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My neighbor Linnaeus: The influence of Studio Ghibli in zoological nomenclature

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Characterized by its complex stories, stunning visual art, and strong female protagonists, Studio Ghibli is one of the most renowned studios in the animation industry. The Tokyo-based Japanese studio was founded by directors Hayao Miyazaki and Isao Takahata and producer Toshio Suzuki in 1985. Since then, it has been involved in different projects: short films, commercials, video games, and most notably, more than 20 feature films such as the classic *Grave of the Fireflies* (1988) or the Academy Award winner *Spirited Away* (2001) (Studio Ghibli, 2023).

It is undeniable that over the years, Ghibli has become a worldwide phenomenon. But its influence has not been limited to entertainment. We can also find traces of it in science, particularly in the one in charge of identifying, classifying, and naming species: taxonomy. In this contribution, I compile the animal species whose scientific names have been inspired by Studio Ghibli, as well as the stories behind the choice of those names.

A BRIEF INTRO TO NOMENCLATURE

Before we get started with the names, let's go back to what rules them: nomenclature. Nomenclature is the part of taxonomy that deals with the naming of species (Winston, 1999). It is a system that allows every discovered species to have a unique name based on specific rules (Winston, 1999, 2018). These rules, assembled into "nomenclature codes", vary depending on the type of organism to be named; for example, to name animals, we have the International Code of Zoological Nomenclature, while for plants, there is the International Code of Nomenclature for algae, fungi, and plants (ICZN, 1999; Turland et al., 2018).

Although humans have assigned names to organisms for thousands of years, it was not until the 18th century that the naming process began to standardize (Winston, 2018). The latter was possible thanks to the work of the Swedish naturalist Carl Linnaeus. Back in his day, scientific names were often long as they also served as descriptions of the species. Linnaeus had the idea to assign each species a two-word name in addition to the longer descriptive one and used it throughout his works. It did not take long for other scientists to adopt these binomial names as the preferred ones for their practicality, so much so that their use prevails today (Winston, 1999, 2018; Heard, 2020).

We can identify a species' scientific name as this two-word, most likely Latinized, label. The first word, always capitalized, is the genus name. It indicates the major group a species is most closely related to. The second word is the specific name, and it "qualifies" the first (Winston, 1999). This is the one that makes a name unique, as no other member in the genus can have the

same name. As we will see below, specific names can refer to different things, explicitly or implicitly: features of the species, places, people, or even nothing at all (Winston, 1999; Heard, 2020). Here, we will get to know a particular type of scientific names, the *ghiblicore* ones.

GHIBLI-INSPIRED SCIENTIFIC NAMES

From the Valley of the Wind

Nausicaä of the Valley of the Wind (1984), considered the first Studio Ghibli feature film, has inspired the names of two marine species: a parasite isopod and a sponge. The former's name is *Cabirnalia nausicaa* Boyko & van der Meij, 2018. This species was named after the film protagonist, Princess Nausicaä, since the structure that helps it attach to its crab host (attachment process) resembled the protective mask Nausicaä wears to enter the Toxic Jungle (Boyko & van der Meij, 2018) (Fig. 1). With a look at Boyko & van der Meij's study (2018: p. 16, fig. 8C), one can see the similarity.

Figure 1. The isopod *Cabirnalia nausicaa* with Nausicaä's flight helmet and Shohki mask.

Also named in honor of the princess, we have the sponge *Scopalina nausicae* Turner, 2021. Although the author of the species did not delve into the origin of the name when describing it, he did talk about it in a later interview (Turner, 2021; Tassof, 2021). Turner (2021) recalled that some creatures in the Ghibli film filter and enhance their environment (probably referring to the Ohmu) just as sponges like *S. nausicae* do in the sea, hence the name (Tassoff, 2021; Nausicaä Wiki, 2023).

Fuzzy species

The fuzzy spirit Totoro, from *My Neighbor Totoro* (1988), is the Studio Ghibli character that has inspired most of the species' names on this list. *Knebelia totoroi* Audo et al., 2014, a fossil lobster, and P*aravimus totoro* García & Villarreal, 2023, a harvestman, were named after Totoro due to the morphological similarities shared with him. For Audo et al. (2014), the margin of the body (carapace) of *K. totoroi* resembled the silhouette of Totoro. In the case of *P. totoro*, it was a pair of tubercles on its back, its paramedian armature, that reminded García & Villareal (2023) of Totoro's ears.

Other two species share their name with Totoro as well, the tardigrade *Pseudechiniscus* (*Pseudechiniscus*) *totoro* Gąsiorek et al., 2021, and the ant-like stone beetle *Stenichnus totoro* Jaloszyński, 2004. These animals received their names as a way to commemorate Totoro, without giving further explanations (Jaloszyński, 2004; Gąsiorek et al., 2021). Still, one could argue that their fluffy bodies, like Totoro's, played a role in this decision.

Finally, there is the velvet worm *Eoperipatus totoro* Oliveira et al., 2013 (Fig. 2). Unlike the rest of the Totoro-named species, the name of this species was inspired by another character in the film, the Catbus, "a many-legged animal" that, according to Oliveira et al. (2013), resembled the worm. It remains a mystery why this species was named "totoro" instead of "catbus" or "nekobasu", its Japanese equivalent. On the bright side, these names are still available for other species with multiple legs.

Figure 2. The velvet worm *Eoperipatus totoro* wearing a Catbus hat.

Spirits of the forest

Princess Mononoke (1997) has given rise to both epic characters and memorable scientific names. For example, the Scandinavian wasp *Odontocolon kodama* Johansson, 2022 is the namesake of a characteristic group of spirits in the film, the Kodama (Johansson, 2022) (Fig. 3). These little white creatures live in the trees and are a sign of the health of the forest; if the forest is destroyed, so are they (Ghibli Wiki, 2023a). Johansson (2022) mentions this in the etymology of the species' name, perhaps hinting that the same could happen to the "real-life kodama" if the forests where it lives are harmed.

Another species related to this film is *Ornamentula miyazakii* Minowa & Garraffoni, 2021. By reading the name in this context, one can immediately tell that this species of gastrotrich was named after Hayao Miyazaki. Nonetheless, there is a descriptive component apart from celebrating the talented director. According to Minowa & Garraffoni (2021), the gastrotrich looks like one of Miyazaki's characters, the Deidarabotchi or Night-Walker, the nocturnal version of the Forest Spirit (Ghibli Wiki, 2023b).

But not only the spirits in *Princess Mononoke* have inspired scientific names. For the name of the leech *Orobdella mononoke* Nakano, 2012, what brought the idea was a place. This Japanese species received the name "mononoke" because it was discovered in Shiratani Unsuikyo, the location that inspired the forest portrayed in the film (Nakano, 2012).

Figure 3. Top: The wasp *Odontocolon kodama*. Bottom: Kodama in the forest from *Princess Mononoke* (1997). Image sources: Barcode of Life Data Systems (H. Haraldseide; CC BY-NC-SA 3.0); Studio Ghibli (screen capture from the movie).

The No-Face cockroach

When a team of researchers found a new species without a face, they did not hesitate to give it a rather literal name: "kaonashi" (faceless in Japanese). *Cretaperiplaneta kaonashi* Qiu et al., 2020 is an amber-embedded fossil cockroach from Myanmar that lived in the mid-Cretaceous (approximately 113–105.5 million years ago) (Qiu et al., 2020). Since the only specimen found had its face damaged, the species was named after the iconic Kaonashi or No-Face, the silent spirit that follows Chihiro in the film *Spirited Away* (Fig. 4).

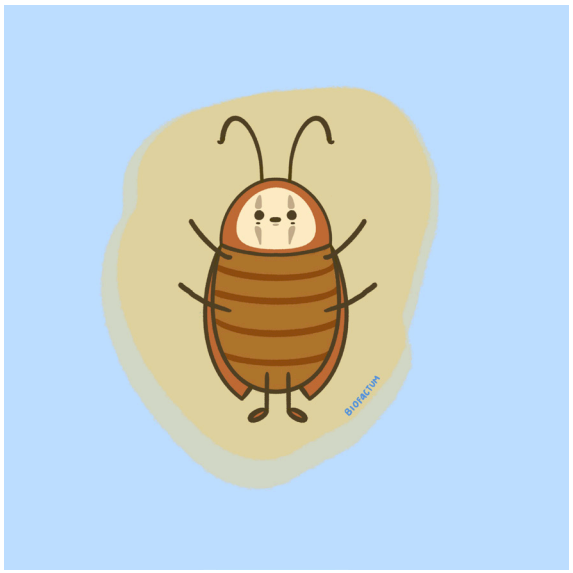

Figure 4. The No-Face cockroach *Cretaperiplaneta kaonashi*, embedded in amber.

An anemone with spark

The sea anemone *Stylobates calcifer* Yoshikawa & Izumi, 2022 is probably one of the most curious species with a Studio Ghibli-inspired name. It is so peculiar that it was listed as one of the ten most remarkable marine new species from 2022 (Dekeyzer, 2023). This Japanese animal can secrete a substance (carcinoecium) that allows it to adhere to the shell of the hermit crab *Pagurodofleinia doederleini* (Doflein, 1902), which becomes its moving home (Yoshikawa et al., 2022). *Stylobates calcifer* owes its name to the fire demon Calcifer from *Howl's Moving Castle*, a novel by Diana Wynne Jones (1986), later adapted into a film and popularized by Studio Ghibli (2004) (Fig. 5). According to Yoshikawa et al. (2022), the relationship between the anemone and the crab reminds that of Calcifer with the wizard Howl, both resulting in a "moving castle".

Brittle starfishy in the sea

Last but not least, there is the fossil brittle star *Stegophiura miyazakii* Ishida et al., 2018. This species was found in Mashiki, Japan, on a strata dating from the Late Cretaceous (approximately 100.5–66 million years ago). Ishida et al. (2018) named the species after Hayao Miyazaki, using his last name as the specific name. The authors decided to do this to honor Miyazaki's work in animation, particularly *Ponyo* (2008), a film where marine life plays a central role (Fig. 6). Moreover, the species' discoverers did not overlook that the director's favorite novelist lived in the same prefecture where the species was found.

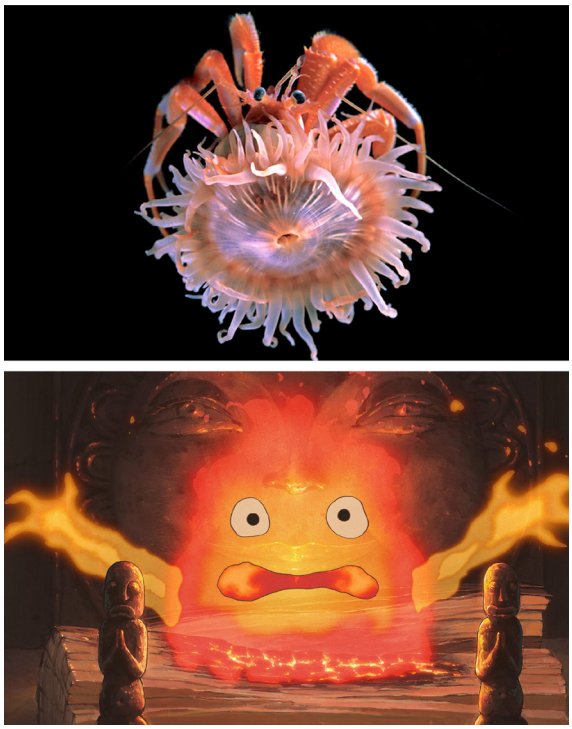

Figure 5. Top: *Stylobates calcifer* anemone and its crab host *Pagurodofleinia doederlini*. Bottom: The fire demon Calcifer from *Howl's Moving Castle* (2004). Image sources: World Register of Marine Species (A. Yoshikawa; CC BY-SA 4.0); Studio Ghibli (screen capture from the movie).

CONCLUSION

To date, Studio Ghibli has inspired the scientific names of 13 animals. These include both extant and fossil species from terrestrial and aquatic environments, all invertebrates. The number of Ghibli-themed scientific names has increased over the years, with one in the 2000s (Jaloszyński, 2004), five in the 2010s (Nakano, 2012; Oliveira et al., 2013; Audo et al., 2014; Boyko & van der Meij, 2018; Ishida et al., 2018), and seven so far this decade (Qiu et al., 2020; Gąsiorek et

al., 2021; Minowa & Garraffoni, 2021; Turner, 2021; Johansson, 2022; Yoshikawa et al., 2022; García & Villareal, 2023). Since the popularity of Studio Ghibli continues to rise and there are still millions (literally!) of species to be named, Ghibli names will almost certainly keep emerging.

Figure 6. Top: The fossil brittle star *Stegophiura miyazakii*. Bottom: Marine landscape from *Ponyo* (2008). Image sources: Ishida et al. (2018; CC BY-SA 4.0, modified); Studio Ghibli (screen capture from the movie).

The one thing that stands out the most about these names, apart from themselves, is their origin story or etymology. Within Ghibli names, we can find indirectly descriptive ones (e.g., *Cabirnalia nausicaa*), commemorative ones (e.g., *Pseudochiniscus totoro*), those which tell us stories (e.g., *Orobdella mononoke*), or a combination of these (e.g., *Ornamentula miyazakii*). Each reflects a great creative work, as they required the authors' ability to identify patterns between their new species and Studio Ghibli's works and link them together, all while having a little fun. For all current and future taxonomists, this is your sign to be ingenious and give your species a name worth remembering. If it is related to Ghibli, even better!

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FURTHER READING

If you are into peculiar scientific names and their etymologies, I recommend you the following:

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You can also find more about scientific names, accompanied by cute drawings, in **Biofactum** (@thebiofactum; https://www.instagram.com/thebiofactum/), where I am a collaborator.

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About the author

Karla J. Humara-Gil is a brittle star taxonomist and a biological nomenclature enthusiast. She grew up watching Studio Ghibli films, with *Princess Mononoke* as her favorite. Naming a species after a Ghibli character is now on her bucket list.