

Sea Cucumbers of American Samoa



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by

the Marine Science Students of American Samoa
Community College
Spring 2008

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Preface

During the spring 2008 semester, five students from the Marine Science Program at the American Samoa Community College, with support from the University of Hawai'i Sea Grant Program, participated in an internship funded by the Hawai'i Institute of Marine Biology through a partnership with the National Oceanic and Atmospheric Administration's National Marine Sanctuary Program. These students participated in classroom and field exercises to learn the major taxa of marine invertebrates and practice near-shore surveying techniques. As a final project for the internship, students each selected several of the native sea cucumber species to produce an informational booklet. In it you will find general characteristics such as scientific and Samoan name, taxonomy, geographical range, and cultural significance. Species have been organized in alphabetical order by species name.

Photos with permission from Dr. Gustav Paulay and Larry Madrigal.

General Characteristics

Sea cucumbers are one of the most important members of sand and mud benthic communities. They belong to the phylum echinodermata (meaning spiny skin) making them relatives of sea stars and sea urchins. As such, they have radial symmetry and tube feet used for feeding and movement. They are found throughout the nearshore coral reef environment and are also found in the deepest parts of the ocean. Sea cucumbers play an important role in reef recycling, gathering organic detritus and bacteria from the water or sand for food. These particles are digested by the animals in order to extract nutrients, a process that helps turn over sediments to maintain an environment that supports other marine life. Other animals, including fish, crustaceans, and molluscs, eat sea cucumber eggs, larvae and juveniles making them an important member of the food web. Many species eject Cuvierian tubules when threatened. These are very sticky and can be toxic or irritating to predators.



Name: *Actinopyga echinites*
Order: Aspidochirotida
Family: Holothuriidae
Range: East Africa, Polynesia, Indo-West Pacific
Size: up to 12 inches

(Photo: Dr. Gustav Paulay)

This species can be found in shallow water on the reef flat or fringing and lagoon-islet reefs. It can also be found in seagrass beds, rubble reef flats and compact flats. This species can be encountered in depths up to 5m.

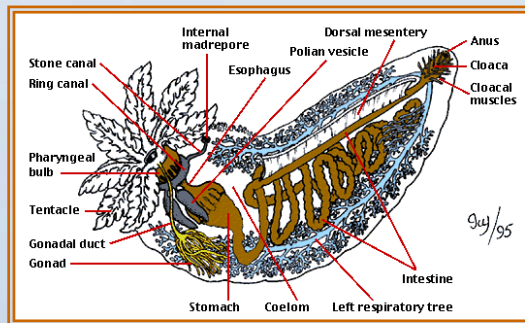


Image source: BIODIDAC, illustrated by Ivy Livingstone.
http://biodidac.bio.uottawa.ca/thumbnails/filedet.htm?File_name=HOLO001C&File_type=GIF



Name: *Actinopyga mauritiana* (mama'o)
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific
Size: up to 12 inches

(Photo: Dr. Gustav Paulay)

Actinopyga mauritiana is a large brown and white speckled sea cucumber. It has a ring of five small teeth around its anus that is used as a defense mechanism against pearl fish, which are parasitic on many sea cucumbers and enter through the anus. They can be found in subtidal and intertidal areas and are especially abundant in sandy areas, sea grasses and sandy lagoons in coral reef.

World wide it is highly valued as a food item and is harvested in great numbers. The adults are dried and processed for their gummy meat (muscular body wall) which is exported primarily to China, Hong Kong and Singapore. The meat is high in protein, low in fat and believed to be an aphrodisiac. Few studies have been conducted on its reproductive biology. However, this information would be very useful for sustainable management of the fishery and aquaculture of this species. Samoans also eat this sea cucumber. They eat the remaining white layer after scrapping off the outer brown color of the body wall.



Name: *Bohadschia argus* (fugafuga)
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific (except Hawai'i)
Size: up to 24 inches

(Photo: Dr. Gustav Paulay)

This species is also known as the eyed or leopard sea cucumber. It can be found in calm lagoon and back reef environments, as well as the fore reef. It slowly plows along the ocean bottom with padded sticky tentacles picking up organic nutrient coated sand particles and passing them to its mouth. *Bohadschia argus* utilizes Cuvierian tubules as a defense mechanism.



Name: *Bohadschia marmorata/vitiensis*
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific (except Hawai'i)
Size: 12-24 inches

(Photo: Larry G. Madrigal)

The body of this species is short and thick with its lower surface slightly flattened. Its small, dark brown dots contrast with a golden brown background, while the underside is lighter in color. It is commonly found in shallow waters, where it buries itself in the silty sands of calm waters at depths of 2-15 meters. Like *B. argus*, this species also ejects Cuvierian tubules from the anus as a defense mechanism.



Name: *Holothuria atra* (loli)
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific, Eastern Africa
Size: up to 24 inches

(Photo: Larry G. Madrigal)

Holothuria atra was first described as a species in 1833. Known as loli in American Samoa, *H. atra* are very common along sandy shores. This species is extremely useful in the Samoan culture as it is considered a food source by many families. People in the Pacific scrape off the black skin of the *H. atra* until they can see or feel the white layer below. The white flesh is cut into cubes and stored in sea water until eaten. *Holothuria atra* is recognized by its uniform black color and sausage shape. Their bodies are typically dusted with sand grains. Unlike many other sea cucumbers, *H. atra* does not have Cuvierian tubules. Instead, if *H. atra* is attacked or injured, it will defend itself by expelling its internal organs, which can be toxic to fish. This behavior has evolved in this and some other sea cucumber species for defense and after it escapes danger it will regenerate its internal organs.



Name: *Holothuria conusalba*
Order: Aspidochirotida
Family: Holothuriidae
Range: South Pacific, East Africa
Size: up to 8 inches

(Photo: Larry G. Madrigal)

Holothuria conusalba is light-tan, speckled with darker brown areas. It is found under rocks or burrowed in the sand in the intertidal region.



Name: *Holothuria flavomaculata*
Order: Aspidochirotida
Family: Holothuriidae
Range: Hawaii, Indo-Pacific
Size: over 12 inches

(Photo: Dr. Gustav Paulay)

The body of the *H. flavomaculata* is dark brown with fleshy yellow spikes and tentacles but they are not dangerous to touch or pick up. You can find this species under rocks within the intertidal region, though they are hard to find. This sea cucumber anchors the rear portion of its body in a crevice and extends the front part forward to feed. They are able to quickly react when sensing danger in their environment. This species was first described and named scientifically in 1868.



Name: *Holothuria hilla* (amu'u)
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific
Size: Up to 12 inches

(Photo: Scott Godwin)

Holothuria hilla is known as the sand-sifting sea cucumber. It has a long gray to chestnut-brown body with white spots and numerous cream-colored spiny papillae. The sand-sifting sea cucumber is one of the few species that attaches its posterior half to the inside of its shelter and only extends its anterior half when searching for food. It scavenges on the algae, bacteria and other organic matter present in the sand. *H. hilla* does not have Cuvierian tubules but in the wild, if it is attacked or injured, it will expel its internal organs which can be toxic to fish. This species is found in American Samoa but it is not as common as *H. atra*. Samoan people do not eat this species.



Name: *Holothuria impatiens*
Order: Aspidochirotida
Family: Holothuriidae
Range: Southern California, Hawaii and Indo-Pacific
Size: up to 8 inches

(Photo: Scott Godwin)

This species can be found in depths up to 15m. *Holothuria impatiens* mouth is surrounded by 8 to 30 tentacles that secrete mucus. The mucus traps small planktonic organisms from the water. The animal feeds by wiping off organisms trapped in the mucus with its mouth. This species has Cuvierian tubules that are ejected when the animal is threatened.



Name: *Holothuria leucospilota* (sisigo)
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific
Size: up to 19 inches

(Photo: Scott Godwin)

The mouth of this species is surrounded by tentacles used for feeding on organic matter found in sand and other substrates. Sisigo is found on sandy patches within coral reefs up to 10 feet deep. It is commonly eaten fresh or dried. When threatened, it may eject Cuvierian tubules as a defense mechanism.



Name: *Holothuria pervicax*
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific, South Pacific
Size: up to 12 inches

(Photo: Larry G. Madrigal)

This sea cucumber is mostly found under large rubble or on submerged, open sand. When it is disturbed, it releases Cuvierian tubules to defend itself. It feeds on particles of organic matter, which it removes from bottom sediments. Its waste is released in the form of strings of sand.



Name: *Labidodemas pertinax*
Order: Aspidochirotida
Family: Holothuriidae
Range: Indo-Pacific
Size: up to 7 inches

(Photo: Larry G. Madrigal)

It is commonly known as the white cucumber, as its entire body is white. It can also have a reddish color at both ends of its body. It can be found in subtidal areas of the reef flat where it burrows itself into the sand. Only part of the organism is exposed and when disturbed it retreats into its burrow. Symbiotic crabs may be found on the body wall.



Name: *Stichopus chloronotus* (maisu)
Order: Aspidochirotida
Family: Stichopodidae
Range: Indo Pacific, South Pacific, Hawaii (rarely)
Size: up to 12 inches

(Photo: Larry G. Madrigal)

This sea cucumber is mostly bumpy and lumpy. It has tubed feet on its flat underside and can be found under large rubble or on sand. This organism feeds on particles of organic matter obtained from bottom sediments. When it is threatened it does not eject Cuvierian tubules but if handled roughly may eject its internal organs. It also has an unusual defense mechanism where it relaxes its body and becomes completely limp.



Name: *Polycheira rufescens*
Order: Apodida
Family: Chiridotidae
Range: Indo and Western Pacific, South Pacific
Size: up to 12 inches

(Photo: Larry G. Madrigal)

These sea cucumbers are found on or under rock rubble. It has a wet, slippery body and has tentacles near its mouth. The tentacles are used to pull its body forward to look for food. Its outer body layer is so thin its internal organs can be seen from the outside. This organism feeds on debris and tiny plants.



Name: *Synapta maculata* (peva)
Order: Apodida
Family: Synaptidae
Range: East Africa, Red Sea; throughout the western Pacific to the Society Islands
Size: up to 10 ft, stretched out

(Photo: Scott Godwin)

Synapta maculata is a common species that is active during the day. It is also called the giant medusan worm. This species moves slowly by rhythmic body wall movements, or peristalsis. As the body wall moves, small hooks called ossicles dig into the substrate allowing the animal to move forward.

Samoans believe this species sucks on people's skin for blood. This is because the ossicles are able to draw blood from a person's skin.

S. maculata can be found in sandy areas of the reef flat and seagrass beds.

Resources

MarineSpecies.org

Answers.com

Mexfish.com

Hawaiiisfishes.com

PetEducation.com

Waikiki Aquarium- University of Hawai'i Mānoa

Charles Darwin Research Station Fact Sheet

