

CODIUM ENTERS MAINE WATERS

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An exotic species of marine algae, *Codium fragile* (Sur.) subsp. *tomentosoides* (Hariot) (fig. 1) was found growing in Boothbay Harbor, Maine, near the Bureau of Commercial Fisheries Biological Laboratory on July 17, 1964. Although the species has been established in the Long Island (N.Y.) and Cape Cod regions for several years, this is its first record from the Atlantic coast north of Cape Cod. In many oyster producing areas, *Codium* grows luxuriantly on the oyster shells and is considered to be a serious pest by the oyster growers.

The specimens from Boothbay Harbor were all collected within 400 m. of the Biological Laboratory in a sheltered cove, and all but one were attached to various objects just below the low tide mark; the single exception was unattached and entangled in some fronds of rockweed (*Ascophyllum nodosum*). Among the substrata to which *Codium* was attached were stones, *Modiolus modiolus* shells, seaweeds, and waterlogged timbers. Because Galtsoff¹ had reported *Codium* from depths down to 12 m., SCUBA divers surveyed the same general area for subtidal specimens. Their survey, as well as littoral surveys in other parts of the harbor, yielded no additional specimens, although more were subsequently found near the site of the original discovery.

Table 1 summarizes the data on all plants collected from July 20, 1964 to August 5, 1965. Gametangia were found on plants only during July and August. Nine specimens bearing gametangia were examined histologically to determine their sex: five bore mostly male, three bore mostly female, and one

had about equal numbers of male and female gametangia.

Growth in the Boothbay Harbor area appears to be rapid even during the cold part of the year. For example, plants collected in May 1965 apparently had grown as much as 34 cm. in length since the previous November when they were so small as to be barely visible.

TABLE 1.—*Codium fragile* var. *tomentosoides* collected in the Boothbay Harbor area, 1964-65

Date collected	Specimens	Length range	Mean length	With gametangia
1964:				
	<i>Number</i>	<i>Cm.</i>	<i>Cm.</i>	<i>Number</i>
July 20.....	18	9-54	25.6	17
Aug. 11.....	10	8-20	13.2	7
Sept. 9.....	7	10-16	13.5	none
Nov. 23.....	1	20	20.0	Do.
Nov. 24.....	2	17-20	18.5	Do.
1965:				
May 5.....	6	11-34	20.3	Do.
July 7.....	16	3-24	10.6	Do.
Aug. 4.....	2	13-14	13.5	1
Aug. 5.....	4	18-43	26.0	4

In the past 60 years, *Codium fragile* appears to have spread widely throughout the world. Silva (1955) presumed its original center of distribution to be the Pacific and Subantarctic regions, perhaps in Japan. It appeared in Holland about 1900 (Van Goor, 1923) and spread to Denmark, Norway, Sweden, England, and France (Silva, 1955). The introduction of *Codium* in Cape Cod was described by Wood (1962), as well as Galtsoff. No certain evidence is available to explain the source of its introduction in Long Island, N.Y., or that of its recent appearance in Maine. One possible explanation of the Maine introduction might be that the

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¹P. S. Galtsoff in a manuscript on file at the Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass., first called attention to *Codium* on Cape Cod in January 1962.

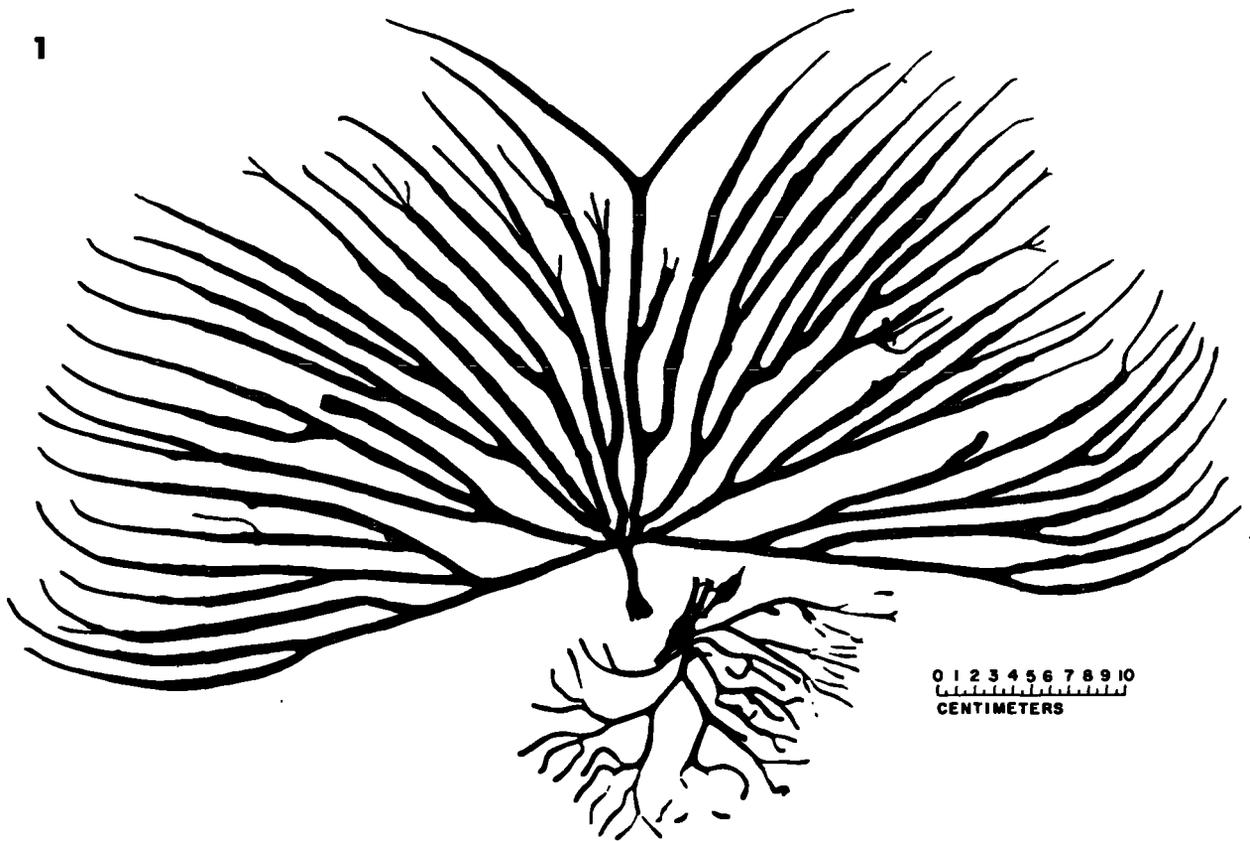


FIGURE 1.—Two typical specimens of *Codium fragile* subsp. *tomentosoides* collected in Boothbay Harbor, Maine.



FIGURE 2.—Utricles and attached gametangia from a specimen of *Codium fragile* subsp. *tomentosoides*.

plant arrived on oysters (*Crassostrea virginica*) shipped from Long Island to Boothbay Harbor to delay their spawning by holding them in the colder Maine waters. These oysters were customarily inspected, however, both upon arrival and again before return, to prevent the possible introduction of undesirable species. *Codium* in very early stages of development may have been overlooked when the oysters arrived from Long Island, because at the time *Codium* was not one of the undesirable species being checked; nevertheless, the reexamination before returning the oysters should have brought to light the plants at a larger stage of development.

Codium could possibly have been introduced on the hulls of some of the yachts visiting the area. Such an explanation was not favored by Rosenvinge (1920) who believed the spread in Europe to be due to the breaking loose and drifting of plants or to their being transported along with oysters or other shellfish.

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