

## MEDICINAL AND MYSTICAL-RELIGIOUS USES OF SEAHORSES IN SOUTHERN BRAZILIAN COAST

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**ABSTRACT:** In this study we interviewed fishermen from traditional artisanal and medium-scale fishing communities from southern Brazil to obtain information about use of seahorses for medicinal and mystics practices, to contribute to future co-management strategies and conservation plans of threatened seahorses. We interviewed 23 resident fishers with at least 10 years of fishing experience from Cananéia, Paranaguá, Guaratuba, and São Francisco do Sul municipalities between August and November 2015. We recorded the use of *Hippocampus reidi*, *H. erectus* and *H. patagonicus*, all obtained through incidental bycatches in shrimp trawls and other fishing gear. Fishers indicated the use of these animals for medicinal and mystical-religious purposes, ranging from therapeutic properties for diseases of the respiratory system to crafts and amulets for spiritual protection. The use of seahorses and their respective conservation status demonstrate that this subject deserves special attention.

**Keywords:** Ethnobiology, traditional knowledge, threatened species, remedies.

## USO MEDICINAL E MÍSTICO-RELIGIOSO DE CAVALOS-MARINHOS NA COSTA SUL DO BRASIL

**RESUMO:** Neste estudo entrevistamos pescadores de comunidades artesanais tradicionais e de pesca de média escala do sul do Brasil para obter informações sobre o uso de cavalos-marinhos para práticas medicinais e místicas, a fim de contribuir para futuras estratégias de manejo e planos de conservação de cavalos-marinhos ameaçados. Entrevistamos 23 pescadores residentes com pelo menos 10 anos de experiência pesqueira dos municípios de Cananéia, Paranaguá, Guaratuba e São Francisco do Sul entre agosto e novembro de 2015. Registramos o uso das espécies *Hippocampus reidi*, *H. erectus* e *H. patagonicus*, todas obtidas por meio de capturas acidentais em redes de arrasto de camarão e outras artes de pesca. Os pescadores indicaram o uso desses animais para fins medicinais e místico-religiosos, que vão desde propriedades terapêuticas para doenças do aparelho respiratório até artesanatos e amuletos para proteção espiritual. A utilização de cavalos-marinhos e seus respectivos estados de conservação demonstram que este assunto merece atenção especial.

**Palavras-chave:** Etnobiologia, conhecimento tradicional, espécies ameaçadas, remédios.

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## INTRODUCTION

Seahorses (genus *Hippocampus* Rafinesque, 1810) are small teleost fishes, members of the family Syngnathidae, with highly specialized morphology and life history traits (NELSON; GRANDE; WILSON, 2016). There are currently fifty-seven recognized seahorses' species (FROESE; PAULY, 2020), but the taxonomy of the group remains unsettled (LOURIE; POLLOM; FOSTER, 2016). They are distributed worldwide in marine and estuarine shallow-waters of tropical and temperate regions of the Pacific, Atlantic and Indian Oceans (LOURIE; FOSTER; COOPER *et al.*, 2004; VINCENT; FOSTER; KOLDEWEY, 2011).

Seahorses are particularly vulnerable to extinction because they have low mobility, patchy spatial distribution, small home ranges, and complex social and reproductive behavior (FOSTER; VINCENT, 2004; LOURIE; FOSTER; COOPER *et al.*, 2004). Seahorses are also included in the Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). According to the IUCN Red List of Threatened Species, several species of seahorses are currently considered threatened or near threatened as result of habitat loss and degradation, overfishing (bycatch), aquarium trade, collection for traditional medicine (zootherapy) and a plethora of religious or spiritual purposes, including species distributed along the Brazilian coast: *Hippocampus erectus* Perry, 1810 (POLLOM, 2017), *Hippocampus reidi* Ginsburg, 1933 (OLIVEIRA; POLLOM, 2017), and *Hippocampus patagonicus* Piacentino & Luzzatto, 2004 (WEI; ESTALLES; POLLOM *et al.*, 2017). All three species are considered vulnerable in the Brazilian Red Book of Threatened Species of Fauna (ICMBio, 2018).

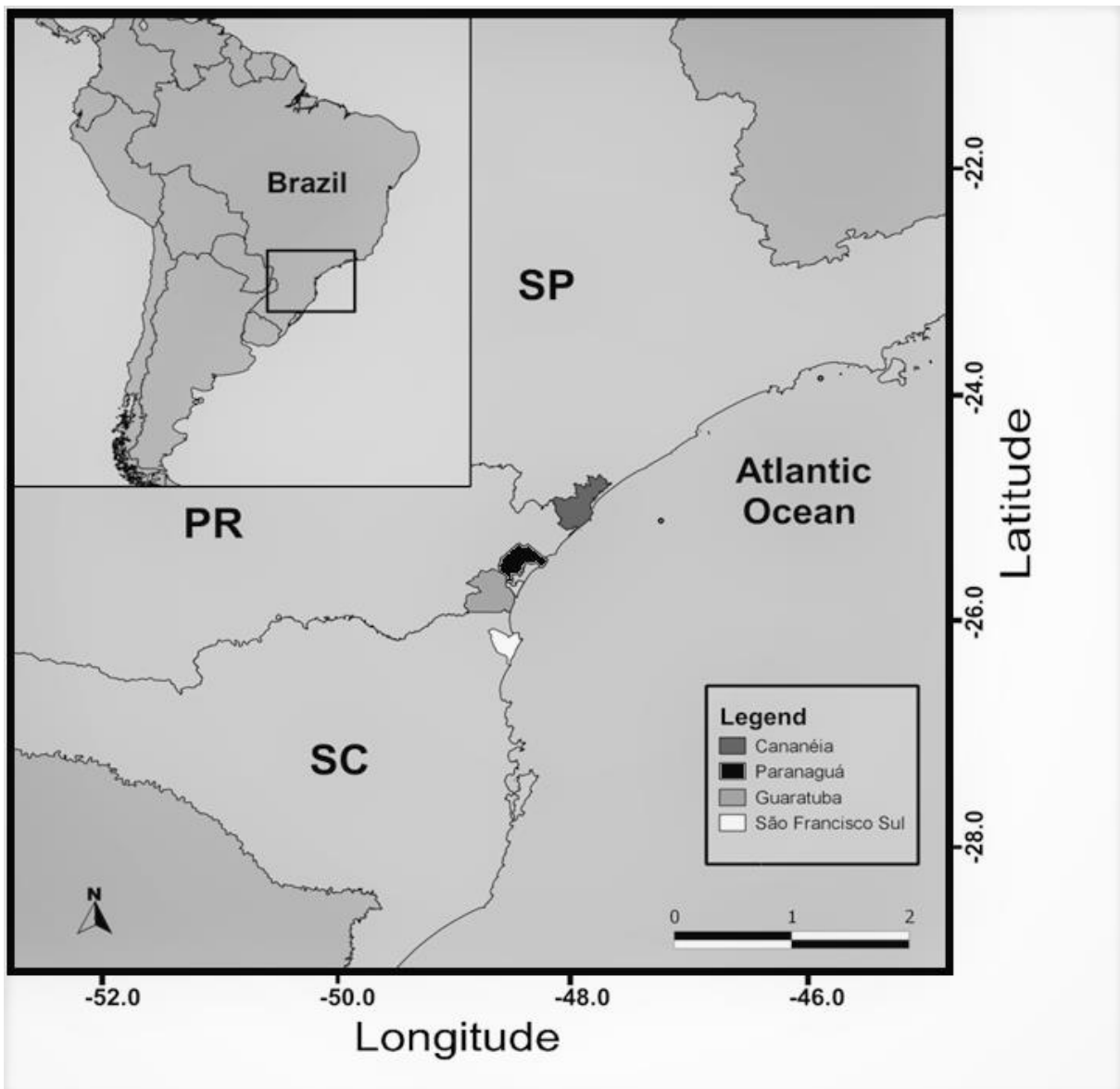
The medicinal and cultural zootherapeutic practices of seahorses have been documented in many different parts of the world (ROSA; DEFAVARI; ALVES *et al.*, 2013). The consumption of wild fauna is an important part of the Chinese culture (COGGINS, 2003), and the traditional Chinese medicine (TCM) is a broad range of health treatments based on a mixture of ingredients and patient's symptomatology, which uses cosmological beliefs, medical herbs and sometimes animal-based products for treatments passed down through millennia-old generations (VINCENT, 1996; QIU, 2007). Despite the scientific lack of evidence (EIGENSCHINK; DEARING; DABLANDER *et al.*, 2020), the clinical use of animal-based products in TCM has helped to push species including seahorses to the brink of extinction (STILL, 2003; ROSA; DEFAVARI; ALVES *et al.*, 2013).

In Brazil, many species of fish have been reported in the secular folk medicine and play a prominent role as zootherapeutic resources (EL-DEIR; COLLIER; NETO *et al.*, 2012). The Long-snout seahorse, *Hippocampus reidi*, is the most documented seahorse species utilized for zootherapeutic purposes in several regions (ALVES; ROSA, 2006; ALVES; LIMA; TAVARES *et al.*, 2008; ALVES; LÉO-NETO; BROOKS *et al.*, 2009; EL-DEIR; COLLIER; NETO *et al.*, 2012). Seahorses have also been used for mystical-religious practices (ALVES; ROSA; LÉO-NETO *et al.*, 2012).

This study aimed to describe the use of seahorses for medicinal and mystical-religious purposes by local fishing communities in southern Brazil. Although previous studies have analyzed relevant topics related to ethnoecological and zootherapeutic aspects of animals in Brazil, including several fishes, there is still the need to establish a better understanding of local fishers' perceptions and practices. Information can potentially contribute to future co-management strategies and conservation plans of threatened seahorses.

## MATERIAL AND METHODS

This investigation comprised traditional artisanal and medium-scale fishing communities from Cananéia (São Paulo), Paranaguá (Paraná), Guaratuba (Paraná), and São Francisco do Sul (Santa Catarina) in southern Brazil (Figure 1). The communities located between north of the State of Santa Catarina and part of Rio de Janeiro are denominated *caiçaras*, whose subsistence is based especially on agriculture and artisanal fishing (BEGOSSI, 2006). They are descendants from the miscegenation between Indigenous Amerindians (original inhabitants) and Portuguese colonizers, with distinct culture and practices (BEGOSSI, 1995; DIEGUES, 1999). Fishing activities encompass a complex network of interactions and strategies among inhabitants, knowledge, resources, and practices regulated by nature (MACEDO-LOPES; FRANCISCO; BEGOSSI, 2009).



**FIGURE 1** - Map of South American coast showing the studied sites in southern Brazil and the municipalities where interviews were conducted.

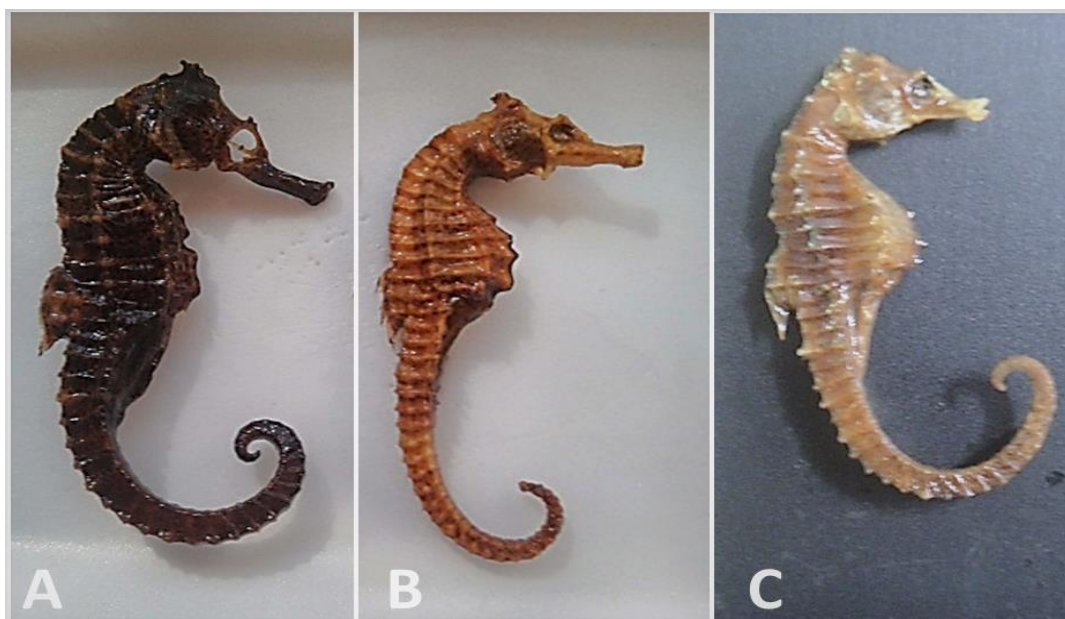
Local fisheries villages were informally visited to obtain information about fishing activities and resident fishers with at least 10 years of fishing experience. The snowball sampling technique was employed to identify local “experts” who attended the criteria to be included in the research, which was based in the selection of fishers with fishing experience and local knowledge about fishing practices (HUNTINGTON, 2000; DAVIS; WAGNER, 2003). After the initial selection, we contacted the fishers and informed on research purpose. After their formal consent to participate in the research, interviews with a semi-structured questionnaire were conducted between August and November 2015. Interviews included images of seahorses’ species registered in the southern Brazilian coast. Fishers were asked to identify and describe the use of seahorses for medicinal and mystical-religious purposes, to allow a more detailed analysis on local ethnoecological and zotherapeutic aspects and comparison with published studies about medicinal and cultural use of marine animals in Brazil.

All sampling procedures and methods were evaluated and approved by the Ethics Committee of the Federal University of Paraná – UFPR (Plataforma Brasil, Number 1.163.053).

## RESULTS

A total of 23 experienced artisanal fishers from Cananéia (30.4%), Paranaguá (17.4%), Guaratuba (34.8%), and São Francisco do Sul (17.4%) municipalities were interviewed from August to November 2015. Fisherman aged between 26 and 74 years old, with an average year of experience in artisanal or medium-scale fishing of 35 years (minimum = 10 and maximum = 57 years) (Table 1).

We recorded the use of three species of seahorses: *Hippocampus reidi*, *H. erectus* and *H. patagonicus*, all obtained through incidental bycatches in shrimp trawls and other fishing gear (Figure 2). Fishers reported a relative low abundance and local availability of seahorses, and indicated the use of these animals for medicinal and mystical-religious purposes, ranging from therapeutic properties for diseases of the respiratory system to crafts and amulets for spiritual protection (Table 2).



**FIGURE 2 – Species of seahorses caught occasionally through artisanal fishing and used for medicinal and mystical-religious purposes. (A) *Hippocampus reidi*, (B) *H. erectus* and (C) *H. patagonicus*.**

**TABLE 1 - Fishing communities studied in southern Brazil, including the number of fishers interviewed on each community, minimum and maximum age, and fishing experience.**

Fishing communities	Cananéia	Paranaguá	Guaratuba	São Francisco do Sul
Number of fishers interviewed	7	4	8	4
Age group	30-67	35-62	26-70	40-74
Fishing experience (years)	10-40	25-43	18-57	20-50

**TABLE 2 - Seahorses uses for medicinal and mystical-religious purposes in the fishing communities.**

Indication of use	Applications	Total of observations
<i>Medicinal purposes (disease or illness)</i>		
Asthma, bronchitis, throat infections, cough (respiratory system)	Herbal tea supplemented with dried and ground parts of seahorses	10
	Whole animal, dried, grounded and taken with food	1
<i>Mystical and religious purposes</i>		
Amulet, talisman	Attract luck, fortune	3
Ornament	Spiritual protection	2
Souvenir	Tourists (necklaces, key rings, house decorations)	9

## DISCUSSION

There was a consensus on the use of seahorses for zootherapeutic practices and the preparation of the remedy in the fishing communities studied, frequently used to treat respiratory diseases (asthma and bronchitis). Several informants also emphasized that patients must be unaware of what they are being fed or ingesting, to ensure therapeutic results, otherwise the remedy will not be effective or the disease may return with greater severity. The same practice was already reported for other animals used for medicinal purposes (COSTA-NETO; MARQUES, 2000; SILVA; ALVES; ALMEIDA, 2004). Furthermore, few informants indicated a medicinal use of seahorses during the waning moon, but the significance of this moon phase for therapeutic properties was not explained precisely, and we believe it could be attributed to folk beliefs, considering the cosmological importance of the Sun and the Moon for many indigenous traditions throughout South America (MELLO, 2015).

Similar use of seahorses by traditional communities was previously reported in other studies, indicating that the zootherapeutic practices with seahorses included mostly respiratory diseases (ALVES; OLIVEIRA; BARBOZA *et al.*, 2010), and also tiredness (SILVA; ALVES; ALMEIDA, 2004), gastritis, bleeding, abortion prevention (ALVES; ROSA, 2006; ALVES; LIMA; TAVARES *et al.*, 2008), epilepsy and alcoholism (ALVES; LÉO-NETO; BROOKS *et al.*, 2009), and baldness, wounds, and tuberculosis (ROSA; OLIVEIRA; OSÓRIO *et al.*, 2011). In addition, they were considered efficacious for magical-religious purposes, locally named as “simpatias” (spiritual protection). Seahorses have long been credit with magic, mystical powers and medicinal value in early European (VALLEJO; GONZÁLEZ, 2014) and Asian civilizations (STILL, 2003).

It was not possible to evaluate the magnitude of the impact of zootherapeutic practices and mystical/religious use of seahorses for fishing communities from southern Brazil, since animals were obtained indirectly through incidental bycatches. Nevertheless, even considering the lack of robust information on the magnitude of the fishing effort, several artisanal fishers reported that seahorse catches decreased in the last years. It is possible that this reported decline was caused by natural fluctuations of seahorses’ populations (CORREIA; CALDWELL;

KOLDEWEY *et al.*, 2015), or by anthropogenic stressors such as the exploitation caused by incidental catches (SILVEIRA; BARCELOS; MACHADO *et al.*, 2018) and the degradation of important habitats (ROSA; OLIVEIRA; OSÓRIO *et al.*, 2011).

The relative low abundance and availability of seahorses obtained locally through incidental catches may explain the scarce use of this fish for zootherapeutic practices and mystical/religious purposes for fishing communities in southern Brazil. Contact with nature was reported as crucial to accumulate folk biological knowledge and subsistence-related skills (WOLFF; MEDIN; PANKRATZ, 1999), reflecting in the maintenance and transmission of knowledge through generations (ALVES; ROSA, 2006).

The use of seahorses for zootherapeutic and mystical-religious practices and their respective conservation status demonstrate that this subject deserves special attention. In order to decrease the pressure over the vulnerable natural populations, the general approach of management recommendations should balance life-history characteristics of seahorses (*e.g.*, site fidelity, male parental care, low mobility, low fecundity), the cultural perspective of the traditional artisanal fishing communities and the ecological sustainability.

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