

IMAGE CATALOG FOR NORTH ATLANTIC DEEP-SEA CORALS

Summary report January 2014

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There is a growing need to use imagery as a sampling tool, as it is both a non-destructive tool that can be used on sensitive habitats, but also is efficient and cost effective. The aim of the project was to produce a guide for the identification of deep-sea corals from imagery, which is as taxonomically accurate as possible. This was achieved through the combination of high-resolution *in-situ* imagery, and where possible, with on-deck specimen imagery to highlight the features used to identify the corals. Due to the complexity of the coral group, efforts were primarily focused on the gorgonians.

An inherent problem with working in the deep sea is the lack of specimens to aid in identification, and without physical samples it is difficult, and in many cases impossible to identify organisms to species level from image data; however, observed organisms can be identified as distinct morphospecies (morphotypes) and assigned Operational Taxonomic Units (OTUs). OTUs allow for greater resolution of data as specimens are not lumped into higher taxonomic groups, but it is important to know the limitations. To aid in the transparency and consistency of identifications, the first part of the project was to build a catalogue with OTUs (derived from Howell & Davies 2010) and taxonomic names. The catalogue was build using taxonomic folders, taking the highest level Class: Anthozoa, down to species level or Operational Taxonomic levels (OTU). Within each folder, a standardised slide (JPEG) with the image of the specimen is provided (see Fig.1), accompanied by an information slide (see Fig.2).

A standardised slide for each species/OTU is provided. OTU numbers link back to Howell & Davies 2010. Information provided on each slide, include: depth of image (depth band), location, who identified the specimen and also who the copyright belongs to.

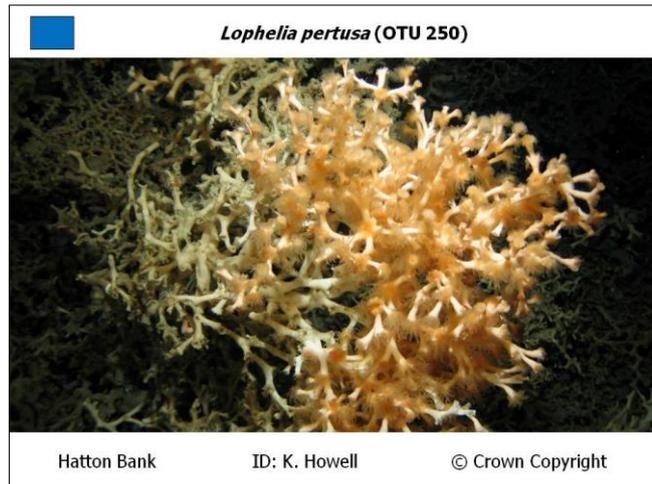


Fig. 1

An information slide accompanies the species slides; this information is taken from WORMS, and its purpose is to give a user an idea of the general distribution, depth and habitat the species is found.

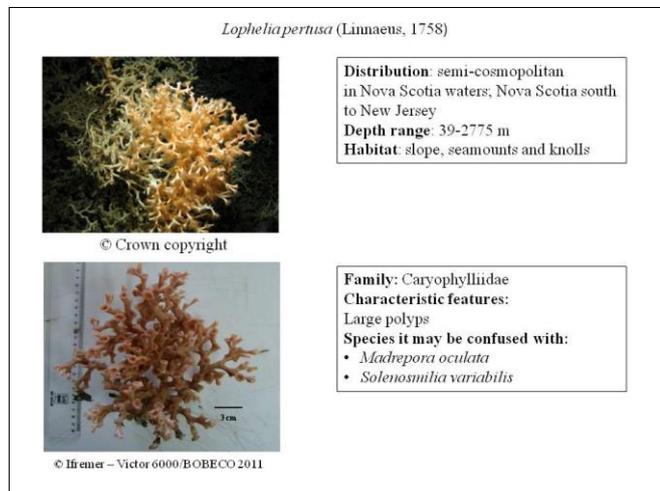


Fig. 2

The identification part of the guide is provided in the form of diagnostic sheets (Fig.3). The main concept is to capture which features are used to identify the corals, this maybe at a species level or higher: for example, the gross morphology of corals can be a very useful tool for identification; e.g branching patterns are useful for identifying black corals (Anthipatharia), while polyp arrangement and size and be useful for identifying other species.

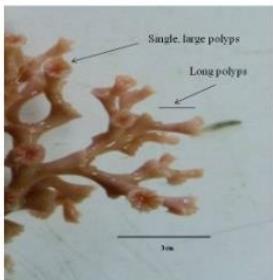
Diagnostic sheet: reef-building Scleractinia

Lophelia pertusa, *Madrepora oculata* and *Solenosmilia variabilis* are 3 of the reef-building Scleractinia. These corals are easily confused as their morphologies are similar.

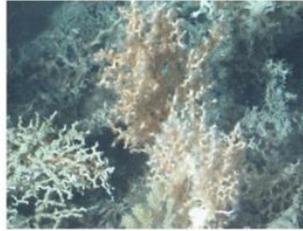
Lophelia pertusa



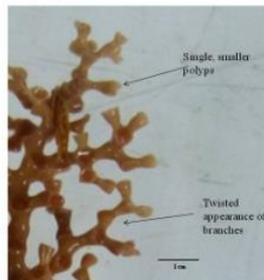
- Larger polyps
- Chunky branches



Madrepora oculata



- Smaller polyps
- Twisted branches



Solenosmilia variabilis



- Twin polyps
- Shorter polyps
- Chunky branches, more dense

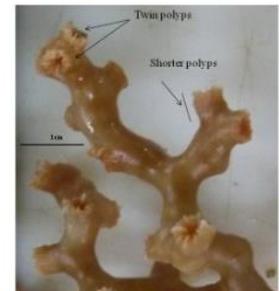


Fig. 3. Diagnostic sheet for distinguishing between the three main types of reef-building cold-water corals *Lophelia pertusa*, *Madrepora oculata*, *Solenosmilia variabilis*.

Fig. 3 illustrates an example of a diagnostic sheet which is included as part of the ID guide. The purpose of the sheets is to fit into the species catalogue and aid in the identification of certain groups or species, depending on the level of detail. Fig. 3 shows the main morphological features which can be used to distinguish between the three scleractinian species, which can often be incorrectly identified. The idea is that once the user has got their eye into the finer detail, in this case the polyp size and arrangement, it makes it much easier to then recognise this from the larger image.

Table 1: List of species/OTUs catalogued during this project, with those that have accompanying information slides and diagnostic sheets marked.

	OTU	Information slide	Diagnostic sheet
Gorgonians			
<i>Acanella</i> sp.	282	x	x
<i>Chrysogorgia</i> sp.	705	x	x
<i>Acanthogorgia armarta</i>	706	x	x
<i>Lepidisis</i> sp.	557	x	x
<i>Paragorgia</i> sp.	707	x	x
<i>Narella bellissima</i>	708	x	x
<i>Narella verluysi</i>	709	x	x
<i>Placogorgia</i> cf. <i>graciosa</i>	546	x	
<i>Candidella imbricata</i>	710	x	
<i>Primnoa resedaeformis</i>	331	x	
<i>Swiftia</i> sp.	711	x	
<i>Eknomisis</i> sp.	649	x	x
<i>Jasonisis</i> sp. nov	617	x	
Briareidae sp.	59	x	
Isididae sp. 2	558	x	
Keratoisis sp.2	578	x	
Pennatulids			
<i>Funiculina quadrangularis</i>	444	x	
<i>Anthoptilum grandiflorum</i>	594	x	
<i>Halipterus</i> sp.	622	x	
<i>Umbellula</i> sp.	581	x	
<i>Pennatula phosphorea</i>	486	x	
Antipatharians			
<i>Leiopathes</i> sp.	305	x	
<i>Parantipathes hirondele</i>	713	x	x

<i>Stichopopathes gravieri</i>	283	x	x
<i>Trissopathes</i> sp.	714	x	x
<i>Antipathes dichotoma</i>	715	x	
<i>Bathypathes</i> sp.	716	x	
cf. <i>Antipathella</i> sp.	320	x	
Soft corals			
<i>Anthomastus</i> sp.	278	x	
<i>Drifa</i> sp. 1	717	x	
<i>Gersemia</i> sp.	64	x	
Scleractinians			
<i>Caryophyllia smithii</i>	500	x	x
<i>Caryophyllia</i> sp. 2	6		
<i>Caryophyllia</i> sp. 3	37		
<i>Caryophyllia</i> sp. 4	192		
<i>Caryophyllia</i> sp. 5	584		
<i>Caryophyllidae</i> sp. 2	260		
<i>Caryophyllidae</i> sp. 3	428		
<i>Desmophyllum dianthus</i>	700	x	
<i>Desmophyllum</i> sp. 1	335	x	
<i>Flabellum macandrewi</i>	701	x	
<i>Leptopsammia britannica</i>	702	x	
<i>Lophelia pertusa</i> (dead structure)	365		
<i>Lophelia pertusa</i>	250	x	x
<i>Madrepora oculata</i>	251	x	x
<i>Solenosmilia variabilis</i>	703	x	x
<i>Enallopsammia rostrata</i>	704	x	
<i>Dendrophyllia</i> sp.	712	x	