

# Sponges

Keziriya Ruben\*

Department of Fisheries, University of Kerala, Karyavattom, Kerala, India

## ABOUT THE STUDY

Sponge, any of the primitive multicellular aquatic animals that constitute the phylum Porifera. They number approximately 5,000 described species and inhabit all seas, where they occur attached to surfaces from the intertidal zone to depths of 8,500 metres (29,000 feet) or more. The members of one family, the Spongillidae, are found in fresh water; however, 98 percent of all sponge species are marine. Adult sponges lack a definite nervous system and musculature and do not show conspicuous movements of body parts. The phylum Porifera may be divided into three classes on the basis of the composition of the skeletal elements. Together, the classes Calcarea and Hexactinellida make up about 10 to 20 percent of the known species of sponges; the remaining 80 to 90 percent are placed in the class Demospongiae.

Most sponges are only a few centimetres in size, but some urn-shaped or shapeless ones are less than a centimetre (0.4 inch); others, shaped like vases, tubes, or branches, may be one to two metres (3.3–6.6 feet) tall, and broad rounded masses may be one to two metres in diameter. Size within a species may vary with age, environmental conditions, and food supply.

## IMPORTANCE

The soft elastic skeletal frameworks of certain species of the class Demospongiae e.g., *Spongia officinalis*, *Hippospongia communis*, *S. zimocca*, *S. graminea* etc., have been familiar household items since ancient times. In ancient Greece and Rome, sponges were used to apply paint, as mops, and by soldiers as substitutes for drinking vessels. During the Middle Ages, burned sponge was reputed to have therapeutic value in the treatment of various diseases. Natural sponges now are used mostly in arts and crafts such as pottery and jewelry making, painting and decorating, and in surgical medicine. Synthetic sponges have largely replaced natural ones for household use.

## DISTRIBUTION

Sponges are present at all water depths, from the tidal zone to the deepest regions (abyss). They occur at all latitudes and are particularly abundant in Antarctic waters. Members of the Calcarea and Demospongiae are found mainly on the rocky bottoms of the continental shelf, and members of the Hexactinellida are characteristic of the deepest muddy bottoms of oceans and seas.

## LIFE CYCLE

Most sponges reproduce sexually, although asexual reproduction may also occur. Sponges are generally hermaphroditic (that is, having male and female germ cells in one animal); however, some sponge species are sequential hermaphrodites (that is, having male and female germ cells that develop at different times in the same animal).

## EVOLUTION

Sponges have evolved in a way foreign to that of other animals. They probably arose from flagellated protozoans, although it is not certain which group. The choanocytes of sponges resemble the choanoflagellate protozoans. Choanoflagellate protozoan colonies, however, do not develop by way of embryological stages as do the sponges. The primitive structure of the Porifera indicates affinities with certain types of protozoan colonies; both lack integration of parts, mouths, and digestive systems, and both have a type of skeletal formation in which single elements are produced by a single cell or by a small group of cells.

## DISEASES OF SPONGES

Sponges may be attacked by diseases of epidemic character, the agents of which are not well known. The commercial sponges of the West Indies once were nearly completely destroyed by a fungus-like microorganism; other sponges were not damaged.

**Correspondence to:** Keziriya Ruben, Department of Fisheries, University of Kerala, Karyavattom, Kerala, India, E-mail: keziriya7@yahoo.com

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