



Fluoro Diving

• *And Photography*

Text and photos
by Kevin Deacon

As day turned to night, two Australian icons—Sydney Harbour Bridge and the Opera House—were silhouetted on the skyline. In the fading light, we prepared our equipment for another excursion into Australia’s temperate seas to discover and prove the existence of fluorescing marine life forms in environments other than tropical oceans.

As our fluoro lights probed the stygian black void, splashes of emerald green revealed fluorescing corals among the rock—a vision that complemented the bright pinpoints of harbour lights above. After 50 years exploring the oceans, I had come full circle. This dive would complete a quest I started in my home town 47 years ago.

The dive was the culmination of many dives over the past six months together with Cherie, my wife and dive buddy, as we explored Sydney Harbour and other dive sites along the shores of our New South Wales coastline making new discoveries on every dive. Many

There are many varieties of tropical morays but we have only found one species that fluoresces, so far



Kevin and Cherie Deacon prepare fluoro lighting and camera equipment for an exploratory dive in search of fluorescent marine life in Australia's Sydney Harbour. Photo by Josie and Jason Ruth

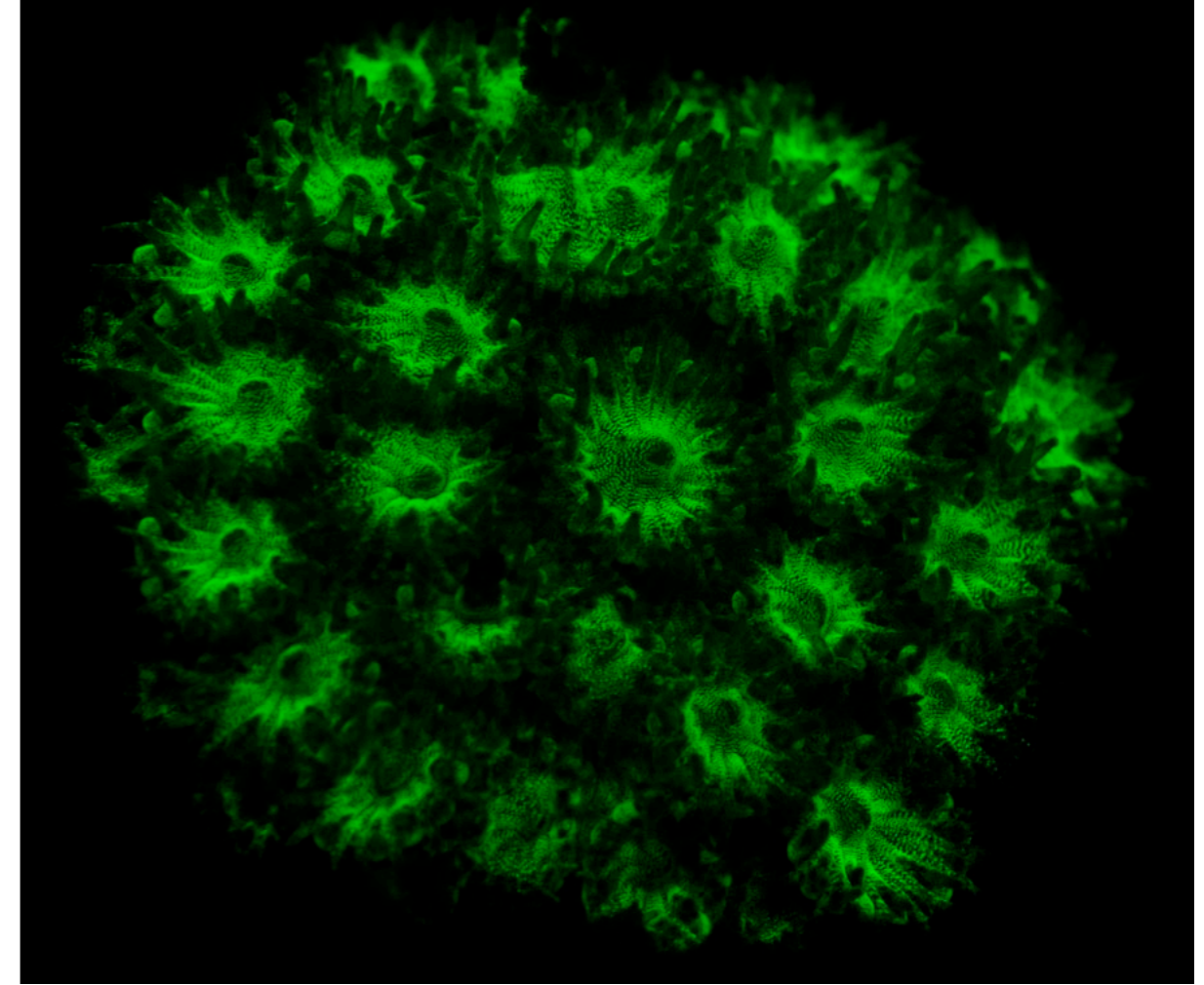
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are world first, revealing fluorescent behaviour in species never before seen, or captured, fluorescing.

I have been fascinated with the concept of fluorescence in corals since 1966 when I first gazed upon a beautiful portfolio of fluorescent coral images in a coffee table book by Dr Rene Catala, director of the Noumea Aquarium in New Caledonia, the man who revealed fluorescent coral to the world via his specimens in aquarium tanks bathed in Ultra Violet light.

Inspired by this, I waterproofed a 12-volt UV Fluoro light powered by a limited length of cable attached to a car battery on the surface. Descending to shallow depths in Sydney Harbour, I managed to reveal fluorescence in our local temperate species of coral but the light emission was weak so it was all rather uninspiring.

That was in 1966, and as an 18 year old just starting out in underwater photography, there was a wealth of other subject matter that would attract my attention over the next 47 years. But the fascination of fluorescence and the potential for new discoveries never really left my mind, especially as it seemed by the 21st century that new discoveries



In the shallow cold waters of Australia's Sydney Harbour, in sight of the Harbour Bridge and the Opera House, the cold water coral species *Plesiastrea versipora* fluoresces

underwater seemed elusive.

For a brief moment in recent years fluorescence in corals was once again revealed to the world in a spectacular portfolio by famed *National Geographic*

photographer David Doubilet. But once again, this was a limited exposure, as corals were collected randomly and brought to a UV light source at a jetty so they could be photographed on site underwater. The images were excellent

Our first temperate ocean fluoro diving discovery was the presence of tiny ascidians (sea squirts) in their thousands glowing like fairy lights guiding us deeper into the darkness of the depths

and once again, inspiring, but the process had not made a major leap in four decades.

New technology

Imagine if we could be free of such limitations and take the light to the animals, free to roam the seven seas and reveal all the fluorescent life forms that I was certain must exist. This would require a whole new technology, and fortunately, it was ultimately developed by Dr Charles Mazel of Nightsea.

A number of underwater photographers had already embraced the technology and begun capturing a few amazing images of fluorescing marine animals in tropical seas. It was my goal to pursue and capture even more tropical species fluorescing, but more importantly, to be the first to capture and prove the existence of such species in our cold temperate Australian seas south of the Great Barrier Reef.





The green moray eel (left) common in Australian temperate seas, is a night predator. We wonder if fluorescence is a link to other night predators' behaviour; Bristle worms (right), also known as fire worms, scurried about in the darkness giving the illusion of emerald jewels in motion

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were treated to multiple examples of tube anemones displaying their range of fluorescent colours, each one reminded me of a miniature display of fireworks, as their tentacles flowed in the current.

Sponges covered every rock, but we could barely see them in the darkness. Much of the marine life carpeting the seafloor did not fluoresce, but incredibly, just one sponge glowed in the darkness. On closer inspection, I found it was spawning, and the spawn was fluorescent. What would be the purpose of that? So many questions like this will keep marine

Temperate water

As total darkness fell on the dive site, Fly Point at Nelson Bay Port Stephens, Cherie and I descended to the seafloor using white light to find our way. Once we were settled, we switched to the Blue wavelength created by Nightsea Excitation filters and flipped our yellow barrier filters over our dive masks. Now everything went black, as only subjects that fluoresced would be seen, so it required good buoyancy control and the use of our probes to feel our way around the dive site.

We scanned the darkness with our lights, and ahead, a carpet of fairy lights was revealed, as hundreds of tiny ascidians, sea squirts, fluoresced like Chinese lanterns. This was a good start, but I was hoping for something more exciting than sea squirts.

Hovering amongst the fairy lights, our eyes caught a sudden movement, slithering through the darkness—a moray

eel fluoresced in bright yellow-green. Then, here and there on the sand, goatfish hunted for food, their tentacles glowing bright, their bodies and fins displaying alternating degrees of fluorescence, as if they had a dimmer switch controlling the intensity. Who would have imaged fish could do that?

Elsewhere on the sand, tiny emerald jewels roamed. On close inspection, these were bristle worms also known as fire worms due to their nasty sting. Why do they fluoresce? Are they communicating, "Don't touch"?

Floating along in a gentle current, we



science busy for decades.

Then out of darkness emerged the largest nudibranch I have ever seen in temperate seas, a Major Armina—at 90 centimetres, it is a giant among nudibranchs. They are rarely seen, as they only emerge from under the sand to hunt and feed on sea pens and soft

corals.

This specimen was glowing powerfully in a vivid display of fluorescing stripes, so powerful in fact it was lighting the sand around it as it hunted. Trailing close behind, a second Major Armina

caught up to the first, and they began to entwine in a courtship dance of dazzling fluorescence.

My heart beat faster, as I fired shot after shot of a display never seen or even imagined before. I was so excited by them that I couldn't tear myself away



Blue-spotted goat fish hunt in the darkness with their tentacles fluorescing, perhaps providing illumination for them? We also discovered these fish could control the intensity of fluorescence on their body and this ranged from almost dark, to bright patches, to full fluorescence

Painted lizardfish, yellow fluorescent eyes staring, haunts the night

to attempt more discoveries, even though my camera monitor confirmed I had the pictures. But the decision was eventually made for me, as the pair parted company and crawled off into the darkness in different directions.

Probing the dark night underwater in almost total blackness in an estuary that was also a known haunt of bull sharks and young great white sharks requires a certain mindset that would not come naturally to many. One must also be very careful to move slow and gentle, as you will not see the many stingrays, scorpionfish, sea urchins and other species that could cause harm to the unwary or careless diver.

Fluoro zen

Strangely enough both Cherie and I found the sensation of darkness guided only by emerald jewels of marine life soothing, almost a Zen like

experience interspersed with moments of excitement with each new discovery. On many dark dives we could only feel, not see, many marine animals, as they bumped us in their desire to flee when we inadvertently disturbed them. We would sometimes wonder what animal it was, or for that matter, what the next

one would be!

As we probed the night seafloor on more exploratory dives, we revealed even more fluorescent creatures of the night. In general most fish do not fluoresce, so we only glimpsed dark shadows, as they morph into the night.

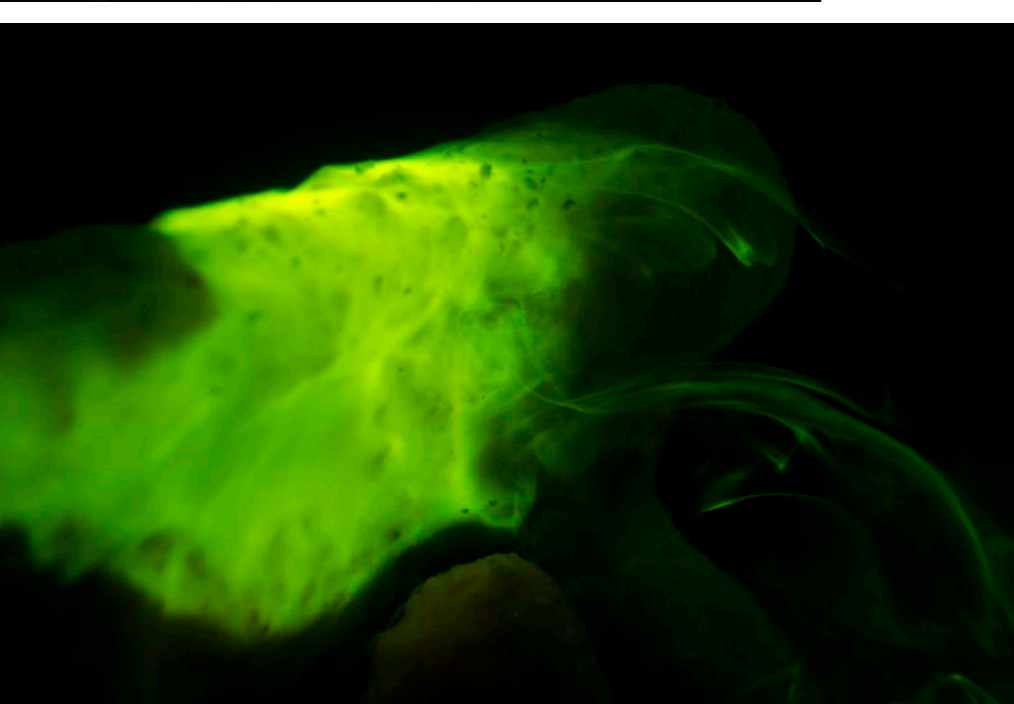
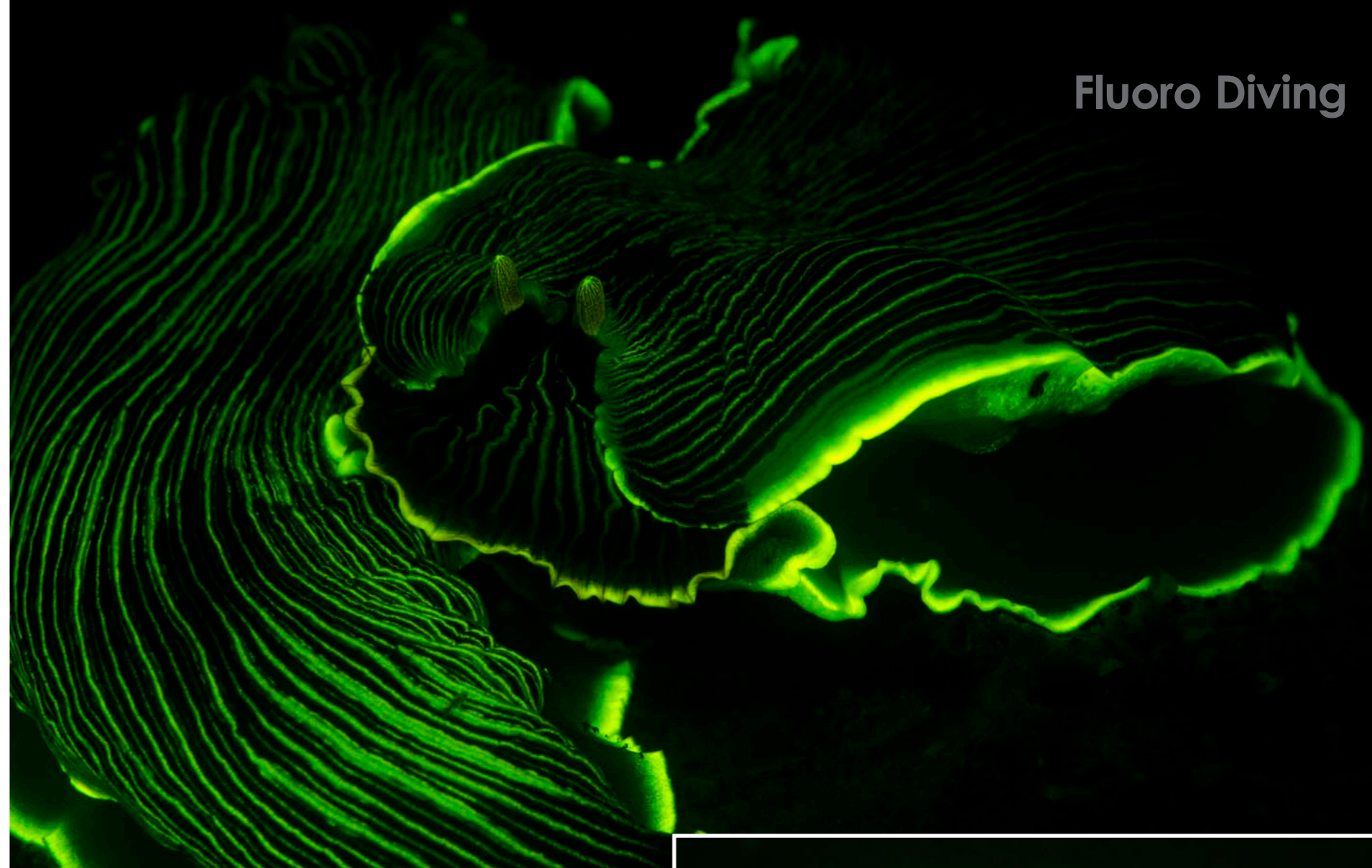
However, with fluoro, exception is the rule. Just at the edge of my fluoro dive light range, I caught a glimpse of a thumb-sized object glowing in the sand. Moving closer, I noticed it had an eye, and once the subject filled the frame magnified by my 60mm macro lens, I could detect the mouth of razor sharp teeth typical of a lizardfish.

Before long, it wriggled out of the sand revealing itself glowing in emerald greens and haunting yellow eyes—a serious ambush predator. But why announce itself in such a spectacular way at UV wavelengths?

Equipment

Equipped with 12-litre dive cylinders filled with nitrox and dry suits to keep warm, we would spend 90 to 100 minutes underwater on each dive.

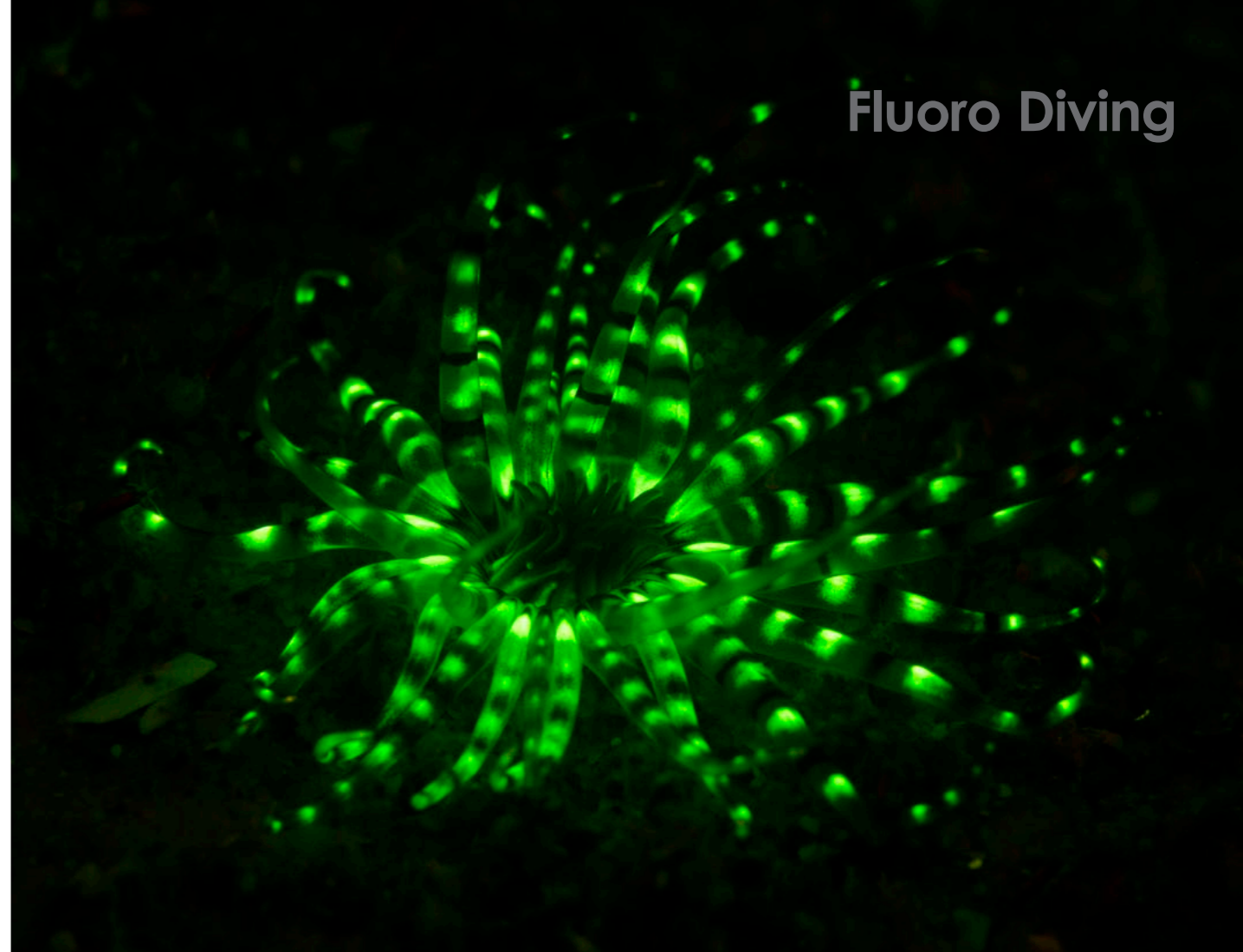
Exhausted and low on air, we completed a safety stop in the shallow kelp gardens near the shore. Suddenly, another glimpse of something glowing in the dark. Clawing



Another amazing discovery was a sponge spawning in fluorescence but only the spawning section of the sponge fluoresced



Two Major Armina nudibranchs (top) swirl together in a slow motion courtship ballet illuminated by their own fluorescence; Blackface Armina with its prey, a sea pen, also fluorescing. Even more remarkable is the fact that none of the other sea pens we have encountered fluoresced. Could this be a reaction to the presence of the fluorescing predator?



THIS PAGE: Some species of tube anemones fluoresce while others do not

known to me, was fluorescing in greens, oranges and burgundy. The algae bed it rested on was glowing dark red. My excitement knew no bounds, as I struggled in my ungainly position, mask leaking due to being inverted, and the slight swell rocking me back and forth.

I was determined to capture yet another image showing evidence of the diversity of temperate water marine life fluorescing. After several shots, I gave up. I could only hope, I got it.

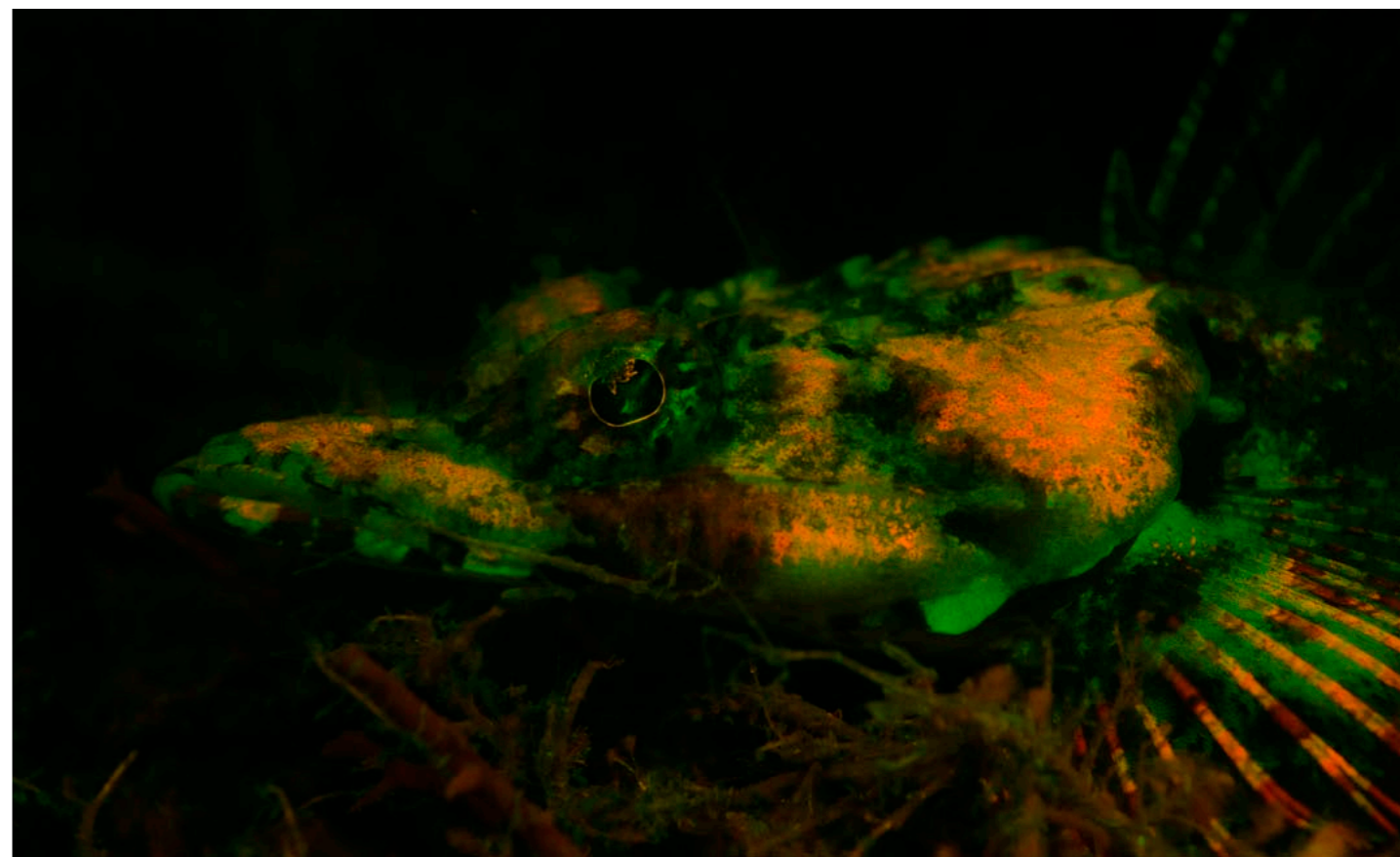
As Cherie and I emerged out of a calm moonlit sea, not another soul was in sight. The night was still and

completely quiet. The stars were the only witness to our endeavours. We were elated, we were inspired, and best of all, I felt vindicated.

Tropical fluoro diving

Our first fluoro dives were conducted in a traditional coral environment among the pristine reefs of Wakatobi Resort in North Sulawesi. Wakatobi Resort is a pioneer of the fluoro diving experience, and all guests have the opportunity to try it there.

Although one has an expectation of what it might be like to fluoro dive a coral reef, nothing prepares you for the reality. The variety of

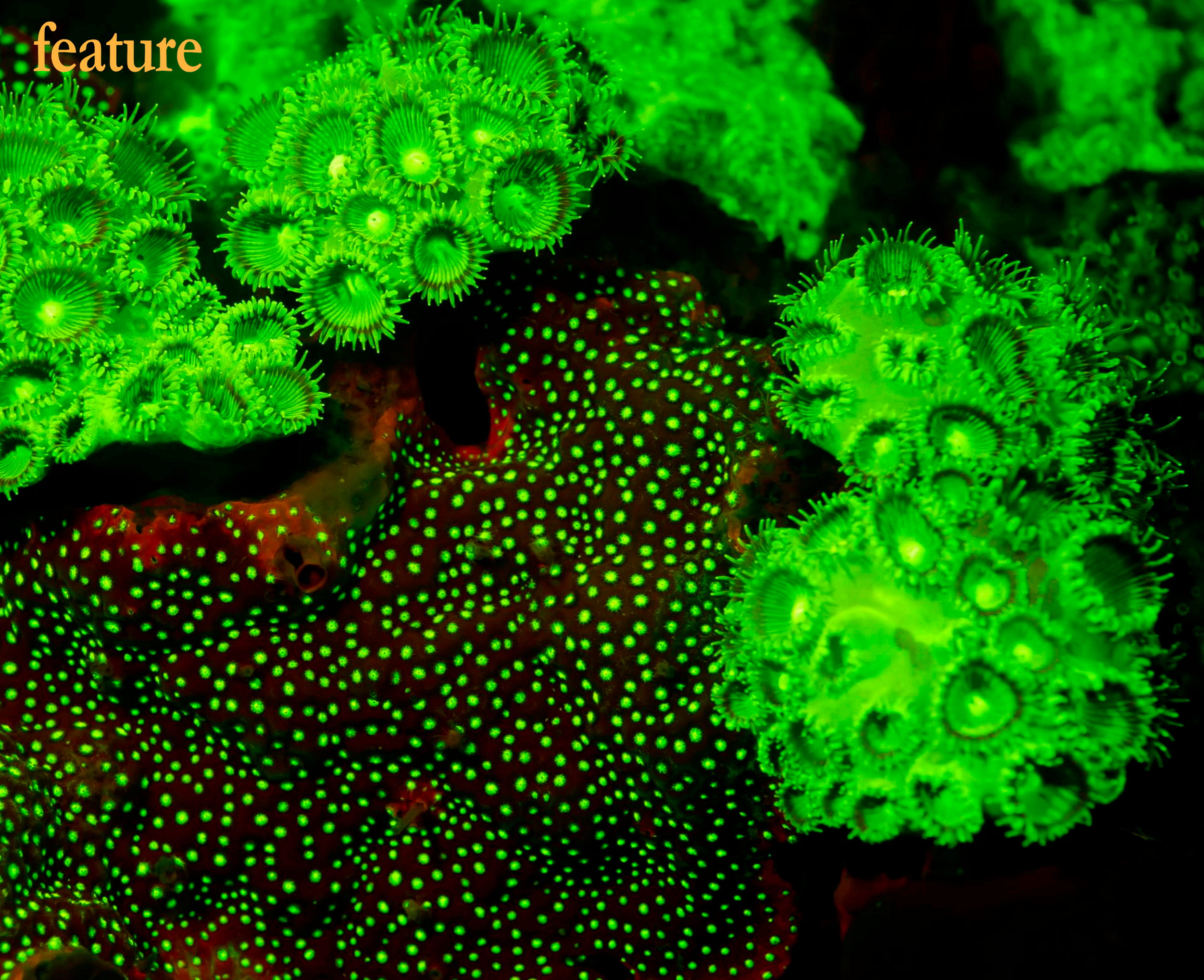


Few fish fluoresce but this tassel-snouted flathead is a spectacular exception to the rule

my way down into the kelp head first with my dry suit boots filling with air, I was struggling to maintain control.

To my amazement a large tassel-snouted flathead, a species well

feature



DivePhotoGuide.com



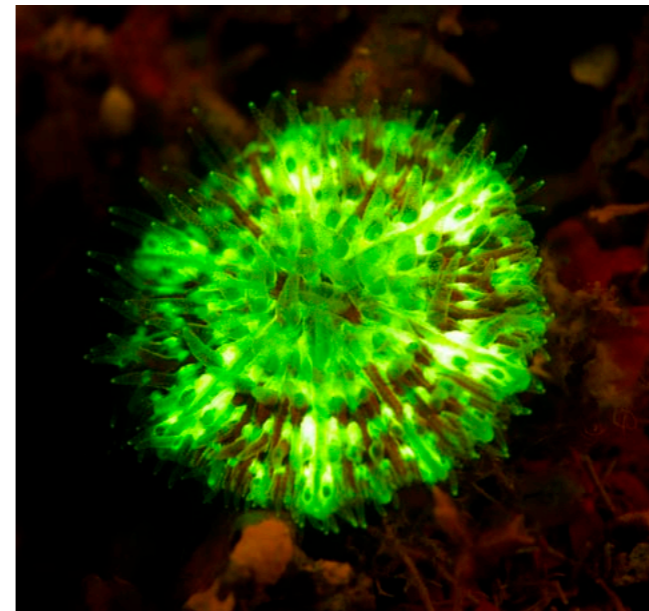
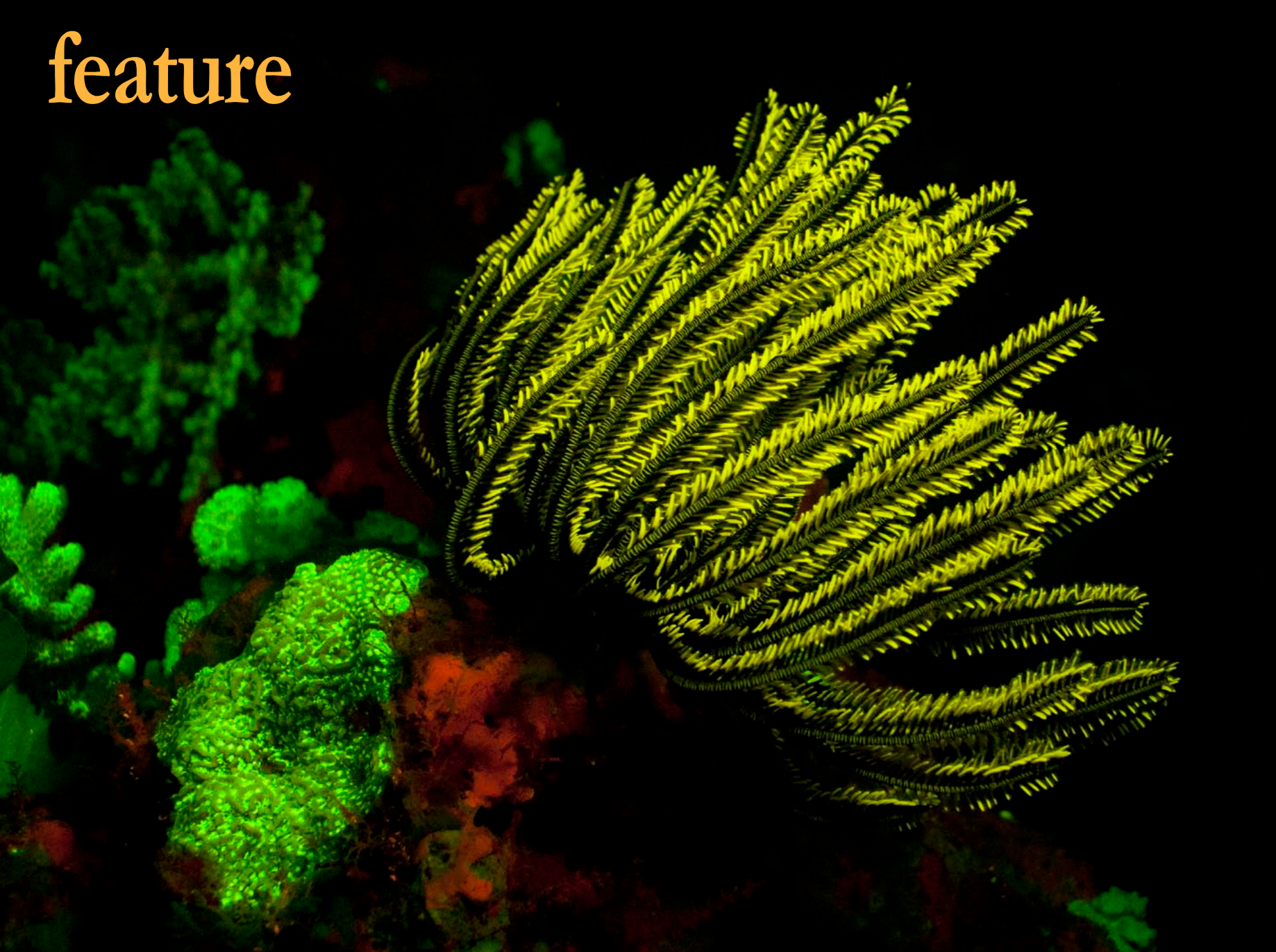
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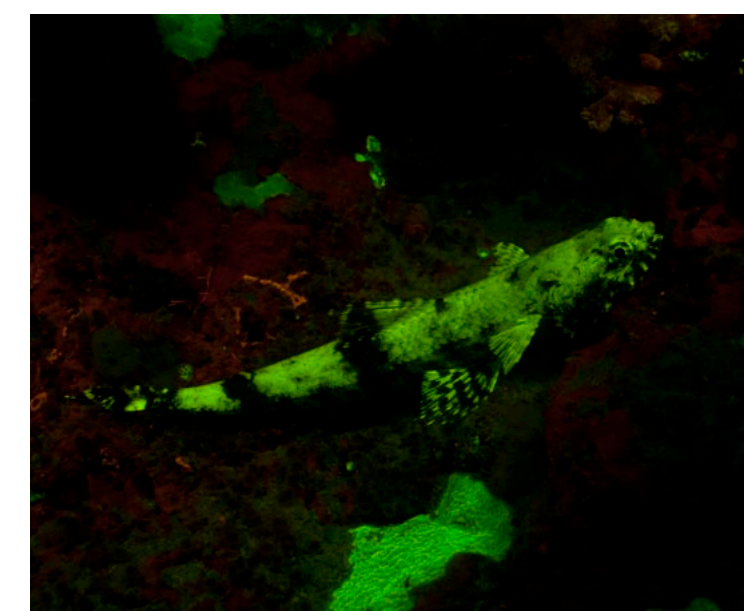
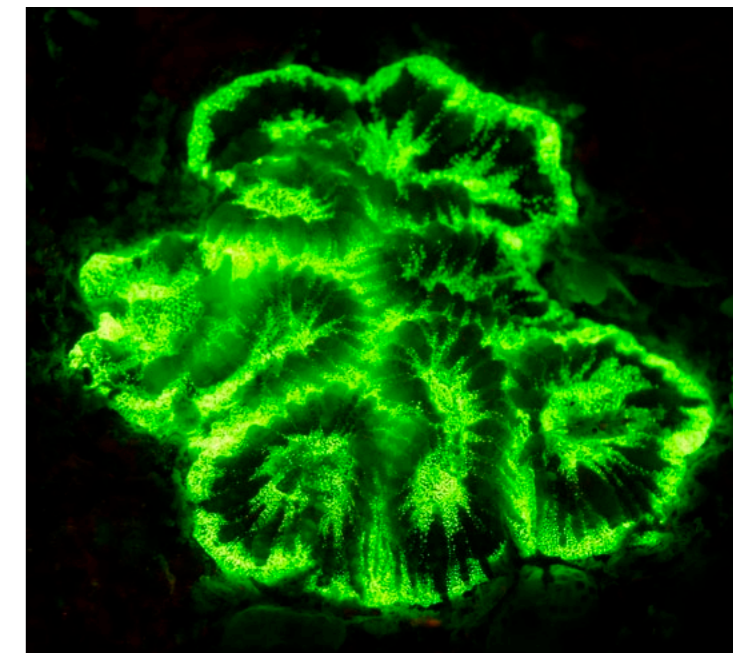
Multiple species of tropical corals fluorescing





CLOCKWISE FROM FAR LEFT: A drab brown crinoid feather star fluoresces bright yellow; Goby fluorescing in metallic orange and red against emerald green fluorescing coral; Fluorescing tropical coral polyps; Tiny mushroom coral, polyps extended, fluoresces

converting it into a very versatile dive and photography tool, especially if one is using the Sola photo light with the option of white and red nocturnal light, plus the Nightsea swing filter.



Lizardfish fluorescing

corals in the region of the Coral Triangle, which includes Wakatobi, is incredibly diverse. The moment you descend and scan the reef with fluoro wavelength, the corals light up like a carnival. There is in fact so much fluorescence in the corals, that you have no trouble with navigation or orientation. The vista of an entire reef glowing in the dark will change the way you think about corals forever.

Hunting for new subjects in coral reef environments is in stark contrast to temperate water environments. The fluorescing coral reef is so vivid, it's distracting, and hunting for life forms other than corals is difficult.

Diving the pitch black environment of temperate water sites is more challenging, but any life form that fluoresces readily stands out.

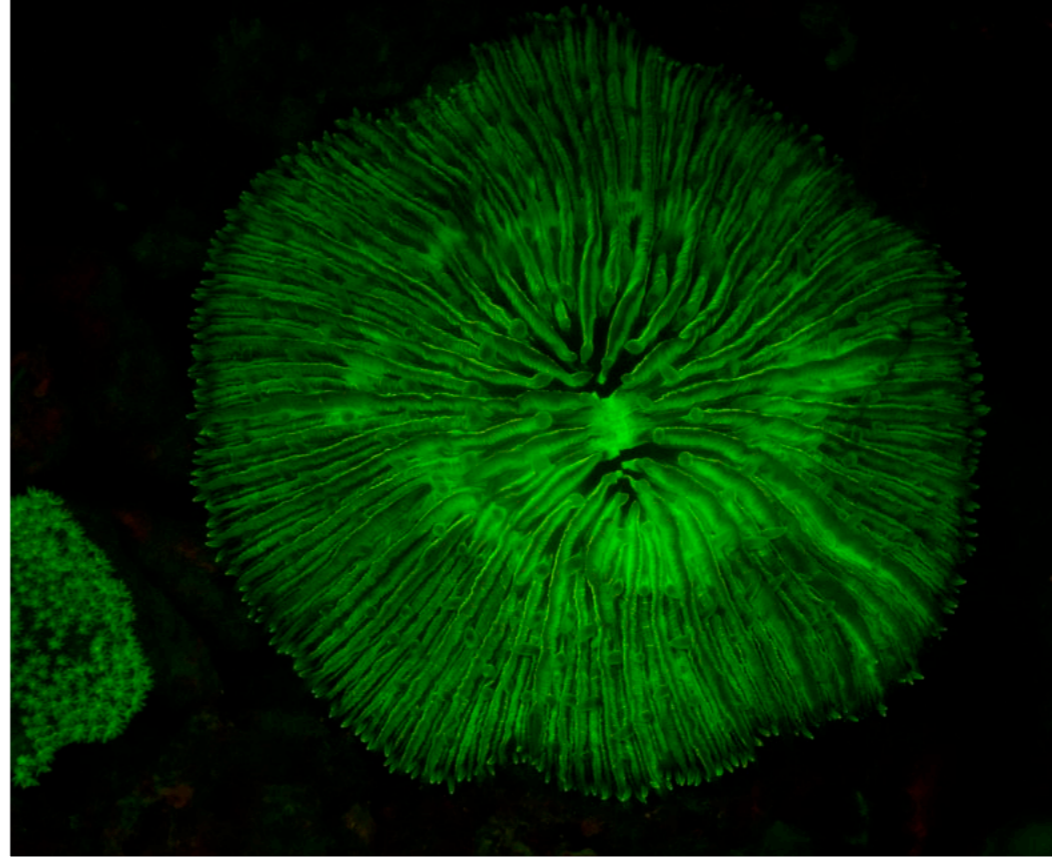
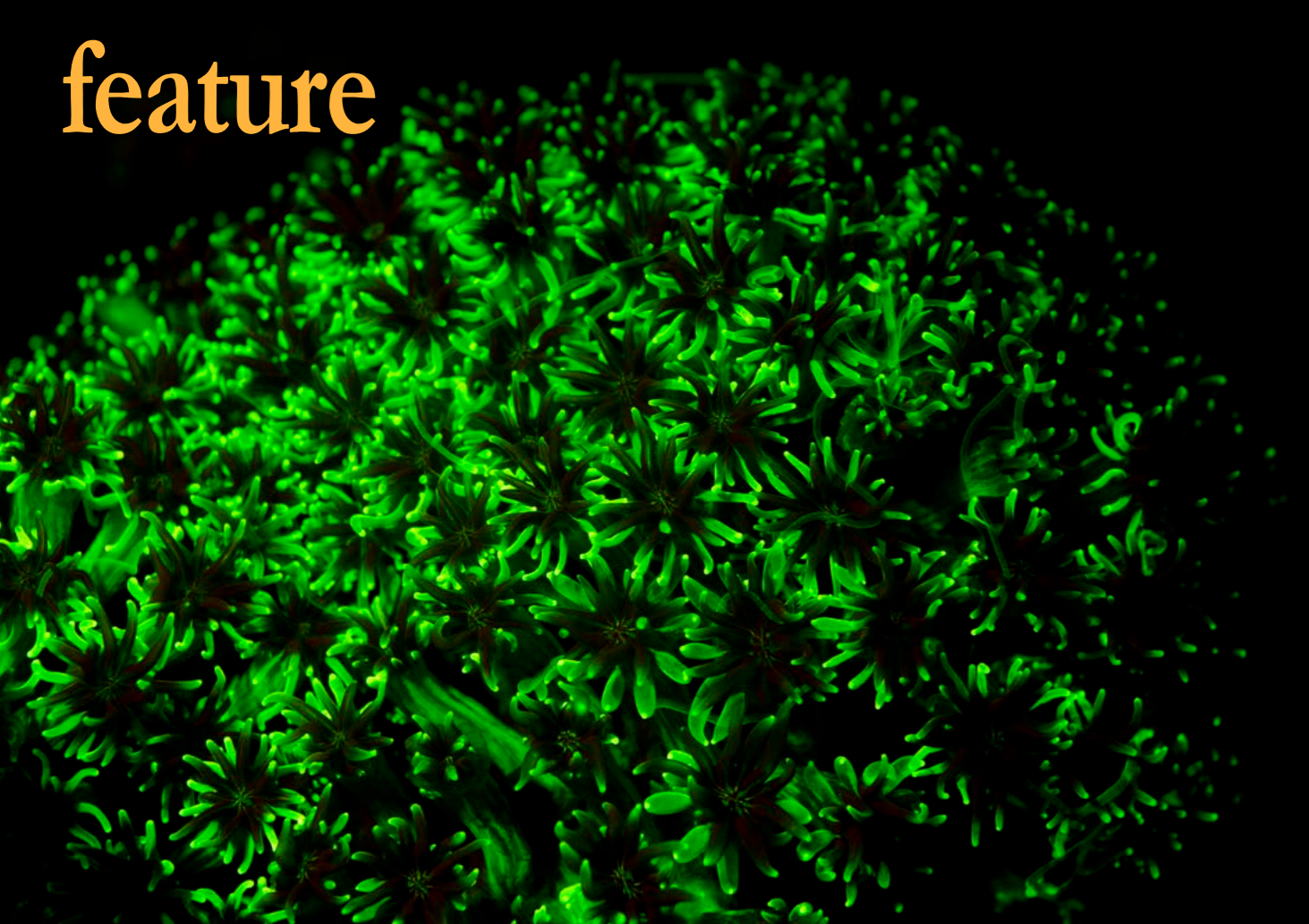
Fluoro technology and photography

Charles Mazel of Nightsea developed special filters for dive lights, video lights and strobes. These are referred to as Excitation filters. They convert white light to a wavelength close to the blue spectrum. This wavelength reveals fluorescence in marine life and algae provided a yellow barrier filter is worn by the diver and used on the camera

lens to block out all visible light other than the fluorescent reaction.

Light and Motion, a company that makes a superb range of dive, photo and video lights in the Sola Dive series in conjunction with Nightsea also produces a dedicated Sola Light that produces the correct blue wavelength with a clip-on filter to convert it back to white light when desired.

Our company, Dive 2000, has also engineered a very convenient swing filter that fits any Sola dive light, thus



Tropical
mushroom
coral
fluorescing

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Kevin Deacon is one of the pioneers of underwater photography in Australia. His images have been published worldwide in prestigious books, magazines and advertising media. Kevin and Cherie Deacon along with their team of scuba and photo instructors, dive masters and tour guides operate Dive 2000 in Sydney, Australia's most experienced dive, travel and underwater photographic equipment centre. Dive 2000 is also the Australian Importer and Distributor for Nightsea Fluoro accessories and Dive 2000 Fluoro Products, Seacam Housings and most Underwater Photography equipment. See: www.dive2000.com.au

Fluorescing tropical coral polyps (left); The Sola Nightsea Light (right) provides a dedicated fluoro light wavelength. The Seacam strobe is fitted with a general purpose Nightsea Fluoro Excitation filter. These are available in a range of sizes to suit many strobes including Ikelite DS160/161



I have not found fluoro photography difficult. With powerful fluoro light, the lens autofocus works quite well. However, ISO settings need to be high, as the wavelength of light via the filters on your strobes is weak compared to white light. Aperture settings need to be wider for macro images. I found 800 ISO at F8 – F11 provided an effective exposure with most strobes, but depth of field is reduced at these

Camera lenses also need a yellow filter to 'see' and capture fluorescence



apertures, so focusing on the key part of the subject is really important.

Strobes or video lights can be used much closer to the camera lens and subject matter, as there is no problem with backscatter, since it does not fluoresce, it will not be revealed!

Buddy contact is difficult, as divers don't fluoresce, so we are invisible to each other in the darkness. Cherie and I could easily get

separated, so we made a point of always wearing chemical Glow Sticks, which helped to reveal our position, as we individually hunted for subjects. Cherie would also carry extra Glow Sticks as markers for any subjects she found, so she could guide me to them. We also found Glow Sticks useful as

navigation way points when we would retrace our path back to the exit area.

The future

Our limited explorations in our local temperate waters, the Tasman Sea off the southern Australian coast, has already revealed many new discoveries and raised many more questions for marine biologists to unravel. As we help equip others and collectively explore even more of our global ocean realm, we are certain a great number of new fluorescent discoveries will come to light. As photographers, we are also excited knowing we have a whole new genre of art to inspire our creativity.

I would not have imagined that 50 years after entering the ocean with black and white film, 12 shots on a roll and flash bulbs, I would still be finding new subjects to capture and new marine life behaviour to discover. The future is still ours. ■



Dive 2000 custom designed Swing filter fitted to any Sola light allows instant switch from white to red to fluoro light wavelengths. Inon strobe fitted with Nightsea Inon Excitation Filter



Dive 2000 designed swing filter visor that hinges from the mask frame and semi locks at three positions





photo & video



Nauticam GH3 Housing

Nauticam has officially announced the release of their housing for the Panasonic Lumix DMC-GH3 camera. The NA-GH3 housing was "pre-released" on the China Nauticam site and then exhibited at the NAB show. Nauticam USA has now confirmed that it will be shipping the NA-GH3 housing from the end of May at a retail price of US\$2,250.

Nauticam Canon EOS-6D Housing

Nauticam has announced that the release their new NA-6D housing for the Canon EOS 6D camera at a U.S. retail price of \$3,300. The NA-6D housing features the multi controller pad used on their Nikon housings and provides access to the EOS 6D's 8-way controller. Plus Nauticam have also provided a dial that controls the camera's rear command dial on the right hand side of the housing.



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Ikelite GH3 Smart Housing

In an interesting development Ikelite has launched a new Smart Housing for the Panasonic Lumix DMC-GH3 Mirrorless Micro Four Thirds camera. Ikelite has previously been largely absent from the mirrorless market, so its decision to develop a new housing for the Panasonic GH3 appears to indicate that they are back. The new housing is classic Ikelite and shares the TTL flash control and polycarbonate design of other Smart housing from the company, but also moves the video and AF lock controls onto the side of the housing for thumb activation. The Ikelite GH3 Smart Housing is available from the end of May at a U.S. retail price of \$1,500.

Sea & Sea's MDX-6D Housing

Sea & Sea has announced the release of their housing for the Canon EOS 6D SLR—the MDX-6D. The new housing is made from black anodized aluminum alloy and gives access to almost all of the camera's essential underwater functions, apart from the depth-of-field preview button. The MDX-6D housing can be fitted with an internal version of the YS Converter/C TTL convertor by Sea & Sea dealers—enabling switching between TTL and manual strobe exposure from the housing. Other key features of the MDX-6D housing include: shutter lever tension that can be adjusted with a spring; a port lock that can be accessed without opening the housing; a new grip design with threadless fixings; a tripod socket on the centre underside of the housing; Optical Viewfinder 0.5x as standard; the use of other interchangeable viewfinders; a built-in leak sensor that immediately alerts you to water ingress; and a depth rating of 100m (330ft).





MyShot Photo Contest 2013

Sponsored by ScubaPortal.it, MyShot Underwater Photo Contest 2013 is open to all photographers to compete for valuable prizes in four categories: Reflex Macro, Reflex Wide-Angle, Compact Macro, Compact Wide-Angle. Registration is free. Deadline for submission is midnight (CET) 31 October 2013. A jury will decide the winners of each category, and there will be a public vote for the best three images out of the top 100 pictures (25 in each category). Judges include Marco Daturi, Cristian Umili, Francesco Turano, Adriano Penco, Marco Milanesi and Roberto Sozzani. A closing ceremony and party will celebrate the end of the contest. For info and updates, visit: **Myshot.it**. For any information and to submit entries, email: **info@myshot.it** ■

DivePhotoGuide/Wetpixel hold exhibit at United Nations

Internet underwater photography sites, DivePhotoGuide and Wetpixel, in affiliation with Blancpain, the Swiss watch company, have created an exhibition of underwater images entitled, "Oceans", on display at the Visitor Center in the United Nations building in New York City, USA. The exhibition celebrates World Oceans Day (June 8) and features 30 underwater photographs and two high-definition videos of various ocean ecosystems around the planet, captured by an international group of accomplished photographers.

"I was extremely excited when the Department of Ocean Affairs approached us about doing a photo exhibition at the United Nations in connection with World Oceans Day," said owner of DivePhotoGuide, Matt Weiss, in a statement. "Beautiful underwater imagery is the perfect medium to convey the importance of

Ikelite Housings for Nikon P330 and S9500

Ikelite has announced the release of two new housings for the popular Nikon P330 and S9500 compact digital cameras. Both housings are manufactured from Ikelite's proven special polycarbonate blends which are clear, light and strong. Access is provided to the majority of both cameras' main functions, and the S9500 housing can be fitted with Ikelite's WD-4 dome to enable wide-angle photography underwater. Both housings have a recommended retail price of US\$400.



Ikelite Housing for Nikon S9500



Ikelite Housing for Nikon P330

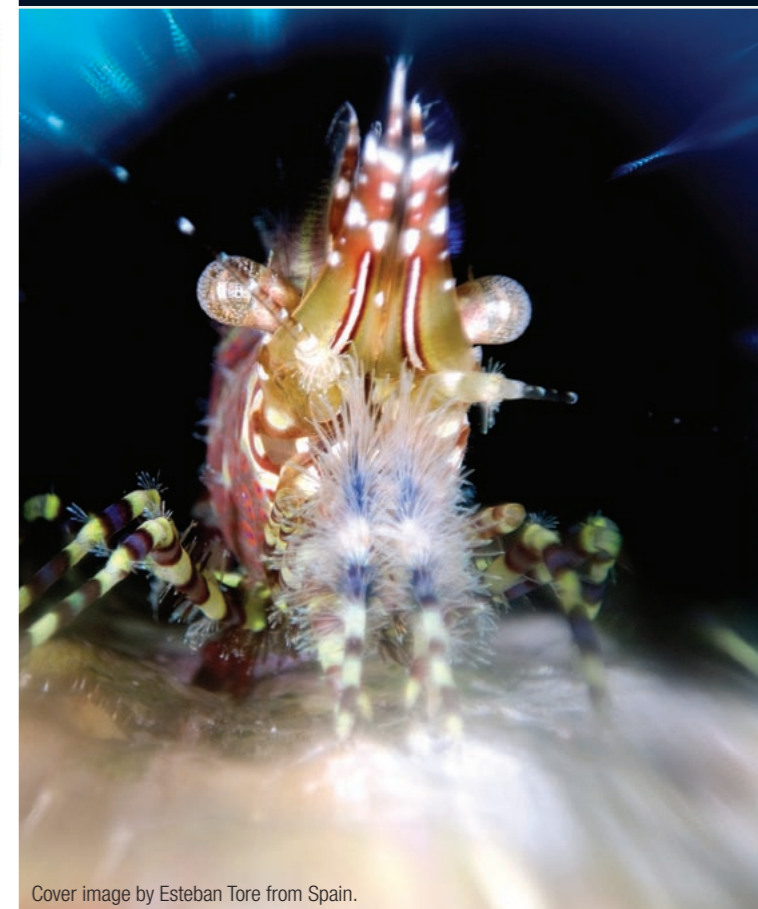
Aquatica AD600 Housing

Canadian manufacturer Aquatica has announced the release of their new housing for the popular Nikon D600 "entry level" full-frame FX DSLR camera.

The Aquatica AD600 is machined from a single aluminum block and is fitted with their standard double o-ring seals on the knobs and levers so that it can withstand pressures exceeding 100m. The AD600 provides access to the camera's Fn control, which can be customized for a variety of functions, via a button on the rear. It also has a thumb lever for ISO adjustment and three ports for accessories such as monitor or vacuum bulkheads. The AD600 housing will retail at \$3,199 in the U.S.A.



The HP Red Sea and World Shoot-Out 2012 competition album is now available!



Cover image by Esteban Tore from Spain.

Stunning images submitted by HP Red Sea & World Shoot-Out 2012 nominees and winners were all gathered into one album, featuring color and creativity at their best.

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