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Mangrove Biotype IV: Porifera (Sponges)

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MANGROVE BIOTYPES IV

PORIFERA (SPONGES)

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PORIFERA (SPONGES)

INTRODUCTION

SPONGES are perhaps the most conspicuous and colourful animals on the red mangrove prop root. The vivid colours can easily be seen from a boat at the edge of the forest (Plates 1 & 2)

Plate 1. Sponges as seen from the boat – Goodbody's Channel, Port Royal Mangroves.

Plate 2. Sponges seen from above the water in Goodbody's Channel.

What is a Sponge?

Sponges are primitive multicellular animals and belong to the phylum Porifera (pore bearer). They are at the cellular level of construction and have no true tissues or organs. However, they have many different types of cells specialised to carry out various functions. The body surface of a sponge is perforated with many small openings (pores) which are formed by a cell called the porocyte. These open into the inner body cavity or Atrium and allow water to enter the sponge. The middle layer of the sponge body wall (the mesohyl) usually contains skeletal structures called spicules. These are composed of inorganic calcium carbonate or silicon. Some sponges may have collagen fibres in this middle layer instead of, or along with the spicules.

Simple sponges have a tubular shape with a relatively large opening called the Osculum at the top (Figure 1). Water enters the body of the sponge via the porocytes, flows into the Atrium and out through the Osculum. This flow of water brings in oxygen and food (sponges are filter feeders) and removes waste. The animal actively pumps water through its body using flagellated cells called choanocytes which line the inner cavity or Atrium. Sponges are able to pump up to 10 times their body volume each hour.

Apart from their aesthetic value and the beautiful colours they provide in the mangrove lagoons, within recent times, sponges and other sessile marine invertebrates have generated increased interest as potential genetic and chemical resources. They have been shown to have “the most active biochemicals potentially useful for mankind in the pharmaceutical industry”. There is urgency in seeking out new species as such discoveries may equate to new types of chemicals which may be useful against human pathogens and ailments. The number of sponges with medical properties has been growing. The most celebrated example is the Mediterranean species *Dysidea avara* which has produced anti-AIDS molecules.

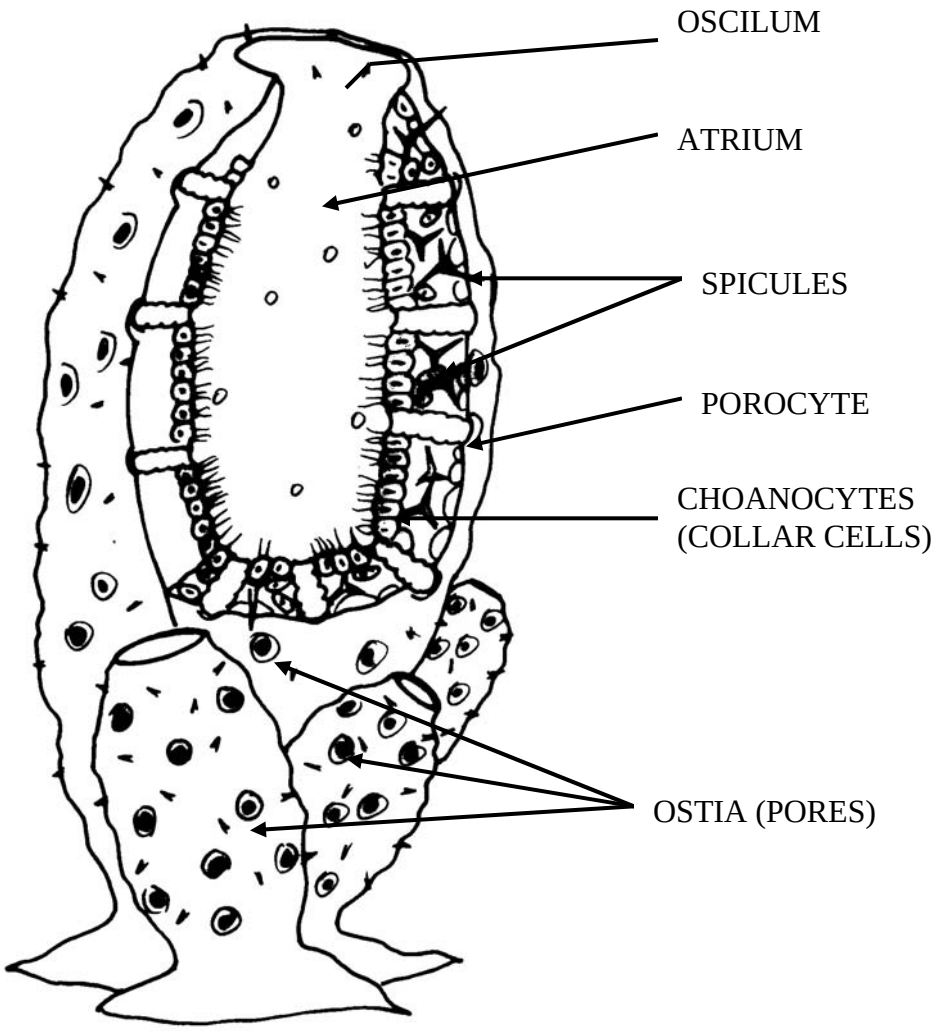

Figure 1. Basic structure of a sponge. From Jackson and Webber (2004).

Sponges of the Port Royal mangroves have been studied systematically by Hetchkel (1967) and Jackson (2003). In both cases the use of colour to distinguish the species was found to be unreliable and accurate identification (especially in the latter study) relied heavily on the spicules found in the body wall of the mangrove sponge.

The most common sponges identified by Jackson (2004) will therefore be presented as pictures of preserved specimens and therefore will be devoid of colour. Pictures of the most common sponges in situ however will be presented after the identified taxa. A new species of sponge has been identified from the PR mangroves. It has been called *Haliclona portroyalensis* (Jackson et al., 2006).

List of sponges found in the mangroves.

Class – Demospongiae

Order Haplosclerida

Family Chalinidae	SPECIMEN REFERENCE NUMBER
Haliclona hogarthi	PRML Por. 0105
Haliclona molitba	PRML Por. 0205
Haliclona lehnerti	PRML Por. 0305
Haliclona curaçaoensis	PRML Por. 0405
Haliclona tubifera	PRML Por. 0605
Haliclona albifragilis	PRML Por. 0705
Haliclona implexiformis	PRML Por. 0805
Haliclona caerulea	PRML Por. 0905
Haliclona portroyalensis n.sp.	PRML Por. 3905
Family Phoeodictyidae	
Calyx podatypa	PRML Por. 1005
Family Niphatidae	
Amphimedon viridis	PRML Por. 1105
Niphates amorpha	PRML Por. 1205
Niphates erecta	PRML Por. 1305
Family Petrosiidae	PRML Por. 1405
Xestospongia muta	PRML Por. 1505
Family Mycalidae	
Mycale microsigmatosa	PRML Por. 1605
Family Myxillidae	
Tedania ignis	PRML Por. 1705
Lissodendoryx isodictyalis	PRML Por. 1805
Order HALICHONDRIDA	
Family Halichondridae	
Halichondria melanodocea	PRML Por. 1905
Halichondria magniconulosa	
Family Hymeniacidonidae	
Hymeniacidon heliophilia	PRML Por. 2005
Order HADROMERIDA	
Family Suberitidae	
Terpios zeteki	PRML Por. 2105

1. *Haliclona hogarthi* (Hechtel, 1965)

The **colour** of this sponge is pinkish-purple alive and light brown to brownish-white in alcohol (Plate 3). The sponge consists of tubular branches, which may remain as distinct tubes or fuse to form a massive structure (ramose). In tubular forms the oscula are at the tip of each tube and in ramose forms the oscula, measuring 1 - 3mm, are on the sides of the branches. The consistency is soft, limp and easily torn. Scale bar = 1 cm.

Plate 3. ***Haliclona hogarthi***

2. *Haliclona molitba* De Laubenfels, 1949

The colour of the sponge is violet alive and beige when preserved in alcohol.
The only specimen collected was not fully formed but was attached to the shell of a bivalve (Plate 4). Its consistency was soft but resilient and difficult to cut. Scale = cm.

Plate 4. ***Haliclona molitba***

3. ***Haliclona lehnerti*** DeWeerdt, 2000

The **colour** of specimen is dark red alive and it becomes reddish brown in alcohol (Plate 5). The specimens are massive and the surface is croscopically hispid with scattered oscula, measuring 1-5 mm. The consistency is tough but spongy and compressible. Scale = cm.

Plate 5. ***Haliclona lehnerti***

4. *Haliclona tubifera* George and Wilson, 1919

The colour of the sponge is pinkish purple alive and beige preserved in alcohol. Plate 6. The sponge is massive with tube-like projections few centimeters in height, some bearing oscula on the sides or near to the apices. Most however are blind ending fistules. The consistency is soft easily torn and is limp when removed from water. Scale = cm.

Plate 6. ***Haliclona tubifera***

5. ***Haliclona curaçaoensis*** Van Soest, 1980

The colour is grayish purple in alcohol (Plate 7). The Sponge is tubular–ramose some with club shaped apices. Blind-ended as well as tapered branches may occur. The oscula are apical or flush on the sides and measure 2 – 6mm in diameter. The consistency is very soft, limp, easily torn and immediately collapses when removed from water. Scale = cm.

Plate 7. ***Haliclona curaçaoensis***

6. ***Haliclona albifragilis*** Hechtel, 1965

The colour is purple alive and cream when preserved in alcohol. The sponge is massive with oscula 2-6 mm, which may be on slightly raised projections or flush with the surface (Plate 8). The consistency is relatively firm, easily cut and easily broken. Scale = cm.

Plate 8. ***Haliclona albifragilis***

7. *Haliclona implexiformis* Hechtel, 1965

The colour of the living sponge is purple to light purple and off white when preserved in alcohol. The specimens are generally massive – lobate with cylindrical projections that may be several centimeters in height arising from the base and bearing oscula scattered along the length or at the apices. These oscula may be 4 - 8 mm in diameter (Plate 9). Slender blind ending fistules are also present. The sponge retains its shape when removed from water and is easily cut and crumbly. Scale = cm.

Plate 9. ***Haliclona implexiformis***

8. ***Haliclona caerulea*** (Hechtel, 1965)

The colour of the specimen is light blue - green alive and beige or light brown preserved in alcohol. The shape is massive with numerous projections, some volcano – shaped bearing oscula and measuring 3 –5mm in diameter. The consistency of the sponge is firm but brittle. Scale = cm.

Plate 10. ***Haliclona caerulea***

9. *Haliclona portroyalensis* n.sp.

The colour of the specimen is purple alive and beige preserved in alcohol. The sponge is massive with digitate and bulbous processes. Oscula scattered, some laterally plush and measured 2 – 3 mm and larger ones up to 6mm on the bulbous areas (Plate 11). Scale = cm.

Plate 11. ***Haliclona portroyalensis* n.sp.**

Family: **PHLOEODICTYIDAE** Carter, 1882.

10. *Calyx podatypa* de Laubenfels, 1934.

The colour of the specimen is dark brownish red in alcohol and alive. The sponge is massively encrusting with ridges and fistules, the body being hollow in most parts. The surface is slightly rough to the touch. The oscula are of two types, small ones measuring 1 – 3mm, may be flush with the surface and larger ones up to 8 mm with raised rims. The consistency is brittle and easily broken. Scale = cm.

Plate 12. ***Calyx podatypa***

Family: NIPHATIDAE Van Soest, 1980

11. *Amphimedon viridis* Duchassaing and Michelotti, 1864

The colour of the specimen is pale green alive and light brown in alcohol

The specimen shown is in the early stages of development with oscula at the apices of short elevations. The surface appears smooth and consistency is fairly soft and easily torn. Another more developed specimen is massive with an encrusting base with a number of fistules and tubes, 2- 3 cm high arising from it. The tubes and fistules have semitransparent walls. The consistency is relatively soft and it easily breaks into fragments. Scale = cm.

Plate 13. ***Amphimedon viridis***

12. ***Niphates amorpha*** Weidenmayer, 1977

The colour of this specimen is purple alive and light brown to salmon in alcohol (Plate 14). The specimen is massive fairly thick encrustation with many conspicuous oscula. Some of these oscula are raised others are flush with the surface with openings 1.5 – 3.0 mm in diameter. The surface is micohispid and the consistency is very tough and not easily cut or torn. Scale = cm.

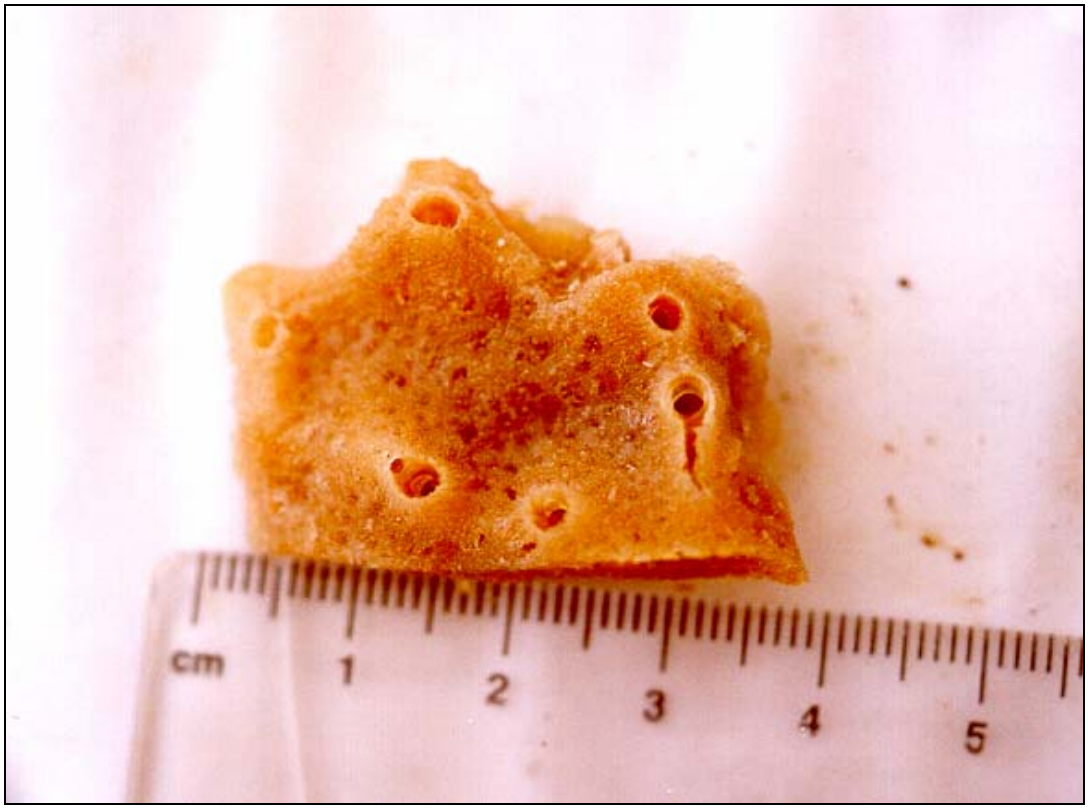

Plate 14. ***Niphates amorpha***

13. ***Niphates erecta*** Duchassaing and Michelotti, 1864

The colours of the specimens are light blue to pinkish alive and white to light brown in alcohol. The sponge may be of a single branch that is repent or may have short erect branches. The surface is conulose or covered with short, sharp outgrowths. The oscula are scattered over the upper surface and sides, usually flush with the surface and measuring 2 - 5mm. The consistency is spongy and resilient. Scale = cm.

Plate 14. ***Niphates erecta***

Family: **PETROSIIDAE** Van Soest, 1980

14. ***Xestospongia muta*** Schmidt, 1870

The colour of the specimen is pale yellow alive and retains the colour when preserved in alcohol (Plate 15). The specimen is massive with cylindrical out growths which branch further and anastomose on the side of the sponge. The upper surface is smooth with no apparent oscula. The consistency is brittle, firm, incompressible and easily crumpled. Scale = cm.

Plate 15. ***Xestospongia muta***

Order: POECILOSCLERIDA Topsent, 1928

Family: **MYCALIDAE** Lundbeck, 1905

15. ***Mycale microsigmatosa*** Arndt, 1927

The specimens show a wide range of colours in life orange peach to bright orange yellow green, yellow orange and red. In alcohol they tend to be cream in colour (Plate 15). Most specimens are thick encrustations while some are irregularly lobate with small oscula. The surface is irregular and finely conulose to microhispid. The consistency of most specimens is soft and easily torn, but some are tough and spongy. Scale = cm.

Plate 16. ***Mycale microsigmatosa***

Family **MYXILLIDAE**

16. ***Tedania ignis*** Duchassaing and Michelotti, 1864

The colours of the specimens are orange red, orange yellow, alive and cream to light brown preserved in alcohol. The growth forms are thickly encrusting, massive to lobate. The oscula are not obvious and the consistency is soft, compressible and easily torn. Scale = cm.

Plate 17. ***Tedania ignis***

17. *Lissodendoryx isodictyalis* (Carter, 1882)

The colours of the specimens varied and include cream to yellow, greenish and light purple alive. All are cream in alcohol (Plate 18). The specimens are massive to lobate with conulose surfaces. There are few oscula, apical on volcano shaped lobes and measuring 5- 7mm are. The consistency is spongy, compressible, soft and easily torn. Scale = cm.

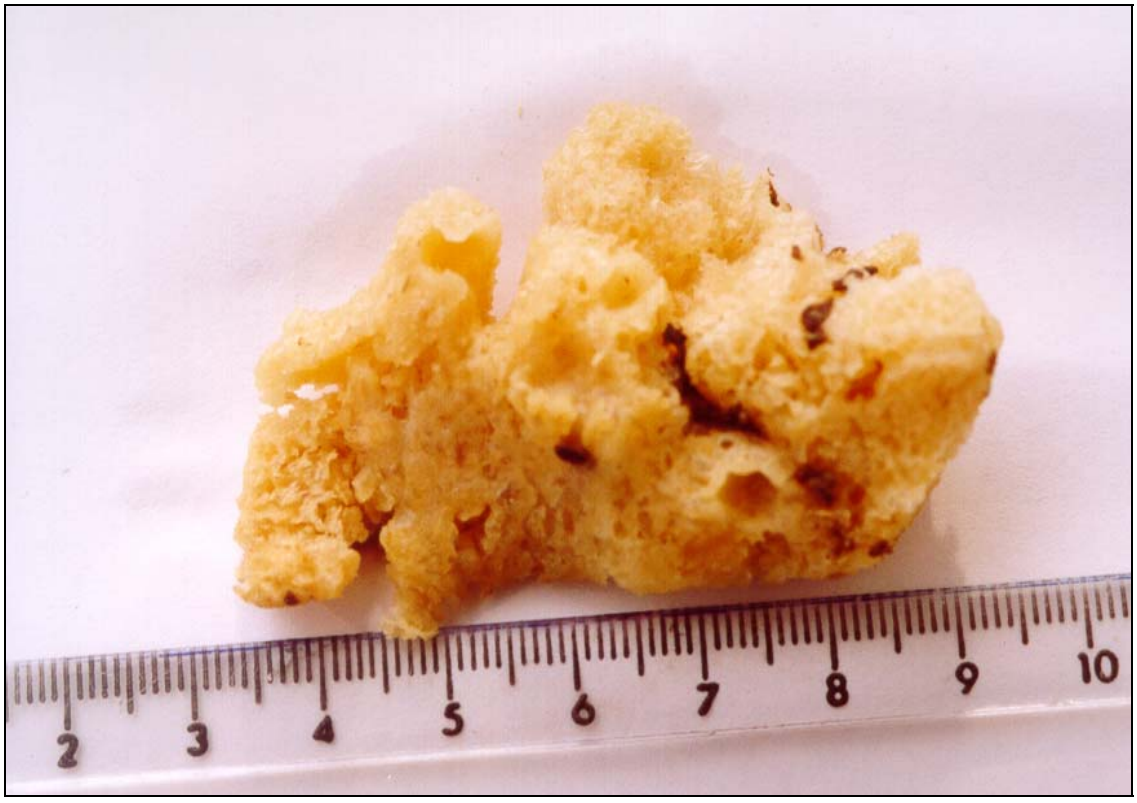

Plate 18. ***Lissodendoryx isodictyalis***

Order: **HALICHONDRIDA** Vosmaer, 1885

Family: **HALICHONRIIDAE** Gray, 1867

18. ***Halichondria melanodocia*** (de Laubenfels, 1936)

The colour of the specimen is dark green almost black with yellowish green interior when alive. The colour is maintained or it gets darker in alcohol (Plate 19). The shape is thickly encrusting, massive to lobate. The surface is smooth to the touch but contains many projections with apical oscula as well as oscula plush with the surface measuring up to 7 mm in diameter. The consistency is relative firm, spongy and fairly easy to cut. Scale = cm.

Plate 19. ***Halichondria melanodocia***

19. *Halichondria magniconulosa* Hechtel 1965

Several specimens will be presented as possibly *Halichondria maniconulosa,* (Plates 20-1 to 20-5).

The colour of ***H. maniconulosa*** # 1. is yellow alive and brown preserved in alcohol (Plate 20-1). The specimen is massive with numerous thick and sharp pointed conules giving a wrinkled appearance. The oscula are not obvious and the few seen measured 1-3 mm in diameter. The consistency is tough and only slightly compressible. Scale = cm.

Plate 20-1. ***H. maniconulosa*** # 1.

The colour of ***H. maniconulosa*** #2 is grayish green alive and light yellowish brown when preserved in alcohol (Plate 20-2). The specimen is massive to lobate. The surface is smooth to the touch but thrown into numerous conules as well as lobes up to 4.0 cm in height. The numerous oscula, measuring 1.5 – 7 mm are mostly oval and scattered all over the surface in slight depressions or at the apices of the lobes. The consistency is firm and easily broken. Scale = cm.

Plate 20-2. ***H. maniconulosa*** #2

The colour of ***H. maniconulosa*** #3 is green yellow alive and a drab light greenish yellow colour in alcohol (Plate 20-3). The sponge is massive with small and large conules and elevations that may be up to several millimeters in height. Oscula are not obvious and the consistency is spongy. Scale = cm.

Plate 20-3. ***H. maniconulosa*** #3

The colour of the ***H. maniconulosa*** #4 is yellow alive and pale yellow preserved in alcohol (Plate 20-4). The sponges are thickly encrusting, massive with very uneven surface with projecting lobes. The oscula are scattered over the mass of the sponge and measure 3mm. The consistency is tough, slightly compressible. Scale = cm.

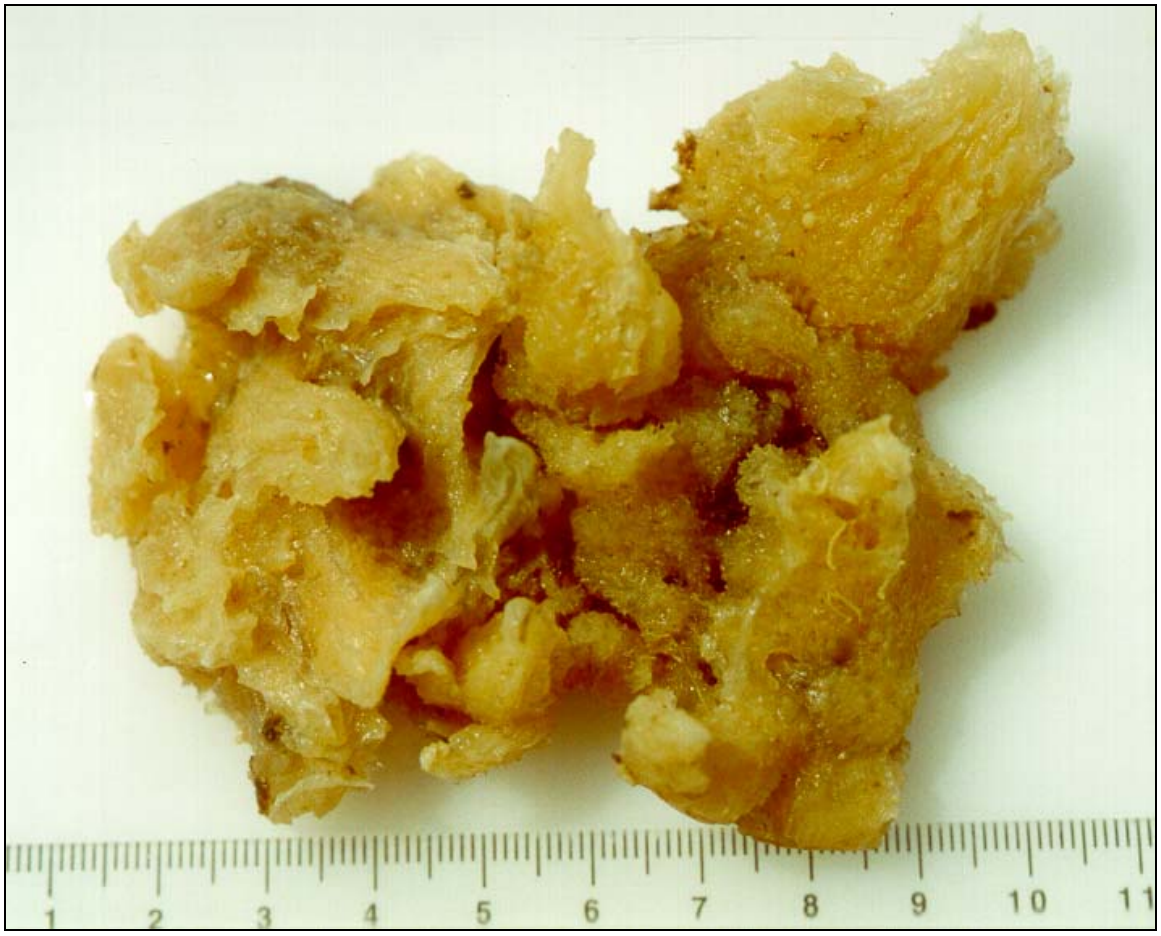

Plate 20-4. ***H. maniconulosa*** #4

The colour of ***H. maniconulosa*** #5 is grayish green alive and light yellowish brown when preserved in alcohol (Plate 20-5). The specimen is massive to lobate. The surface is smooth to the touch but thrown into numerous conules as well as lobes up to 4.0 cm in height. The numerous oscula, measuring 1.5 – 7 mm are mostly oval and scattered all over the surface in slight depressions or at the apices of the lobes. The consistency is firm and easily broken. Scale = cm.

Plate 20-5. ***H. maniconulosa*** #5

Family HYMENIACIDONIDAE de Laubenfels, 1934

20. ***Hymeniacidon heliophila*** Parker

The colour of the sponge is a light orange/ yellow orange alive and cream in alcohol (Plate 21). The sponge forms an encrustment, a few mm in thickness. The surface is very uneven with numerous conules or digitations. When examined at low magnification spicules projecting beyond the surface can be seen and these account for its hispid appearance. Oscula are not readily obvious in the preserved specimen. The consistency is soft, delicate and compressible. Scale = cm.

Plate 21. ***Hymeniacidon heliophila***

Order: HADROMERIDA Topsent, 1898

Family: SUBERITIDAE Schmidt, sensu de Laubenfels, 1936

21. *Terpios zeteki* de Laubenfels

Colour. The surface of this sponge shows a wide range of colours that include bright yellow, gold, yellowish green, dark green, blue green, purplish pink, red, bright orange red and reddish brown (Plate 1 above). The undersides of most specimens however were yellow. All specimens lost their colour when preserved in alcohol and become cream to light brown (Plate 22). Scale = cm.

Plate 22. ***Terpios zeteki***

Plate 23. Different colours of ***Terpios zeteki***