

ENVIRONMENT

The deeply mysterious mola

A unique tagging project off Bali hopes to shed some light on the remarkable deep-dwelling sunfish

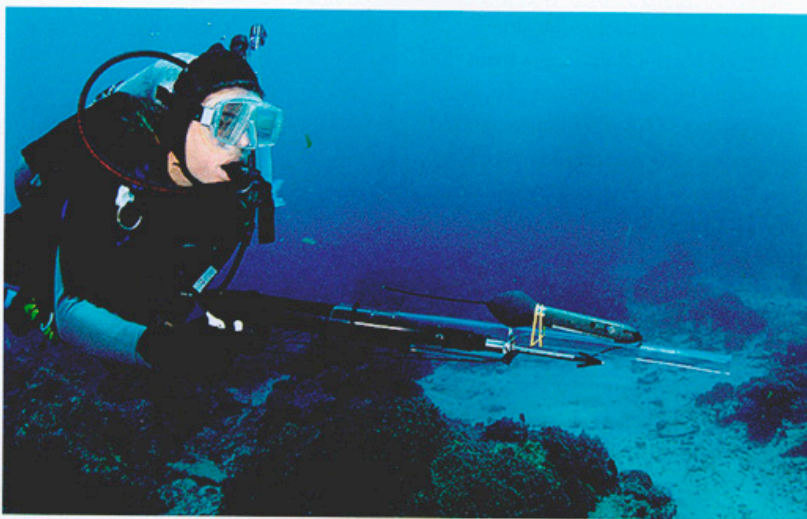
Text and photos by Tim Rock



The common mola or ocean sunfish is the Holy Grail of fishes, an incredible, otherworldly animal that many divers and marine scientists would like to see but few ever do. Named in English for its habit of basking on the surface, its Latin name *mola mola* is derived from the word meaning 'millstone': also appropriate for the fish's rough grey skin, vaguely circular body and massive bulk. Their unusual appearance is compounded by a round, ever-gaping mouth; well set back eyes; huge anal and dorsal fins and virtually no tail. Related to the pufferfish, they are the largest bony fish in existence, some growing to be up to 4m from fin-tip to fin-tip and weighing over 2,000kg. Without a doubt, the mola is one of the marine world's oddest looking creatures.

In September 2004, one of the planet's most eminent marine biologists came to the waters around Bali looking for the fish. The scientist in question was Tierney Thys, a National Geographic Emerging Explorer, and her goal was to place satellite tags on these giants of the sea to track them and to hopefully expand on the little we currently know about them.

In temperate waters, the molas are seen seasonally around southern New Zealand, Japan, Taiwan, Southern California, the Cape Town area of South Africa and even the British Isles. They hang at the surface under kelp beds where they are quite easily tagged by snorkelling biologists. Though tagging molas is still relatively new, it is already bringing some fascinating data to light about how the fish live. For instance, those animals tagged around California and the Cape have taught us that



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while the giant fish sleep almost at the surface at night, they dive to the dark depths of 100m or more by day to feed. This is probably to feast on jellyfish, their favourite prey. But since jellyfish provide little in the way of nutrition for such a huge fish, they must also be finding other forms of sustenance. Discovering what this might be will not only teach us about the mola them-

selves, but their interactions in the water column, particularly those down in the 'twilight zone', may shed light on some of the other types of creatures that live at those depths.

Thys and others have also taken DNA samples from some of the temperate populations to try to determine if all molas are the same or if perhaps some are sub-species.

Those temperate-water kelp beds are ideal places to catch the elusive deep-diving mola on a visit to the surface, but in tropical areas, there are no such beds

Facing page: Majestic and mysterious in equal measure. Top and left: The tools of the tagging trade, an adapted speargun and a satellite tag. Above: Tierney Thys.

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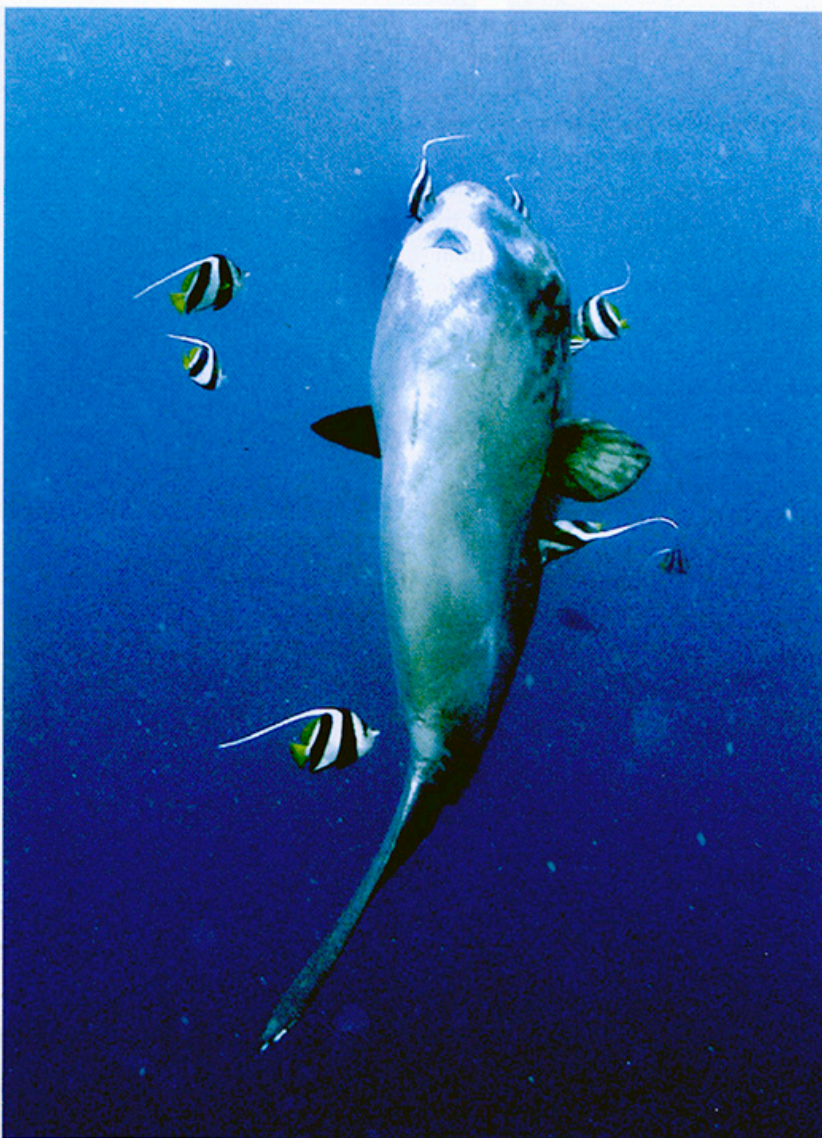
and this is where Bali comes in.

Just across the Bali Straits from the main island lie Nusa Lembongan, Nusa Ceningan and Nusa Penida, separated by deep channels where cold upwellings bring nutrients to a wide array of marine life. The molas come close to the reefs around these islands starting around late July and stay until October. Following the upwellings, which range between 17-21°C, the sunfish emerge and head to cleaning stations where small reef fish peck at their parasites.

This is another aspect of the mola that makes them worthy of study: they are the host to a huge array of unusual and invasive parasites, with more than 40 different worms and other critters having been found on individuals. Thys says that almost any other fish or animal with as many kinds of parasites would quickly perish. Just how and why the mola lives and functions with all these hangers-on is not known, but discovering the answers may provide science with valuable insights on parasitic migration in other fish species.

To coordinate the project, Thys had teamed up with locally-based Michael Cortenbach, owner of Bali Hai Diving Adventures; while the sharp end of the operation was to use a tagging system designed by Brett Hobson, Thys' marine engineer husband. He had adapted a pneumatic speargun to implant the tags behind the mola's large dorsal fin where the skin is a little softer. While tagging fish like sharks, whale sharks and even pelagic tuna isn't new, deploying tags at these depths is.

Adding to the challenge is the fact that these fish are actively sought out by other divers who want to observe and photograph them – not least the BBC



We are still unsure why the mola needs to leave the deep periodically to come to the surface.

crew on hand on this occasion to film the cleaning stations for the next instalment of its Blue Planet series. Recreational divers also cross the straits from Bali daily in small fleets to catch a glimpse of the fish. But the presence of the divers forces the molas deeper, to clean at depths of 45-55m, and Thys

and her crew had no choice but to follow them. Searching for the molas in the crevices where they like to hole up is tricky enough at depth, but add the extreme cold of the upwellings and the currents themselves and you have an exhausting and potentially very dangerous task ahead.

At a price of US\$3500 each satellite tag, no one was going to fire one off unless hitting the target was assured, but getting close enough was also a real test of patience. The tags can only go in one place: at the rear of the upper dorsal. They must go in at a specific angle and with enough force to stay in, yet without danger of buttonholing –

More on molas

Sightings off Bali are most likely between July and September though they are by no means guaranteed – good luck! In the meantime, there's more general info at www.oceansunfish.org.

If you are lucky enough to see a mola, report it at www.earthwindow.com/mola.html to help with the ongoing research effort.

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For an unusual report on a large mola that became stuck on the bow of a cement carrier (its abrasive skin wore the paint away!), see www.amonline.net.au/fishes/fishfacts/fish/mola.htm

sending a tag right through the animal. In practice this means you must be almost touching the skittish fish in order to effectively deploy the tag and as they don't like being approached from behind, this entailed a frontal approach with the speargun fired on the turn as the diver drifted past. This was where the cleaning stations were crucial – for here the fish were easier to get close to as they idled and allowed the cleaners to work on their parasites.

After making many deep and tiring dives, Thys and her team were able to successfully deploy a number of tags, even down as deep as 50m. Once in place, these tags will stay anchored for around six months, until the wire that attaches the tag dissolves and the remainder floats to the surface, beaming back another precious cargo of mola data via satellite.

Now that Thys and Cortenbach have tagged all they could, the waiting game begins. There's no rest for Thys, who will tour the world in the meantime, lecturing on the research so far and raising funds. Then, around March, the tags will start to pop to the surface to hopefully shed some light on the movements of molas in tropical waters and add another piece to the jigsaw that



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is gradually taking shape. Later in 2005, Thys will go to the Galapagos Islands to do another tagging program on molas. Hopefully by then we will be on the way to a better understanding of these curious giants of the deep. ΔΔ

Above: The surpiser surprised. Below: Pecked clean again, the giant slips back into the deep.



Fast facts

- Hatchlings are around 2.5mm long at birth and covered in spines (like the mola's relative, the pufferfish)
- As they grow, they shed their spines, flatten out, and start packing on the kilos: eventually reaching up to 60 million times their starting weight
- The biggest common mola ever found weighed 2,235kg
- The mola produces the most eggs of any vertebrate – more than 300 million of them in a large female
- Mola skin can be up to 15cm thick
- It swims like a triggerfish by synchronised flapping of its dorsal and anal fins
- Their gut is a delicacy in Taiwan and there is concern that stocks in parts of the Pacific are beginning to show signs of decline
- Their behaviour in basking on the surface may be to warm up after diving deep in search of food, but some claim they also signal with their fins to attract seabirds to come and feast on their parasites