

San Marcial

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Seamounts cannot be seen with the naked eye. They lie below the surface and are only detectable through a depth sounder. The San Marcial seamount, or Bajo Sur de Catalana, the first seamount of our expedition, is found some eight nautical miles south of Isla Santa Catalina, the name given to this island by the Jesuits in the 18th century, or Isla Catalana, as the fishermen know it today.

Like all the other seamounts we explored in the Sea of Cortés, the San Marcial seamount is formed by the remains of an underwater volcano whose basalt column stretches upwards, short of a few meters of the surface. The mount has a rocky center that reaches in its shallowest part around ten meters below water, and is surrounded by a sandy platform that descends gradually towards the Gulf's depths. Because of the gradual slope of this seamount, outside the rocky center the

seafloor is sandy, populated by a benthic fauna typical of sedimentary floors.

The shallow, rocky reef harbors many of the typical elements of shallow coastal communities of Baja California, like starfish and sea cucumbers, and a diverse array of reef fish. Unlike coastal reefs, however, it has an abundance and rich assemblage of soft corals, such as sea fans and black corals. They all feed on organic particles suspended in the water, and rely on intense currents and high productivity in the water column for their development. For example, the sun coral (*Tubastrea*) is seen here in great abundance, while it can only be observed in the coast in rocks protected within holes or crevices.

The typical rock corals of warm, shallow waters are not found here although they are common, for example, less than 150 miles

Close-up view of an arm of the deep water sea star *Tethyaster canaliculatus*.
Photo © Lorenzo Rosenzweig.

south in Cabo Pulmo. These hard corals are internally colonized by dinoflagellates, symbiotic algae inside the polyp that form photosynthetic structures called “zooxanthellae” that contribute organic material to the coral colony’s metabolism. All the corals observed at San Marcial, both in shallow and deep waters, lack zooxanthellae and thus their survival is completely dependent on the organic particles suspended in the water. This suggests that the water around this seamount is rich in nutrients.

Shallow zone

The rocky, shallow zones (less than 30 m deep) bordering the San Marcial seamount are inhabited by colorful species of echinoderms like the purple starfish (*Tamaria* sp.), the blue starfish (*Phataria unifascialis*), red starfish (*Pentaceraster cumingi*), chocolate starfish (*Nidorellia armata*), and yellow starfish *Pharia pyramidatus*. All these species are adapted to living on shallow reefs and feeding in a variety of ways. The flower urchin (*Toxopneustes roseus*), a common species found in the Gulf, together with the brown sea cucumber (*Isostichopus fuscus*), can be seen

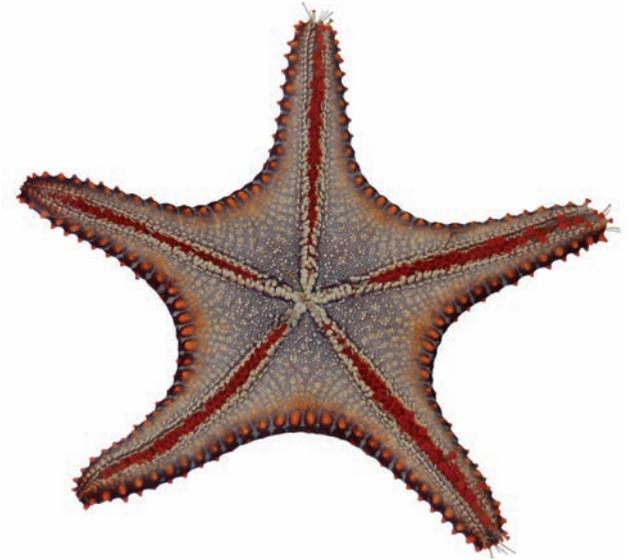
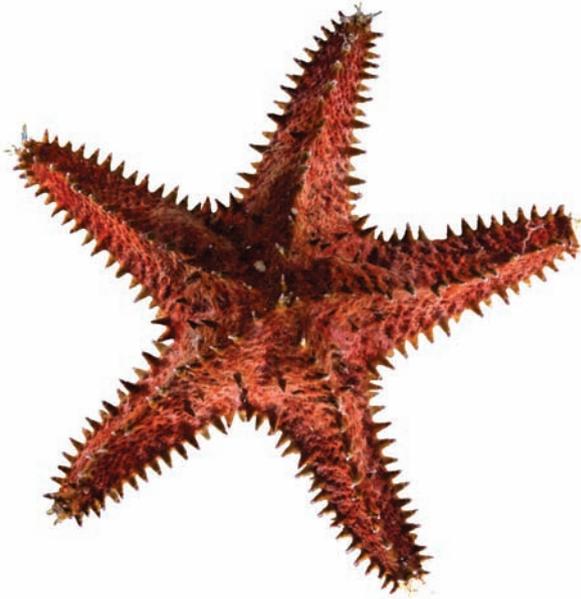
between the rocks, protected from the light that filters in at those depths. The latter, a delicacy in oriental cuisine and some countries in Europe, has been aggressively harvested since the 1980s. The federal government has now protected this species, and it is now the only echinoderm in Mexican waters protected by the International Convention on the Trade of Endangered Species (CITES).

Deep zone

The sandy seafloor surrounding the large stone boulders show a typical sandy bottom assemblage of echinoderms: carnivore starfish like *Tethyaster canaliculatus*, *Luidia phragma*, *Luidia ludwigi ludwigi*, and *Narcissia gracilis*, crawl along the bottom looking for smaller prey such as mollusks and crustaceans. Because of their abundance, large populations of the ophiuran (brittle star) *Ophiolepis crassa* form extensive groups along the seafloor and feed on the detritus that falls down the water column. Close to the boulders, on the transitions from sand to rock, we found species of echinoderms adapted to these habitats: the starfish *Amphiaster insignis* and the basket

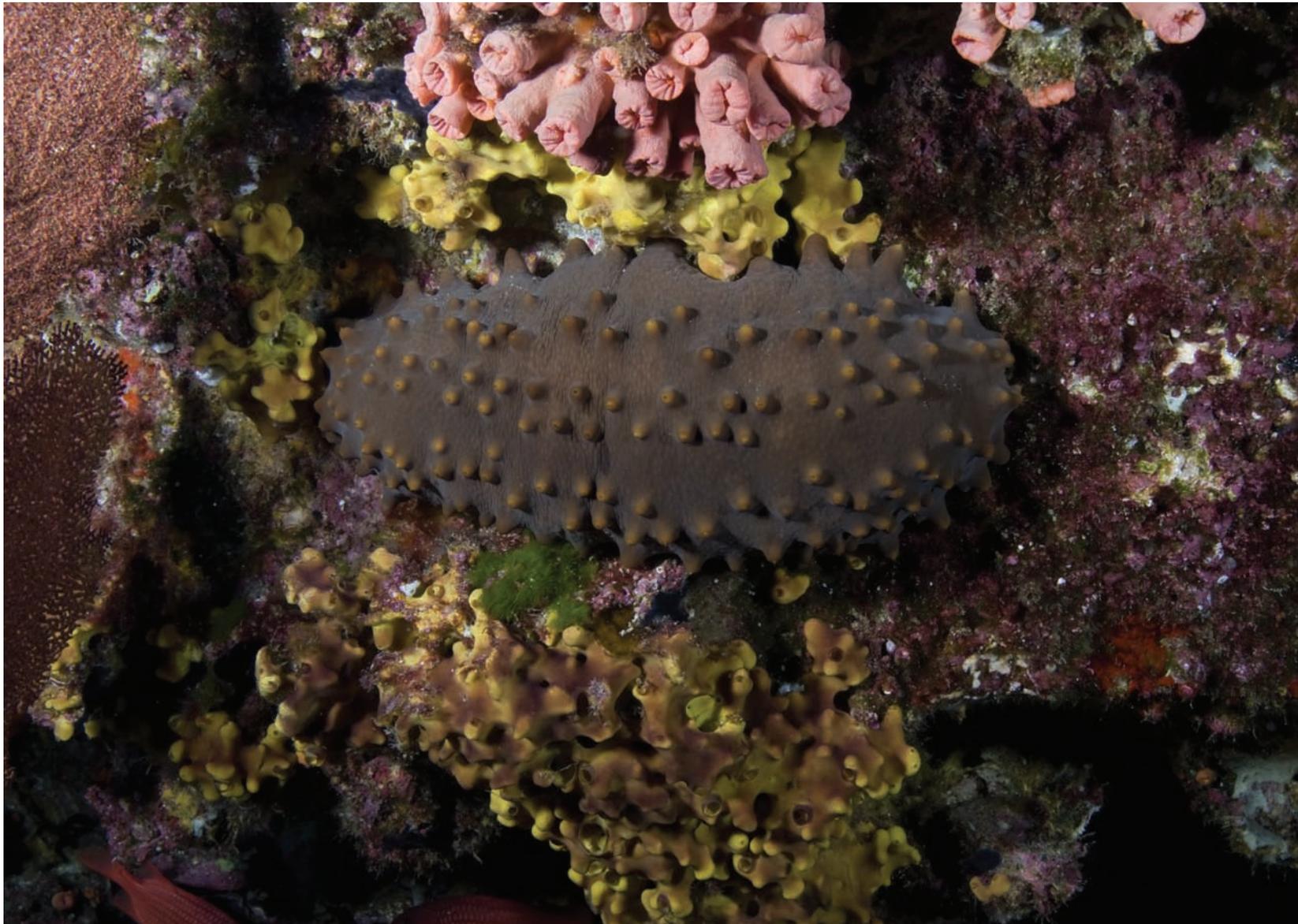
Top row,
left, *Tethyaster canaliculatus*.
Photo © Paula Ezcurra;
center, *Pentaceraster cumingi*.
Photo © Margarita Caso;
right, lower part or actinal zone of
Narcissia gracilis. Photo © Margarita Caso.

Lower row,
left, *Astereopsis espinosus*.
Photo © Carlos Sánchez-Ortiz;
center, *Nidorellia armata*. Photo © Paula Ezcurra;
right lower part or actinal zone of
Pentaceraster cumingi. Photo © Margarita Caso.





Basket star *Astrocaneum spinosum*
Photo © Carlos Sánchez-Ortiz.



Sea cucumber *Isostichopus fuscus* in its native rocky habitat.
Photo © Carlos Sánchez-Ortiz.

star *Astrocaneum spinosum*. The latter is amply distributed from shallow zones (12 m deep) in the Gulf of California to areas under 300 m; it is a carnivorous species that feeds at night on small fish and microcrustaceans, extending its long arms like a large, living cobweb to capture its prey. In the sandy seafloor at the San Marcial seamount, we observed a species of excavating sea urchin *Metalia espatagus*; a rare species, usually very difficult to observe in other parts of the Gulf. Here we saw dozens of its skeletons scattered throughout the seafloor, very possibly victims of the voracious *Cassis* mollusk.

Despite the gradual slope and the predominant presence of sandy seafloors, several fish species were observed. At a depth of 100–120 m we observed various schools of small wrasses (Family Labridae) that experts could not identify. However, several months later ichthyologist and fish taxonomist Benjamin Victor from the Ocean Science Foundation recognized them from our photographs and video. The species was identified as *Halichoeres raesnori*, a rare wrasse that was only recently described from observations and collections at the Gala-

pagos Islands. This finding is of the highest importance since this simple observation extends the distribution range of this species for several thousands of kilometers, and points towards the existence of an important biogeographical connection between the seamounts of the Gulf of California and the Galapagos reefs.

Two subsequent immersions confirmed the sandy-sedimentary nature of this seamount with the identification of several fish species typical of such environments, including several species of snake eels buried in the ocean floor sand with only their heads emerging. We also found tilefishes (*Caulolatilus affinis*) and catalufas (*Pristigynys serrula*) that had dwellings in small burrows and sand pits at the bottom. We saw a few swell sharks (*Cephaloscyllium ventriosum*) and banded guitarfish (*Zapteryx exasperata*), two species typically associated with shallow waters in the Pacific near California. In the Gulf they search for dwellings in deeper waters to find similar temperatures. Lastly, we also observed a number of species belonging to the families Triglidae, Synodontidae, Paralichthyidae and Lophiidae.

At a depth of 25 meters in Bajo San Marcial a new species of fan coral in the genus *Muricea* is seen surrounded by rainbow and señorita wrasses — *Thalassoma lucasanum* and *Halichoeres dispilus*. Photo © Carlos Sánchez-Ortiz.

Pages 40–41:
Aggregation of sea stars *Pentaceraster cumingi* on a sandy bottom in San Dieguito.
Photo © Octavio Aburto-Oropeza.



