Corsola ecosystems in the Galar region

Rodrigo B. Salvador

Email: salvador.rodrigo.b@gmail.com

To begin this article in the most honest way I can think of, I must state that as a biologist I’ve always complained about those absurdities in the Pokémon franchise that could have been solved if the designers had taken 10 minutes to Google them. And I’m not alone in this! – There are issues such as mistaken cephalopod anatomy (Salvador & Cavallari, 2019), using Japanese species on a setting that’s clearly France (Tomotani, 2014), the impossible water-holding capacity of Blastoise (dos Anjos, 2015), and the skewed biodiversity of the Pokémon world towards cats and dogs (Prado & Almeida, 2017; Kittel, 2018; Salvador & Cavallari, 2019).

Maybe that’s why one Pokémon in this new generation (Gen VIII) has caught me so off-guard. Given that the whole franchise is about making monsters beat other monsters, I was not expecting something with an ecological/conservationist edge out of it. I was particularly not expecting a new Pokémon to reflect one of the major environmental problems our planet is facing: coral bleaching. The Galarian form of Corsola was a slap to the face and a brilliant addition to the game, so hats off to Game Freak Inc. and The Pokémon Company in this regard.

Figure 1. Corsola. Original artwork from the game; extracted from Bulbapedia.

Figure 2. The skeletal remains of a Corallium rubrum (Linnaeus, 1758). Extracted from Wikimedia Commons (P. Géry, 2010).

1 Not in other regards, though. We did not need a new Mr. Mime or a Pokémon who’s a walking dollop of whipped cream. Not to mention that the ice cream Pokémon were included in the game, but Abra, Starly and Lord Helix were not.
CORSOLA AND CORALS

Corsola’s first appearance on the franchise was on Gen II, the famed Gold and Silver games (Fig. 1). It is a dual-type Pokémon (Water/Rock) based on a coral, likely the red corals\(^2\), a moniker given to several species in the genus *Corallium* (Fig. 2).

Corals are animals belonging to the phylum Cnidaria, which also includes jellyfish and anemones. Broadly speaking, there are two types of corals: soft corals (Alcyonacea) and stony corals (Scleractinia). The latter, as can be surmised by their name, have hard skeletons made of calcium carbonate (Fig. 2). That explains Corsola’s Rock type – or would, because the red corals that are the likely inspiration for Corsola, are not stony corals. Rather, they are soft corals (Alcyonacea) that – atypically for the group – have calcareous structures in their otherwise organic skeleton (Grillo et al., 1993; Debreuil et al., 2011).

The live polyps (Fig. 3), however, look very different from the dead coralline skeleton. But oddly enough, Corsola looks more like a dead coral colony skeleton (Fig. 2) than a living one. Also, Corsola looks like a single creature rather than a colony, as it would be expected of red corals.

Despite being colonial, red corals (and other soft corals) are not reef-building corals. Even though, to better explain the issue with coral bleaching and threats to ecosystems, I need to provide a brief explanation on reefs and reef-builders.

Stony corals are often colonial and a group of them known as “hermatypic corals” are reef-builders; that is, their skeletons fuse to become coral reefs (Fig. 4). These corals often have symbiotic zooxanthellae (single-celled photosynthetic algae) embedded in their soft tissues. Since they depend on photosynthesis to acquire nutrients, they are typically found in shallow and clear tropical waters.

Figure 3. Live *Corallium rubrum* (Linnaeus, 1758). Extracted from Wikimedia Commons (P. Géry, 2010).

Coral reefs are hotspots of marine biodiversity. They sustain and shelter a myriad of species: lobsters and shrimps, snails and squids, worms, fishes, turtles, and many others (Fig. 5). So, why does that matter? Simply put, the highest the biodiversity (number and types of different species), the more ‘ecosystem services’ we can benefit from (CORAL, 2019). Think of these services\(^3\) as everything nature can provide us if we could just take good care of it. To

\(^2\) Also known as ‘precious corals’ because people like to use its red/pink/orange skeleton for making jewelry.

\(^3\) Ecosystem services are split into four categories: provisioning (e.g., food production); regulating (e.g., climate buffering); supporting (e.g., oxygen production); and cultural (e.g., recreational and spiritual benefits).
help inform decision-makers, many ecosystem services are being assigned economic values. It seems ridiculous that we have to assign an economic value to nature, but unfortunately that’s how our short-sighted governments work.

Inevitably, coral reefs are extremely threatened by overfishing and pollution (including the now pervasive microplastics) and by climate change, because the increased temperatures lead to coral bleaching and ocean acidification (McClanahan, 2002). But I will come back to this later; first, let’s take a look at the Galar region and its Corsola.

**GALAR**

The Galar region is the setting of the newly released games *Pokémon Sword* and *Pokémon Shield*, the franchise’s Gen VIII. Galar is based in the United Kingdom and several locations in the game were inspired by real-world places. Part of the new fauna (but not all of it⁴) is also appropriate to the UK, such as ravens (Corviknight) and cormorants (Cramorant). However, as the game says, Galar is heavily industrialized and this has influenced some Pokémon living there, like Weezing, whose Galarian variant manages to look even more noxious than the original form from Kanto (but see Box 1).

The Galarian variant of Corsola is a Ghost-type Pokémon, clearly indicating it’s already dead. It is entirely white (bleached) and has a sad face (Fig. 6). Its Pokédex entry in *Pokémon Shield* bluntly states: “Sudden climate change wiped out this ancient kind of Corsola.” In Galar, Corsola also have an evolution, named Cursola (Fig. 6), which is, likewise, a Ghost-type. It is a larger and more branched coral.

However, contrary to regular Corsola, the Galarian Pokémon are not based on the red coral. Instead, given the shape of their branches, they seem to be based on actual reef-building corals such as *Acropora* spp. (Fig. 7). That is fitting, because *Acropora* corals are major components of reefs and are one of the most sensitive corals to climate change (Loya et al., 2001). Also, *Acropora* corals are what you usually find when googling for “bleached coral”. So it seems *Sword* and *Shield* developers are finally using Google, after all.

**CORAL BLEACHING**

When ocean temperatures increase⁵, the symbiotic zooxanthellae leave the corals. This makes the corals become white (Fig.

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⁴ For instance, one of the starters is a monkey.

⁵ Water pollution can also be a cause for bleaching in some cases.
they “bleach”, so to speak. Also, without their photosynthetic “buddies”, corals are under more stress, start to starve, and overall have a serious decrease in their chances of survival (Fig. 8). Decline in coral ecosystems have been reported from all over the world: from the Caribbean to the Indo-Pacific, most famously including the Great Barrier Reef (Bruno & Selig, 2007; Edmunds & Elahi, 2007; De’ath et al., 2012). As is, the Channel’s ecosystem cannot recover and the biodiversity in the area has plummeted (Molfese et al., 2014).

Decline in coral reefs will start a cascading effect and most other species dependent on them (lobsters, squid, fish, etc.) will decline as well (Jones et al., 2004). This might lead to ecosystems collapses and, needless to say, it will affect all those ecosystems services (including food) we derive from the sea. When corals die, the dead rocky reefs become dominated by low-productivity and non-commercial invertebrate species such as sea urchins, starfish, and small snails (McClanahan, 2002).

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Curiously, *Pokémon Moon* (Gen VII) had the following Pokedex entry for Sharpedo, a shark Pokémon: “It has a sad history. In the past, its dorsal fin was a treasured foodstuff, so this Pokémon became a victim of overfishing.”

So, the absence of Sharpedo in *Sword* and *Shield* could be explained by an extinction event.

Just using this footnote to point out that this person has a PhD and is thus known as Dr. De’ath. That is one of the coolest Marvel-esque names I’ve ever seen in academia.
Bleaching, however, is not the only threat to corals. Our oceans are acidifying due to increased CO\textsuperscript{2} concentrations in the air since the Industrial Revolution. When CO\textsuperscript{2} is absorbed into the water, it reacts to become bicarbonate ions, making the water more acidic. This effect is, of course, amplified by higher temperatures (Humphreys, 2017). Acidified waters make it more difficult for corals to produce and deposit calcium carbonate (Albright et al., 2017), which is the substance that makes up their skeleton, as we’ve seen above.

Unfortunately, corals are not the only animals threatened by rising temperatures in the ocean.

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\textsuperscript{8} Phione and Manaphy are Pokémon based on the pteropod species Clione limacina (Salvador & Cavallari, 2019). Their absence in Sword and Shield could be explained by an extinction event due to climate change.
Mollusks have shells made of calcium carbonate and are thus vulnerable to more acidic waters, especially during their larval or juvenile phase. Mollusks such as planktonic sea-butterflies (pteropod snails; Fig. 9) and bottom-dwelling bivalves are as important as corals for ecosystems, and several other animals depend on them, from other mollusks to crustaceans and fish (Manno et al., 2017). Here, the situation might be even worse than with corals: while reefs are restricted to tropical regions, ocean acidification will affect mollusks in temperate regions as well (Soon & Zheng, 2019).

As much as we can protect the natural world by creating nature reserves (including marine ones), unfortunately they will not work in this case (Allison et al., 1998; Jameson et al., 2002). Reserves can protect the reef ecosystem against overfishing and trawling, but it cannot stop ocean acidification. That is linked to climate change and we are already passing the tipping point in which the change could be turned back (Aengenheyster et al., 2018); soon, all we’ll be able to do is damage control.

REFERENCES


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About the Author

Dr. Rodrigo Salvador is a biologist who specializes in mollusks; fittingly, his favorite Pokémon is the West Sea Gastrodon. Part of his research is on marine snails and slugs, but he’s also interested in other marine animals – except fish maybe, which are mostly boring. He has played Pokémon since Gen I, but never really cared about Corsola – until now.