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SeaHorse review article and its utilization

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Abstract

Seahorses are one of the marine fishery commodities of high economic value because in a state of life or death still have a high trade value around the world. This review article aims to get information on seahorse cultivation catch production, SeaHorse trading and seahorse benefits. The benefits of seahorses in addition to being aquarium ornamental fish, can also be used as souvenirs. In medicine, dried seahorses are included in the drug which is believed to have many benefits. This makes many people hunt seahorses. Every year no less than 20 million dried seahorses and hundreds of thousands of live seahorses are traded by ± 40 countries including Indonesia.

Keywords : Benefits, Seahorses, trade, health

INTRODUCTION

Seahorses have high economic value both at home and abroad. According to Vincent (2004), at least 77 countries are involved in the seahorse trade, it is estimated that every year 24 million seahorses are caught from nature to then be dried and sold as TCM materials and hundreds of thousands of seahorses are sold live as ornamental fish. The largest importers of dried seahorses are China, Hong Kong, Taipei and Singapore. In Asia alone it is estimated that annual seahorses consumption amounted to 45 tons (16 million seahorses) in the 1980s and early 1990s (Vincent, 1996).

Live seahorses for ornamental fish are imported by the country, America, Europe, Japan and Taipei. The largest exporters of living seahorses are the Philippines, Indonesia, and Brazil. The Philippines and Indonesia each export hundreds of thousands of live seahorses each year, reaching 854,000 live seahorses.

The high market demand and at this time the seahorse trade is still a lot that relies on catches from nature that are increasing over time will certainly threaten the seahorse population and its habitat. Indonesia has not established its protection status but due to a decline in seahorse populations in nature caused this biota to be included in the red list of the IUCN (*The International Union for Conservation of Nature)* with *a threatened status (Vulnerable)* in 1996. Cites included all species of seahorses in appendix II's list. CITES has recommended a size limit of at least 20 cm for all seahorse specimens in the trade.

Pressure from seahorse fishing activities as both the main and *bycatch* catches caused seahorse populations in some places in Indonesia to decline. But until now there has been no specific regulation governing the protection of seahorses nationwide. One of the efforts that can be made to maintain the preservation of seahorses is to develop seahorse cultivation through *hatchery activities.* In Indonesia, seahorse cultivation business has been successfully carried out, both by government agencies, private companies and community groups. According to the KKP, Indonesia is able to produce up to 10,000 seahorses by 2024. This review article aims to get information about the utilization of seahorses based on the nutritional content in them.

Classification, Morphology, Habitat and Spread of SeaHorses in Indonesia

The classification of seahorses according to Burton and Maurice (1983) is:

Kingdom : Animalia

Phylum : Chordata

Subfilum: Vertebrate

Class: Pisces

Subclass : Teleostomime

Order : Gasterosteiformes

Family : Syngnathidae

Genus: Hippocampus

Species: Hippocampus spp.

Seahorses have morphology that is, the body is slightly flattened and curved, the head is equipped with a muzzle *(snout)*, the neck can be moved and a long tail. Seahorses do not have scales like fish, the entire body of the seahorse is wrapped by a kind of armor consisting of bone plates or rings that serve as an outer skeleton. *(exoskeleton)* (Burton and Maurice, 1983). The morphology of seahorses can be seen in figure 1.

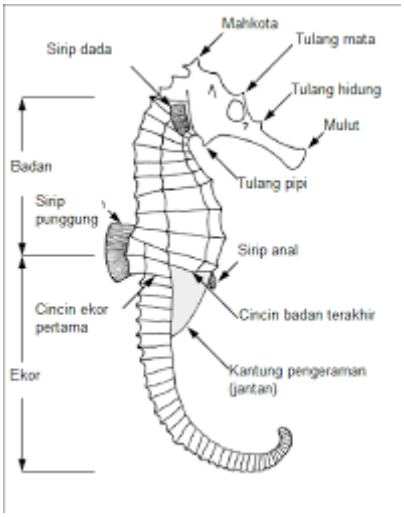

Figure 1. Seahorse Morphology
(Source: Ministry of Marine Affairs and Fisheries)

Seahorses use their eyes to find prey having double vision (binocular vision). Seahorses include animals that eat all kinds of small animals ranging from members of the Crustacean group to fish larvae. According to Al Qodri et al., (1998) in addition to adult Artemia, seahorses eat shrimp or small fish from fresh water while the most preferred frozen food is rebon (Acetes). Seahorses do not have teeth and stomachs that are why seahorses are passive predators that wait for food to pass and attack their prey by sucking until it enters its long muzzle (Al Qodri et al., 1998). The manga is swallowed completely and will go directly into the digestive tract. The digestibility of seahorses is very fast, although seahorses have a rolling digestive tract (Asmanelli and Ikhsan, 1993)

A two-week-old seahorse can eat approximately 3600 juvenile shrimp in less than 10 hours. Hippocampus zosterae consumes enough Copepods in florida seagrass meadows to control the population of at least one species of crustacean (Lourie, 2001). Natural feed given to the mother of seahorses must be really considered because the feed affects the juwana to be produced. The feed given during maintenance is rebon shrimp, adult artemia, and diaphanosoma.

Seahorses are widespread and almost found throughout the world's waters, spreading from temperate to tropical coastal waters, with a distribution of areas 50° north to 50° south (Lourie *et al.,* 2004), covering the coasts of the Indian and Pacific Oceans to the Hawaiian Islands and Japan (Widianingrum, 2000) with the highest diversity found in the Indo-Pacific (Lourie *et al.*, 1999).

In Indonesia, seahorses are widely spread in the waters of Lampung, Jakarta Bay, Bali and Flores (Marine Fisheries Research Center, 2004). In South Sulawesi, seahorses are mostly found in the Tana Keke Islands, Takalar Regency (Syafiuddin, 2010). Three types of pygmy seahorses (H. ponohi, H. satomiae and H. severns) found in Indonesian waters have a spread in Sulawesi, Papua and Kalimantan (Lourie & Kuiter, 2008). While H,

Waleananus is found only in Kep. Togean, Tomini Bay (Gommon & Kuiter, 2009). The distribution of seahorses in Indonesia can be seen in figure 2.

Figure 2. Map of the global distribution of seahorses
(Source: Lourie & Kulter, 2008. Reprocessed)

Seahorses can usually be found among corals, macro algae, mangrove roots and seagrass meadows, but some live on open sand, muddy or rocky bottoms. Certain species can be found in river estuaries or lagoons (Lourie et al., 2004) and estuary areas (Hansen, 2002). Dominant temperate species live in seagrass meadows and algae, while tropical species generally live on coral reefs, some estuary species such as H. abdominalis, H.capensis, H. horse, H. reidi are able to tolerate salinity fluctuations, although they can experience high mortality rates during freshwater floods (Russell, 1994; Bell et al., 2003). The depth of the waters of seahorse habitat found in Indonesia can be seen in table 1.

Table 1. Distribution, distribution and habitat type of seahorse species located in Indonesian waters (Lourie et al., 1999; Foster & Vincent 2004; Lourie & Kutter, 2008)

Kind	Distribution	Spread	Habitat Type	Depth
Hippocampus barbouri	Central western Pacific	Waters of Sulawesi, East Nusa Tenggara	Seagrass coral	1-10 m
Hippocampus comes	Eastern Indian Ocean; Central western Pacific	Waters of Sumatra, Tanaleke	Algae, corals, sponge seagrass	10-20 m
Hippocampus histrix	Western and eastern Indian Ocean; North pacific and central west	Waters of Sulawesi, NTT	Coral, seagrass, soft water bottom	1-20 m
Hippocampus kelloggi	Western and eastern Indian Ocean; North pacific and central west	Waters of Cilacap, Banyuwangi and NTT	coral, seagrass	1-152 m

Horse hippocampus	Western and eastern Indian Ocean; North, east and west central Pacific	Waters of Riau, Padang, Belitung, Bandar Lampung, Pangandaran, Tanjung Redep, Sulawesi, West Bali, Komodo Island, Flores, Ambon, and Manokwari	Algae, mangroves, rocks, seagrass, soft waterbed	0-8 m (normal) maximum 55 m
Hippocampus bargibanti	Eastern Indian Ocean; North pacific and central west	Waters of Bali, Sumbawa, North Sulawesi, and Raja Ampat	compose	16-40 m
Hippocampus trimaculatus	Eastern Indian Ocean; South pacific and central west	Waters of Riau, Padang, Bandar Lampung, Anyer, Indramayu, Jepara, Central Sulawesi, North Sulawesi, Lombok and Flores.	Corals, rocks, soft waterbeds	100 m
Hippocampus spinosissimus	Eastern Indian Ocean; South pacific and central west	Karimun Waters of Java, North Sulawesi, Komodo Island, and Maluku	Soft water bottom coral	8-70 m
Hippocampus denise	Western Pacific	Waters of Papua and Bali	Compose	13-90 m
Hippocampus pontohi	Central western Pacific	Bunaken, Sorong, Wakatobi and Lembeh Strait	Compose	11-25 m
Hippocampus satomiae	Central western Pacific	Derawan, Lembeh Strait, and northern Kalimantan	Compose	15-20 m
Hippocampus severnsi	Central and southern western Pacific	Bunaken, Wakatobi, Raja	Compose	8-20 m

		Ampat, and Kawe Island		
Hippocampus waleananua	Indonesian	Waters of the Togean Islands, Tomini Bay	Soft corals	5-20 m

Seahorses live in the littoral zone, which is an offshore water that is between the highest and lowest tides, where penetration of sunlight can reach the bottom of the waters (Widianingrum, 2000). Generally seahorses live in warm shallow waters with a depth of less than 20 m, but some types are found at depths of 150 m (Lourie et al. 1999). The hippocampus kelloggi was once found at a depth of 90 meters in Malaysian waters (Choo & Liew, 2003), and H. minotaur was once reported to be found in trawl nets with an operating depth of 100 meters in Australia (Gomon, 1997).

Seahorses can also live in artificial habitats such as nets or cages. Generally seahorses wrap their tails around various natural structures such as sponges, branched corals, seagrass strands, or submerged tree branches (Foster & Vincent, 2004), but some types wrap their tails around artificial structures. The hippocampus abdominalis and H. White reportedly wrapped around their tails in shark nets in Sydney Harbour, and the population of H. Abdominalis was found perched on salmon enclosures in Tasmania (Foster & Vincent, 2004). Other types of seahorses that use artificial habitats are H. horse (fishing nets and cages), H. reidi (wooden pier), H.sub elongatus (dock wood pile) (Coleman, 1980; Choo & Liew, 2003; Dias & Rosa, 2003)

Utilization of seahorses and myths

In traditional Chinese medicine, seahorses are included in the list of drugs that are believed to have benefits. For example, it becomes a powerful drug or Viagra and treats asthma. The belief that the benefits of seahorses can increase stamina make seahorse hunting increase and seahorse populations decrease drastically. According to Lixing Lao, director of the School of Chinese Medicine, University of Hong Kong, seahorses were first mentioned in Chinese medical literature in 700. That said, based on the literature seahorses can provide nutrients and energy. However, it has not been proven that these seahorses can cope with asthma and male sexual diffusion and there have been no clinical trials in humans related to these seahorses. So, the use of seahorses as a powerful drug and asthma cannot be ascertained the truth.

Seahorses are a commodity that is already known and believed to be an important raw material for medicinal herbs (Redjeki, 2007). As an ornamental fish, seahorses are commonly placed in aquariums besides that they can also be used as decorations or decorations or souvenirs after drying.

Utilization of dried seahorses as a medicine is due to the efficacy of aphrodisiacs. Wilmana (1980: 284-286), states that aphrodisiacs can be interpreted as drugs or substances that can stimulate and improve a person's sexuality ability; So that drugs that will stimulate the pituitary to efficacy as an aphrodisiac are in great demand to produce Follicle Stimulating

Hormone (FSH) in the community, especially men. Luteinizing Hormone (LH). In the testes, some research results from China, LH will stimulate leydig cells to like research from Shi Rui et al. (1993), producing androgens (Ganong, 1987). Zhang Zhaohui et al. (1995) and Zhang Androgen subsequently diffused into Zhaohui et al. (1997: 140) stated in the sertoli cells present in the tubules that seahorses contain the chemical compounds progesterone and taurine related to the reproductive system.

The process of spermatogenesis takes place in the seminiferous tubules of the testes, so that if there is a change in the number of members of the association of spermatogenic cells in the transverse pieces of the seminiferous tubules at some stage is an indicator of interference in the process of spermatogenesis. This is because the number of spermatocyte cells is a clue to meiosis, the number of spermatids is an indicator of the occurrence of the process of spermatogenesis, and the total number of spermatogenic cells is an indicator of the progress of the process of spermatogenesis as a whole. As a result, a decrease or increase in the number of spermatogenic cells in the transverse pieces of the seminiferous tubules is an indicator of decreased or increased fertility of a male individual (Orphan 1984)

There have not been many studies that examine the effect of seahorse extract utilization on health, especially those related to the study of histology and the number of associations of spermatogenic cells. Based on the things that have been stated, a person, so that drugs that are efficacious as an aphrodisiac are in great demand in the community, especially men.

Some chinese research results, such as research from Shi Rui et al. (1993), Zhang Zhaohui et al. (1995) and Zhang Zhaohui et al. (1997: 140) state that seahorses contain the chemical compounds progesterone and taurine related to the reproductive system. Hyde (1986), states that progesterone is a metabolite of progestogens that are highly efficacious and essential for both men and women. In male individuals, progesterone is the result of androgen biosynthesis, so the amount of progesterone affects the amount of androgen produced. Kaltenback & Dunn (1980), added that androgens play an essential role in the initiation and maintenance of spermatogenesis and stimulate the maturation and ripening of spermatozoa in the seminiferous tubules.

Taurine known as 2 aminoethanesulfonic acid (C_2H,NO,S) acts as an inhibitory and regulatory neurotransmitter in the osmosis process involving Ca^2 and CI ions (Azuma et al., 1982). In addition, tannins also act as precursors to specific regulatory hormones in which control the secretion of Gonadotropin Releasing Hormone (GnRH) (Shills et al. 1994: 1120). Furthermore, GnRH produced by the hypothalamus then it is necessary to conduct research to find out the effect of seahorse extract on male micecite spermatogenesis (Mus musculus L.) judging from the number of associations of spermatogenic cells, which include: spermatogonium, spermatocytes, spermatids and the total number of spermatogenic cells.

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