Coral Spawning: 'Romance' Under a Starlit Sky

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Participating in a night dive over a coral reef during the height of the summer is an ideal way to spend an evening in the midst of one of the hottest months of the year. But once a year, for a very brief period of time, the coral reefs of the Caribbean become truly magical. On the eighth day following August's full moon, many species of coral will spawn. This phenomenon, which was only discovered in 1982 on Australia's Great Barrier Reef, has been witnessed by very few divers and scientists. Matt Patterson, a Park Ecologist for Biscayne National Park, describes a coral spawning event he experienced in the Dry Tortugas as "an upside-down snowstorm of iridescent orange, white and red egg sacs and sperm floating toward the surface for a chance rendezvous."

Coral researchers have now been able to document that most large, reef-building boulder corals use this strategy of the precise and simultaneous release of sperm and eggs. Although corals reproduce by many other means, mass spawnings are probably the most unusual, and certainly the most exciting method, to observe. Biologists believe that corals developed this cooperative approach for a number of reasons. A mass spawning event allows all of the colonies of one species to mix genetically and to maximize the chance for fertilization. Many fish take advantage of the spawning event to feed unmercifully on the released sperm and eggs. However, during a spawning event, there is such an incredible amount of food available that it is believed that the predators become overwhelmed with more food than they could ever consume.

No one really understands what factors contribute to triggering a spawning event or how corals synchronize to spawn all at the same time. Nevertheless, because spawning events can be effectively predicted from closely observing the lunar phase, this is undoubtedly an important influence. Scientists also believe that water temperature, tidal fluctuations, and length of the daylight period may contribute to corals spawning on cue.

Most of the corals that reproduce by mass spawning are hermaphrodites. Hermaphroditic corals possess both sperm and egg in each individual polyp. When a hermaphroditic coral begins to spawn, each polyp releases both sperm and egg in a bundle that resembles a BB or a small seed. Once this fragile bundle is released, it floats freely, slowly traveling toward the surface. Upon reaching the surface, it easily ruptures and breaks apart, where it adds its gametes to the genetic "soup." Although most mass spawning corals are hermaphroditic, a lesser number of mass spawners are gonochronic. Unlike their hermaphroditic cousins, gonochronic corals release either eggs or sperm, but not both. Gonochronic corals depend on a neighboring colony of the opposite sex to complete the fertilization process.

Every year, some coral colonies die from either natural or human influences. Natural impacts affecting health of coral reefs include occasional hurricanes, extreme cold or warm seawater events, algal blooms, and other reef-dwelling animals that feed on the tissues of corals. Human influences having an impact coral reef health can be very diverse, but include anchoring damage, boat groundings, and coastal runoff that affects water quality. The successful spawning, fertilization, and eventual settlement of a coral that begins life as a single polyp are all necessary to maintain and enhance coral reefs.

Although the spawning period may last only for a few hours each year, the event is of incredible importance to the viability of coral reefs around the world. Future generations of corals are dependent on the success of these spawning events. Tens, or perhaps hundreds of years ago, these large parent corals also began life somewhere in warm ocean waters, under the light of a setting August moon. Their legacy will be found gently floating to the surface each summer, in a colorful "upside-down snowstorm," for a chance to colonize the reefs of tomorrow.

A colony of Elkhorn coral, (Acropora palmata), is one of the large reef-building corals in the Florida Keys that spawns each year after the full moon in August. (Photo by John Halas, FKNMS)

This mature colony of boulder coral, Montastrea cavernosa), began life as a single polyp that reproduced asexually to form an entire colony. The original polyp resulted from sexual reproduction when an egg and sperm united in the water column after a mass spawning event in boulder corals. (Photo courtesy of FKNMS)

Close-up of Boulder coral (Montastrea cavernosa) polyps. Hermaphroditic corals simultaneously release both sperm and eggs from their polyps into the water column where fertilization takes place. (Photo by Paige Gill, FKNMS)