

PAPER • OPEN ACCESS

Identification and prevalence of the ectoparasite *Octolasmis* in sand lobster (*Panulirus homarus*) and bamboo lobster (*Panulirus versicolor*) in Floating Net Cages in Sape, Bima Regency, West Nusa Tenggara Province, Indonesia

To cite this article: L. Yusgita *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **236** 012099

View the [article online](#) for updates and enhancements.

Identification and prevalence of the ectoparasite *Octolasmis* in sand lobster (*Panulirus homarus*) and bamboo lobster (*Panulirus versicolor*) in Floating Net Cages in Sape, Bima Regency, West Nusa Tenggara Province, Indonesia

L. Yusgita¹, Kismiyati², S. Subekti^{3,5*}, P D Wulansari², M K Amiin⁴

¹Bachelor programme in Aquaculture, Faculty of Fisheries and Marine Universitas Airlangga, Surabaya 60115, Indonesia

²Department of Fish Health and Aquaculture Management, Faculty of Fisheries and Marine Universitas Airlangga, Surabaya 60115, Indonesia

³Department of Marine, Faculty of Fisheries and Marine Universitas Airlangga, Surabaya 60115, Indonesia

⁴Graduate Student in Fisheries and Marine of Biotechnology, Sekolah Pasca Sarjana Universitas Airlangga 60115, Indonesia

⁵Entomology Study Group, Institute of Tropical Diseases, Universitas Airlangga, Surabaya 60115, Indonesia

*Corresponding author: ssbendryman@yahoo.com

Abstract. The problems that are often faced by fishermen include decreased durability and stress during handling caused by pathogenic organisms known as ectoparasites on the gills that disrupt the respiratory tract of the lobster during transportation. An ectoparasite that often infests the gills of lobsters includes *Octolasmis*, which is suspected to be a factor that triggers stress and causes death with a high level of infestation. This study aims to identify the species and to determine the prevalence of the ectoparasite *Octolasmis* that infests sand lobster (*P.homarus*) and bamboo lobster (*P.versicolor*) in the floating net cages in Sape, Bima Regency, West Nusa Tenggara Province. This study used the survey method and the data analysis was descriptive. The results showed that the species that infested the sand lobster (*P.homarus*) and bamboo lobster (*P.versicolor*) were *Octolasmis lowei* and *Octolasmis angulata*. The prevalence in sand lobster (*P. homarus*) was 70%, which consisted of a single infestation of 55% (infested *O.angulata*) and the mixed infestation was 15% (*O.angulata* and *O.loweii*). The prevalence in the bamboo lobster (*P. versicolor*) was 100%, which consisted of a single infestation of 84% (infested *O. angulata*) and the mixed infestation was 16% (*O.angulata* and *O.loweii*).

1. Introduction

Bima is located in West Nusa Tenggara Province, with a 4.389.400 km² wide area that is located between 117°.40'-119°.24'EL and 70°.30' SL. Bima district is very productive in the marketing of the lobster commodity that is caught by the fishermen.

Lobsters are one of the fishery resource commodities that have a high economic value. Most of their productivity is from fishing [1]. The global market demand for lobsters is very significant and has kept on increasing, up to 15% in last year [2]. A problem that often occurs is the infestation of ectoparasites in the gills, which interferes with the respiratory system. This makes them stressed and also decreases the lobster's endurance during handling (transporting to the destination), often causing death and impacting on the selling price [3].



Ectoparasites that often infest the lobster's gills include *Octolasmis*, which is suspected to be a stress trigger [4]. According to Praptiasih [5], a heavy infestation of *Octolasmis* is a threat to the population of some hosts of Crustacea that can cause a high mortality rate. Therefore, there needs to be done research into the identity and prevalence of *Octolasmis* in sand lobsters (*P. homarus*) and bamboo lobsters (*P. versicolor*) from within the catches of the fishermen of Bima, West Nusa Tenggara Province.

2. Methodology

This study was held in the Floating Net Cages belonging to the fishermen in Sape, Bima Regency, West Nusa Tenggara Province. The inspection and saving of the ectoparasites in a fixative solvent was conducted in the Laboratory of the Station of Quality Assurance of Fish Quarantine Class II Bima. The ectoparasites were identified in the Laboratory of the Department of Fishery and Marine, University Airlangga, Surabaya

2.1 Tools and materials

The tools consisted of a digital camera, cool box, paper/plastic for the sample packing, fine sea sand, brine, rubber gloves, a stereo microscope equipped with optilab and a Lucida camera, surgical scissors, object glass, cover glass, drop pipette, and a petri dish. The materials used were lobsters, physiological NaCl, and alcohol glycerin 5%.

2.2 Procedures and data analysis

The taking of the sample was from one of the Floating Cage Nets of the fisherman in Sape, Bima. The amount of lobsters taken at every Floating Cages Net location was 10% from the population with the size of the lobsters being 15 - 20 cm in length and 200 - 300 gram/pieces of weight.

The inspection of the lobster sample was done using a weighing method per tail and the measurement of the lobster body (carapace length and amount length). A section of the lobster's macroscopic gills were then documented. The samples which were positively infested by *Octolasmis* were separated from the hosts and saved in a microtube with alcohol glycerin 5%. The identification was conducted using a stereo-microscope equipped with an optilab and stereo microscope equipped with a Lucida camera. The *Octolasmis* ectoparasite specimens were observed in wet form, put on the object glass surface and then dripped with physiological NaCl. The analysis of the data used the descriptive method.

3. Result and discussion

3.1 Identification species of *octolasmis*

The result showed that an infestation of *Octolasmis lowei* and *Octolasmis angulata* were found in the gills of both the bamboo lobsters (*Panulirus versicolor*) and sand lobsters (*Panulirus homarus*) in the Floating Net Cages in Sape, Bima Regency, West Nusa Tenggara Province (Table 1).

Table 1. *Octolasmis* identification; infestation in the bamboo lobsters (*P.versicolor*) and sand lobsters (*P. homarus*) in the floating net cages in Sape, Bima Regency, West Nusa Tenggara Province.

No.	Species Ectoparasites <i>Octolasmis</i>	of Infested Organ	Hosts
1.	<i>Octolasmis lowei</i>	gills	Bamboo lobsters (<i>P.versicolor</i>) and sand lobsters (<i>P.homarus</i>)
2.	<i>Octolasmis angulata</i>	gills	Sand lobsters (<i>P.homarus</i>) and bamboo lobsters (<i>P.versicolor</i>)

3.2 *Octolasmis lowei*

This species is included in the Maxillopoda Class of Crustacean, with the characteristics of having a body with a goose-like neck with a capitulum (Cp) in the anterior part and a peduncle (P) or stalk on the posterior. There are some organs that have morphological characteristics inside the capitulum as follows: the carina (C) is L-shaped, and the pair of scutum (Sc) are in an L-shape reversed with the tip of the anterior being dull. There are also a pair of tergum (T) which is in a reverse U-shape (Figure 1).

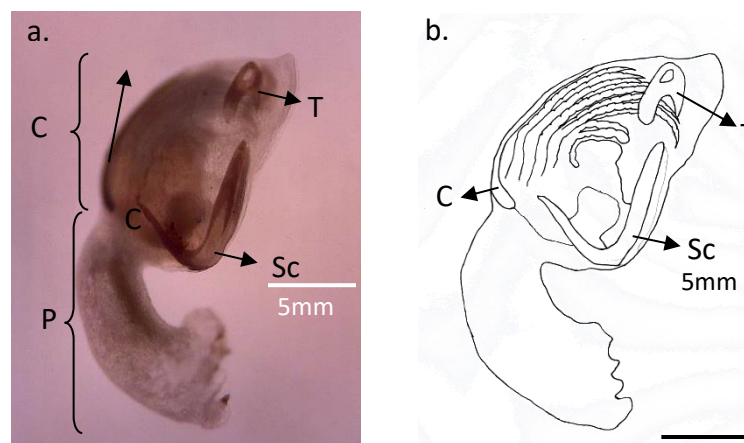


Figure 1. *Octolasmis lowei* seen with a stereo microscope (a) and *Octolasmis lowei* seen through the stereo microscope equipped with a Lucida camera (b)

Octolasmis lowei has a white color. The capitulum is oval-shaped in the anterior part, and covered by five chalk skeletons consisting of a pair of scuta and terga, and a carina. In the posterior part, there is an elongated peduncle. That is also aligned with the statement of Jeffries *et al.*[6], stating that *Octolasmis lowei* have five chalk skeletons consisting of two scuta and terga, and a carina which functions as support and protection for the vital organs like the feeding apparatus. [7]. *Octolasmis lowei* have a U-shaped tergum U, carina and an L-shaped scutum.

3.3 *Octolasmis angulata*

This species infested the gills of the bamboo lobsters (*P.versicolor*) and sand lobsters (*P.homarus*). *Octolasmis angulata* has the same shape as the other species of the *Octolasmis* genus, with a goose-like neck. The difference in this species to others is that there is no tergum in the capitulum. Other organs in the capitulum (Cp) include an L-shaped carina (C) and a pair of scutum (Sc) (Figure 2)

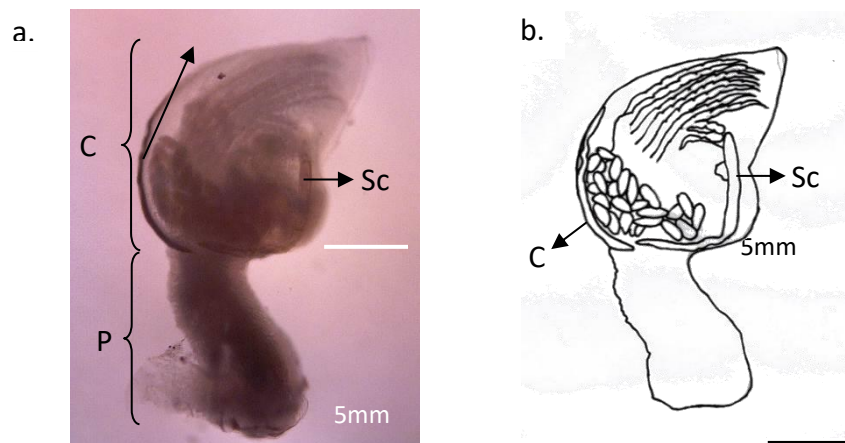


Figure 2. *Octolasmis angulata* as seen through a stereo-microscope (a) and *Octolasmis angulata* as seen through a stereo-microscope equipped with a Lucida camera (b)

Octolasmis angulata are a brown color. The anterior part consists of a capitulum (oval shaped) that is protected by several chalk skeleton dishes in certain parts. The dishes consist of a pair of scuta and a Carina. There are also peduncles that are elongated in shape in the posterior part. These characters are appropriate to the main *Octolasmis* identification as done by Praptiasih [5]; *Octolasmis angulata* has two suckers and a carina. Chan *et al.* [1] also added that *Octolasmis angulata* have a thin scutum in an L-shape, and that the carina is thin and wide in the horizontal part.

3.4 Prevalence of *octolasmis* ectoparasites

The result showed that the prevalence of *Octolasmis* ectoparasites in the sand lobsters (*P. homarus*) and bamboo lobsters (*P. versicolor*) in Sape, Bima Regency, West Nusa Tenggara Province, was 70% and 100% respectively (Table 2).

Table 2. The prevalence of *Octolasmis* ectoparasites in sand lobsters (*P. homarus*) and bamboo lobsters (*P. bersicolor*) in Sape, Bima Regency, West Nusa Tenggara Province.

No	Type of lobsters (host)	Total of samples (tails)	Amount of infested lobsters (tails)	Prevalence (%)
1	Sand lobsters (<i>P. homarus</i>)	20	14	70
2	Bamboo lobsters (<i>P.versicolor</i>)	25	25	100

The high population and distribution of *Octolasmis* ectoparasites in the water can be caused by several factors, such as the presence of suitable hosts, oxygen and sufficient foods, in addition to the sense of security from predators. According to Kennedy [8], the availability of suitable hosts can indirectly provide two advantages for *Octolasmis*; there is a supply of oxygen and food continuously which is carried out by the waters entering the hosts body. These factors are caused by mechanism of oxygen exchange in the Decapoda host, and this provides security or protection for the ectoparasites from predators directly. The data of the prevalence value of the *Octolasmis* ectoparasites species that infested sand lobsters (*P. homarus*) and bamboo lobsters (*P. versicolor*) has been shown in Table 3. The infestation of the *Octolasmis* species showed both single and mixed infestations in both types of lobster in floating net cages in Sape, Bima Regency, West Nusa Tenggara Province.

Table 3. The prevalence of *Octolasmis* species infested in sand lobsters (*P.homarus*) and bamboo lobsters (*P. versicolor*) in Sape, Bima Regency, West Nusa Tenggara Province.

No	Species of Ectoparasites	Types of losbtars infested		Total Sample (tails)	Prevalence (%)
		Sand lobsters (<i>P.homarus</i>)	Bamboo lobsters		
1	<i>O.angulata</i>	-	21	25	84
2	<i>O.angulata</i> + <i>O.loweii</i>	-	4	25	16
3	<i>O.angulata</i>	11	-	20	55
4	<i>O.angulata</i> + <i>O. lowei</i>	3	-	20	15

The prevalence of bamboo lobster (*P. versicolor*) infested by a single infestation (*O.angulata*) was 84% and by a mixed infestation (*O.angulata* + *O.loweii*) was 16%. The prevalence of sand lobsters (*P.homarus*) infested by a single infestation (*O.angulata*) was 55% and by a mixed infestation (*O.angulata*+ *O. lowei*) was 15%.

The *Octolasmis* infestation in the lobsters was also affected by the environment as the habitat, and the habits or behavior of the lobsters also had an impact. According to Longhurst and Pauly, [9] said that the habitat of the lobsters can be because the waters have a hard substrate in the tropical sea and are an important part of coral reef fauna. This habitat is similar to the habitat of *Octolasmis* in tropical water. The habits and behavior of the lobster can be the key to the distribution of the *Octolam* infestation. Losbtars usually hide between rocks and corals in the morning and evening, but at night they go out to look for food (nocturnal type) [10]. Their hiding habits provide *Octolasmis* with a reproductive stimulus for releasing cyprid larvae into the waters.

Cyprid larvae swim freely in the water to look for the suitable hosts, which is primarily in the gills of crustacea as the optimal place to continue their life cycle until the adult stage. The increase in the *Octolasmis* colony number on the gills can harm the hosts as physiological, it interferes with the oxygen exchange in the gills normally until death [6].

4. Conclusion

Octolasmis lowei and *Octolasmis angulata* infest sand lobsters (*P.homarus*) and bamboo lobsters (*P.versicolor*) and the prevalence of *Octolasmis* ectoparasites in both is in the high category.

5. References

- [1] Masithoh I, Uktolseja J L A, Mangimbulude J C, and Trihandaru S 2014 *Bioecological aspects of Lobster (Panulirus spp.) As an Important Economic Commodity*. Proceedings of the National Seminar. Raja Ampat-Waisai: 181.
- [2] Jones, C, Suastika M, Sukadi F, Surahman A, and Shearer D 2008 *Feasibility Study: Increases the enlargement and nutrition of lobster in West Nusa Tenggara. Final Report*. Australia: ACIAR-SADI Research Report
- [3] Praptiasih I 2010 *Bull.*, 34-38.
- [4] Ihwan M Z, Ikhwanuddin M, Marina H 2015 *Res. J. Parasitol* **10**, 25-30
- [5] Praptiasih I. 2010 Knowing *Octolasmis*, Goose's neck parasite in Crustaceans. *Bull.*, 28-33.
- [6] Jeffries W B, Voris H K, Naiyanetr P, and Panha S 2005 *J. Chulalongkorn Univ* **5**, 9-13.
- [7] Chan K K, Prabowo R, Lee K S 2009 *Crustacean Fauna of Taiwan: Barnacle, Volume I - Cirripedia: Thoracica Excluding The Pyrgomatidae and Acastinae*. Taiwan: National Taiwan Ocean University: 13-26.
- [8] Kennedy C R 1979 *Ecological Animal Parasitology*. New York: Halsted Press: 65-73.
- [9] Longhurst A R, and Pauly D 1987 *Ecology of Tropical Oceans*. Orlando, Academic Press, 407.
- [10] Nontji A 1993 *Nusantara Sea*. Jakarta: PT. Djambat: 367.

Acknowledgments

We would like to thank all of the staff of the Bima Regency and the Faculty of Fisheries and Marine, Universitas Airlangga, for the use of the facilities during the experiment.