FIS2005 – http://www.mdpi.org/fis2005/

Endosymbiotic Relationship in Corals

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Abstract: All living forms are somehow equipped with some sort of survival strategies. Each knows what kind of food it needs and what means to avoid or defend itself against any predators. Yet, because of this symbiotic relationship, some creatures allow other species, which normally would serve as a meal, to carry out certain tasks in a form of symbiotic co-operation in which this community of species both produce and benefit the whole community. An example of this beneficial symbiosis are coral animals and their endosymbionts; we are able to see that neither population could exist without the other, and hence the size of each is determined by that of the other. It would also make no sense to ask whether the coral or the endosymbiont came first, but rather both were able to go into an evolutionary process, a form of metasystem transition that shaped this co-operation and helped to gain a competitive advantage. According to evolution for both to survive they had to evolve independently of each other as constituents, yet appeared at exactly the same time and with precisely the right functions to carry out their own tasks. In a way that they went into a downward causation and self-organization so that they were able to co-exist and contribute to benefit the partnership as a whole. At the same time, each of its components was able to determine the appearance and behavior of this high level of organization. We could also ask, how could two completely different species evolve separately from distinct ancestors, yet depend on each other to exist? The idea that this relationship evolved stretches the imagination beyond the breaking point. Both production and decomposition processes on coral reefs are exquisitely tied to their structural organization at all levels (in the physiological, physiographic, and community senses, emphasizing the holistic principles of community stability). The energetic pools within a reef seem so large, but considering that they are spread over huge areas around the world attributes a relativistic momentum to this abundance. At the very base of this abundance are hermatypic corals living in a symbiotic relationship with endosymbiotic dinoflagellates. Altogether, the "economic" benefit of this partnership can be summarized by an increased competitive advantage for space on the reef, resource partitioning and due to the carbonate skeleton, some mechanical protection. On the other hand, this partnership restricts the physiological tolerance to an optimum value (in terms of abiotic conditions such as temperature, light, sedimentation, etc.). Within limits, such narrowed ranges of tolerance highlight the stenobiotic environmental conditions that prevailed over long times in establishing the evolutionary relationship necessary for their survival.