

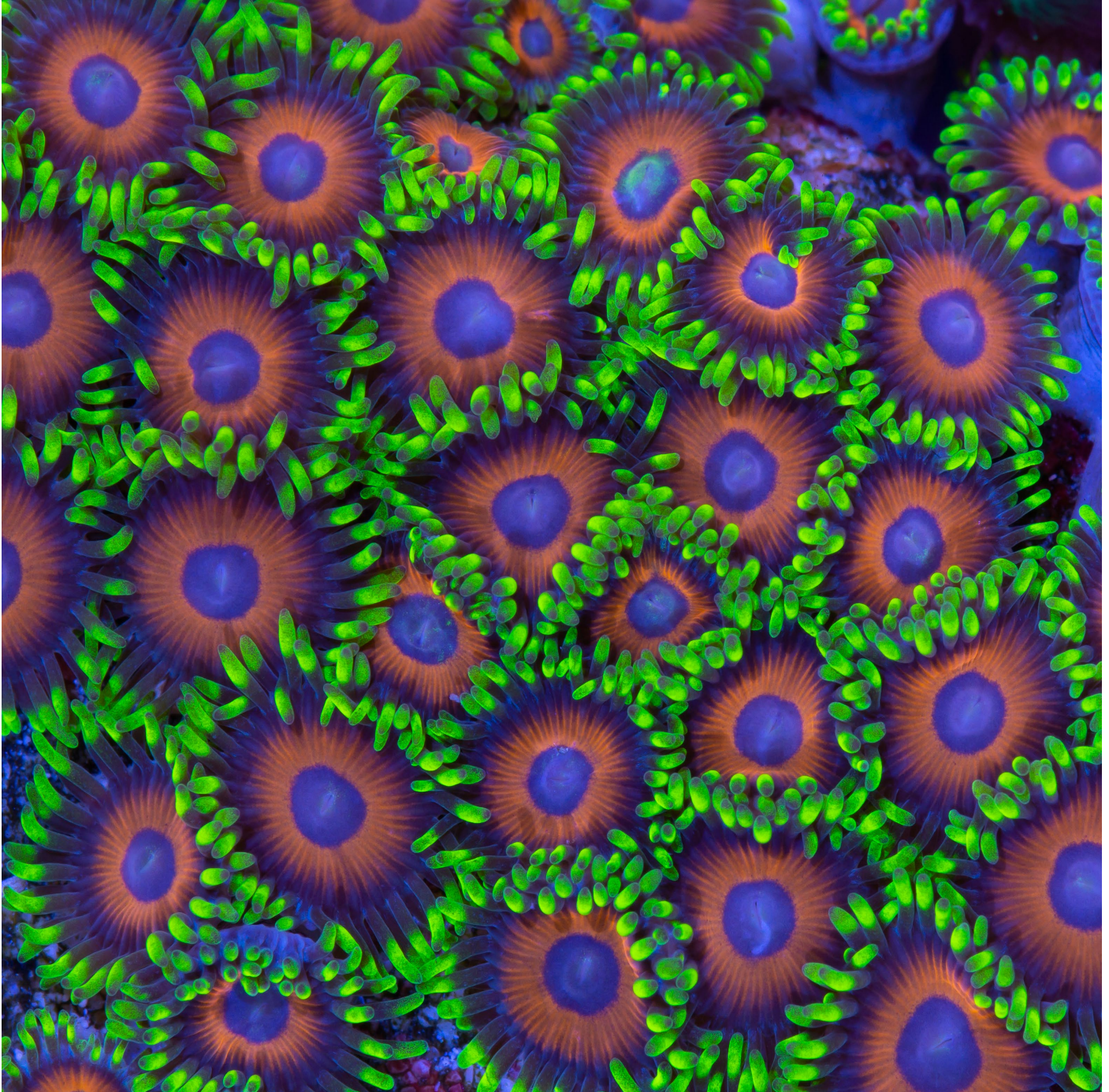


Fig. 1. A healthy colony of polyps of the genus *Zoanthus* (Hexacorallia: Zoanthidae).

Coral Nubbins: Zoa Pox

Chris Aslett

Anecdotes of this illness began to emerge on web forums in the early part of the 2010s whose aetiology was poorly understood, so the author thought it time to implement a literary review with an aim of furthering his previous comprehension. Aquarists have successfully mitigated this ailment with aquarium-approved chemotherapies formulated as bactericides for the genus *Pseudomonas* (Heidi 2011; MyNemesis 2011). We must first, however, raise awareness of the real threat to human health posed by the toxins liberated by its favourite hosts.

Zoanthid Palytoxin

Polyps classified in the family Zoanthidae manufacture palytoxin where fever, chills, muscle aches (myalgias), and a shortness of breath (dyspnoea) that develops into a potentially-lethal non-productive cough, typically follow exposing cuts or grazes, aerosol inhalation, or the ingestion of polluted water, polyp mucus, or contaminated shellfish (Sand et al. 2015).

A man and his family were poisoned when he cleaned *Zoanthus* polyps under running hot water, because stress triggers the excretion of surplus mucus and defence compounds. The patient suffered tachycardia at 112 beats per minute as well as elevated temperature and blood pressure and at some point, developed acute lung damage during his seven-day hospitalisation (Sand et al. 2015).

Zoanthus Taxonomy

Animals of the genus *Zoanthus* are ranked in the phylum Cnidaria, the class Anthozoa, the subclass Hexacorallia, the order

Keywords: reef aquarium, palytoxin, successful treatment, zoa pox, family Zoanthidae, *Zoanthus* polyps.

Zoantharia, and the suborder Brachycnemina (WoRMS 2020).

Handling *Zoanthus*

The author and his employees have acclimated, cultured, and packaged *Zoanthus* polyps in commercial environments for numerous years without precaution and mishap, albeit here, he recommends avoiding skin breach exposure and wearing a facemask, gloves, and safety glasses. Do not stress colonies and purge mucus from skin with thorough rinsing and gentle rubbing.



Fig. 2. Acute zoa pox. Image courtesy of Peter Hughes ©, Southampton, UK.

Symptoms

Polyps close and liquefy but not before their stalks develop yellow pimples, which is a rare example of extraordinary host fidelity insomuch as members of the genus *Palythoa* are not affected (Figs 2. to 4.).

A search on Google Scholar indicated that the scientific community has not undertaken studies of this disease. We are thus limited to hearsay and grey literature. In the interests of objectivity, it was therefore impossible to further enlighten over and above what is described herein.

Be that as it may, gram negative bacteria of the genus *Pseudomonas* are significant nitrifiers of the microbial consortium of a saltwater biofilter, that perform best in the laboratory (in vitro) using a growth medium supplemented with a salt of ammonium like ammonium nitrate (Cowan 1974; Tal et al. 2003). They ostensibly participate in denitrification (Colasanti 2011) whilst many manufacture an arsenal of protein-degrading proteases which may represent virulence factors used during disease-causation (pathogenesis; Herbert 1999). However, Roberts maintained in historic literature that members of this genus are obligate non-fermentative aerobes that respire oxygen (Roberts 1989). A handful of species and strains are conspicuous pathogens of animals (Noga 2010) like *P. fluorescens* that cause piscine bacterial haemorrhagic septicaemia, whereas Japanese eels (*Anguilla japonica*) can suffer from red spot disease elicited by *P. anguilliseptica* (Roberts 1989). Moreover, some species manufacture yellow pigments, whereas *P. aeruginosa* generate rainbow-like patterns on the surface of bacon (Cowan 1974a) which are rendered harmless when properly cooked. The specificity of nitrofurazone may be limited to strains of this species (Google.com 2026).

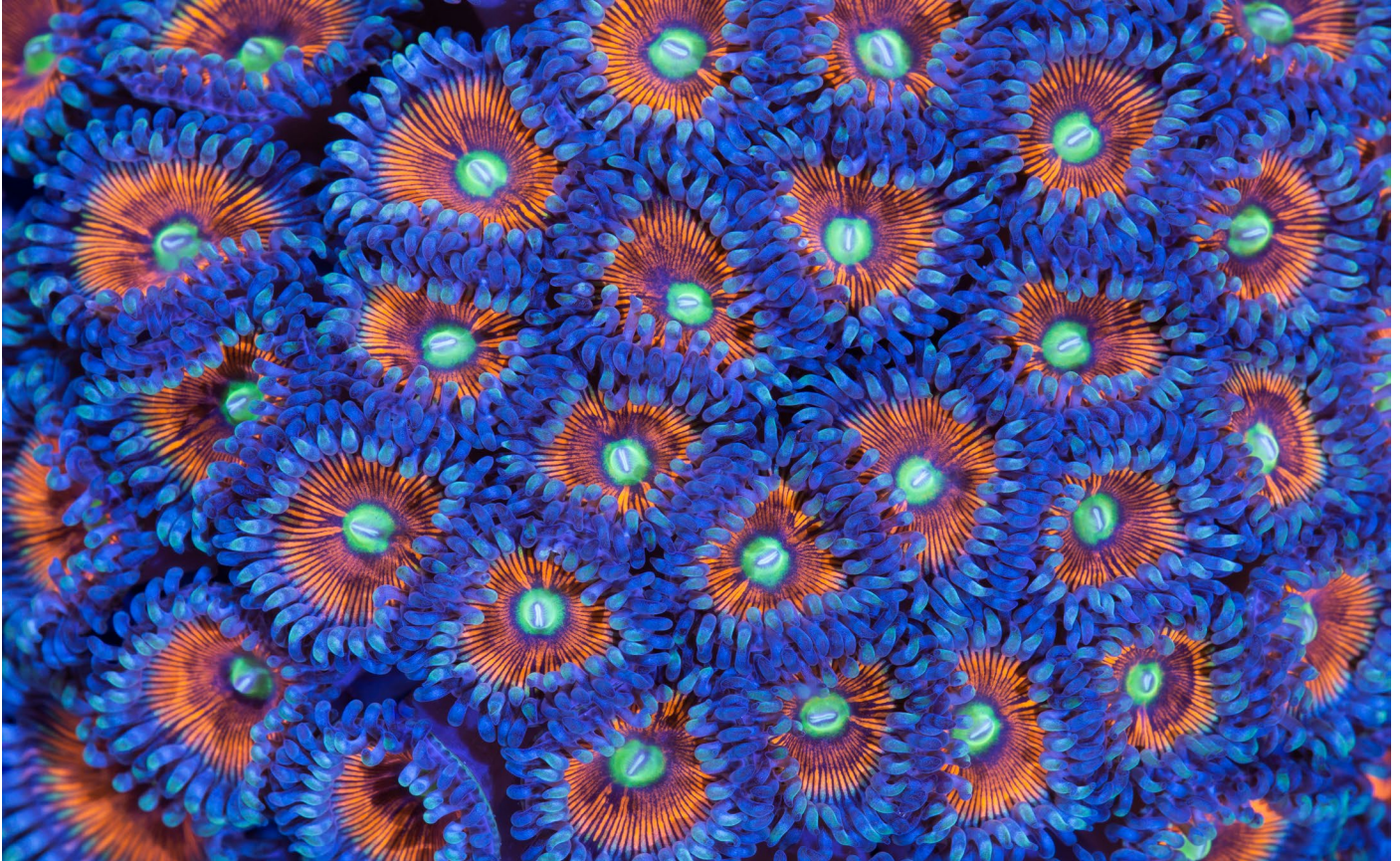


Fig. 3. Button polyps of the genus *Palythoa* (Hexacorallia: Sphenopidae) do not develop zoa pox.

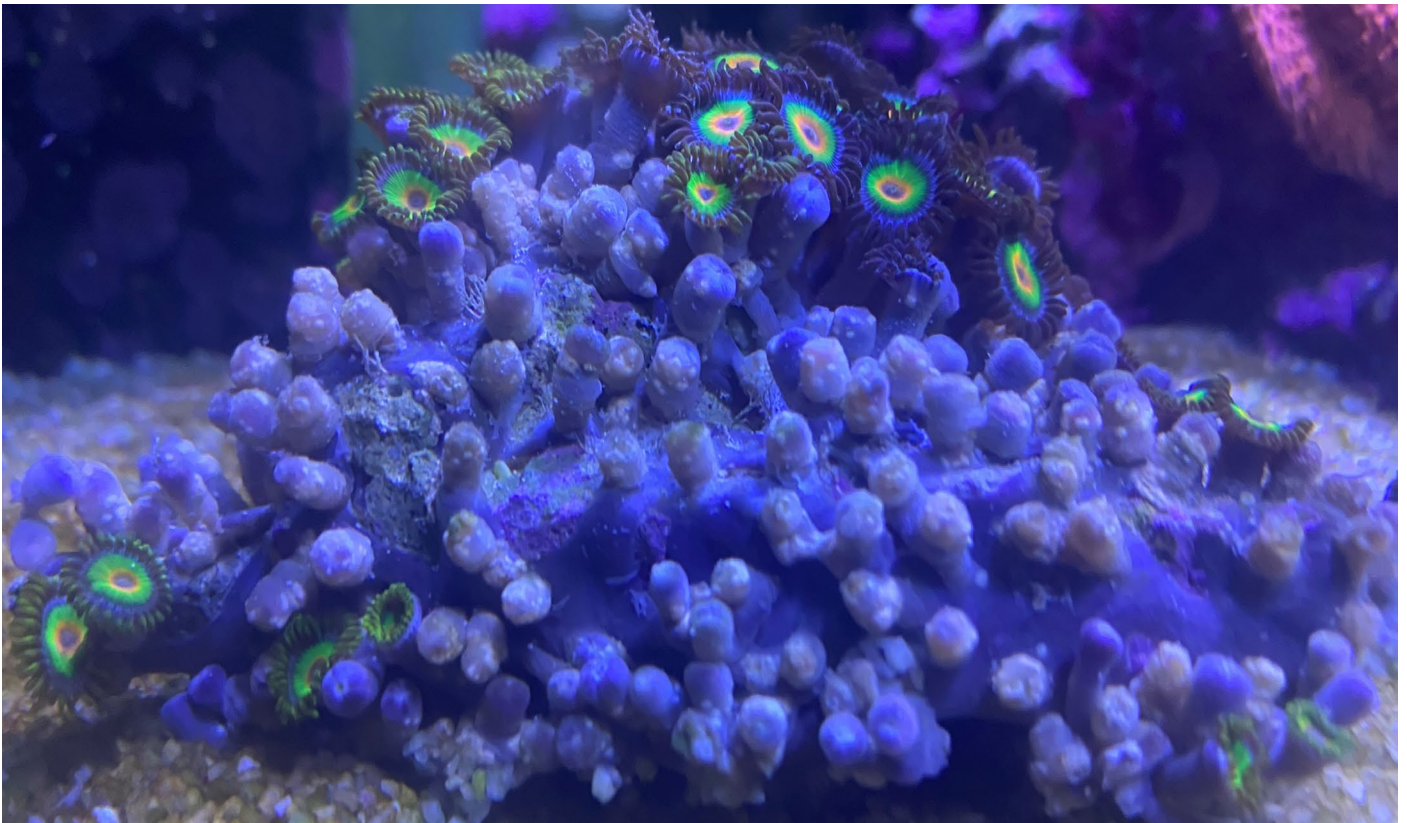


Fig. 4. The cause of zoa pox remains unclear. Image courtesy of Peter Hughes ©, Southampton, UK.

The author has no firsthand experience of this illness despite trading in too numerous to quantify zoanthids, and there were no reports or sightings of this disease before he closed The Reef Ranch™. New illnesses do materialise whilst reefing trends and practices remain exceedingly changeable. Could it be that recent parasitic loads and the advent of coral dips have somehow contributed. A coral's mucosal microbiome is the colonies first line of defence and even those formulated from natural ingredients are meant to stimulate surplus mucus and a sloughing of these vital microbial communities. Aquarists have dipped corals in a dilute solution of Lugol's iodine long before the first reports of this illness, which comprises beneficial as well as molecular iodine that is corrosive and hostile to all life. The author recalls weighing molecular iodine (I_2) which is a remarkable deep purple fuming crystalline halogen on a laboratory balance in an extraction cabinet with a pure nickel spatula, which to his surprise and horror, it dissolved.

Grey literature suggests that immersion in a solution of around 2 millilitres (ml; ~40 drops) of Lugol's iodine in a US gallon (380 ml) of aged aquarium water for 15 minutes (reef2reef.com; 3reef.com; nano-reef.com) will cure this illness (Ricklalde 2010). Sterilising the mucus layer of corals will leave them vulnerable to microbial attack, yet the virulence of zoa pox appears to demand a "kill or cure" approach. Preferably dip new outwardly healthy zoanthids in dilute solutions of Coral RX Pro or ReVive Coral Cleaner but if from a reputable supplier that openly discusses the control of pests and parasites, it would be imprudent to stress colonies.

Strains of *Pseudomonas aeruginosa* are likely common environmental contaminants whereas the microbiome that is human skin, comprises too numerous to include microscopic taxa. Handling bacon then submerging your hands in a reef is one possible way of inoculating potentially pathogenic strains. Furthermore, the oils from your skin will flatten protein skimmer foam for several hours. Strip sebum and microbes from your hands and arms by gently rubbing them with copious amounts of non-fragranced hand sanitiser made from only *Aleo vera* gel and ethanol/methanol, then thoroughly rinse in chloramine-comprising mains tap water followed by meticulous drying.

Frozen fish and crustaceans considered safe for humans may contain organisms that cause aquatic diseases. All reef-safe foods have been irradiated with gamma rays which leaves them nutritionally unaffected but pathogen free.

Ensure your husbandry and system are optimised by consulting open-access Coral Nubbins: Reef Troubleshooting at <https://reefranch.co.uk/> as less than ideal conditions can predispose corals to ailments that they might ordinarily withstand.

Control

API Furan-2™ has proven efficacious as a colonial dip which contains the *Pseudomonas* antimicrobial, nitrofurazone as well as methylene blue. Likewise, Jungle Fungus Clear is formulated from nitrofurazone and potassium dichromate, all of which may be unavailable or banned, and thus adhere to national legislation. Submersion in a dilute solution of either therapeutic will be stressful and will likely elicit the excretion of palytoxin, whilst neither of these remedies should be administered to reef aquaria.

Dissolve three 8-oz sachets of Furan-2™ in three cups of aged tank water and dip the coral for 25 minutes (Heidi 2011; MyNemesis 2011). Peter Hughes observed partial efficacy with this preparation and advised multiple treatments (Hughes, personal communication) and thus re-immerses on the seventh and 14th day (Heidi 2011; MyNemesis 2011).

Thoroughly purge these compounds or iodine from corals before reintroducing them to a system by immersing them in two consecutive vessels filled with just aged seawater. Use a turkey baster in the second to jet water at the colony and exploit prerinsed reef-grade granular activated carbon (GAC) in the aquarium's filtration for 48 hours, and / or place recuperating polyps in quarantine.

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As the principal director of Reef Ranch Publishing Ltd (<https://reefranch.co.uk/>) and author of The Complete Reef Aquarist – A Conservation Manual (<https://reefranch.co.uk/reef-aquarium-guide/>), Chris has over 55 years of experience keeping aquatic animals with 47 of them nurturing marine species. His innate passion for system dynamics drove him from the laboratory to university where he gained a greater appreciation of biochemistry, biotechnology, epidemiology, genetics, histology, inorganic and organic chemistry, mariculture, molecular and microbiology, saltwater zoology, and the diagnosis and treatment of aquatic diseases. His dedicated marine livestock supplier, The Reef Ranch™, demanded he devise, streamline, and establish protocols for combined acclimation and prophylactic pest/parasite clearance, and innovate system design, optimisation, maintenance, and husbandry in the face of incessant influxes of hundreds of delicate marine animals. With exceptional, uncompromising, and likely the UK's most disease-free reef and fish-only facilities, losses were less than one resident every six months. 20 years hence, he has refined his expertise for digesting, authoring, editing, and publishing reef conservation-driven scientific literature (<https://reefranch.co.uk/reef-research-and-aquarium-advice/>), to an end of diminishing the impact the tropical marine ornamental industry exerts in the wild.