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MYSTERIOUS NEW CALEDONIA COWRIES

> UNDER THE SURFACE OF NEW CALEDONIA SOUTH LAGOON, A SINGULAR PHENOMENON AFFECTS SOME SPECIES OF COWRIES BY DEFORMING OR ALTERING THE COLOUR OF THEIR SHELL. JACK BERTHOMIER HAS ALWAYS BEEN FASCINATED BY THESE ABERRANT SHELLS.



Left - A comparison of two specimens of *Cypraea mappa* – a *niger* and a normal one. (Photo Pierre Larue)

Above left to right

- A normal *Cypraea fimbriata* on the move at night. (Photo Jack Berthomier)

- A distorted and slightly melanized *Cypraea fimbriata* measuring 1cm photographed at night. (Photo Jack Berthomier)

- An example of a normal *Cypraea punctata*. (Photo Jack Berthomier)

- A *Cypraea punctata* with signs of melanism accentuating the dark spots. (Photo Jack Berthomier)

- A *Cypraea cribraria*, nicknamed 'Bambi', with its deep carmine mantle deployed. (Photo Jack Berthomier)

- Meeting at night – a couple of *Cypraea cribraria* 'niger' (Photo Jack Berthomier)



SEARCHING FOR BLACK BEAUTY

Nouméa born Jack Berthomier has been a high level spearfishing competitor for 30 years. His infinite knowledge of the lagoon gives him a definite edge in identifying and approaching New Caledonian marine fauna as astonishing as diverse. He's now converted to the macro underwater wildlife photography. In a short time he has compiled a huge bank of images about this subject, exceptional in both quantity and quality. He's now known as a famous malacologist. He searches only at night for the rarest aberrant specimens of a particular family of gastropod shells: the *Cypraea niger*, more commonly known as 'black cowry'. He knows exactly the different biotopes of the lagoon where these extraordinary natural jewels live, and he studies their behaviour. It's long been observed that the devastation cyclones caused to these species has been increased significantly by anthropogenic pollution such as nickel mining destruction of coral reefs, and the anarchic uprising of dead coral heads and stone at low tide.

Jack invited me to join him in the footsteps of these rarest 'black beauty'. He chose Baie de N'Go, an isolated location in the southwest of the Grande Terre (Mainland). Very well organized, he uses a range of plastic containers of different volumes to protect his equipment

and prevent leakage of salt water into his car. One of them is allotted to diving and photographic equipment and projectors etc. He chose to dive on the edge of a small dropoff reef with a steep slope between three to six metres. Jack photographs only while freediving. He swam very smoothly and silently and methodically scanned the coral wall with the brush of his projector. It immobilizes the ray of light on a sleepy parrotfish being cleaned by the 'tools' of an agile multi-coloured shrimp. He photographed a murex, seen on the sand bottom at the end of the trail left by the dribbling mucus while moving. We admired the feeding feather stars, extending their agile arms to capture macro plankton swarming at night. His light hits a wandering sea slug, a recent passion! The outrageous colour of the nudibranch warns potential predators of the mortal danger they face if they consume it. On each dive Jack carefully inspected each crevice. Bingo! He got as close as possible to watch a rare show: the meeting of two *Cypraea cribraria* with charcoal shells. Their two horns on each side moving their siphon and a part of their crimson mantle left no doubt as to the identification of this species whose normal shell colour can be described as 'Bambi'. Perfectly weighted, he steadied and framed without disturbing these splendours of nature surprised in a mating session. Tireless in his quest, Jack



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Top - Jack photographing a nudibranch with great care. (Photo Jean-François Hervé)

- A comparison of the base of two specimens of *Cypraea mappa*: a rostrate and a normal one. (Photo Pierre Larue)

- A *Cypraea mappa* completely blackened by melanism. This exceptional 91 mm specimen was collected in 1972. (Photo Pierre Larue)

- Casy Island in the middle of the Baie de Prony. (Photo Pierre Larue)



will spend several hours searching without finding new cowries outliers. He never takes ordinary, juvenile, or 'mestizo' species. Each discovery has to be deserved. In 2009 he took only nine high quality niger or distorted cowries in 128 hours of night diving. What a privilege to see this show in situ – a rare parade of beautiful 'New Caledonian cowries in black evening dress'.

THEORIES OF MELANISM AND ROSTRATION

Grande Terre in the New Caledonia archipelago is surrounded by a huge reef and lagoon complex populated by 6500 species of molluscs. Malacological caledonian fauna is considered to be an exceptional 'Eldorado' for conchologists interested in the most desirable kinds of gasteropods, as represented by the cones and cowries. Scientists have identified no fewer than 62 species here belonging to the family Cypraeidae (cowrie) of the 200 known in the world. These undeniably elegant shells, especially popular with collectors, live in the southwest lagoon of the Grande-Terre and have singular shape abnormalities (rostrata), colours (Melanie) and sometimes both, increasing their value 10-fold.

Various hypotheses attempt to explain the phenomenon. Dr. Robert Pierson, a French active diver-



collector, develops a pathological thesis. It summarizes a track can explain these anomalies with endocrine disorders. **Melanism**, first of all, is caused by pathological senile lesions determined by one or several substances present in the substrate; these senile lesions would affect the neuroglandular secretive system, which is highly developed in cowries, thus disrupting the regulation of enzymatic secretion, provoking an anarchic production of melanin. **Rostration**, is the result of excessive secretion of calcite or aragonite, an essential component of the shell.

Francis Rougerie, a French oceanographer at ORSTOM (French scientific institute overseas), argues with a thermic thesis. He believes that the winter cooling of the temperature of marine waters south of the lagoon causes a stress on tropical cowries used to living in water exceeding 22 degrees. The drawing of isotherms on maps of surface temperatures of the coldest month of the austral winter (August), shows a striking coincidence: the recovery identical between the coldest areas of the lagoon and habitat cowries outliers. Lastly, Dr CM Burgess an American malacological consultant, believes these changes may be chiefly due to age. He describes the presence of a

second aberrant deposit cowries in the world. Indeed, 1000 nautical miles west of New Caledonia, following the same latitude, the reefs of Queensland's Capricorn Channel host several species of cypraea affected mainly by the deformation and some melanism.

Here are three options to be explored that may explain these metabolic abnormalities in some of the tropical cowries subservient to the thermal limit of their habitat. In New Caledonia some cowries develop these aberrations in the lagoon just south between Baie de Goro and Baie de Saint Vincent to the exclusion of the Great Barrier Reef and median islands of the lagoon. 36 species of



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Top - Two *Cypraea erronea erronea* completely covered by their mantle. (Photo Jack Berthomier)

- *Cypraea erronea erronea* 'niger' moving across the ceiling of a cave at night. (Photo Jack Berthomier)

- A *Cypraea lynx* half covered by her mantle with long white dentritic papillae that look exactly like Christmas trees moving at night (Photo Jack Berthomier)

- A stamp showing a representative specimen of *Cypraea moneta rostrate* (OPT: Post Office of New Caledonia)

- Two samples of *Cypraea mauritiana*. This is a common species, but it is extremely rare to find this as a niger. (Photo Pierre Larue)





melanism and / or rostrata were counted until today.

Cowries for Dummies...

Cowrie is a mollusc, gastropod in a shell, the order mesogastropod, Cypraeidae family, Cypraea genus. It builds an elegantly shaped and glossy shell with various designs, round or pear-shaped, of variable size (5mm to 15cm).

They move by crawling on one muscular foot, horns fitted with an eye on the base surrounding the proboscis that enables it to eat. Their colourful mantle, lined with multiple coloured papillae, completely covers the shell and helps to camouflage. Mainly herbivorous animals, except a few species are

carnivorous, feeding on sponges. They are bisexual, and lay egg masses consisting of several hundred capsules glued together. Exclusively nocturnal animals, cowries leave their shelter to feed on algae or mate at night. During

the day, they can be particularly vulnerable to many predators such as benthic fishes with a powerful jaw such as parrotfish and rays, crabs, octopus, conus, murex and... men. In short, the survival model of cowries is: 'live happy, live in hiding'!

Cowries, unsurpassed for their beauty, were used by our ancestors to decorate ceremonial costumes or as jewelry. Excavations carried out in the Dordogne (France) on a site inhabited by Cro-Magnon, uncovered cypraea from the tropics. In Oceania, some notables wore collars of the rare golden cowrie *Cypraea aurantium*. Many civilizations, including Africa and Asia, used cowries as money. Today's shell collections, less popular, suffer from the ecological diktat. But there is still a private market for rich collectors which is ruled by the law of supply and demand. Accordingly, huge prices can be and are offered to acquire exceptional pieces.

Further Reading:

- *Mysterious Cowries of New Caledonia* Robert et G Pierson IRN Nouméa
- *Porcelaines Niger et Rostrées de Nouvelle-Calédonie*, JM Chatenay



Left: A normal *Cypraea eglantina* near her eggs. (Photo Jack Berthomier)
Right: Under a ledge, a *Cypraea eglantina* 'niger' with its exceptional shell partially uncovered. (Photo Jack Berthomier)

SHARKS AT RISK

> OVER 120 SPECIES OF SHARKS ARE CURRENTLY LISTED AS THREATENED OR ENDANGERED. THE IMPLICATIONS ARE ENORMOUS. AS APEX PREDATORS, SHARKS PLAY AN IMPORTANT ROLE IN MAINTAINING THE HEALTH OF THE OCEAN'S ECOSYSTEM. SERIOUS DECLINE IN THEIR NUMBERS AFFECT MANY OTHER SPECIES, AND THERE IS CLEAR EVIDENCE THAT SOME FISH STOCKS HAVE COLLAPSED BECAUSE OF A REDUCTION IN SHARK NUMBERS. CERTAIN SPECIES OF SHARKS HAVE ALREADY PLUMMETED BY AS MUCH AS 80% IN THE PAST DECADE, AND ARE WELL ON THEIR WAY TO BECOMING EXTINCT WITHIN THE NEXT 10 YEARS. SINCE 1986 IN THE NORTHWEST ATLANTIC, HAMMERHEADS HAVE DECLINED BY 89%, WHITE SHARKS BY 79% AND TIGER SHARKS BY 65%. ALL RECORDED SHARK SPECIES, WITH ONE EXCEPTION, HAVE DECLINED BY MORE THAN 50% IN THE PAST EIGHT TO 15 YEARS. THE RAPID SLIDE IS EVEN MORE ACUTE IN SOME POPULATIONS, LIKE THE WHITETIP SHARK IN THE GULF OF MEXICO, WHERE 99% HAVE BEEN ERADICATED BY HUMANS.

On average, there are 100 shark 'attacks' on humans each year around the world. Only about a dozen are fatal. More people die annually from bee stings, dog bites or slipping in bath tubs. For every single human fatality from an encounter with a shark, we kill 10 million of them – roughly 11,000 sharks every hour of every day...

...Many sharks are caught as by-catch in fishing nets, or as a result of long-line fishing practices. But the real culprit is shark-finning to feed the insatiable appetite, mostly in Asia, for shark fin soup-which can sell for as much as \$100 USD a bowl. Ironically, some shark fins contain toxic mercury that is potentially harmful to humans. Singapore and Hong Kong are consistently the biggest importers of Indonesian shark fins, a principal source for the product. From 1996 to 2002, Indonesia exported over 1,595 metric tons of dried shark fins to Singapore alone. But, the problem has stretched from China to Latin America to Africa and the United States...

...There are some promising signs for sharks, though. Shark finning bans already exist in South Africa, Brazil, Costa Rica, Canada, Namibia, Ecuador, Palau, the European Union, the U.S., and most Australian States and Territories. The first international ban on shark finning in the Atlantic, including 60 countries, was adopted in November 2004 by the International Commission for the Conservation of Atlantic Tunas (ICCAT) in response to the worldwide outcry...

Enforcement of shark finning bans will always be a problem, especially when profits remain high. A single basking shark fin, for example, can fetch \$6,000 USD or more. In 2002, authorities boarded the Honolulu-based King Diamond II, 350 miles southeast of Acapulco, and discovered 32 tons of shark fins – the biggest shark fin seizure in US history. The cargo was bound for Guatemala and an eventual sale in Hong Kong...

...Some technological advancements are helping. A research team in Florida has developed a genetic test to help wildlife experts crack down on the illegal trade in sharks fins. Small bits of fish flesh can be removed from bins

JEAN-MICHEL COUSTEAU
President, Ocean Futures Society
www.oceanfutures.org

aboard ships or on docks to test to see whether they are protected sharks, and severe fines can be levied. A new DNA test can now identify the flesh of a Great White, which is protected under the Convention on International Trade in Endangered Species...



More needs to be done to destroy the myths and build appreciation for sharks as a productive species on Earth. Time is critical and we cannot ignore our responsibility to right the wrongs done to these amazing creatures. Image: Miles O'Sullivan www.milesosullivan.com

...But sharks are still under-protected in many parts of the world ocean, and populations continue to decline at a precipitous rate...

...I respectfully ask all you fellow divers, OFS supporters, to become ocean champions by doing your part to ensure sharks will remain in our oceans for another 400 million years!

Excerpt from *DiveLog Australasia*, November 2011

Paradise Trashed.



The Northwestern Hawaiian Islands, a 1,200-mile chain of islands and atolls, is one of the most remote places on Earth, far from human civilization and largely uninhabited. Its beaches are strewn with manmade garbage, reefs straggled by hundreds of tons of discarded fishing nets and countless decaying dead albatross with only the remnants of plastic and other debris in their carcasses. Jean-Michel Cousteau's report on the Kure Expedition can be found on www.oceanfutures.org



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