

INVESTIGATIONS OF THE MARINE ALGAE OF NOVA SCOTIA XIV. *COLPOMENIA PEREGRINA* SAUV. (PHAEOPHYTA: SCYTHOSIPHONACEAE)¹

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The occurrence of *Colpomenia peregrina* in Nova Scotia is established from 5 collections of the species from 1960 to 1977. Plants were found between May and August in the upper sublittoral zone, to 3 to 5 m below mean low water, at sites on the Atlantic coast of the province and the Bay of Fundy approaches. Thalli ranged to 25 cm in diameter, and plurilocular sporangia occurred sparingly on the largest plants, collected in June. The records from Halifax County, N.S. represent the present northern limits of distribution of *C. peregrina* in eastern North America.

Introduction

Colpomenia peregrina Sauv. is a cosmopolitan alga of widespread if discontinuous occurrence in the northern Atlantic Ocean (Blackler 1967), including occasional records from eastern Canada (Blackler 1964; MacFarlane & Milligan 1966). However, the species was excluded from the current eastern Canadian check-list of marine algae (South 1976) pending substantiation of the latter records. On the basis of a study of available herbarium specimens, we now confirm the presence of *C. peregrina* in Nova Scotia.

Materials and Methods

Collections of *Colpomenia peregrina* from Nova Scotia (Table 1) were located in the herbaria of the Atlantic Regional Laboratory (NRCC), the Nova Scotia Museum (NSPM), and the University of New Brunswick (UNB). Collection sites are indicated in Figure 1.

Portions of dried thalli were rehydrated in a 3% aqueous solution of potassium hydroxide, and sectioned with a freezing microtome. Formalin-preserved material proved more satisfactory for sectioning than pressed specimens, which were fragile and often persistently semi-collapsed after rehydration. Thus, illustrations and measurements of microscopic features were taken only from liquid-preserved plants.

¹NRCC NO. 16775

*Deceased

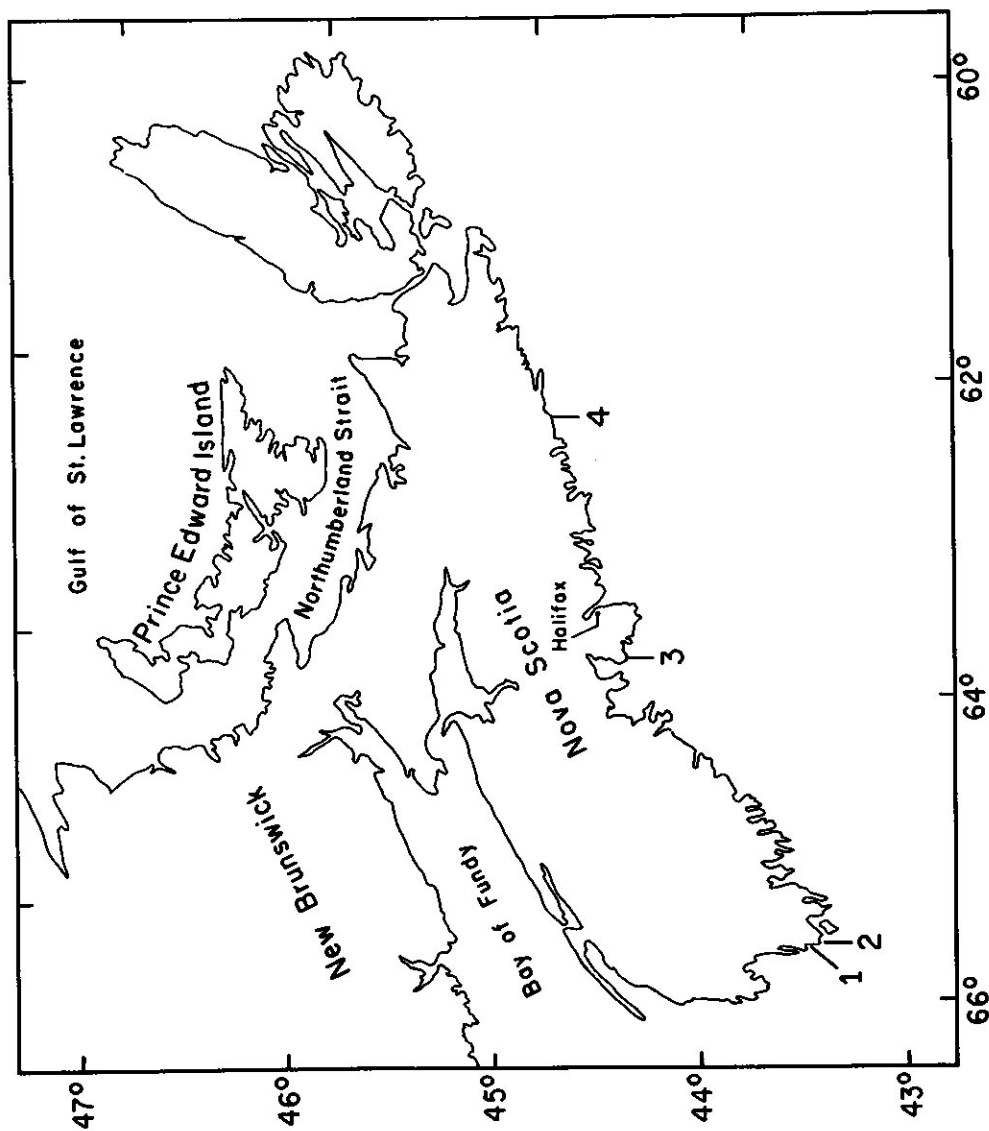


Fig 1.

Collection sites of *Colpomenia peregrina* in Nova Scotia.

1. Goodwin Island;
2. Bon Portage Island;
3. Polly Cove;
4. Atkins Point.

Table 1 Synopsis of Nova Scotian collections of *Colpomenia peregrina*

Locality	Date	Depth	Substratum (Host)	Collector(s)	Herbarium reference
Atkins Point Halifax Co.	15 July 1960	upper sublittoral		A.R.A. Taylor	UNB NS-16*
Goodwin I., Shelburne Co.	29 June 1966	3-4 m	<i>Chondrus</i> <i>Cladosiphon</i> <i>Zostera</i>	G.M. Milligan G.A. Neish	NSPM 1966-57†
Polly Cove Halifax Co.	24 May 1967	3-5 m	<i>Chondrus</i> <i>Rhodomela</i>	D. Pace	NRCC-6400
Polly Cove Halifax Co.	5 June 1967	3-5 m	<i>Chondrus</i> <i>Rhodomela</i>	D. Pace	NRCC-6401
Bon Portage I. Shelburne Co.	4 Aug. 1977	3 m	<i>Phyllophora</i>	M. Greenwell J.S. Wilson	NRCC-7148

*Temporary designation

†Number from the herbarium of the Nova Scotia Research Foundation Corporation

Description of Nova Scotian *Colpomenia peregrina*

As the distinction of species of *Colpomenia* is sometimes equivocal (Clayton 1975; Wynne 1972), it is worthwhile to include a description of Nova Scotian material, as determined from the NRCC collections.

Young thalli subglobose, thin-walled vesicles (Fig 2), smooth except for scattered cryptostomata; older thalli becoming irregularly bullate, coarser, up to 21 cm in overall diameter; plants generally epiphytic, sessile, attached by a compact tangle of rhizoids; color of fresh specimens light olive to olive-brown, of pressed thalli olive-brown to yellow-brown.

Cortical cells polygonal in surface aspect (Fig 5), 9 to 21 μm in their longest dimension, in section flattened and forming a monostromatic or rarely distromatic pigmented layer 9 to 13 μm thick (Fig 3), near the base of the thallus often produced into aseptate or sparingly septate rhizoids (Fig 4) of irregular diameter and with occasional branching. Medulla of 2 to 4 layers of ovoid, nearly colorless vesicular cells, larger than the cortical cells and increasing markedly in diameter towards the lumen of the thallus (when 4 medullary cell layers present, the outermost cells usually transitional in size and pigmentation to the cortical cells). Cryptostomatal hairs originating from the medullary cells, meristematic immediately above the point of origin (Fig 3).

Plurilocular sporangia in small, diffuse patches on the lower portion of the thallus, not in discrete sori or strictly associated with cryptostomata (Fig 5), consisting of 1 to 4 files of locules 5.5 to 9.0 μm broad, 15 to 24 μm deep, lacking a cuticle. Paraphyses ovoid, sessile on cortical cells, darkly pigmented [in formalin-preserved material; cf. Lund (1945)], 17 to 42 μm broad (Figs 5,6), persistent after

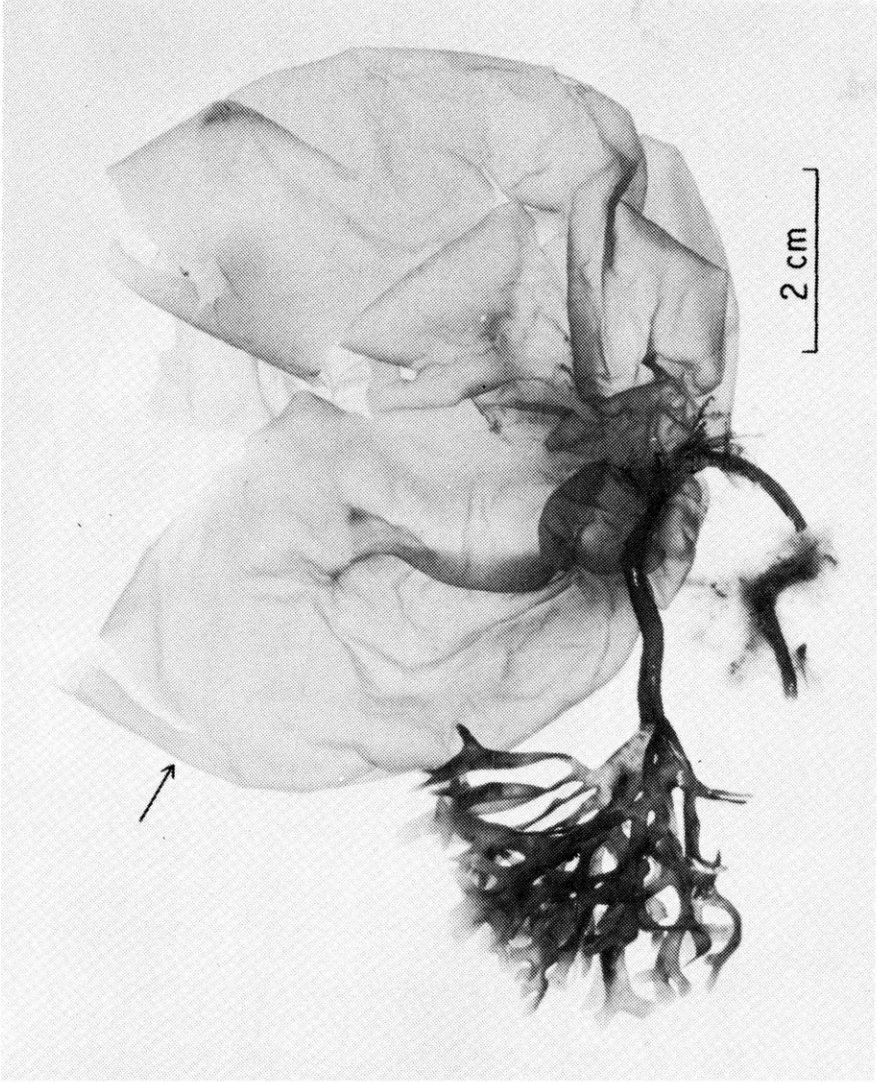
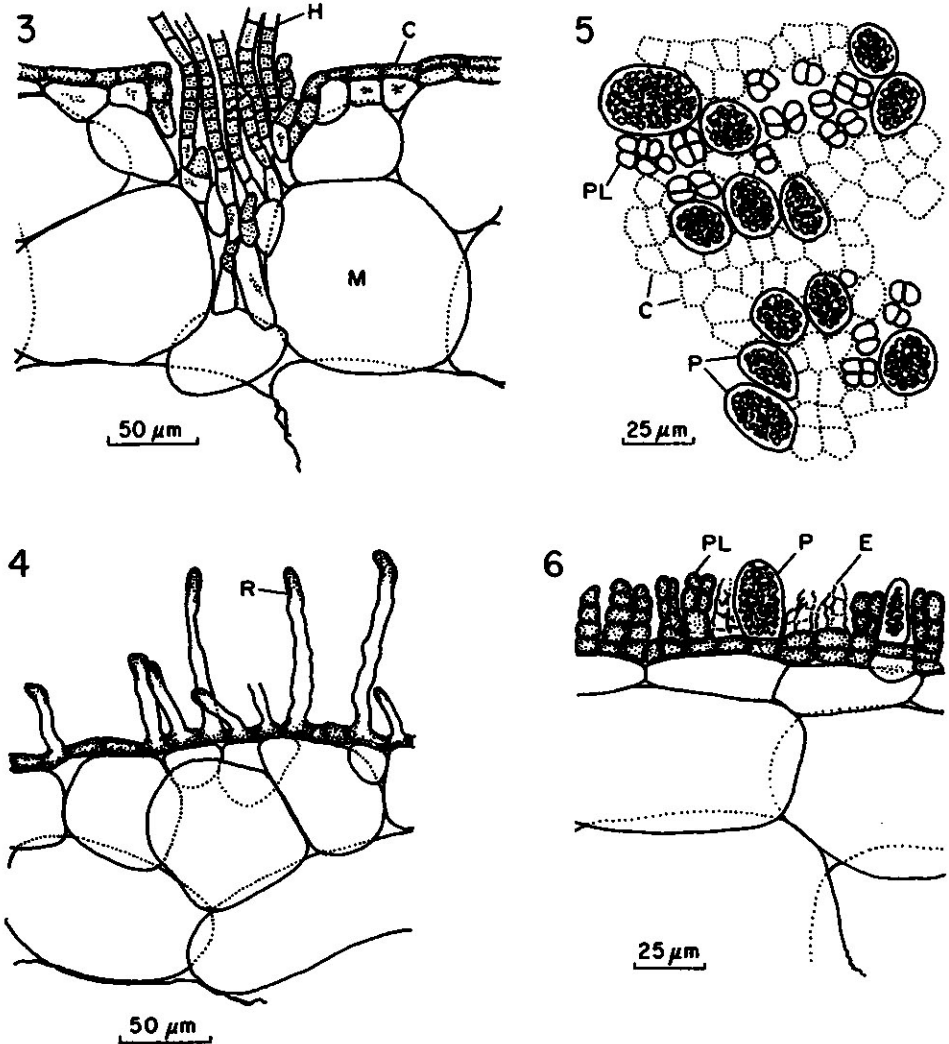


Fig 2. *Colpomenia peregrina*. A young plant (arrow) on *Chondrus crispus* Stackh., NRCC 6400.

Figs 3-6. Microscopic anatomy of *Colpomenia peregrina*. C—cortical cell; E—empty plurilocular sporangium H—hair, M—medulla, P—paraphysis, PL—plurilocular sporangium, R—rhizoid.



- Fig 3. Anticlinal section of an older thallus, showing pigmented cortex over large-celled medulla, and a cryptostoma with hairs issuing from the medullary cells; NRCC 6400.
- Fig 4. Anticlinal section from basal region of thallus, with rhizoids developing from cortical cells; NRCC 6400.
- Fig 5. Surface view of a fertile portion of a thallus, with plurilocular sporangia and paraphyses; cortical cells are outlined with dotted lines to indicate their lower focal plane; NRCC 6401.
- Fig 6. Same as Fig 5, in anticlinal section, showing empty sporangia.

discharge of plurilocular sporangia (Fig 6). Only the largest plants (Polly Cove, June collection) were fertile, and then only sparingly so. Sori were identifiable under low (25-50X) magnification by the presence of the darker paraphyses.

The Goodwin Island (NSPM) collection was essentially identical with the NRCC specimens. A note on the label of 1966-57 states that fresh specimens ranged to 25 cm in diameter. Again, only the largest plants were fertile, but in contrast with the Polly Cove material, paraphyses were not observed.

The Atkins Point (UNB) specimen, a juvenile plant 2.8 cm in diameter as pressed, was identified as *C. peregrina* by H. Blackler and erroneously ascribed by her to New Brunswick (Blackler 1964). Anatomically, it was identical with young plants in the NRCC collections.

Discussion

Clayton (1975) compared Australian populations of *Colpomenia peregrina* and *C. sinuosa* (Roth) Derbès et Solier, and concluded that the only valid distinctions between the 2 species were diffuse disposition of plurilocular sporangia and absence of a soral cuticle in *C. peregrina*. On the basis of these criteria, the present specimens are assigned to *C. peregrina*. They also possess other features previously considered indicative of *C. peregrina* (Lund 1945)—medullary origin of cryptostomatal hairs and fewer layers of medullary cells—although the coarse, bullate convolutions of older thalli are traditionally more suggestive of *C. sinuosa*. However, *C. sinuosa* is a more southerly species which, on this coast, has not been reported north of North Carolina, while *C. peregrina* is widely known from colder waters (Blackler 1967). Wynne's (1972) contention that *C. peregrina* is a synonym of *C. bullosa* (Saund.) Yamada remains to be investigated pending an opportunity to study the latter species.

The significance of the absence of paraphyses in fertile Goodwin Island specimens is not clear. Earlier reports claim paraphyses in *C. peregrina* to be variable in number (Lund 1945; Rosenvinge & Lund 1974), but generally more common than in *C. sinuosa* (Blackler 1964). Clayton (1975) did not consider paraphyses in her analysis of morphological and anatomical differences between these two species, and evidently attached little importance to them. However, presence or absence of paraphyses has been used as a critical taxonomic feature in the related genus *Scytosiphon* (Wynne 1969).

As the present records indicate, *C. peregrina* is a rare species in Nova Scotian waters, although multiple plants occurred in some instances. Recurrent populations have not been noted; numerous subsequent collections at Polly Cove, until the sublittoral algal flora was removed by sea urchins, failed to turn up additional specimens. Nor was the species observed again at Atkins Point in September and October of 1970 and 1971 (A.R.A. Taylor, *in litt.*), although its absence in this case could be due to the later collection dates. Further search at Bon Portage and Goodwin Islands is still pending, and it is hoped that the persistent rich algal flora in this area will foster additional occurrences. The sporadic records thus far suggest that *C. peregrina* is adventive in these waters, the present northern limits of its distribution in eastern North America.

Bon Portage Island was revisited on August 23, 1978, and numerous thalli of *C. peregrina* were observed in the same site as the original collection of August 1977 (NRCC 7148).

Acknowledgements

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