

SYMBIOSIS

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"... and the topic for next months underwater photo competition is symbiosis." Budding photographers look at each other in bewilderment. No one dares show their ignorance and ask what is symbiosis. Meaningless conversations continue. Later, in the seclusion of their own homes, faithful Oxford English Dictionaries will reveal all.

Relationships! Isn't that what life is all about? Then why call it symbiosis? Well, symbiotic relationships are special associations. Just like 'ebony and ivory live in perfect harmony', so too are some symbiotic relationships – perfectly harmonious. Both benefit from each other but could, if need be live apart.



That rings a bell. A clown fish and its anemone host is a symbiotic relationship. Anemones have stinging cells that ensure protection from predators. The clownfish rub their bodies with the anemone's mucus. As a result the anemone does not sting the clownfish. The clownfish benefits from shelter provided by the anemone while the anemone benefits from morsels the clownfish may have leave behind. Now I know of one symbiotic relationship but this is not a clownfish photo competition. What of other

symbiotic relationships?

I delve into the subject and find there are 3 different types of symbiosis: - mutualism, commensalism and parasitism. Big words for a little person like me. It all boils down to down either both organisms benefiting from each other; only one benefiting and the other not harmed; or one benefiting at the expense of each other. The choice of photographic subject is suddenly wide open.





Coral has a mutual symbiotic relationship with unicellular green algae living within. Coral polyps are animals that feed on plankton and extract calcium from the water to build their skeletons. They cannot photosynthesize but need oxygen in order to grow. The algae meanwhile, can photosynthesize and in so doing, produces the oxygen the polyps need. A great relationship, but would the judges recognize the symbiosis without being able to see the unicellular algae. I think not.



What about damselfish and coral? This is an example of mutualism and a visible relationship, even if it is almost a triad of relationships. Damsels release ammonia in their excreta. This serves as a fertilizer for those same unicellular algae. By default, the more active algae encourage the coral to grow faster. Damsels benefit from the protection gained by the hard coral host while both algae and ultimately the coral, grow prolifically. Still a little too subtle for the judges.

A commensal relationship is seen with whip coral gobies and black-coral sea whips.

Whip coral gobies are a challenge to find and to photograph. The gobies enjoy a roller coaster ride on the whips swaying in currents. This ensures they have wider access to passing plankton food. The gobies assume the same colouration as

the whip corals. This disguise allows the gobies to gain protection from the coral whip. The whip coral has no direct benefit.



The disguise technique used by anemone shrimps is that of transparency. They live on their host anemone confident that they cannot be seen. The shrimps snack on food regurgitated by the anemone. Often they feed on the anemone's mucus or eat a part of their host to collect colour pigments used to enhance their



camouflage. The anemone is not bothered by the shrimp's presence. The shrimps have both the cake and eat it.



Camouflage, as a means of disguise, is not only used by anemone shrimps. Inside the mantle of a spanish dancer lives a pair of emperor shrimps, yet another commensal relationship. The emperor shrimp's disguise is perfect for ensuring their safety. They too have adopted the same colouration as their host. Similarly another species of emperor shrimp are found living in harmony with sea cucumbers. These minute shrimps can best be seen at night, when under the cover of darkness, they feel safe to roam the sea cucumbers body in search of food. Neither the spanish dancers nor the sea cucumbers gain from their boarders but the shrimps have faith in the protection their mobile homes provide.

Occasionally mutual symbiotic relationships engage camouflage techniques.

Hermit crabs use drastic measures to protect against their enemies. Not only do they find a hard shell to live in, but make the shell a hostile environment. Hermits painstakingly decorate their shells with anemones that have stinging nematocysts. The hermit feels



protected under this poisonous canopy while the anemone gets a free ride and a greater opportunity to capture food. Some hermits become so attached to their home decorators that they take them with when they outgrow their shells. Once a new shell is found the hermit strokes the anemone with its feelers encouraging it to move house.



Another hostile environment is created by the stinging nematocysts on the tentacles of a jellyfish. Medusa



fish, however, swim amongst the tentacles, immune to the stings. These silvery fish look very appetizing to other fish. The predator becomes the prey when the voracious jellyfish immobilize or kill with their stings. Both Medusa fish and jellyfish make a meal out of this attack. A mutual relationship is formed for the purpose of food.

Cleaning stations are always a hive of underwater activity. Fish approach these 'stations' exposing their gills and opening their mouths to allow cleaner shrimps or wrasse to nibble off any decaying matter. The fish being cleaned is at the mercy of the cleaners. During this time it is motionless and exposed, possible easy prey. The cleaners themselves are at risk of being accidentally eaten during the process. Mutual symbiosis is tested full strength.



Shark sucker fish latch onto the largest of sharks (or even a passing ship) in order to get a free ride to a better meal. An association of pure laziness. As the shark stops to feed, the suckerfish releases its grip snacking on the tidbits from the sharks' attack. The hitchhikers do not bother the sharks.

Some species of isopods are carnivorous scavengers. Attaching themselves onto an innocent fish, they suck out the life.





Isopods are not always parasitic, some feed only on the slime that covers a fish. No matter the type of isopod, one is always reminded of Steven Spielberg movie character.

The quaintest example of a harmonious relationship has to be that of the blind shrimp and his housemate, the goby. Both share a sandy hole. As the blind shrimp spends the day cleaning out the hole he is exposed to dangers of the world outside the entrance of the hole. Instead of a white cane, the shrimp places a feeler on the goby. Thus the shrimp can detect any sudden movement warning of danger. Here the goby acts as the guide dog and in return receives regular home maintenance.



My dilemma is deciding which photo best portrays symbiosis. Should I leave the clown fish photos for those that cannot think of better relationships, or should I enter it because it is a stunning picture? I have a month to think about it.

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