

Hippocampus  
bargibanti biology:  
camouflage  
behaviour



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*Hippocampus bargibanti*Introduction

Camouflage behavior is a technique used within the Animal Kingdom which allows for organisms to remain undetected and concealed from potential predators. Animals and other organisms alike can utilize a variety of different forms of camouflage to help determine which would best fit the environment where it resides. Many articles have been written that highlight visual camouflage - one of the most widely known and easily recognizable forms of camouflage. When one thinks of an example of visual camouflage, chameleons and cuttlefish are two well-known organisms which come to mind. However, there are a number of different types of visual camouflage. Some organisms will have markings or distinct features on their body that will help them to blend into their surroundings. These could be examples such as color matching to the environment, patterns that help an organism blend in or being able to change colors to camouflage themselves in many different environments (Merilaita and Stevens, 2009). Another form of visual camouflage is "homochromy", in which body color, shape, and skin orientation will closely mimic its background, its host, or its living environment (Ross et al, 2017).

In regard to other adaptations involving camouflage, humans have taken their own form of camouflage - hunters and military often wear uniforms that will resemble the context in which they will be working (Merilaita and Stevens, 2009). In the case of human camouflage for hunting, the individual would dress in a manner that would resemble woodlands to be able to blend

in with the environment in waiting for a potential deer to come by. Military camouflage, however, is more so a necessity for survival. When the military is looking to be camouflaged, they are looking to be elusive and to avoid being seen by the enemy. In a sense, the camouflage that the military utilizes is more closely related to the camouflage used by animals. With both instances, protection is the clear goal. Animals will try to avoid being seen by predators, and the military will try to avoid being seen by the opposing force.

A specific example of animal camouflage is seen in the *Hippocampus bargibanti*. This is a specific species of pygmy seahorse that can be seen in different regions of the world, including Australia, New Caledonia, Indonesia, Japan, Papua New Guinea, and the Philippines (Reijnen et al, 2011). This is a species of pygmy seahorse that live on the gorgonians (soft corals) *Muricella plectana* and *Muricella paraplectana* and which exhibits host-specific camouflage (Lourie and Randall, 2003). Host-specific camouflage is when a species is specifically geared to be camouflaged for that organism. In the case of *Hippocampus Bargibanti*, there are individuals who are camouflaged for *Muricella plectana* and individuals who are camouflaged for *Muricella paraplectana* (Lourie and Randall, 2003). Throughout this essay, the camouflage tendencies of *Hippocampus bargibanti* will be discussed.

### Body

It was not until recently that pygmy seahorses have been discovered and studied. The species, *Hippocampus bargibanti*, has been determined by DNA sequence analysis to be the most basal seahorse (Kuitert and Lourie, 2008). It is from this species in particular that other new pygmy seahorse species

such as *Hippocampus denise* and *Hippocampus satomiae* are linked and compared to regarding feeding, lifestyle, physical characteristics, and camouflage. *Hippocampus bargibanti* exhibits camouflage in a combination of ways, utilizing different techniques.

## Structure

On the gorgonian sea fans of *Muricella plectana* and *Muricella paraplectana*, one can find one of the smallest known vertebrates, barely 2-3 centimeters in length, the *Hippocampus bargibanti* (Ross et al, 2017). Species-specific, this pygmy seahorse will either be able to camouflage on one of two *Muricella* sea corals. In fact, the difference between these two different camouflages comes down to the color of the tubercles on the pygmy seahorse. While both of the *Muricella* species requires the *Hippocampus bargibanti* to utilize grey striations, the seahorse which is on the *Muricella paraplectana* will have orange and yellow tubercles whereas the seahorse which is on the *Muricella plectana* will have red and pink tubercles (Lourie and Randall, 2003). The slight difference in these two types of camouflage may seem insignificant - but for this little seahorse, it can be the difference between life and death. The wrong color, in this case, would lead to detection by predators and even humans looking to do research or capture the small organism on camera. The main focus of camouflage for the *Hippocampus bargibanti* is the ability to conform with its host both in color and body structure (Kuitert and Lourie, 2008).

The species tends to live at depths greater than 13 meters and have 12 trunk rings, 10-11 pectoral fin rays, and 14 dorsal fin rays (Lourie and

Randall, 2003). The species' small size, ability to match the dull and bright substrates of the host, specific body shape resembling the host, and textural camouflage are some of the tools that have helped this creature stay out of the sight of predators and also are what has helped them stay elusive to humans and prevent an earlier discovery (Johnsen and Marshall, 2011).

Unfortunately, due to the rarity and recent discovery of this species, it has not been observed if the creature is able to change from one color morph to the other, as the phenomenon has not yet been observed in the wild (Ross et al, 2017). While it is known that the *Hippocampus bargibanti* is able to be camouflaged to either the *Muricella plectana* or the *Muricella paraplectana*, there is no evidence yet that the species is able to be camouflaged to both species (Reijen et al, 2011).

## Function

*Hippocampus bargibanti* utilizes what is known as "homochromy". This combination of camouflage styles yields a high resemblance to the hosts and a high protective façade against predators (Ross et al, 2017). Mimicry camouflage is efficient in allowing the organism to easily blend into its host or the background/environment that it is in. This is an effective means in keeping out of sight of predators and being inconspicuous.

This creature has been studied in laboratory settings to make it easier to collect data and observations due to the lack of access to them in the wild. Even still, studying this particular species in a laboratory presents its own challenges. The researchers and lab technicians have to be able to maintain

both the species and the host for any kind of data collection or experimental  
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analysis to be conducted (Ross et al, 2017). According to an article written in 2011, there was not enough evidence to confirm an association between color morphs of the *Hippocampus bargibanti* and *Muricella* (Reijnen et al, 2011). Later on, in 2017, this species was taken to the lab and it was concluded that it is possible an adult *Hippocampus bargibanti* would be able to change from one color morph to the other (Ross et al, 2017).

While the camouflage mechanism of *Hippocampus bargibanti* is still somewhat unknown, it has been discovered that the color and morphological changes are under hormonal and neuronal control (Ross et al, 2017). The color changes, in this case, are what allow the species to match both the dull and bright substrate, providing a seamless escape into the gorgonian (Johnsen and Marshall, 2011). Having such a convincing camouflage with the gorgonians is extremely advantageous to these small creatures which would otherwise stand out in the depths with their vividly colored tubercles.

While it is still unclear if an adult would be able to change its color morphology in the wild or even in a lab setting, juvenile *Hippocampus bargibanti* have given researchers valuable information. For instance, it has been observed that juveniles select their host. They do not just make the decision to settle on the host due to its presence alone, but instead, tend to make this decision based off of certain characteristics and criteria. Some examples of this concept would be camouflage, survival, and reproductive needs (Ross et al, 2017).

This study showed that coloration was not predetermined due to the genetic influence of the parents as previously believed but was due to juvenile

mimicry of their chosen host (Ross et al, 2017). An important point which backs up this ideal is that while in the lab it was observed that orange adults wound up having offspring that, upon settlement, were pink in color (Ross et al, 2017). If the coloration of the seahorses, in general, was determined by the genetics of the parental seahorses, then one would expect orange seahorses to have orange offspring and pink seahorses to have pink offspring.

The fact that juveniles select their host shows plasticity within the larval development (Ross et al, 2017). Plasticity is a quality of something that can be adapted or molded into something new or to a situation. In this case, plasticity is referring to the developing *Hippocampus bargibanti* as it is adapting to its environment, and more specifically, its host. The term helps to emphasize that the tubercles and color of the seahorse are under hormonal, neuronal, and possibly other forms of control. It can be concluded that camouflage for this species can also be determinant on the signals of the environment that they are in. The juveniles are able to mimic their host and thus choose the most appropriate camouflage for their needs.

### Conclusion

The species *Hippocampus bargibanti* utilizes a variety of techniques to camouflage themselves with their external environment which includes their host - either *Muricella plectana* or *Muricella paraplectana* . The organism is able to utilize its small size to hide in the host, its color matches the color of the host, and its body orientation to have similar shape and structure to the host (Kuiter and Lourie, 2008). *Hippocampus bargibanti* will reside only the

gorgonian hosts and will spend their lives amongst them. It is up to the juveniles of the species to choose the host which will provide them with the most secure camouflage (Ross et al, 2017). It is due to this that the animal has had to adapt and develop a form of camouflage that would work for the specific habitat. Mimicry camouflage is seen within this species and other organisms as an efficient way to blend in with the surroundings or the host or environment the creature is living in.

This species of pygmy seahorse is the most basal of the pygmy seahorses and is able to be a good reference point when it comes to the discovery of different new species (Kuitert and Lourie, 2008). As more and more species are being discovered, the basal group is going to wind up being looked at over and over again as well. In the years to come, there may be more insight into the actual mechanism that *Hippocampus bargibanti* utilizes to camouflage to their environment. This animal was not even discovered until rather recently due to how complex and effective its camouflage is (Johnsen and Marshall, 2011). A case such as this makes one wonder what other creatures that are out there have not been discovered yet.

Learning about this seemingly insignificant pygmy seahorse has the potential to open up more research opportunities and launch more projects with the hope of discovering more animals that may have been hiding in plain sight, not only in the ocean but terrestrial animals as well. The *Hippocampus bargibanti* could potentially share very similar traits and mechanisms for camouflage with other organisms that have not been discovered yet, or even that have been discovered. There are still steps that have to be taken to fully understand the camouflage mechanism of this <https://assignbuster.com/hippocampus-bargibanti-biology-camouflage-behaviour/>



species and with more advanced equipment and research, that mechanism just may be able to be discovered (Ross et al, 2017)

Through study and research, the field of zoology will be able to expand.

There are many species which have not been discovered that could be related to already known species or represent a new cohort of creatures.

Interest in the field and advancements in technology will be able to drive research leading to new discoveries and more knowledge about the world and what lives on it.

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