

Rathlin Island: a sponge biodiversity hotspot

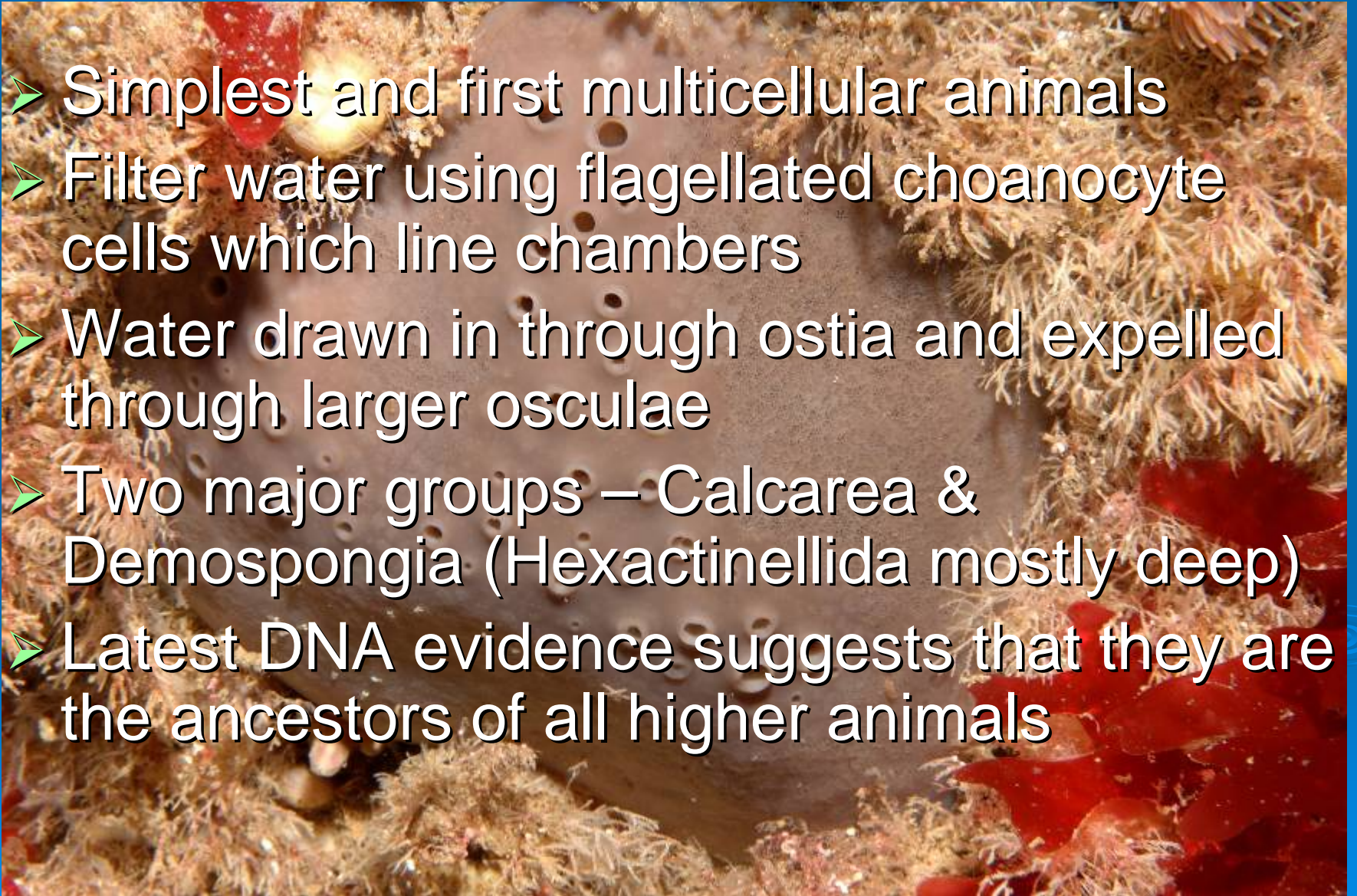


Claire Goodwin & Bernard Picton
Ulster Museum, Belfast



What is a sponge?

- Simplest and first multicellular animals
- Filter water using flagellated choanocyte cells which line chambers
- Water drawn in through ostia and expelled through larger osculae
- Two major groups – Calcarea & Demospongia (Hexactinellida mostly deep)
- Latest DNA evidence suggests that they are the ancestors of all higher animals

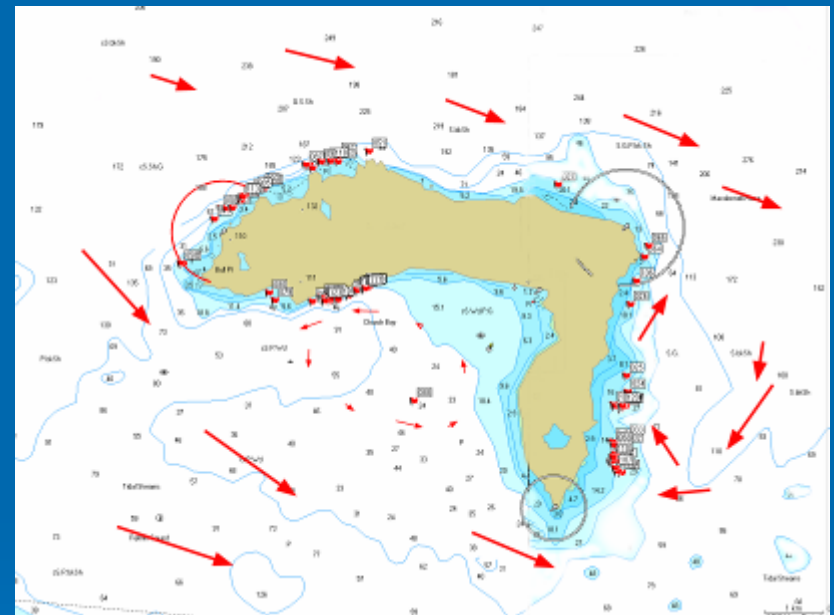


Why are sponges important?

- 
- A photograph of a bright yellow, porous sponge growing on a dark, rocky seabed. The sponge has a complex, branching structure. In the background, there are some reddish-brown seaweed-like structures and other smaller sponges. The overall scene is underwater, with some light filtering through the water.
- Often dominant in hard substratum habitats
 - One of the top spatial competitors
 - Low in the food chain, recycling nutrients and feeding on plankton and bacteria
 - Diverse : > 350 species in UK waters
 - Long-lived and short-lived species
 - Source of bio-active compounds

Rathlin Island

- Situated six miles off North Coast of NI
- In middle of North Channel, subjected to tides of up to 8 knots
- Known to be rich in sponge biodiversity (NISS)





Project Aims



- Initial project 2005-2006
- Document sponge biodiversity of Rathlin Island (funding!)
- Collect material for museum collections
- Check for indications of change since 1982-6 Northern Ireland Sublittoral Survey
- Check habitat quality in Rathlin SAC
- Linked in with BSP themes of water quality and tourism
- Additional work during “Sublittoral Survey Northern Ireland”

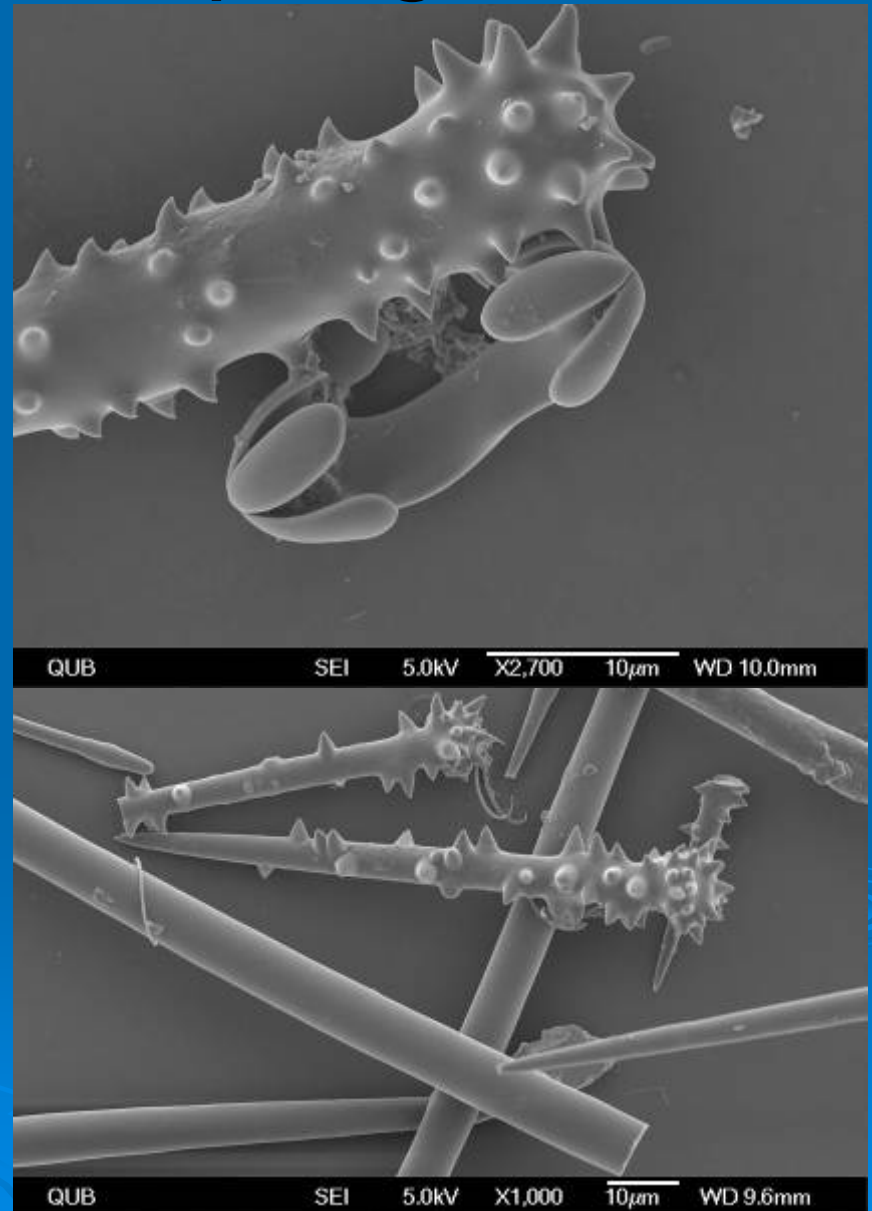
Field Methodology

- Six weeks survey summer 2005
- Diving team of 4-6 people
- Underwater photography of undisturbed specimens
- Collection of portion of specimen in numbered bags
- Preserve specimens in 95% alcohol
- Document to allow linking specimens with images
- Sampling not quantitative
- Additional sampling and research funded by EHS during SSNI



Identification of sponges

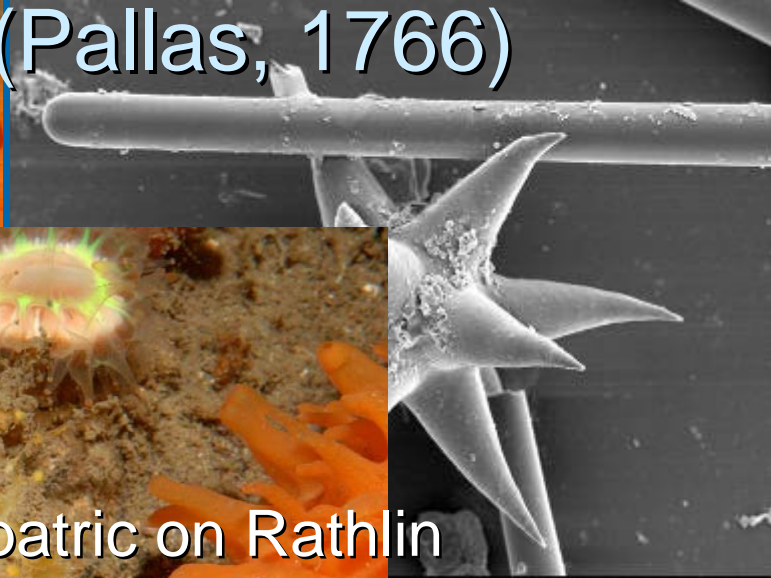
- Primarily on skeleton
- Most sponges have spicules : some only fibres or no skeleton
- Demospongia have silica (silicon dioxide) spicules
- Sometimes necessary to examine fine spicule detail using SEM



Results

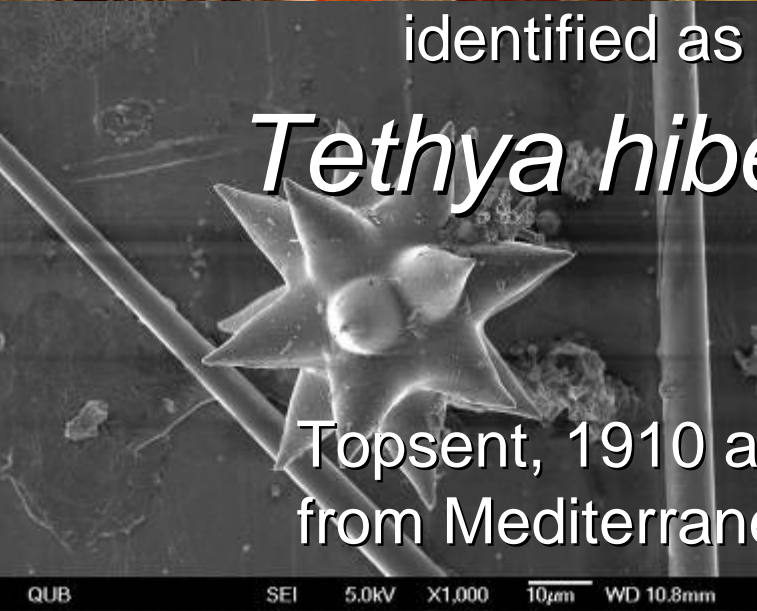
- 850 specimens
- 3000+ digital photographs
- 134 species (~50% UK species)
- 29 new to science
- 3 new to Britain and Ireland
- 9 new to Northern Ireland
- **Examples of new discoveries:**

Tethya aurantium (Pallas, 1766)



Thought two species sympatric on Rathlin
But using molecular techniques "*T.norvegica*
identified as new species.

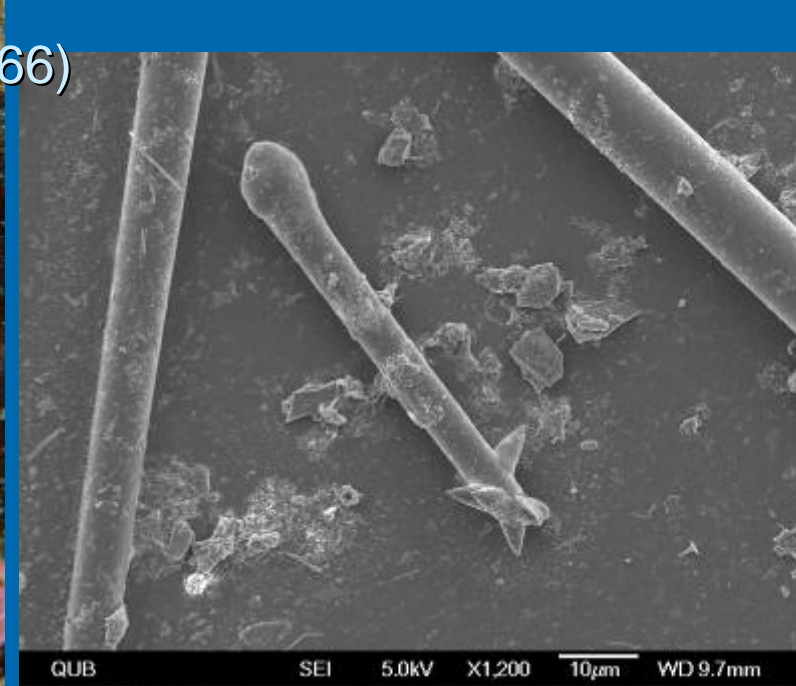
Tethya hibernica Heim, Nickel; Picton & Brümmer 2007



Topsent, 1910 and Burton, 1924 – one species
from Mediterranean to Spitzbergen

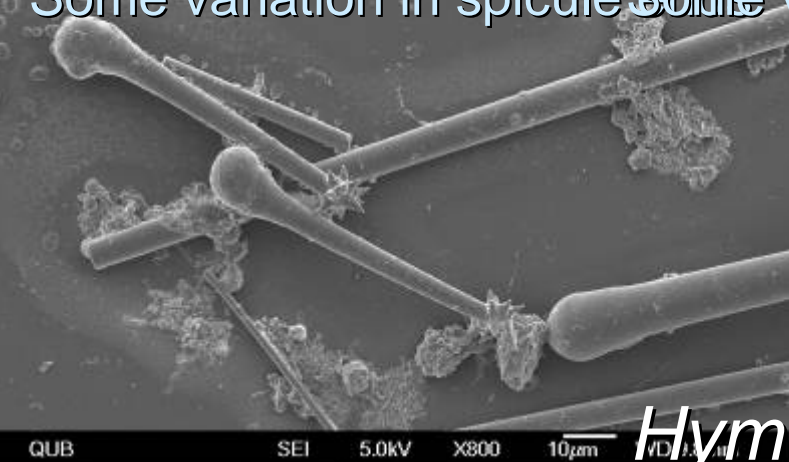
Tethya norvegica?

Hymeraphia stellifera Bowerbank, 1866)



22 specimens

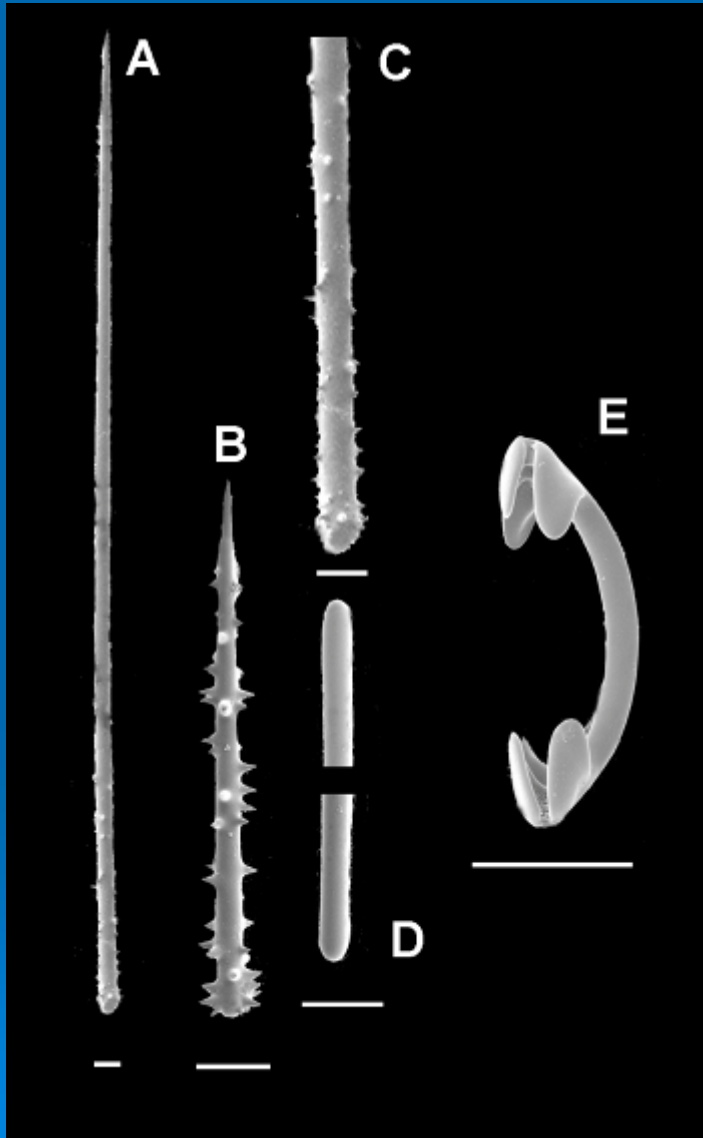
- Well known species with distinctive type of spicule
- Well known species with wide distribution
- Some variation in spicule ends



22 specimens

Hymeraphia breeni Picton & Goodwin 2007

Hymedesmia rathlinia Goodwin & Picton (in press)



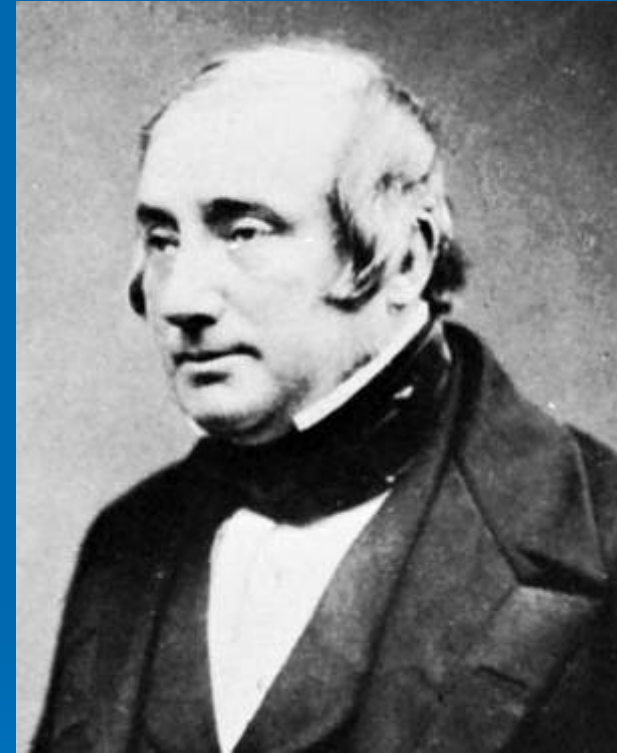
Rathlin: sponge biodiversity hotspot?

- Large number species just product of intensive study?
- Rathlin 136 species (including 29 new species)
- Other similar studies lower biodiversity – Kilkeran Bay - 66 species, Lough Hyne - 90 species
- Rathlin site of world importance for sponges
- Not just sponges – 2/3 NI marine invertebrate species
- Location, location, location!



Rathlin: sponge biodiversity hotspot?

- Lack of data to compare study with
- Many species impossible to identify *in situ*
- UK and Irish sponges last intensively studied by Bowerbank and Stephens
- Looked in little studied circalittoral depth ranges, diving sampling methodology, examined crusts
- Some new species relatively common and known from other areas (*H. stellifera*)
- Rathlin is a sponge biodiversity hotspot! - but are there more?
- Esmée Fairbairn



J.S Bowerbank
1798- 1877

Aknowledgements



- BSP for funding initial project
- EHSNI for funding “Sublittoral Survey Northern Ireland”
- SYNTHESYS programme
- The dive team