

● Mass spawning of acroporids

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Reef building scleractinian corals propagate and maintain their populations, in part, through sexual reproduction. Passive dispersal of the gametes, fertilization in the water column, and dispersal of planktonic larvae play a major role in genetic exchange among reefs. Coral spawning patterns were relatively unknown until the discovery, 20 years ago, of the peculiar spawning behavior – simultaneous mass coral spawning – of corals on the Great Barrier Reef. Before that time most researchers believed brooding and the release of live larvae into the water column was the most common mode of coral reproduction in the Pacific Ocean. Reports of simultaneous mass coral spawning on the Great Barrier Reef attracted the attention of the world. Over 45 coral species spawned their gametes synchronously, at night, following the full moon in October or November, corresponding to early summer in the southern hemisphere. Following this remarkable discovery coral spawning patterns were examined at other localities around the world. However, such highly synchronous behavior has not been observed in other localities. The pattern of coral spawning in Japan has been studied for over 15 years.

Around Okinawa, the spawning patterns of about 100 coral species are known. The spawning period is long, compared with the Great Barrier Reef, extending from May to September, and some species have protracted spawning patterns extending over two to three months. Thus spawning synchrony is lower than on the Great Barrier Reef. Nevertheless, mass spawning by genus *Acropora*, which is the main constituent of the coral communities on the southern reefs, is still highly synchronized both within and between species and the number of participants is quite large compared to other genera. Yet, it is still difficult to predict the exact date of mass spawning; it varies considerably, some years it occurs a few days before full moon and in other years 7-8 days after full moon. It is speculated that some cues, other than the lunar cycle, affects the timing of coral spawning.

Spawning information on high latitude coral communities has also accumulated over the last 15 years. Tabulate coral *Acropora hyacinthus*, which are widely distributed from Yaeyama Islands in the south to mainland Japan, spawns in April to May in the Yaeyama region, May to June around Okinawa, and

July to August in Kushimoto, Kii Peninsula (Misaki 2001), in the north (Photo. 1). These spawning patterns appear to follow sea surface temperatures that progressively increase toward the north with the oncoming summer. Interestingly, spawning of this species has been observed in August in the Ogasawara Islands (Inaba 2003), although its latitude is almost the same as Okinawa.

The process of sexual reproduction has recently gained considerable attention as a means of coral community recovery following such destructive affects as terrestrial soil runoff, mass bleaching events, and crown-of-thorns starfish (*Acanthaster planci*) outbreaks. There are basically two ways to restore coral communities via sexual reproduction; first, to utilize recruits and transplant them to damaged localities, and second, to release a large number of competent larvae near damaged coral communities. There has been considerable attention on *Acropora* corals recently because these corals are very vulnerable and susceptible to disturbance, but also because of their fecundity and rapid growth rates renders them potential target species for restoration projects.

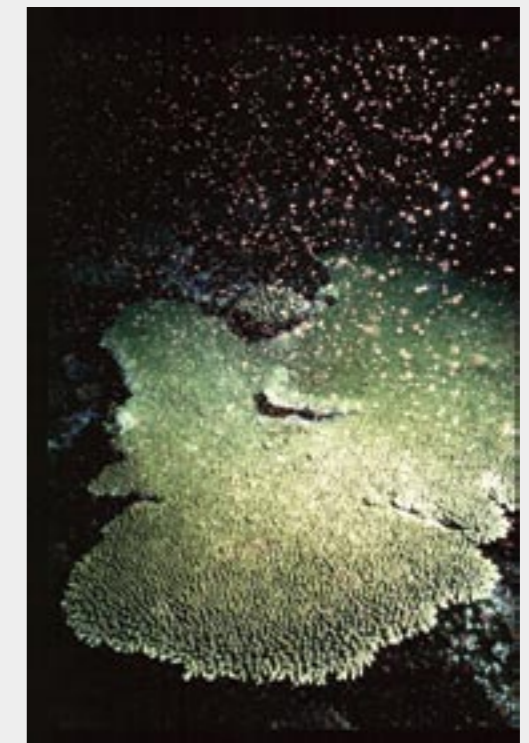


Photo. 1. Spawning of *Acropora hyacinthus*. (Photo taken by K. Shimoike)
Each particle seen in the photograph is not one egg but an egg-sperm bundle, which contains about ten eggs and millions of sperm. Each bundle is approximately 1 mm.