

Fun Fact Sheet - Underwater Symbiosis

1. Symbiosis, meaning “living together”, is a biological interaction between two organisms where at least one of the organisms benefit from the relationship (Zandonella 2016).
2. The first symbiotic relationship was discovered in 1879 between trees and lichen by Dr. Anton de Bary, and the term symbiosis was officially coined (de Bary 1879).
3. There are three different kinds of symbiosis: mutualism (both organisms benefit), commensalism (one organism benefits with little/no effect on the other), and parasitism (one organism benefits to the detriment of the other) (Zandonella 2016).
4. Corals have a mutualistic symbiotic relationship with zooxanthellae. Zooxanthellae are microscopic algae that live inside the corals polyps and provide the coral with 95% of its food. In turn the coral provides a protected home in which the zooxanthellae live (Barnes 1987).
5. The symbiotic relationship between coral and algae began more than 210 million years ago (Sigman 2015).
6. Zooxanthellae help give corals their beautiful colours. Different species of coral contain different kinds of zooxanthellae, which creates the many different colours on a coral reef (Barnes and Hughes 1999).
7. Corals and algae survive symbiotically within a certain temperature range. When oceans warm above a certain temperature, the relationship will be lost. Temperature-stressed coral have no choice but to expel the algae from their tissues, or the algae may choose to leave the stressed-out coral. This is called coral bleaching (Barnes and Hughes 1999).
8. A great example of mutualistic symbiosis in the Cayman reefs is the relationship between the giant anemone and Pederson’s cleaning shrimp. The tiny shrimp are immune to the sting and thereby protected from predators by living within the anemone’s tentacles. In turn, the anemone gets a thorough cleaning of parasites and removal of any nearby waste (Wood 2007).
9. A common commensal symbiotic relationship seen in the Cayman Islands is the nuclear feeding between an apex predator and another consumer, such as a stingray and a bar jack, a shark and a remora, or an eel and a Spanish hogfish. Nuclear feeding is when an apex predator does the hunting and the following consumer picks up the leftovers. At the same time the consumer is also protected from other predators by traveling with their companion (Zandonella 2016).
10. A parasitic symbiotic relationship is seen on the reef when isopods attach themselves to various reef fishes. These isopods occasionally eat the tongue of its host’s mouth and lives inside the host fishes’ mouth, acting as a replacement tongue for the remainder of its life (Karsten 2015).