and Acer rubrum. One specimen (loc. 35) is from a boulder and three are from the ground in coastal heaths (loc. 5, 5c, 28). Two of the heath specimens were recorded as A. sarmentosa var. cincinnata by Ahti (1959: 37, plots 47, 53). The great abundance of A. sarmentosa is an indication of the 'suboceanic' climate in the boreal zone, both in North America and Eurasia (not transcontinental), but even in the climatically most continental areas of Newfoundland it is quite common.

A. sarmentosa is a large and conspicuous lichen and therefore it has been collected and reported by almost all lichen collectors visiting Newfoundland since de la Pylaie (1826). Two specific names, A. luteola Mont. ex De Not. and A. subsarmentosa Stirt., which are now regarded as synonyms of A. sarmentosa, have been based on type material collected from Newfoundland. A. subsarmentosa was distinguished particularly on the basis of a KC- medullary reaction (Slarton 1883; the type from Brigus). At least ten additional collections from various parts of Newfoundland have the same reaction, while most of the specimens react KC+ red. The positive reaction indicates the presence of alchoronic acid, which is absent in 'A. subsarmentosa'. This
chemical difference does not seem to be correlated with any morphological or significant geographical differences and is therefore considered to be taxonomically unimportant. KC-specimens occur almost throughout the range of A. sarmentosa in N. America but appear to be particularly frequent in the Newfoundland area. Ascocarps are common on this subspecies in many places in Newfoundland.

A. sarmentosa subsp. sarmentosa is also extensively browsed by the Newfoundland caribou in winter (BERGERUD 1972: 918), although A. americana and the other usnic acid-deficient species of Alectoria may be a somewhat more preferred food (AHIT 1959: 12).

A. sarmentosa subsp. vexillifera (Nyl.) D. Hawksw. [A. sarmentosa var. cincinnata (Fr.) Nyl.]


Scattered on the ground or on rocks in coastal and mountain heaths, generally in situations exposed to strong wind.

Reported for Newfoundland by NYLANDER (1860: 282) and others, usually as A. ochroleuca var. cincinnata. This is another member of the arctic-alpine element in the Newfoundland heath flora. The collection probably made by Despréaux (FH) is fertile; a very rare phenomenon in this subspecies.

The taxonomic status of this taxon has been much discussed. Some lichenologists have treated it as a distinct species, while others have considered it only an ecad. The senior author is inclined to regard it only as a terricolous and saxicolous (rarely corticolous) modification of A. sarmentosa. The chief character of subsp. vexillifera, besides its habitat and distribution, is the presence of flattened, expanded main stems, and especially in marginal parts of heaths there are all kinds of intergradations between the two subspecies. The degree of shelter of the habitat against wind (perhaps especially in wintertime) seems to determine which plants have flattened stems. Even in the present material some specimens included in subsp. sarmentosa have somewhat flattened main stems (e.g., those included in var. cincinnata by AHIT 1959). However, the extreme forms of subsp. vexillifera have a very characteristic habit (particularly our specimens 2920 and 9389; see also HAWKSWORTH 1972, 1973).

A. simplicior (Vain.) Lyngne

This species occurs most frequently on twigs of Larix laricina in open bog forests and dry lichen woodlands but was also collected from Picea mariana, Betula papyrifera, Prunus sp. and a boulder by a lake. It is locally common in Grand Falls and Humber East Districts though was little collected. A. simplicior seems to show some continental tendencies in its distribution – as it does in northern Europe (AHNLER 1948) – and it was not seen in the more oceanic coastal areas, unlike A. nidulifera. It is also essentially confined to the northern boreal zone elsewhere.

Probably first recorded for Newfoundland by AHIT (1959: 7) and MOTYKA (1964).

A. smithii DR.
Reported from Newfoundland by STIZENBERGER (1892) under the name A. bicolor var. berengeriana but the collection on which this record is based has been redetermined as A. fuscescens var. positiva (see JORGENSEN & RYVAARD 1970.)

A. tenuis Dahl
Placentia East: 12 (8867).

In an Abies balsamea thicket in the extreme coastal heath region, epiphytic, sparse.

New to Newfoundland. Also known from the adjacent Miquelon Island.

A. trichodes Pylai, nom. inval.
Reported from Newfoundland by DE LA PYLAI (1826; see also ARNOLD 1896: 214) but the application of Pylai's name is uncertain. It most probably referred to A. americana, as a specimen probably collected by him (FH) and under the name Setaria trichodes Michx. is that species (see BROO & HAWKSWORTH 1976.)

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Received 10. I. 1974

Suomalaisen Kirjallisuuden Kirjapaino Oy Helsinki 1974