

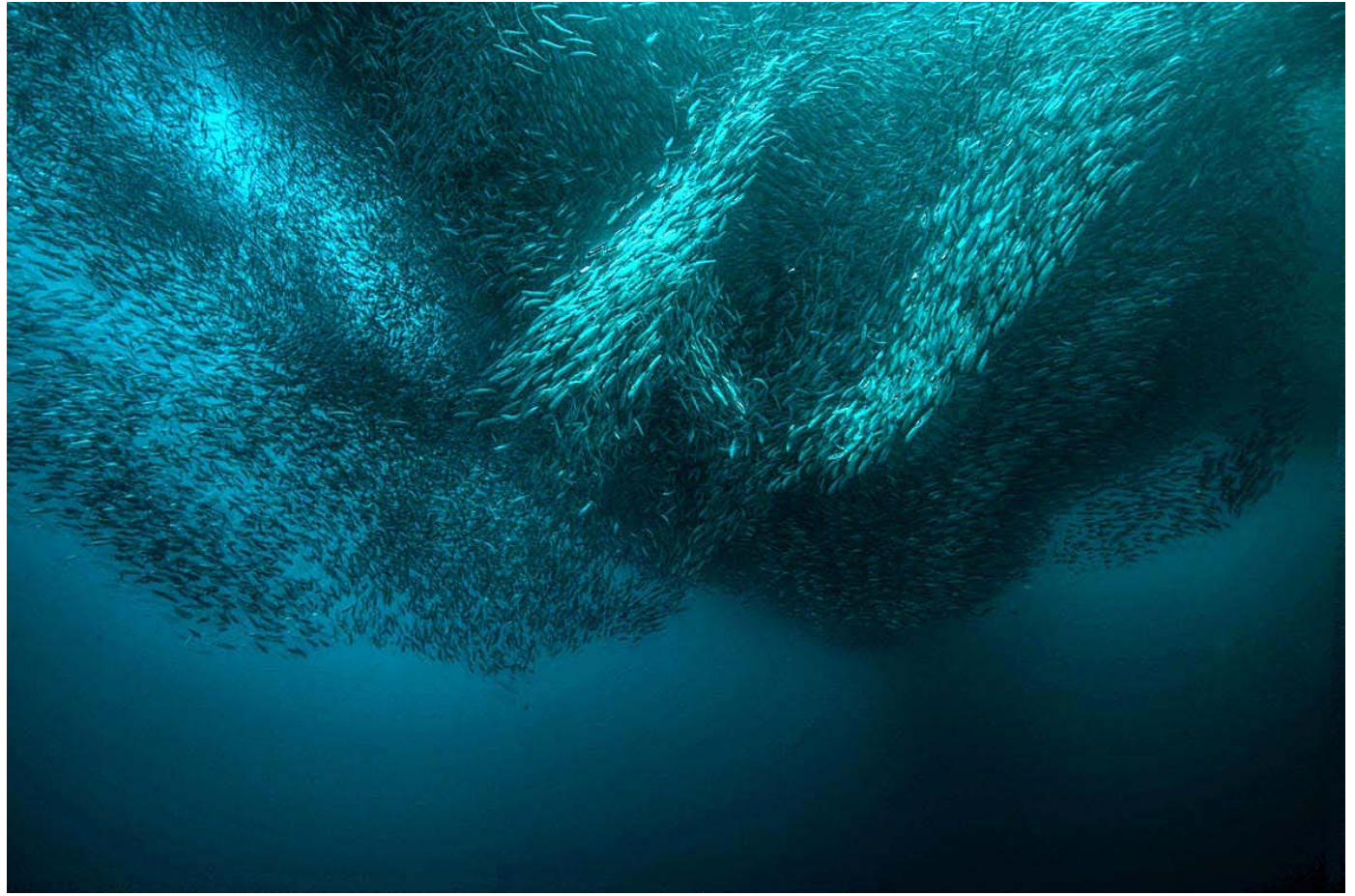
# Great Moalboal Sardine School

by Klaus Stiefel

Moalboal in the south of Cebu is your typical charming little Philippine country town with a church, a buzzing fruit and fish market, a statue of national hero Dr. Jose Rizal with the usual book in his hands, and a hand full of pawn shops. From the chicken-barbecue street-corner eateries you can watch the city life involving market-goers of all ages, groups of giggling school-kids in bright white uniforms, and lots of very relaxed looking guys leaning on their mopeds and tricycles, hanging out on street corners and offering rides.

The tricycle is one of the main forms of transportation in the Philippines - it's a side car welded to a motorcycle in an act of impressive back-yard engineering. A short tricycle ride with a driver who would undoubtedly make it in formula 1, if given the chance, brings you to Panagsama beach, the diving suburb of Moalboal. About a dozen dive shops on the rocky shore indicate that there must be something worth checking out below the waves.

And there is. The steep walls and the healthy hard coral cover on the reef tops are worthy of many dives. But the signature dive of Moalboal is undoubtedly an excursion into the massive school of sardines just off the rocky shore in Panagsama. In my time as Savedra Dive Center's photo-pro, I was mesmerized by this massive school of fishes. Right in front of Savedra, at or just below the steep drop off, probably at least a million of the small silvery fishes congregate. They form the most astonishing



*Sardine Dynamics. High dynamic range fusion of 3 shots taken with a Canon EOS5DII, Canon L 17-40mm, Hugyfot housing.*

patterns! Within seconds a homogeneous mass of eyes, scales and fins transforms itself into eddies, swirls and vortices. At times some of the sardines swim about in a separate fish-ball; then a three-dimensional pathway forms between that ball and the main school, and sardine bodies without end flow back and forth. If you enjoy the hypnotizing patterns of the atmospheric bands of Jupiter played at time-lapse speed, or if you are fascinated by the

rotating swirls of foam on top of your cappuccino, then you will be thrilled by the sardines! To put it in geeky terms: Non-linear pattern formation and emergent animal group behaviour at it's best!

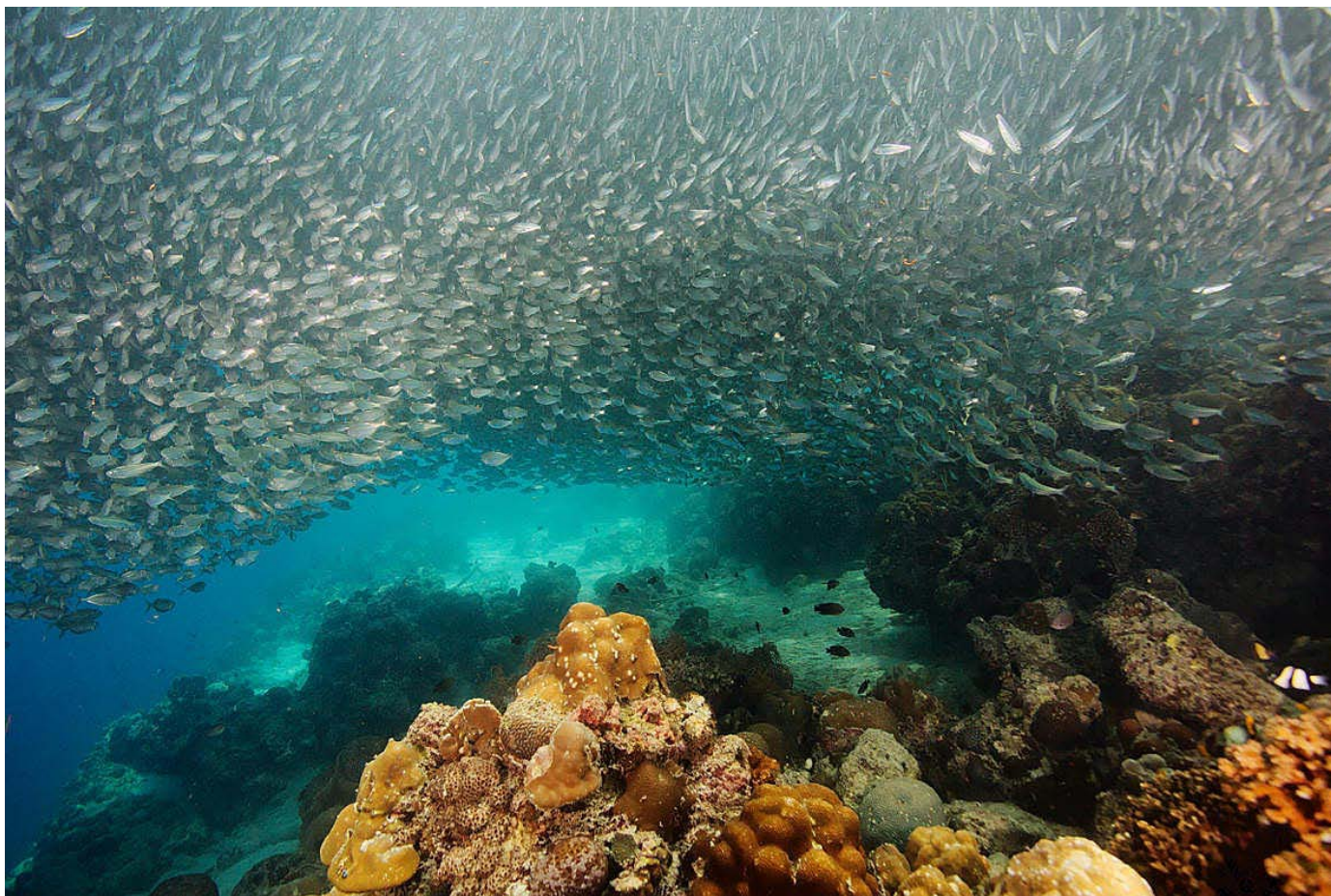
We as divers influence the way the school looks: the sardines don't particularly like bubbles. So swimming below the school and exhaling our air makes the fish part. The sardines also don't like fast-changing light: Sometimes I see dive guides

shaking their diving torches up and down repeatedly and quickly, which startles the school into darting a few meters away. I personally don't engage in such fish-scaring!

While divers might scare the fish, we don't eat them. A number of jacks, from below, and needlefish, from above, certainly try. Whenever these predators make a go at the sardines, the school bursts apart. I particularly like watching the jacks, which hunt in packs. And once a week or so, someone reports seeing a thresher sharks hunting sardines! In contrast to Malapascua island, further north in the Cebu province, where threshers can be seen daily at cleaner stations, such thresher shark encounters are a matter of luck in Moalboal - luck which, irksomely, I have lacked so far.

Currently, the sardines are right in front of Panagsama beach, all day, every day. According to Savedra owner Kalle Epp, the sardines used to have a steady presence from around 1999 to 2005 but then disappeared. They came back to a small nearby rocky island called Pescador and stayed there from 2007 to 2011. A new school has been living at Panagsama from 2013 until now. It's not clear what makes the sardines as a group decide to move - it's some enigmatic emergent decision taken by millions of fish minds in a strange form of piscine democracy. During my time in Panagsama, the sardines moved their home location along the coast 150 meters to the south within a few days, with no trigger for the move apparent to me! Did they follow a local aggregation of plankton or did they try to avoid predation and fishing? I would love to know!

If they don't decide to move again, the future of the great Panagsama sardine school seems safe: Fishing at both Panagsama and Pescador is



*Sardines on the Reef. Canon EOS5DII, Canon L 17-40mm, Hugyfot housing, 2 x Inon z-240 strobes, f11, 1/160, ISO400*

restricted to hook & line fishing and spearing by locals. The 'fairly well enforced' absence of net fishing lets the sardine school as a whole live.

An important question of course is: How to photograph these amazing masses of fish? It's surprisingly hard to capture the magnificence of this spectacle of nature. One problem is that there are so many sardines that they darken the sun. When swimming underneath the sardine school it seems like clouds have covered the sky all of a sudden,

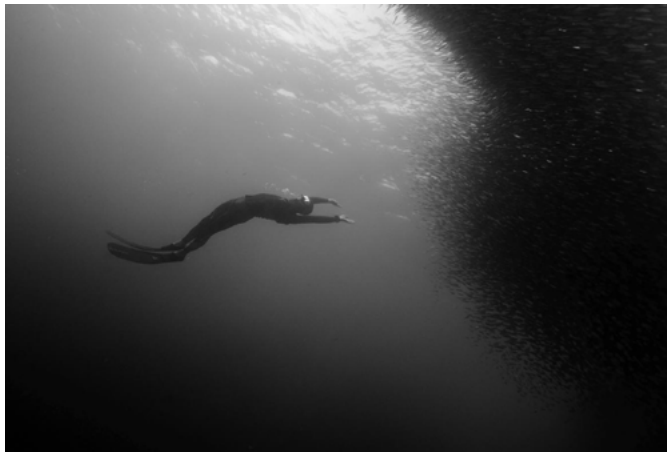
but it's really the massive number of densely packed fish occluding the sunlight. So, there is not as much ambient light as one would wish, and the school is so big that even a powerful strobe will not illuminate the whole school.

The aforementioned fear of bright & fast light by the sardines makes strobe use even less attractive. In my opinion it only makes sense to use a strobe when including some parts of the coral reef into the shot, where the artificial light restores some

of the warmer colors in your photograph.

For the quality of the natural light a big factor is the time of the day to head underwater. In the morning, the visibility is best, but the sun is still hiding behind the mountains to the east, in the center of Cebu (the island rises to 1013 m at Osmeña Peak). In the afternoon the sun is out in full force, but a tad higher waves make the view worse, as does the trickle of sardine feces through the water. Just as you can't have the pudding and eat it, and you can't have a million sardines without the end products of sardine digestion. However, the bacteria in sardine guts and salt water are very different than those which make humans sick, and I believe the hygienic problem here is small; I have certainly never heard of anyone getting sick after a sardine dive! Where the fish poop is a problem though is in photography: You will typically have to edit out a few poop specks in post-processing with the 'heal brush' tool.

One option to overcome the issues of low ambient light to photograph the large fish school is to use the high dynamic range technique (HDR). HDR gives vibrance to the image by eliminating local over- or under exposure, by using the properly exposed areas from 2 or more shots taken of the same scene in rapid succession. This is normally done with a camera on a tripod so not an option in mid-water below the sardines. Instead, I used good buoyancy, a steady hand and a wide depth-of-field to keep the image steady while my 5DII fired 3 shots in rapid succession. Is HDR still a 'photograph' or is this 'cheating'? I think it's only dishonest to image-manipulate if one does not state what one did, either in-camera or on the laptop. The proper question is, how far along the gradient from photography to digital art is HDR? In my opinion, it

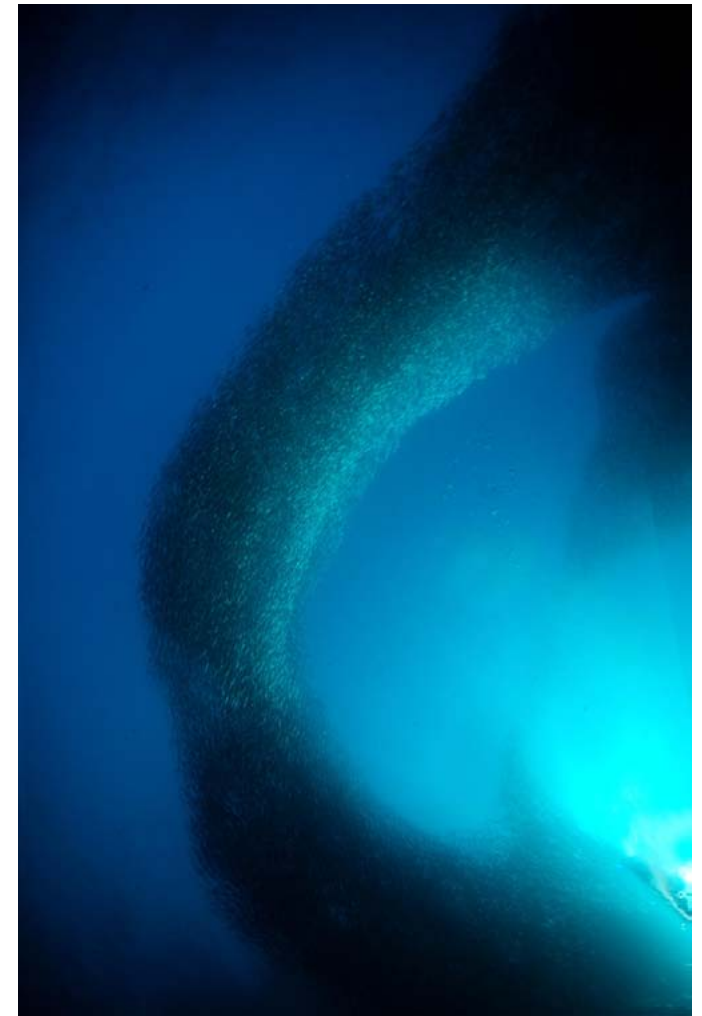


***Freediver approaching Sardines. Canon EOS5DII, Canon L 17-40mm, Hugyfot housing, f14, 1/100, ISO640***

represents the light falling on the camera sensor in a very cleverly enhanced way. In fact, the eye has a significant higher dynamic range than any camera, and so a high-dynamic-range image might be closer to what we actually see. HDR captures the light that was present in the moment the 3 exposures were taken - a longer moment than a single exposure, but still an instant.

Culturally, HDR has moved from an esoteric image processing trick used by photo nerds to a technique so widely-used that it now comes with many cell phone cameras. I use LuminanceHDR 2.4, by Giuseppe Rota and colleagues, for my HDRing. This program has a wealth of options for creating an HDR image, and an algorithm for aligning the individual shots, should the aforementioned good buoyancy and steady hand be less than perfect.

Sardine school shots often come across as eerie, unreal images. They appear more like an abstract piece of art and less like a nature



***Sardine Arc. High dynamic range fusion of 3 shots taken with a Canon EOS5DII, Canon L 17-40mm, Hugyfot housing.***

photograph. All the viewer sees are odd three-dimensional patterns formed by countless silvery lines before a blue background. This eerie atmosphere in the shots of the sardines is an effect I really like; But it's not the only way to photograph the sardines. To put them more into the context



*Lady in black scanning the tidal flats for tasty edible crabs and shellfish. Yes, I used a polarization filter for this shot. Canon EOS5DII, Canon USM 100 mm f2.8, f22, ISO100*

of their environment, I recommend including the reef or a diving model into your shots.

And there is one type of sardine shot I can't tell you about from personal experience: quality shots of predatory fishes having a go at them. The jacks, needle fish and the occasional thresher sharks are too fast & shy to be good photo subjects. To shoot acts of predation

on the Panagsama sardines I can only recommend to go diving a lot and..... luck!

## Klaus Stiefel

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*After growing up in land-locked Austria, Klaus has lived and dived in Southern California, Okinawa, Sydney and, currently, the Philippines.*

*Klaus shoots a Canon 5DII in a hugyfot housing and, for some of his time underwater, dives a Pelagian rebreather. His newest book "The Camera and the Brain" is still looking for a good publisher!*



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