Coral Spawning

by Alex Tyrell

As we approached the large Brain Coral, I checked the time on my dive computer. It had just turned 7pm. I looked up as I heard muffled shouting coming through my buddy, Shin's, regulator, accompanied by wild arm movements! Looking closer in the direction he was gesturing, I could see small pink spheres slowly starting to emerge from the coral, floating gently up into the water column and then gradually disappearing into the watery darkness. A small school of Yellow-Backed Fusiliers (Caesio xanthonota) passed over the coral head, feeding on the erupting eggs, while Shin ascended to get the word out to the other divers that it was finally happening. I had seen this amazing event on documentaries and earlier that day had even been looking at Alex Mustard's great backlit-photo from Grand Cayman for inspiration. But now I was seeing it with my own eyes – Coral Spawning. I had to act quickly, as I knew my time was limited. I took a few test shots, quickly checking the LCD for blown-out highlights, and then readjusted my strobe power and angle for the next shot. I had less than 10 minutes before it was all over and had to work around the other divers, as the main reason for being there was to actually catch the coral gametes, cross fertilize and cultivate them.

Coral spawning has been studied for a while now, making it a fairly predictable event. But that information is very site specific and cannot be transferred between different areas. Here on Koh Tao it can be narrowed down to about possible 5 days of the year. It was with this in mind that a collaboration of Eco-Divers from New Heaven Reef Conservation Project, Save Koh Tao & Eco Koh Tao, commenced the third year of culturing coral larvae from the annual mass spawning of corals around Koh Tao, in the Gulf of Thailand.

The aim was to raise coral colonies with a unique genetic design for their reef restoration projects. For three nights at the beginning of March, divers were out on the reefs of Chalok Baan Khao in the south of the island, waiting for the corals to spawn. Eggs had been sighted in the target colonies (Symphillia & Goniastrea), so it was just a matter of being there when it all happened. Spawning events are usually witnessed a few

Brain coral spawning as divers approach from behind: F/8 – 1/125th – ISO 500 @ 14mm. Nikon D7000, Subal ND7000, Tokina 10-17mm behind Zen mini Dome, Twin Sea & Sea YS-250 Pro's (A. Tyrell)

nights after the full moon in spring. This year the full moon was on February 26th, so the observations started on 1st March. It is difficult to pick the exact night the corals will spawn and, as it only occurs once a year, you don't want to miss it! Therefore, it's best to play it safe and go early, rather than late.

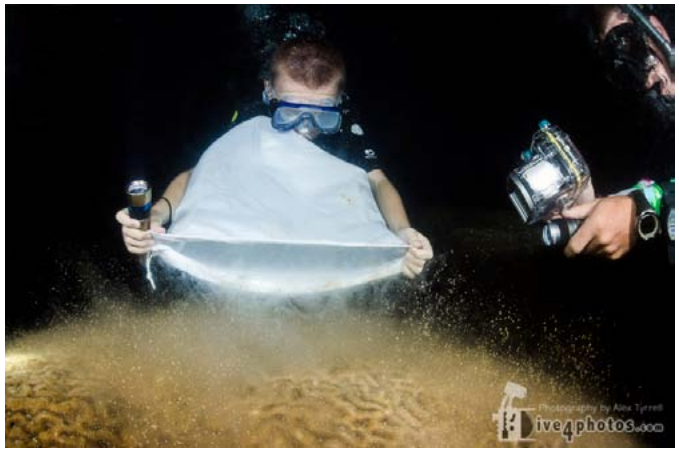
The first potential night of spawning didn't see any action. The following day is where I came into the equation, when on the dive boat I saw Nathan Cook from Eco Koh Tao, who brought me up to speed with the progress and said he was due out again that night. It was too late for me to get a space on the boat, so I asked Nathan to let me know if the spawning didn't happen, so I could come along the next evening. I got the call from Nathan the following morning saying the corals didn't spawn, but were looking very close to it, so they were hoping for it to go off that night. A few Facebook messages to Shin at New Heaven Dive School and my space on the boat had been

arranged.

When I arrived at about 5.30 that evening the whole operation was being coordinated by Chad Scott, who is focusing on this project as part of his Masters Thesis. New Heaven Dive School owner, Dev, was also heavily involved with the operations. The site set-up is an important part of the process considering the whole operation and the spawning itself happens at night. Colonies of target species were marked at 4 different locations throughout the bay. Colonies housed predominantly one or the other species of coral, but some areas had a mixture of both target species. Buoys marked the separate sites, with lines running underwater to mark the different target colonies within that site. The four sites were also marked with lights that flashed once the sun was down for easy location.

Once the sites were marked, pairs of divers were sent into the water shortly after sunset to monitor the colonies and alert the rest of the team once the corals started showing signs that they were about to spawn. When corals are preparing to release eggs, the bundles of eggs and sperm appear on the mouth of the corallite. This is called 'setting'. In some coral colonies, like the Goniastrea, this is far more obvious than in other species, like Symphillia. The Symphillia seems to change its appearance when ready to spawn, with the tissue surrounding the corallite swelling up more than it would do on a normal night. Historically, the Symphillia colonies (in Chalok Ban Khao) have spawned approximately an hour before the other massive species (e.g. Goniastrea & Platygyra) and so they expected to see them 'set' before the other species this year.

The divers were armed with flashlights and small cone-shaped plankton nets, modified to have



10-year old Kailash Cook catching coral eggs: F/8 – 1/125th – ISO 500 @ 10mm. Nikon D7000, Subal ND7000, Tokina 10-17mm behind Zen mini Dome, Twin Sea & Sea YS-250 Pro's (A. Tyrell)

the top-third of a water bottle at the end of the net. Coral eggs are essentially buoyant, so the aim is for the net to be held or placed over a colony as it spawns and catch as many bundles of eggs as possible. The Goniastrea tend to be buoyant and are relatively easy to catch. The Symphillia are much smaller and far less buoyant, making this method of collection less effective for that specific species.

That evening it was a bit choppy and the bay of Chalok Baan Khao is very shallow. These factors were not ideal for the collection of the coral eggs and were going to make taking photos a bit more of a challenge too. The Symphillia, as expected, went off first, releasing plumes of eggs and sperm at intervals of around 30 seconds to 1 minute. The whole event does not last long, maybe 10 minutes, and if you miss it, then you've missed it and have a long wait to try again!

That afternoon I had been debating with

Coral Spawn Macro: F/2.8 – 1/100th - ISO 100 – E.V. Comp +1/3 (No Flash). Canon G11 in OEM housing with Dive Light. (Shin Arunrugstichai)

myself whether to set up for wide-angle or macro. I eventually decided to go wide and set up with the Tokina 10-17mm on my D7000 behind a Zen mini dome with Subal housing. I used twin Sea & Sea YS-250 Pros and a Sola 600 Photo focus light. I also

set up a Canon S100 in FIX housing with Inon Z240's and Nightsea Flurorescent filters, hoping to capture some fluro-images of the spawning. I had previously shot an Anemone spawning and the spawn fluroresced, so anticipated something similar with coral eggs. Needless to say I was a bit loaded on the dive, so soon found a suitable area to leave the fluro set-up until I wanted to use it later in the dive, letting me concentrate on my DSLR.

Photographing the actual spawning wasn't too technical from a lighting point of view. There is no ambient light to consider and no sun-angles to think about. Lighting the scene is done solely by the strobes, which were positioned well behind the dome to minimise backscatter. The hardest part was framing and composition, as my photography was second in line to the science. I therefore had to work around the other divers and attempt to compose shots with quite a few people around one coral colony, as well as trying to keep out of the way! In preparation for this I had set the ISO to 400 enabling me shoot with a slightly lower strobe power for quicker recycling, letting me nip in and out, getting shots off in bursts. I soon upped this to ISO 500 though, for better exposure at f/8 that I wanted to maintain depth-of-field.

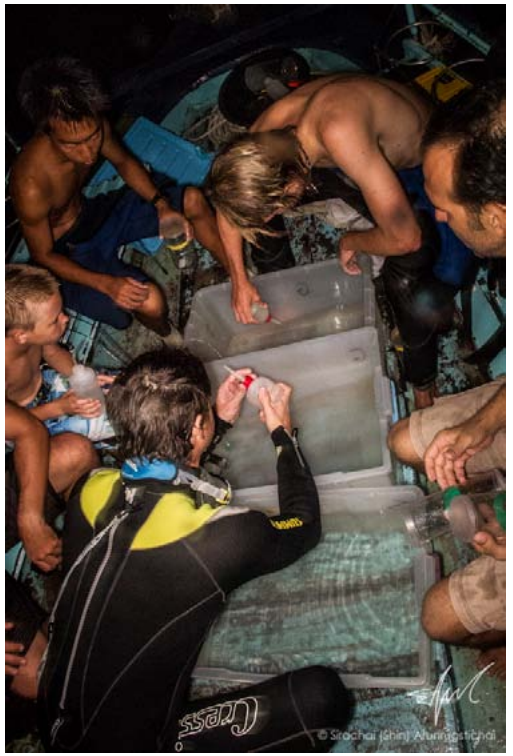
It was all over too quickly for the eggs. To my delight the coral spawn did fluroresce and even though the quality of the images isn't quite as good as with my DSLR, I am happy with them. Maybe next year the fluro-filters will go on the DSLR rig.

Back on the boat after the 2-hour dive, the eggs and sperm from different jars (from different colonies) were added to separate buckets to allow for cross fertilisation. This occurred at approximately 9pm, after which time the buckets were transferred to shore. Battery powered aerators were used to oxygenate the water. Spray bottles were used to break up the bundles of eggs coalescing at the surface. This simulates wave action and what would naturally occur in the ocean. During this time it is also important to wash the sides of the buckets gently with water to ensure the eggs don't get caught out of water on the sides of

the spawning of the Symphillia Brain Coral, and even with the surge and waves, eggs had been caught successfully (as well as a few images on the memory card). Surprisingly though, the other Symphillia colonies nearby did not appear to have spawned. Corals are hermaphroditic, but cannot self fertilise. To create fertilised eggs you need eggs and sperm from different colonies. So although eggs were captured from this colony, there were no other eggs to cross-fertilise and they were therefore released.

By 7.30pm a number of Goniastrea colonies began to 'set'. These colonies appeared to be synchronizing their release and as such the divers were able to catch eggs and sperm from a number of different colonies across the reef. Once eggs were 'caught' in the nets, the top of the attached bottle cap was opened into a submerged jar, whereby the buoyant gametes float up into the jar for transportation. While the eggs are visible, the sperm is harder to see with the naked eye. But it is assumed that it is collected in the water at the same time as the eggs are transferred to the jar.

The duration of spawning for the Goniastrea colonies was a bit quicker than the Symphillia. I used the Fluro set-up this time and managed to get a few shots in between Shin catching



Buckets on the Boat: F/4 – 1/15th – ISO 400 – E.V. Comp -2 (Flash used). Canon G11 in OEM housing with Dive Light (Shin Arunrugstichai)

Coral Eggs in a Jar: F/2.8 – 1/200th - ISO 200 – E.V. Comp -2 (No Flash). Canon G11 in OEM housing with Dive Light (Shin Arunrugstichai)

he buckets. The eggs were left in the buckets for about 90 minutes before being transferred into semi-permanent holding tanks at the dive school. Within this time the eggs should be fertilised. The holding tanks are made of cement and had been washed down and cured before use. They had previously held juvenile Turtles in rehabilitation, so their exposure to seawater had already been assured prior to introduction of the coral eggs. The water contains aerators and is changed every day, however it is important to have a system that allows for the removal of water while not removing any larvae.

Within approximately 48 hours the larvae will develop cilia and start 'swimming'. At this stage the panula larvae is circular in shape, and as a result, tend to swim in circles. By approximately 72-hours they will develop into more of a pear-shape and be able to actively move in a desired direction. Within approximately 4-5 days they will begin swimming down searching for suitable substrate on which to settle. As the tanks are smooth, they are not an ideal settlement location for the larvae. So 'cement buttons', which have 'cured' in the ocean, have been placed inside the tanks. The larvae more readily choose these when it's time to settle.

I feel very lucky to have witnessed this natural spectacle, even more so seeing that I had only been in the water a matter of minutes before the spawning started! I would even go so far as feeling a little bit guilty, as the other divers were on their third night of diving and I just jumped in and it happened. Everyone was so happy to have witnessed this amazing event and capture the gametes in the process, that I don't think they cared how many dives it took to see it.

Text by Alex Tyrrell
& Nathan Cook
Photos by Alex Tyrrell
& Shin Arunrugstichai

Alex Tyrrell is the owner of Dive4Photos, who provide underwater photography training through Crystal Dive Resort in Koh Tao, Thailand.

www.dive4photos.com

For further information on the various marine conservation related projects and courses available on Koh Tao, please see the following links:

www.ecokohtao.com
www.newheavendiveschool.com
www.marineconservationkohtao.com