BASIC INSTINCTS

By Jeanne Liebetrau and Peter Pinnock

The first rule in nature is 'kill or be killed'. Quite simply interpreted this means you are either eating off the menu or you are on it. The second rule is 'fight for survival'. This rule can entail using defense mechanisms as counter-offensive maneuvers or be well equipped for instant battle. The third, most important rule is 'avoid detection'. It's worth remembering that the enemy also employs this strategy to ambush prey. These 3 rules apply whether defending life, offspring, hunting territory and feeding grounds or even a soul mate. Tactics vary from species to species. In the ocean realm fish have acquired ingenious fishtactics and design adaptations to institute these rules, but the basic instinct is that of survival.

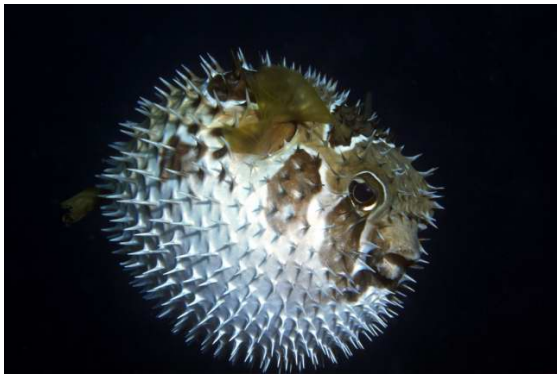
It's either survival of the fittest or survival of the smartest. Predators, such as kingfish and jacks, are designed for speed. With their sleek torpedo shaped bodies and retractable fins to reduce drag, these fish can out-swim any victim. But expending so much energy swimming at speed is not very fuel efficient so they have learnt fishtactics such as; to hunt in packs. When attacked by a hunting pack the vulnerable prey have difficulty figuring out exactly which hunter they need to stay clear of. In the ensuing confusion the prey are more easily slain. The reverse tactic is often adopted by smaller fish. Safety in numbers is probably one of the most common

survival strategies. Anthias, damsels, sardines, snappers and glassies, to name but a few, shoal in large aggregations. The predators themselves have difficulty honing in on a potential meal as the sensible fish swarm within their shoal keeping it moving in multifaceted directions.

Some fish don't have the advantage of crowd protection but they have their own unique idiosyncrasies. One modus operandi to avoid being killed is to either look very unappetizing or taste absolutely awful. It is thought that the bright colours of nudibranchs warn of their impending foul taste. A fish only has to sample one nudibranch to learn to stay clear of all others in future. Frequently, juvenile fish are much brighter coloured than their adult version. The cute little day-glo yellow boxfish grows up to be quite dull by comparison. The adult female boxfish is pale yellow while the male is a navy blue. The juvenile semicircle angelfish is vivaciously painted with bold royal blue circles yet the adult has almost boring green monotones bearing few markings. Is this the juveniles' way of saying "hey I don't taste good, leave me alone"? There is yet another theory that their bright colours say "hey I'm new on the block, get used to my presence." This conditions the adults to their presence allowing the juveniles to share feeding grounds without being terrorized. Whatever the theory it's worth remembering that bright yellow often means bad taste.

Small damsels are not brightly coloured but they too have taught larger fish a lesson in feeding decorum. Damsels have extremely strong sharp dorsal spines, which get wedged in the gullet of the greedy diner. Having once experienced a fish bone stuck in my throat, I can imagine the discomfort of a whole fish being stuck. The pufferfish family goes one step further. When threatened, pufferfish dramatically increase their body size by pumping water into a part of their stomach. Whoever thought the puffer would be a

small easy meal now faces a fish too big to eat. But just in case the attacker is not intimidated, pufferfish have an extremely toxic skin. Porcupine pufferfish are extreme puffers. They take the 2nd rule of fighting for survival to the limit. Not only do they puff but they also turn into inflated mobile spiny pincushions -a serious deterrent.



Adopting the foul taste method or risking a potential meal challenge by a predator is not something every fish would want to try. The simpler method is to live within something that is itself a hostile environment. The clever clownfish have learnt to live within the folds of anemones. The anemone tentacles are loaded with stinging nemotocysts yet the anemone offers the clownfish blanket protection from their enemies. However, as the clownfish cannot lay their eggs within the anemone folds, the eggs are open to attack. No matter the size, clownfish zealously defend their offspring by attacking everything encroaching on their territory. Many a diver has had blood drawn by the fearless over-protective parents. Male goldies are not concerned about their young, they are protective over their harem of females. The dominant male spends the better part of the day chasing and nipping at other males to keep his extended family happy.

A popular application of the third rule (avoid detection) is the use of camouflage. Topping the master class here is the frogfish. I don't know how many frogfish I must have swum past over the years. Disguised as a blob of reef or sponge with authentic colouring, these guys are near impossible to find. This is their ultimate ploy. Frogfish are lazy hunters. Their first dorsal spine, or esce, serves the purpose of a fishing rod and lure. The frogfish must remain invisible for unsuspecting fish to think that the lure is a tasty morsel and take the bait (excuse the pun). As soon as the prey gets close enough,

the frogfish opens its ginormous expandable mouth creating a vacuum of note and sucks in its prey whole.

Another fish that disguises itself as reef to avoid detection is the scorpionfish. Their bodies are bedraggled with ragged appendages resembling seaweed. Fish that aren't streetwise may venture too near and fall into a deathtrap as the scorpionfish move with lightening speed to grab the hapless victim. While the frogfish and scorpionfish use camouflage to deceive their victims, others use camouflage to hide from their enemies. The many-host goby is practically see-through allowing it to roam freely on whip corals, gorgonians, fans or hard corals undetected. The juvenile rock mover wrasse masquerade as a piece of drifting seaweed in order to avoid detection.

Even fish that don't possess camouflage abilities have techniques to apply the first rule – kill or be killed. Trumpet fish lurk apparently innocently in amongst shoals of fusiliers or snappers. This enables them to sneak up on their prey as their 'hosts' are often peaceful herbivores scrounging for reef debris. The so aptly named surgeonfish have minimal yet effective weapons of destruction. Armed with a samurai sword at the base of their tail they inflict serious wounds as they lash out at their attacker. The only defense the strikingly beautiful triggerfish have is to create an earth shattering noise to scare off would-be attackers. They do this by raking their gills. It's loud and effective.

Each and every fish from the leviathan whale shark to the teeniest goby has a plan to implement the fundamental rules of nature and follow their basic instincts in the fight for survival.

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