Journal of Oceanography and Marine Research
ISSN: 2572-3103
OPEN ACCESS Freely available online
Perspective

Habitate of Seahorses and their Importance

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DESCRIPTION

Seahorses (*Hippocampus* spp.) are symbolic of many issues in marine conservation, including overfishing, bycatch, and habitat loss. The historical and current information on global seahorse aquaculture, including aquaculture operation characteristics, species in culture, contribution to international trade, and technical issues associated with raising seahorses in captivity were observed. Humans discovered that prior to the 1990s, seahorse aquaculture was plagued by disease and feeding issues. The number and size of aquaculture operations, as well as the number of species in culture, increased significantly in the late 1990s and early 2000s.

The market for traditional medicines as a whole did not reflect this, despite the increased contribution of captive-bred seahorses to the aquarium trade. Currently, the vast bulk of seahorse aquaculture involves small-scale operations in developed nations, hiring few people and selling live animals to the household aqua market. Although there are still significant technical issues with diseases and breeding and raising some species, others are performing well in aquaculture. At least 13 species are currently commercially cultured or being researched for their potential for culture. However, many current aquaculture operations are concerned about their commercial feasibility, including price competition with wild-caught animals.

Large-scale aquaculture for the traditional medicine market or as a source of income has yet to be proven commercially viable, despite active research. Although most animal tails are cylindrical in shape, seahorse tails is square prisms. Their tail skeleton is made up of bony armour arranged in several ring-like segments made up of four L-shaped plates that surround a central vertebra. These plates are articulated with specialized joints that allow for bending and twisting while also preventing vertebral fracture from crushing.

Muscles attached to the vertebral column transmit forces to the bony plates, allowing them to move and grasp objects like sea grasses, mangrove roots, and coral reefs, allows them to hide and rely on camouflage when evading predators and capturing the prey. Due to its male pregnant strategy in the brood pouch, the seahorse is a specialized animal that can clearly provide immune protection, nutrition, and osmoregulation to the offspring.

Secretory phospholipase A2 group IB (sPLA2-IB) encodes a secreted phospholipase A2 that functions for metabolic regulation and antibacterial defense in teleosts, but its potential immune characteristics in seahorse are unidentified.

The characteristics and functional profiles of sPLA2-IBs in the lined seahorse (*Hippocampus erectus*), which is one of the world's most important breeding seahorse species. The findings revealed that most teleost species have only one sPLA2-IB gene, whereas seahorses have two tandem repetitive copies (sPLA2-IBa and sPLA2-IBb). The highest expression levels of sPLA2-IBs were found in the liver of seahorses, and significant up-regulation could be induced by Lipopolysaccharide (LPS), polyinosinic-polycytidylic acid, and the seahorse's widespread pathogen Vibrio parahaemolyticus.

Interestingly, the expression levels of seahorse is sPLA2-IBs in the brood pouch increased during pregnancy compared to non-pregnancy, peaking in late pregnancy, implying that seahorse sPLA2-IBs in the brood pouch may function for adaptive immunity during pregnancy. Furthermore, seahorse sPLA2-IBa was considerably overexpressed in early developing embryos in the brood pouch, whereas sPLA2-IBb expression increased dramatically in new-born juveniles, implying functional divergence between the two sPLA2-IBs due to different ontogenetic expression. In conclusion, this study found that seahorse sPLA2-IBs play an important role in immune protection during male pregnancy, and functional co-option of seahorse sPLA2-IBs may be beneficial to offspring survival.

CONCLUSION

Seahorses and other Syngnathidae fishes are in high demand around the world because they are an important ingredient in Traditional Chinese Medicine (TCM). TCM traders are looking for alternatives due to dwindling supplies from natural sources. Seahorse aquaculture has enormous potential for bridging the demand-supply gap. However, concerns about the potency of cultured seahorses *versus* wild caught seahorses remain unresolved. The yellow seahorse, Hippocampus kuda (Bleeker, 1852) is a popular and expensive TCM material. The antioxidant capacity of methanolic extracts from three body parts (head, trunk, and tail) in both genders of captive-bred H. Kuda were analyzed.

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Received: 13-May-2022, Manuscript No. OCN-22-18444; **Editor assigned:** 16-May-2022, Pre QC No. OCN-22-18444 (PQ); **Reviewed:** 03-Jun-2022, QC No. OCN-22-18444; **Revised:** 10-Jun-2022, Manuscript No. OCN-22-18444 (R); **Published:** 20-Jun-2022, DOI: 10.35248/2572-3103.22.10.249.
Citation: Prabha J (2022) Habitate of Seahorses and their Importance. J Oceanogr Mar Res. 10:249.