Symbiosis - Perfect Match or Fatal Attraction?

Plants, Animals, Fungi, and even Bacteria regularly form relationships with one another that may be beneficial or harmful. Here are some of the most amazing symbiotic relationships known in the realm of Biology.

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Symbiosis is the act of two or more different species interacting with one another in a relationship.

These relationships are not always beneficial.

There are actually three different types of Symbiosis:

- **Mutualism -** Both creatures benefit
- **Commensalism -** Only one creature benefits, but the other isn't harmed
- **Parasitism -** Definitely an uneven trade, where one creature may end up dead.

Mutualism

Mutualism happens when different organisms form a biological interaction in which both benefit. In other words, both species involved gets something out of the deal, whether it be food, a place to live or protection.

The most common form of mutualistic relationships are between flowering plants and animal pollinators.

Pollination

Flowering plants have a problem – they can't move. Because of this, they have a hard time reproducing. Unless a plant has evolved a different means of exchanging pollen, they need animals to aid them in finding a mate.

These plants produce flowers that contain sweet nectar that is appealing to many types of insects, birds and even mammals. The plants offer up a free meal and in return, the pollinators willingly (and unknowingly) pick up some pollen from the stamen (male portion) of the flower.

When the pollinator reaches another flower on a different or even the same plant, the pollen may rub off into the pistil (female portion). This leads to fertilization and eventually reproduction.

Human Beings and Bacteria

Did you know that you have ten times more bacterial cells in your body than human ones? Well, its true, and we couldn't live without them!

In our gut, there are many different kinds of bacteria that aid us in the digestion process. These bacteria break down substances that our digestive system can't. We provide them with an endless source of energy and in return they help us digest our food properly. In addition, these bacteria also help us establish a healthy immune system.

Zooxanthellae and Coral

Another amazing example of mutualism is the relationship between zooxanthellae, which are microscopic and photosynthetic protists and coral.

Since zooxanthellae are photosynthetic they make sugar using the energy in sunlight. These zooxanthellae actually are found living in the tissues of some corals. The coral provide shelter and nutrients to the zooxanthellae and, in return, the zooxanthellae provide sugars.

Clown Fish and Sea Anemones
"Finding Nemo" is a family favorite that illustrates one of the most interesting mutualistic relationships in all of Biology.
Sea Anemones are carnivores that trap and disable prey with stinging harpoons on their tentacles. Clown fish are immune to the toxins of the anemones and actually reside within their deadly tentacles.

The anemone provides shelter and even food for the clown fish. The clown fish are protected by the tentacles from predators and gain a meal or two by eating the anemone's dead tentacles and feasting on morsels left over by the anemone.

In return, the clown fish helps attract prey for the anemone to eat and provide a fertilizing feces that helps nourish the anemone.

Commensalism
Commensalism is a biological relationship in which one organism benefits in some way and the other is harmlessly unaffected.

Grazing Animals and Birds
Have you ever watched the Discovery Channel or National Geographic Channel and saw a large ox or a water buffalo walking through a field. Chances are that some of those oxes and buffalo had birdsperched on their backs.
The reason these birds do this, aside from looking cool, is because the large grazing animals kick up lots of flying insects in the process.

These insects fly away and scatter. In the frenzy, the bird has a smorgasbord of insects that it can literally pluck out of the sky! As you can see, the bird benefits, while the animal grazer could care less.

Whales and Barnacles
Whales and even sea turtles are regularly seen with barnacles on parts of their bodies. These barnacles are actually crustaceans that have anchored themselves to the underbelly of whales and the shells of turtles.
The reason barnacles do this is because both whales and turtles migrate incredibly long distances. This supplies the barnacles with an endless supply of new, fresh food. Sometimes the barnacles even get some leftovers from the animal they are attached to. These little guys can even grow on boat bottems.

Parasitism
Parasitism is a biological relationship in which on organism gains or benefits while the other one is harmed in some way or even killed.

Humans (Mammals) and Ticks
Anyone who has ever hiked, fished or been outside for a long period of time for that matter, has probably found a tick on them before.
The tick attaches to our skin and makes a puncture where it feeds on our blood. The tick becomes engorged and is therefore benefited. On the other hand, us mammals have the delight of having a tick feeding on us and the chance of getting an infection or disease like Lyme's – clearly not beneficial.

Parasitic Worms and Grasshoppers
There is a certain type of worm that invades grasshoppers. These worms grow and mature inside the body cavity of the host grasshopper.

When they reach maturity, the worms secrete a type of protein that interacts with and eventually takes over the grasshopper's central nervous system.

Eventually, the grasshopper loses control and jumps into a body of water, killing itself.

At this point, the parasitic worms leave the grasshopper via the abdomen and start the reproductive portion of their life-cycle which must happen in the water.

For more info on this relationship, check out this article on the National Geographic website.
Here is a video of a similar relationship with ants and another video with crickets. *Warning: Kind of gross!*

If you can stomach more, here are more videos with snails and caterpillars.

These interesting relationships are very common in the biological spectrum and even help shape the food chain. What would happen in some of these relationships were disrupted? Think about it!