

Underwater Photography and Marine Biology

by Dr Richard Smith

I began exploring the aquatic realm at sixteen, learning to dive with my father in a frigid British quarry in November with a thick frost on the ground – I saw one crayfish during four dives, but thankfully I persevered. Since then, my journey as a marine biologist and underwater photographer has given me a huge amount of insight about the many overlooked creatures of coral reefs, culminating in my book *The World Beneath*.

Some of the earliest images I captured were taken in the Maldives during the first global coral bleaching event that devastated many of the Indian Ocean's reefs. Although these images were decidedly average, the subject matter led to a fundamental shift in my consciousness and my aspirations of becoming a terrestrial zoologist plunged beneath the waves. I soon became interested in macro underwater photography, through trying to identify nudibranchs (sea slugs). The little sketches on my underwater slate weren't quite cutting it when faced with the hundreds of potential species, so I started to take

close-up images to help. I realized how many of these tiny slugs, most measuring less than a centimeter in length, were undescribed or my sightings were adding huge extensions to their known geographic ranges.

Several years later underwater photography became a vital part of my PhD research on the elusive, but charismatic, pygmy seahorses. These animals barely stretch across a dime, and the two species I studied spend their entire adult lives cryptically clinging to the surface of fan-like gorgonian corals.

Through my photography, I was able to observe and record their reproductive cycle for the first time, taking images to help sex the animals. This is only possible by taking a very close up image of the base of the trunk to show a raised circular pore in females, or a slit-like opening in males from which the young are released.

At the time of seeing my first pygmy seahorses on the coral reefs of Komodo, Indonesia in 2002, there was just one named species. Now there are seven, and I am working

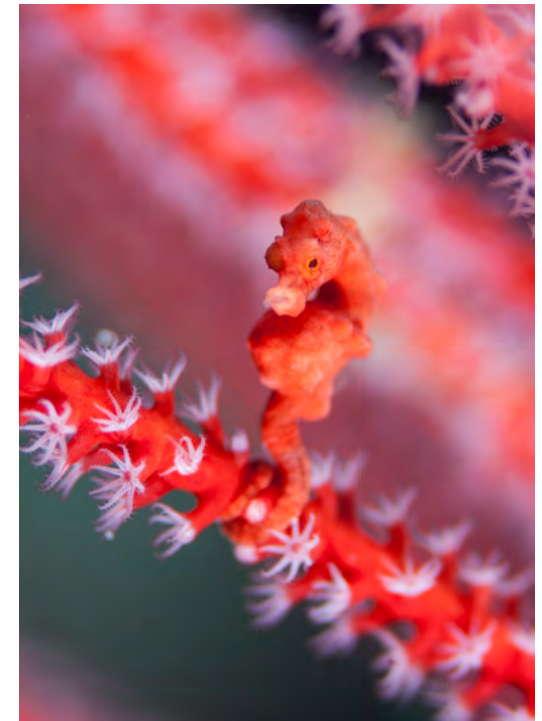


Like corals, anemones also suffer from bleaching, which puts both the anemone and their resident fishes in jeopardy. West Papua, Indonesia.

Denise's pygmy seahorse on a whip coral. Sulawesi, Indonesia.

on describing another; the first from the Indian Ocean. Underwater photography has played an important part in this group's discovery, with many new pygmies coming to the attention of researchers through images taken by recreational divers.

In 2017, the SyngBio conference held in Tampa drew the world's seahorse and pipefish researchers





Huge swells crashing through an overhang in West Papua, Indonesia



Male Galapagos pike blenny displaying. Galapagos Islands, Ecuador.



Giant barrel sponge, many decades old, spawning. Tubbataha Reef, Philippines

together for only the third time. I was invited to give a keynote speech one evening, and chose to speak about the huge diversity of small, newly discovered, habitat specialists I was coming across during my travels. One of the images I showed was a pygmy seahorse, measuring just 1.6 cm in length, that I had photographed a few years prior in Japan. I was

sure that it was a new species, but it wasn't until chatting with syngnathid taxonomist Graham Short afterwards that his skills in taxonomy were able to realize *Hippocampus japapigu* as a new species in 2018.

The combination of my background in natural history observation, photography and marine

biology has led me to photograph many new and undescribed species. I was diving with my friend Anna DeLoach when she spotted a stunning male flasher wrasse in a remote corner of southern Indonesia, which was named as Alfian's flasher in 2016. The rainbow of color, just a few inches long, shot around several feet above the reef showing off



Displaying male Blue flasher wrasse, measures just two and a half inches long. West Papua, Indonesia

to a harem of somewhat ambivalent females like a frenzied peacock. This is yet another example from the surprising number of micro-endemics that are being discovered on coral reefs, some with geographic ranges possibly only spanning just a few hundred square miles.

Through collaboration with researchers, my images of rare or previously undocumented behaviors and species have been published numerous times in the primary literature; however, I hope these images can also have a reach beyond the scientific community, sharing

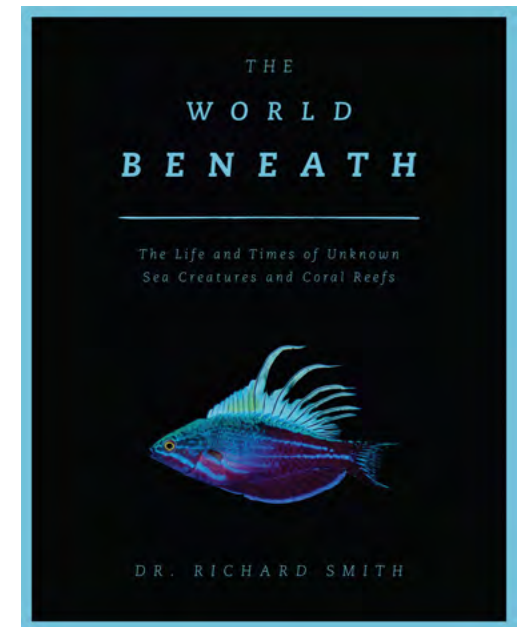
these wonderful animals with a wider audience. During the past twenty years, the coral reef fish identification books that I pore over have more than doubled in size with new species thanks to the combined efforts of biologists and citizen scientists alike. These days, with the fabric of coral reefs changing before our very eyes, it's both encouraging that new species continue to be discovered but wildly alarming at how quickly their homes are disappearing.

Dr Richard Smith
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Dr Richard Smith, a British marine conservationist, underwater photographer and author, aspires to promote an appreciation for the ocean's inhabitants and raise awareness of marine conservation issues through his award-winning images.

*A marine biologist by training, Richard's pioneering research on the biology and conservation of pygmy seahorses, led to the first PhD on these enigmatic fishes. Richard is a member of the IUCN Seahorse, Pipefish and Seadragon Specialist Group working to conserve these fascinating fishes. He has named the two most recent pygmy seahorse discoveries from Japan, *Hippocampus japapigu*, and South Africa, *H. nalu* – the latter being the first in the Indian Ocean and, like all pygmy seahorses, is the size of a grain of rice.*

He is a Fellow of The Royal Geographical Society and The Linnean Society of London. Richard's bestselling book, 'The World Beneath: The Life and Times of Unknown Sea Creatures and Coral Reefs' explores the wealth of coral reef biodiversity through his stories of adventure, discovery and many photographs.



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