

INVESTIGATIONS OF THE MARINE ALGAE OF NOVA SCOTIA.

IX. A PRELIMINARY SURVEY OF THE FLORA OF BRAS D'OR LAKE, CAPE BRETON ISLAND¹

J. McLachlan and T. Edelstein
*Atlantic Regional Laboratory, National Research Council
of Canada, Halifax, Nova Scotia*

(Received for publication March 26, 1971)

Abstract. The algal flora of Bras d'Or Lake is in general restricted to a narrow fringe which extends from the shoreline to a depth of 3-4 m. A total of 92 species and varieties were identified during the survey. Two algal associations were evident; in one the species were the same as those of the open coastal area of Cape Breton Island, and in the other the species were similar to those of other warm-water habitats in Nova Scotia and Prince Edward Island. Ecological conditions in the lake have an apparent effect on the morphology of many of the species, and three free-living ecads were recorded.

Introduction

Bras d'Or Lake, Cape Breton Island, with a surface area of 1050 km² and a shoreline length exceeding 500 km, is the largest inland sea on the east coast of North America. Although this body of water is a unique biological habitat, it has been largely ignored as an area of investigation. The only comprehensive study was undertaken by Geen (1965) in which he assessed the primary productivity of the lake. He presented little information on the fauna and flora, nothing on the benthic algae, but some valuable data on the physical and chemical conditions of the lake.

Limited observations on the benthic marine algae were made by Bell and MacFarlane (1933*a, b*) who pointed out that ecological conditions of Bras d'Or Lake were unlike those of the open ocean, and that the flora was atypical and more like that of a deep tide pool of the upper littoral zone. Very few species were recorded by these authors who nevertheless noted certain similarities with the flora of Hudson Bay (Bell and MacFarlane 1933*c*). More recently Adey (1966) recorded a warm-water, crustose coralline *Phymatolithon laevigatum* in East Bay (private communication 1970).

¹ Issued as NRCC No. 11886.

Description

The Bras d'Or Lake area was glaciated and the bedrock of sedimentary shale, sandstone and conglomerate with some volcanic rock is superficially overlain with till (Geen 1965). The shore of the lake is composed of mud, sand, gravel and boulders whereas the bottom is generally covered with a sand-silt mixture with few large emergent boulders. The lake is an exceptionally deep body of water; St. Andrew's Channel exceeds 250 m in depth, and maximum depths in the other basins are 50 to 100 m.

Bras d'Or Lake is joined with the Atlantic at three constricted points — St. Peter's, St. Andrew's and Great Bras d'Or Channels. The bottom rises abruptly at the channel entrances, and at St. Peter's the connection is through a lock system. Consequently, exchange of water with the open sea is very limited, and current action in the lake is negligible. The tidal amplitude in the lake is less than 0.3 m. Hence there is no intertidal zone, and the only wave action is from local winds. Salinity in the open lake ranges from 20-25‰ (Geen 1965), but in the numerous barachois ponds the salinity is more variable and may approach that of freshwater (Smith and Rushton 1962-63). Surface temperatures during summer are consistently from 15-20 °C. With the exception of Great Bras d'Or Channel, the lake freezes over during winter.

None of the major basins is anaerobic, and Geen (1965) found 5-8 mgm/l of oxygen in the deepest parts of St. Andrew's Channel. The barachois ponds may however be anaerobic near the bottom (Smith and Rushton 1962-63). Aerobic conditions throughout the water column, together with limited exchange of water with the open sea, suggest that primary production *in situ* and transport of organic materials into the lake are minimal. This is consistent with Geen's estimate of an annual production of 55 gm C/m² with daily rates in the order of 100-300 gm C/m². The major primary producers during summer months are nanoflagellates, predominantly cryptomonads, but during fall, winter and early spring the phytoplankton is composed of diatoms and dinoflagellates similar to those in the surrounding ocean. Geen's analyses indicated that dissolved nitrogen and phosphorus were low in the photic zone, and bioassays suggested that phosphorous and iron were present in limiting concentrations.

Methods

During the summer of 1970 we made intensive observations and collections throughout Bras d'Or Lake. A total of 45 stations was established (Fig. 1) which included sites in all basins of the lake. Most stations were reached in a shallow-draft power boat, although in some areas we used a small car-top boat.

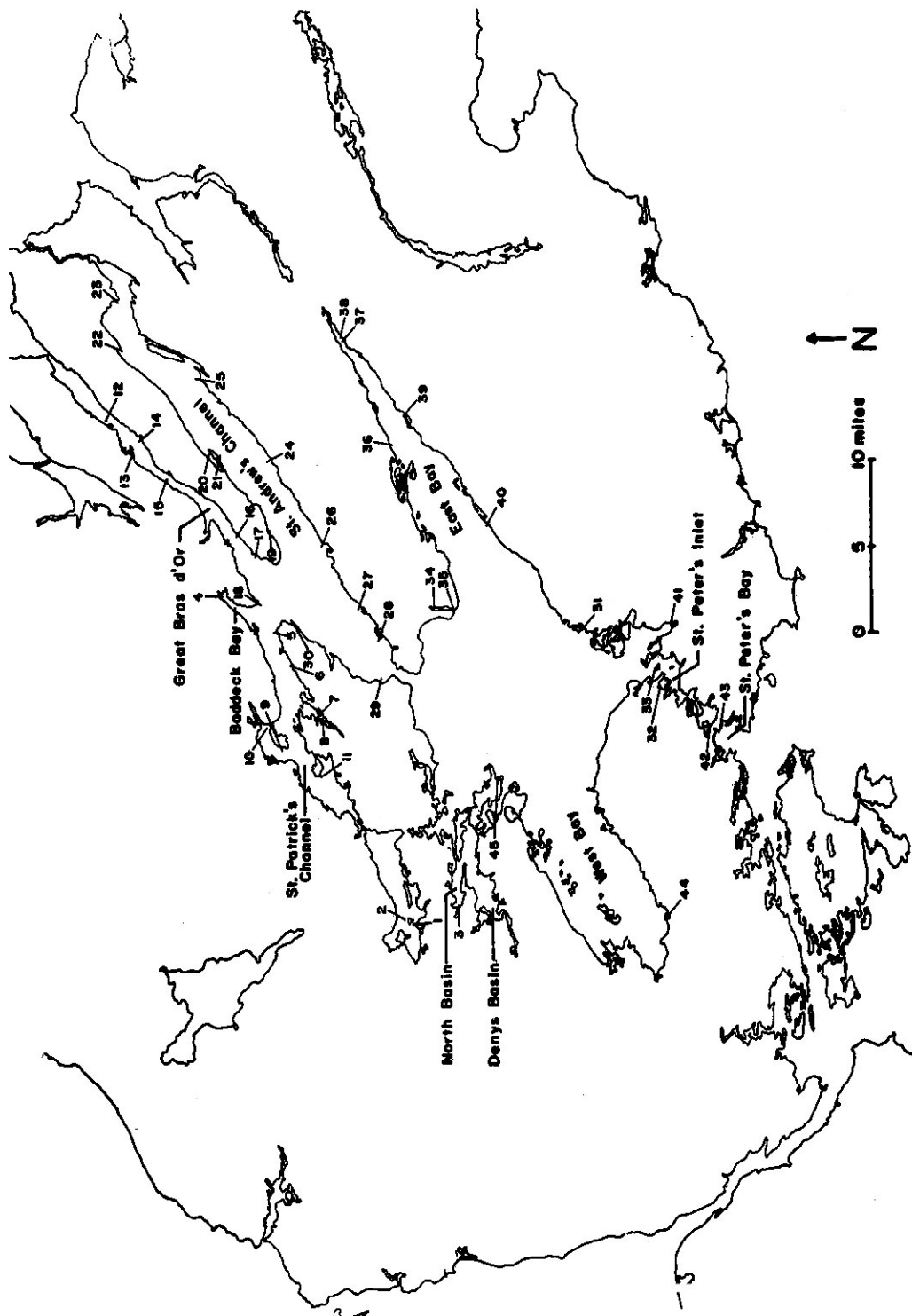


Fig. 1. Bras d'Or Lake, C.B.I. indicating collecting sites.

We employed SCUBA only occasionally. Most of the plants were in shallow water and observations could be made from the surface and collections by free-diving. The plants were either mounted on site or preserved in formalin for later observations in the laboratory. Voucher specimens have been deposited in the Marine Algal Herbarium of this Laboratory.

Observations and Discussion

A total of 92 species and varieties of benthic marine algae were recorded during our survey. These include 31 Rhodophyceae 31 Phaeophyceae, 23 Chlorophyceae and 7 Cyanophyceae. Three are new records for Nova Scotia. A listing of species together with the reproductive structures present and distribution within the lake is presented in Table I.

The algal flora in general occupied a narrow band which extended from the shoreline to a depth of 3-4 m, and in no place was the plant cover dense. The quantity of the benthic vegetation is therefore low, and undoubtedly their contribution to the productivity of the lake is small. The shallowness of the vegetation in Bras d'Or Lake is unusual compared with open coastal areas. Throughout most of the lake there was an appreciable accumulation of fine sediments which formed an unstable substratum, and frequently we noted large emergent boulders covered with algae in areas otherwise free of vegetation. In addition the suspended sediment undoubtedly reduced the amount of submarine illumination available for plant growth. Not uncommonly the angiosperm *Zostera marina* occupied areas of silt and mud. It was the most abundant plant in the lake and occurred at all stations and tended to grow at greater depths than other species.

We have recognized two distinct associations of algae in Bras d'Or Lake. One comprised species common to the adjacent open sea, and the other of shallow, warm-water plants characteristic of protected bays such as those along the north shore of the province and in Prince Edward Island.

The former association consisted predominantly of fucoids. *Fucus vesiculosus* was the most abundant species and frequently formed a narrow band near the shoreline. *Ascophyllum nodosum* was common and tended to occupy a zone below *F. vesiculosus*. In some areas, and especially along St. Andrew's Channel, *A. nodosum* was the deepest, major alga present. *Fucus serratus* was restricted to Great Bras d'Or Channel, and even here it occurred in patches along the east side of the Channel. *Laminaria agardhii*, *Chondrus crispus* and *Phyllophora membranifolia* were distributed generally throughout the lake although absent in the more shallow, muddy areas. *Chorda filum* was a common

and abundant species of both associations. Other characteristic summer annuals were *Sphaerotrichia divaricata*, *Chordaria flagelliformis*, and *Dictyosiphon foeniculaceus*. The perennials were thickly covered with epiphytes which included species from the warm-water association such as *Erythrotrichia carnea*, *Goniotrichium alsidii*, *Ceramium fastigiatum* and *Polysiphonia subtilissima*.

Species common in the warm-water association were free-floating ecads of *Gracilaria foliifera*, *Ahnfeltia plicata* and *Ascophyllum nodosum*. Other characteristic species of this association were *Bryopsis hypnoides*, *Dasya pedicellata*, *Ceramium fastigiatum*, *Stilophora rhizodes* and the large form of *Sphaerotrichia divaricata*. The most common blue-green alga was *Calothrix confervicola* which formed a thick layer on various algae and on *Zostera*.

The flora of Great Bras d'Or Channel was similar to that of the open coast of Cape Breton Island. In general these species were characteristic of St. Andrew's Channel and extended into West Bay and the western portion of East Bay. Progressing into East Bay the oceanic species disappeared and the algal vegetation became very poor indeed. Here the flora consisted predominantly of *Z. marina* with a few small epiphytes and some *C. filum*. Species of the warm-water association were characteristic of the flora of St. Patrick's Channel, Deny's Basin and North Basin. The bottom in these areas tended to be more muddy and *Z. marina* was the dominant component. In St. Peter's Inlet the flora was poorly developed and resembled that of the upper reaches of East Bay. The vegetation of St. Peter's Bay was similar to that of the rest of Chedabucto Bay. None of the oceanic species was, however, observed beyond the first lock of the canal.

It is evident that conditions of temperature, salinity, water movement, absence of tides and perhaps nutrients have considerable influence on the vegetation of Bras d'Or Lake. This is reflected not only in the composition of the flora, but also in morphological variation amongst some of the species. *Fucus vesiculosus* tended to become bushy and branched from the base. Vesicles were either lacking or collapsed, and some plants resembled *F. spiralis* including the shape of the receptacles. The colour tended towards reddish-brown, and the plants were poorly attached. Extreme variability was noted amongst plants of this species. A broad form of *Fucus*, probably *F. distichus* subsp. *evanescens*, was commonly encountered. There was little apparent variation amongst plants of *F. serratus* which resembled those of the open coast. The distribution of this species within the lake was restricted to Great Bras d'Or Channel and was not seen beyond Station 30 (Fig. 1). The limited penetration of this species may be the result of ecological barriers. More likely migration is still occurring as it is along the open coast.

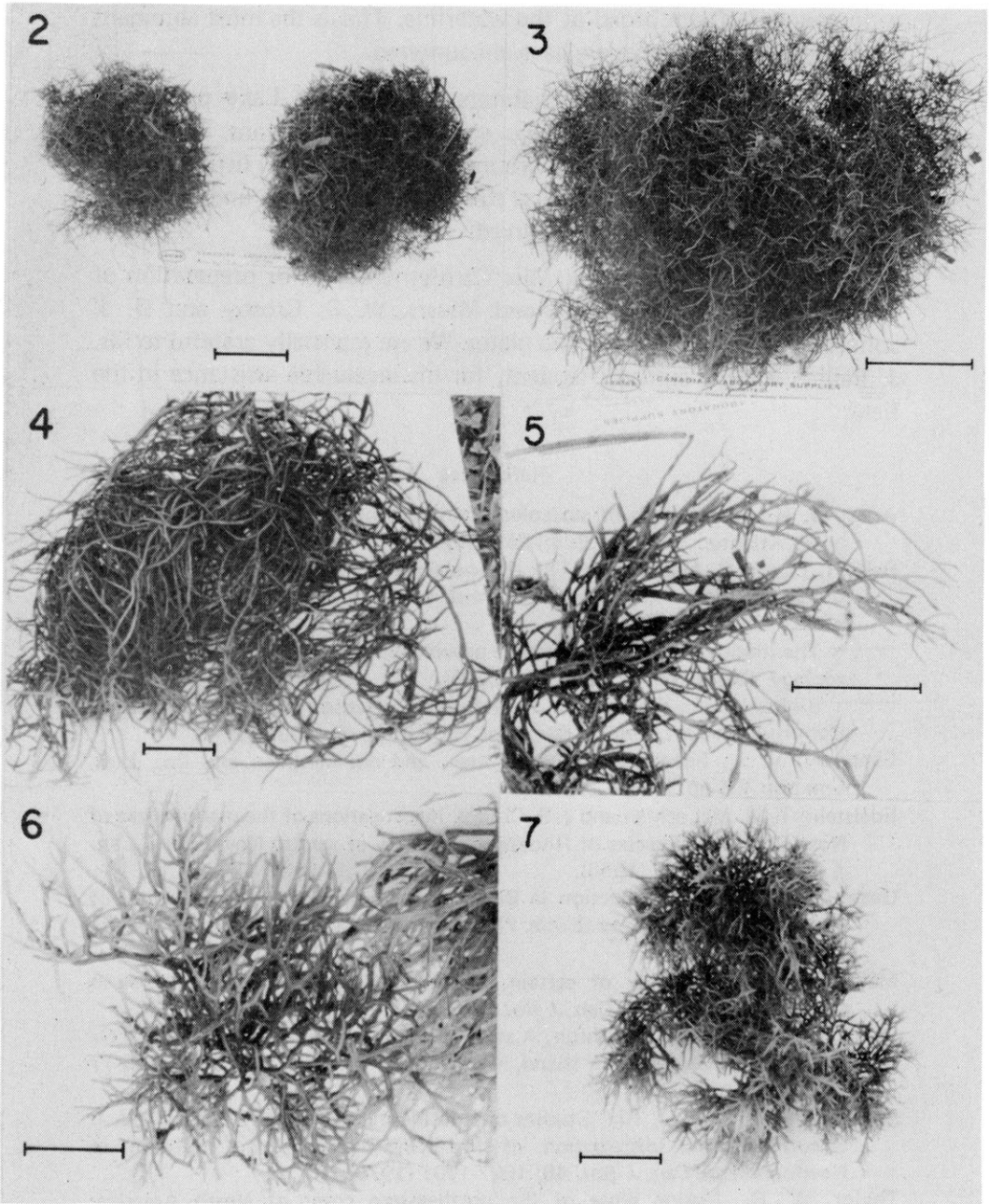
Ascophyllum nodosum was bushy, much branched and vesicles were either present or absent. The plants were yellowish and receptacles were absent or poorly developed. In more protected areas the free-living ecad *scorpioides* (Hornemann) Reinke (Figs. 4, 5) was present. Clumps of entangled plants were present at Stations 4 and 10 in St. Patrick's Channel (Fig. 1) on a shallow, muddy bottom. The plants were strongly branched, mostly lateral with main axes obscured and the branches cylindrical to somewhat flattened. The apices occasionally forked (Fig. 5) and the vesicles were few and small. The last two characters suggest that our specimens are intermediate with ecad *mackaii* (Turn.) Cotton, but we have insufficient material to form definite conclusions. Previous records for northeastern North America are given by Taylor (1957, as *A. nodosum* f. *scorpioides*), MacFarlane (1952, as *A. mackaii*) and South and Hill (1970, as the "beach form" of ecad *mackaii*).

A free-living form of *Ahnfeltia plicata* was found in St. Patrick's Channel also at Station 4. The plants formed rigid, strongly branched tufts or dense mats up to 15 cm in diameter (Figs. 2, 3). The regular mode of dichotomous branching of this ecad, which distinguishes it from the attached plants of the open coast, resembles f. *furcellata* Collins (Taylor 1957). We noted only a small population in the lake. The only published record of free-living *Ahnfeltia* of which we are aware is given by Chapman (1970) for the Sarema and Khiuma Islands in the Soviet Union.

We reported previously on the free-living ecad of *Gracilaria foliifera* var. *angustissima* from Pomquet Harbour, Antigonish Co. (Edelstein *et al.* 1966). Specimens collected in Bras d'Or Lake (Figs. 6, 7) were smaller than those from Pomquet. In the barachois pond at Station 34, where the salinity was 15 ‰, the plants were very much reduced in size. They formed small, dense balls up to 5 cm in diameter with strongly proliferating, short cylindrical branches most of which were dichotomous. In addition the following halophytic phenograms were present: *Potamogeton bupleuroides* Fernald, *Ruppia maritima* L. v. *longipes* Hagstrom and *Zannichella palustris* L. v. *major* (Boennighausen) Koch.

The morphology of *Laminaria agardhii* along most of Great Bras d'Or and St. Andrew's Channel was normal. An atypical habit was noted throughout the rest of the lake. These plants were pale and stunted with extremely thin blades. *Chondrus crispus*, which was sparsely distributed, tended to become greenish, and the plants were relatively small.

In the Atlantic Provinces *Nemalion helminthoides* is rare and the populations sparse. This species was found at several sites in the lake and at Station 6 there was a very dense population. The plants,



Figs.

2, 3. *Ahnfeltia plicata* — free living form. Fig. 2. A ball-form. Fig. 3. A mat-form.

4, 5. *Ascophyllum nodosum ecad scorpioides*.

5. Same as Fig. 4 showing vesicles and forked tips.

6, 7. *Gracilaria foliifera* var. *angustissima*.

Scale bar for Figs. 2-5 and 7 is 5 cm.

Scale bar for Fig. 6 is 2 cm.

attached to the vertical surface of rock, formed a thick band about 50 m long and 7-10 cm broad at the waterline. This is the most abundant occurrence of this species we have encountered.

The great diversity of habitats in Bras d'Or Lake presents a unique opportunity for extensive ecological observations. Moreover, with the exception of the area around Baddeck, we saw little evidence of pollution in the lake. Ecological surveillance should be undertaken to ensure that this condition is preserved.

Acknowledgments. We thank Miss Carolyn J. Bird for preparation of specimens for the herbarium and Messrs. W. R. Crosby and D. J. Johnson for assistance with the plates. We are especially grateful to Mr. J. Bailey, a NRC summer student, for his invaluable assistance in the field.

References

- Adey, W. H., Distribution of saxicolous crustose corallines in the northwestern north Atlantic. *J. Phycol.* 2: 49-54 (1966).
- Bell, H. P. and C. MacFarlane, The marine algae of the maritime provinces of Canada. I. List of species with their distribution and prevalence. *Can. J. Res.* 9: 265-279 (1933a).
- The marine algae of the maritime provinces of Canada, II. A study of their ecology. *Can. J. Res.* 9: 280-293 (1933b).
- Biological and oceanographic conditions in Hudson Bay. 10. Marine algae from Hudson Bay. *Contrib. Can. Biol. Fish.* 8: 65-68 (1933c).
- Chapman, V. J., Seaweeds and their uses. 2nd ed. Methuen and Co., Ltd., London, 304 pp. (1970).
- Edelstein, T., J. McLachlan and J. S. Craigie, Investigations of the marine algae of Nova Scotia. II. Species of Rhodophyceae new or rare to Nova Scotia. *Can. J. Bot.* 45: 193-202 (1966).
- Geen, G. H., Primary production in Bras d'Or Lake and other inland waters of Cape Breton Island, Nova Scotia. Ph.D. Thesis, Dalhousie University. 187 pp. (1965).
- MacFarlane, C., A survey of certain seaweeds of commercial importance in southwest Nova Scotia. *Can. J. Bot.* 30: 78-97 (1952).
- Smith, M. W. and D. K. Rushton, A study of barachois ponds in the Bras d'Or Lake area of Cape Breton Island, Nova Scotia. *Proc. N. S. Inst. Sci.* 26: 3-17 (1962-63).
- South, G. R. and R. D. Hill, Studies on the marine algae of Newfoundland. I. Occurrence and distribution of free-living *Ascophyllum nodosum* in Newfoundland. *Can. J. Bot.* 48: 1697-1701 (1970).
- Taylor, W. R., Marine algae of the northeastern coast of North America. University of Michigan Press, Ann Arbor. 509 pp. (1957).

Table I

Species found, reproductive structures present and distribution according to collecting site as in Fig. 1

Rhodophyceae

<i>Acrochaetium emergens</i> ³ (Rosenvinge) Weber-van Bosse	9
<i>Acrochaetium microfilum</i> Jao	16 36 39
<i>Acrochaetium zosteræ</i> Papenfuss	3 4 5 10 11(M) 12 16 22 23 38 39
<i>Ahnfeltia plicata</i> (Hudson) Fries	3 4 5 14 16 17 22 23 24 25 26 27 28 29 30 31 35 40 44 45
<i>Antithamnion americanum</i> (Harvey) Farlow	5 23
<i>Bonnemaisonia hamifera</i> Hariot ⁴	5 12 13 14 15 16 17 22 23 24 25 26 27 28 29 30 43
? <i>Callithamnion</i> sp.	5 13
<i>Callithamnion byssoides</i> Arnott	26 29 30
<i>Ceramium rubriforme</i> Kylin	1(Cy) 2(Cy T) 3 9(T) 10(T) 11(Cy) 22 23 29(T) 30 38(Cy) 39 42 43(Cy)
<i>Ceramium fastigiatum</i> Harvey	1(T) 2 3 4 5 7 9 10 11 23 26 30 34 38(T S) 39 42 44
<i>Chondrus crispus</i> Stackhouse	2 5 6 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 33 35 40 44 45
<i>Cystoclonium purpureum</i> (Hudson) Batters	15(Cy) 23 30
<i>Cystoclonium purpureum</i> v. <i>cirrhosum</i> Harvey	26 29
<i>Dasya pedicellate</i> (C. Agardh) C. Agardh	1 2 9
<i>Erythrotrichia carnea</i> (Dillwyn) J. Agardh	4 5 6 7 11 15 16 22 23 26 29 30 36
<i>Goniotrachium alsidii</i> (Zanardini) Howe	2 3 4 10 11 12 13 15 16 23 26 29 31 36 38 39 44
<i>Gracilaria foliifera</i> (Forsskål) Börgesen v. <i>angustissima</i> (Harvey) Taylor	2 3 4 5 7 10 34 38
<i>Hildenbrandia prototypus</i> Nardo	9(T) 42
<i>Kylinia collopoda</i> (Rosenvinge) Kylin	2
<i>Nemalion helminthoides</i> (Vellay) Batters	2 6(S) 12
<i>Phyllophora brodiaei</i> (Turner) Endlicher	13 16(N) 29(N)
<i>Phyllophora membranifolia</i> (Goodenough et Woodward) J. Agardh	2 5 6 11 16 17 22(Cy) 23(T) 24 25 26 27 28 29(Cy) 30(T) 44
<i>Polyides rotundus</i> (Hudson) Greville	26
<i>Polysiphonia</i> sp.	1 4 11 31 36 38 41 43
<i>Polysiphonia harveyi</i> Bailey	4 5 7 9 10
<i>Polysiphonia nigrescens</i> (Hudson) Greville	2 13 15 16 22 23 24 25 26 27 28 30 38 39 43 45
<i>Polysiphonia subtilissima</i> Montagne	3(T) 4(Cy) 5 7 9 23 30 31 34(T) 35

<i>Polysiphonia urceolata</i> (Lightfoot) Greville	29
<i>Porphyra umbilicalis</i> (Linnaeus) J. Agardh	12 13 43
<i>Rhodochorton penicilliforme</i> (Kjellman) Rosenvinge	16(M) 26(T) 29 36 44(M)
? <i>Rhodomela confervoides</i> (Hudson) Silva	4 13 15 42 44 45
Encrusting corallines	5 12 16 23 24 25 27 28
Phaeophyceae	
<i>Ascophyllum nodosum</i> (Linnaeus) Le Jolis	1 3 4 5 6 9 10 11 12 13 17 18 19 20 21 22 23 24 25 26 27 28 30 31 32 33 37 38 39 41 42 43 44 45
<i>Chorda filum</i> (Linnaeus) Stackhouse	1 3 4 5 6 9 10 11 12 13 14 15 16 17 18 19 21 22 23 24 25 26 27 28 29 30 31 32 33 36 37 39 40 41 42 44 45
<i>Chordaria flagelliformis</i> (O. F. Müller) C. Agardh	2 5 6 10 11 12 13 15 16 17 18 19 20 21 22 23 24 25 26 27 28 30 31 35 39 40 41 42 44
<i>Desmarestia aculeata</i> (Linnaeus) Lamouroux	16 ¹
<i>Desmotrichum undulatum</i> (J. Agardh) Reinke	13 26 44
<i>Dictyosiphon foeniculaceus</i> (Hudson) Greville	2 6 10 12 13 15 16 17 18 19 20 22 23 24 25 26 27 28 31 35 36 42 44 45
<i>Ectocarpus</i> sp.	1 4 9 10 11 12 13 14 15 16 17 29 30 33 36 39 44
<i>Ectocarpus confervoides</i> (Roth) Le Jolis	5(Ps)
<i>Ectocarpus confervoides</i> v. <i>hiemalis</i> (Crouan) Kjellman	3(Ps) 5(Ps) 22(Ps) 23(Ps) 24(Ps) 25(Ps) 26(Ps) 27(Ps) 28(Ps) 38(Ps)
<i>Ectocarpus confervoides</i> v. <i>siliculosus</i> (Dillwyn) Kjellman	34(Ps)
<i>Elachista fucicola</i> (Vellely) Areschoug	5 12 13 20 22 30 36 44
<i>Farlowiella onusta</i> (Kützting) Kuckuck	3(Ps) 7 38(Ps)
<i>Fucus distichus</i> Linnaeus subsp. <i>evanescens</i> (C. Agardh) Powell	5 29 35
<i>Fucus serratus</i> Linnaeus	5 ² 12 14 16 17 30(R) 43
<i>Fucus vesiculosus</i> Linnaeus	1 3 5 6 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 26 27 28 30(R) 31 32 33 35 36 37 38 39 40 41 42 44 45
<i>Fucus vesiculosus</i> v. <i>sphaerocarpus</i> J. Agardh	5 45
<i>Giffordia</i> sp.	11
<i>Laminaria agardhii</i> Kjellman	5 12 13 15 16 17 19 29 30 45
<i>Leathesia difformis</i> (Linnaeus) Areschoug	16
<i>Litosiphon pusillus</i> (Carmichael) Harvey	3(Us Ps) 7(Us Ps)

<i>Myriotrichia filiformis</i> Harvey	13 16 26
<i>Petroderma maculiforme</i> (Wollng) Kuckuck	36 38
? <i>Phaeostroma pustulosum</i> Kuckuck	36(Ps)
<i>Punctaria plantaginea</i> (Roth) Greville	6(Us) 20 22 26 29 30 35 44 45
<i>Ralfsia clavata</i> (Harvey) Crouan	1(Us)
<i>Ralfsia verrucosa</i> (Areschoug) J. Agardh	5 9 16 23 24 25 27 28 31 33 36 38 39 40 41 42
<i>Scytosiphon lomentaria</i> (Lyngbye) Link	2 10 12 13 31 40 41 45
<i>Sphacelaria cirrosa</i> (Roth) C. Agardh	2 3 5 6 7 10 11 12 13 14 15 16 20 22 23 26 29 30 31 38 39 40 42 44 45
<i>Sphacelaria plumosa</i> Lyngbye	13 31 34
<i>Sphaerotrichia divaricata</i> (C. Agardh) Kylin	1 2(Us) 4 5 6 9 10 11 12 13 14 16 17 20 22 23 24 25 26 27 28 29 30 31 32 33 35 36 37 38 39 40 42 44 45
<i>Stilophora rhizodes</i> (Turner) J. Agardh	2(Us) 3 9(Us) 26(Us)

Chlorophyceae

<i>Bryopsis hypnoides</i> Lamouroux	4
<i>Bolbocoleon piliferum</i> N. Pringsheim	2 42
<i>Chaetomorpha aerea</i> (Dillwyn) Kützing	13 15 22
<i>Chaetomorpha linum</i> (O. F. Müller) Kützing	26 29 31
<i>Chaetomorpha melagonium</i> (Weber et Mohr) Kützing	26 29 31
<i>Cladophora</i> sp.	2 10 15 22 40 41
<i>Cladophora glaucescens</i> ³ (Griffiths ex Harvey) Harvey	34 41 42
? <i>Cladophora rudolphiana</i> ³ (C. Agardh) Harvey	22 31
<i>Cladophora rupestris</i> (Linnaeus) Kützing	34 35
<i>Endoderma cladophorae</i> Hornby	42
<i>Enteromorpha clathrata</i> (Roth) Greville	1 11
? <i>Enteromorpha compressa</i> (Linnaeus) Greville	34 38
<i>Enteromorpha intestinalis</i> (Linnaeus) Link	2 3 9 36 41 43
<i>Enteromorpha linza</i> (Linnaeus) J. Agardh	34 36 38
<i>Enteromorpha plumosa</i> Kützing	2 3 4 7 34 38 42
<i>Enteromorpha prolifera</i> (O. F. Müller) J. Agardh	36 38
<i>Monostroma oxyspermum</i> (Kützing) Doty	34
<i>Pringsheimiella scutata</i> (Reinke) Marchew	2
<i>Stichococcus marinus</i> (Wille) Hazen	2
<i>Ulva lactuca</i> Linnaeus v. <i>latissima</i> (Linnaeus) de Candolle	3 4 9 10 42

Brackish water species

<i>Chara vulgaris</i> Linnaeus	34
<i>Mougeotia</i> sp.	3
<i>Spirogyra</i> sp.	3 34

Cyanophyceae

<i>Anabaena cylindrica</i> Lemmermann	9 10 12 22 26 30 31
<i>Aphanocapsa marina</i> Hansgirg ex Foslie	13
<i>Calothrix confervicola</i> [(Roth) C. Agardh] Bornet et Flahault	3 5 6 9 10 11 12 13 15 16 22 23 26 29 30 36 38 39 42 44
<i>Isactis plana</i> [(Harvey) Thuret] Bornet et Flahault	12 13 23 26
<i>Lyngbya</i> sp.	2 4 9 11 23 33 43 44
<i>Rivularia atra</i> [Roth] Bornet et Flahault	9 10 26 30 31 39 42
<i>Spirulina subsalsa</i> [Oersted] Gomont	7 33

Ps = plurilocular sporangia; Us = unilocular sporangia; R = receptacles; Cy = cystocarps; T = tetraspores; M = monospores; S = spermatia; N = nemathecium.

¹ Detached specimen

² A single plant

³ New record for Nova Scotia

⁴ The tetrasporic phase (*Trailiella intricata*).