

The sponge fauna of Frobisher Bay, with the description of a new species of *Iophon*[†] and geographic range extensions



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Background and Project Aims

The biodiversity and distribution of sponge species in the Eastern Canadian Arctic is largely undescribed. Less than 20 species have been described from the region surrounding Southeast Baffin Island and Northern Labrador, and fewer than 24 species in the Canadian portion of Baffin Bay/ Davis Strait.

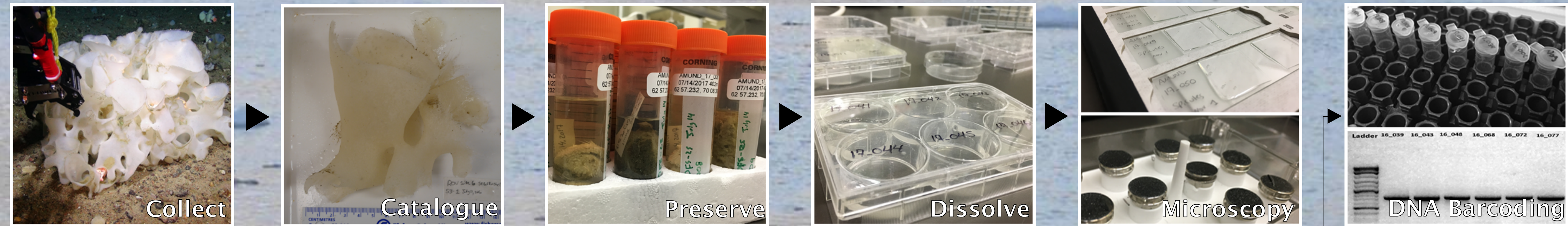
Frobisher Bay is a 230 km long inlet on the southeast corner of Baffin Island, Canada that is not routinely surveyed for benthic fauna despite its proximity to the rapidly expanding city of Iqaluit. The sponge fauna of the bay is currently unknown.

Sponge specimens and underwater video were collected from Frobisher Bay as part of the ArcticNet HiBio (Hidden Biodiversity and Vulnerability of Hard-Bottom and Surrounding Environments in the Canadian Arctic) research program to describe the hidden benthic biodiversity along the entire Eastern Canadian Shelf.

Methods – Sponge Taxonomy

Spicules were isolated using bleach and mounted in DPX for light microscopy. Spicules were also coated in a gold/palladium mix and viewed on a Zeiss Sigma 300VP or Hitachi TM3000 scanning electron microscopes. Spicule measurements were made in ImageJ. Spicule-based identifications were confirmed through DNA barcoding. Target genes were amplified using modified COI and sponge specific 28S primers

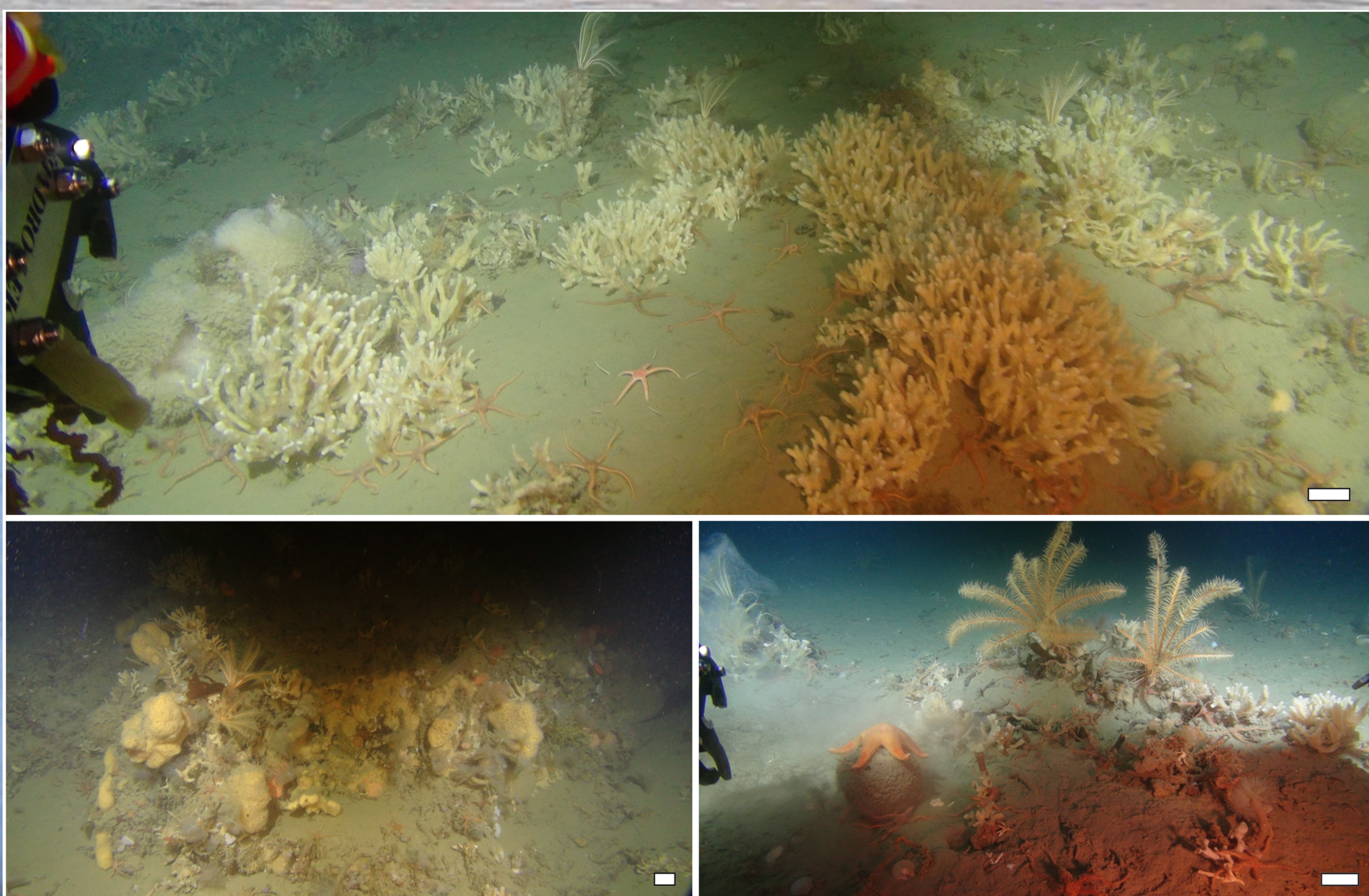
Sponge Taxonomy Workflow



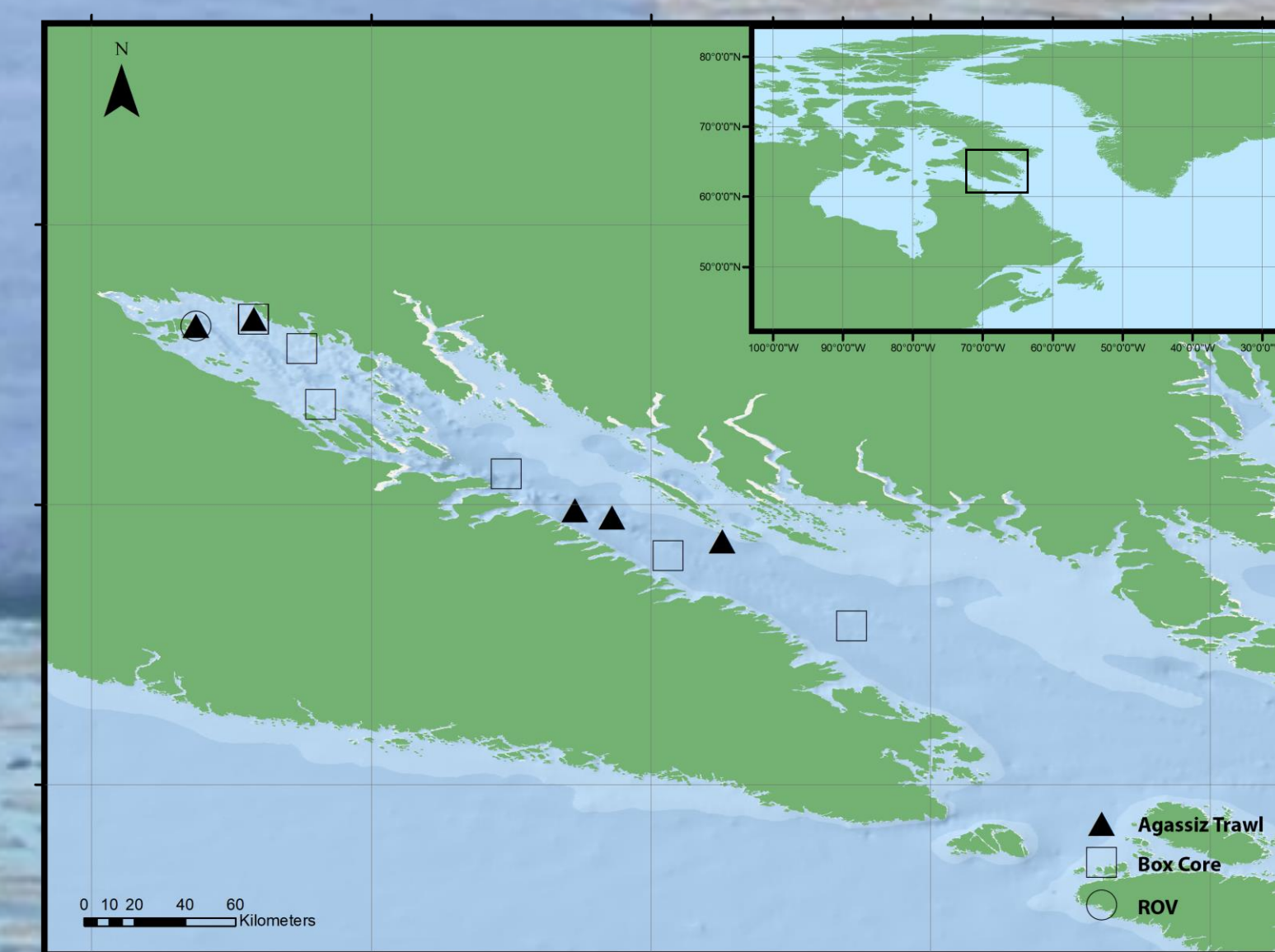
Results

Forty-three sponge specimens were collected from 65–402 m depth throughout the bay. The ROV dive in the inner bay completed a 1.2 km transect which covered depths ranging from 59–139 m. In total, **22 sponge species** were identified. **One species new to science** and **five sponges never before described from the region** were collected. The sixteen other sponge species collected in the bay include:

- ◆ *Tentorium semisuberites*
- ◆ *Hymedesmia* sp.
- ◆ *Halichondria* sp.
- ◆ *Craniella* cf. *cranium*
- ◆ *Cladorhiza* *oxeata*
- ◆ *Forcepia* (*Forcepia*) *fabricans*
- ◆ *Halichondria* (*Reniera*) sp.
- ◆ *Thenea* sp.
- ◆ *Lycopodina* *lycopodium*
- ◆ *Lycopodina* *cupressiformis*
- ◆ *Halichondria* (*Eumastia*) *sitiens*
- ◆ *Thenea* cf. *muricata*
- ◆ *Polymastia* *grimaldii*
- ◆ *Lissodendoryx* *indistincta*
- ◆ *Sycon* cf. *lambei*
- ◆ *Sycon* sp.



Benthic community of inner Frobisher Bay. Dense sponge gardens occurring on sand and bedrock outgrowths. Scale bars are 6 cm.

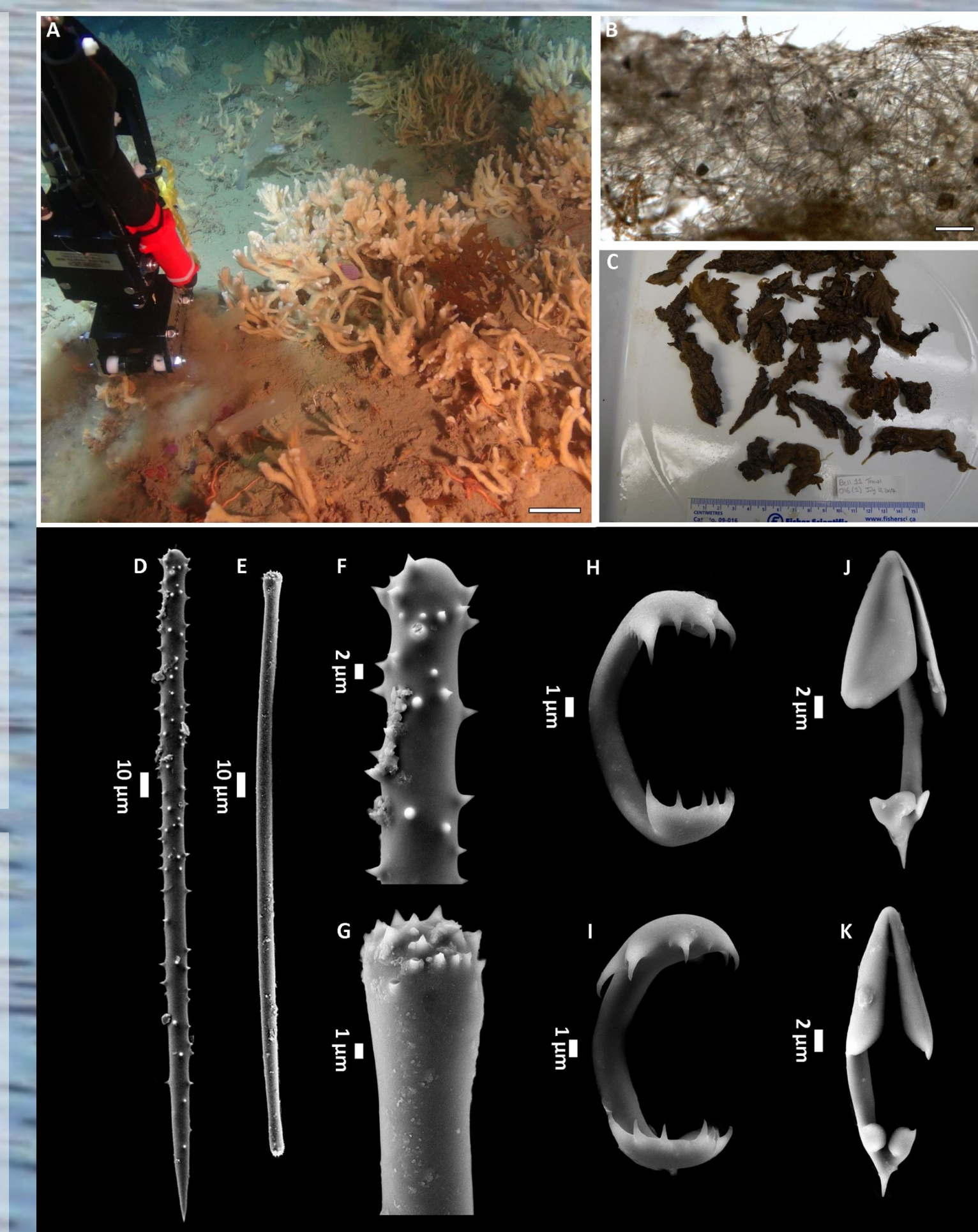


Sampling Locations in Frobisher Bay.

New Species – *Iophon amundseni* n. sp.[†]

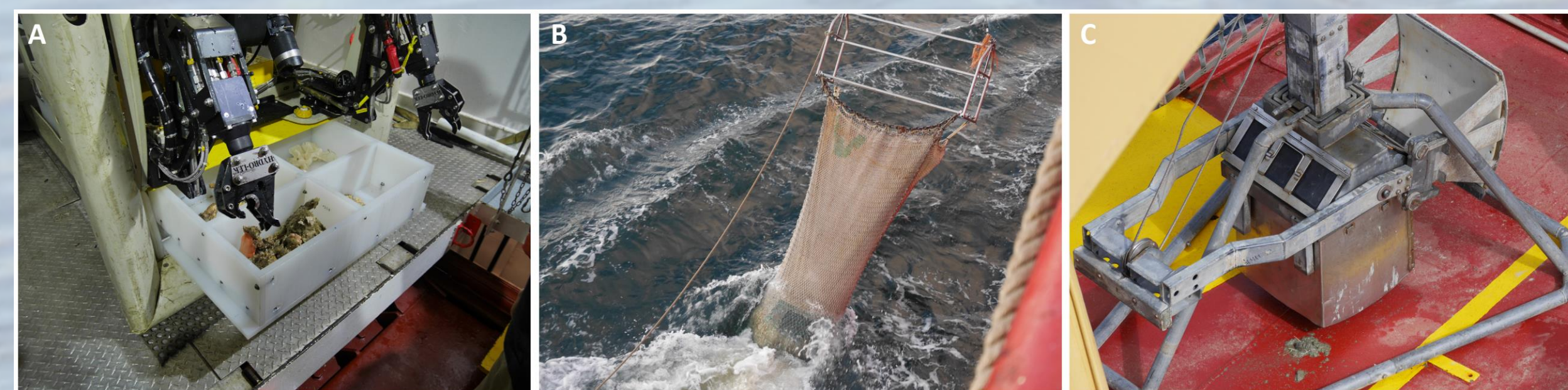
This sponge was collected in the shallow water of the head of the bay near Hill Island. It has a finger-like growth form and forms dense sponge gardens. This is a species genetically similar to European/Irish *Iophon nigricans*, but differs in the size and shape of the bipocille spicules, and only possesses one size category of anisochelae spicules. This sponge is tentatively named after the *CCGS Amundsen* ([†]*manuscript name*).

- A, Collecting with ROV manipulator arms, scale bar is 6 cm. B, Skeleton, scale bar is 200 µm.
- C, Collected sponges showing browning on contact with air. D, Acanthostyle. E, Tylote. F, Acanthostyle head. G, Tylote head. H, G, Bipocilles, J, K, Spurred anisochelae.



Methods - Collection

Sponges were collected during research cruises aboard the *CCGS Amundsen* in October 2015 and July 2016/2017. Sponges were collected using a remotely operated vehicle (ROV), box core, and an Agassiz trawl and preserved in 96% ethanol.



Sampling methods. (A) Hydraulic sampling skid of SuMO ROV with specimens (B) Agassiz Trawl (C) Box Core

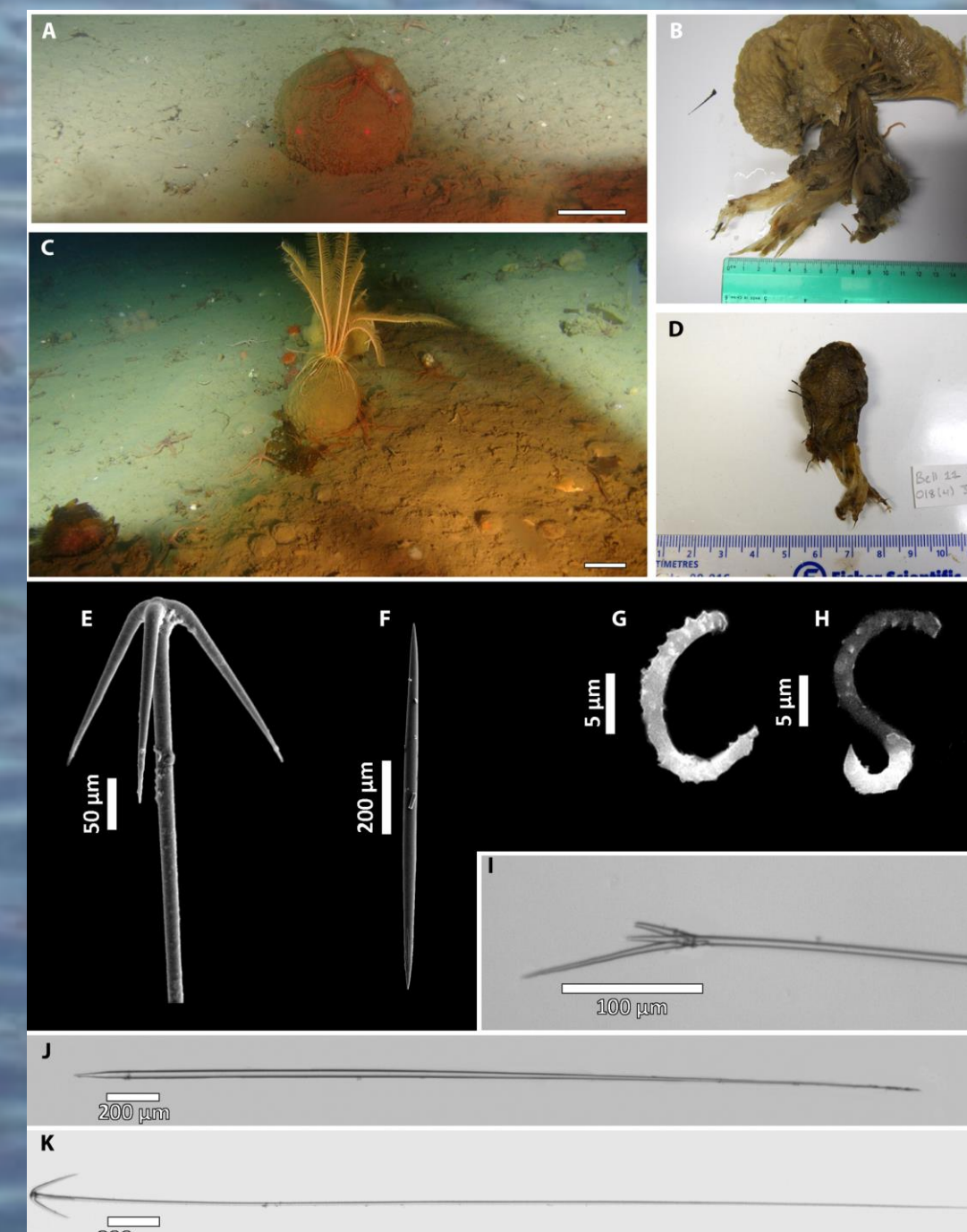
Geographic Range Extensions

Five species were collected in Frobisher Bay that were never before collected in Baffin Bay/ Davis Strait. *Craniella* cf. *polyura*, *Tetilla sibirica*, *Mycale lingua*, *Polymastia thielei*, and *Iophon piceum* have well documented European or high Arctic distributions. These species identifications establish the first inventory of sponges living in Frobisher Bay.

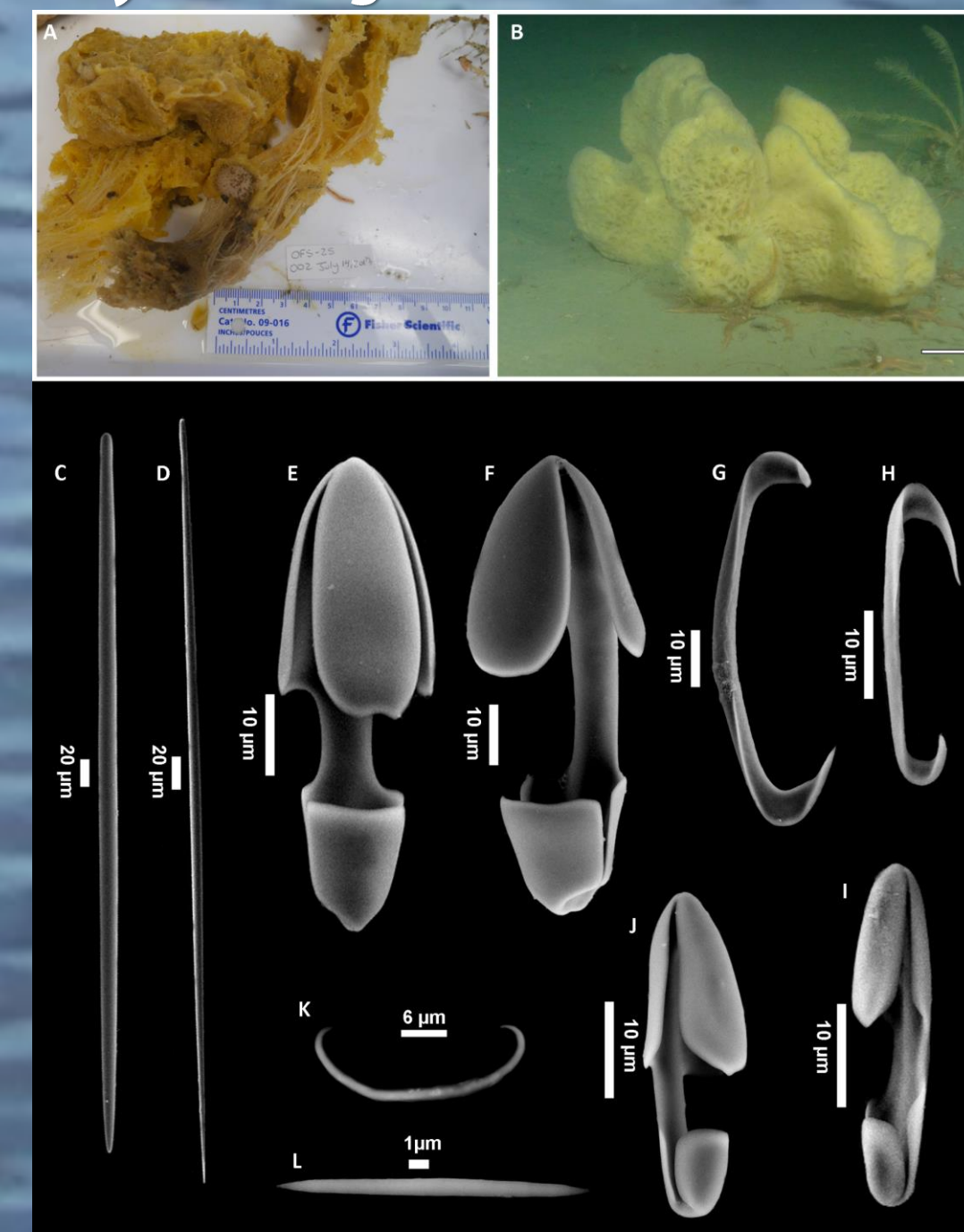
Craniella cf. *polyura*



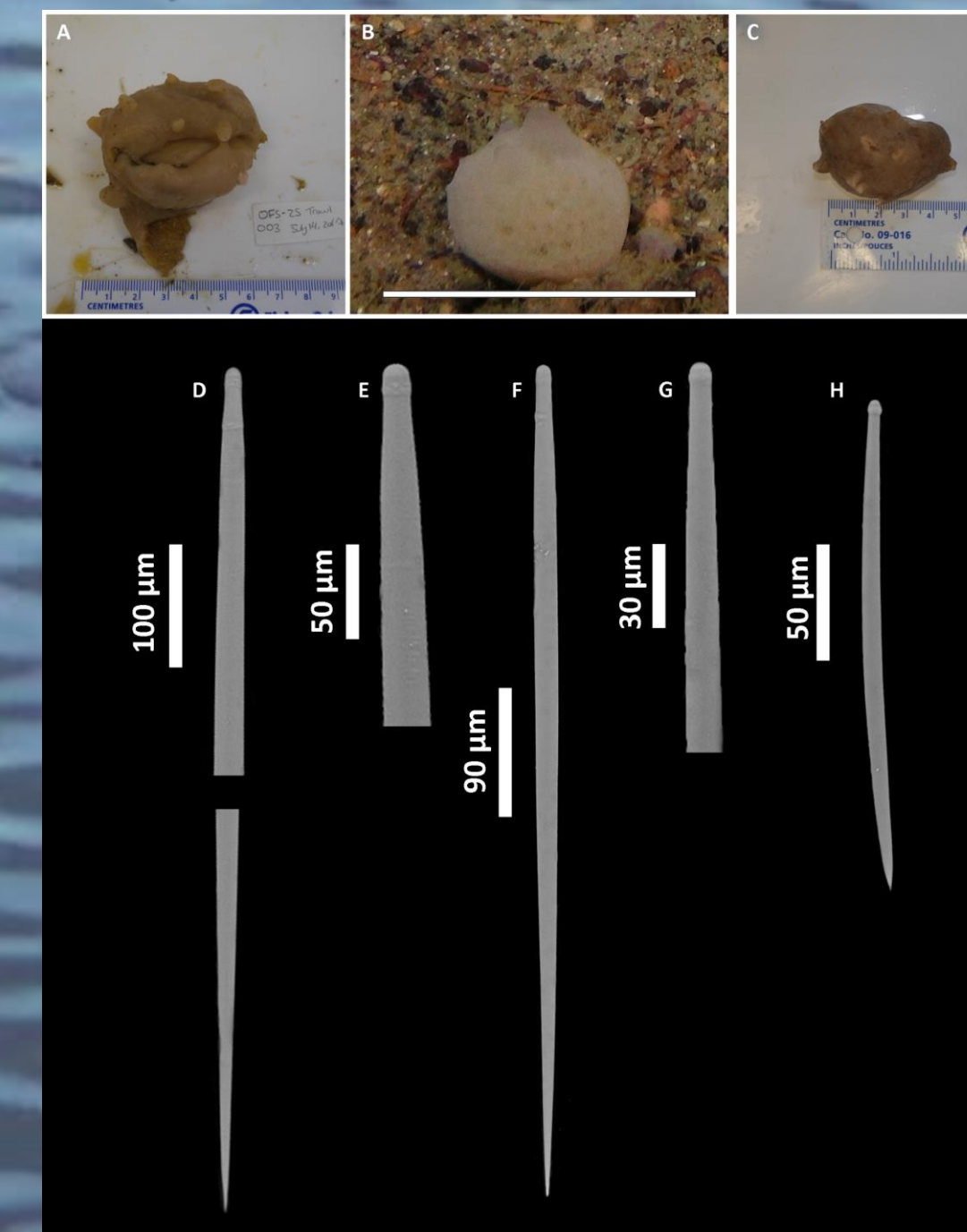
Tetilla sibirica



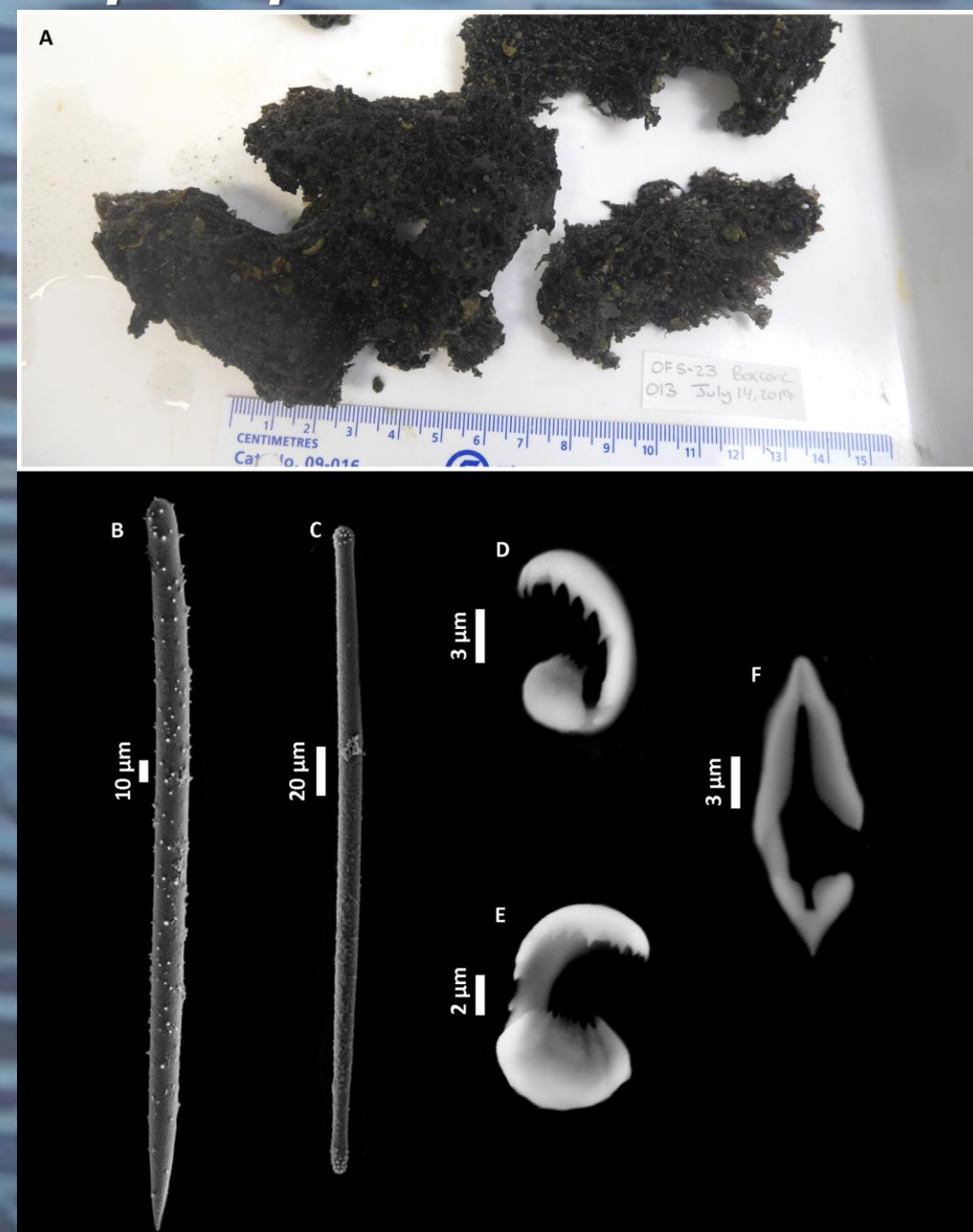
Mycale lingua



Polymastia thielei



Iophon piceum



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