Observation of male and female seahorse food types in the waters of Weh Island Indonesia

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Abstract. Sea horses have begun to be used as food and medicine and aquaculture efforts have begun. This study aims to observe the types of wild food consumed by each type of sea horse that lives on the waters of Weh Island. The method is carried out by observation of the point VI of the station location. The results obtained were found 96 idv. Sea horses with 6 types of food (Ephausiae, Isopoda, Herpacticoida, Mysidiacea, Amphipoda and Calanoida). Both male and female sea horses. The most common type of food found in the intestine is Amphipoda (43%) and the least is isopoda (0.05%).

1. Introduction

Aceh is a province located at the western tip of Indonesia. The area surrounded by oceans (Indian Ocean and Malacca Strait), makes Aceh rich in fishery potential. Aceh has a coastline of approximately 1,865 Km and a sea area of 591,089 Km² and has 663 islands. Aceh Province fishery production including capture fisheries and aquaculture reached 210,508.3 tons in 2014 [1].

The average per capita fish consumption of the Acehnese people reaches 45.45 kg / capita / year and the second highest in Sumatra after Lampung Province (49.66 kg / capita / year). This is an indicator of the importance of fish for the people of Aceh [2]. In Aceh waters, 114 species of freshwater and brackish water fish live there, some of which have high economic value and have the potential to be cultivated. Seahorse (Hippocampus spp.) which has a role in Aceh's economy because of its high economic value as medicine.

So far, fishery production the sea comes mostly from the produce arrests that tend not restrained so that it affects production continuity and sustainability resource. Despite the resources life generally can recover (renewebel) and utilization of potential aquatic capture production territorial and EEZ only reached 41%, However, in several locations in Indonesia fish population tends to decline so that the impact on the decline production [3].

The exploitation of seahorses in the waters of Pulau Weh has long been carried out to fulfill consumer demand as traditional medicine (field survey). So far it is known that the benefits of seahorses are as stamina enhancing drugs. In addition, seahorses contain bioactive substances such as flavonoids, triterpenoids, steroids, saponins, and phenol hydroquinone which function as health supplements in humans [4]. Previous research stated that the exploitation of seahorses in peninsular Malaysia was carried out to meet the demands of consumers, especially Chinese people as traditional medicine [5]. Apart from being a traditional medicine, seahorses> 6 cm in size are used as aquarium
ornamental fish. Seahorse is traded as a traditional medicine at sizes> 12 cm, with prices around USD 100-300 / kg after drying [6].

The consumption of seahorses in the Asian region reaches 45 tons per year, with the largest user country are China, (20 tons per year), Taiwan (11.2 tons per year), Hong Kong (10 tons per year) and other Asian countries (3.8 tons per year) [7]. Has a distinctive morphology, namely the shape of the head resembling the head of a horse, male fish have an egg incubation bag that is not found in other types of fish. The incubation bag serves to protect and incubate the fertilized egg until they hatch into larvae and continue to protect the larvae in the sac so it's ready born to be a seahorse juvana in nature. Another attraction is the upright position of the body when swimming and the ability to adjust the color of his body to the environment. In Chinese medicine, sea horse is believed to have properties from generation to generation to strengthen and maintain stamina and strengthen the kidneys.

Research result in the field of Pharmacology or the science of medicine that has been done, namely demonstrated that the seahorse had properties in enhancing hematopoeysis, besides it has hormone-like activity. Sea horse is predicted to contain progestron and high tauran, both of which are important hormones that play a role metabolism. Progestrons are precursors in the formation of other steroid hormones. so that Hoermon is able to initiate the formation of the hormones testosterone and estrogen on the mouse that was given seahorse extract.

So far, 44 species of seahorse have been identified in the world, all of which have been included in the IUCN Red List of Threatened Species, which indicates that the existence of seahorses has been threatened due to exploitation and destruction of the marine environment [2]. Furthermore, CITES has included seahorses in appendix II for the category of trade [8]. Furthermore, previous research states that there are 13 species of seahorses that have been identified in Indonesia, one of which is an endemic species found in Sulawesi [9, 10]. However, seahorse research conducted in Indonesia is only limited to the central and eastern regions (Java Island to Sulawesi), whereas western Indonesia (Aceh) has never been carried out [4,5,6]. Therefore, data on the species and distribution of seahorses in Aceh have never been reported and are very important to be assessed so that they contribute to the diversity of germplasm in Indonesia, especially in Aceh. so there needs to be conservation to keep this species sustainable.

So that the exploitation continues without any effort to maintain its existence so that it is sustainable. So far, research on seahorses in Aceh has not been carried out and in Indonesia it is still very limited. Therefore, research on sex and type of food is very important in Aceh so that the research data can be used as a reference for the development process of seahorses in aspects of cultivation and conservation efforts in the future.

2. Material and Methods

2.1. Location and Measurement of Specimens

The study was conducted on July, 2020. Sampel seahorses were collected from 5 sampling points (5 stations) at the coastal area of Gapang, Weh island, Sabang Aceh Indonesia. The seahorse samples were captured using (size of mesh 0.5 and 1.0 inch). A total of 970 seahorses were collected from location during 6 months. The collected specimens were preserved in formalin (10%). The habits of feeding was measured.

Determination of food habits using the frequency of occurrence method refers to [8], with the formula: Occurance index (Oi) = \[\frac{n_i}{\sum n_i} \times 100\%\], where: Oi = Percentage of frequency of occurrence of one type of food, ni = amount of food it-i, \(\sum n_i\) = total amount of food in the stomach.

2.2. The gonad maturity level (GML)

The gonad maturity level (GML) was observed visually. This observation aims to determine the maturity and reproductive organs of females (ovaries) and males (testes), so that the body length of the first sexually mature fish can be determined (puberty).
3. Results and Discussion

3.1. Foods of Seahorse

In general, of all types of food found in the intestines of seahorses, all are classified as zooplankton, this confirms that seahorses are carnivores. Seahorses are carnivores that prey on zooplankton such as copepoda, amphipoda and mysida [8]. Zooplankton found in the seahorse intestines as the main food (> 40%) originally from the amphipoda, complementary foods (4-40%) from the mysida and calanoida, as well as additional food (<4%) from the order harpacticoida, Isopoda and Euphausiacea (Figure 2).

![Figure 2. Average percentage of food found at each station](image)

Based on the sampling location, the locations of ST I and ST II are relatively shallow <1 m. At this location, amphipoda, Calanoid and Mysidiaceae plankton are often found in the hulps of seahorses (Table 1). It is assumed that the plankton dominates the shallower areas.

| Stasiun | Calanoida (idv) | Amphipoda (idv) | Mysidiaceae (idv) |
|---------|-----------------|-----------------|-------------------|
| ST I    | 25, 03          | 13, 07          | 12, 93            |
| ST II   | 3, 71           | 11, 39          | 10, 9             |
| ST III  | 6, 81           | 4, 98           | 1, 81             |
| ST IV   | 2, 60           | 7, 19           | 3, 1              |
| ST V    | 2, 44           | 7, 88           | 0, 75             |
| ST VI   | 0, 88           | 13, 50          | 6, 19             |
In-depth observation for each station (Table 1 and Figure 1), it was found that in general the types of food eaten by seahorses were the same at all stations. Calanoid, Amphipoda and Mysidiacea diets were found at all stations, and it is suspected that this type of food was food from seahorses. Amphipod plankton is commonly found as the main food in seahorses and Harpacticoida erectus species, and copepods as a complementary food [9].

At each station there is a difference in the amount of food consumed, for station I it is found that there are more types of Calanoid food and for stations II-VI it is generally the same. Amphipoda food types obtained at each station were the same and not significantly different (p> 0.05). The number of Mysidiacea foods obtained at stations I, II, and III was the same and not significantly different (p> 0.05), while at stations III, IV, and V decreased the number of Mysidiacea. This is made possible by the availability of food from different stations.

3.2. Types of food in male & female seahorses
There are 91 seahorses found in the waters of Wehada Island for 6 stations and there are 4 types, namely Hippocampus barbouri, Hippocampus histrix, Hippocampus bargibanti, and Hippocampus comes. In general, the number of male seahorses is 47 and 44 females. This shows the ratio is 1: 1. Table 2 shows that there is no difference in the type of food consumed by male and female seahorses. This is very possible due to the availability of the same types of food at the observation location.

| No | Types of feeding | Male (%) | Female (%) |
|----|------------------|----------|------------|
| 1  | Ephraustiae      | 1        | 1          |
| 2  | Isopoda          | 1        | 1          |
| 3  | Herpacticoida    | 1        | 1          |
| 4  | Mysidiacea       | 24       | 27         |
| 5  | Amphipoda        | 43       | 35         |
| 6  | Calanoida        | 31       | 35         |

4. Conclusion
Seahorses consume a lot of Amphipod plactones and the ratio of male to female is 1: 1. There is no difference in the type of food between male and female.

Acknowledgements
This study was supported by Indonesian Ministry of Education and Culture (Kemdikbud) and through LPPM-UNSYIAH science fund grant #171/UN11.2.1/PT.01.03/PNBP/2020#. The technical assistance provided by all members of Aquaculture Research group of The Laboratorium Histology and Fish Nutrition Universitas Syiah Kuala also acknowledged.

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