

Sponges of the Scotian Shelf. A field and laboratory guide

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by

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ABSTRACT

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This report describes sponges collected from Maritimes Region Ecosystem Research Vessel Survey. Samples were collected during the 2017 Summer Survey (NED2017020), carried out by DFO on the Scotian Shelf, Gulf of Maine, Scotian Slope, and Bay of Fundy (NAFO Divisions 4VWX and Canadian portions of 5YZ) between 26 and 1384 m depth. Sponges were collected in 172 stations (70%) and sponge biomass ranged between 0.001 and 73.14 kg per station. In total 597 sponge specimen lots were collected (some containing multiple individuals). Samples were taken and identifications were confirmed by undertaking morphological taxonomic work on a subset of specimens, including microscopic examination of the skeleton. Sponges were identified to species where possible. We identified 37 taxa, mostly to species level. These comprise two taxa in Class Calcarea, covering two orders and two families; one in Class Hexactinellida; and seven orders of Class Demospongiae, representing 19 families. We present a guide to sponge taxa to aid in the identification of sponges from this region in the field and laboratory. Guides to methods for collection and analysis of sponges, major terminology used in sponge taxonomy, and a key to Porifera higher taxa present in the region are provided. We discuss the biogeography of the species reported.

RÉSUMÉ

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Ce rapport présente les éponges collectées dans le cadre des relevés par navire de recherche sur l'écosystème réalisés par la région des maritimes. Les échantillons ont été prélevés au cours de la campagne estivale de 2017 à bord du NGCC Alfred Needler (NED2017020), menée par le MPO sur le plateau néo-écossais, dans le golfe du Maine, sur le versant néo-écossais et dans la baie de Fundy (divisions 4VWX de l'OPANO et parties canadiennes de la division 5YZ) à des profondeurs comprises entre 26 et 1 384 m. Des éponges ont été collectées à 172 stations (70 %) et la biomasse totale des éponges variait entre 0,001 et 73,14 kg par station. Au total, 597 lots de spécimens d'éponges ont été collectés (certains contenant plusieurs individus). Les échantillons ont été prélevés et les identifications ont été confirmées par un travail taxonomique morphologique sur un sous-ensemble de spécimens, comprenant un examen microscopique du squelette. Les éponges ont été identifiées jusqu'au niveau de l'espèce lorsque cela était possible. Nous avons identifié 37 taxons, pour la plupart au niveau de l'espèce. Ceux-ci comprennent deux taxons de la classe Calcarea, couvrant deux ordres et deux familles; un de la classe Hexactinellida; et sept ordres de la classe Demospongiae, représentant 19 familles. Nous présentons un guide des taxons d'éponges afin de faciliter l'identification des éponges de cette région sur le terrain et en laboratoire. Des guides sur les méthodes de collecte et d'analyse des éponges, la terminologie principale utilisée en taxonomie des éponges, ainsi qu'une clé des taxons supérieurs de Porifera présents dans la région sont fournis. Nous abordons la biogéographie des espèces répertoriée.

1. INTRODUCTION

Historically there have been limited studies on sponges of the Canadian coast, these are reviewed in Fuller (2011) who lists 67 sponge species from the Bay of Fundy and Gulf of Maine which had been documented by prior studies (Barthel and Tendal, 1997; Bleakney and Mustard, 1974; Fuller *et al.*, 1998; Ginn *et al.*, 1998; Hartman, 1958; Harvey-Clark, 1997; Magee *et al.*, 2000; Procter, 1933; Verrill and Smith, 1874; Witman and Sebens, 1990). More recently our knowledge of sponges in Eastern Canada has greatly expanded due to targeted studies (Baker *et al.*, 2018a, 2018b; Bouchard-Marmen *et al.*, 2019, 2021; Dinn, 2020; Goodwin, 2017; Nozères *et al.*, 2020; Odenthal *et al.*, 2023; Tompkins *et al.*, 2017).

In 2017, a Strategic Program for Ecosystem-Based Research and Advice (SPERA) project “Benthic Community Mapping on the Scotian Shelf” contributed to a special effort to document epibenthic invertebrates from the Fisheries and Oceans (DFO) annual summer ecosystem research vessel (RV) surveys in the Maritimes Region (Murillo *et al.*, 2018). Some of the sponges collected in this survey have been identified as key components of the benthic communities of the Scotian Shelf and Gulf of Maine (Murillo *et al.*, 2024) and samples obtained from the RV surveys offer an important resource to improve the regional knowledge of sponge diversity.

The aim of this report is to describe the sponges collected from the 2017 RV summer survey (NED2017020), carried out by DFO on the Scotian Shelf, Gulf of Maine, Scotian Slope, and Bay of Fundy (NAFO Divisions 4VWX and Canadian portions of 5YZ) between 49 and 1348 m depth, documenting their occurrences and to provide a field and laboratory guide to help the sponge identification in future surveys.

2. MATERIAL AND METHODS

The RV summer survey was conducted on the CCGS *Alfred Needler* between June 28 and August 14, 2017. Fishing stations were allocated using a stratified random sampling design (Halliday and Kohler, 1971) and conducted with standardized 30-minute bottom tows at vessel speed of approximately 3.5 knots using a Western II-A bottom trawl gear. Two hundred forty-four stations were used in this study. All invertebrate fauna retained by the trawl net, which has a 19 mm mesh lining in the codend (Tremblay *et al.*, 2007), were sorted on board to the lowest possible taxonomic level. Wet weight for each taxon was measured and numbers of individuals recorded (except for colonial organisms that in most cases were only weighed). Attached rocks were removed before weighing. The trawl net was examined after each set when time allowed to collect entangled fauna and to minimize contamination of preceding sets. A photographic catalogue of all species caught was created and voucher specimens for subsequent definitive identification in the laboratory. Sponges were fixed in 95% ethanol.

A subset of specimens was sent to Huntsman Marine Science Centre for identification. Specimens were prepared as detailed in Appendix 1. Selected representative specimens were archived in the Atlantic Reference Centre Museum (ARC)

and some have been molecularly sequenced. Successful sequences will soon be available via the Barcode of Life Database (<https://boldsystems.org/>).

We have divided sponges into morphological categories to aid in identification (Figure 1). These have been adapted from those in Bowen *et al.* (2018) and Dinn (2020). Sponge growth form has no taxonomic significance; many growth forms can be found within one family and growth form can vary even within some species.

Calcareous tubes	White or grey sponges either formed of a single tube or many connected tubes.
Cups, vases and tubes	Non-calcareous sponge with cub, vase or tube form.
Fan-shaped	Erect sponge in the form of a fan.
Finger-shaped	Sponge with finger-like branches. May consist of one finger or might be branched.
Balls and lobes	Sponge which might be stalked or only have a little of the base attached to the substrate. Globular or irregular lobe.
Thickly encrusting/massive	Thicker encrusting sponge, generally several cm thick. Upper portions may have mounds and lobes but most of the area of the sponge is attached to the substrate.
Cushion with projections	Thickly encrusting sponge with many erect papillae or other projections.

Figure 1. Sponge morphological categories.

3. RESULTS

Sponges were collected in 173 stations (71%) and sponge biomass ranged between 0.001 and 73.14 kg per station. In total 597 sponge specimen lots were collected (some containing multiple individuals).

We present a guide to many of the species recorded to aid in their identification in the field and laboratory. Recommended methods for collection and analysis of sponges are provided in Appendix 1, whereas a brief guide to major terminology used in sponge taxonomy is provided in Appendix 2. We cover 37 taxa, mostly identified to species level. These comprise two taxa in Class Calcarea, covering two orders and two families; one in Class Hexactinellida; and seven orders of Class Demospongiae, representing 19 families. Many families were only represented by one or two taxa. Family Polymastiidae was by far the most speciose, represented by 9 species. A quick reference guide to use in the Maritimes Region Ecosystem Research Vessel Survey is provided in Appendix 3.

Spicule Key for Species Presented in this Report

This is not intended to be a comprehensive key to sponges—for more complete keys see *Systema Porifera* (Hooper and Van Soest, 2002). This key aims to help those with little experience in sponge taxonomy find the right section in this guide. This guide is organised in taxonomic order. The quick reference guide (Appendix 3) can be used to aid in identification if good field pictures are available. Information regarding spicule compliment, sizes and skeleton form should be compared carefully with the specimen to ensure accurate identification.

Table 1. Spicule Key for Species Presented in this Report.

1.	Spicules not present	2
	Spicules present	4
2.	No spongin fibres, sponge thinly encrusting	<i>Halisarca</i>
	Spongin fibres present	3
3.	Sponge fibres have debris core, sponge white and bumpy	<i>Dysidea cf. fragilis</i>
	Sponge fibres have no debris core. Sponge thinly encrusting and bright yellow	<i>Aplysilla sulfurea</i> *
4.	Triactines present	Class Calcarea
	Triactines not present	5
5.	Hexactines present	Class Hexactinellida, Large vase shaped sponge <i>Vazella pourtalesii</i>
	Hexactines not present	Class Demospongiae – go to 6
6.	No microscleres present	7
	Microscleres present (Chelae, Sigmata, Toxas, Bipocilla, Microxea, ect.)	12
7.	Spicules oxea	8
	Spicules styles	9
8.	Oxea are all under 270 µm long	Family Chalinidae
	Some oxea over 270 µm long, oxea often bent	Family Halichondridae

9.	Styles have a neat pin-like head	Family Suberitidae
	Head may be tylote or sub-tylote but not pin like	10
10.	Several categories of styles, sponges have a thick cortex, specimens massive, with papillae	Family Polymastiidae
	Only one category of styles	11
11.	Styles 180 – 550 µm. Stalked, vase shaped sponge	<i>Semisuberites cribrosa</i>
	Styles all under 300 µm	Family Halichondriidae <i>Hymeniacidon*</i>
12.	Bipocilla present (caution! these may be very small and can be rare)	<i>Iophon</i>
	No bipocilla	13
13.	Onychaetes present (thin, hair-like microspined spicules)	<i>Tedania suctoria</i>
	No onychaetes present	14
14.	Asters present	Order Tetractinellida
	Asters not present	15
15.	Chelae not present	16
	Chelae present	17
16.	Microscleres include sigmas and raphides	<i>Biemna varianta</i>
	Microscleres include fat oxborn toxa and sigmas	<i>Hemigellius arcofer</i>
	Microscleres include microxea	<i>Stylocordyla borealis</i>
17.	Chelae arcuate or polydentate	18
	Chelae palmate	19
18.	Chelae normal arcuate chelae. Skeleton with basal layer of acanthostyles and ascending columns of ectosomal megascleres	Family Hymedesmiidae*
	Chelae are 'Myxillid' type chelae with long alae, skeleton reticulate	Family Myxillidae
	Chelae arcuate or polydentate, ectosomal crust of spined acanthostyles or oxea	Family Crellidae
19.	Palmate isochelae (equal ends)	20
	Palmate anisochelae (unequal ends)	21
20.	Chelae very small, all under 20 µm long	Family Microcionidae <i>Artemisina arcigera</i>
	Chelae over 20 µm long	Family Isodictyidae <i>Isodictya</i>
21.	Chelae only microsclere and all under 30 µm long	Family Esperlopsidae <i>Amphilectus ovulum*</i>
	Some chelae much larger than 30 µm long. Other microscleres present.	Family Mycalidae <i>Mycale lingua</i>

*Taxa not described in this report but found in the proximities.

***Brattegardia nanseni* (Breitfuss, 1896)**

APHIA ID: 742257; **CLASS:** Calcarea; **ORDER:** Clathrinida; **FAMILY:** Clathrinidae

External appearance (Figure 2A): Dirty white/grey lobes around 2–3 cm in diameter. The sponge is composed of a network of tubes and spaces are visible between these, making the sponge appear porous.

Skeleton (Figure 2B): No special organisation.

Spicules (Figure 2C): Measurements from ARC 81474. Triactines with rays 66(112)127 by 7(9)12 µm and tetractines with large rays 102(115)137 by 7(9)11 µm. The short rays were broken in our specimen; those that could be measured were 7–18 µm long, but longer ones should have been present.

Rapp (2006, 2015) notes that the spicule complement comprise of regular triactines and two types of tetractines. He gives ray lengths of 102(113)130 by 8.8 µm for triactines and 100(115)132 by 8.6 µm for tetractines with an apical ray length of 32(39)80 by 4.1 µm, but in some of the tetractines the apical ray may be rudimentary, forming only a small projection.

Distribution: This species is widely distributed in the Arctic with records from north-east Canada, Spitzbergen, the Barents Sea, Murman Coast and northern Norway (Rapp, 2006, 2015). There are recent Canadian records from the Gulf of St. Lawrence (Curtis Dinn unpublished data) and St Ann's Bank (Teed *et al.*, 2025). Two records from 57–73 m were confirmed from the NED2017020 RV survey (Figure 3).

Remarks: The Calcarea of the east coast of Canada require a thorough revision aided by molecular work. Rapp (2015) noted *Clathrina cancellata* (Verrill, 1874), described from Casco Bay (Maine) may be a synonym of *B. nanseni*, but he refrained from synonymising as he was not able to examine the type material and the original description is not very detailed. Rapp noted that one of Lambe's specimens from Labrador identified as *C. cancellata* was identical to *B. nanseni*. Verrill (1874) describes *C. cancellata* as having mainly equal rayed triactines, although some triactines can be sagittal, and tetractines with short apical rays. Forming a sponge mass of 6 to 30 mm with tubes 0.5 to 1 mm in width.

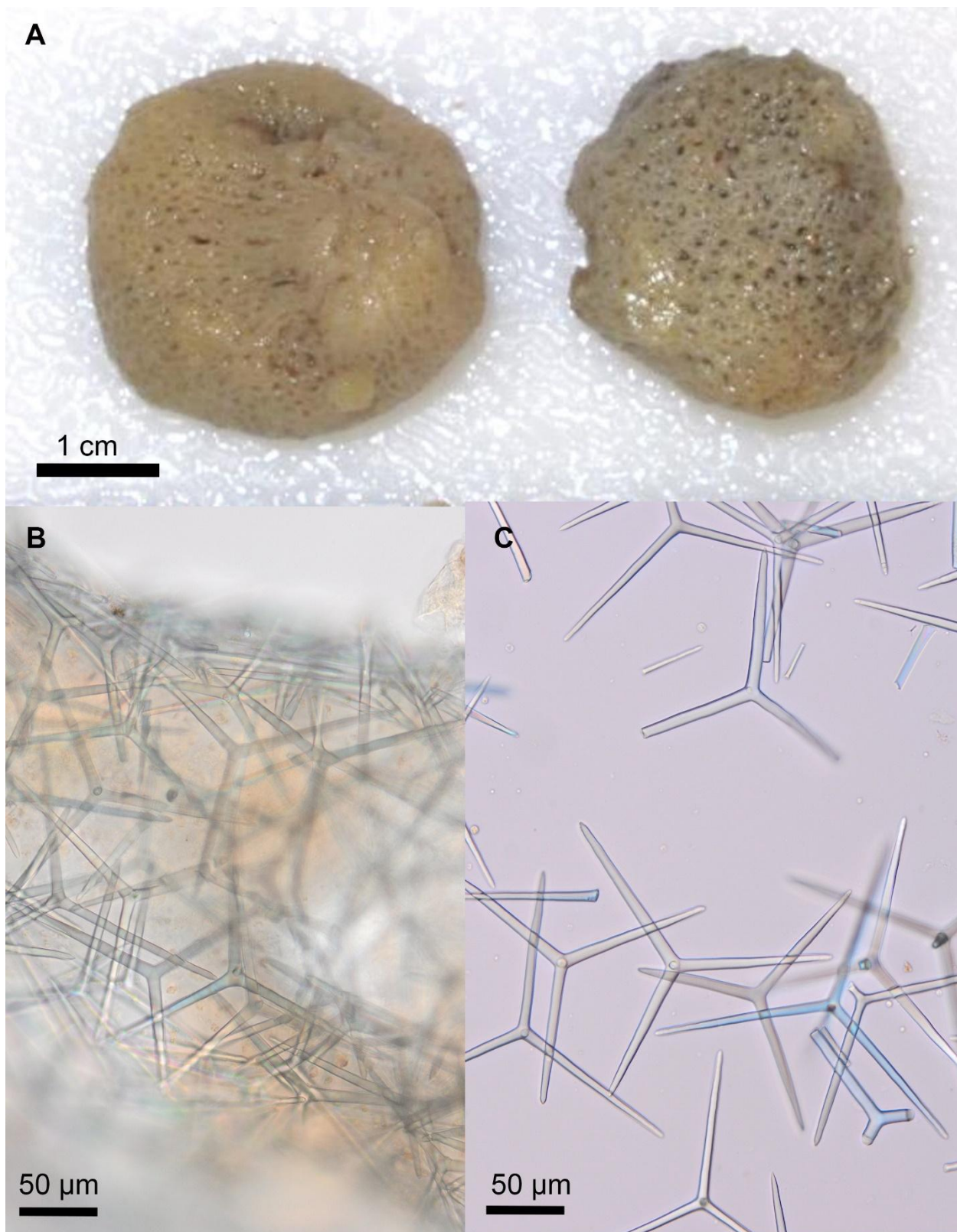


Figure 2. *Brattegardia nansenii*. A. Collected specimen, ARC 81474; B. Skeleton, close up showing tetractines; C. Spicules.

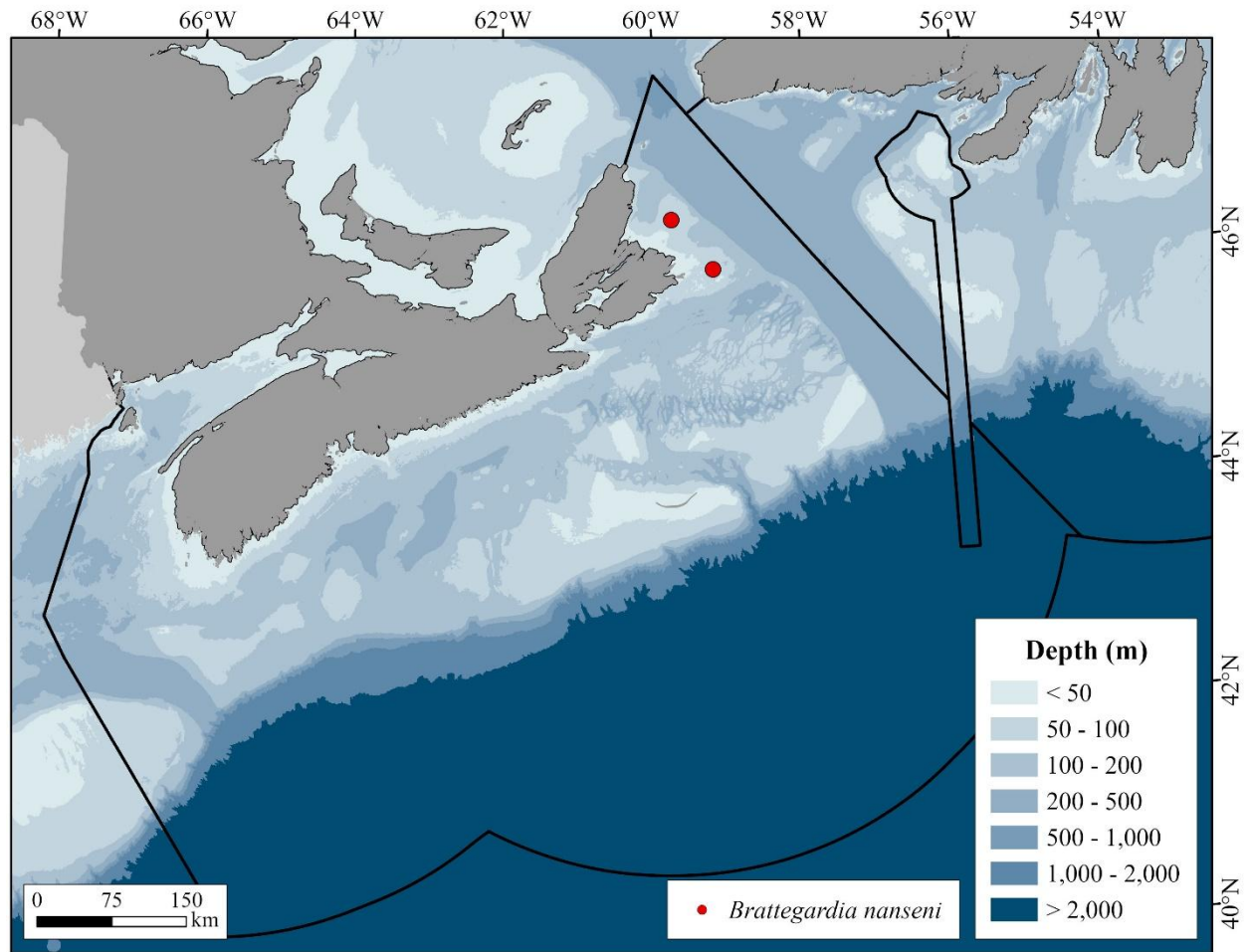


Figure 3. Records of *Brattegardia nanseni* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Grantia* Fleming, 1828**

APHIA ID: 131703; **CLASS:** Calcarea; **ORDER:** Leucosolenida; **FAMILY:** Grantiidae

External appearance (Figure 4A, B): Small, white or grey, tube-shaped sponge with a single terminal osculum. There is a fringe of spicules around the osculum. The sponge surface is hispid due to projecting diactines.

Skeleton (Figure 4C, D): Sponge body wall is made up of radial chambers, each ornamented by a tuft of diactines that protrude through the body wall. The cortical skeleton is comprised of small irregular triactines. The tubular skeleton is composed of several rows of t-shaped sagittal triactines, the atrial skeleton is a thick layer of sagittal triactines.

Spicules (Figure 4E): Large diactines and sagittal triactines and tetractines.

Distribution: Two records from 75–86 m were confirmed from the NED2017020 RV survey (Figure 5).

Remarks: Many specimens from the area previously identified as *Sycon*, including *Sycon protectum* (Lambe, 1896) may in fact be *Grantia*, see Rapp (2015) for discussion. The *Grantia* present in the region require revision. Some of our specimens may correspond to *Grantia arctica* (Haeckel, 1872) which is widely distributed around Greenland.

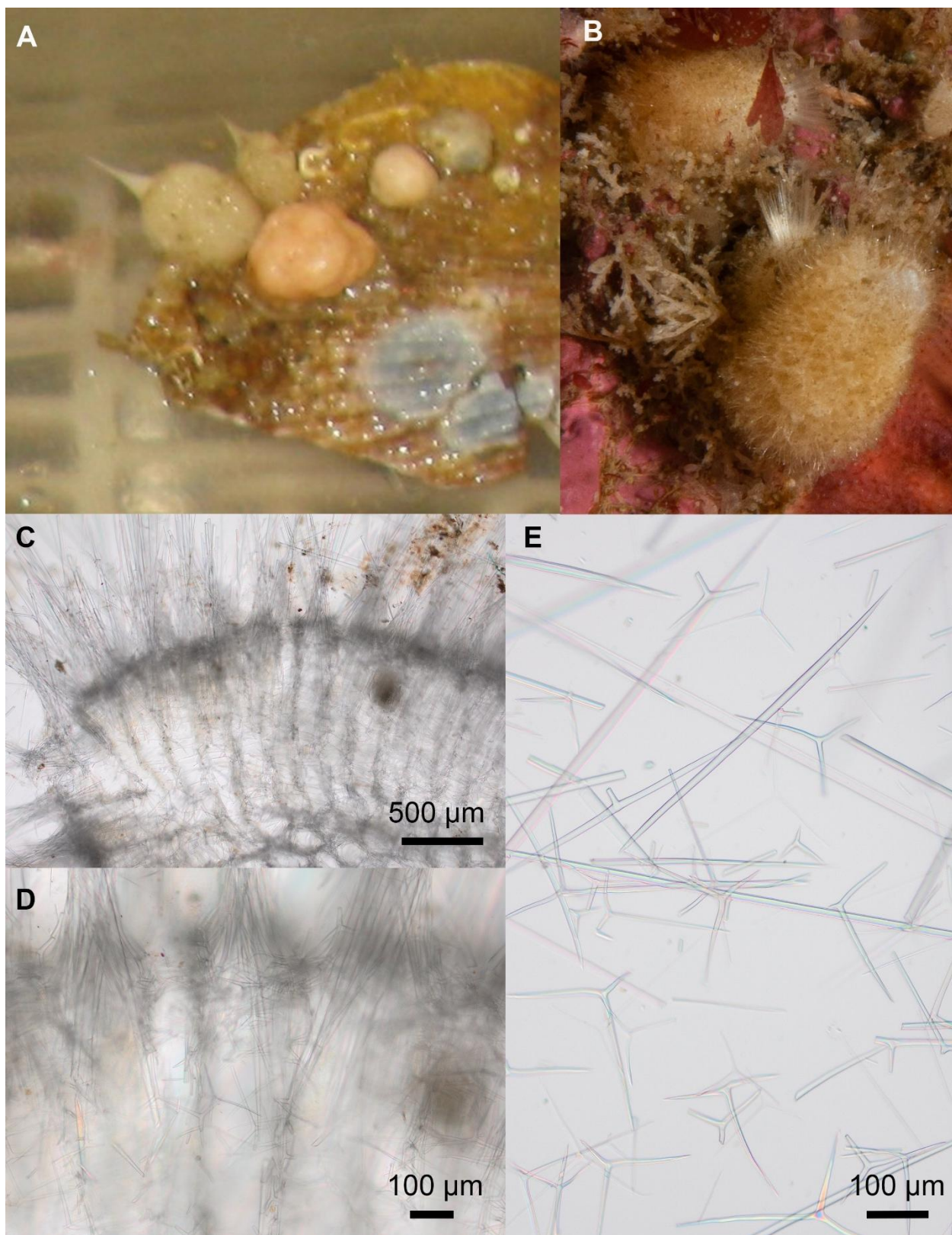


Figure 4. *Grantia*. A. ARC 81466 collected specimen; B. ARC 82253 *in situ* specimen; C. Skeleton; D. Cortical skeleton; E. Spicules.

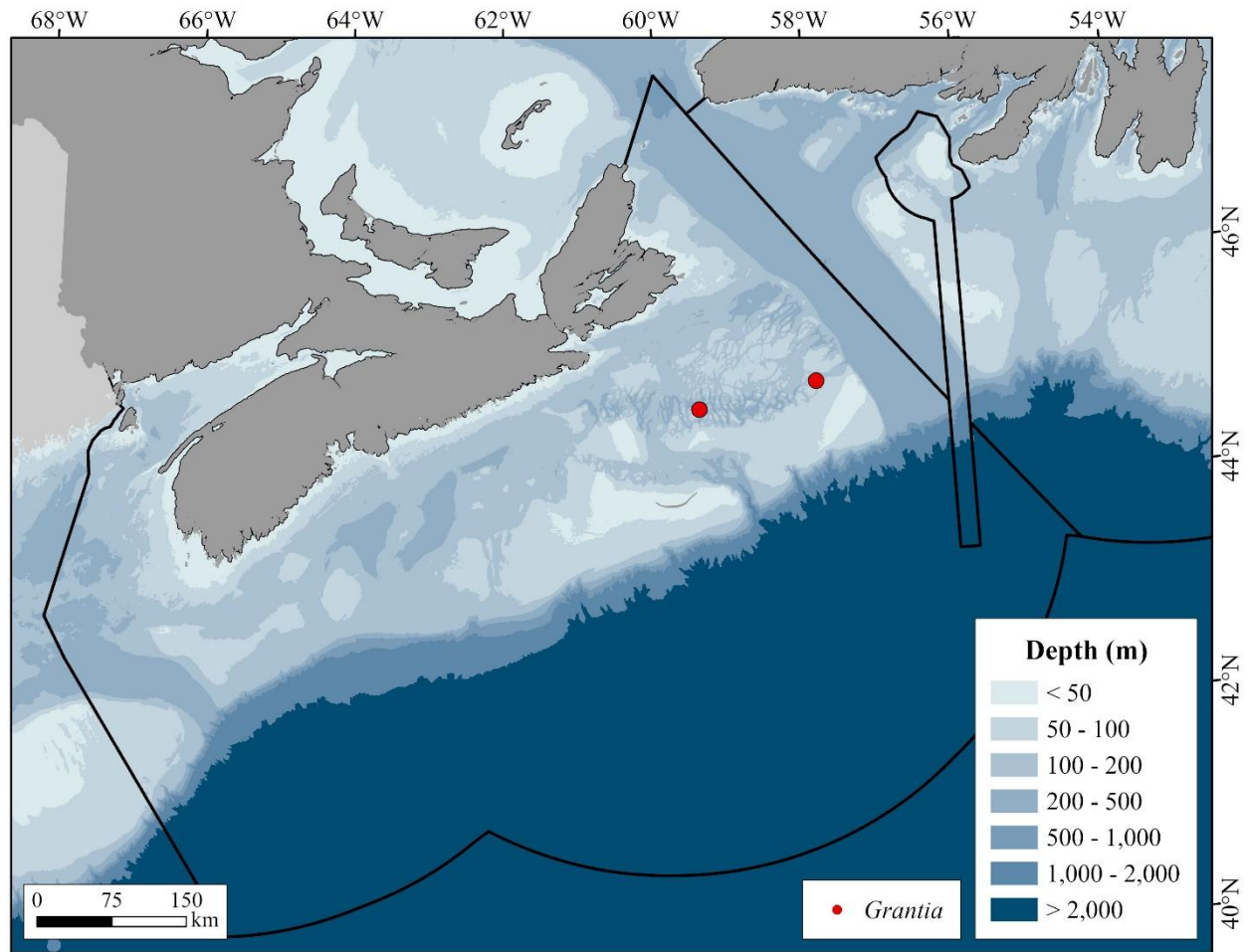


Figure 5. Records of *Grantia* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Biemna varianta* (Bowerbank, 1858)**

APHIA ID: 133205; **CLASS:** Demospongiae; **ORDER:** Biemnida; **FAMILY:** Biemnidae

External appearance (Figure 6A): Thickly encrusting yellow sponge which has a bumpy/hispid surface caused by projecting spicule tracts.

Skeleton (Figure 6B): Ascending fibres of styles joined by smaller fibres and loose styles. Microscleres abundant throughout the tissue.

Spicules (Figure 6C, D): Measurements from ARC 81451. Styles: 582(1002)1211 by 11(16)24 µm. Microxea and raphides: 189(232)259 by 0.9(1.3)1.7 µm. Sigmas, which seem to be in three categories, 20–40, 44–91, and 108–166 µm.

These are similar to specimens reported by Dinn (2020) from the Gulf of St. Lawrence. Van Soest *et al.* (2000) give styles 360(580)700 µm, sigmas 50–70 and 10–20 µm, microxea and raphides 63–165 µm, gathered into trichodragmata, commas (like halved sigmas) 10–20 µm. All spicule categories are larger in our specimens and the ‘commata’ spicules do not seem to be present.

Distribution: The type location is from the intertidal in Tenby, Wales. This species is found in the Arctic and south to around 40°N, it is widespread in the British Isles (Van Soest *et al.*, 2000). Recent Canadian records from the Gulf of St. Lawrence (Dinn, 2020). Five records from 82–152 m were confirmed from the NED2017020 RV survey (Figure 7).

Remarks: Lundbeck (1902) reported several species from East Greenland in depths of up to 250 m. These include *Biemna hamifera* (Lundbeck, 1902) and *Biemna variantia hamifera* (Lundbeck, 1902). These are currently considered synonyms as are other northern species such as *Biemna groenlandica* (Fristedt, 1887). Under the current species concept high Arctic specimens can have styles up to 1500 µm long (Van Soest *et al.*, 2000; de Voogd *et al.*, 2025). Given the considerable variation in both style size range and microsclere complement it is possible that some of these are valid species and this group warrants further taxonomic investigation.

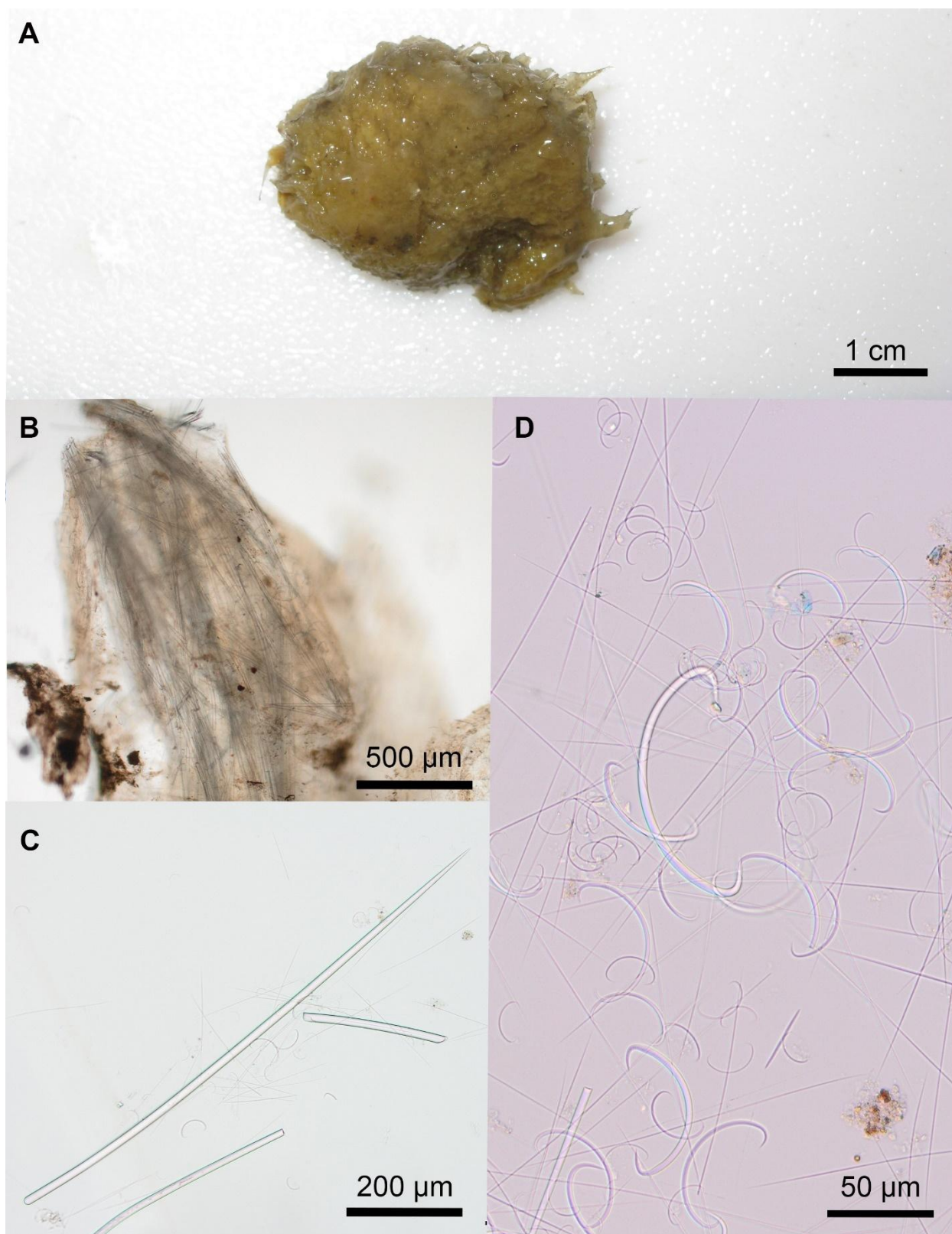


Figure 6. *Biomna variantia*. A. Collected specimen, trawl set 18; B. Section ARC 81451; C. Style ARC 81451; D. Microscleres. ARC 81451.

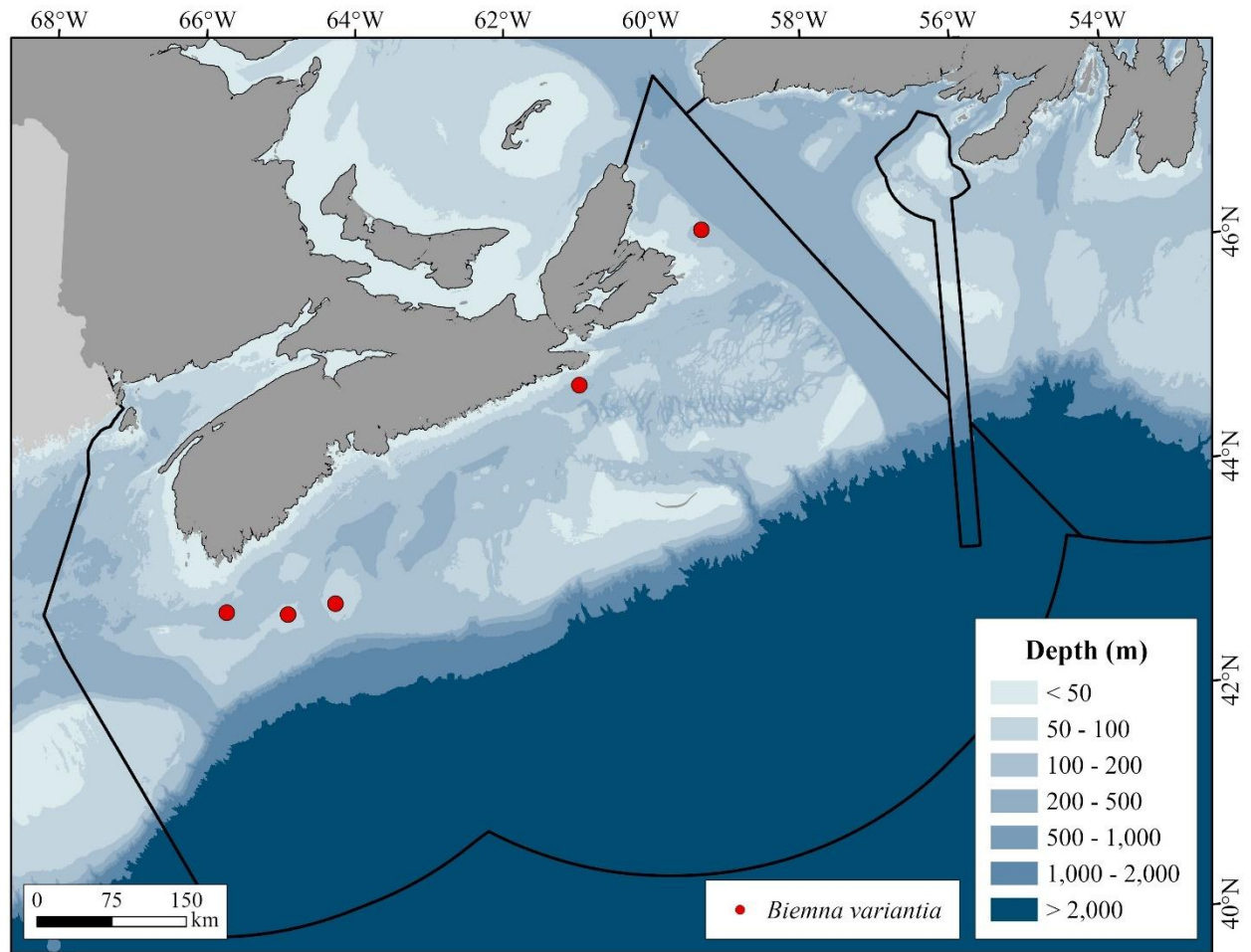


Figure 7. Records of *Biomna variantia* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Dysidea cf. fragilis* (Montagu, 1814)**

APHIA ID: 132324; **CLASS:** Demospongiae; **ORDER:** Dictyoceratida; **FAMILY:** Dysideidae

External appearance (Figure 8A): White sponge with conulose surface.

Skeleton (Figure 8B): A reticulation of spongin fibres with stouter ascending fibres joined by thinner connecting fibres. The fibres have many foreign inclusions in their core (sand grains, shell fragments, etc.).

Spicules: None, but spicules from other sponges may be incorporated into fibres.

Distribution: Recorded by de Laubenfels (1953) from the western Atlantic. Although this species has been widely reported but is probably restricted to Atlantic European coasts and the Mediterranean (de Voogd *et al.*, 2025). One record in 82 m was confirmed from the NED2017020 RV survey (Figure 9).

Remarks: The common name for this species is the goose-bump sponge, due to its bumpy surface texture resembling human skin with goose bumps (due to cold).

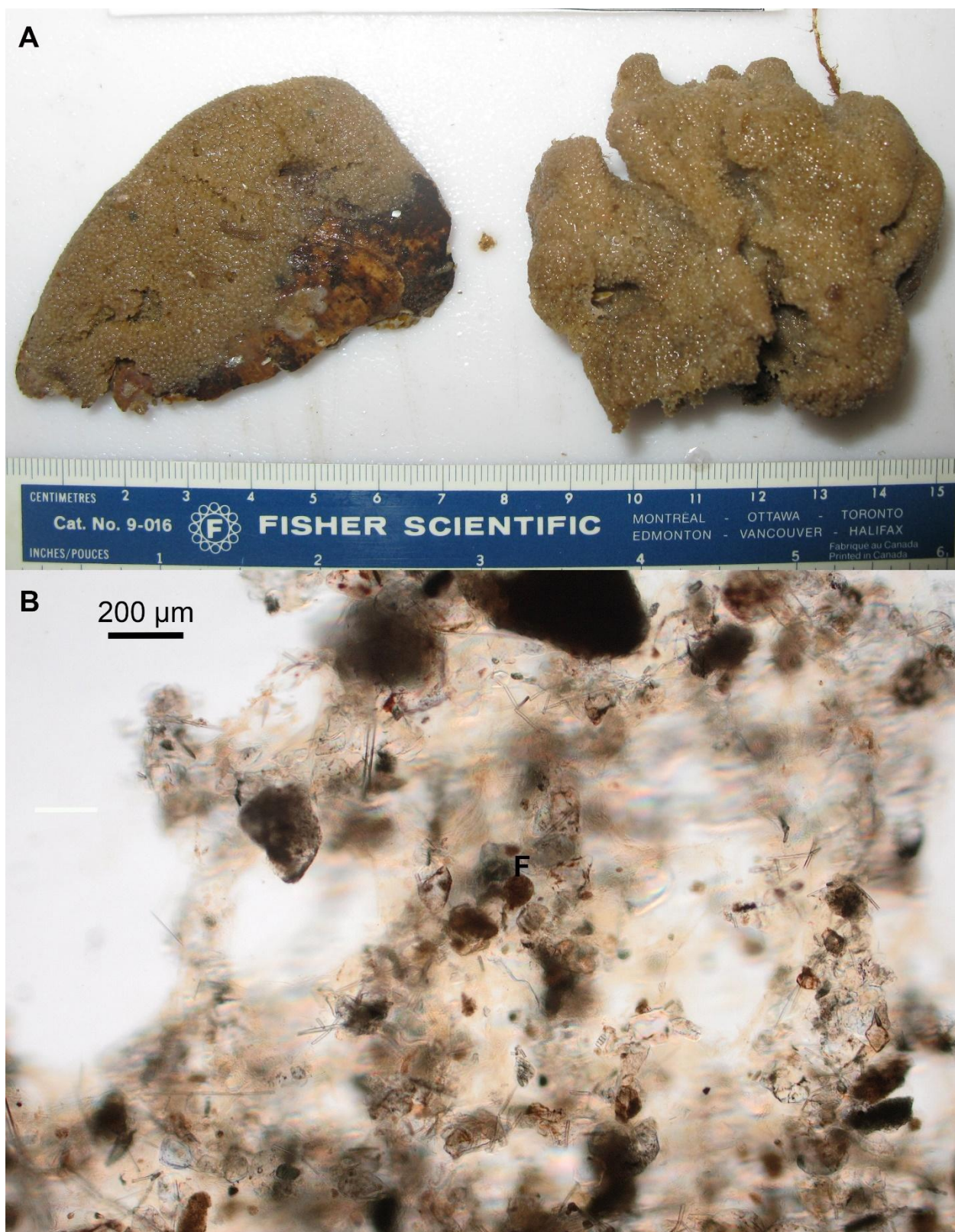


Figure 8. *Dysidea* cf. *fragilis*. ARC 81531. A. Collected specimen; B. Skeleton.

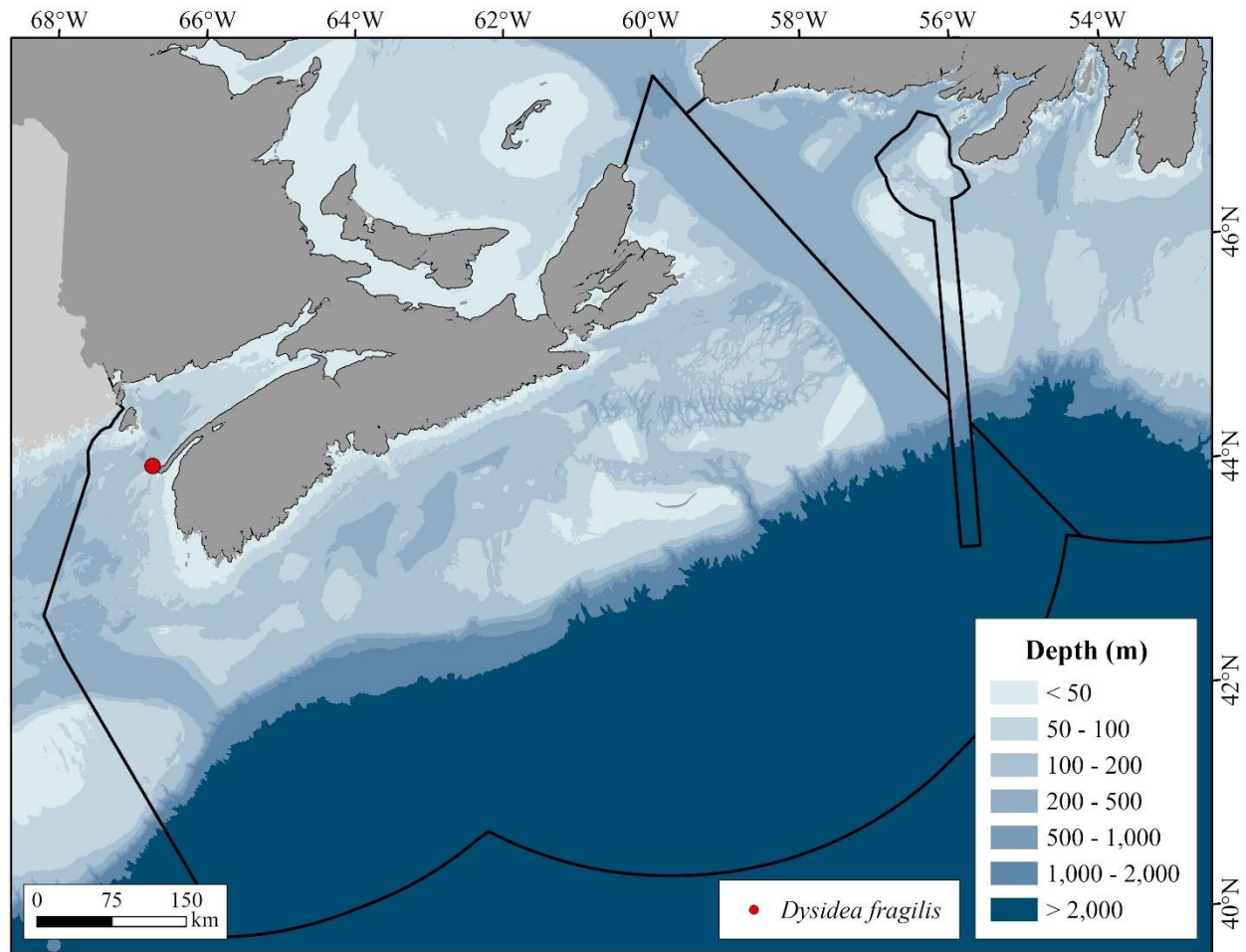


Figure 9. Records of *Dysidea cf. fragilis* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Cladocroce spatula* (Lundbeck, 1902)**

APHIA ID: 370775; **CLASS:** Demospongiae; **ORDER:** Haplosclerida; **FAMILY:** Chalinidae

External appearance (Figure 10A, B): Light brown sponge with rounded stalk and one or more flattened, leaf shaped lobes. Can be large, up to 35 cm in height (Dinn *et al.*, 2020). Large oscula (up to 0.3 cm diameter) on fan and stalk.

Skeleton (Figure 10D): Rather confused, with ascending columns two to three spicules thick joined by single spicules.

Spicules (Figure 10C): Stout oxea with sharply point tips. Measurements from two specimens ARC 81472: 187(207)249 by 12(14)16 μm ; ARC 81481: 173(195)215 by 10(13)17 μm .

Distribution: The type locality is the west Greenland Shelf. Very common in Gulf of St. Lawrence from 20 to 365 m, also reported from northern Laurentian Channel, North Labrador Sea, Norway and Scotland (Dinn *et al.*, 2020; Nozères *et al.*, 2020; de Voogd *et al.*, 2025). Three records from 71–132 m were confirmed from the NED2017020 RV survey (Figure 11).

Remarks: The oxea size in our specimens is slightly smaller than that reported from the Gulf of St. Lawrence 245(228)326 by 26(18)20 μm (Dinn *et al.*, 2020).

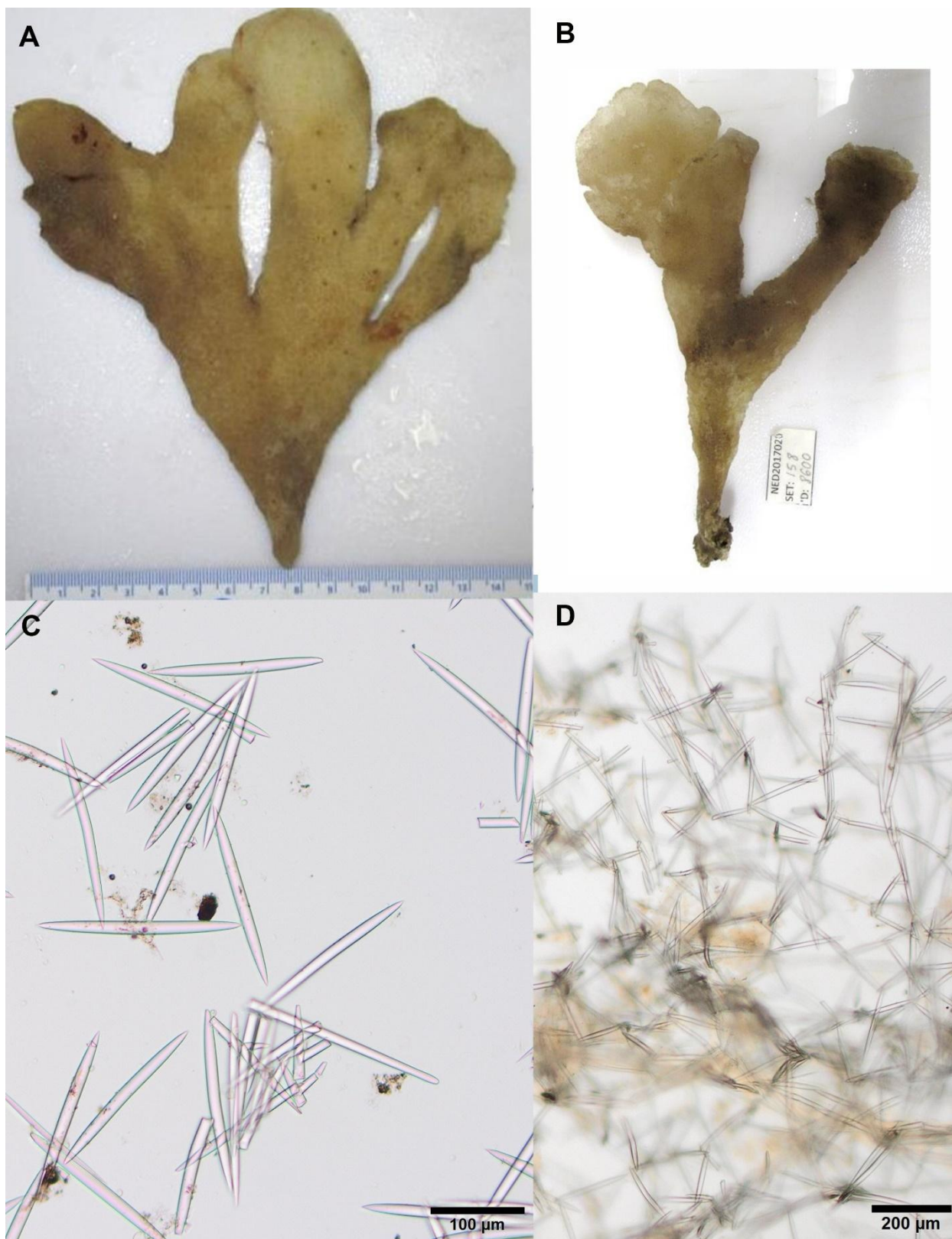


Figure 10. *Cladocroce spatula*. A-B. Freshly collected trawl specimens ARC 81472 (A) and ARC 81481 (B); C. Oxea from ARC 81472; D. Skeleton from ARC 81472.

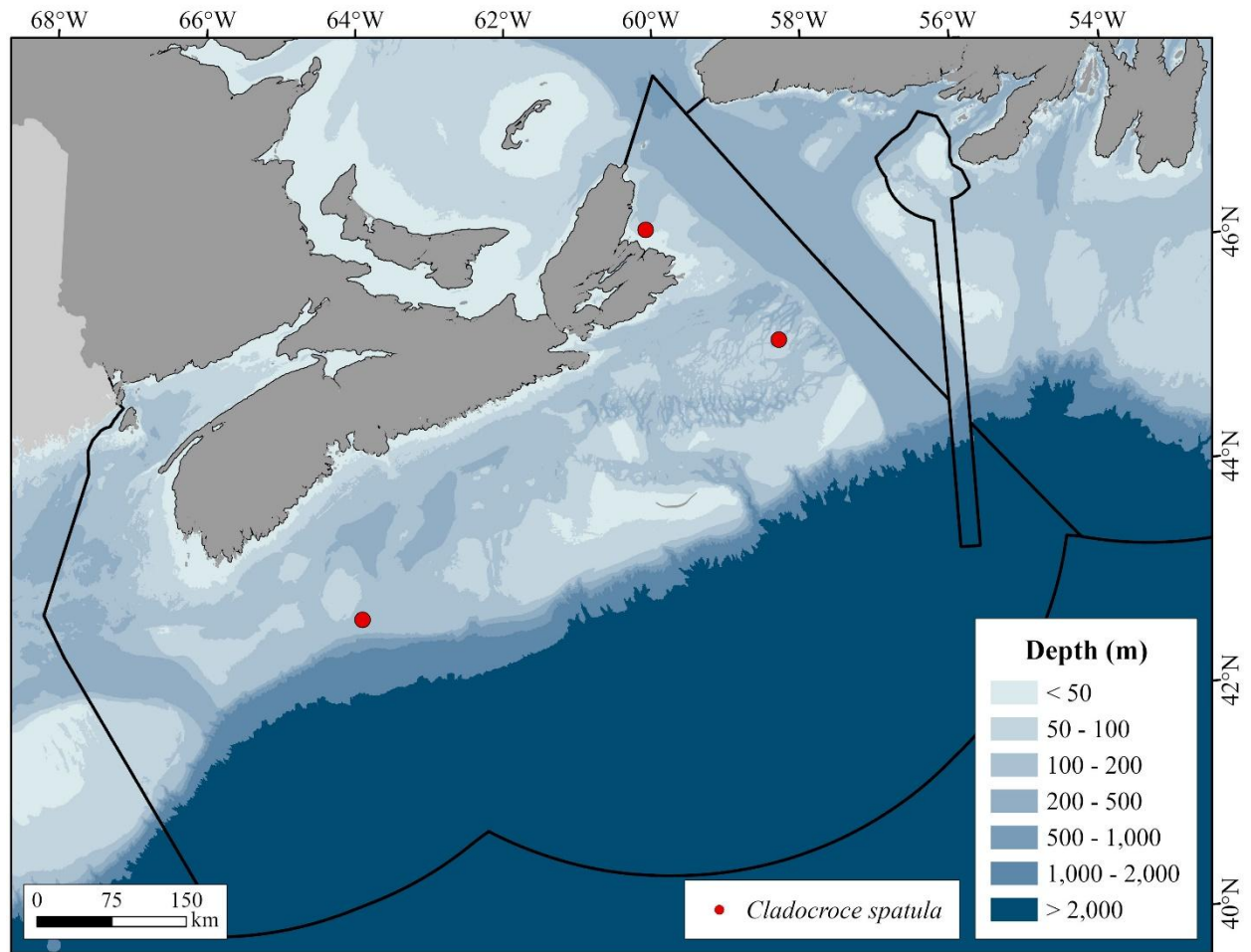


Figure 11. Records of *Cladocroce spatula* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Hemigellius arcofer* (Vosmaer, 1885)**

APHIA ID: 166752; **CLASS:** Demospongiae; **ORDER:** Haplosclerida; **FAMILY:** Niphatidae

External appearance (Figure 12A): Trawl collected specimens very large, flattened fragments of sponge. Many ostia visible over their surface. Spicule fibres in skeleton visible giving the sponge a woven appearance. The type specimen was also fragmented but Vosmaer hypothesised that the original shape was probably a fan.

Skeleton (Figure 12B): Formed of thick columns up to ten oxea across connected by single oxea.

Spicules (Figure 12C–E): Measurements from ARC 81484. Oxea: 356(397)430 by 14(18)22 µm, stout oxea with short tips. Sigmas: 11(15)17 µm. Toxas, stout ox-horn shaped, 93–114 µm. Lundbeck (1902) gives oxea 420 by 15–22 µm, toxas 57–178 µm and, sigmas 12–19 µm.

Distribution: The type locality is the Barents Sea. Also recorded from East Greenland (Lundbeck, 1902), Norway (Vosmaer, 1885; Burton, 1930) and the Laptev Sea (Fristedt, 1887). In Canada common in the Gulf of St. Lawrence (Dinn, 2020; Nozères *et al.*, 2020). Seven records from 66–165 m were confirmed from the NED2017020 RV survey (Figure 13).

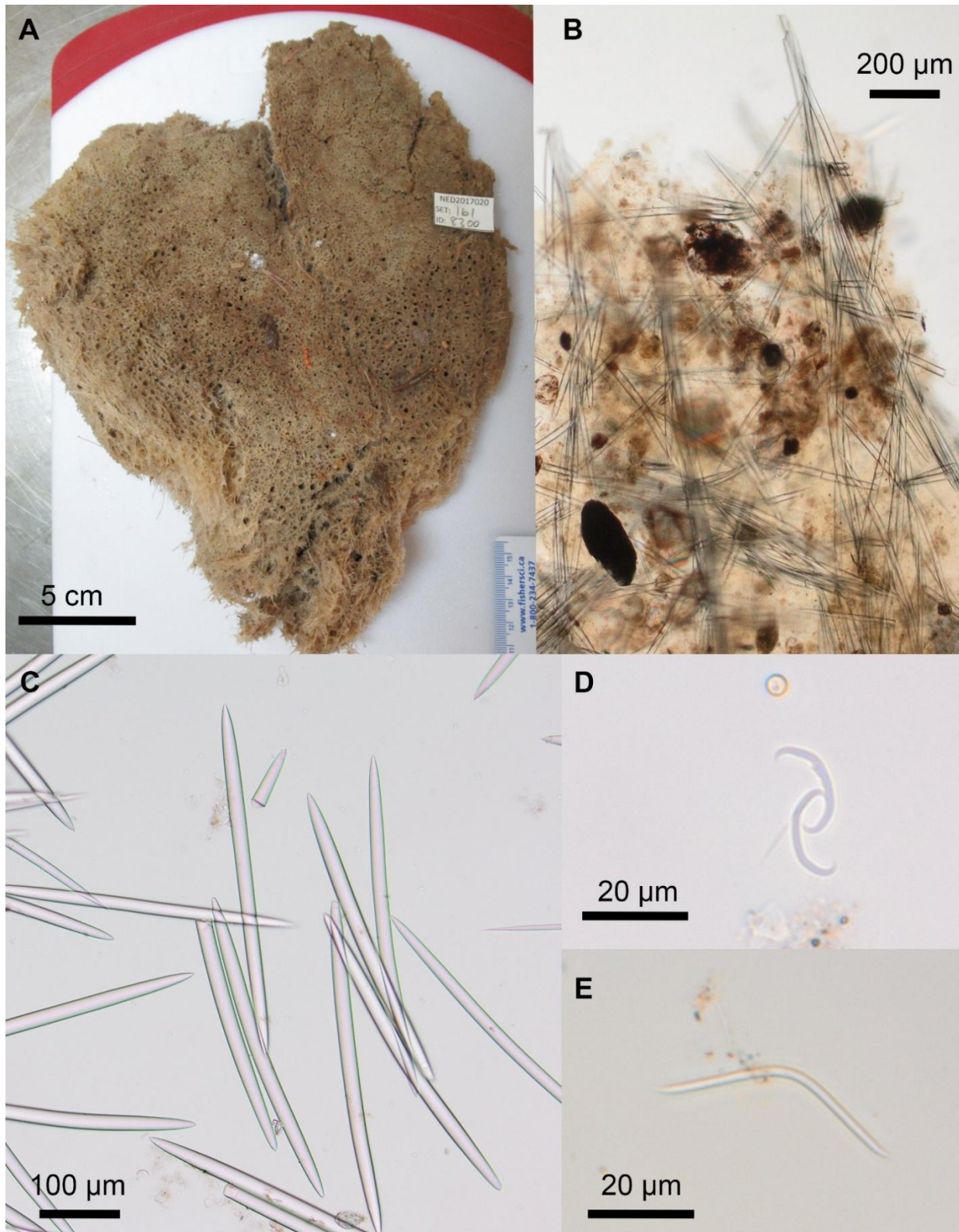


Figure 12. *Hemigellius arcofer*. A. Collected specimen ARC 81484; B. Skeleton; C. Oxea; D. Sigmas; E. Toxa. All ARC 81484.

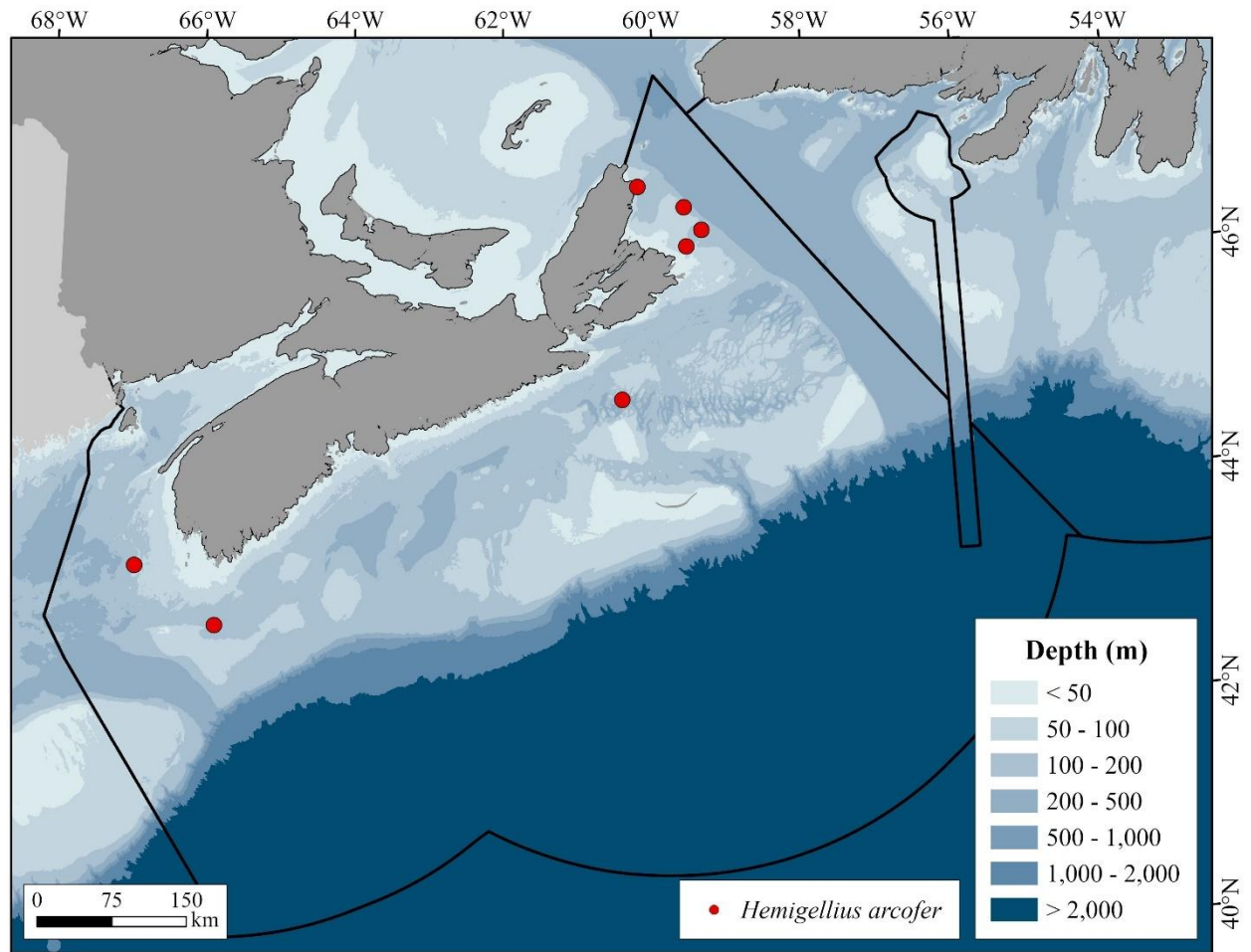


Figure 13. Records of *Hemigellius arcofer* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***lophon* cf. *koltuni* Morozov, Sabirov & Zimina, 2019**

APHIA ID: 1338205; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Acarnidae

External appearance (Figure 14A): Thickly encrusting yellow sponge which develops a brown tinge on collection.

Skeleton (Figure 14B): The choanosomal skeleton is a triangular meshed reticulation. With ascending fibres of up to four acanthostyles connected by bundles of 2–4 acanthostyles. The ectosomal skeleton is formed of a palisade of tylotes lying tangentially to the sponge surface.

Spicules (Figure 14C–G): Measurements from ARC 81469. Acanthostyles: 301(319)345 by 12(14)15 µm. Spined for most of their length but spines are fairly sparse. There is usually an unspined area at the tip. Tylotes: 245(272)308 by 8(9)12 µm. Ends slightly tylote and spined. Bipocilla: 11(14)18 µm. Unequidended. Robust alae with many teeth. Some of the teeth are long giving them a leaf like appearance. Chelae: Two size categories, 16(18)20 µm and 28(32)35 µm. Standard *lophon* palmate anisochelae with spine on basal end.

Distribution: The type locality of this species is the Laptev Sea. It was also recorded from the Barents Sea. This species has also been recorded from Frobisher Bay (Dinn *et al.*, 2019), and Hudson Bay (Bouchard Marmen *et al.*, 2019).

Remarks: In the original description of *I. koltuni* spicule dimensions are given as acanthostyles 226(297)325 by 6(10)12 µm; tylotes 250(266)286 by 6.5(8)10 µm; anisochelae 15(23)39 µm; and bipocilla 10(13)17 µm. So, the acanthostyles and tylotes in the type specimen are slightly smaller than those found in our specimens, and two categories of chelae are not mentioned. However, the chelae are in a similar size range and the bipocilla have a similar form. Dinn *et al.* (2019) reported *I. koltuni* from Frobisher Bay, with slightly smaller spicule size ranges than the type and specimens consisted of erect finger-like growths that could be 15–25 cm in height, quite different in appearance to our specimens which are massively encrusting.

lophon species from this region require taxonomic revision so our identification remains tentative at this point. The *lophon* species of the eastern coast of Canada require a complete taxonomic revision. There are possibly species new to science which require description from the Labrador Sea, Scotian Shelf (Claire Goodwin unpublished data) and Bay of Fundy (Goodwin, 2017). Confirming these requires revisiting the type material of all described species.

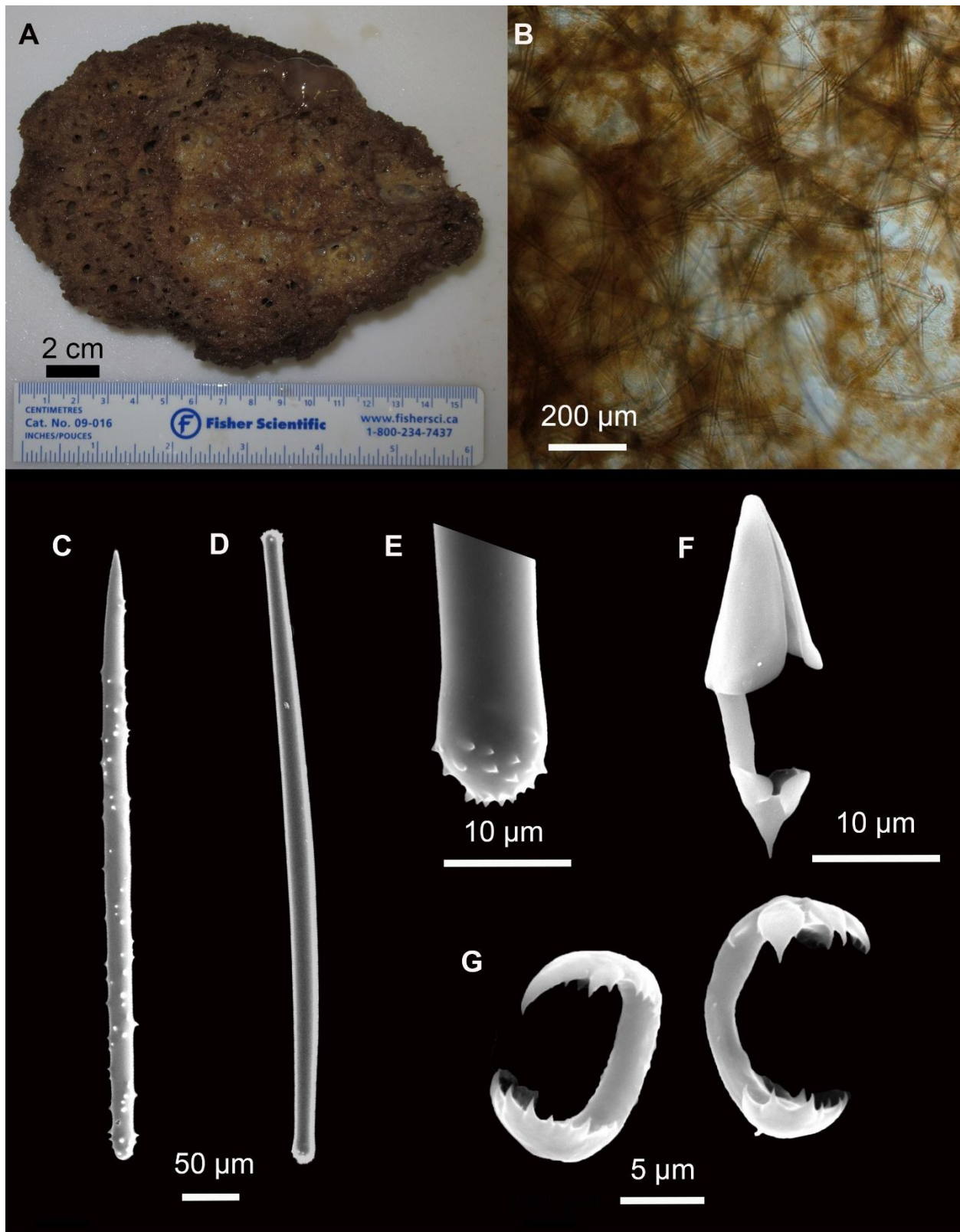


Figure 14. *Iophon cf. koltuni*. A. Freshly collected trawl specimen ARC 81469; B. Choanosomal skeleton; C. Style; D. Tylote; E. Tylote end; F. Chelae; G. Bipocilla.

***lophon cf. nigricans* (Bowerbank, 1858)**

APHIA ID: 1338205; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Acarnidae

External appearance (Figure 15A): Thickly encrusting yellow sponge which becomes a very dark brown on collection.

Skeleton (Figure 15B): The choanosomal skeleton is a triangular meshed reticulation with ascending fibres of up to four acanthostyles connected by bundles of 2–4 acanthostyles. The ectosomal skeleton is formed of a palisade of tylotes lying tangentially to the sponge surface.

Spicules (Figure 15C–H): Measurements from ARC 81465. Acanthostyles: 246(265)281 by 11(13)15 µm, sparsely spined. Tylotes: 219(242)256 by 5(8)11 µm. Ends slightly tylote and spined. Chelae: Two size categories, 18(19)21 and 30(32)35 µm. Standard *lophon* palmate anisochelae with spine on basal end. Bipocilla: 11(12)13 µm. Unequipped.

Distribution: The type locality is in Strangford Lough, Northern Ireland, UK. This species is common in the UK (Ackers *et al.*, 2007) and also reported from other areas of Europe, Greenland and the Barents Seas (Fristedt, 1887). There is an unconfirmed record from Cobscook Bay (Trott, 2004)

Remarks: The spicules in our specimens are similar to those reported in Ackers *et al.* (2007) who give acanthostyles 220(240)260 µm; tylotes 240(245)250 µm; anisochelae 10 and 26 µm and bipocilla circa 7.5 µm. The bipocilli pictured are similar to those in our specimens, although the size range is smaller.

The *lophon* species of the eastern coast of Canada require a complete taxonomic revision. There are possibly species new to science which require description from the Labrador Sea, Scotian Shelf (Claire Goodwin unpublished data) and Bay of Fundy (Goodwin, 2017). Confirming these requires revisiting the type material of all described species.

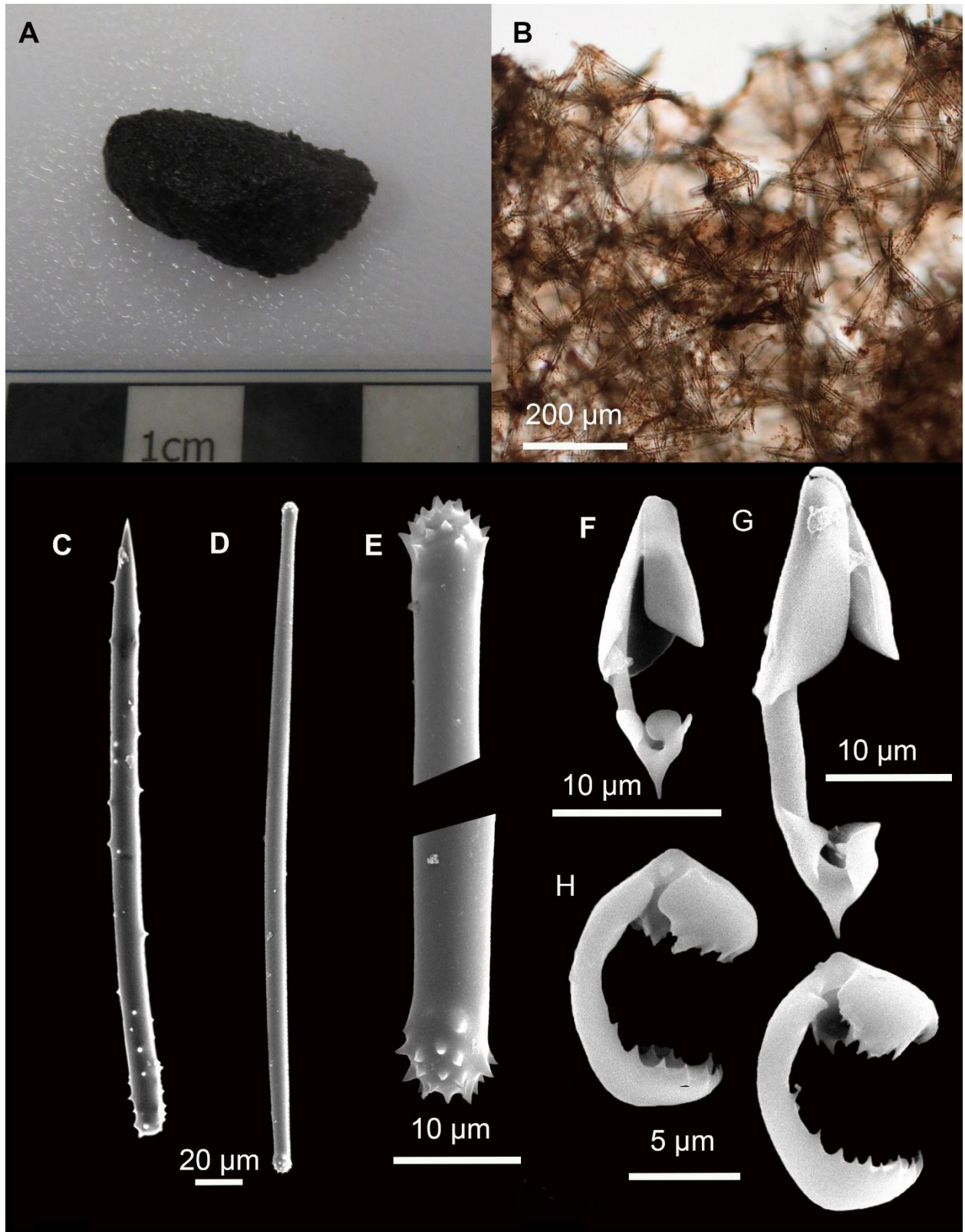


Figure 15. *Iophon cf. nigricans*. A. Freshly collected trawl specimen ARC 81465; B. Choanosomal skeleton; C. Acanthostyle; D. Tylote; E. Tylote ends; F, G. Chelae; H. Bipocilli.

***lophon* sp. 3 Gray, 1867**

APHIA ID: 131863; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Acarnidae

External appearance (Figure 16A): Thickly encrusting yellow sponge which becomes a very dark brown on collection.

Skeleton (Figure 16B): The choanosomal skeleton is a triangular meshed reticulation with ascending fibres of up to four acanthostyles connected by bundles of 2–4 acanthostyles. The ectosomal skeleton is formed of a palisade of tylotes lying tangentially to the sponge surface.

Spicules (Figure 16C–G): Measurements from ARC 81432. Acanthostyles: 245(275)281 by 9(11)13 μm . Entirely but sparsely spined. Tylotes: 201(242)258 by 2(7)9 μm . Thin tylotes with lightly swollen, spined ends. Bipocilli: 10(14)16 μm . Thin, unequipped with unequal ends and an elongated, curved, shaft. The form is open, in contrast to the tightly curled bipocilli found in other specimens. Chelae: 23–36 and 15–16 μm . Chelae are in two size categories, both rare. Standard *lophon* palmate anisochelae with spine on basal end.

Remarks: The *lophon* species of the eastern coast of Canada require a complete taxonomic revision. There are possibly species new to science which require description from the Labrador Sea, Scotian Shelf (Claire Goodwin unpublished data) and Bay of Fundy (Goodwin, 2017). Confirming these requires revisiting the type material of all described species.



Figure 16. *Iophon*. sp. 3. ARC 81432. A. Freshly collected trawl specimen; B. Choanosomal skeleton; C. Acanthostyle; D. Tylote; E. Tylote ends; F. Chelae; G. Bipocilla.

***Crella (Pytheas) cutis* Goodwin, Dinn, Nefedova, Nijhof, Murillo & Nozères, 2021**

APHIA ID: 1531932; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Crellidae

External appearance (Figure 17A, B): Massively encrusting species which has a distinctive leathery skin with many small conical papillae. The ectosome of preserved specimens is detachable as a very thin, translucent skin.

Skeleton (Figure 17P, Q): The ectosomal skeleton consists of a multilayered and dense skin of long acanthostyles, with tangential tylotes supporting the papillae. The skin can be several hundred microns thick. The choanosomal skeleton is formed by plumose bundles of mostly smooth acanthostyles with sigmas and isochelae scattered throughout with no discernable pattern. The spicule bundles ascend towards the ectosomal skin, but meander and converge. Echinating acanthostyles are present between the spicule bundles and are common in the basal skeleton near the substrate, especially obvious near embedded sand grains.

Spicules (Figure 17C–O): Choanosomal acanthostyles: 427(478)539 by 13(17)19 µm. Large, mostly smooth, and have a mucronate head, sometimes with multiple spines near the rounded head or scattered along the shaft. Tylotes: 360(389)413 by 8.9(10)12 µm. Fusiform and strongyle-like with minimal swelling at the ends. Large ectosomal acanthostyles: 294(331)384 by 11(12)14 µm. Choanosomal echinating acanthostyles: 99(132)192 by 7.0(9.6)11.5 µm. Arcuate isochelae: 21(24)27 µm (uncommon). Possess three or more pointed alae, often with a longer centre ala. Sigmas: 32(36)39 µm. C-shaped, narrow abruptly near the pointed end.

Distribution: The holotype is from the southern edge of the Laurentian Channel, near St. Paul Island. Common on the Scotian Shelf where it was collected from 82–227 m in the NED2017020 RV survey (Figure 18). Encountered often during trawl surveys in the Northern Gulf of St. Lawrence from 100–250 m depth. Collected several times from the Esquiman Channel up to the shelf west of Newfoundland. Found encrusting pebbles and often with many embedded sand grains (Goodwin *et al.*, 2021).

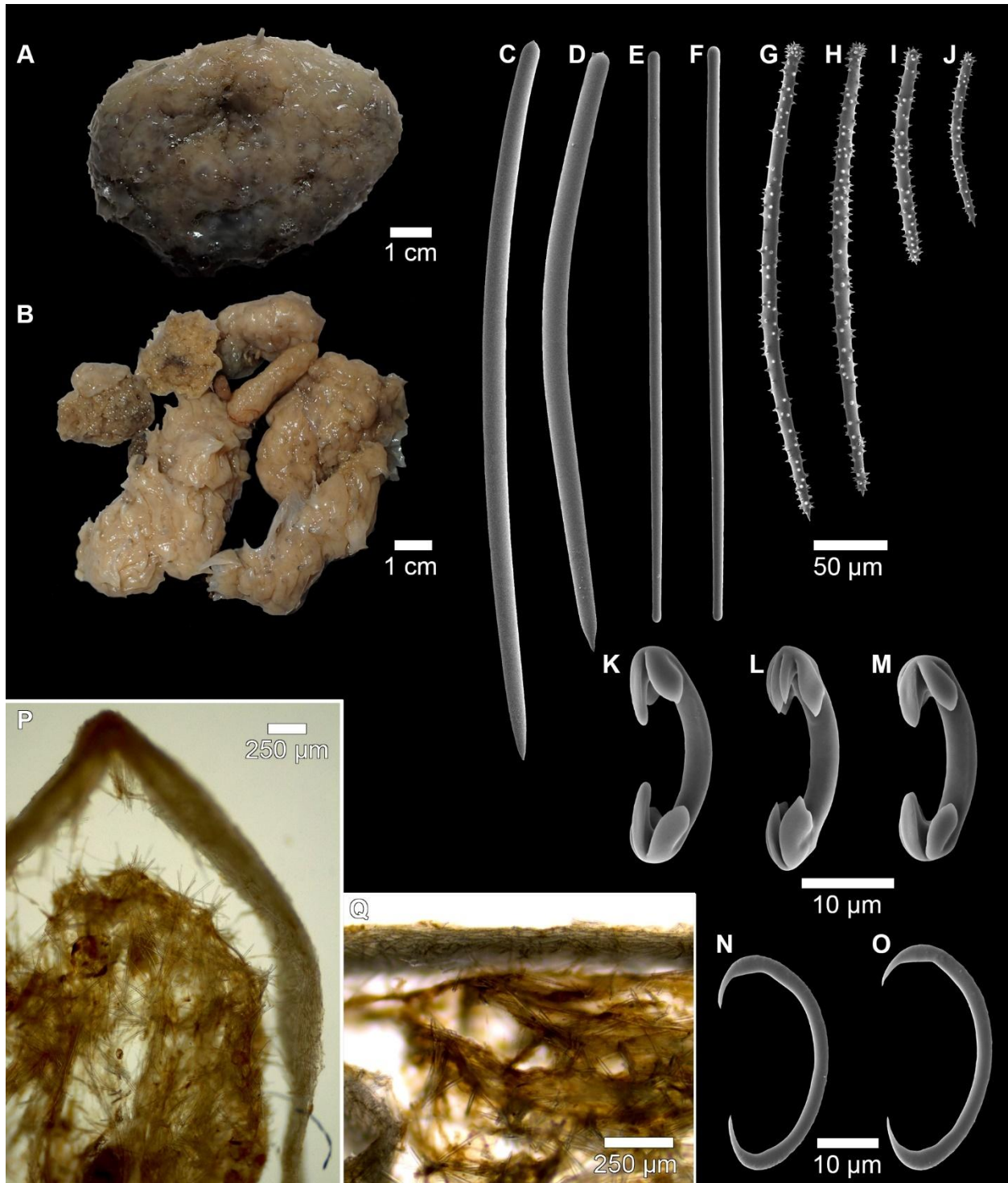


Figure 17. *Crella (Pytheas) cutis*. A.-B. Collected specimens; C.-D. Choanosomal acanthostyles; E.-F. Tyloes; G.-H. Ectosomal acanthostyles; I.-J. Echinating/basal acanthostyles; K.-M. Isochelae; N.-O. Sigmas; P.-Q. Skeleton. Modified from Goodwin *et al.* (2021).

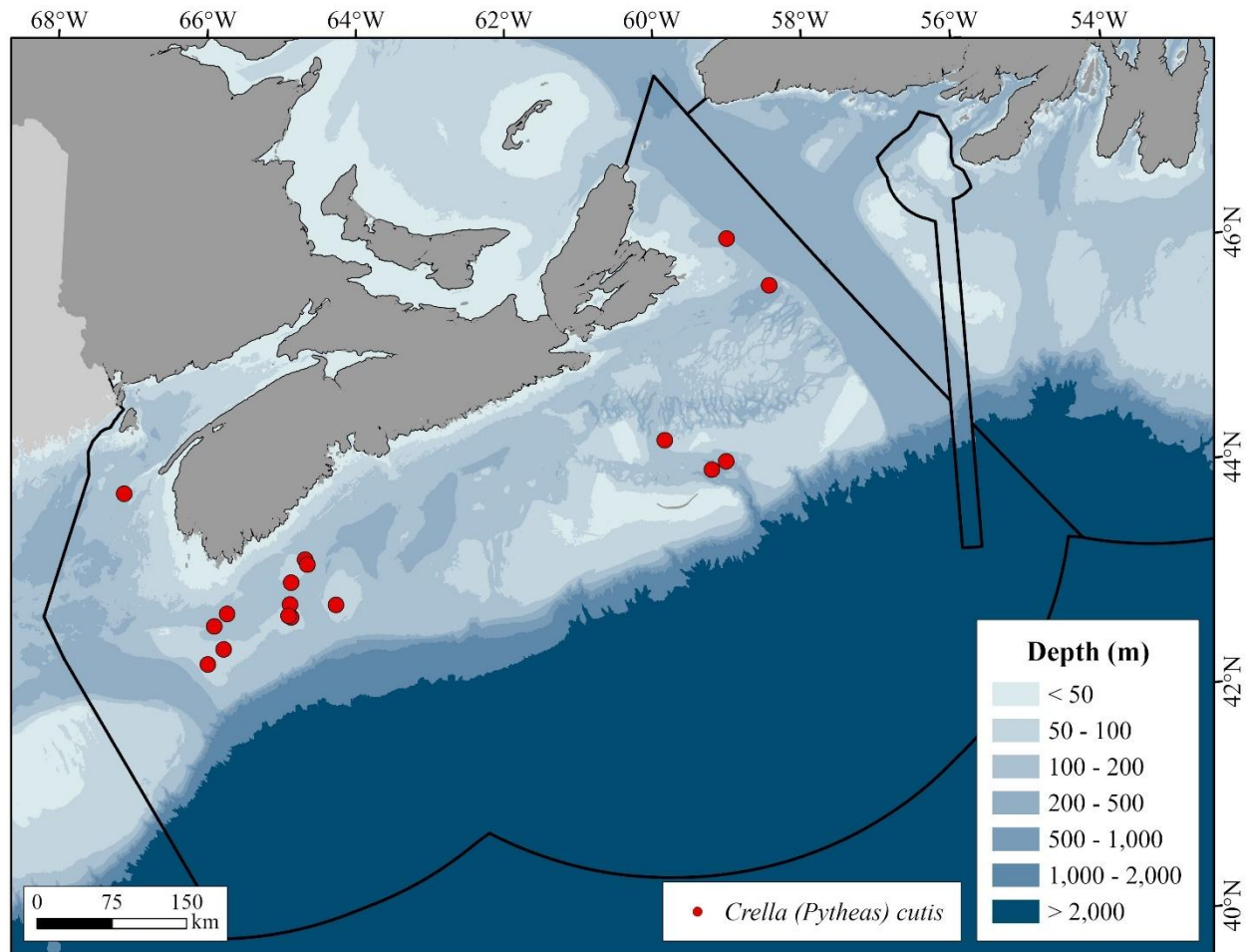


Figure 18. Records of *Crella (Pytheas) cutis* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Esperiopsis villosa* (Carter, 1874)**

APHIA ID: 133272; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Esperiopsidae

External appearance (Figure 19A, B): Brown sponge with obvious fibres. Our specimens were quite broken. Lundbeck (1905) describes this species as erect and irregularly leaf shaped with a shaggy surface and oscula along the fan edge.

Skeleton (Figure 19C): Irregularly anastomosing network of thick fibres; Lundbeck (1905) reports around 350 µm thick. The ends of the fibres pierce the surface, creating the shaggy texture.

Spicules (Figure 19D, E): Styles, palmate isochelae (2 size categories) and sigmas. Measurements are given for two specimens. ARC 81492. Styles: 541(623)676 by 11(14)19 µm. Chelae: 72(89)103 µm and 17(21)26 µm. Sigmas: 49(62)107 µm. ARC 81493. Styles: 598(625)656 by 15(17)20 µm. Chelae: 92–128 µm (rare), 38–54 µm and 12–25 µm. Sigmas 32–159 µm. Lundbeck's description (1905) gives styles 500–750 by 10–20 µm; chelae 80–120, 78–92 and 21–35 µm, and sigmas 45–190 µm. Bouchard Marmen *et al.* (2019) report sigmas up to 203 µm. Our specimens have smaller chelae than described in these two references. The chelae can be hard to divide into categories as noted by Bouchard Marmen *et al.* (2019) but ours correspond with the overall size range despite only two obvious categories being present.

Distribution: The type locality for this species is the Faroe Plateau. Also recorded from Iceland, Denmark Strait and Davis Strait (Bouchard Marmen *et al.*, 2019; Lundbeck, 1905), the Barents Sea (Koltun, 1959) and European waters (de Voogd *et al.*, 2025). Two records from 218–433 m were confirmed from the NED2017020 RV survey (Figure 20).

Remarks: Several other *Esperiopsis* species are present in the North Atlantic but these are mainly encrusting and with different spicule complements. Lundbeck (1905) reports that Carter (1874) said the large chelae of this species, were like a weaver's shuttle. The alae continue along much of the shaft and only a short space in the middle is free.

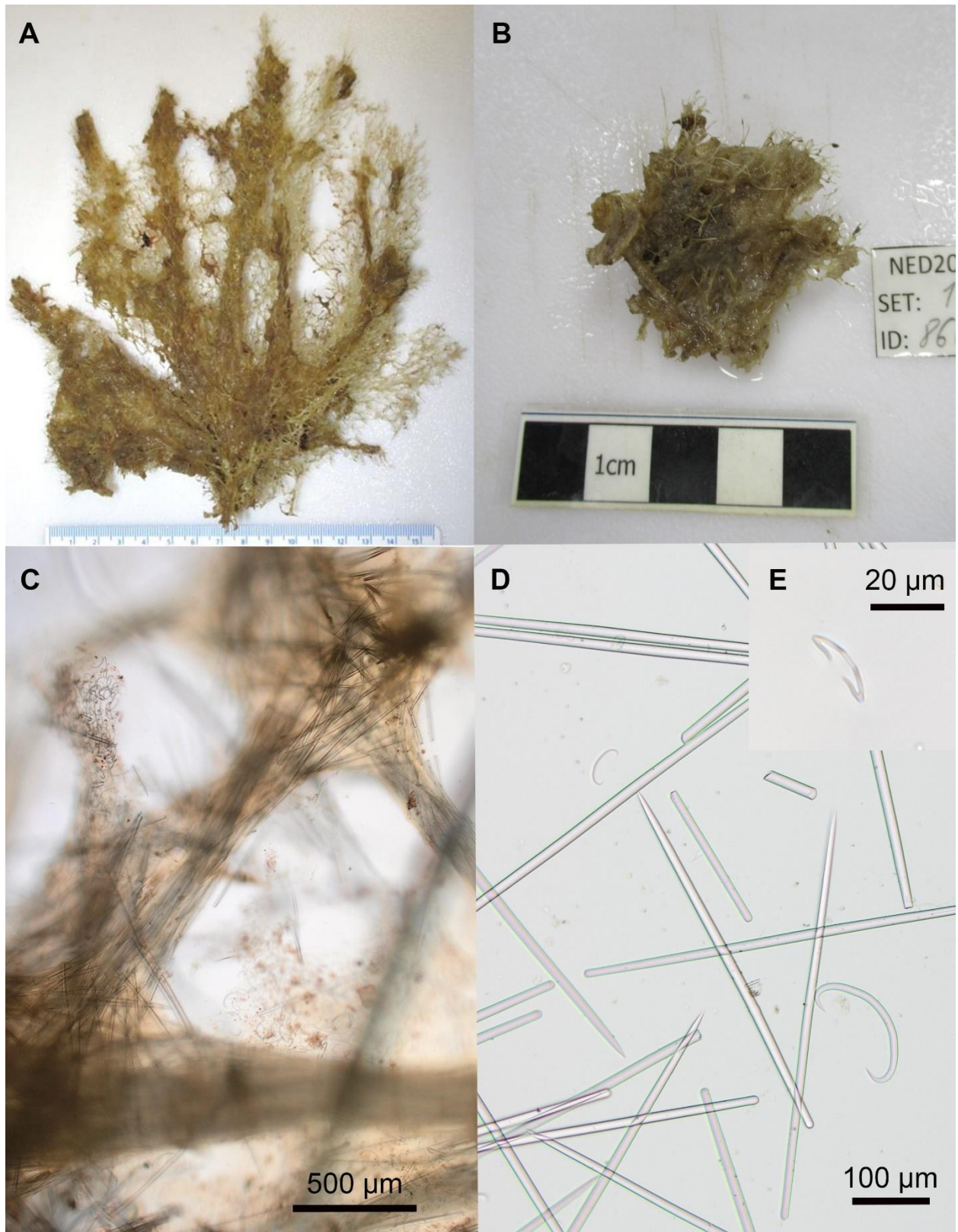


Figure 19. *Esperiopsis villosa*. A. Collected specimen ARC 81492; B. Collected specimen ARC 81493; C. Skeleton ARC 81493; D–E. Spicules ARC 81493.

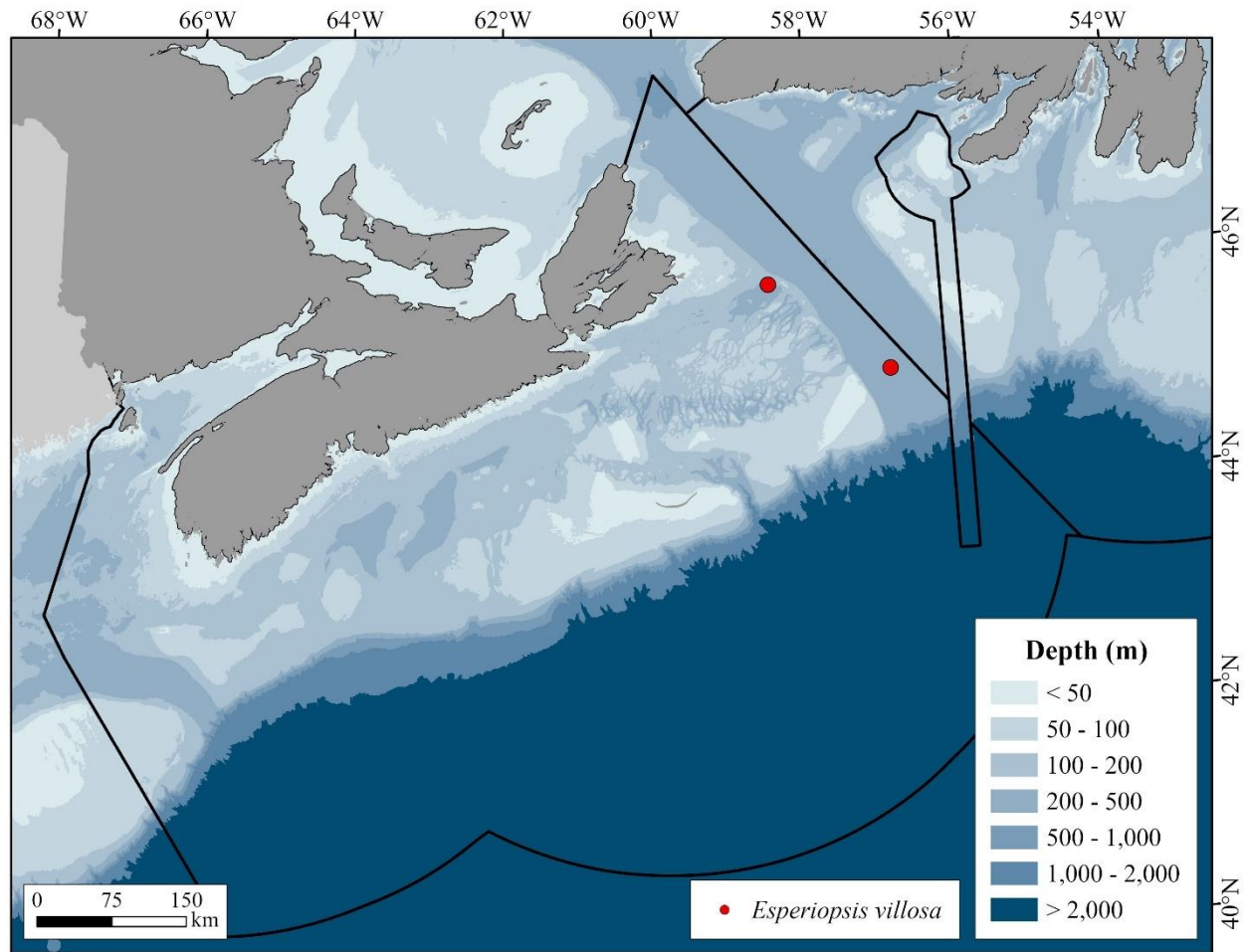


Figure 20. Records of *Esperiopsis villosa* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Semisuberites cribrosa* (Miklucho-Maclay, 1870)**

APHIA ID: 168379; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Esperiopsidae

External appearance (Figure 21A): Vase shaped sponge which can be over 15 cm tall. Long, cylindrical stalk up to 5 cm long, attached by a root-like holdfast (Van Soest *et al.*, 2000). The diameter of the cup can approach 35 cm, and the sponge can extend up to 25 cm in height (Dinn *et al.*, 2020). The surface is smooth and the sponge is firm and difficult to tear.

Skeleton (Figure 21B): In the choanosome, there are ascending columns of styles (5-10 spicules thick) these fan out at the surface to form dense ectosomal brushes.

Spicules (Figure 21C): Fairly thin styles. No microscleres. Measurements are 406(455)489 by 5(8)11 μm for specimen ARC 81440 and 256(387)461 by 6(9)11 μm for specimen ARC 81471. Dinn *et al.* (2020) report 186(390)540 by 6(10)14 μm from their species from the Gulf of St. Lawrence. Van Soest (2016) reports a similar size range but divides them into two categories (215–260 by 5–7 and 500–565 by 9–11 μm).

Distribution: Type locality is the Sea of Okhotsk, in the Western Pacific. Circum-Arctic distribution (de Voogd *et al.*, 2025). In Canada this species has been recorded from the Gulf of St Lawrence from 34–289 m (Dinn *et al.*, 2020; Nozères *et al.*, 2020) and tentatively from Ungava Bay, as *Semisuberites* cf. *cribrosa* (Bouchard Marmen *et al.*, 2019). Seven records from 62–227 m were confirmed from the NED2017020 RV survey (Figure 22).

Remarks: Might have been previously confused with *Phakellia ventilabrum* (Linnaeus, 1767) in eastern Canada (Dinn *et al.*, 2020). *P. ventilabrum* is also vase shaped but possesses strongyles.

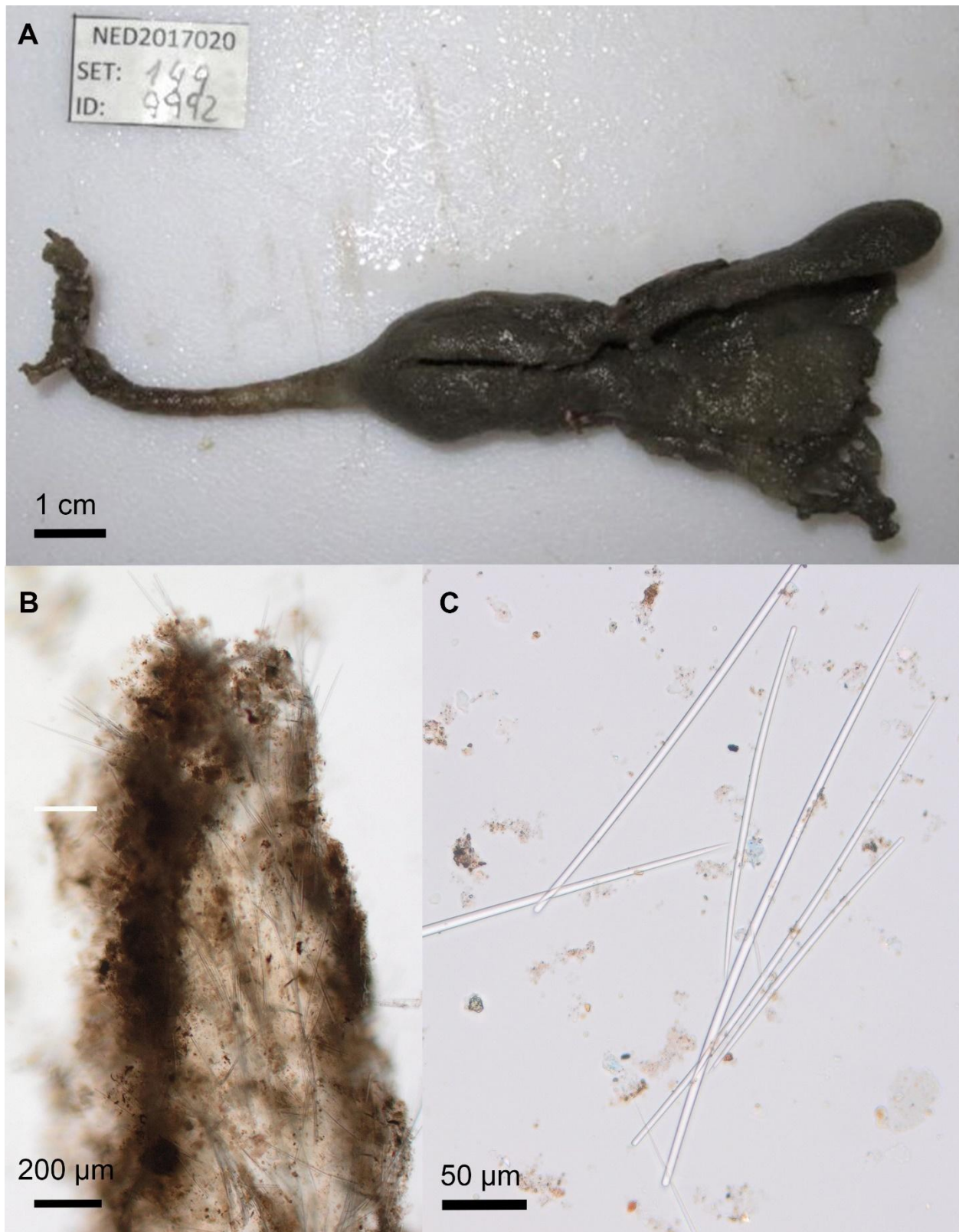


Figure 21. *Semisuberites cribrosa*. A. Freshly collected trawl specimen ARC 81471; B. Skeleton ARC 81440; C. Spicules ARC 81440.

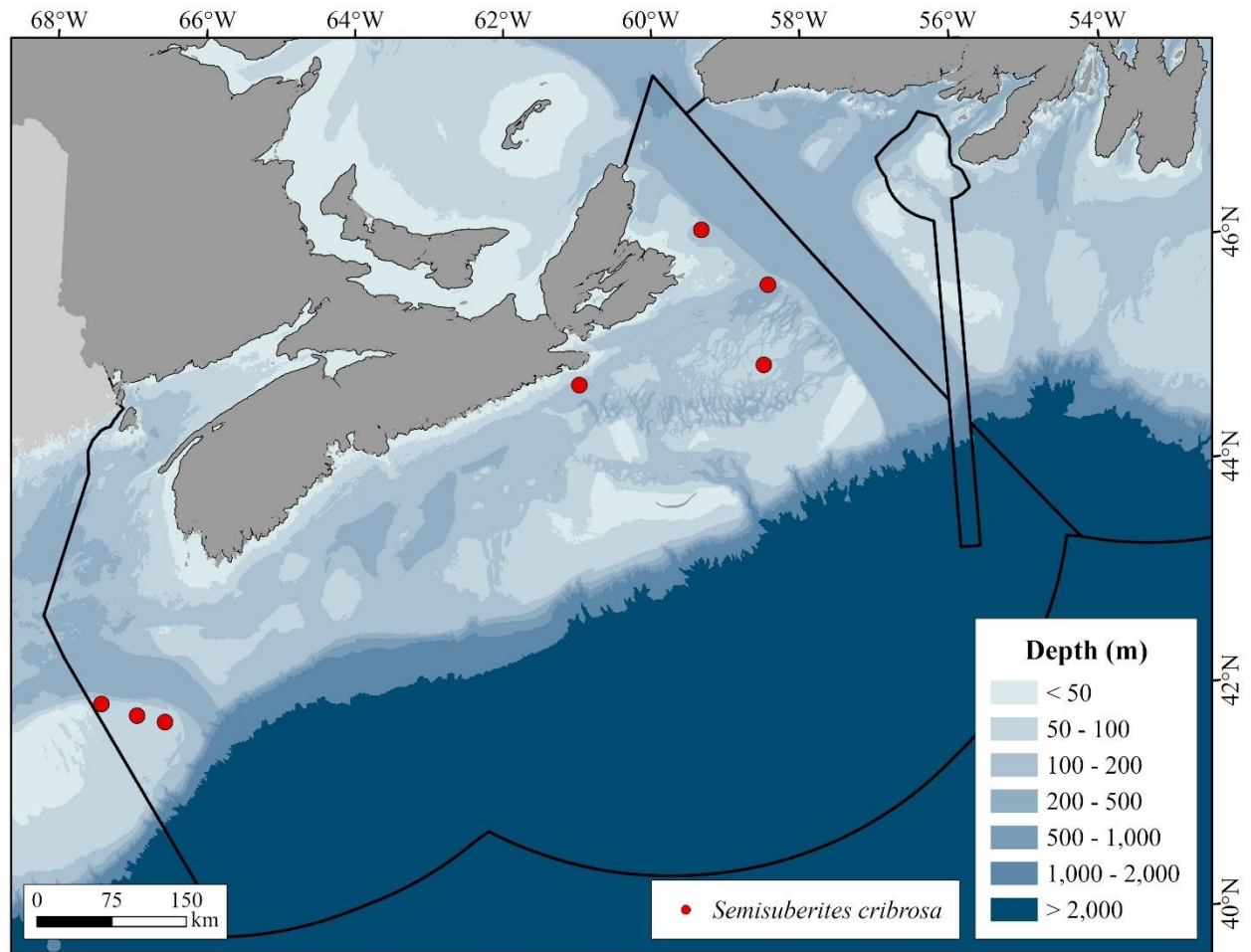


Figure 22. Records of *Semisuberites cribrosa* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Isodictya palmata* (Ellis & Solander, 1786)**

APHIA ID: 133247; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Isodictyidae

External appearance (Figure 23A, B): Flattened lobes or rounded fingers that can be very long (our specimens > 15 cm). Colour when freshly collected is beige. The surface is slightly shaggy from projecting fibres. Oscula around 0.5–1 mm scattered over the sponge surface.

Van Soest *et al.* (2000) say specimens can be up to 35 cm with variable finger-like compressed branches up to 2.5 cm wide. A living specimen from the UK was yellow/light brown (Ackers *et al.*, 2007). A specimen observed in shallow waters in the Bay of Fundy was beige (Goodwin, unpublished data), as were collected specimens from deeper waters whereas *Isodictya deichmannae* is usually bright orange.

Skeleton (Figure 23D): Plumo-reticulate skeleton of columns of oxea up to 10 spicules thick.

Spicules (Figure 23C): Oxea, often bent in the middle, with sharply tapered points. Palmate chelae. Measurements from ARC 81527: oxea 180–275 by 4–13 µm and chelae 26–32 µm. Measurements from ARC 81526: oxea 160–242 by 4–13 µm and chelae 30–38 µm. Measurements from ARC 81483: oxea 239(260)297 by 12(15)18 µm and chelae 35(39)45 µm. Van Soest *et al.* (2000) give oxea dimensions as 130–265 by 4–17 µm and chelae as 17–35 µm.

Distribution: The type locality is in the North Sea (Europe). Found in the boreal and sub-arctic North Atlantic including Orkney, Faroes, between Faroes and Iceland, Norway; NE America (Van Soest *et al.*, 2000). Two records from 82–128 m were confirmed from the NED2017020 RV survey (Figure 24).

Remarks: Van Soest *et al.* (2000) note that this species can be distinguished from *Haliclona oculata* by the presence of oscula arranged in groups along the faces of its branches, rather than mainly on the narrower sides of the compressed branches as in *H. oculata*. However, separation based on external appearance can be difficult, given the variation in morphology, even for those with some experience. Examination of spicules is often required to definitively confirm identification.

It has been suggested that this species may be conspecific with *Isodictya deichmannae* (de Laubenfels, 1949). Van Soest *et al.* (2000) suggested this on the basis that specimens bearing styles and oxea occur sympatrically and the habit and chelae are identical.

We have specimens which correspond to the description of *I. deichmannae* from the Scotian shelf from the RV surveys (but not covered here) and shallower waters in the Bay of Fundy and on the Scotian Shelf (C. Goodwin, unpublished data). These have styles which are smaller than the oxea found in these specimens (145(175)205 by 5(9)11 µm) and smaller chelae (19(22)24 µm). These seem to be good morphological distinguishing characters, so we have maintained the separation here. However, as noted by Van Soest *et al.* (2000) occasionally Scotian Shelf RV survey specimens do have a mixture of styles and oxea. Additional molecular and morphological taxonomic work is warranted to explore possible synonymy.

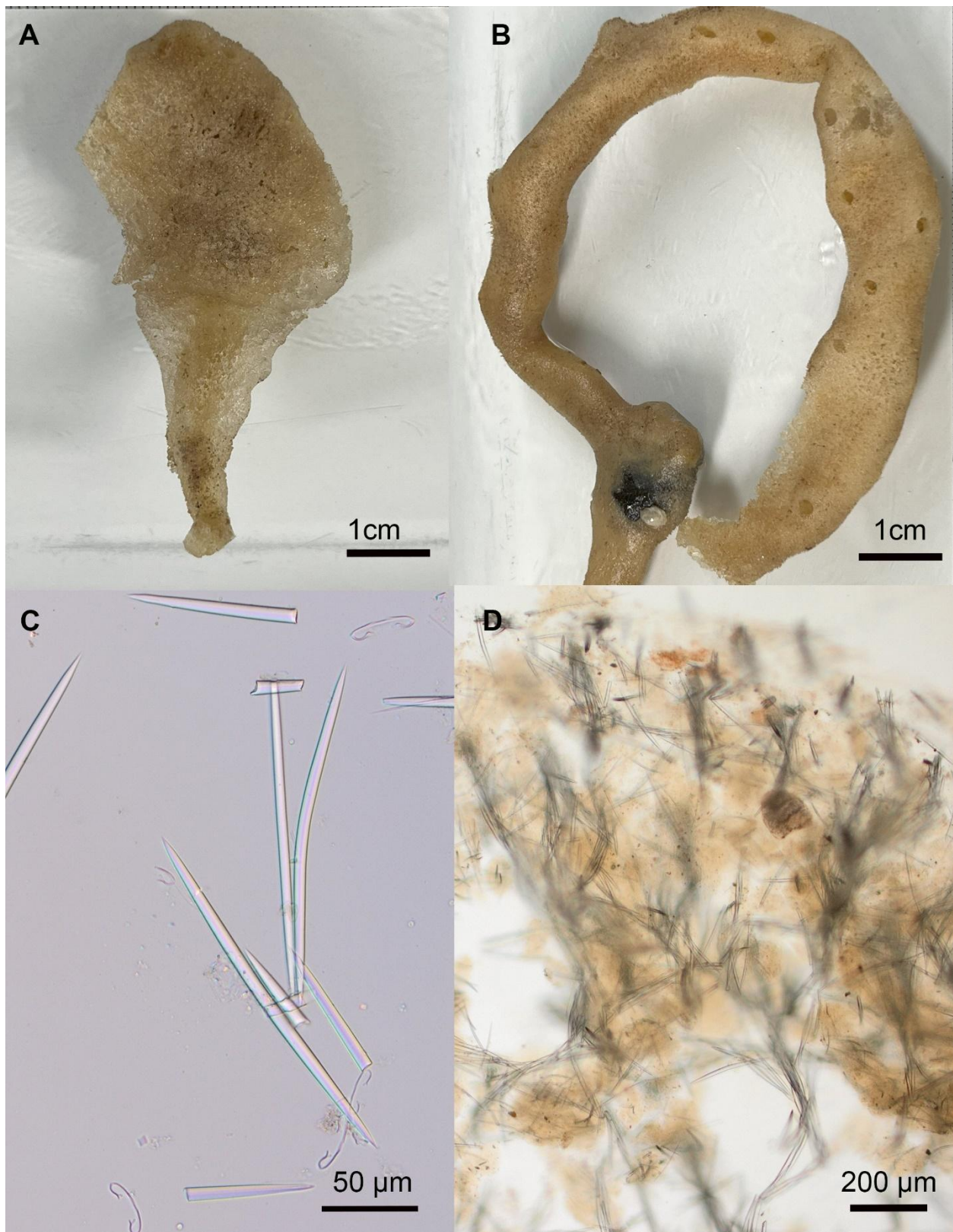


Figure 23. *Isodictya palmata*. Freshly collected specimens: A. ARC 81526; B. ARC 81527; C. Spicules (oxea and chelae) from ARC 81527; D. Skeleton from ARC 81527.

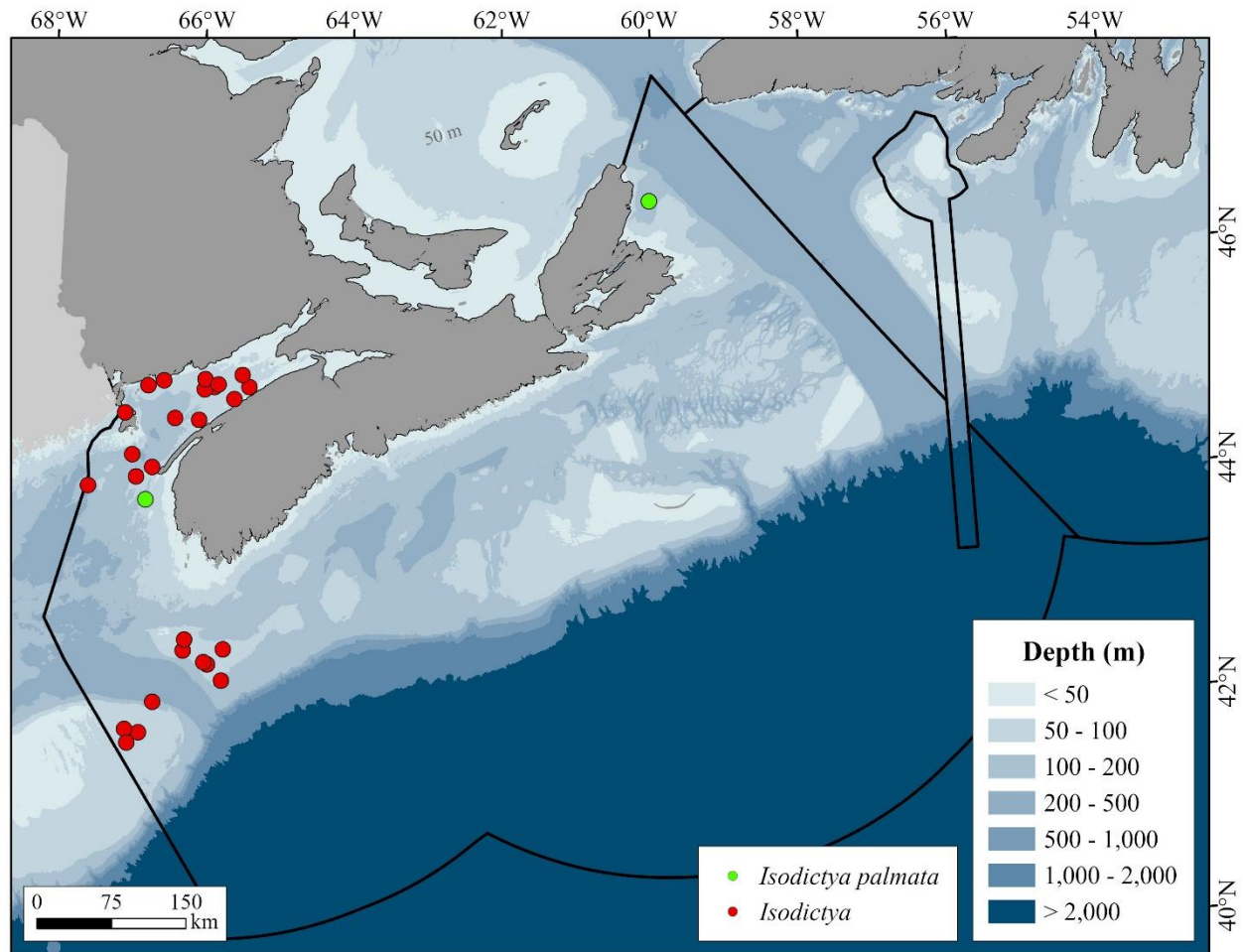


Figure 24. Green dots indicate the records of *Isodictya palmata* specimens ARC 81526 and ARC 81483. Red dots indicate additional records of *Isodictya* from the NED2017020 RV survey which can include both *Isodictya palmata* and *Isodictya deichmannae*. They are not separated here due the difficulty separating the species in the field. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Artemisina arcigera* (Schmidt, 1870)**

APHIA ID: 132992; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Microcionidae

External appearance (Figure 25A): Globular or cushion shaped grey (shipboard) sponge around 5 cm maximum diameter with a smooth, velvety surface. Oscula with raised rims irregularly scattered over the surface.

Skeleton (Figure 25B): There is an ectosomal palisade formed of brushes of subtylostyles carried by sub-ectosomal bundles of styles. The choanosomal skeleton is very confused with many single styles and a few bundles.

Spicules (Figure 25C–E): Measurements from ARC 81477: subtylostyles are 482(548)618 by 6(8)11 µm, toxas, thin and deeply curved with heavily spined ends, are 165(188)241 µm and palmate isochelae are around 8 µm, which makes these hard to see under the light microscope. Measurements correspond well to those given in Van Soest *et al.* (2000), choanosomal subtylostyles 450–650 by 6–9 µm, ectosomal subtylostyles 290–428 by 9–18 µm, toxas 70–320 µm and chelae 7–15 µm.

Distribution: The type locality is on the West Greenland Shelf. Widespread in the Arctic and north Atlantic (de Voogd *et al.*, 2025). Previously recorded from the Scotian Shelf near Halifax in 118 m (Ridley and Dendy, 1886). Other Canadian records from Baffin Bay/Davis Strait and Northern Labrador (Bouchard Marmen *et al.*, 2019) and the Gulf of St. Lawrence where it is common (Dinn, 2020; Nozères *et al.*, 2020). Sixteen records from 82–433 m were confirmed from the NED2017020 RV survey (Figure 26).

Remarks: The Latin species name derives from *arciger* meaning carrying a bow and refers to the toxas.

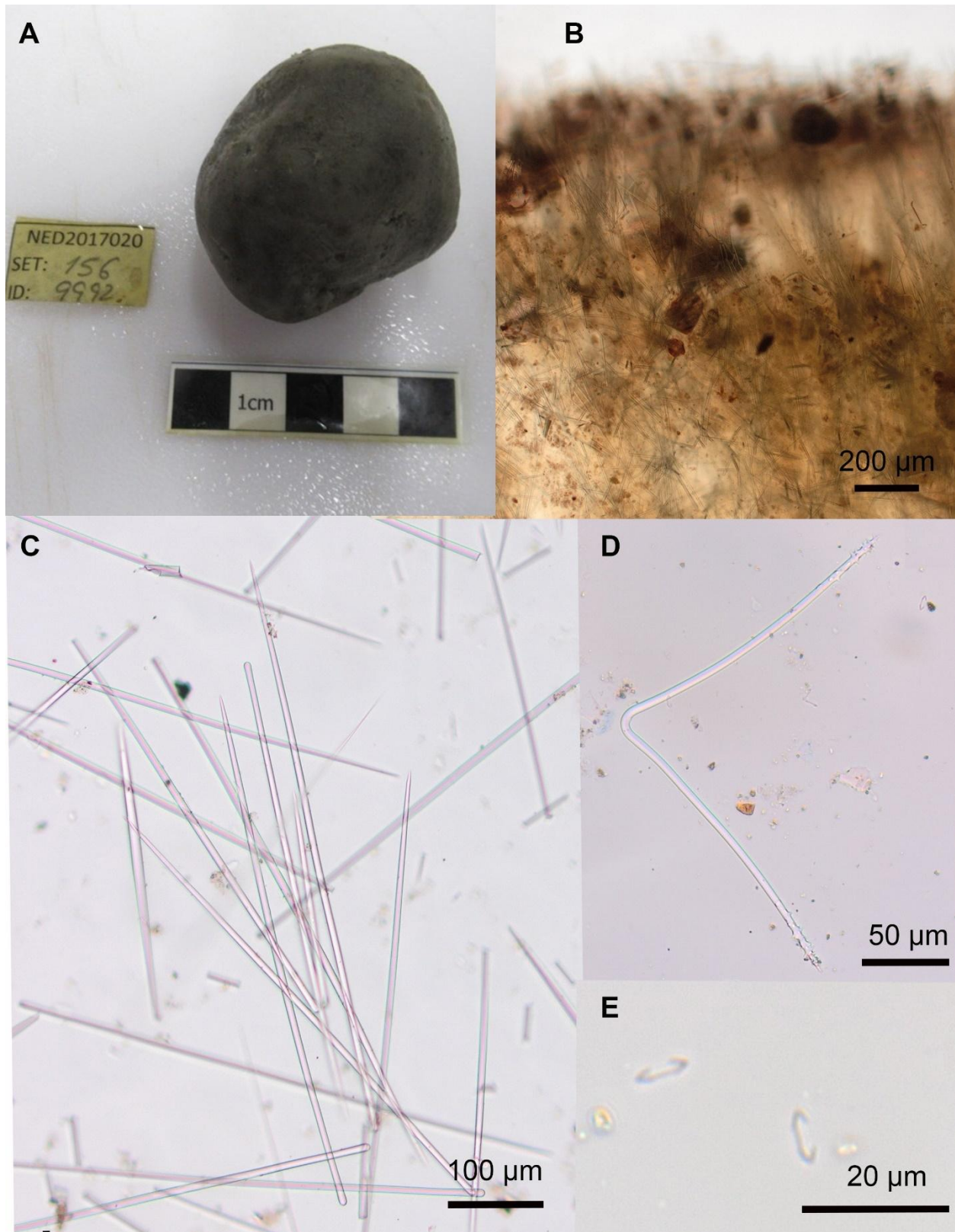


Figure 25. *Artemisina arcigera*. ARC 81477. A. Freshly collected trawl specimen; B. Skeleton; C. Styles; D. Toxas; E. Chelae.

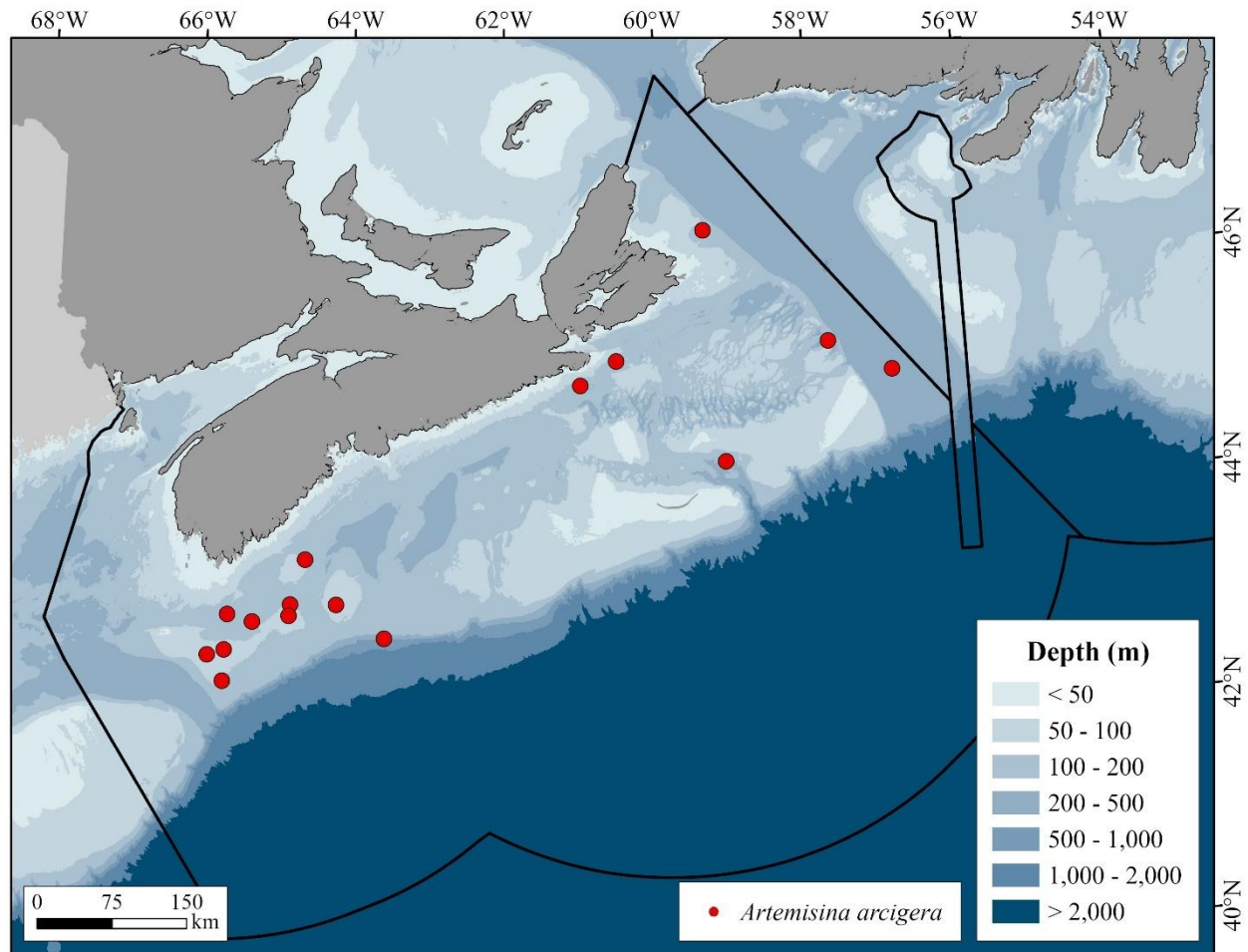


Figure 26. Records of *Artemisia arcigera* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Mycale (Mycale) lingua* (Bowerbank, 1866)**

APHIA ID: 168640; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Mycalidae

External appearance (Figure 27A, B): This sponge is normally massively encrusting, and specimens are pale yellow when living. They have distinctive channels (sulcate grooves) on their surface. Trawled specimens were often very broken up. Large spicule fibres were often visible. Sponges accumulated silt in the trawl and were often a greyish colour.

Skeleton (Figure 27C): The choanosomal skeleton is plumoreticulate, formed of thick columns of mycalostyles. The ectosome is composed of a felted tangential mass of mycalostyles.

Spicules (Figure 27D–G): Measurements from ARC 81467. Mycalostyles: 459(497)534 by 10(14)19 μm . Palmate anisochelae in two size classes: large chelae (in rosettes): 64(79)88 μm and small chelae: 30(44)54 μm . Sigmas abundant 20–25 μm . Trichodragmata were not found in ARC 81467 and many other specimens but were present in ARC 81431, measuring around 50 μm . The spicules size is a good match for that given in Van Soest *et al.* (2000) although they note that mycalostyles in this species can be 460–1150 by 13–20 μm , the upper range being much larger than found in our specimens. Ackers *et al.* (2007) give style size range of 460–560 μm .

Remarks: *M. lingua* is common in the Bay of Fundy, where it is found in depths as shallow as 10 m (Goodwin, 2017). It was common in deeper waters of the Scotian Shelf but not found in diving depths at the Eastern Shore Islands (Goodwin *et al.*, 2025). This species is widely distributed across the north Atlantic from Spitzbergen to the Azores (Van Soest *et al.*, 2000). It is common in the Gulf of St. Lawrence (Dinn, 2020). Forty-six records from 57–944 m were confirmed from the NED2017020 RV survey (Figure 28).

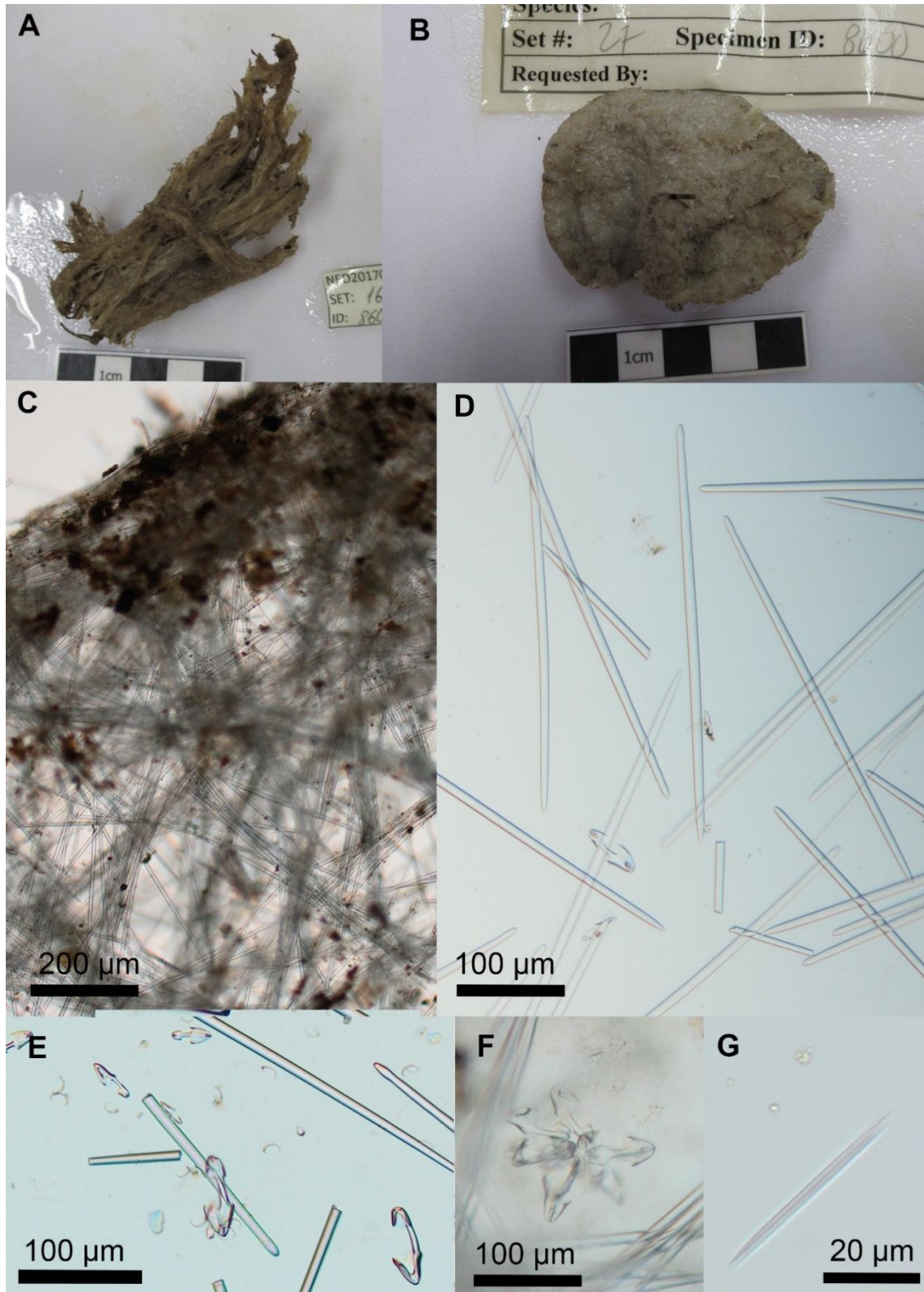


Figure 27. *Mycale (Mycale) lingua*. Freshly collected trawl specimens: A. ARC 81485, B. ARC 81518; C. Skeleton from ARC 81431; D. Mycalostyles from ARC 81467; E. Chelae (two size classes) and sigmata from ARC 81538; F. Chelae rosette from ARC 81467; G. Trichodragmata from ARC 81431.

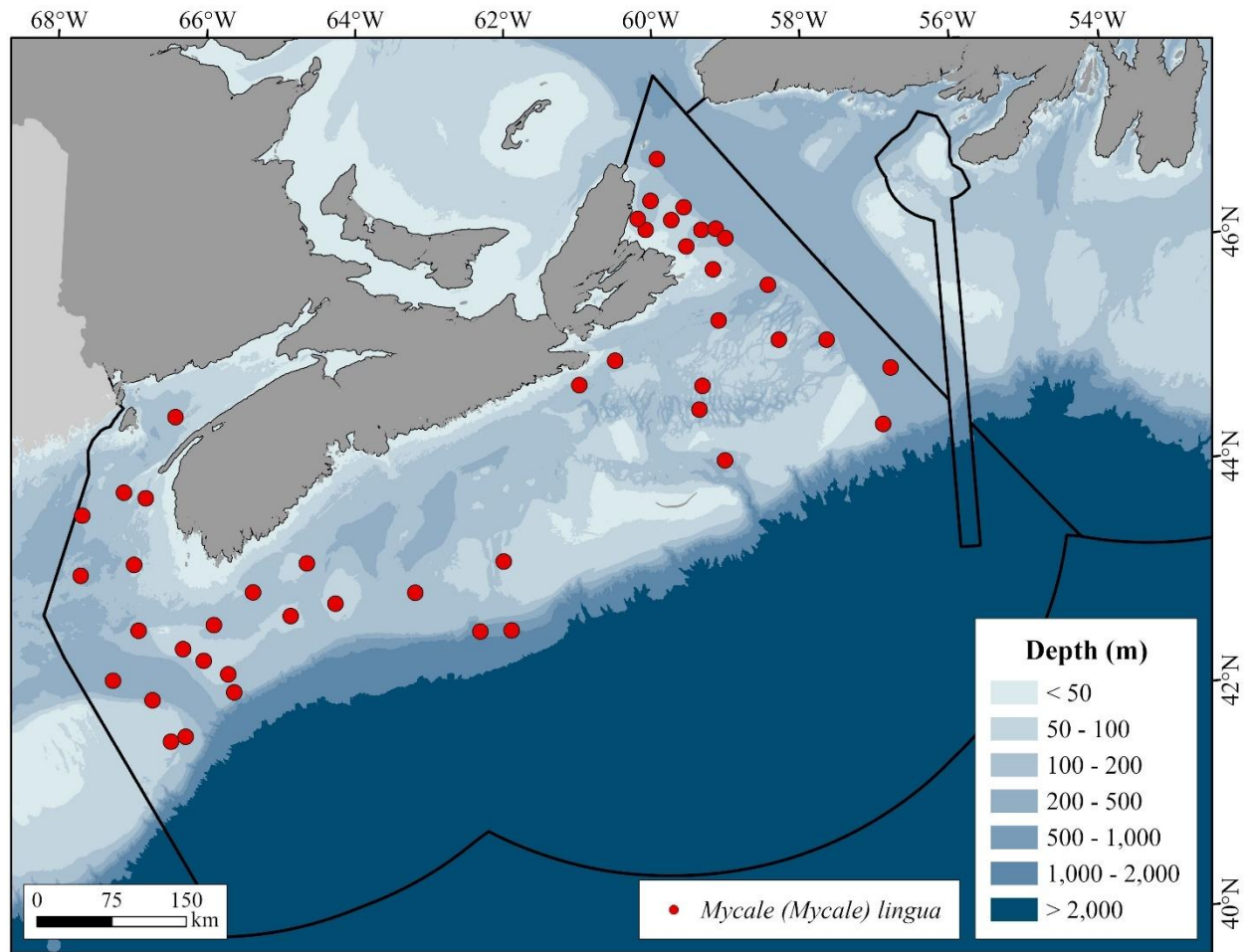


Figure 28. Records of *Mycale (Mycale) lingua* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Myxilla (Myxilla) fimbriata* (Bowerbank, 1866)**

APHIA ID: 169461; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Myxillidae

External appearance (Figure 29A, B, D): Bright orange sponge forming low, thick cushions or mounds. Large oscula (up to 10 mm in diameter) are sparsely scattered across the surface and sub-surface spaces are visible through the ectosomal membrane, giving the sponge a punctate appearance. When preserved in alcohol the tissue turns a dark chocolate brown and shipboard specimens are also a dark brown colour.

Skeleton (Figure 29C): The choanosomal skeleton is a regular reticulation of acanthostyles. The ectosomal skeleton is formed of a tangential layer of tornotes.

Spicules (Figure 29E, F): Measurements from ARC 82167. Acanthostyles: 189(253)329 by 7(9)13 µm sparsely spined. Tornotes: 173(209)252 by 6(7)9 µm Abruptly pointed ends, often mucronate. Chelae: 21(24)27 µm spatuliferous anchorate chelae. These have the fimbriae which are distinctive for the species. A second category of larger chelae 60–70 µm in length was found in some specimens. These were rare and not found in other specimens. Sigmata: Not recorded. The spicule form and sizes recorded are a good match for that given by Van Soest *et al.* (2000): acanthostyles: 265(300)350 µm, tornotes: 265(300)350 µm, chelae: 27 and 60 µm (two size classes). The tornotes are smaller in our specimens, as reported from the Bay of Fundy (Goodwin, 2017).

Distribution: Very common on the Scotian Shelf and Eastern Shore. Elsewhere in eastern Canada it is also common in the Quoddy Region of the Bay of Fundy (Ginn *et al.*, 1998; Goodwin, 2017) and has been recorded from Cobscook Bay Maine (Trott, 2004), Mount Desert, Maine (Procter, 1933), and the eastern Arctic (Baker *et al.*, 2018a). This species is widespread in the Atlantic and Arctic, it has been found in the Faroes, Norway, Sweden, Northern France and the British Isles in north-eastern Europe (Van Soest *et al.*, 2000). There are also records from Greenland and Iceland (Lundbeck, 1905) and Baffin Bay to the Davis Strait (Fristedt, 1887). Thirteen records from 48–188 m were confirmed from the NED2017020 RV survey (Figure 30).

Remarks: The Latin species name refers to the visible fimbriae of the large anchorate chelae.

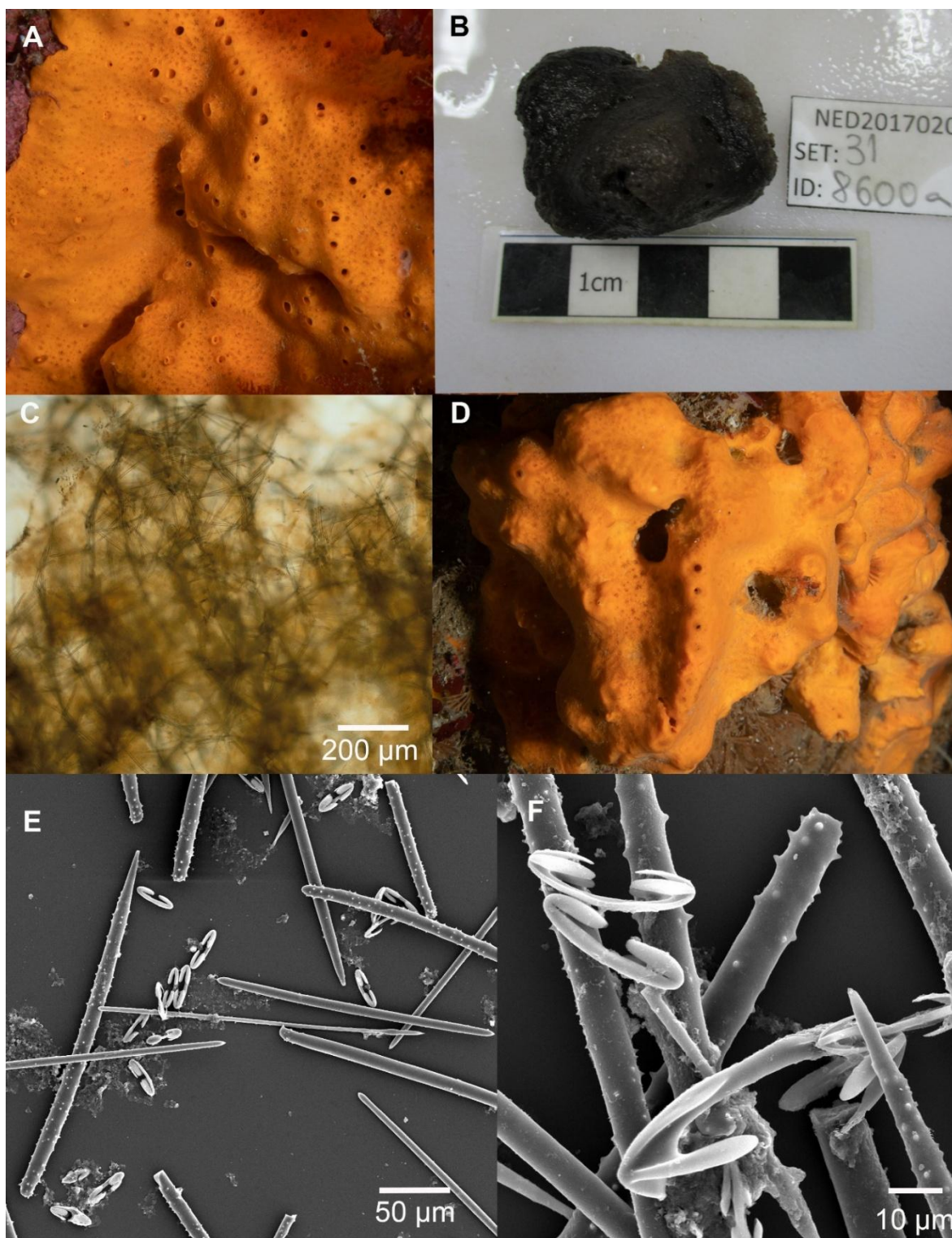


Figure 29. *Myxilla* (*Myxilla*) *fimbriata*. A. *In situ* appearance, from specimen ARC 82111; B. Freshly trawled specimen ARC 81523; C. Skeleton, specimen ARC 82141; D. *In situ* appearance from specimen ARC 82167; E. Spicules, specimen ARC 82107; F. Close up of chelae from specimen ARC 82107. A and D are images of *in situ* specimens taken in adjacent waters during SCUBA surveys but are provided here to show colour when living.

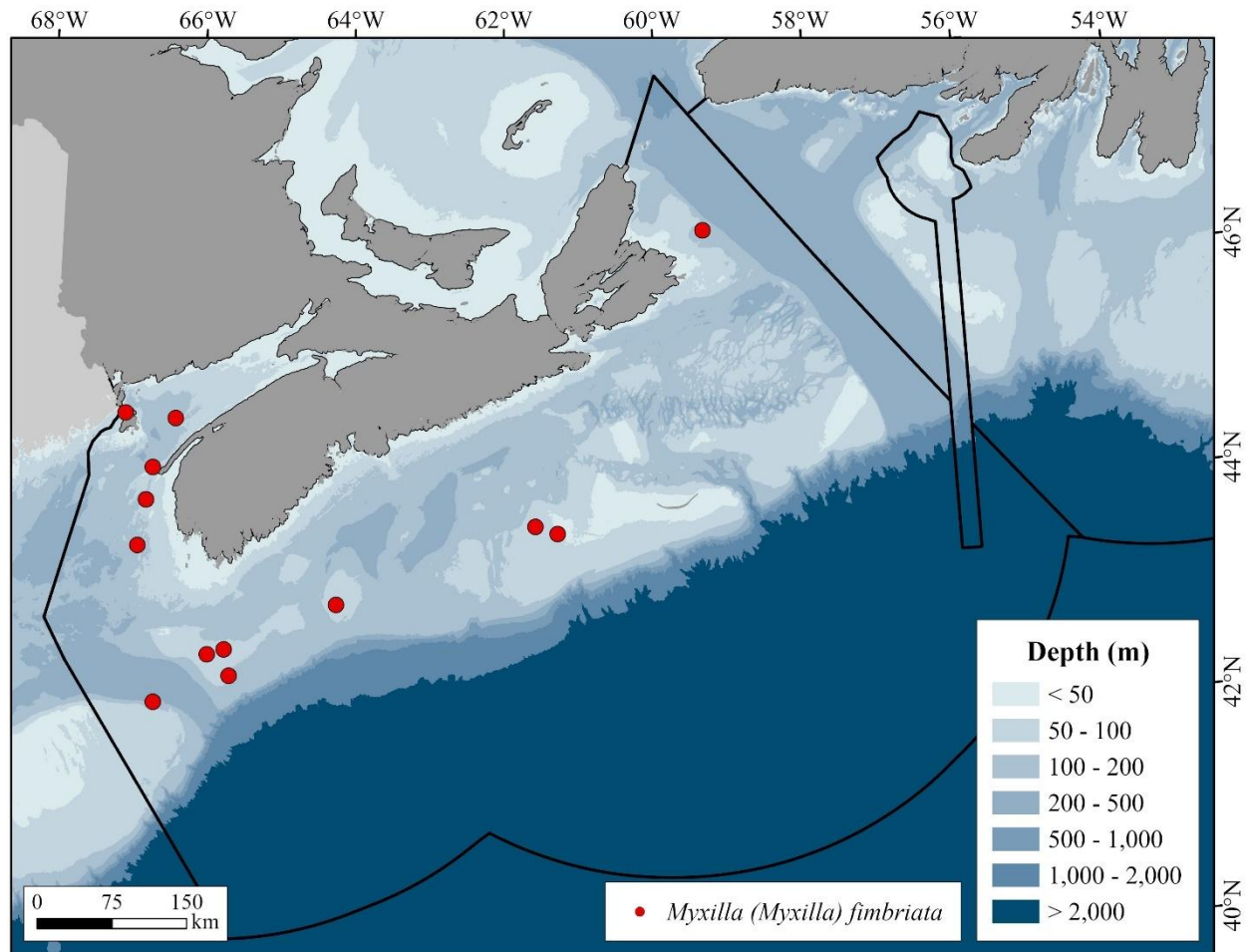


Figure 30. Records of *Myxilla (Myxilla) fimbriata* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Myxilla* sp. 1 Schmidt, 1862**

APHIA ID: 131970; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Myxillidae

External appearance (Figure 31A): Massively encrusting bright yellow sponge.

Skeleton (Figure 31B): The choanosomal skeleton is a regular reticulation of acanthostyles. The ectosomal skeleton is formed of a tangential layer of tornotes.

Spicules (Figure 31C–F): Measurements from specimen ARC 81532. Acanthostyles are 169–238 by 12–18 μm , thin acanthostyles 151–174 by 3–6 μm and tornotes 143–199 by 4–4.8 μm , with mucronate tips, tips not microspined. Chelae are typical myxillid chelae in two size categories: 18–24 and 31–45 μm . Sigmata are 23–27 μm and abundant.

Distribution: Not known. One record in 82 m was confirmed from the NED2017020 RV survey (Figure 32).

Remarks: This species differs from *Myxilla* (*Myxilla*) *fimbriata* in having smaller chelae, abundant sigmata and much shorter acanthostyles. *Myxilla* (*Myxilla*) *fibrosa* Levinsen, 1893 has been recorded from the region but it is noted that it could be a potential synonym of *M. fimbriata*. *M. fibrosa* has spicules of a similar size range to our specimens (styles 165–250 by 17 μm ; tornotes 19–230 by 7.5 μm ; chelae 20–50 μm and sigmata 25–30 μm).

Myxilla (*Myxilla*) *inequitornota* Burton, 1931 also has similar spicule dimensions (acanthostyles 200 by 4–7 μm ; tornotes 200 by 4 μm ; two categories of chelae 17 μm and 40 μm and sigmata 24–40 μm). But possesses tornotes which are mucronate at one end and oxeote at the other.

Myxilla (*Myxilla*) *perspinosa* Lundbeck, 1905 also has similar spicule dimensions (acanthostyles 140–208 by 4–7 μm ; tornotes 130–178 by 35–50 μm ; chelae 18–30 μm and sigmata 18–24 μm). However, its tornotes are microspined on the ends, the sigmata are smaller and it only has one category of chelae.

Examination of additional specimens and comparative type material will be required to determine the identify of our specimens.

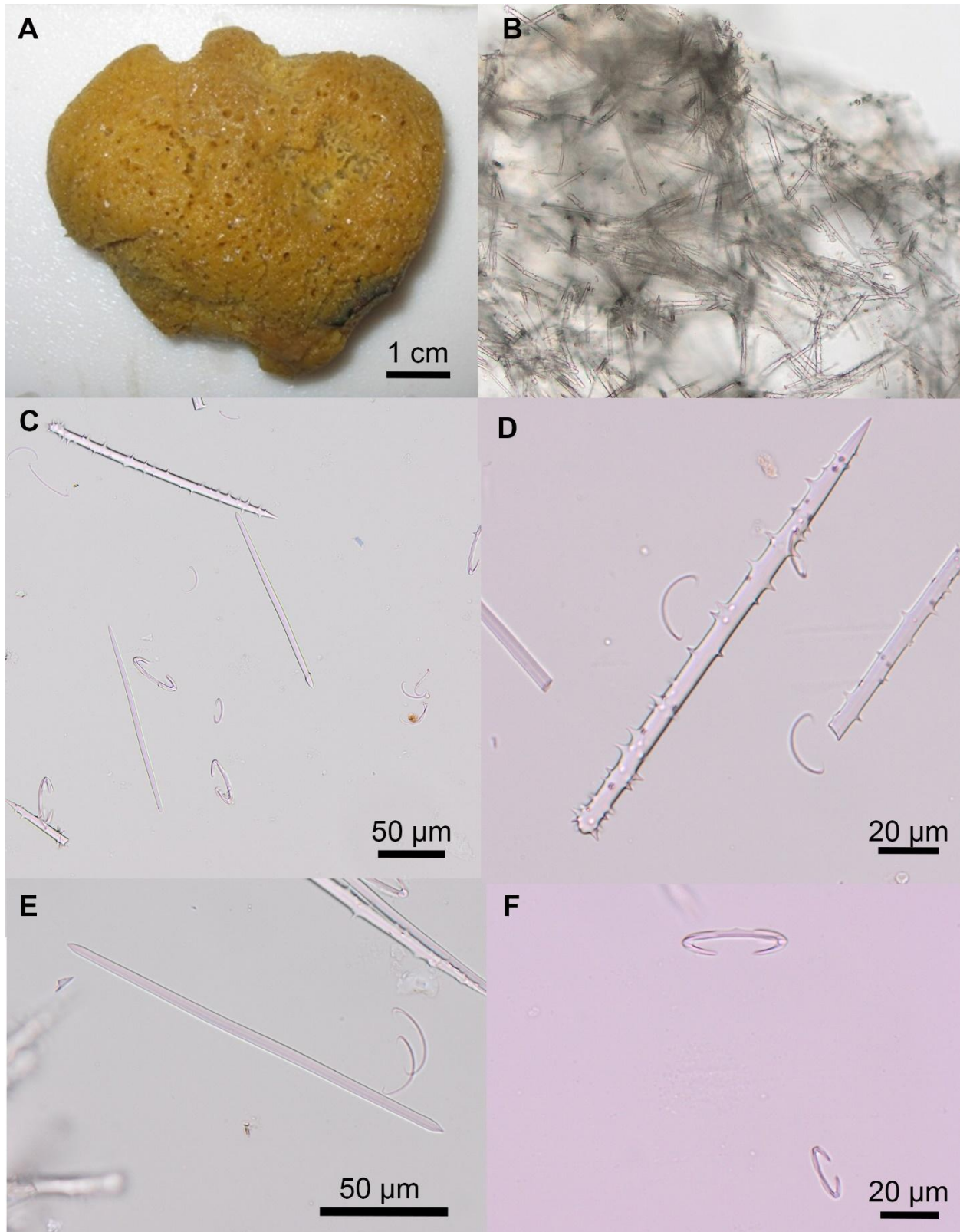


Figure 31. *Myxilla* sp. 1., specimen ARC 81532. A. Collected specimen; B. Skeleton; C. Spicules; D. Acanthostyle and Sigmata; E. Tornote; F. Chelae.

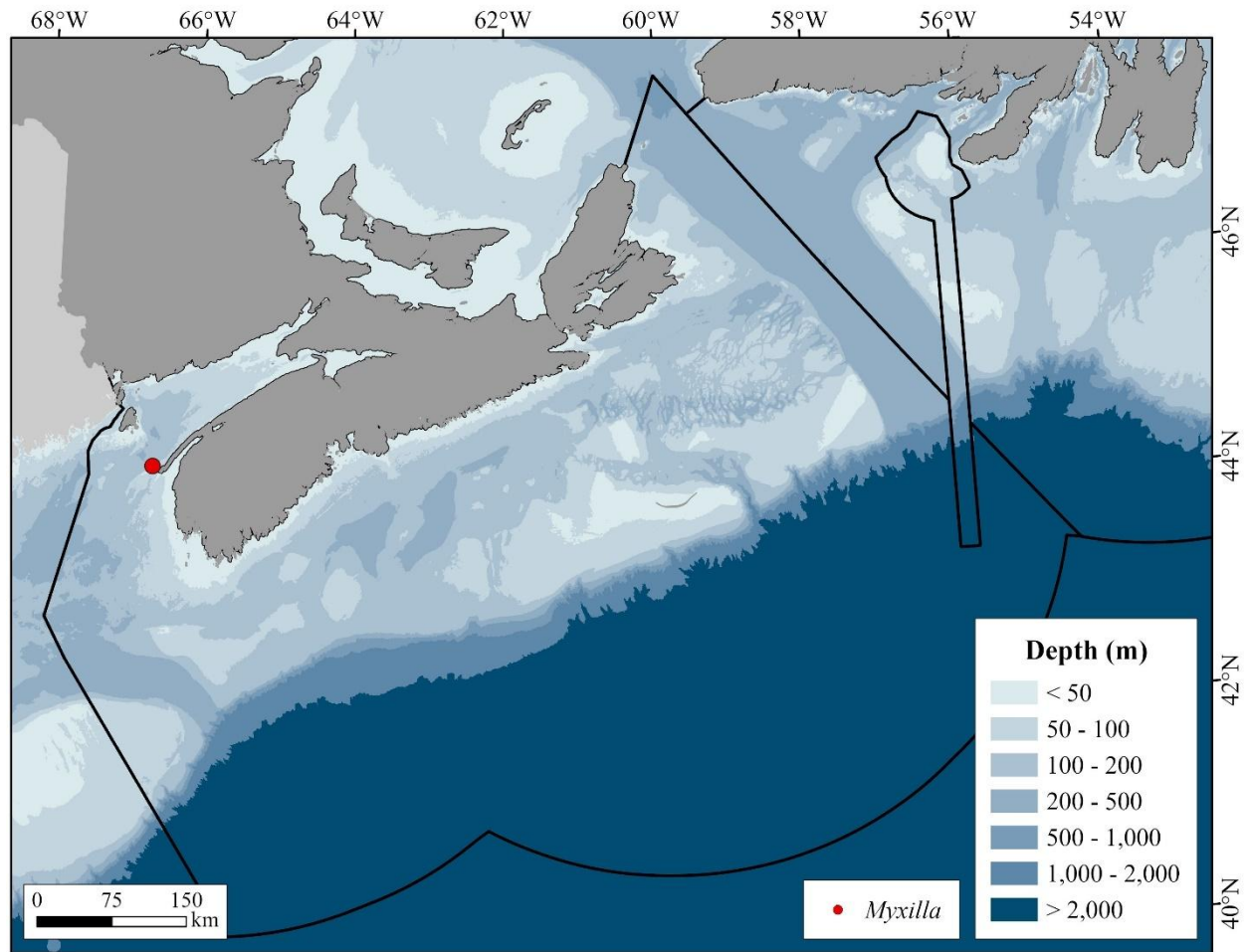


Figure 32. Records of *Myxilla* sp. 1 from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Tedania (Tedania) suctoria* Schmidt, 1870**

APHIA ID: 169587; **CLASS:** Demospongiae; **ORDER:** Poecilosclerida; **FAMILY:** Tedaniidae

External appearance (Figure 33A, B): Yellow to brown thickly encrusting sponge with conical papillae. Can form large clean lobes (Figure 34A) or be covered in silt with only the papillae visible (Figure 34B).

Skeleton (Figure 33C): The choanosomal skeleton is a reticulation of bundles of styles. In the ectosome there are bundles of tylotes which fan out at the surface. Onychaetes are scattered abundantly through the tissue.

Spicules (Figure 33D–F): Measurements from ARC 81464. Styles: 383(489)519 by 12(14)20 µm, smooth and slightly curved. Tylotes: 348(367)387 by 4(5)7, neat oval tyles, entirely smooth. Onychaetes: 107(129)256 µm, unequidended, entirely spined, but spines are hard to see on the light microscope. Sizes close to those given in Van Soest *et al.* (2000): styles 300–680 by 7–14 µm; tylotes 250–470 by 3–6 µm; onychaetes 55–500 µm (possibly in two size classes).

Distribution: Found from 10–200 m, records from Iceland, Norway, Faroes, Azores and the Arctic (Van Soest *et al.*, 2000). Recent Canadian records from the Bay of Fundy (Goodwin, 2017) and Gulf of St. Lawrence (Dinn, 2020). Thirty-four records from 66–272 m were confirmed from the NED2017020 RV survey (Figure 34).

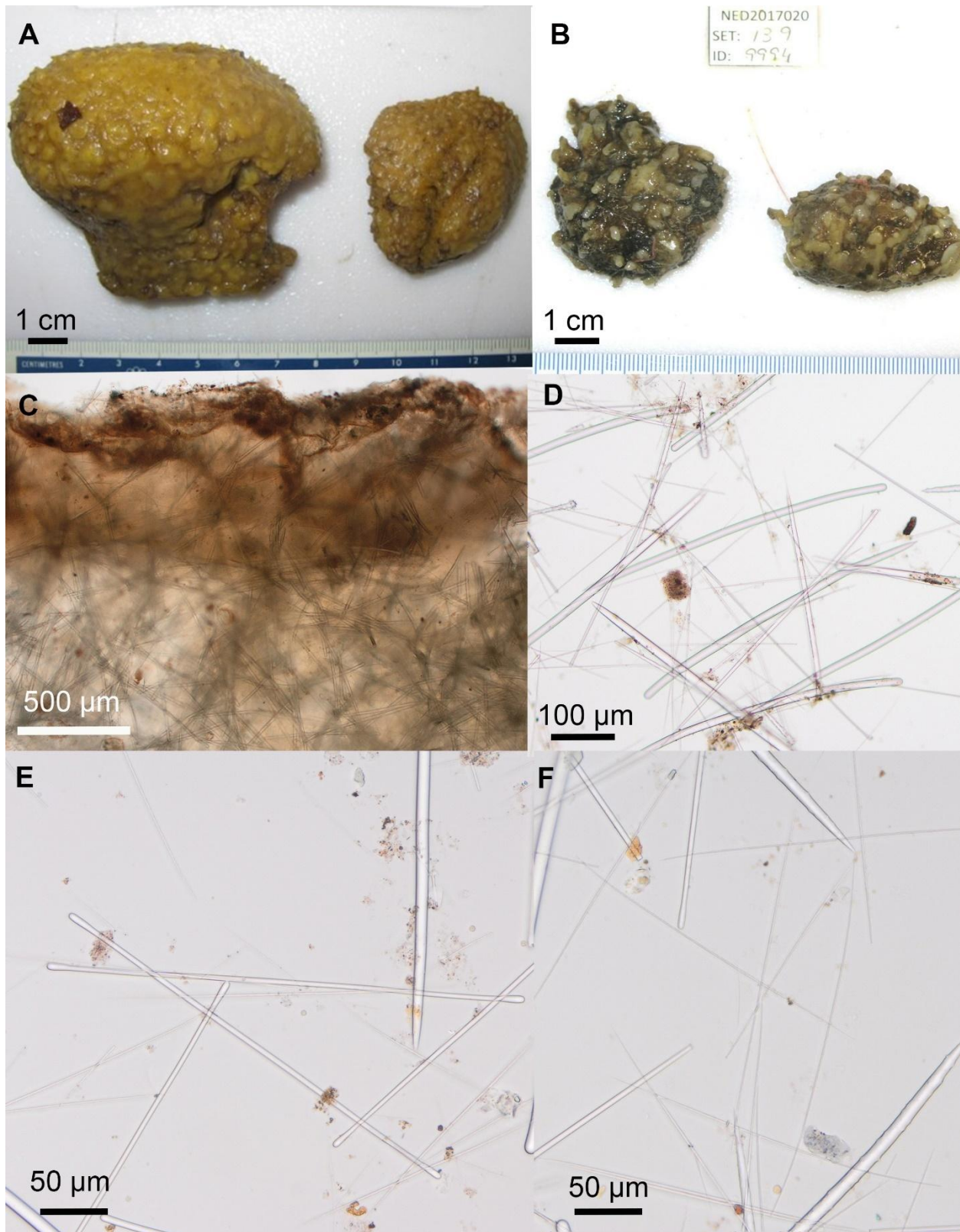


Figure 33. *Tedania (Tedania) suctoria*. A. Freshly collected specimen, ARC 81530; B. Freshly collected specimen, ARC 81464; C. Skeleton; D. Styles; E. Tylotes; F. Onychaetes (all from ARC 81464).

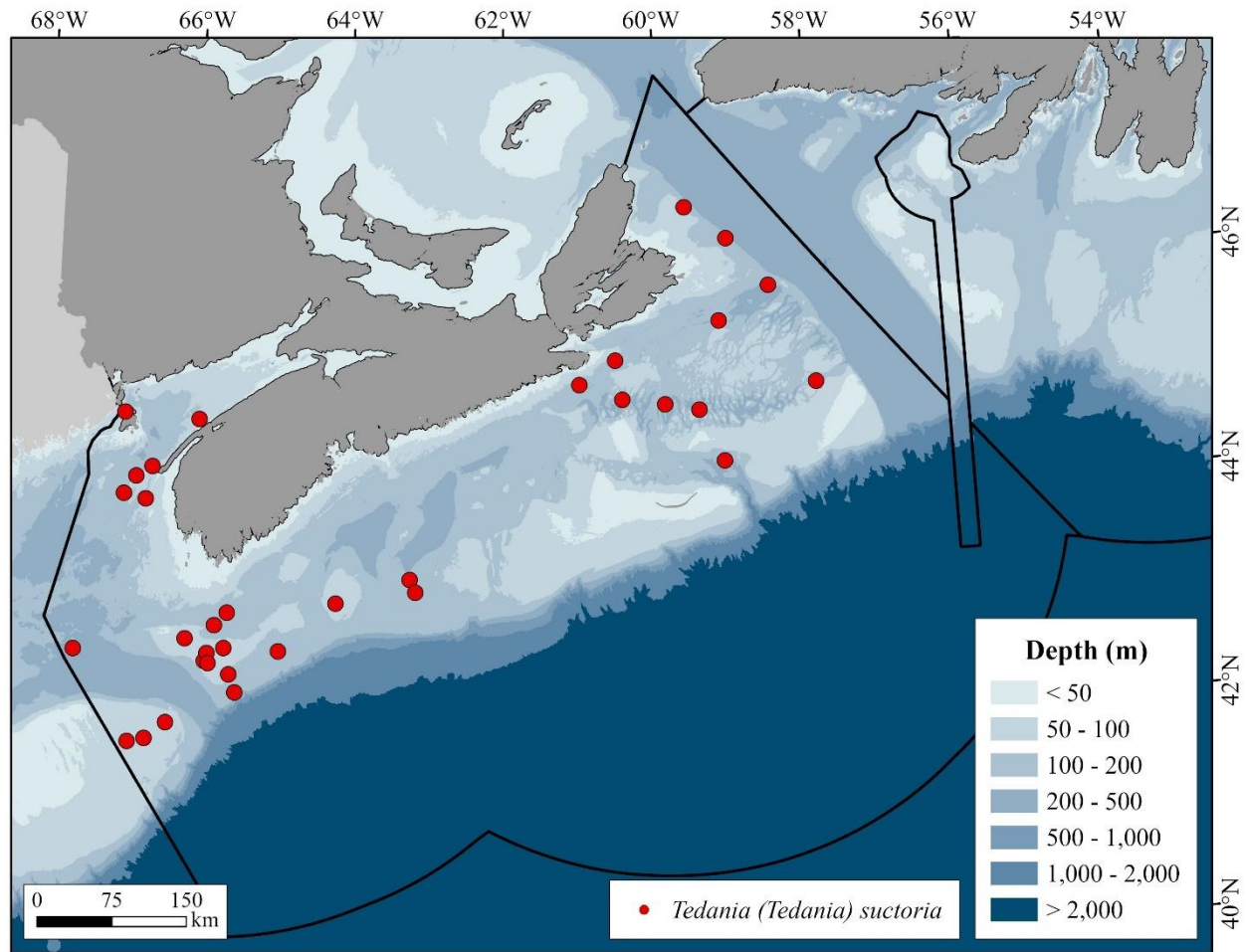


Figure 34. Records of *Tedania (Tedania) suctorica* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Polymastia andrica* de Laubenfels, 1949**

APHIA ID: 157415; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 35A, B): Relatively small cushion shaped sponge (our specimens around 5 cm maximum diameter) with papillae around 1 cm long. The surface of the sponge is brown and very hispid, the papillae are yellow to white and smooth.

Skeleton (Figure 35C): The choanosomal skeleton is formed of thick columns of primary styles up to around 400 µm diameter. These cross the cortex and created the hispid surface. There are also smaller styles scattered in the choanosome. The cortex has an outer palisade of small styles and a basal layer of tangential intermediate styles. There is a middle layer with few spicules.

Spicules (Figure 35D): Measurements from ARC 81498. Primary subtylostyles 1802 to over 2975 µm (some larger than visible in one piece on the microscope) by 8.8–9.5 µm; intermediate subtylostyles 440–1309 by 10.5–19.2 µm; small tylostyles 149–217 by 3.1–11.4 µm. Widths measured at the tyle. Plotkin *et al.* (2018) give primary styles/tylostyles 613(1248)2132 by 5(11)14 µm; intermediate styles/subtylostyles 316(517)898 by 6.4(9.9)15.6 µm; and small tylostyles 100(176)286 by 2.1(6.5)13 µm. Also, exotyles (filiform styles) 1314(2358)5500 by 2.5(6.7)12.7 µm (widths measured at the tyle).

Distribution: The type locality is the Gulf of St. Lawrence. Also recorded from Newfoundland and Norway (Plotkin *et al.*, 2018), and the Canadian Arctic (Dinn and Leys, 2018). Depths of records 28–721 m (Plotkin *et al.*, 2018). Twelve records from 68–234 m were confirmed from the NED2017020 RV survey (Figure 36).

Remarks: The type specimens were identified by Whiteaves (1874, 1901) as *Polymastia mamillaris*. Lambe (1896) confirmed this identification. De Laubenfels (1949) designated one of these specimens (field number no 8) as the Holotype of *P. andrica*, but this no longer seems to be present in the Canadian Museum of Nature although the other specimens remain (Plotkin *et al.*, 2018).

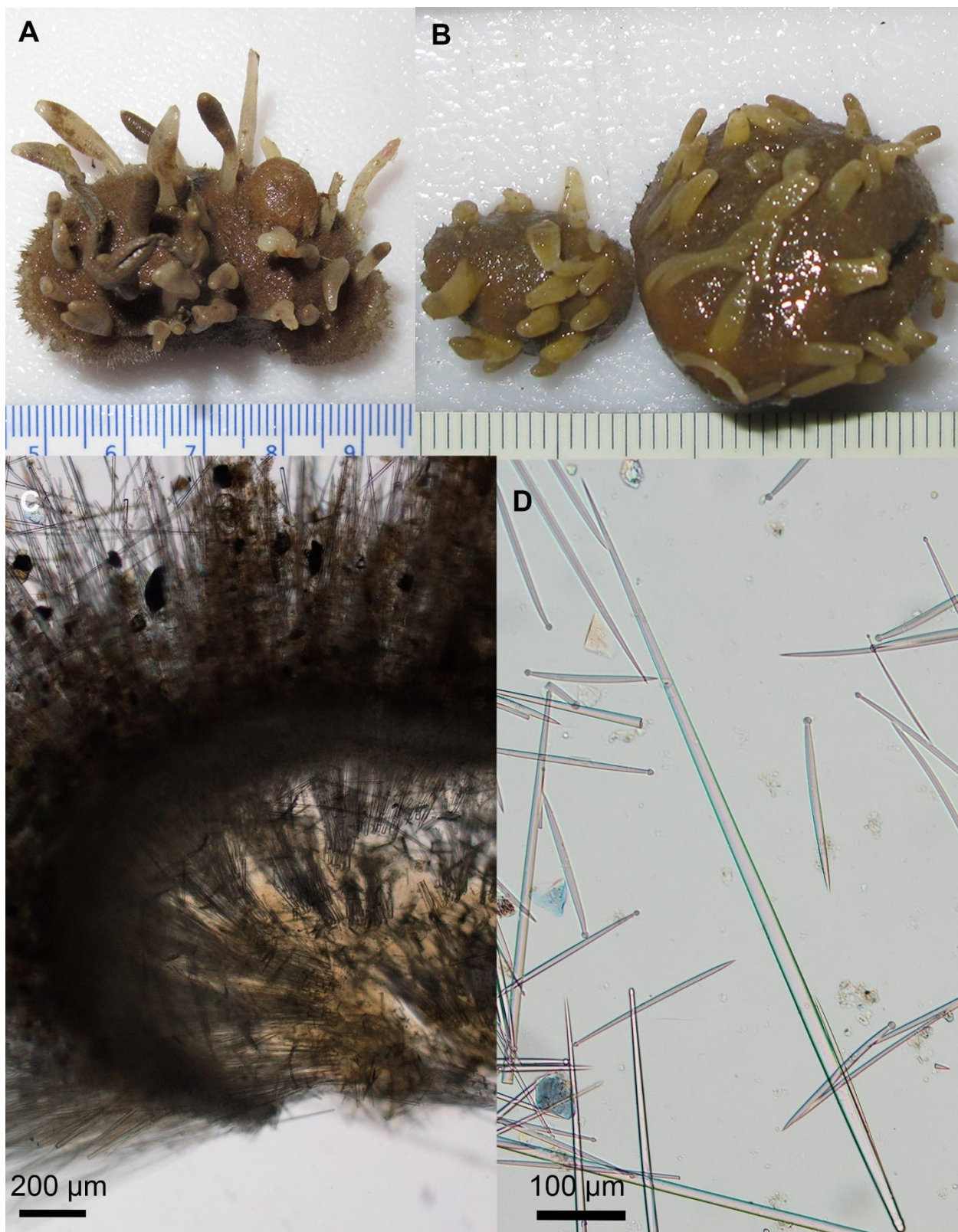


Figure 35. *Polymastia andrica*. Freshly collected specimens. A. trawl set 176; B. Trawl set 32; C. Skeleton ARC 81498; D. Spicules ARC 81498.

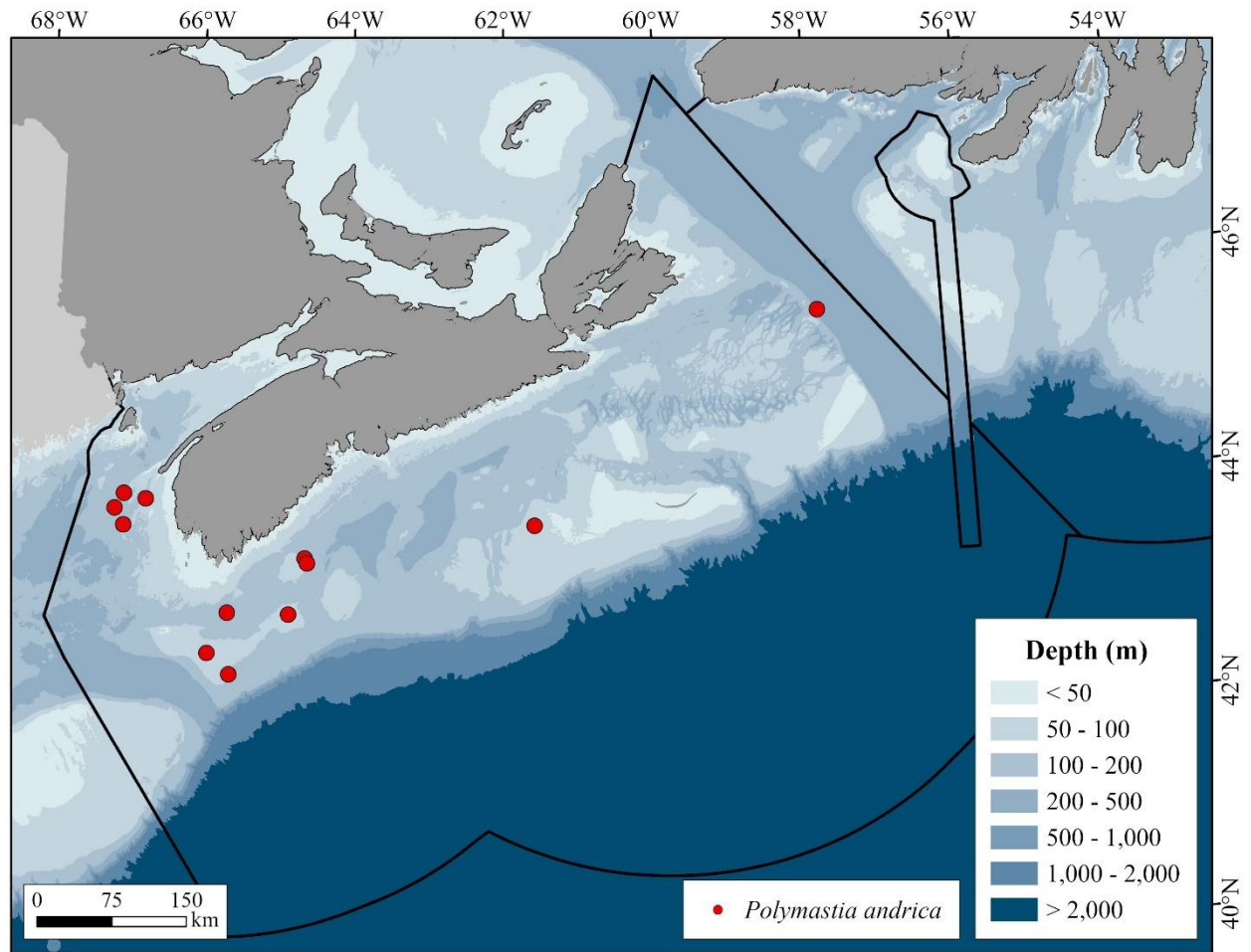


Figure 36. Records of *Polymastia andrica* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Polymastia bartletti* de Laubenfels, 1942**

APHIA ID: 134193; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 37A, B): Circular cushion shaped sponge with very long papillae (some over 4 cm long). Both papillae and surface of sponge are smooth. Colour bright yellow when living or recently collected, pale when preserved in alcohol. Papillae lack visible oscula.

Skeleton (Figure 37C): Choanosomal skeleton has tracts of principal styles around 200 µm thick. These fan out towards the ectosome. Cortical layer is 400-500 µm thick. The cortex is a palisade of ectosomal tylostyles (around 200 µm thick) with an underlying layer of intermediate styles (around 300 µm thick).

Spicules (Figure 37D): Measurements from specimen ARC 81535: styles 777–1314 by 17.6–19.8 µm and tylostyles 138–190 by 4.1–7.1 µm. ARC 81540: styles (some have a slight swelling at base, maybe a tylostyle) 503–1156 by 4.9–16.3 µm and tylostyles 153–208 by 4.0–6.7 µm. Dimension given in Plotkin *et al.* (2017) for his Canadian specimen (ZMBN 098111). Principal styles 930(1162)1327 by 14.0(17.1)20.3 µm (max diameter). Intermediary subtylostyles to styles 467(565)648 by 8.9(10.2)12.7 µm. Small tylostyles 127(161)192 by 4.6(5.3)6.4 µm on tyle. Widths measured at the tyle for all specimens.

Distribution: The type locality of this species is the Foxe Basin (Nunavut, Canada). There are records from Nova Scotia and possibly Sweden, although the Swedish specimen has some genetic differences (Plotkin *et al.*, 2018). Other recent records from the Bay of Fundy (ARC 81706) and the Gulf of St. Lawrence (Dinn *et al.*, 2020). Four records from 53–84 m were confirmed from the NED2017020 RV survey (Figure 38).

Remarks: Plotkin *et al.* (2018) note that it is not possible to distinguish between *Polymastia nivea* (Hansen, 1885) and *Polymastia bartletti* without molecular data. We obtained CO1 and 28S sequences from our specimens. These align with those obtained by Plotkin from his specimens ZMBN 98111 from Canada and with a barcoded specimen from the Gulf of St. Lawrence (BOLD PIMI066-23, Claude Nozères, Maurice Lamontagne Institute) and the Bay of Fundy (ARC 81706). *P. nivea* was historically confused with *Polymastia boletiformis* (Lamarck, 1815) and *Polymastia robusta* Bowerbank, 1862 and the status of *P. robusta* is questionable. Records of *P. robusta* from Canadian Atlantic (Lambe 1896, Whiteaves, 1901) may in fact be *P. bartletti* but specimens need to be examined to confirm (Plotkin *et al.*, 2018).

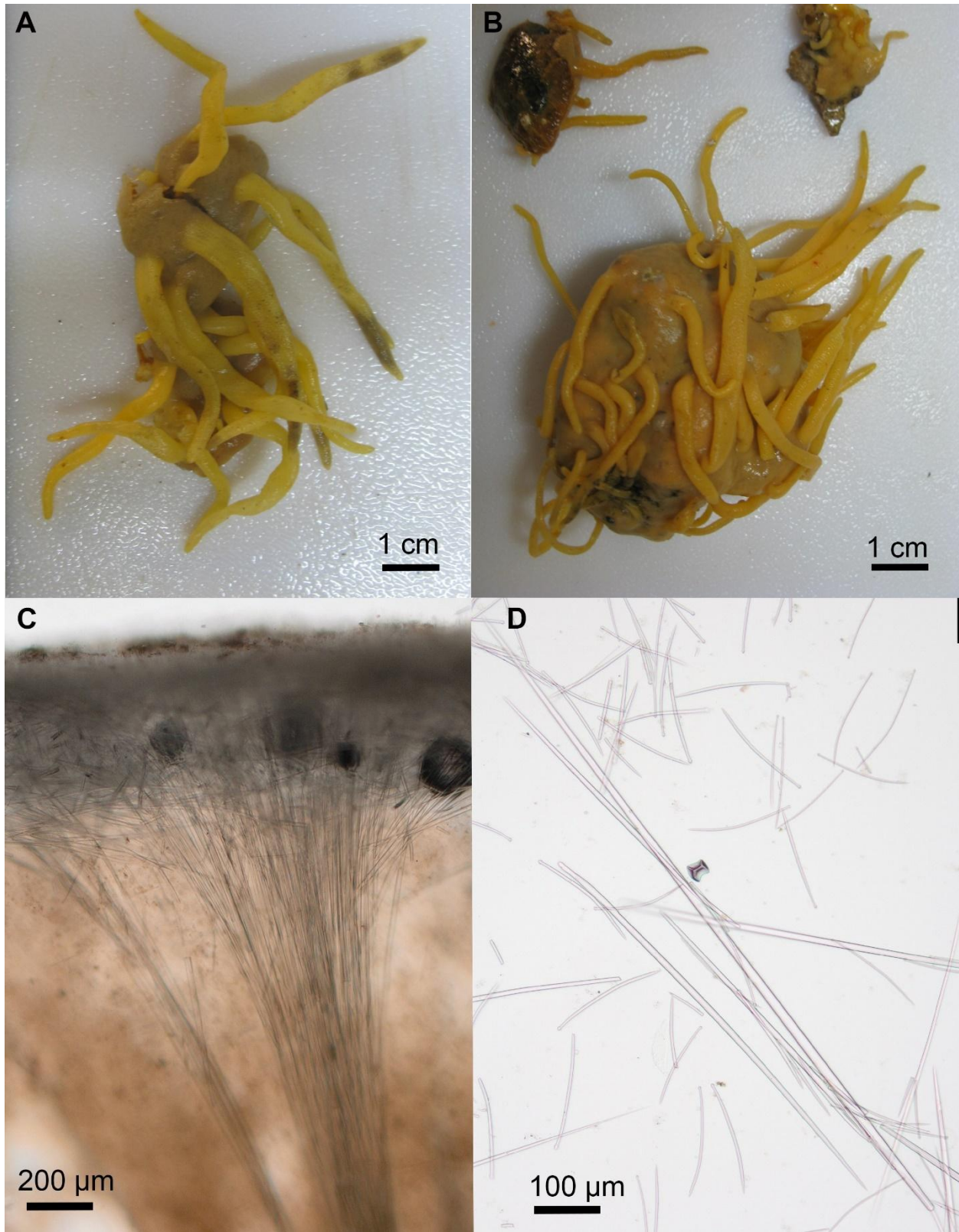


Figure 37. *Polymastia bartletti*. Freshly collected specimens: A. Trawl set 49; B. ARC 81540; C. Skeleton ARC 81540; D. Spicules ARC 81540.

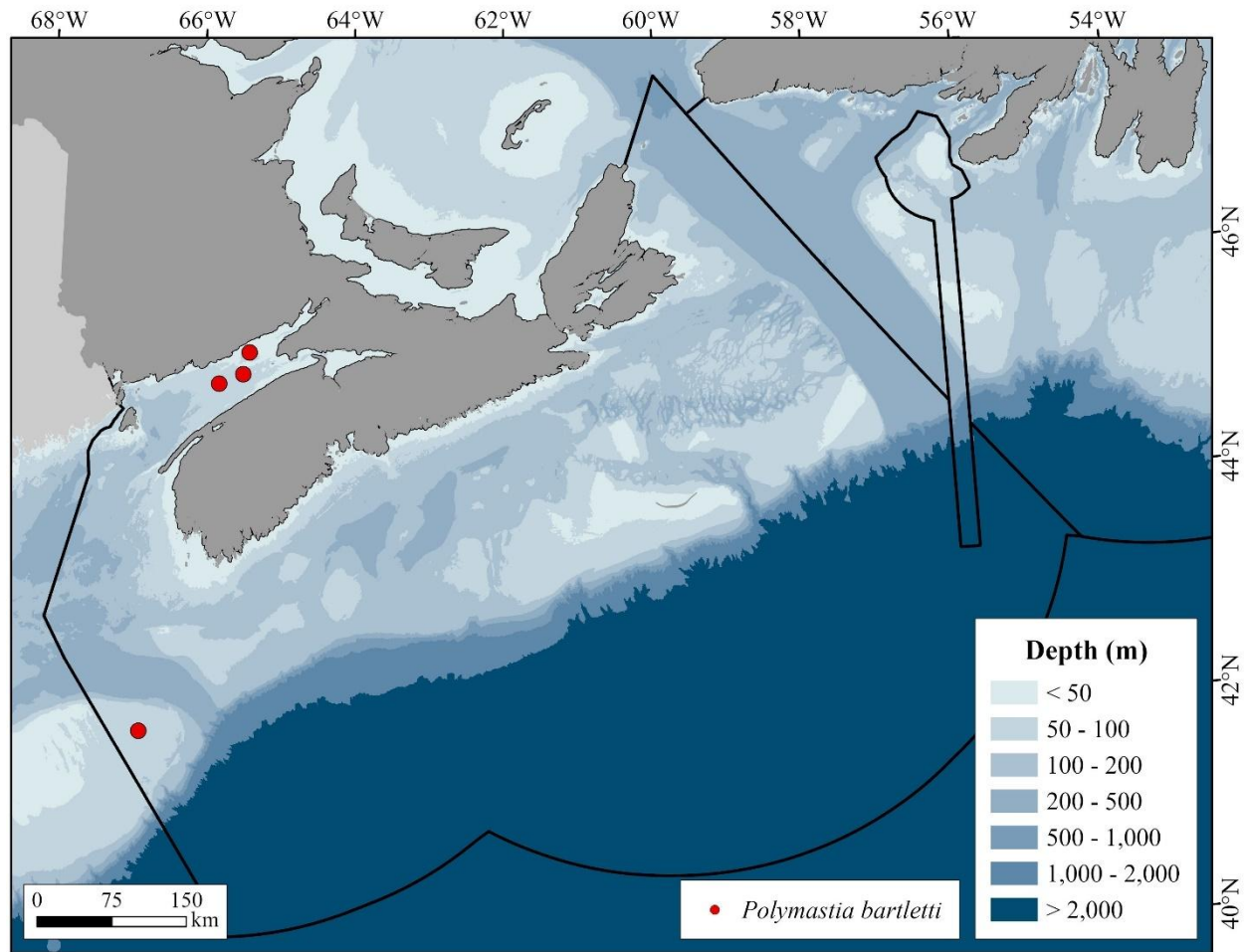


Figure 38. Records of *Polymastia bartletti* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Polymastia hemisphaerica* (Sars, 1872)**

APHIA ID: 157415; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 39A): Small discoid sponge. There is a prominent spicule fringe between upper and basal surfaces. Two conical papillae are visible on our specimen (Plotkin *et al.* [2018] note up to 30 in their specimens). Freshly collected sponge is cream coloured with brown around spicule fringe. Specimen ARC 81494 is around 5 cm maximum diameter (including spicule fringe).

Skeleton (Figure 39B, D): The choanosomal skeleton is composed of tracts of principal styles (up to 800 µm wide) that radiate from the base to the cortex where they run perpendicular to surface in the upper cortex but protrude and created a hispid surface in the basal cortex. Bundles of intermediate styles and scattered small styles are found in the sub-cortical area. The cortex is formed of a palisade of the small styles and an internal layer of criss-crossed intermediate spicules.

Spicules (Figure 39C, E): Measurements from ARC 81494. Styles are 1088(1466)2893 by 17(27)42 µm— some much bigger, not possible to measure. Small tylostyles are 205(226)256 by 9(11)15 µm. Plotkin *et al.* (2018) note principal styles 1920(3125)5400 by 10.9(20.2)32.3 µm max shaft diameter; intermediate tylostyles 390(512)618 by 17.2(19.9)26.2 µm; and small tylostyles 160(229)305 by 4.2(5.8)8.4 µm. Exotypes that form the marginal fringe are styles 4990(6511)8015 by 45.8(47.5)50.1 µm, maximum diameter.

Distribution: The type locality of this species is off the Norwegian coast. It has been recorded from Greenland, Iceland, Norwegian Coast, Barents Sea and Kara Sea (Plotkin *et al.*, 2018). There are many records from the Canadian Atlantic Coast (Nova Scotia, Newfoundland and Labrador, Gulf of St. Lawrence) (Whiteaves, 1874, 1901; Lambe 1896; Plotkin *et al.*, 2018; Dinn, 2020; Nozères *et al.*, 2020). Depth of records ranges from 91 to 850 m (Plotkin *et al.*, 2018). Two records from 375–439 m were confirmed from the NED2017020 RV survey (Figure 40).

Remarks: The CO1 sequence obtained from ARC 81494 aligns with those obtained from ZMBN 098056 and 098043 from Norway (Plotkin *et al.*, 2018). However, as noted by Plotkin *et al.* (2018), *Polymastia hemisphaerica* is quite close genetically to *P. thielei*.

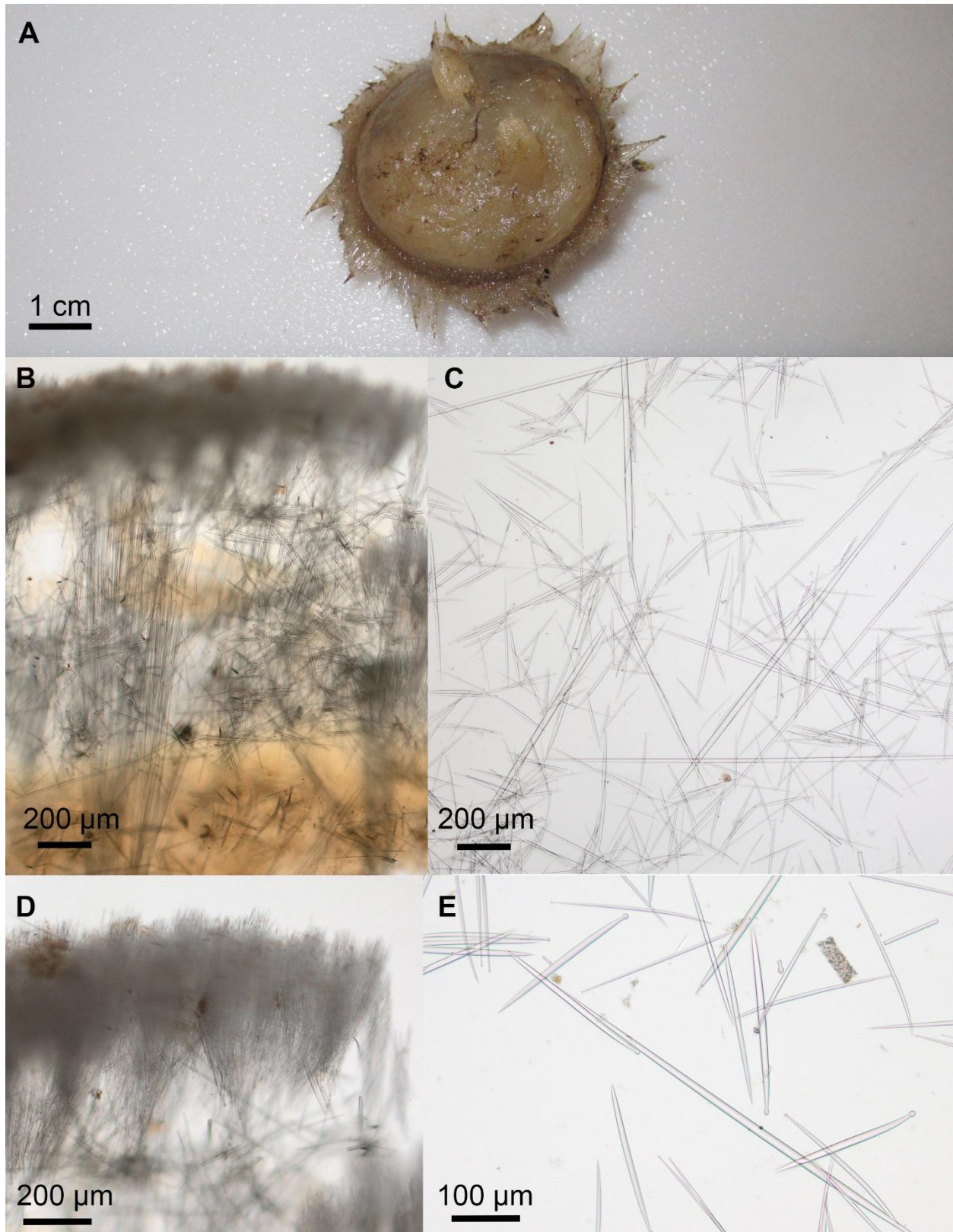


Figure 39. *Polymastia hemisphaerica*. ARC 81494: A. Collected specimen; B. Skeleton; C. Spicules; D. Ectosomal skeleton; E. Small tylostyles.

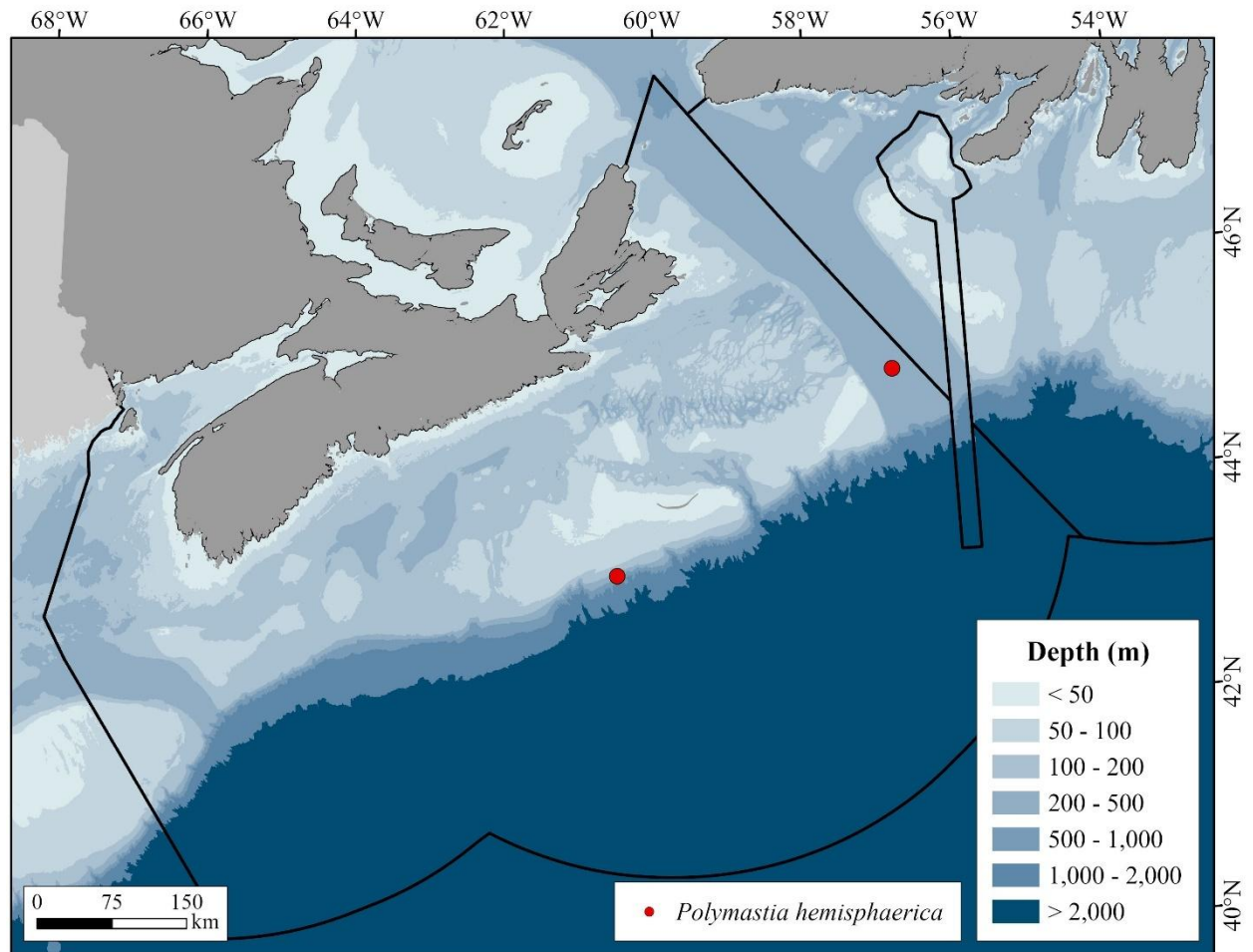


Figure 40. Records of *Polymastia hemisphaerica* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Polymastia uberrima* (Schmidt, 1870)**

APHIA ID: 134214; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 41A, B): Smooth (apart from marginal collar), custard yellow, cushion with many conical papillae. There is a brown, hispid, marginal collar around the edge of the base of the sponge.

Skeleton (Figure 41C): Choanosomal skeleton with thick ascending tracts of largest tylostyles. The auxiliary choanosomal skeleton is composed of bundles of the intermediate tylostyles, the cortex consists of a palisade of the smallest tylostyles.

Spicules (Figure 41D): Measurements from ARC 82146. Tylostyles are in three size categories: large tylostyles 884(1088)1297 by 13(21)30 µm, intermediate tylostyles 365(455)546 by 7(11)14 µm and small tylostyles (ectosomal) 166(204)245 by 6(8)13 µm. These size classes are a good match for those reported by Plotkin *et al.* (2018) for this species. They described large styles 715(1409)1889 by 11(23)30 µm, intermediate styles 381 (550)706 by 7(12)17 µm and small styles 153(218)327 by 3(6)9 µm.

Distribution: The holotype location is Iceland. Leucotype designated by Plotkin *et al.* (2018) from south-east of Halifax, described as *Polymastia infrapilosa* Topsent, 1927. This species has been recorded from Nova Scotia, Labrador, SW Greenland/Davis Strait, Iceland, north-east Atlantic, Norwegian Sea, Barents Sea, Norway, Svalbard, Finland, Russia, and offshore Arctic Ocean (Plotkin *et al.*, 2018). There are other recent Canadian records from the Gulf of St. Lawrence (Dinn, 2020) and eastern Arctic (Dinn and Leys, 2018). Plotkin *et al.* (2018) note depth ranges of 31–700 m. Sixty records from 71–439 m were confirmed from the NED2017020 RV survey (Figure 42).

Remarks: This species is similar to *Polymastia thielei* Koltun, 1964 but can be distinguished by the presence of a marginal hispid collar, which is lacking in *P. thielei*. This collar is sometimes lost in dredged specimens, making identification difficult but there are also differences in skeletal architecture and genetic sequences (Plotkin *et al.*, 2018).

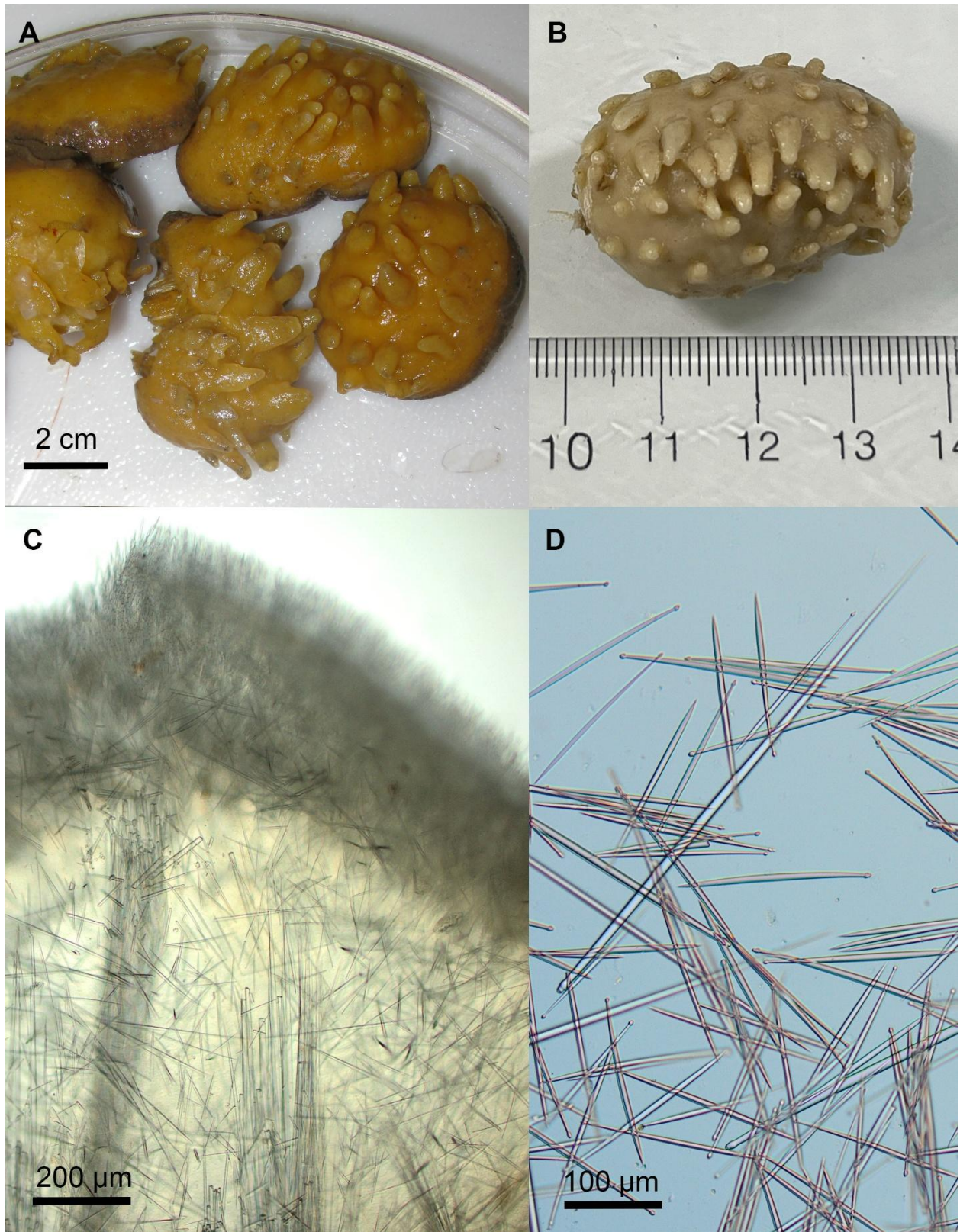


Figure 41. *Polymastia uberrima*. A. Freshly collected trawl specimens set 33; B. Preserved specimen ARC 81524; C. Skeleton; D. Spicules.

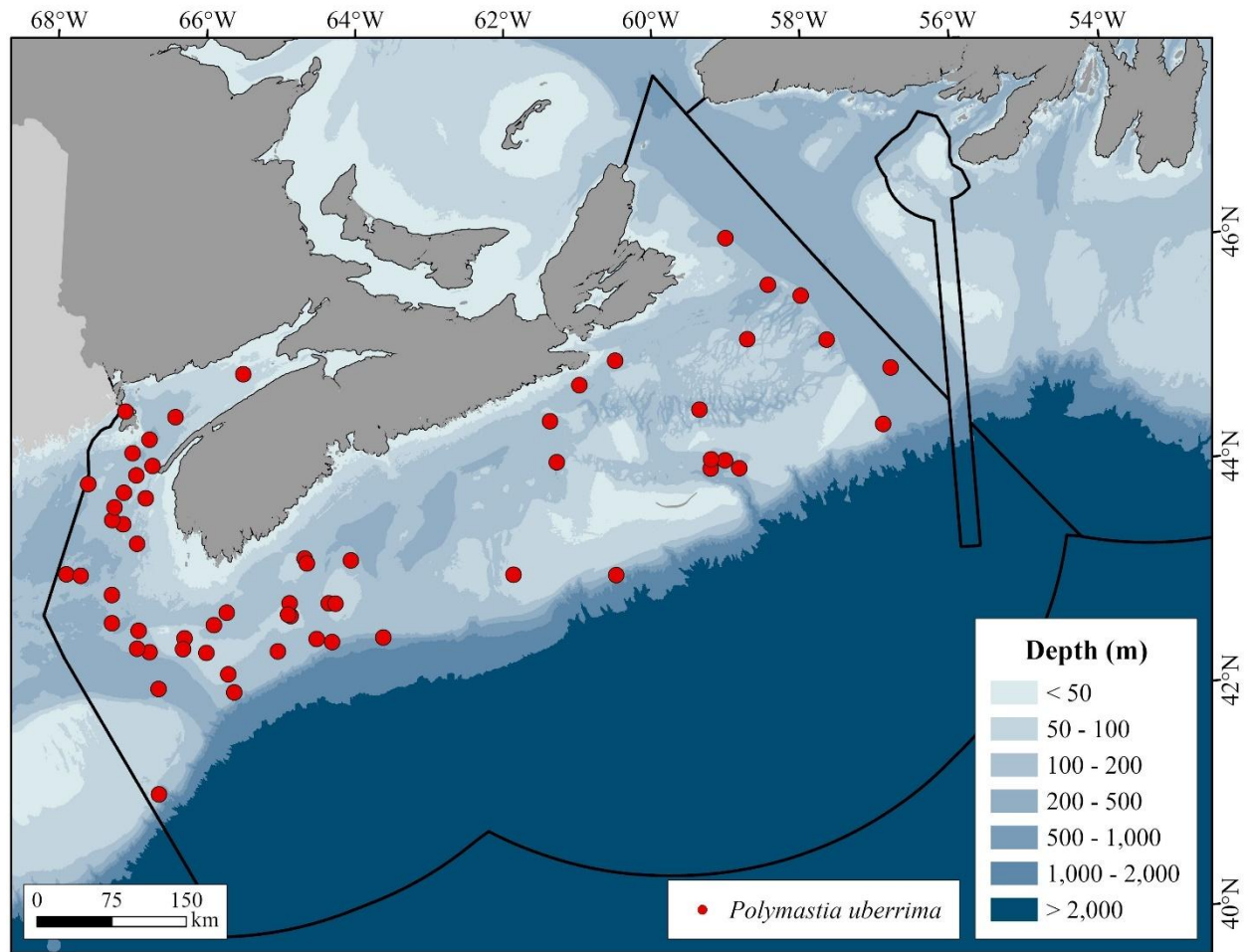


Figure 42. Records of *Polymastia uberrima* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Quasillina brevis* (Bowerbank, 1866)**

APHIA ID: 134215; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 43A): Our specimen is a small (< 2 cm in length) oval sponge with a terminal osculum, and a smooth surface. Other specimens have a terminal papilla with an oscula at the summit, some are columnar rather than oval, and some have a stalk (Plotkin *et al.*, 2018). Colour when freshly collected light brown in our specimen, can be pale orange or yellowish (Plotkin *et al.*, 2018).

Skeleton (Figure 43B, C): The choanosome is formed from scattered bundles of small styles. The cortex has an external palisade of small styles and two internal layers composed of principal styles: a layer of criss-crossed principal styles and an internal layer of longitudinal tracts. It was hard to obtain decent sections from our specimen so this information is from Plotkin *et al.* (2018).

Spicules (Figure 43D): Measurements from ARC 81433. Principal styles 644(744)817 by 9(13)18 µm and small subtylostyles 178(219)249 by 6(7)10 µm. Both categories in our specimens were slightly smaller than those described in Plotkin *et al.* (2018) who give principal styles 570(862)1098 by 11.2(17.8)25.5 µm (maximum diameter) and small spicules styles to subtylostyles 140(217)306 by 1.9(4.0)5.8 µm (maximum diameter).

Distribution: The type locality is Shetland, Scotland. This species is recorded from Atlantic and Mediterranean coasts of Europe including the UK, France, Sweden, Iceland, Norway and the Azores, east Greenland and the Faroes, the Arctic including the Barents, Kara and Laptev Seas (Plotkin *et al.*, 2018; De Voogd *et al.*, 2025). From Canada there are records from the Atlantic coast (Plotkin *et al.*, 2018) including Nova Scotia (Ridley and Dendy, 1886, 1887), and Northern Labrador (Dinn and Leys, 2018). One record in 503 m was confirmed from the NED2017020 RV survey (Figure 44).

Remarks: Topsent (1913) established *Q. richardi* for Norwegian specimens based on the presence of spicules with bent distal ends. However, this is currently regarded as a synonym of *Q. brevis*. Molecular work is needed to investigate if this species could be valid (see Plotkin *et al.*, 2018).

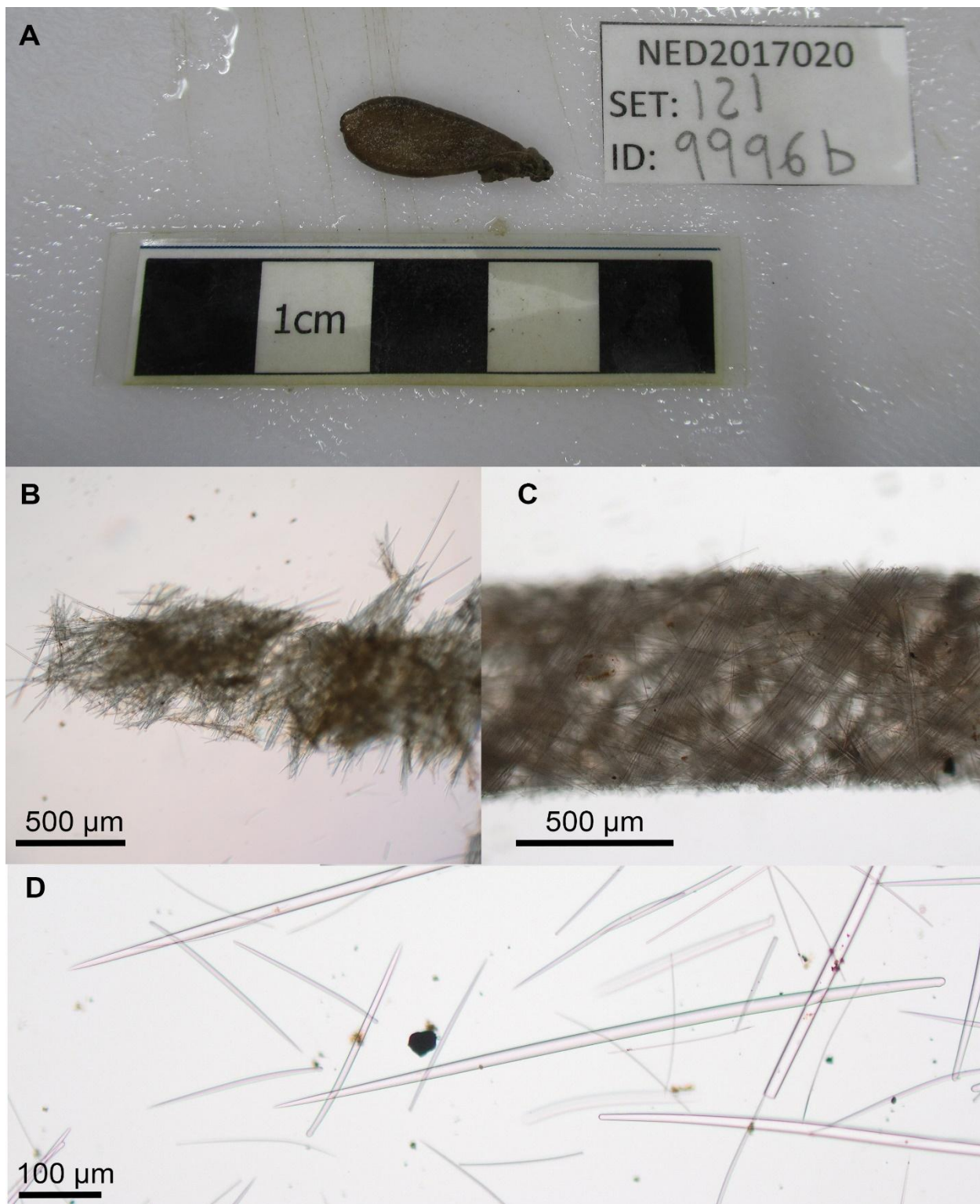


Figure 43. *Quasillina brevis*, specimen ARC 81433. A. Freshly collected specimen; B, C. Sections of Skeleton; D. Spicules.

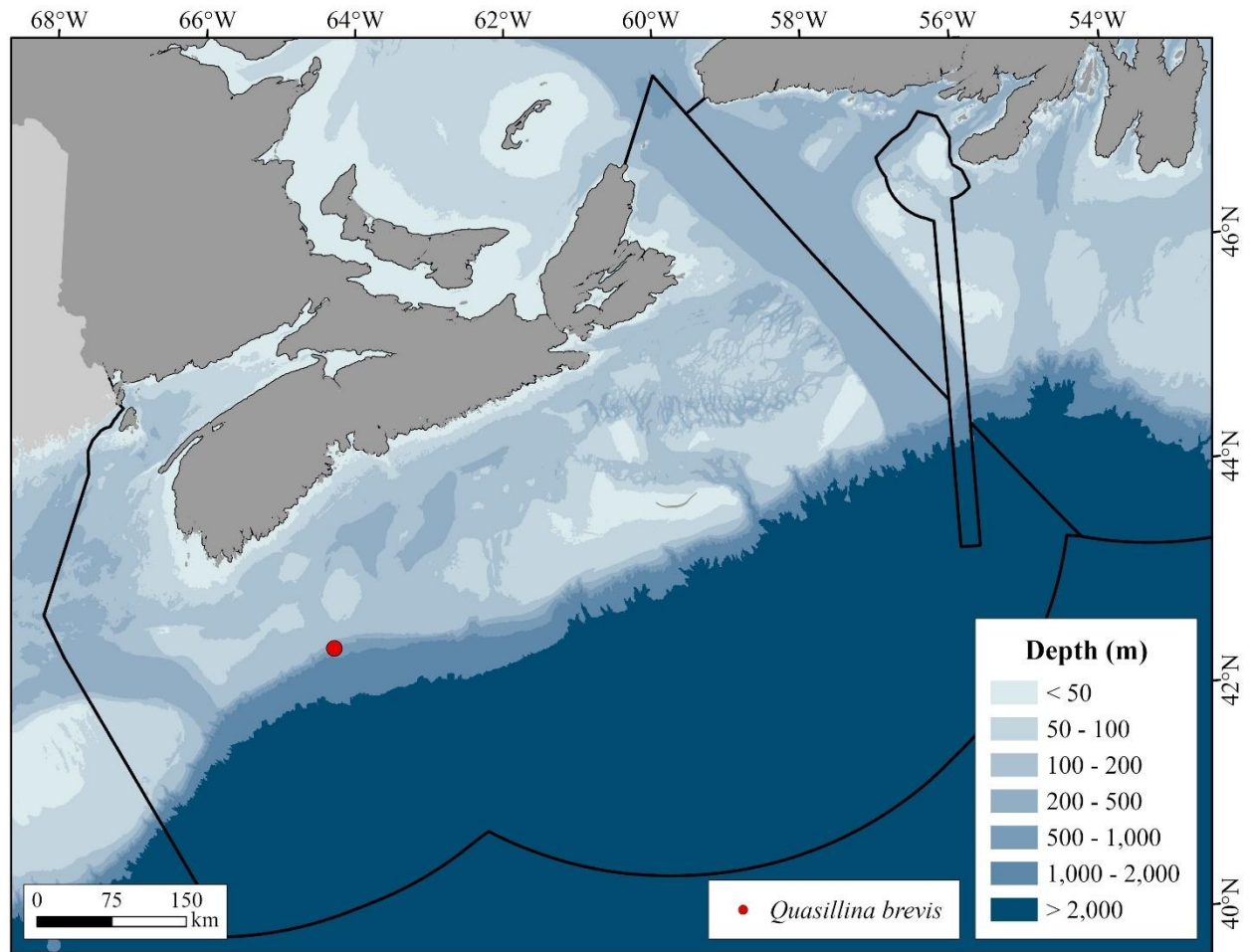


Figure 44. Record of *Quasillina brevis* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Spinularia sarsii* (Ridley & Dendy, 1886)**

APHIA ID: 989667; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 45A, B): Small discoid sponge. The body of our specimens was under 1 cm in diameter. The sponge has a median spicule fringe which is around 3–4 mm long. One specimen has a median papilla. The sponge is grey in colour when freshly collected and the upper surface is hispid.

Skeleton (Figure 45C): The choanosomal skeleton is formed of tracts of principal styles 200–300 µm wide, these cross the cortex and protrude from the sponge surface. There are also free scattered bundles of intermediary spicules. The cortex is composed of an upper palisade of small styles and an inner layer of criss-crossed intermediary spicules.

Spicules (Figure 45D, E): Principal tylostyles to subtylostyles are 1411(1864)2794 by 15(25)44 µm, although some larger ones were present (not possible to measure). Small tylostyles are 307(402)571 by 9(13)16 µm. Exotyles were present but it was not possible to get measurements. Plotkin *et al.* (2018) give principal styles 871(1787)2900 by 13.0(19.3)26.6 µm (maximum diameter); intermediate tylostyles 250(471)632 by 6.1(7.6)8.7 µm (maximum diameter); small tylostyles 152(232)298 by 8.1(9.8)10.4 µm; exotyles of marginal fringe 3890(5010)6030 by 24.5(27.3)29.8 µm.

Distribution: The type locality of this species is the Azores, north-east Atlantic. There are other Atlantic records from Cape Verde, Madeira, Iberian Sea, Greenland Sea, and Norwegian Sea. It is also recorded from the Mediterranean and the Arctic (Plotkin *et al.*, 2017; Plotkin *et al.*, 2018). There are Canadian records from off Newfoundland in 1267 m (Topsent, 1892) and in the Labrador Sea in 615 m (Dinn and Leys, 2018). One record in 1158 m was confirmed from the NED2017020 RV survey (Figure 46).

Remarks: We obtained CO1 and 28S sequences from ARC 81517. These are closest to ZMBN 098103 from the Mozambique Coast in the Indian Ocean, identified as *Spinularia* cf. *sarsii* by Plotkin *et al.* (2017). They note that this specimen forms a separate molecular clade from specimens from the Norwegian Sea and may be a separate species but did not formally describe it due to lack of material. Sequencing additional specimens from the Scotian Shelf area would be helpful in resolving this potential species complex.

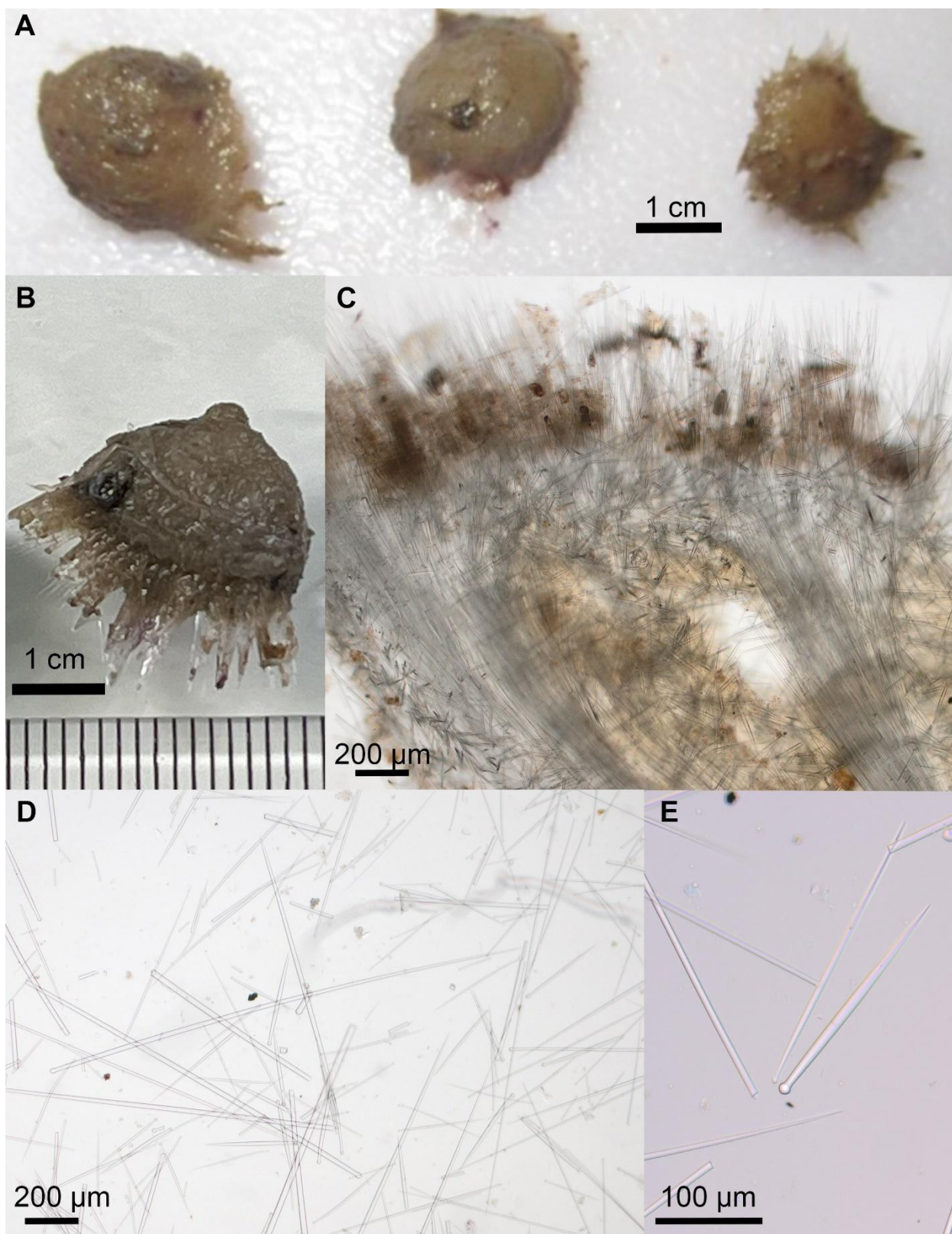


Figure 45. *Spinularia sarsii*. ARC 81517 A. Collected specimens; B. Cross section of preserved specimen showing the median spicule fringe; C. Skeleton; D. Primary and intermediate styles; E. Small subtylostyle.

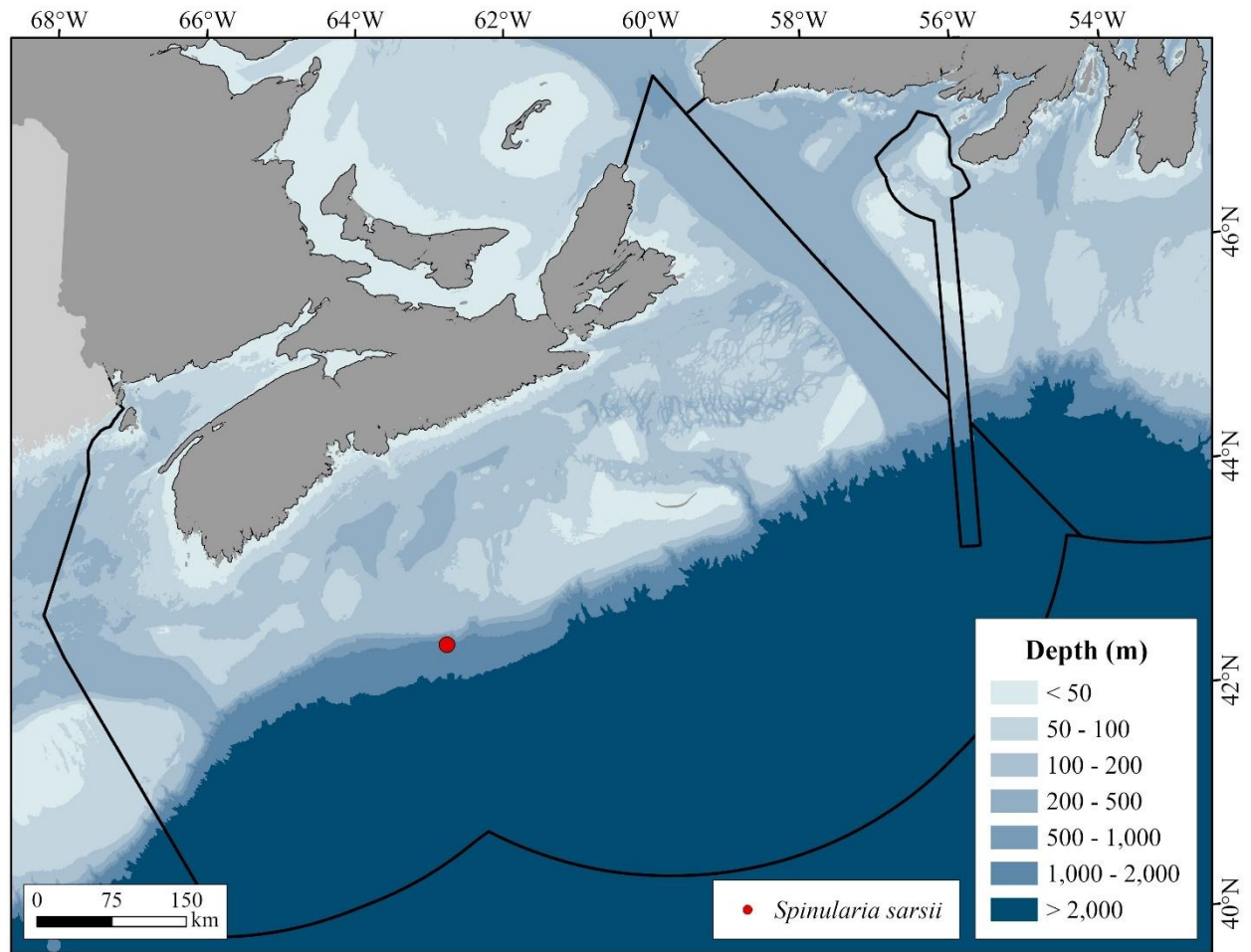


Figure 46. Record of *Spinularia sarsii* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Tentorium semisuberites* (Schmidt, 1870)**

APHIA ID: 134224; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 47A): Small, white, mushroom shaped, sponge. Our specimens have a maximum length of 1.5 cm. The sides are smooth, but the upper surface is hispid and may bear one or more papillae.

Skeleton (Figure 47B, C): Tracts of principal tylostyles ascend to the cortex, these may branch. Tract diameter ranges from 68 to 153 μm in our specimens. The lateral cortex is formed of a dense layer of criss-crossed intermediate styles. The upper cortex is composed of tracts radiating from the choanosome and an upper palisade of small styles.

Spicules (Figure 47D): Measurements from ARC 81515. Principal tylostyles: 1395(1741)2133 by 16(20)25 μm . Intermediate tylostyles: 655(894)1186 by 9(16)24 μm . Small tylostyles: 245(363)548 by 7(11)16 μm . Plotkin *et al.* (2018) give principal subtylostyles to tylostyles 956(1642)2400 by 13.2(20.8)25.2 μm , intermediate tylostyles 810(955)1138 by 20.5(24.7)31.2 μm and small tylostyles 274(467)670 by 12.8(16.8)19.8 μm .

Distribution: The type locality is the West Greenland Shelf. Recent Canadian records from Newfoundland and Labrador (Plotkin *et al.*, 2018), Gulf of St. Lawrence (Dinn, 2020; Nozères *et al.*, 2020) and Saguenay Fjord (C. Goodwin, unpublished data). Four records from 82–433 m were confirmed from the NED2017020 RV survey (Figure 48).

Remarks: While this species has been reported from the Antarctic, genetic evidence suggests southern hemisphere specimens are a separate species (Plotkin *et al.*, 2017).

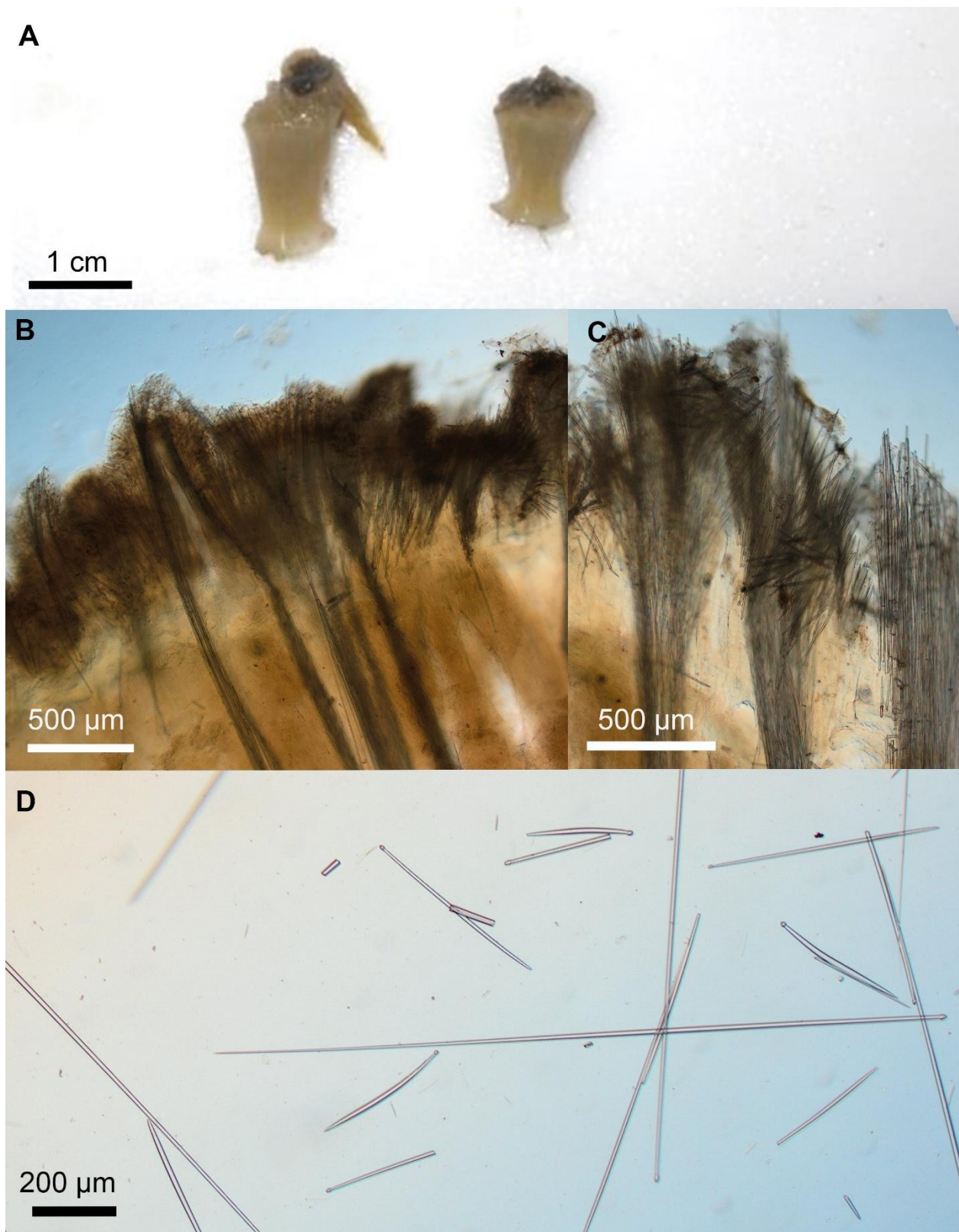


Figure 47. *Tentorium semisuberites*, ARC 81515. A. Freshly collected specimen; B, C. Sections of Skeleton; D. Spicules.

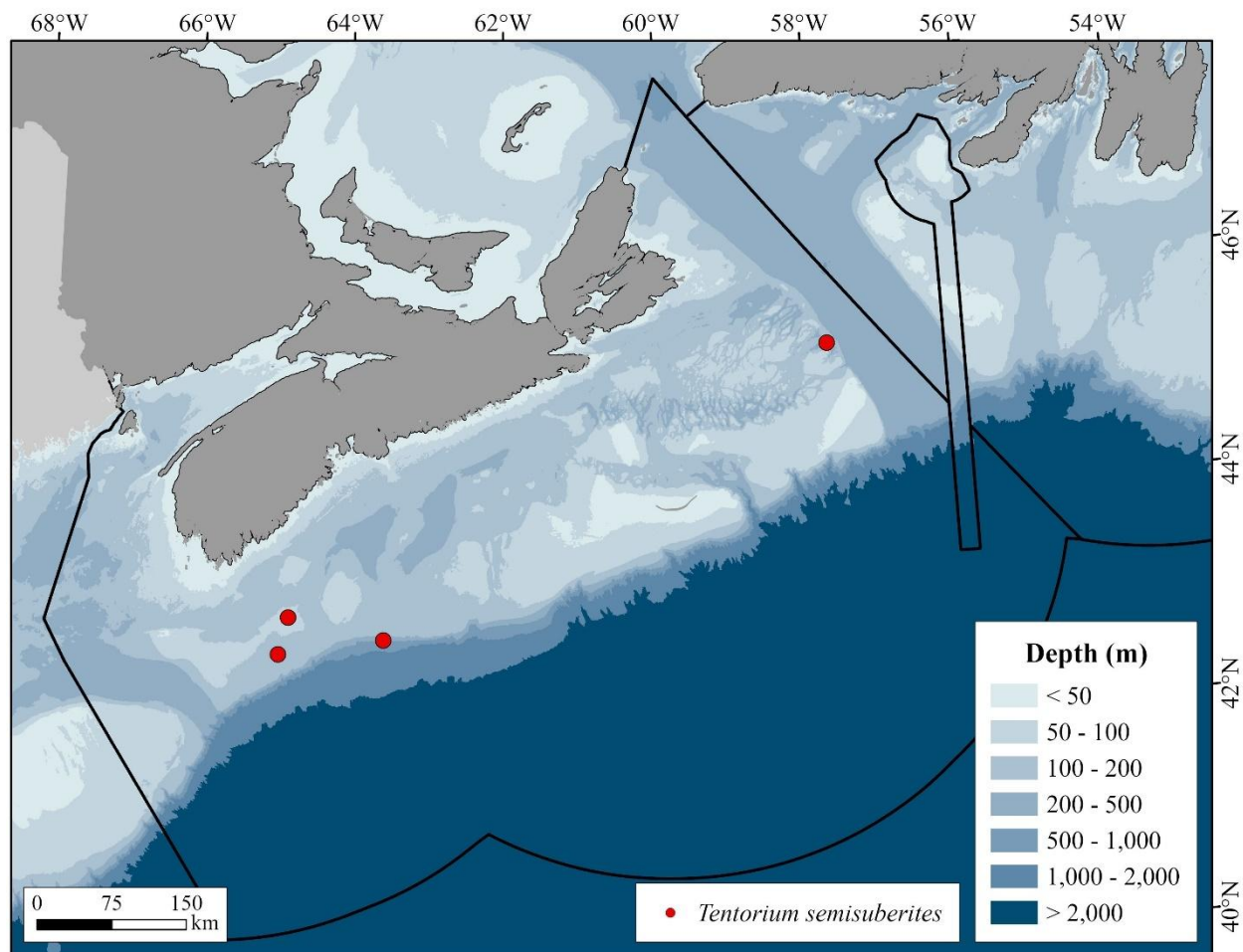


Figure 48. Records of *Tentorium semisuberites* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Trachyteleia hispida* (Bowerbank, 1864)**

APHIA ID: 170691; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 49A): Small ball shaped yellow sponge with much of the surface is covered in a brown hispid layer and a single central osculum is visible.

Skeleton (Figure 49B): Radial choanosomal skeleton with dense tracts of choanosomal tylostyles, exotyles and subtylostyles. Ectosomal skeleton is formed by a dense layer of tylostyles, traversed by echinating choanosomal subtylostyles and exotyles.

Spicules (Figure 49C–H): Measurements from ARC 81436. Choanosomal subtylostyles: 452–1934 by 9–28 μm , fusiform with a marked tyle. Ectosomal small tylostyles: 90(120)191 by 3(4)6 μm , fusiform with a marked tyle. Exotyles: rough or microspined in their central region—this is not immediately obvious under the light microscope and spicules just look dirty unless viewed under very high power. One large, rounded end and one smaller rounded end. Dimensions for measured exotyles were 1319(2354)3295 by 18(26)31 μm . Longer ones were present but these were broken on the slide, so it was not possible to measure them.

De Laubenfels (1949) gives measurements of exotyles > 2600 by 20 μm ; tylostyles 900–1800 by 27 μm ; ectosomal tylostyles 90–180 by 2–4 μm .

Distribution: The type locality is off Portland in the Gulf of Maine. Northeast coast of USA and Canada from Maine to the Gulf of St. Lawrence (de Laubenfels, 1949). Seventeen records from 57–572 m were confirmed from the NED2017020 RV survey (Figure 50).

Remarks: The genus is defined by the centrally spined exotyles. Two species are known: *T. stephensi* Topsent, 1928 from Azores and Cape Verde and *T. australis* Carvalho, Lopes, Cosme & Hajdu, 2016 from Brazil.

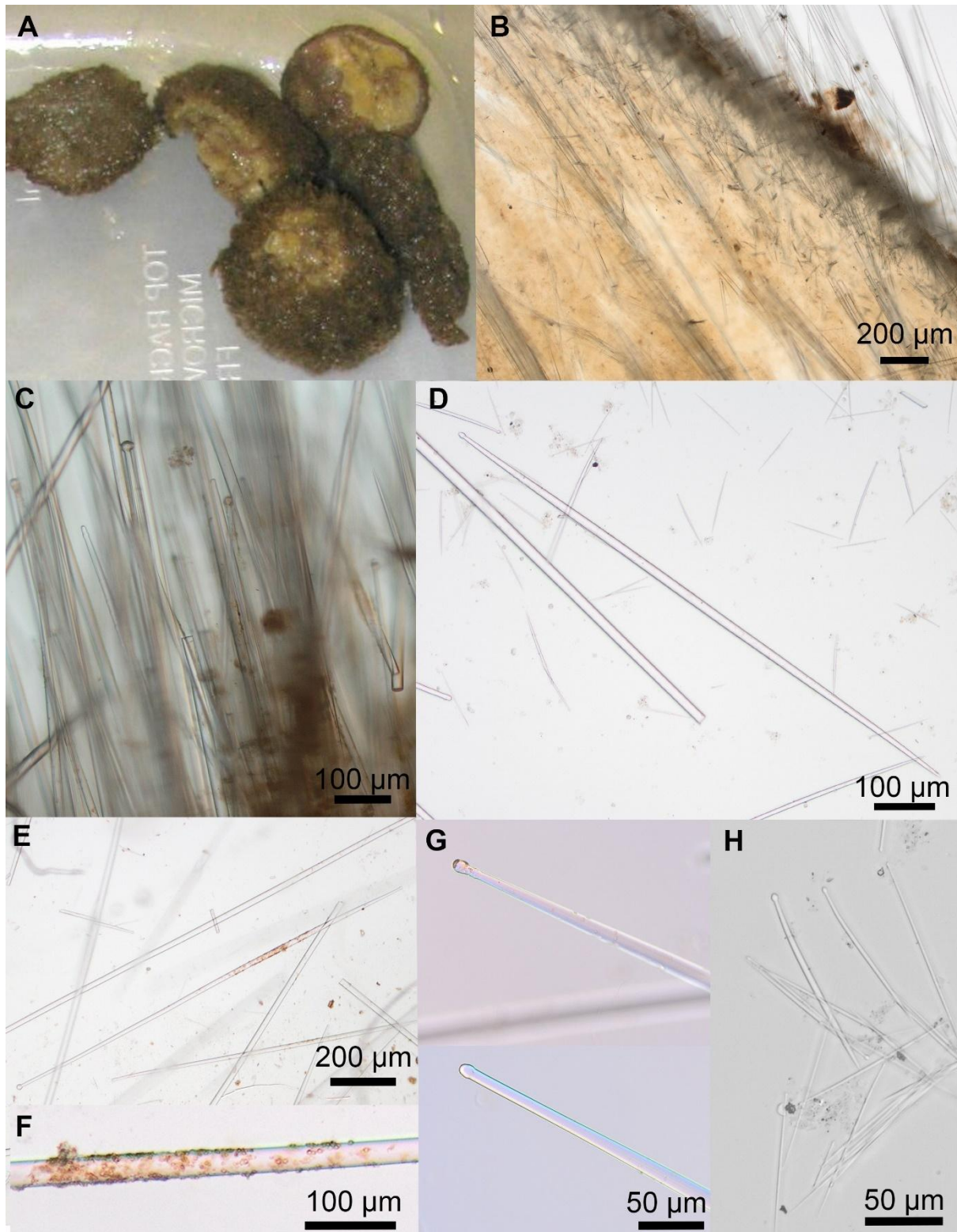


Figure 49. *Trachyteleia hispida*. ARC 81436. A. Freshly collected specimens; B. Skeleton, ectosome to top right; C. Exotyle end visible in section of ectosomal skeleton; D. Choanosomal subtylostyles; E. Exotyles with spined shafts; F. Close up on spined shaft of exotyle; G. Ends of exotyle; H. Small tylostyles of ectosomal skeleton.

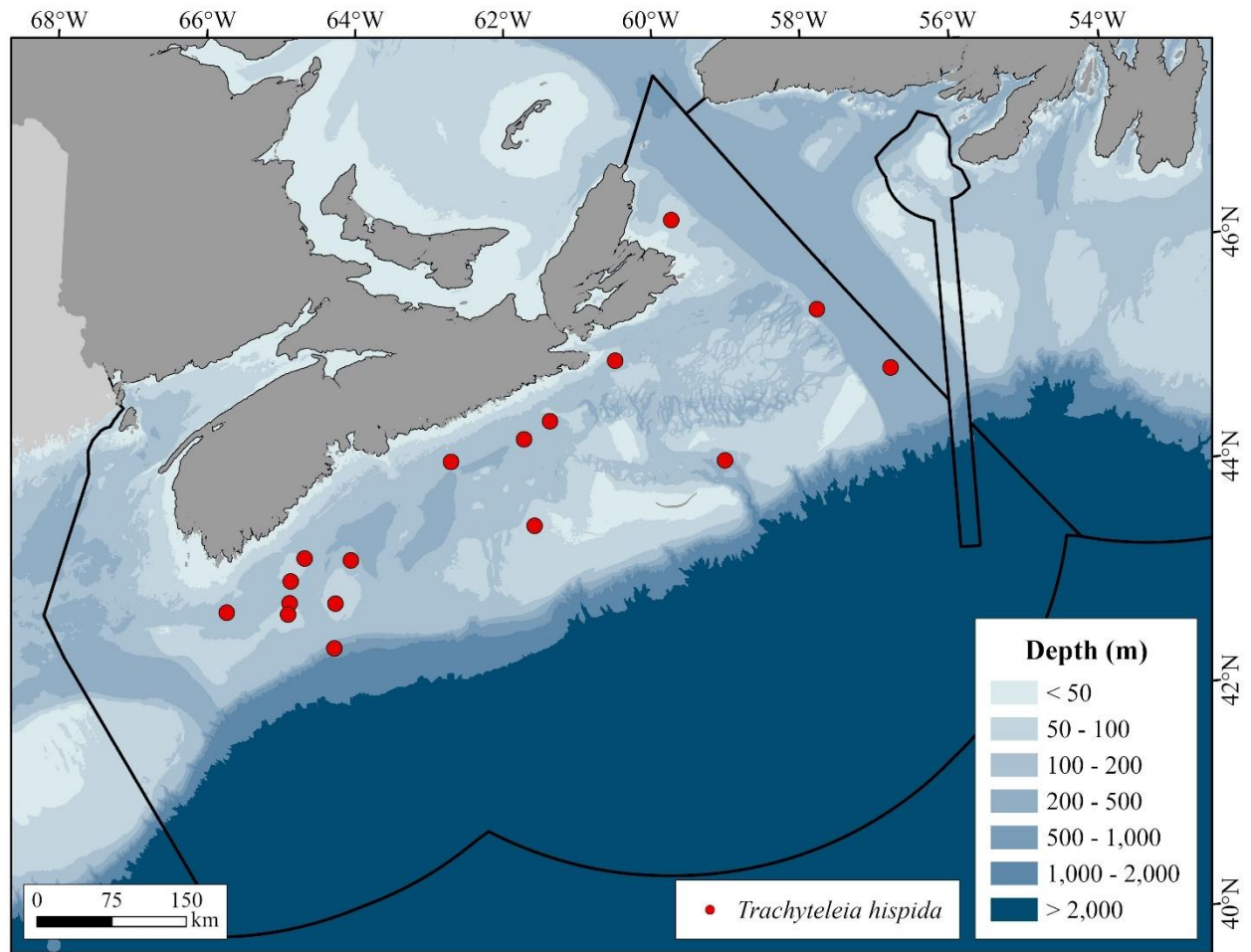


Figure 50. Records of *Trachyteleia hispida* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Weberella bursa* Vosmaer, 1885**

APHIA ID: 134232; **CLASS:** Demospongiae; **ORDER:** Polymastiida; **FAMILY:** Polymastiidae

External appearance (Figure 51A, B): Large (our specimens up to 30 cm maximum diameter) cushion shaped sponge with bright yellow smooth surface. Surface is covered with many irregular conical papillae which have oscula at their summits.

Skeleton (Figure 51C): Choanosome skeleton is formed of a reticulation of tracts of primary styles (around 100–300 µm thick), free scattered small tylostyles are also present. In the cortex there is a basal layer of obliquely lying small styles, a middle layer with the ascending choanosomal tracts with spaces between them, and an outer palisade of small tylostyles.

Spicules (Figure 51D): Measurements from ARC 81470. Large subtylostyles or styles 374(514)661 by 8(12)14 µm. Small tylostyles 127(149)166 by 2(3)4. This is similar to that reported by Plotkin *et al.* (2018): large styles 407(538)700 by 8.8(11)13 µm (width measured at tyle) and small tylostyles 90(201)273 by 2.3(4.8)7.7 µm. These authors measured spicule width at the tyle.

Distribution: The type location is in Northern Norway. This species is widely reported from the Arctic, from the Barents Sea in the east to the Davis Strait in the west (Plotkin *et al.*, 2018; de Voogd *et al.*, 2025). There are recent Canadian records from the Southern Grand Banks, Davis Strait (Plotkin *et al.*, 2018) and the Gulf of St. Lawrence (Dinn, 2020; Nozères *et al.*, 2020). Thirty-nine records from 42–238 m were confirmed from the NED2017020 RV survey (Figure 52).

Remarks: *Weberella bursa* can be distinguished from the visually similar *Polymastia uberrima* by the lack of a hispid collar at the base of the sponge. And in the laboratory by its reticulate choanosomal skeleton and much smaller spicules which have only two rather than three size categories.

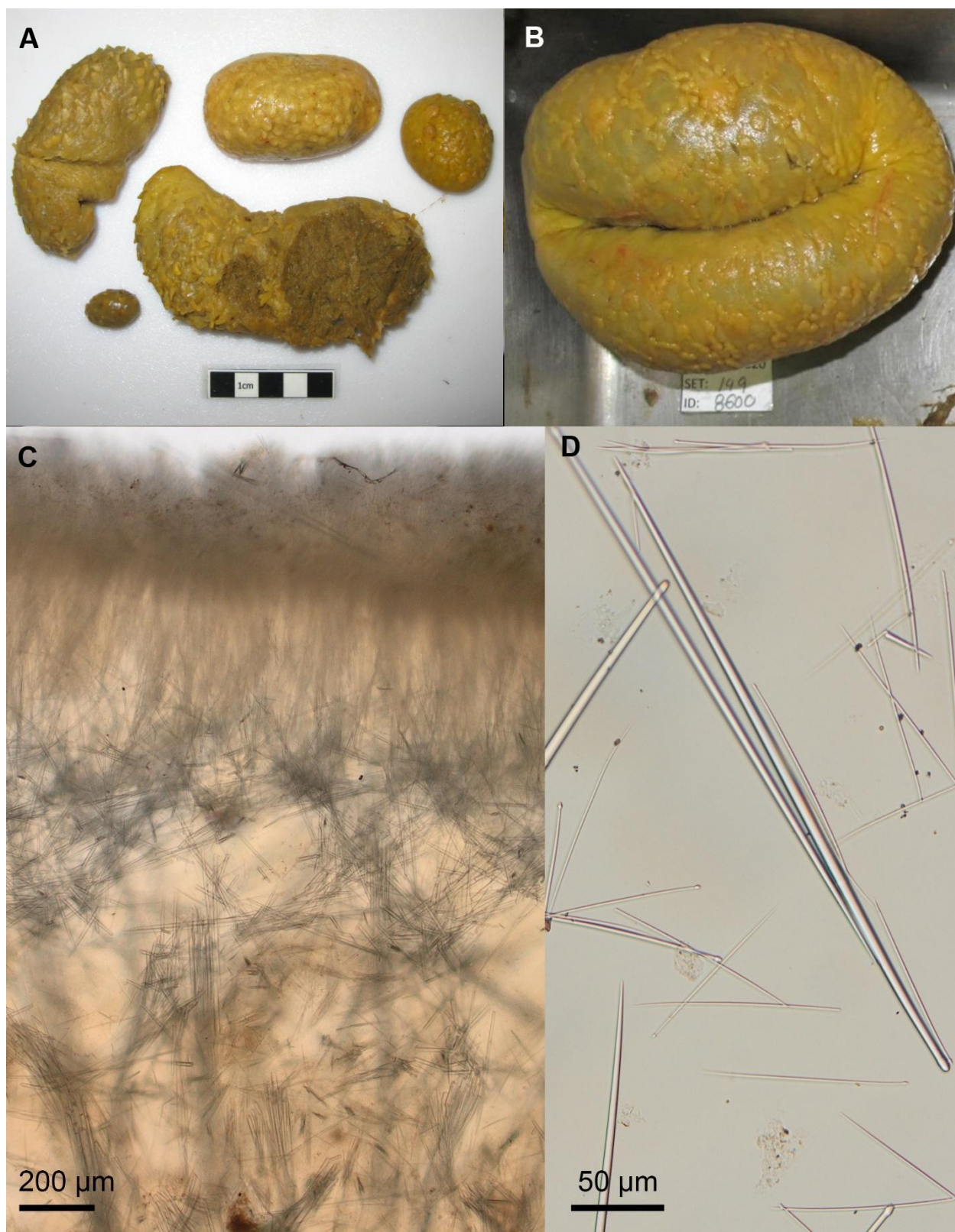


Figure 51. *Weberella bursa*. A. ARC 81439 Freshly collected specimen; B. ARC 81470 Freshly collected specimen; C. Skeleton ARC 81439; D. Spicules ARC 81439.

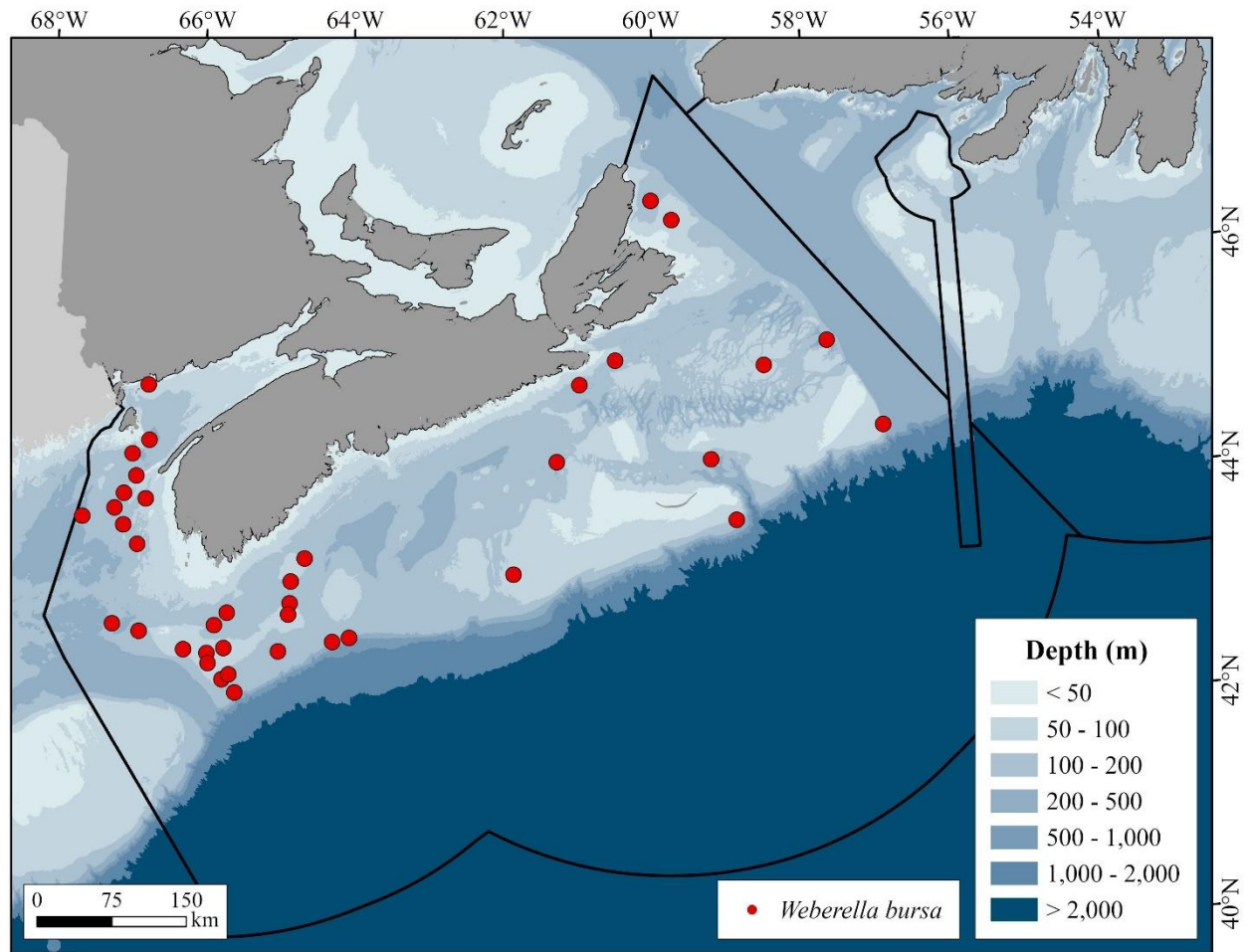


Figure 52. Records of *Weberella bursa* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Halichondria panicea* (Pallas, 1766)**

APHIA ID: 165853; **CLASS:** Demospongiae; **ORDER:** Suberitida; **FAMILY:** Halichondriidae

External appearance (Figure 53A–C): Form varies from thick crust to massive with lobes. Massive specimens have low lobes or ridges, which usually bear terminal oscula. Encrusting specimens have large oscula irregularly scattered over their surface. Surface of sponge quite smooth and visible as a distinct layer in preserved specimens. The colour in life is dull yellow to green; the green tinge is from symbiotic algae.

Skeleton (Figure 53D): Choanosomal skeleton is confused with some ascending tracts. Ectosomal skeleton is a more regular reticulation formed of bundles of 10–15 oxea.

Spicules (Figure 53E): Oxea are often bent in the middle and their ends taper to sharp points 192–445 by 5–15 μm . These oxea are similar to that reported for European specimens; they can be 124–482 by 2–15 μm (Hooper and Van Soest, 2002), but more typically 200(265)320 μm (Ackers *et al.*, 2007).

Distribution: Common in shallow waters of less than 30 m deep in this area, this species is usually found in the intertidal and shallow subtidal, but it has been recorded down to 500 m. It is particularly common on boulders in the intertidal and on the holdfasts of kelp (Van Soest *et al.*, 2000). It has a wide distribution. Its type locality is the UK, but it is found throughout the North Atlantic, both on European and American coasts. It is reported from the Mediterranean and New England to Norway, Iceland, and Northern Canada (Van Soest *et al.*, 2000). While there are records from the Pacific coasts of North America, these may be a sister species (Erpenbeck *et al.*, 2005). In Canada, it has been recorded from the Bay of Fundy (Hartman, 1958; Goodwin, 2017), Southern Grand Banks (Topsent, 1892), Gulf of St. Lawrence (Lambe, 1896; Dinn, 2020) and Northern Labrador (Dinn and Leys, 2018). Three records from 79–91 m were confirmed from the NED2017020 RV survey (Figure 54).

Remarks: The Latin name *paniceus* (Latin) = of bread, refers to the bread-like texture of dried specimens. It is often known as the breadcrumb sponge or crumb-of-bread sponge (Van Soest *et al.*, 2000).

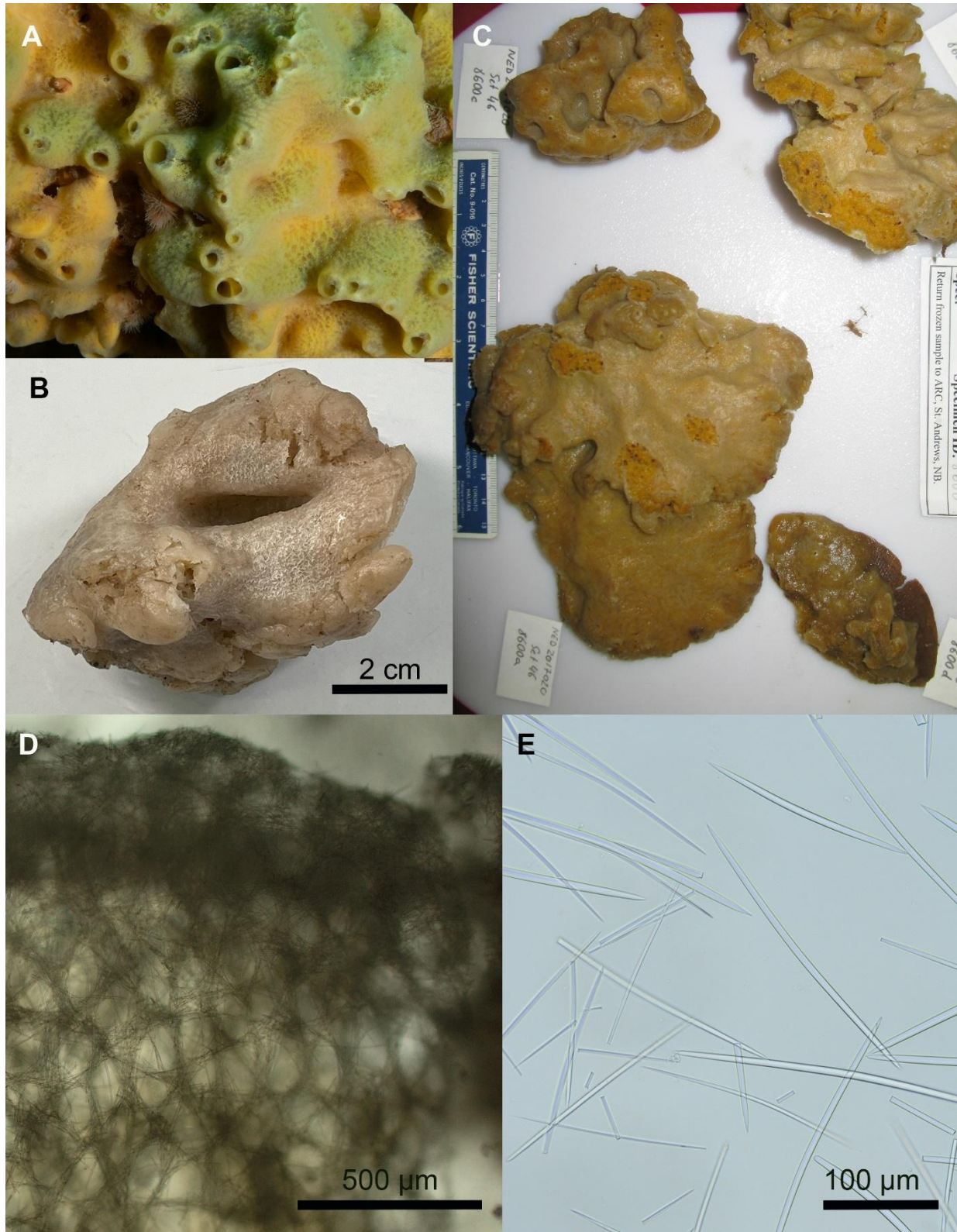


Figure 53. *Halichondria (Halichondria) panicea*. A. ARC 82023 *In situ* appearance (from SCUBA surveys in adjacent waters); B. ARC 81536 preserved specimen, note smooth, shiny surface; C. ARC 81534 freshly collected trawl specimens; D. Skeleton, ARC 82023; E. Spicules, ARC 82023.

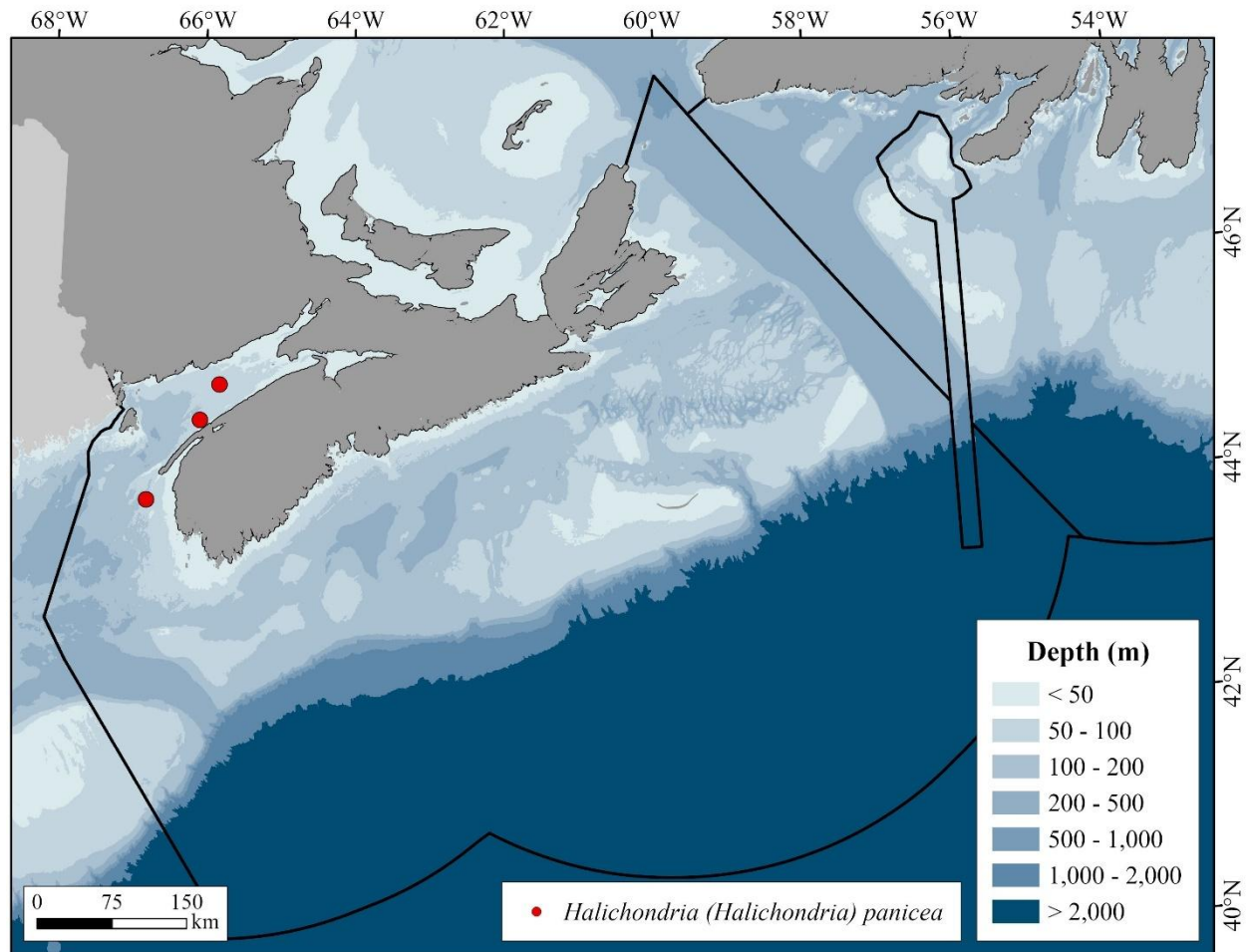


Figure 54. Records of *Halichondria (Halichondria) panicea* from the NED2017020 RV survey. This species is likely to be more common, but it is hard to confirm from spicule morphology. A combination of spicule morphology and molecular sequencing was used to confirm these mapped specimens. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Halichondria (Eumastia) sitiens* (Schmidt, 1870)**

APHIA ID: 165789; **CLASS:** Demospongiae; **ORDER:** Suberitida; **FAMILY:** Halichondriidae

External appearance (Figure 55A–D): Yellow massively encrusting sponge with irregular fistules. Surface often translucent with internal skeleton visible through it.

Skeleton (Figure 55F): The choanosomal skeleton consists of ascending columns of oxea (up to 100 µm thick) joined by individual spicules. The ectosomal skeleton consists of a felted layer of oxea, with no particular arrangement, which is supported by the ends of the choanosomal spicule tracts.

Spicules (Figure 55E): Long oxea, evenly tapering to sharp points. Oxea are often bent in the middle, 514(752)1089 by 11(15)20 µm from ARC 81473 which was from 154 m. Van Soest *et al.* (2000) note that the size range of oxea in this species is 360–1020 by 7–20 µm, which is similar to that found in our specimen.

Distribution: The type location for this species is on the west Greenland Shelf. It is found from the Arctic (Koltun, 1959; Dinn and Leys, 2018), through the Gulf of St. Lawrence (Dinn, 2020; Nozères *et al.*, 2020) and the Scotian Shelf (this report) down to Maine (Trott, 2004). It is also found in Iceland (de Montety *et al.*, 2021). In the eastern Atlantic there are records from Northern Ireland (Picton and Morrow, 2016) and Norway (Van Soest *et al.*, 2000). Five records from 57–88 m were confirmed from the NED2017020 RV survey (Figure 56).

Remarks: There is a range in external appearance in specimens from the eastern Canadian coast. Specimens from the Bay of Fundy typically form very large patches (some over 2 m in length) with low papillae (Goodwin, 2017). Those from the eastern shores (Goodwin *et al.*, 2026) and Scotian Shelf (this publication) have more prominent papillae, as noted in the original description (Schmidt, 1870) and photographed in Northern Ireland (Picton and Morrow, 2016). This difference might be related to their habitat. However, even when the papillae are less obvious, the skeleton with its detachable ectosomal membrane and subdermal spaces is unlike other *Halichondria* species found in the area.

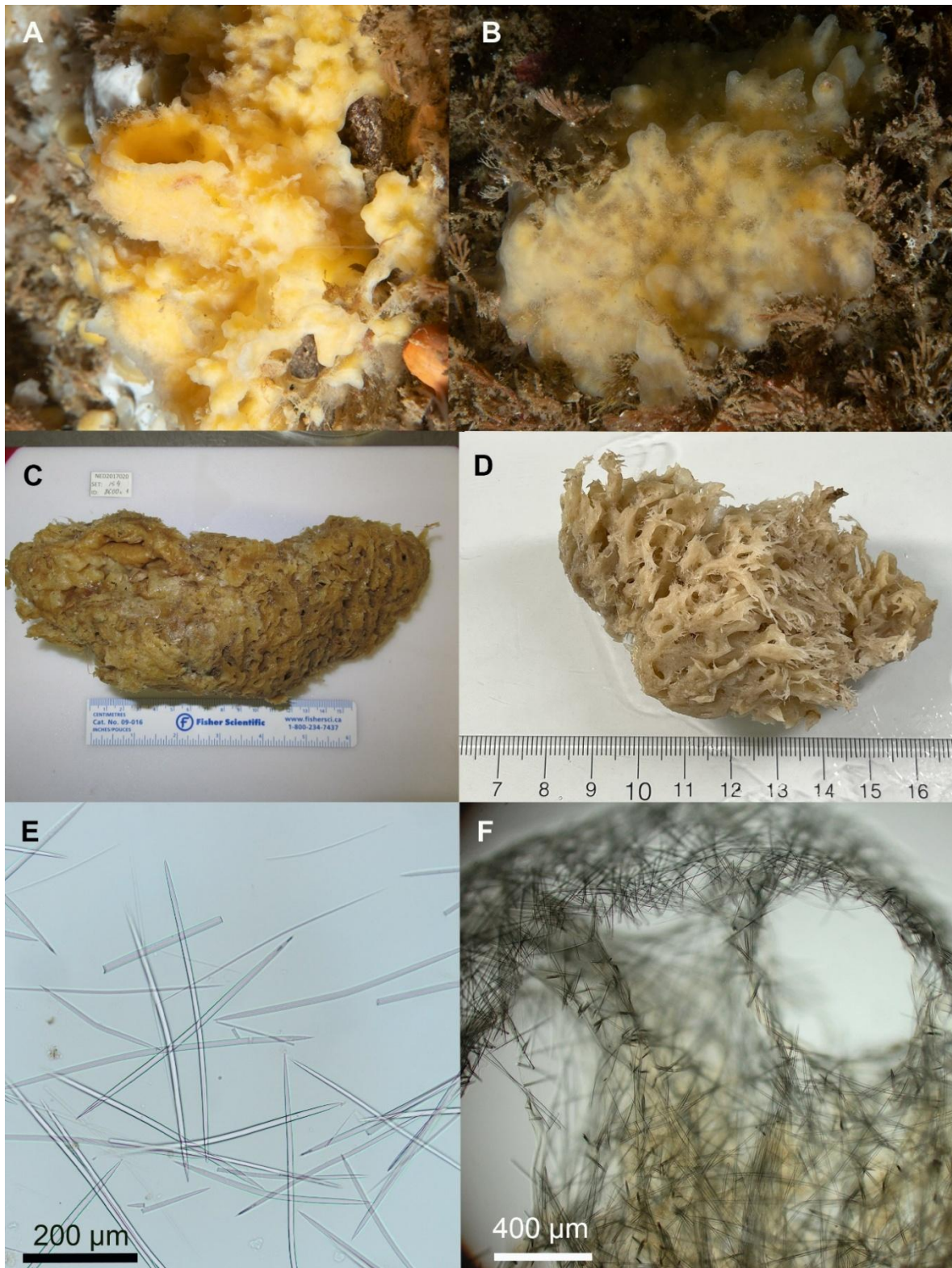


Figure 55. *Halichondria (Eumastia) sitiens*. In situ appearance: A. ARC 82165; B. ARC 82144, from specimens collected in SCUBA surveys of adjacent waters; C. Freshly collected trawl specimen ARC 81473; D. Preserved specimen ARC 81473; E. Spicules, ARC 82165; F. Skeleton, ARC 82165, ectosome to right.

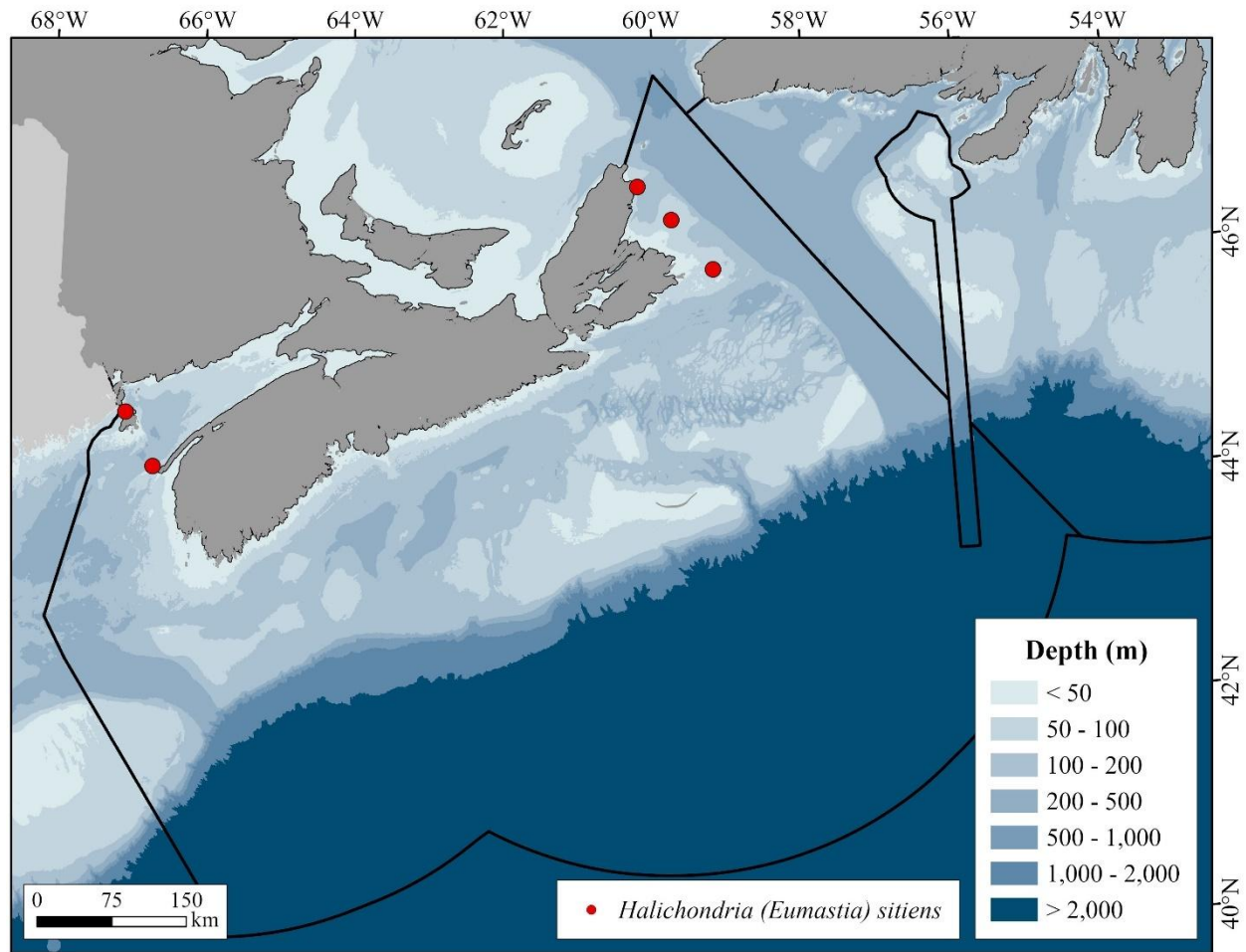


Figure 56. Records of *Halichondria (Eumastia) sitiens* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Spongosorites* sp. Topsent, 1896**

APHIA ID: 131818; **CLASS:** Demospongiae; **ORDER:** Suberitida; **FAMILY:** Halichondriidae

External appearance (Figure 57A, B): Surface smooth and only detachable as flakes. Consistency dense but compressible. Tissue brown in ethanol but not blackened (does not seem to have an aerophobic reaction).

Skeleton (Figure 57C): The choanosomal skeleton is confused with some thick ascending columns of oxea and many free spicules. The ectosomal skeleton is a tangential crust of the small oxea. In some specimens the bundles of the small oxea form a circular mesh.

Spicules (Figure 57D, E): ARC 81441: large oxea 685(837)981 by 12(15)18 μm , smooth, often one point more abrupt; microxea 52(61)74 by 3(3)4 μm , entirely spined with small spines, most slightly curved. ARC 81509: large oxea 789-1091 by 9 by 14 μm and spined microxea 35–66 by 2–2.5 μm .

Distribution: In addition to our specimens from the Scotian Shelf, this species has also been recorded from the Gulf of St. Lawrence (Dinn, 2020, as Suberitida unknown 2). Twenty-three records from 75–269 m were confirmed from the NED2017020 RV survey (Figure 58).

Remarks: Because our specimens have a soft rather than stony texture and do have choanosomal fibres we tentatively place them in *Spongosorites*. However, this genus is not well defined and both it and the closely related genus *Topsentia* require revision.

Sequences were obtained for specimens from the Scotian Shelf and Gulf of St. Lawrence (C. Dinn, unpublished data). These are closest to *Suberites virgultosus* (Johnston, 1842). Genera in the Suberitidae typically have tylostyle megascleres but can have oxea rather and may have microxea. But our specimens lack ectosomal brushes of tylostyles which are characteristic of this family. Many families in the Halichondrida have been shown to be polyphyletic (Erpenbeck *et al.*, 2005) so molecular tools may not be as useful as in other groups for resolving taxonomic issues.

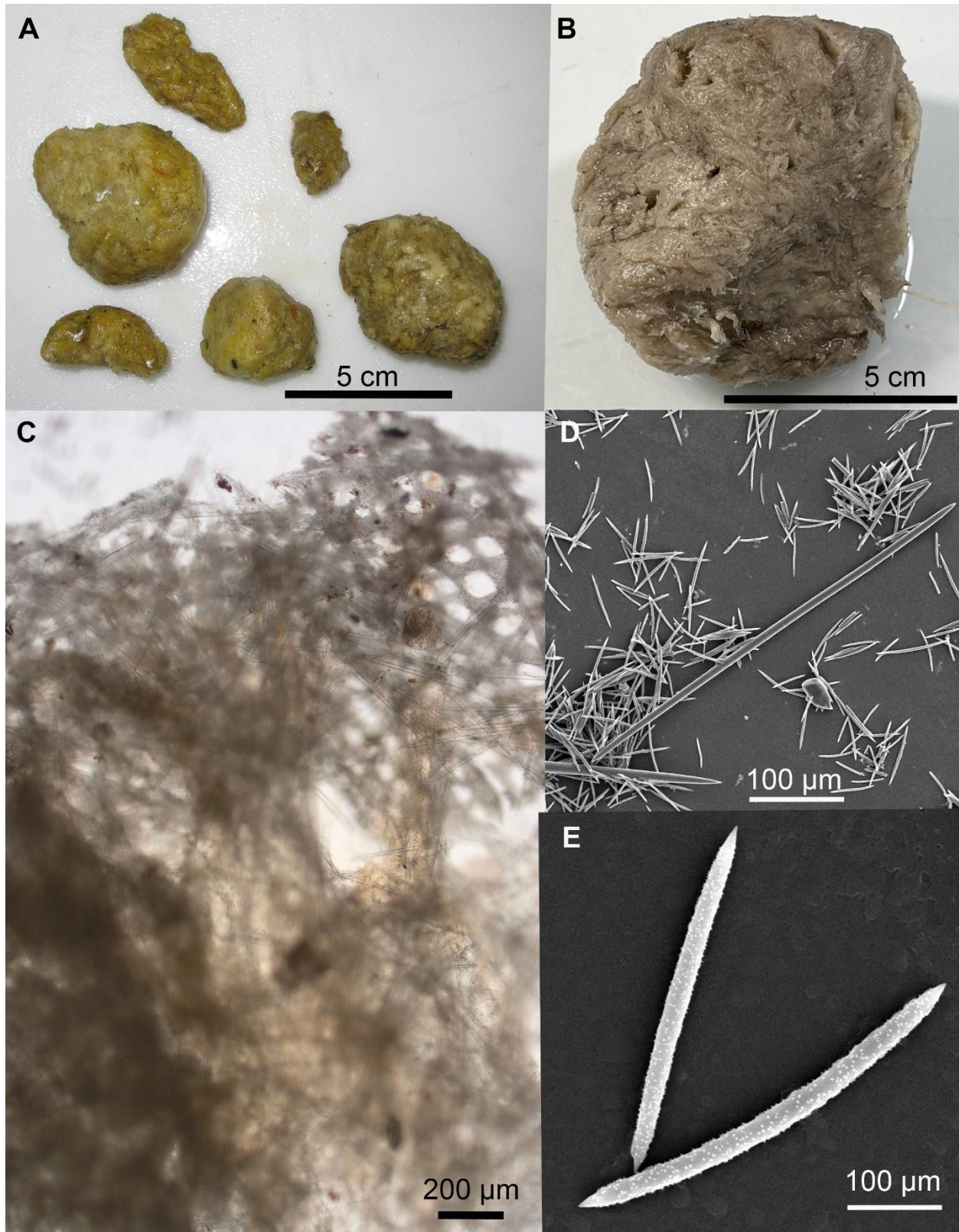


Figure 57. *Spongosorites* sp. A. Freshly collected specimens; B. ARC 81441 Preserved specimen; C. Skeleton ARC 81509, note the ectosomal mesh to the top; D. Large oxea; E. Spined microxea. Both ARC 81438.

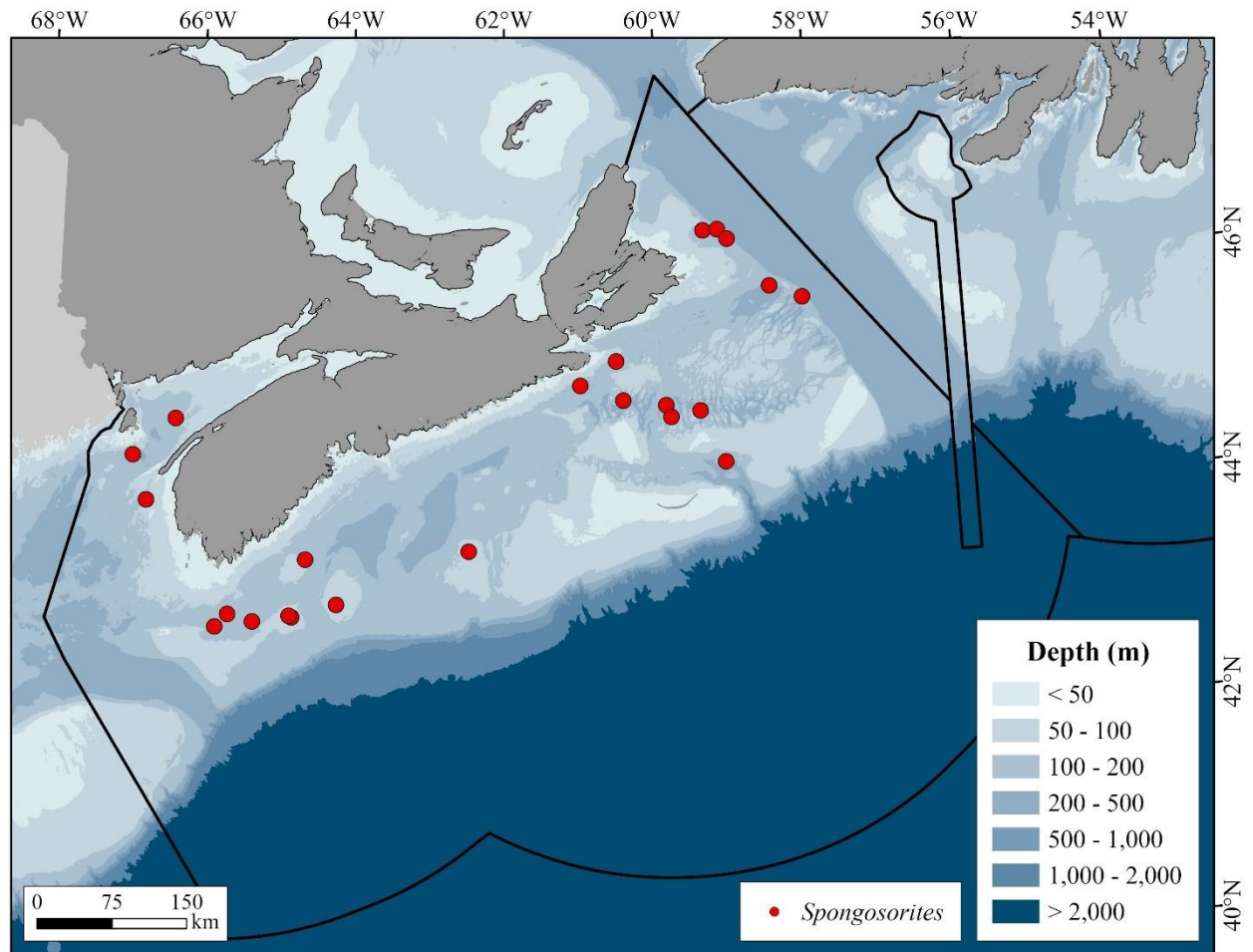


Figure 58. Records of *Spongosorites* sp. from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Stylocordyla borealis* (Lovén, 1868)**

APHIA ID: 134240; **CLASS:** Demospongiae; **ORDER:** Suberitida; **FAMILY:** Stylocordylidae

External appearance (Figure 59A, B): Beige to brown sponge with soft oval body and long thin stalk. The type specimen is described as being 5.2 cm long with a body 1.3 cm and a stalk of 3.9 cm (Hooper and Van Soest, 2002).

Skeleton (Figure 59C): The choanosomal skeleton is radiate with columns of oxea. These protrude through the sponge surface and a palisade of smaller oxea between them forms the ectosomal skeleton.

Spicules (Figure 59D): Measurements from ARC 81489. Oxea with sharp points, some centrotylote, 268(527)1066 by 7(10)16 µm. These possibly represent two size classes, 268–450 µm and 504–1066 µm. Microxea 70–111 by 3–6 µm. Spicules given from re-measurement of the type specimen are in three categories of oxea: 790–2930 by 10–47 µm, 400–1140 by 11–13 µm, and 340–450 by 4–4.5 µm and microxea 70–100 by 1.5–2 µm.

Distribution: The type locality is Northern Norway. Previously recorded from the Scotian Shelf by Ridley and Dendy (1887). Common in the Gulf of St. Lawrence (Dinn, 2020; Nozères *et al.*, 2020). Records from the North-east Atlantic and Arctic (de Voogd *et al.*, 2025). Two records from 190–227 m were confirmed from the NED2017020 RV survey (Figure 60).

Remarks: Several records of this species were previously made from the Antarctic, but these have recently been redescribed as *Stylocordyla chupachups* Uriz, Gili, Orejas & Pérez-Porro, 2011 (Uriz *et al.*, 2011).



Figure 59. *Stylocordyla borealis*. A. Collected specimen set 66 (the oval body has been fragmented); B. Preserved specimen; C. Skeleton; D. Spicules. All images apart from A. from ARC 81489.

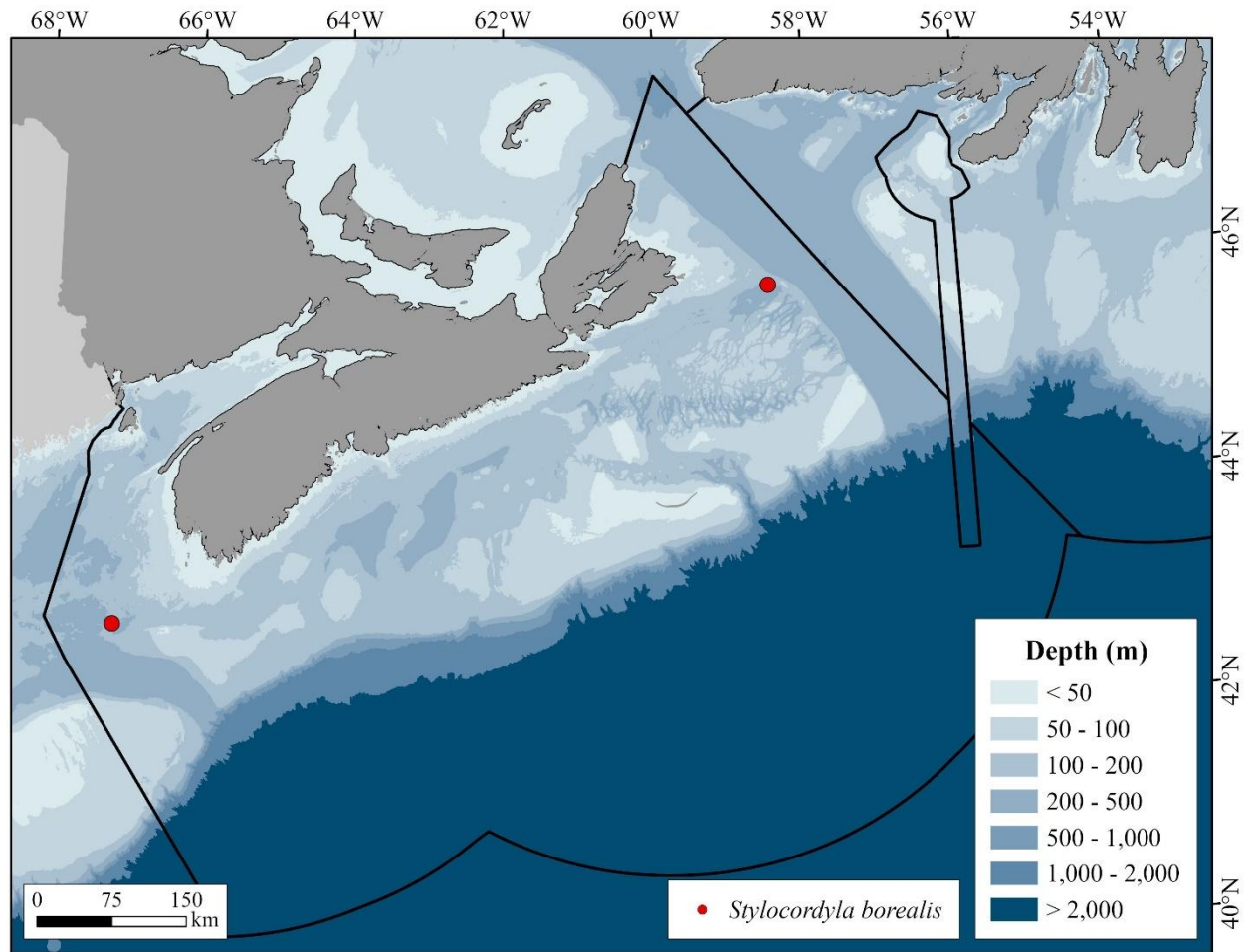


Figure 60. Records of *Stylocordyla borealis* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Plicatellopsis* sp. 1 Burton, 1932**

APHIA ID: 165444; **CLASS:** Demospongiae; **ORDER:** Suberitida; **FAMILY:** Suberitidae

External appearance (Figure 61A): Yellow branching sponge. Specimens had broken in the trawl, but branches were around 0.5 cm in diameter.

Skeleton (Figure 61B): Choanosomal skeleton is radiate with columns of tylostyles and many spicules in confusion. Columns fan out towards the surface and there is an ectosomal palisade of tylostyles (but these do not appear to be a separate size category to those in the choanosome).

Spicules (Figure 61C): Tylostyles with neat pin-like head ARC 81512 170–470 by 4.6–11.9 μm .

Distribution: Not known. Four records from 82–210 m were confirmed from the NED2017020 RV survey (Figure 62).

Remarks: There are currently seven valid species in this genus (de Voogd *et al.*, 2025). It has solely been recorded from the Southern Ocean apart from one species from the Bering Sea *Plicatellopsis borealis* Lehnert and Stone (2017). *P. borealis* differs from our specimens in being a funnel shaped sponge with two categories of tylostyles 445–550 by 14–24 and 165–270 by 9–11 μm (measurements from ARC). *Plicatellopsis bowerbanki* (Vosmaer, 1885) was recently re-assigned to this genus (Dinn *et al.*, 2020). This has similar sized tylostyles (198(258)344 by 13(19)24 in ARC 81424 from the Gulf of St. Lawrence). However, this species is a large fan shaped sponge and the tylostyles are thicker and do not have a pronounced tyle. All the southern hemisphere species have longer spicules than are present in our specimens, and many are funnel or fan shaped (see Lehnert and Stone, 2017).



Figure 61. *Plicatellopsis* sp. 1. All ARC 81512; A. Collected specimen; B. Skeleton; C. Spicules.

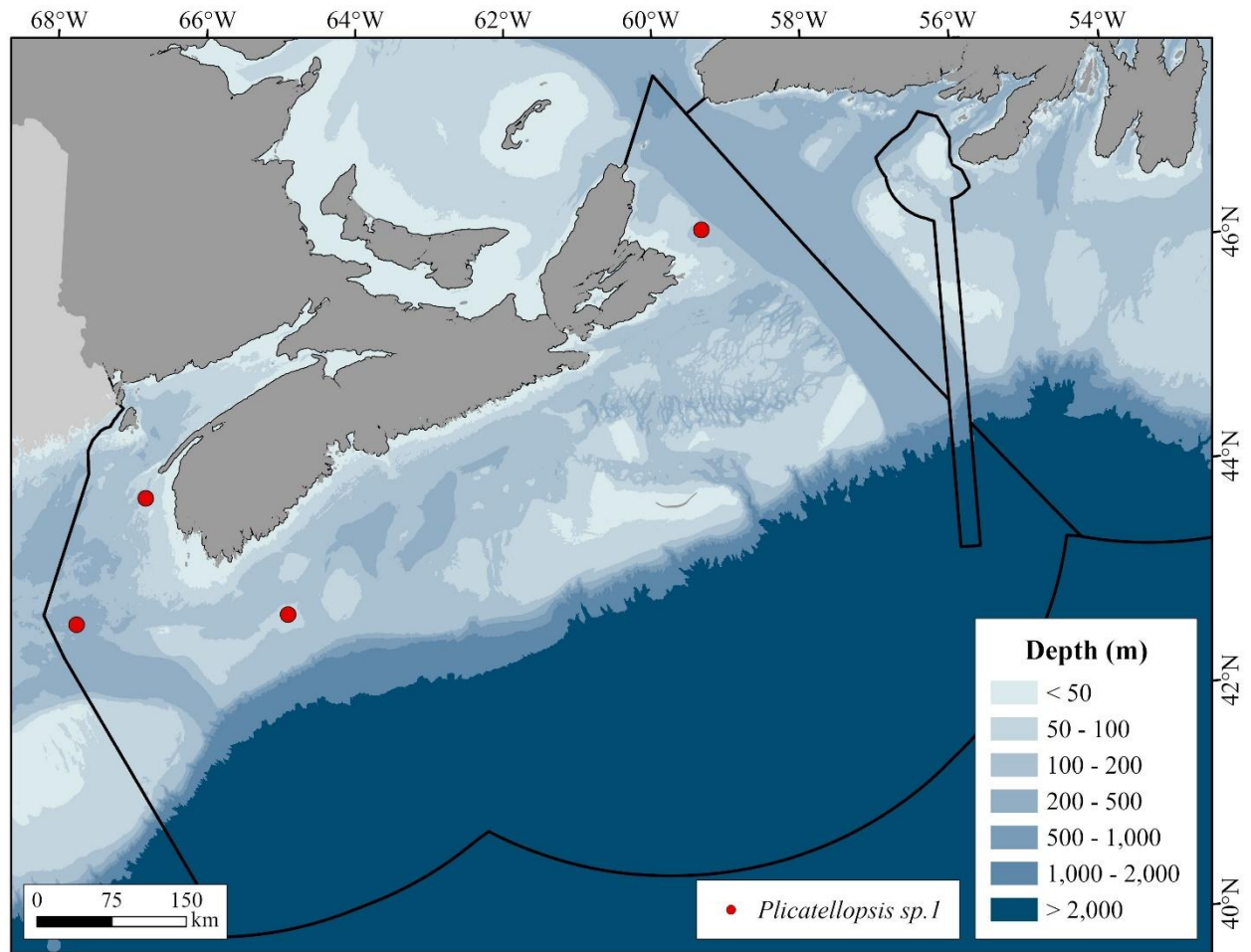


Figure 62. Records of *Plicatellopsis sp. 1* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Suberites ficus* (Johnston, 1842)**

APHIA ID: 134285; **CLASS:** Demospongiae; **ORDER:** Suberitida; **FAMILY:** Suberitidae

External appearance (Figure 63A, B): Buff, mustard or pale orange sponge which is often covered in silt. When living the sponge forms large soft lobes (maximum diameter can be over 30 cm) which have prominent oscula. When collected, specimens contract and the sponge can have a smooth shiny surface.

Skeleton (Figure 63C): The choanosomal skeleton is very confused with some radiate columns of large tylostyles and many free spicules. Surface palisade of smaller tylostyles. Centrotylote microrhabds are present in the ectosomal layer between the tips of the projecting styles – may be hard to spot and may be rare.

Spicules (Figure 63D, E): Measurements from ARC 81506. Tylostyles: 373 (423)477 by 5(7)14 µm, thin with a neat pin-like head. Centrotylote microrhabds: 17(25)35 by 2(2)3 µm. ARC 81504. Tylostyles: 287(376)457 by 5(7)8 µm. Centrotylote microrhabds: 17(20)26 by 2(2)3 µm.

Distribution: Typically found in soft sediment habitats, often attached onto pebbles or shells. Widespread throughout the Arctic and Atlantic. Associated with sheltered, silty habitats such as harbours (Van Soest *et al.*, 2000). Recent Canadian records from the Bay of Fundy (Goodwin, 2017) and the Gulf of St. Lawrence (Dinn, 2020). Thirty records from 31–223 m were confirmed from the NED2017020 RV survey (Figure 64).

Remarks: Van Soest *et al.* (2000) note that two size categories of tylostyles are present: 100–250 µm and 350–500 µm. The spicules present in our specimens were not readily divisible into two categories but the ectosomal layer was composed of smaller spicules. The size of microrhabds given by Van Soest *et al.* (2000) is 15–50 µm. These dimensions are larger than found in our specimens and the typical European form of *S. ficus* is bright orange with a smooth surface. The taxonomy of *Suberites* requires revision and it is possible that *S. ficus* represent a species complex. Other *Suberites* species are present in eastern Canada including *Suberites cebriones* Morozov, Sabirov and Zimina, 2019. Examination of spicules including the form of the microscleres is required to distinguish them as spined microxea as well as microrhabds are present in some species.

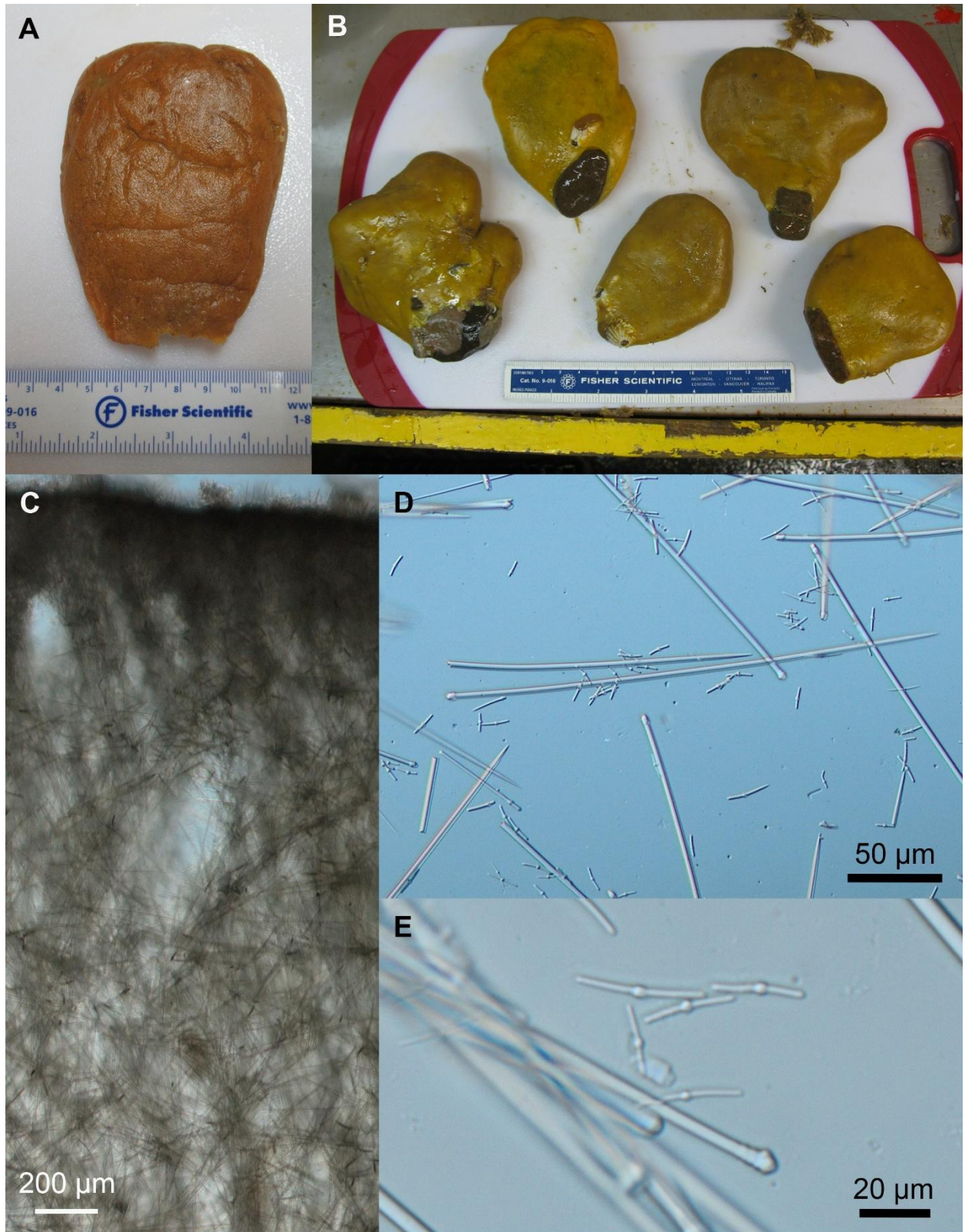


Figure 63. *Suberites ficus*. A. Freshly collected specimen ARC 81504; B. Several specimens from NED2017020 Set 84; C. Skeleton ARC 81506; D. Tylostyles ARC 81506; E. Centrotylote microrhabds ARC 81506.

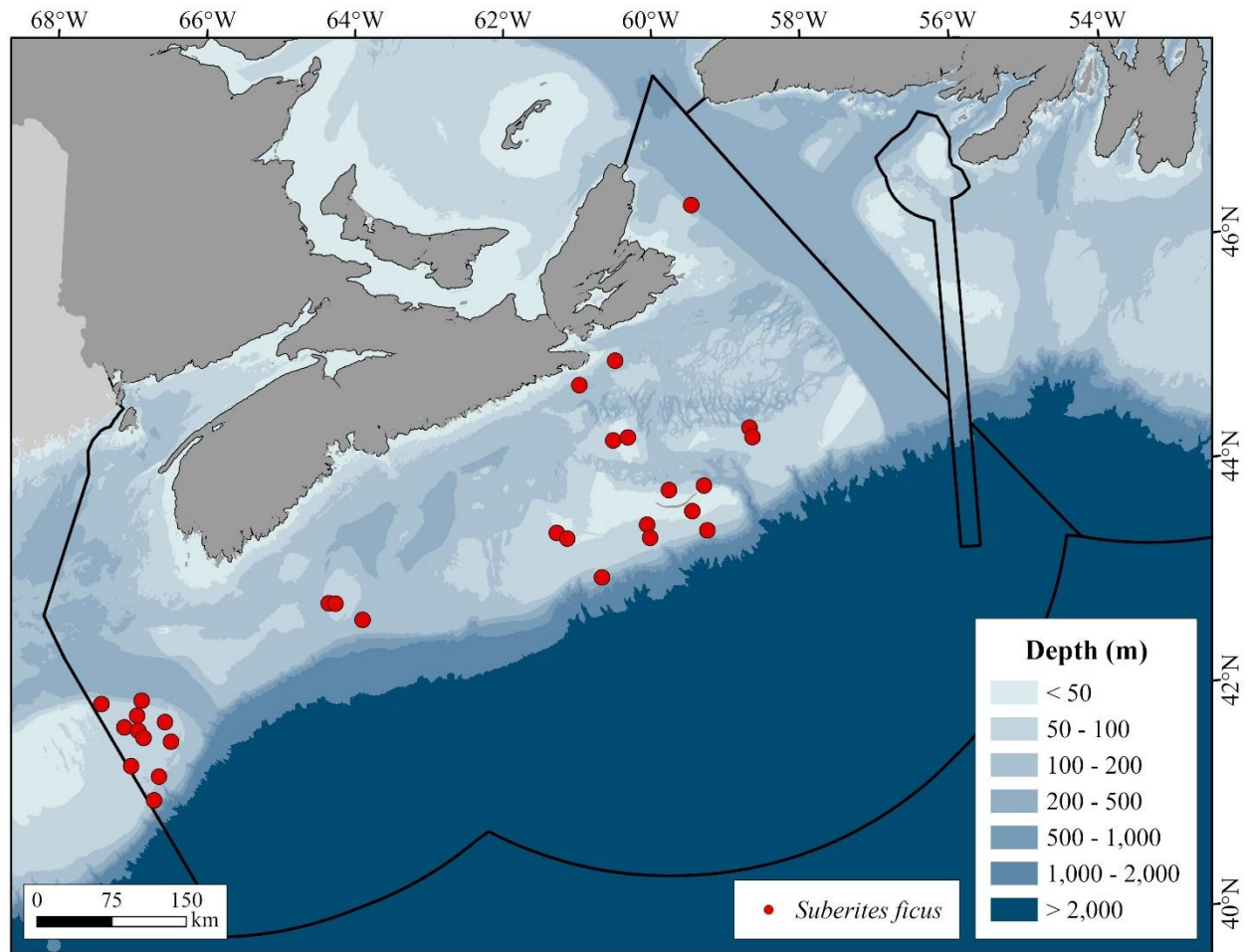


Figure 64. Records of *Suberites ficus* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Stelletta normani* Sollas, 1880**

APHIA ID: 133980; CLASS: Demospongiae; ORDER: Tetractinellida FAMILY: Ancorinidae

External appearance (Figure 65A): The type specimen is described as a cake like ellipsoid with a hispid surface which is grey due to clinging foraminifera, other organisms, and mineral deposits. There are other *Stelletta* species present in this region. Cardenas and Rapp (2012) note that these can usually be distinguished based on appearance. Our specimen was a ball around 2.5 cm in diameter and a hard white cortex. *Stelletta normani* has a clear double-layered cortex with (i) a bright white layer (packed with trichodragmas) and (ii) a vitreous grey layer (fibrous layer).

Skeleton: Radiate skeleton with the cladomes of the triaenes and oxyasters (large and small sizes) embedded in the ectosome. Bundles of oxea and the rhabdomes of the triaenes make up the columns in the choanosome. There is a layer of microscleres in the ectosome.

Spicules (Figure 65B-F): Measurements from the type description. Megascleres: large oxea simple fusiform, straight or slightly curved, 6 mm by 0.06 mm; potriaenes with a rhabdome length 4 mm and width of 0.08 mm, clade 0.76 mm long; dichotriaenes with a rhabdome length 2.79 mm and width of 0.1 mm; thin megascleres, all around 0.03 mm wide; long, slender oxea 5.8 mm long; protriaenes 5.46 mm long; anatriaenes 5.48 mm long; protriaene 1.59 mm long. Microscleres: oxyasters 30 µm in diameter; strongylasters 10 µm diameter; trichodragmata 40–50 by 20 µm.

Distribution: The type locality is in Southern Norway. Alander (1942) reports it is very common in the Koster Fjord in depths of 100–200 m. Recorded from the Southern Grand Bank, Newfoundland (Topsent, 1892). One record in 84 m was confirmed from the NED2017020 RV survey (Figure 66).

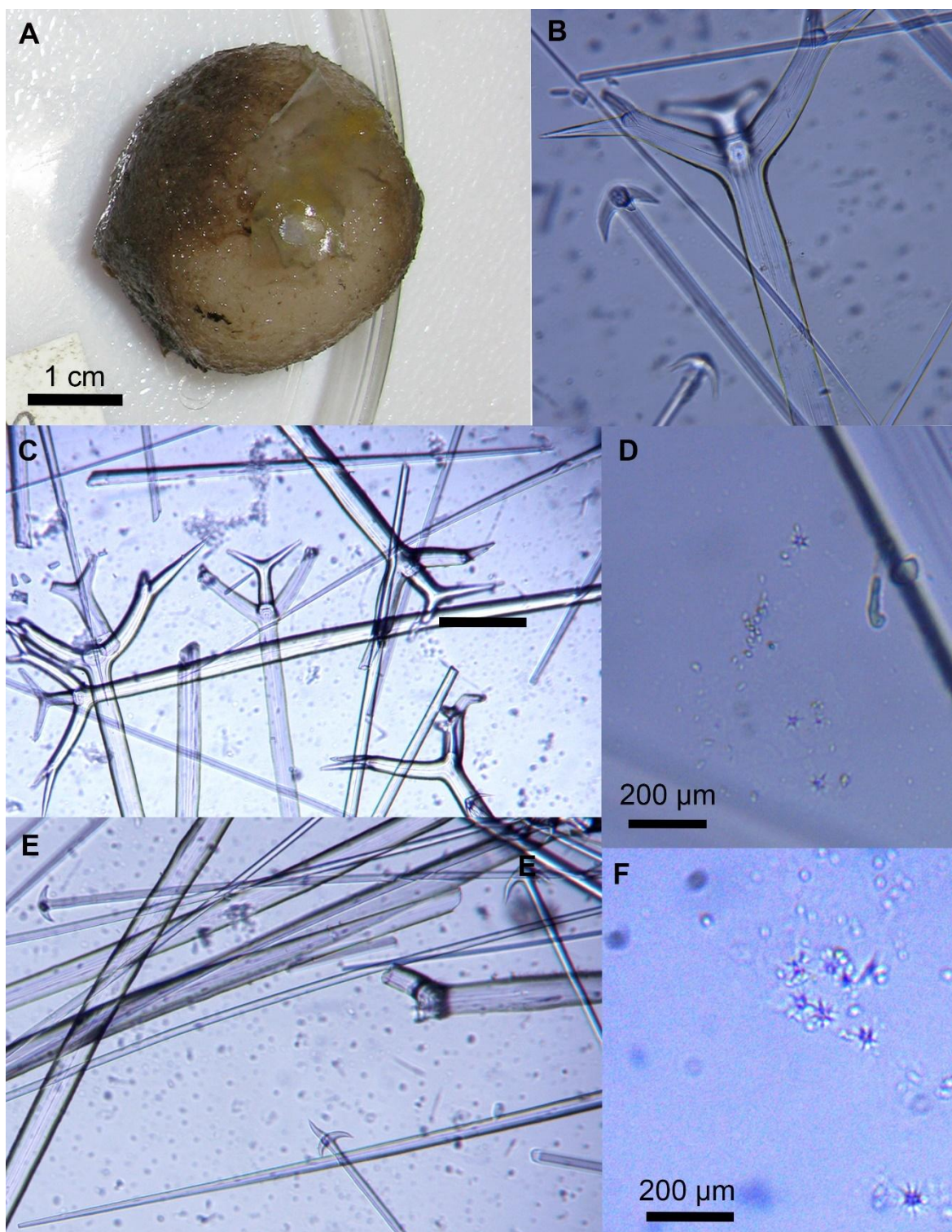


Figure 65. *Stelletta normani*, all images from NED2017020 Set 21. A. Freshly collected specimen; B. Dichotriaenes and anatriaenes; C. Dichotriaenes; D-F. Asteroose microscleres; E. Anatriaenes. This specimen is in Uppsala, and spicule images were kindly provided by Julio A. Díaz (Museum of Evolution, Uppsala University, Sweden).

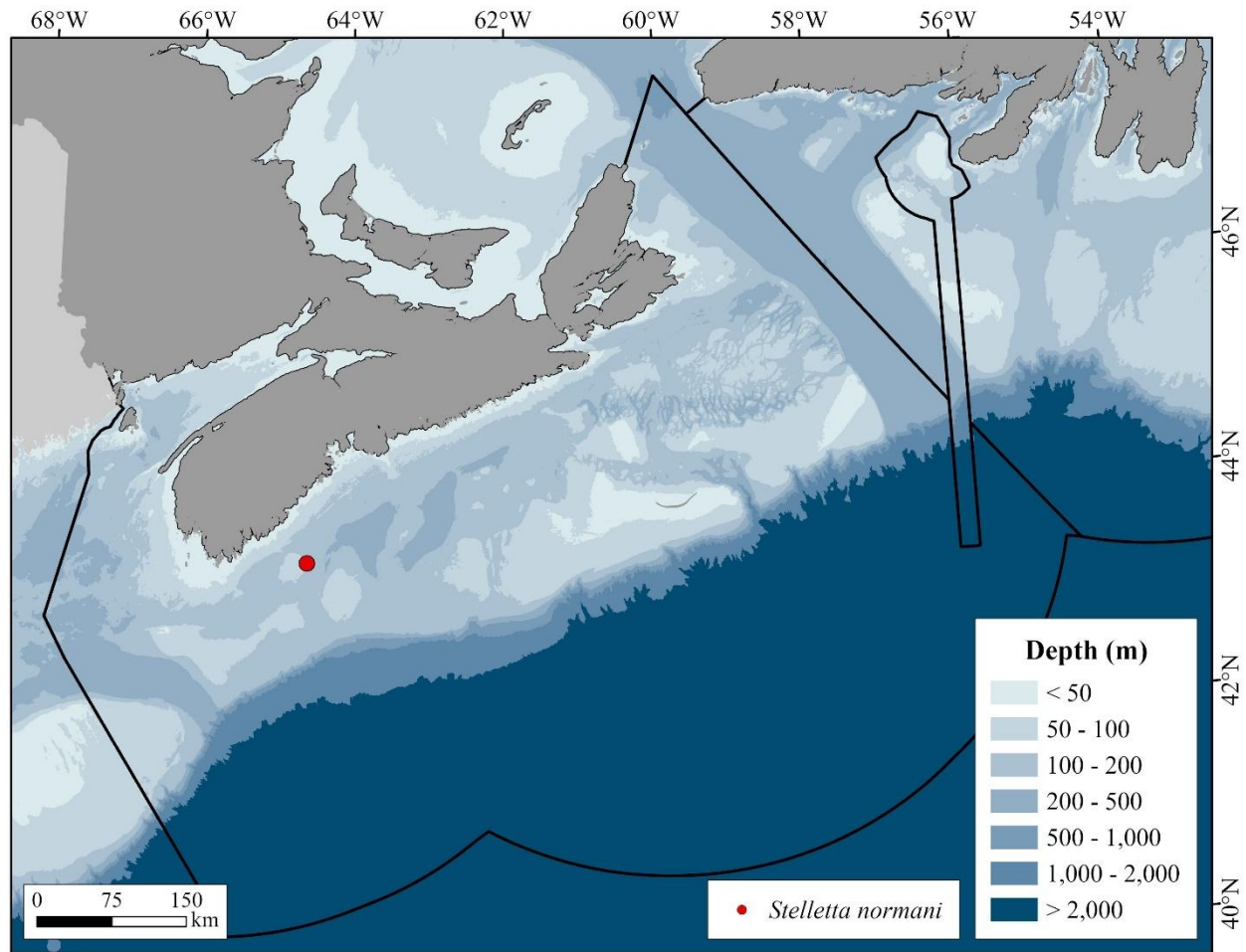


Figure 66. Records of *Stelletta normani* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Craniella polyura* (Schmidt, 1870)**

APHIA ID: 171347; **CLASS:** Demospongiae; **ORDER:** Tetractinellida; **FAMILY:** Tetillidae

External appearance (Figure 67A): Egg shaped sponge with a single conical osculum. Long spicules protrude from the lower end of the body forming a felt-like mass. Colour is light brown (Morozov *et al.*, 2019).

Skeleton: Radiate skeleton.

Spicules (Figure 67B, C): Measurements from Morozov *et al.* (2019). Large oxea 1532(2905)4375 by 11.7(28)42.3; small oxea 556(776)1118 by 6(18)29; anatriaenes, rhabdome length up to 5 cm and thickness 4(4.5)5.2 μm ; cladome length 64(74.7)86.3 μm ; sagittal protriaenes, rhabdome length 1073(1637.9)2575 by 2.6(3.66)5.6 μm ; length of paired cladomes 20.2(33.3)69.4 μm ; unpaired cladome length 66.7(106.5)179.7 μm . Normal protriaenes, rhabdome length 510(617.8)931.7 by 4.7(5.8)6.9 μm ; cladome length 22(27.8)33.2 μm . Raphides, dimensions: 192(347.7)473 by 1–2 μm . Sigmas centrotylote, spined, dimensions: 9(12.7)16 μm .

Distribution: The type locality is in Iceland. Recently recorded from Frobisher Bay (Dinn *et al.*, 2019) and the Kara, Laptev and East Siberian Seas at depths of 33–313 m (Morozov *et al.*, 2019). One record in 461 m was confirmed from the NED2017020 RV survey (Figure 68).

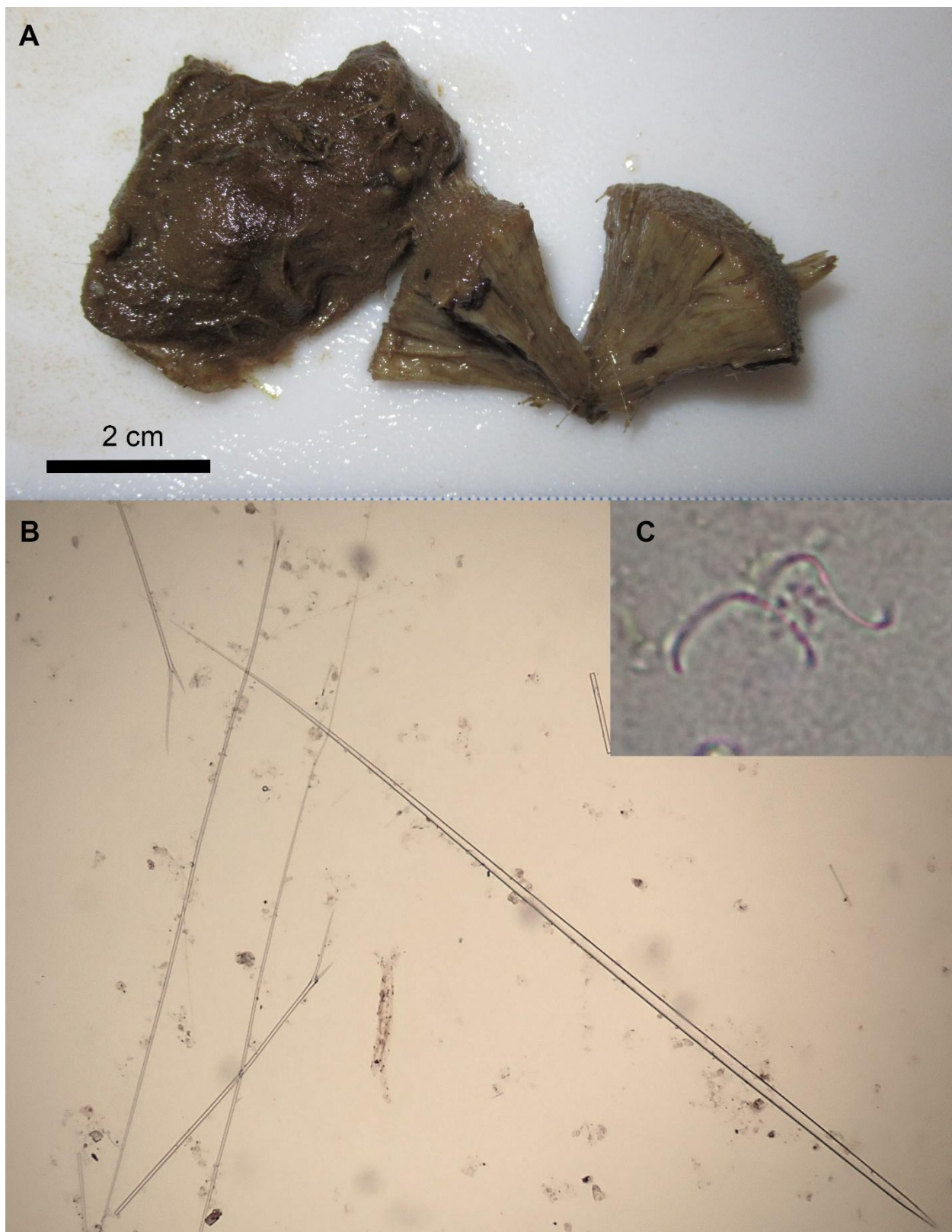


Figure 67. *Craniella polyura*. A. Freshly collected trawl specimen; B. Megascleres (protriaenes and oxea); C. Centrotylote sigmas.

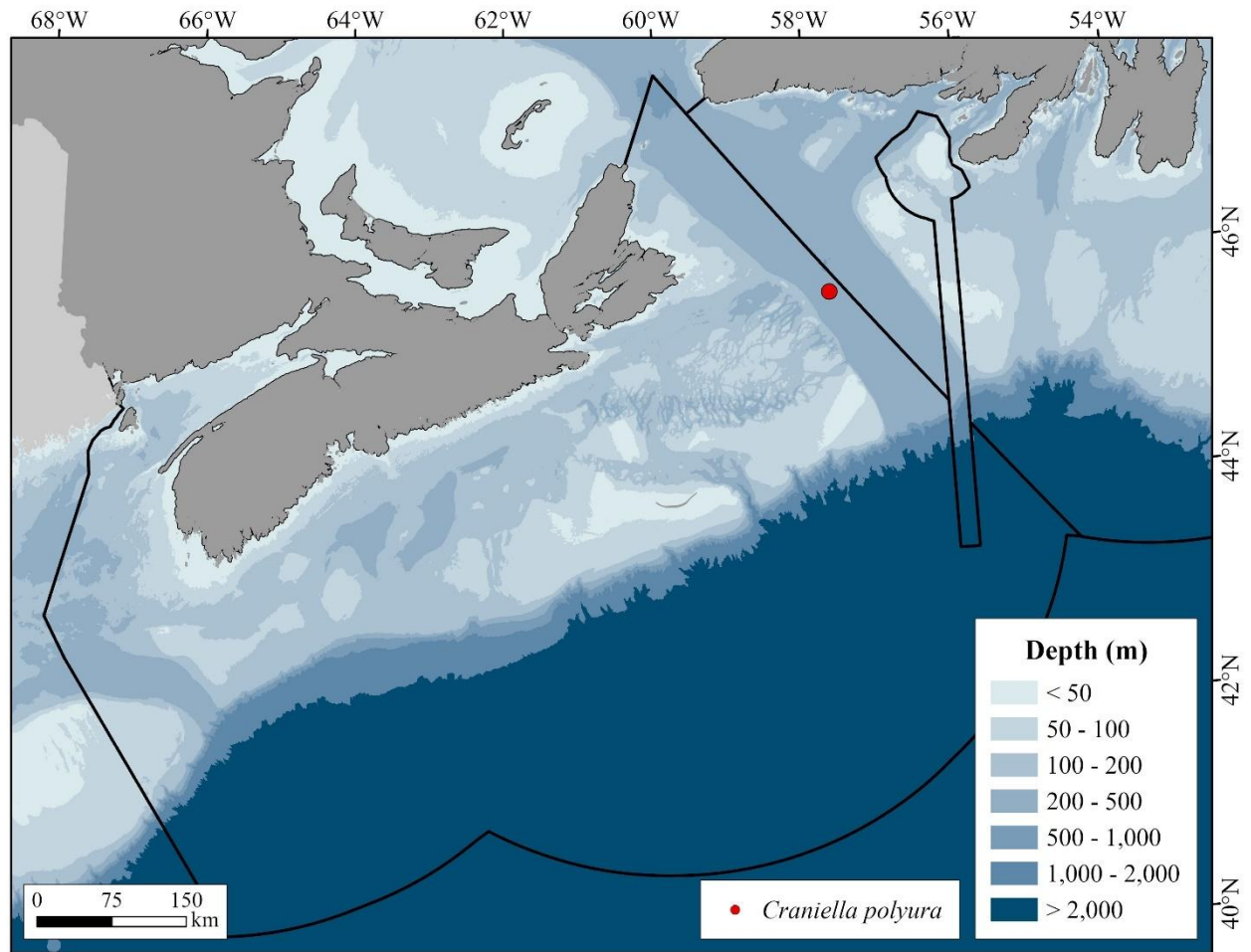


Figure 68. Records of *Craniella polyura* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Thenaea muricata* (Bowerbank, 1858)**

APHIA ID: 134106; **CLASS:** Demospongiae; **ORDER:** Tetractinellida; **FAMILY:** Theneidae

External appearance (Figure 69A, B): Massive sub spherical sponge. Our specimens were around 5 cm in diameter and yellow to light brown. Our specimens were damaged and features were not clearly visible. Cárdenas and Rapp (2012) report that a single osculum (around 3 mm diameter) is present on their specimens and roots were present.

Skeleton: The megascleres form a radiate skeleton with bundles of oxea ascending from the centre of the sponge. Triaenes are only found at the surface. Spirasters are abundant in the ectosome but spirasters and plesiasters are also found throughout the choanosome.

Spicules (Figure 69C–E): Megascleres are oxea, dichotriaenes, anatriaenes, and prototriaenes. These were difficult to measure in our specimens but Cárdenas and Rapp (2012) give oxea 400(5196)5925 by 30(41)55 µm; dichotriaenes 1925(2972)3875 µm long and 23(50)80 µm wide, protoclad length 190(285)370 µm, deutero clad length 350(564)900 µm; anatriaenes 1550(3976)4675 µm long, rhabdome width 5(12)22 µm, clad length 60(157)242 µm; prototriaenes rhabdome length >1000 µm, width 50 µm, clad length >600 µm.

Microscleres are plesiasters with 3–7 actines, maximum diameter of 54–176 µm in our specimens (similar size to those reported by Cardenas and Rapp (2012) who give actine lengths of 17–70 µm) and spirasters with a length of 16–36 µm (Cardenas and Rapp [2012] give 13–32.5 µm).

Distribution: *T. muricata* is one of the most common *Thenaea* species, recorded at depths of 60–2940 m from Greenland and the Denmark Strait in the north to Morocco in the south. Arctic records of *T. muricata* are likely to be *Thenaea valdiviae* Lendenfeld, 1907 (Cárdenas and Rapp, 2012). Recent Canadian records from the Gulf of St. Lawrence (Dinn, 2020; Nozères *et al.*, 2020). Four records from 234–1242 m were confirmed from the NED2017020 RV survey (Figure 70).

Remarks: Cárdenas and Rapp (2012) note that the easiest way to discriminate adults is to look at osculum morphology: *T. valdiviae* has large irregularly shaped oscula which are covered by a sieve (cribriporal) and have a surrounding fringe. *T. muricata* has small uniporal, naked, oscula. Plesiasters may be rare in *T. valdiviae* but are common in *T. muricata*. The identification of these specimens was confirmed by Paco Cárdenas.

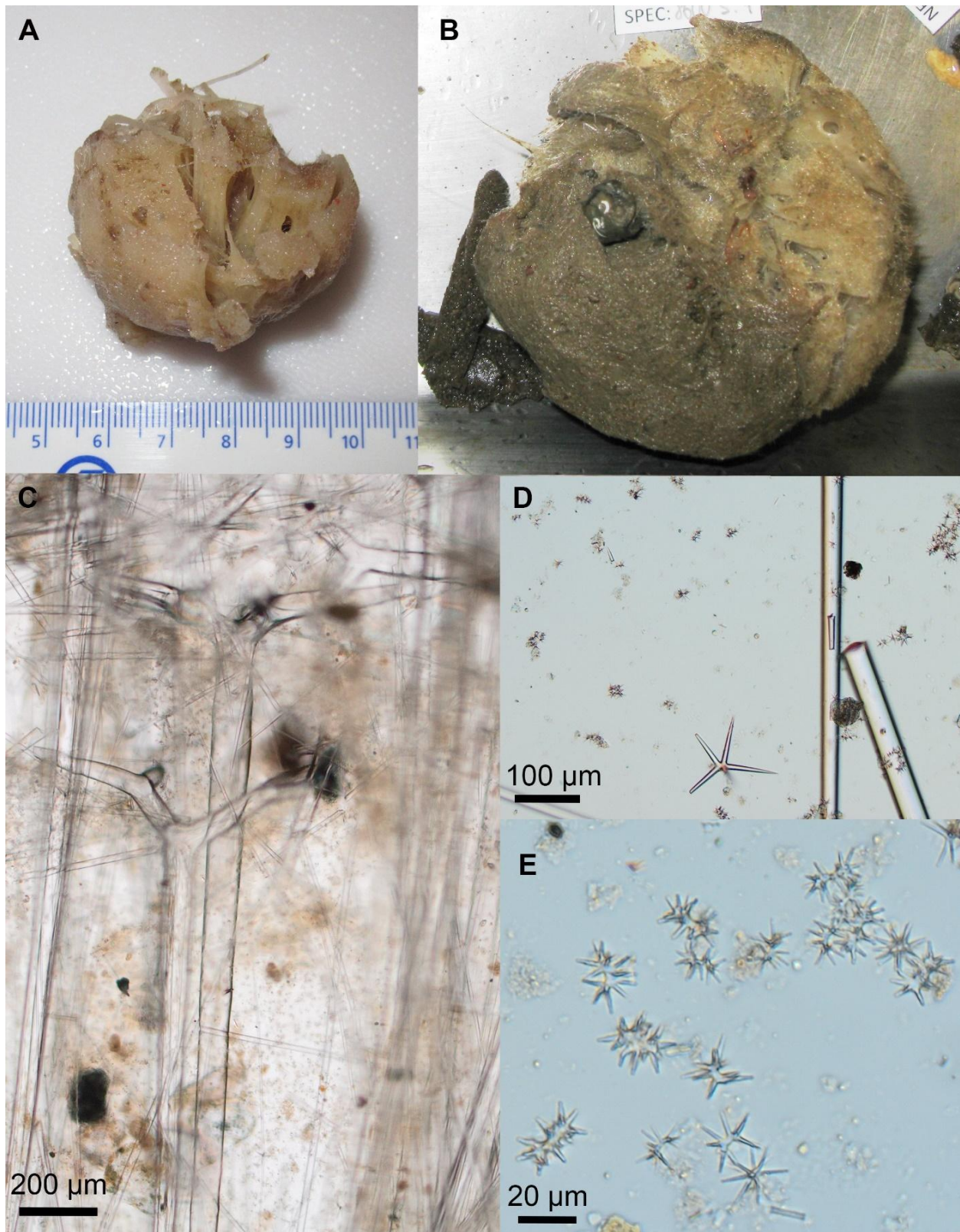


Figure 69. *Thenea muricata*. Freshly collected trawl specimens, A. ARC 81491; B. ARC 81435; Spicules from specimen ARC 81435; C. Dichotriaenes; D. Plesiaster; E. Spirasters.

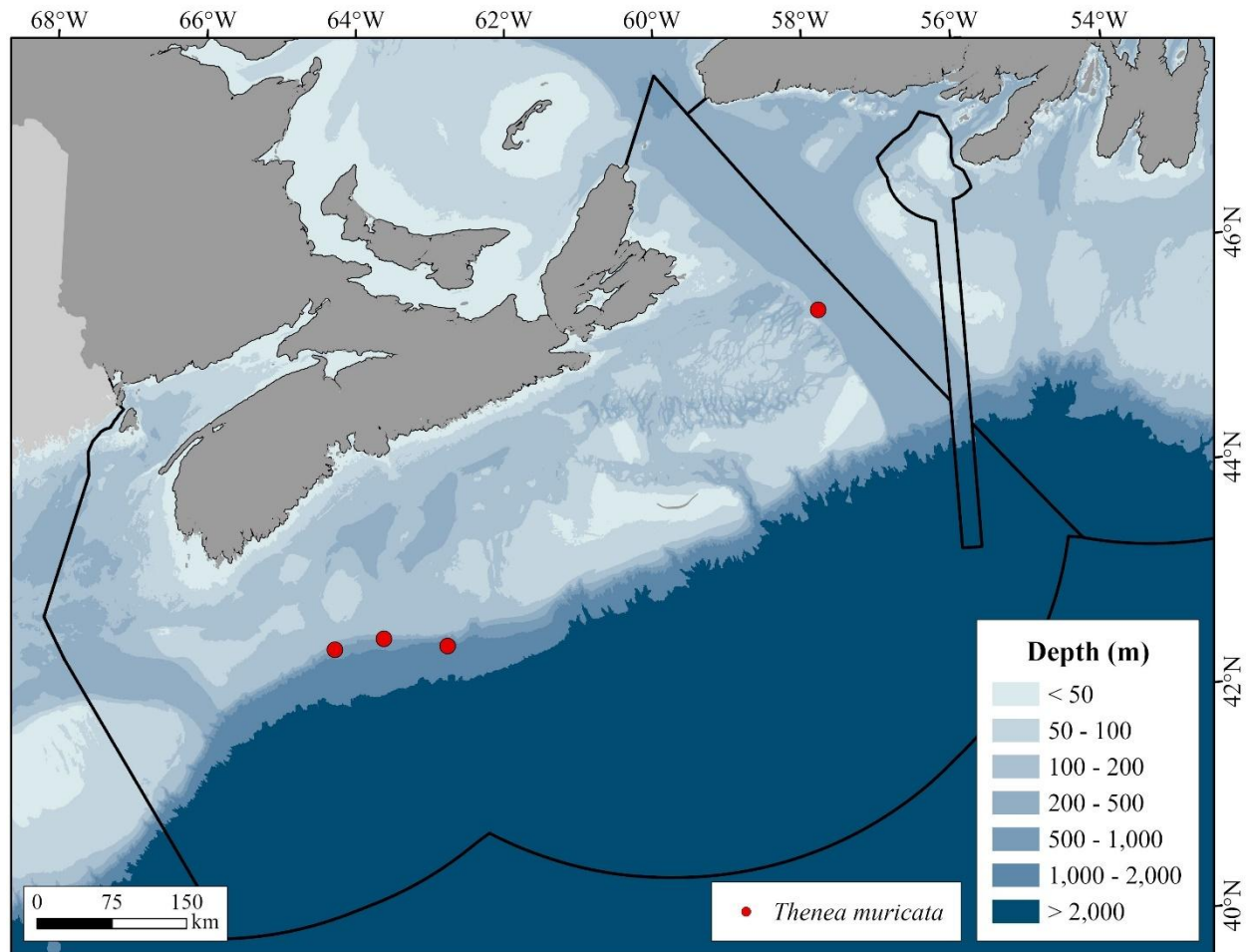


Figure 70. Records of *Thenea muricata* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

***Vazella pourtalesii* (Schmidt, 1870)**

APHIA ID: 172121; **CLASS:** Hexactinellida; **ORDER:** Lyssacosida; **FAMILY:** Rossellidae

External appearance (Figure 71B–D): Vase shaped sponge with large central cavity. Individuals on the Scotian Shelf can reach heights of 1.1 m and widths of 0.75 m (Fuller, 2011). The leucotype has a flattened saccular body 92 mm long and 100 mm in diameter with large atrial cavity and walls about 1 mm thick (Tabachnick, 2002).

Spicules (Figure 71A): Information from Tabachnick (2002). Prostalia are monaxones 5200–54000 by 58–139 μm with finely pointed smooth terminations. Hypodermal pentactines have paratropal tangential rays often rough with spines rarely smooth without spines as well as the proximal ray. The tangential rays of hypodermal pentactines are 4200–14200 by 61–118 μm , the proximal ray is 7200–12300 by 77–120 μm . Dermalia are stauractines and pentactines. Dermal stauractines and pentactines have rays 112–342 by 7–14 μm . Tangential rays are usually equal long when the proximal ray can be slightly smaller or larger. Atrialia are hexactines, rarely pentactines, stauractines, triactines and spicules with more than 6 rays. One ray of atrial hexactines can be slightly longer than the others. The rays of atrial hexactines are 162–249 by 7–12 μm . Both dermal and atrial spicules have smooth rays with rough rounded terminations. Microscleres are microdiscohexasters and combinations of hexactines, hexasters and hemihexasters. Microdiscohexasters have numerous secondary rays which can have different length (anisodiscohexasters) bearing toothed discs. Microdiscohexasters are 21–36 μm in diameter, diameter of the primary rosette is 4–15 μm . These spicules are 37–122 μm in diameter.

Distribution: The type locality is Florida. *Vazella pourtalesii* occurs along the continental slope of the northwest Atlantic at depths of 100 to 750 m. Dense aggregations ‘*Vazella* grounds’ are present along Emerald Basin and Sambro Bank on the central Scotian Shelf (Beazley *et al.*, 2018, 2021; Cutcliffe *et al.*, 2025). Eighteen records from 124–305 m were confirmed from the NED2017020 RV survey (Figure 72).

Remarks: Hawkes *et al.* (2019) found that species density and abundance within *Vazella* aggregations along the Scotian Shelf was three to four times higher than found in adjacent areas.

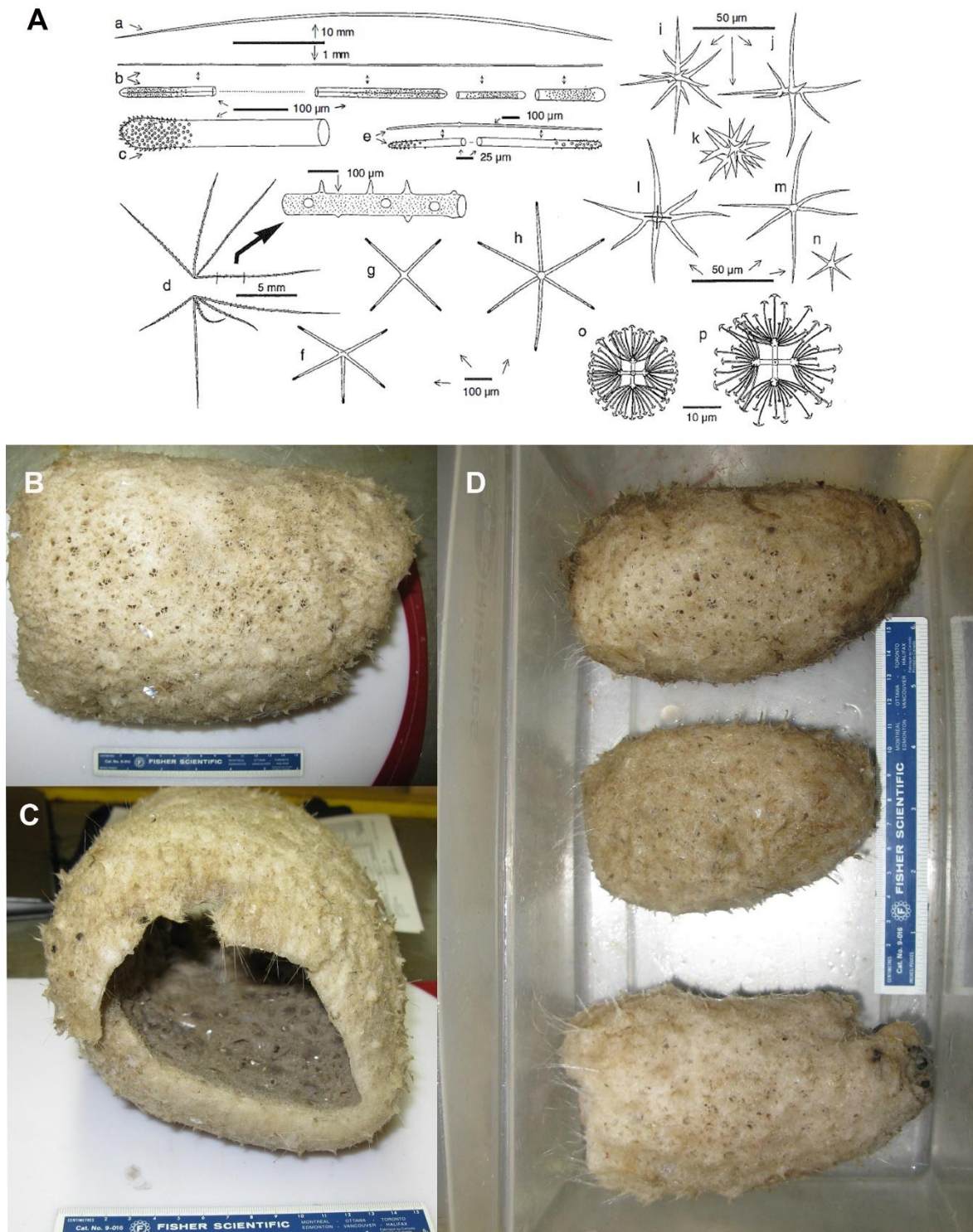


Figure 71. *Vazella pourtalesii*. A. Spicules reproduced from Reiswig (1996). a, b, c. diactines; d. pentactin; e. subdermal diactin; f. autoderma pentactin; g. autoderma stauractin; h. autogastral hexactine; i-l hemioxyhexasters; o. microdiscohexaster; p. micropodiscohexaster; B. and C. Freshly collected trawl specimen from NED201720 Set 10; D. Freshly collected trawl specimens from Set 6.

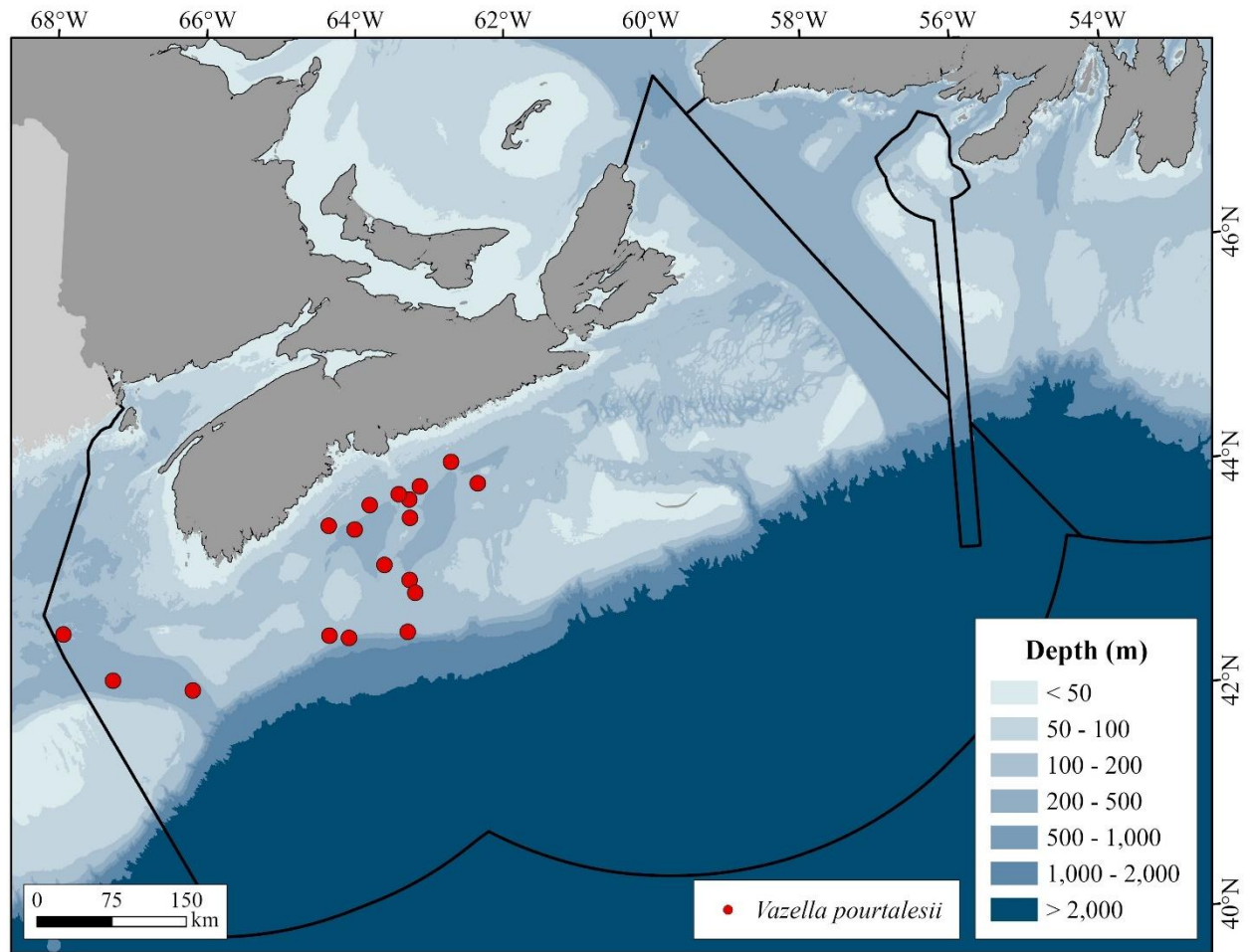


Figure 72. Records of *Vazella pourtalesii* from the NED2017020 RV survey. The black line delineates the Scotian Shelf-Bay of Fundy Bioregion.

4. DISCUSSION

Our knowledge of Porifera in Eastern Canada has rapidly improved in recent years thanks to several targeted studies (Goodwin, 2017; Tompkins *et al.*, 2017; Baker *et al.*, 2018a, 2018b; Bouchard Marmen *et al.*, 2019, 2021; Dinn, 2020; Nozères *et al.*, 2020; Odenthal *et al.*, 2023). These have revealed many new records for the region and even species new to science (Goodwin *et al.*, 2021). However, additional targeted studies incorporating laboratory identification are needed to fully understand the diversity of Porifera present in the northwest Atlantic coast of Canada.

Additional morphological and molecular taxonomy work is needed to refine the identifications of some sponge groups. Of particular note is the genus *Iophon* which requires a full revision of the North Atlantic and Arctic species. The Class Calcarea also requires complete revision for the east coast of Canada. As in other areas, this class has been neglected due to a lack of taxonomic specialists working on this group.

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6. DATA AVAILABILITY STATEMENT

Data on all sponge records collected on this survey are available at <https://data.mendeley.com/datasets/bjtybtpg6g/1>. Atlantic Reference Centre Museum Specimens referenced in the text (using ARC followed by catalogue number) are available for loan from the Atlantic Reference Museum, St. Andrews, New Brunswick. Some of the specimens collected have been molecularly sequenced these will soon be made publicly available through the Atlantic Canadian Marine Invertebrates project on The Barcode of Life Database (<https://boldsystems.org/>).

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Appendix 1. Recommended methods for collection and analysis of sponges

Sponge collection

- 1) Sponge should be photographed when freshly collected (e.g., trawl surveys). Scale bar should be included in the photo if possible.
- 2) A small piece of the sponge is usually sufficient for identification, but it is desirable to preserve whole individuals if possible. Sponges can be frozen at -20°C or placed in ethanol $>70\%$.
- 3) Sponge sample should be clearly labelled with sample number both inside the container (or waterproof paper) and outside the container. Associated metadata should be recorded (location, depth, time, etc).
- 4) If sponge is to be used for molecular work it is desirable to preserve a small subsample in 95% ethanol. This is because the water in the sponge tissues dilutes the preserving alcohol. The ethanol on this sample should be changed after 24 hours, and further changes may be required if the ethanol becomes discoloured. Genetic subsamples should be kept cool (can be placed in a freezer if available).

Laboratory methods

To confirm sponge identification it is necessary to make microscope slides to examine spicules and skeleton.

Tissue section for examination of skeleton

- 1) Slice a very thin cross section from the sponge using a scalpel blade include both choanosome (inner layers of sponge) and ectosome (outer layers of sponge).
- 2) Dehydrate tissue in 95% or higher ethanol for 2-3 minutes.
- 3) Place in clove oil for 2-3 minutes or until the tissue becomes translucent.
- 4) Mount in Canada Balsam or other mountant on a microscope slide. Allow to dry before examining on microscope.

Spicule preparation

- 1) Cut a very small piece sponge, include both choanosome and ectosome.
- 2) Dissolve tissue in household bleach. This usually takes up to 30 minutes but may take several hours. Shake occasionally to aid process.
- 3) When dissolved, leave for 15 minutes so spicules settle to the bottom of the vial. Then pipette off most of liquid carefully, trying not to disturb spicule layer.
- 4) Add water, shake vial to rinse spicules, leave for 15 minutes to settle. Then pipette off most of liquid carefully.
- 5) Repeat above with one more water rinse, two 70% ethanol, one 95% ethanol.
- 6) Finally add 95% ethanol to vial and shake spicules to suspend.
- 7) Place a microscope slide on hotplate.
- 8) Place a few drops of the spicule suspension on the slide and allow the alcohol to evaporate off.
- 9) Cover with Canada Balsam or other mountant. Allow to dry before examining on microscope.

Microscope examination

Examine slides on compound microscope. You will need an eyepiece graticule or camera system to take measurements of spicules as these are an important feature for sponge identification.

Appendix 2. Brief guide to major terminology used in sponge taxonomy

This is only intended to be a brief introduction, for a comprehensive guide to sponge taxonomy terms please see Boury-Esnault and Rützler (1997) and for spicules Łukowiak *et al.* (2022).

Sponges have skeletons composed of calcium carbonate or silica spicules and/or spongin fibres. Laboratory identification of sponges is based on the arrangement of their skeleton and the types and size ranges of their spicules.

The skeleton can usually be divided into an outer layer known as the **ectosome** (or **cortex** in some groups of sponges such as the Family Polymastiidae) and the inner layer or **choanosome**. These often have different spicules, so it is very important to sample both layers when making spicule preparations or sections.

Fibres and spicules within the skeleton may have different arrangements. They can be arranged in a mesh or net, a **reticulate** skeleton. Or they may have a **plumose** skeleton, with columns of spicules with tufts of spicules fanning out from them, columns may be joined into a network (**plumo-reticulate**). In the ectosome spicules can sometimes be arranged upright with tips pointing outwards in a layer or **palisade**.

Spicules are divided into **megascleres**, the larger category of spicules, usually over 100 µm, and **microscleres**, smaller spicules, usually 10–100 µm but can be smaller or larger. It may be necessary to search carefully to find microscleres as they can be rare.

Megasccleres can have two points (**diactines**), one point (**monoactines**) or even three (**triactines**) or four points (**tetractines**).

Styles are monactinal megasccleres with a pointed and rounded end. If the rounded end is swollen, we call them **tylostyles** or **subtylostyles**. If the styles are spiny, we call them **acanthostyles**.

Oxea are megasccleres with two pointed ends.

Tornotes also have two pointed ends but are usually thinner than oxea and are often ectosomal spicules found in association with styles.

Strongyles have two rounded ends, if the ends are swollen, they are called **tylotes**.

Microscleres come in a very wide variety of forms. **Chelae** are some of the most common. These may have the alae separate from the shaft (**arcuate**) or joined onto the shaft (**palmate**). Chelae may be symmetrical with both ends the same size (**isochelae**) or asymmetrical with one end larger (**anisochelae**). Bow shaped spicules (**toxa**), star shaped spicules (**asters**), and c-shaped **sigmas** are also common types. **Bipocilla** are found in the genus *lophon*.

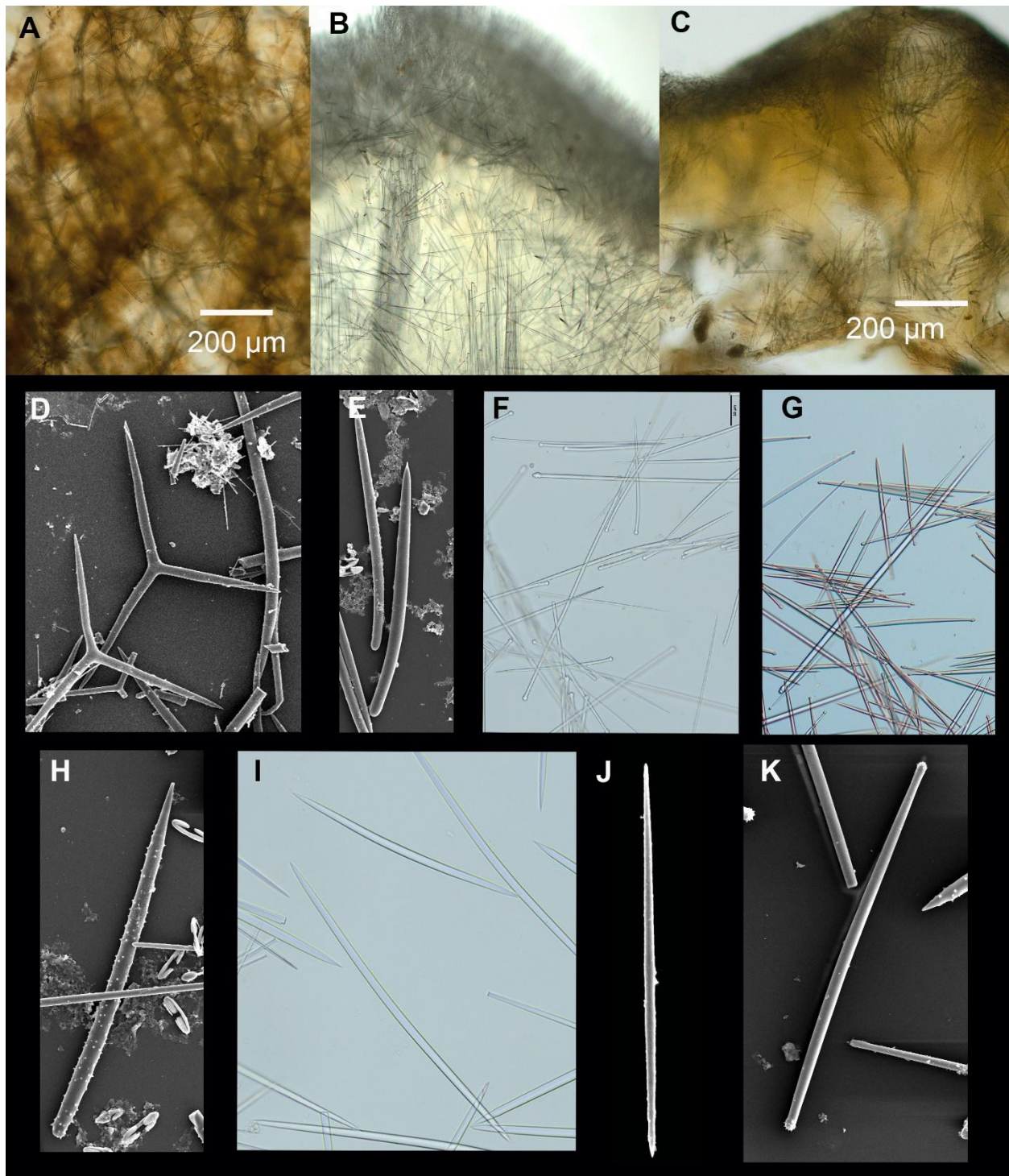


Figure A2.1. Terms used in sponge description. A. Reticulate skeleton. B. Skeleton with thick cortical layer (top) and choanosomal skeleton. C. Plumose choanosome with ectosomal crust of oxea. D. Triactines. E. Styles. F. Tylostyle with point-like head. G. Tylostyles and subtylostyles. H. Acanthostyle and chelae. I. Oxea. J. Tornote. K. Tylote.

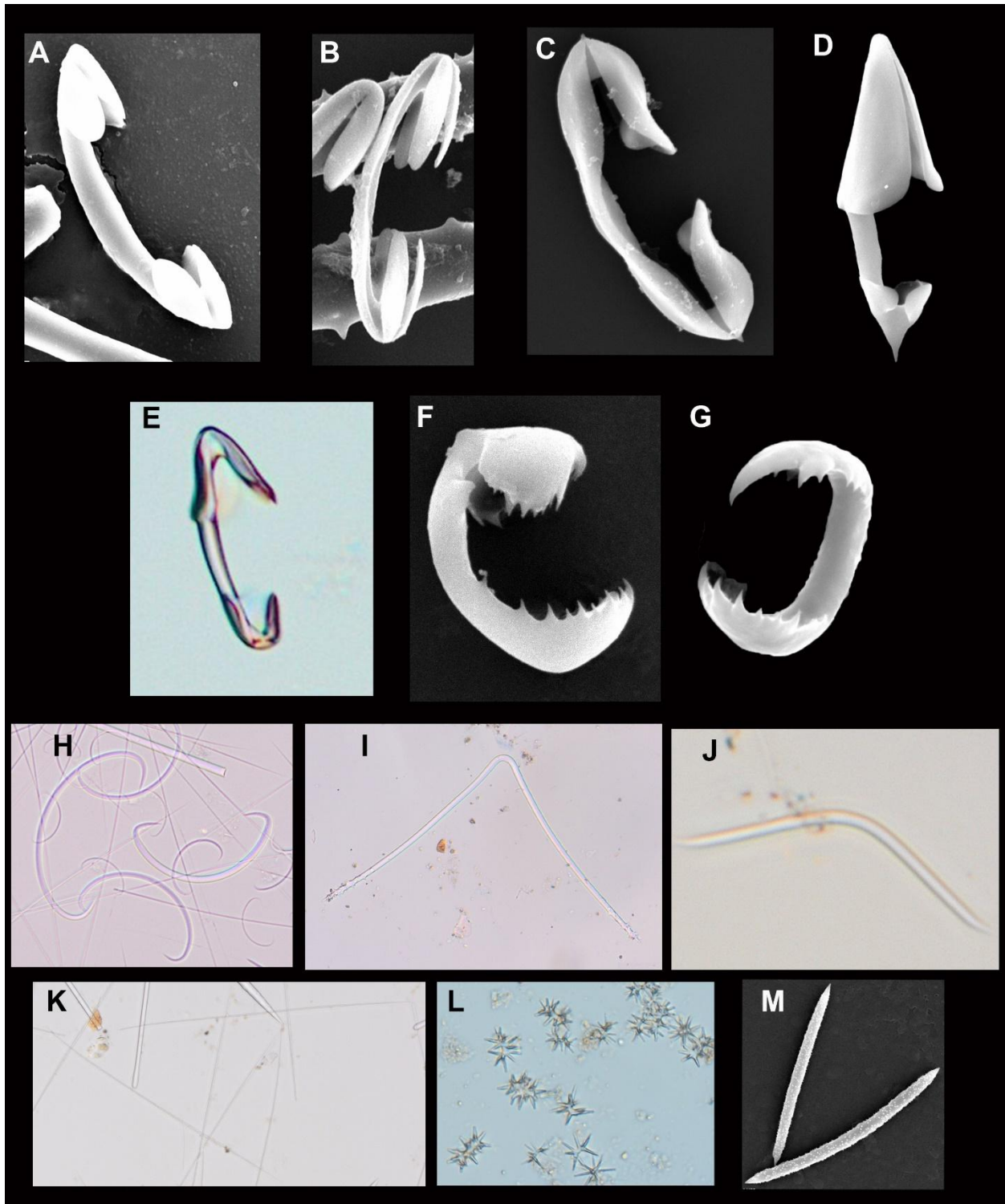


Figure A2.2. Terms used in sponge description. A. Arcuate isochela. B. Unguiferate arcuate isochela (Myxillid type). C. Palmate isochela. D. Palmate anisochela with spurred end. E. Palmate anisochela. F. Bipocillum. G. Bipocillum. H. Sigmata. I. Toxa with spined ends. J. Oxhorn toxa. K. Onychaetes. L. Asters. M. Spined microxea.

Trawl survey quick reference guide

Cushion with projections



8609 ***Polymastia andrica***
Body around 5 cm diameter.
Pale papillae and dark hispid cushion



Polymastia bartletti
Body 5-10 cm diameter.
Very long papillae (> 4cm)



8641 ***Polymastia uberrima***
Around 5-10 cm diameter.
Short papillae, hispid collar at base



8620 ***Halichondria sitiens***
Branched projections
Individuals can be > 1 m diameter,
but likely to fragment on collection.



8638 ***Tedania suctorior***
Typically 10-20 cm diameter.
Low projections on surface.
Surface sometimes covered in silt.



8642 ***Weberella bursa***
Large sponge, up to 30 cm diameter.
Low conical projections
No hispid collar



Spinularia cf. sarsi
Small (body under 1 cm diameter)
Median spicule fringe.



Trachytelia hispida
Small sponge (2-3 cm diameter).
Hispid surface.
Central cluster of papillae.



8612 ***Tentorium semisuberites***
Small (max length around 1.5 cm).
Mushroom shaped sponge.



8608 ***Polymastia hemisphaerica***
Small (approx 5 cm diameter).
Pale. Skirt of projecting spicules.

Trawl survey quick reference guide

Thickly encrusting/massive



8617

Biemna varianta
Bumpy/hispid surface.



Dysidea fragilis
Beige sponge with bumpy surface.



8646

Spongosorites
Specimens >5 cm diameter.
Surface smooth
and only detachable as flakes.



8614

Iophon
Crust or lobes of variable sizes,
often > 10 cm diameter.
Yellow but frequently turns
dark brown on collection.



8631

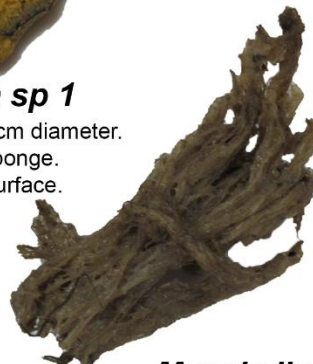
Crella cutis
Detachable, leathery skin
with conical papillae.
Lobes often > 10 cm diameter.



Myxilla sp 1
Lobes over 10 cm diameter.
Yellow sponge.
Porous surface.



Myxilla fimbriata
Lobes can be > 20 cm diameter.
Orange sponge that turns dark on collection.



8616

Mycale lingua
Individuals can be over 50 cm diameter.
Fibres of spicules often clearly visible



8623

Halichondria panicea
Lobes can be > 50 cm diameter.
Yellow with smooth surface.
Large oscules,
often on top of lobes/ridges.

Trawl survey quick reference guide

Finger-shaped



8621

Haliclona oculata

Can be over 30 cm high
Branches narrow (1-2 cm diameter)
Lines of oscules down branches.



Isodictya palmata

Rounded or flattened fingers.
Can be over 15 cm long
Clusters of oscules.



Plicatellopsis sp.

Fragments around 5 cm high.

Balls and lobes



8625

Thenea muricata

Ball around 5 cm diameter.
Single oscule. Roots present.



8613

Suberites ficus

Smooth surface. Often attached onto pebbles.
Found in muddy areas.
Can be > 20 cm diameter.



8651

Craniella polyura

Egg shaped,
Around 6 cm diameter..
Single oscule.
Mass of long spicules
at base of body.



Stelletta normani

Ball, around 2.5 cm diameter
Hard, hispid surface.



8635

Artesimina arcigera

Ball, around 5 cm diameter
Smooth, velvety surface.

Trawl survey quick reference guide

Fan-shaped



8627

Cladocroce spatula

Up to 35 cm high.
Large oscules on fan and stalk.



8629

Hemigellius arcofer

Large (often >30 cm) flattened fragments
Many ostia. Spicule fibres visible.



Esperopsis villosa

Flat brown fan with large spicule fibres.
Specimens can be over 20 cm.



8633

Semisuberites cribrosa

Vase shaped sponge, can be over 25 cm tall.
Cup diameter can be over 35 cm.
Long stalk with root-like base.



8647

Stylocordyla borealis

Oval body 1-2 cm in diameter.
Stalk around 5 cm long.



8601

Vazella pourtalesii

Vase shaped with large central cavity.
Can be over 1 m tall.

Cups, vases and tubes

Calcareous tubes



Quasillina brevis

Small (< 2 cm) oval sponge.
Smooth surface.
Terminal oscule.



Brattegardia nansenii

Cream to white lobes 2-3 cm diameter.
Formed of network of thin tubes.



Grantia sp.

Small (<2cm) white sponge.
Terminal oscule is surrounded
by a spicule fringe.