Sainmatika: Jurnal Ilmiah Matematika dan Ilmu Pengetahuan Alam
Volume 20 No. 1, June 2023 DOI 10.31851/sainmatika.v20i1.11875
https://jurnal.univpgri-palembang.ac.id/index.php/sainmatika

Characteristics of Xanthidae Crab in the Intertidal Zone at Gili Meno Beach, West Nusa Tenggara

Syuhriatin[1], Slamet Mardiyanto Rahayu[2*], Rosalina Edy Swandayani[3]
*e-mail: slamet.mardiyantorahayu@gmail.com

[1,2,3] *Department of Biology, Faculty of Mathematics and Natural Sciences*
Universitas Islam Al-Azhar, Nusa Tenggara Barat, Indonesia

ABSTRACT

Gili Meno is one of the leading small (gili) tourist islands in North Lombok Regency, West Nusa Tenggara Province. Massive tourism activities have an impact on marine biota, including crabs. This research is to determine the characteristics of the crab family of Xanthidae in the intertidal zone of Gili Meno Beach, North Lombok Regency, West Nusa Tenggara Province. The research was conducted using an exploratory method by measuring the abiotic factors of the aquatic environment which is the habitat of crabs. Based on the research, two species of crab from the family of Xanthidae were obtained: *Actaeodes tomentosus* and *Atergatis floridus*. *A. tomentosus* has a relatively rough carapace while *A. floridus* has a relatively smooth carapace. Both like habitats with sandy substrates with reefs and coral rubble as protection from predators and waves. Abiotic factors: temperature and pH in the intertidal waters of Gili Meno Beach which are suitable for the growth, development and distribution of the two crab species.

Keywords: Brachyura, Exploration, Morphology, North Lombok

INTRODUCTION

West Nusa Tenggara is a province in Indonesia which is an archipelago, with two large islands: Lombok and Sumbawa which are surrounded by small islands (dyke). Gili Meno is one of the islands of a group of small islands which are well-known as tourist destinations in North Lombok Regency, West Nusa Tenggara Province. Based on the Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia No. Kep.67/Men/2009, Gili Meno, Air and Trawangan waters are designated as Marine Protected Areas and Marine Tourism Parks. Many tourists and docks can disturb the habitat of marine life, one of which is crabs.

The habitat of crabs (Brachyura) is in the intertidal zone with sandy, muddy and rocky beaches (Jumeini et al., 2021). Crab (Brachyura) plays a role in the nutrient cycle of an ecosystem (Bandekar, 2021; Chakravarty et al., 206). Crabs are benthic organisms as aquatic bioindicators. Therefore, crabs can be said to be key species (Guerra-Marrero et al., 2023; Min et al., 2023). Changing water quality affects the life and diversity of crabs. Unbalanced ecosystems are caused by environmental conditions that affect the diversity and existence of crabs (Leonville et al., 2021; Tiralongo et al., 2020).

Previous research has studied Gili Meno beach tourism (Aprilina, 2022; Handika et al., 2022; Septiani et al., 2019) and has not studied the diversity of biological ecosystems on Gili Meno beach, especially crabs. Analysis of the existence of crabs is important to

p-ISSN 1829 586X
e-ISSN 2581-0170

determine the health of coastal waters ecosystems. However, there has been no research on Xanthidae crabs on Gili Meno. Therefore, this research was conducted to determine the characteristics of the family of Xanthidae crabs in the intertidal zone of Gili Meno Beach, North Lombok Regency, West Nusa Tenggara Province.

RESEARCH METHODS

The research in the intertidal zone on Gili Meno, Gili Indah Village, Pemenang District, North Lombok Regency, West Nusa Tenggara Province (Figure 1). Data was taken at low tide, namely: in the morning between 05.00-07.00 WITA and in the afternoon between 15-17.00 WITA. The research method is explorative. Sampling at four points: two points in the west and two points in the east of Gili Meno Island. The crabs found were then put in a plastic bag and labeled. Next, the crab samples were brought to the Biology Laboratory of the Faculty of Mathematics and Natural Sciences, Al-Azhar Islamic University for identification. Identification using several identification books: A guide to decapod crustacea of the South Pacific (Poupin and Juncker, 2010), Marine Decapod Crustacea of Southern Australia: A Guide to Identification (Poore, 2004), and The Living Marine Resources from the West Central Pacific Volume 2 Cephalopods, crustaceans, holothurians and sharks (Carpenter and Niem, 1998).

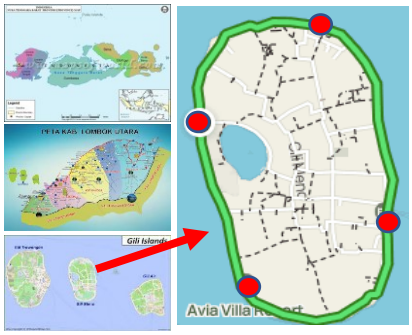

Figure 1. Research location

Abiotic factors in the intertidal zone of Gili Meno Beach were measured in situ: temperature using a thermometer and pH using a pH meter. Then it is analyzed in accordance with the Decree of the State Minister for the Environment Number 51 of 2004 concerning Seawater Quality Standards for Marine Biota (Ministry of Environment, 2004). The research results were then analyzed descriptively to determine the characteristics of crab species belonging to the family of Xanthidae in the intertidal zone of Gili Meno Beach, North Lombok Regency, West Nusa Tenggara Province.s

RESULTS AND DISCUSSION

Xanthidae crabs are crabs in the intertidal zone. Intertidal crabs live in ocean conditions that fluctuate during high and low tide. This pressure will cause a certain adaptation. Intertidal crabs will keep their gills moist using articulating plates that can block dry air from getting to the gills. Crabs prefer dark, damp places to hide. Most intertidal crabs are small and easily enter rock crevices to escape predators and big waves. Xanthidae are the dominant group of inhabitants of coral reef and rock rubble ecosystems (Pratiwi, 2012), such as in the coastal intertidal ecosystem of Gili Meno.

The family of Xanthidae is a group of crabs that are often found in sandy substrate habitats and rock fragments. The Xanthidae family has more species than other crab families. Based on the research of Anggraini et al. (2015) that the Xanthidae family in Tikus Island consists of twelve species, namely: *Xanthias* sp., *Euxanthus exculptus*, *Xanthias lamarcki*, *Pilodius areolatus*, *Chlorodiella nigra*, *Ethisus* sp., *Chlorodiella* sp., *Platypodia granulosa*, *Leptodius exaratus*, *Atergatis floridus*, *Banareia* sp., and *Actaeodes tomentosus*.

p-ISSN 1829 586X
e-ISSN 2581-0170

Xanthidae crabs also known as rock crabs, these crabs are found hiding in rocks firmly attached to the inside of rocks. Coral reef ecosystems and dead coral rubble are ecosystems that are rich in food sources, so they are preferred by crabs, especially Xanthidae crabs (Pratiwi, 2012).

Identification of crab morphology: carapace, color, and presence or absence of fine hairs. Based on the research, two species of crabs belonging to the Xanthidae family were obtained, namely: *Actaeodes tomentosus* and *Atergatis floridus*. The crabs *A. tomentosus* and *A. floridus* like intertidal zone at Gili Meno beach as their habitat because the beach has sandy substrate accompanied by coral reefs and broken coral for shelter from predators and sea waves. This is in accordance with research by Sukmaningrum et al. (2018). The substrate influences the existence and abundance of crab species (Wulandari et al., 2023).

Actaeodes tomentosus

The carapace is oval and forms a narrow strip. The whole body is covered with coarse ridges and covered with short fine hairs, including the sternum and belly of the crab. The anterolateral margin is divided into four inconspicuous denticles. The color is usually brown (Figure 2).

A **B**

Figure 2. Morphology of crab species: *Actaeodes tomentosus* (A) and *Atergatis floridus* (B)

Atergatis floridus

Smooth carapace. The anterolateral margin forms the apex and is separated by the posterolateral margin from the blunt tooth. It is usually olive green or brownish in color with dark chelipeds (Figure 2).

The results of measurements of abiotic factors in the intertidal waters of the Gili Meno coast are: temperatures ranging from 29-30°C and pH ranging from 7-8. The water temperature is within the appropriate quality standards for marine biota (28-30°C) making it suitable for both crab species. This is in accordance with research by Zolkiflee et al. (2021). Temperature is important as a limiting factor affecting the growth, development, and distribution of organisms. The temperature of a water will affect the solubility of oxygen and the metabolism of aquatic organisms so that it will determine their growth and reproduction (Hasudungan, 2008). The pH of the waters at the study site was within the appropriate quality standards for marine biota (7.0-8.5). Optimum pH for aquatic organisms: 7 - 8.5. Water conditions that are very acidic or very alkaline will endanger the survival of organisms because they will cause metabolic and respiratory disorders (Kristanto, 2002). Environmental parameters are a limiting factor for the existence of crabs. Stable environmental conditions allow the growth and development of crabs (Leonville et al., 2021; Tiralongo et al., 2020).

CONCLUSION

Based on the research, two species of crabs belonging to the Xanthidae family were obtained, namely: *Actaeodes tomentosus* and *Atergatis floridus*. *A. tomentosus* has a relatively rough carapace while *A. floridus* has a relatively smooth carapace. Both of them like

p-ISSN 1829 586X
e-ISSN 2581-0170

habitats with sandy substrates accompanied by reefs and broken coral as a place of protection from predators and sea waves. Abiotic factors: temperature and pH in the intertidal waters of Gili Meno Beach which are suitable for the growth, development and distribution of the two crab species.

ACKNOWLEDGMENTS

The authors would like to thank Institute for Research and Community Service, Al-Azhar Islamic University which have provided Research Grant No 182/SK/REK/UNIZAR-012/XII/2022 so that this research can be carried out properly.

REFERENCES

Anggraeni, P., Elfidasari, D., Pratiwi, R. (2015). Brachyuran Crabs Distribution in Tikus Island, Pari Islands Group, Seribu Island. Proceedings of the National Seminar on Indonesian Biodiversity Society 1 (2), 213-221. DOI: 10.13057/psnmbi/ m010208

Aprilina, Y. (2022). Identifikasi Kawasan Tiga Gili di Kecamatan Pemenang, Kabupaten Lombok Utara. *Jurnal Handasah*, 2 (1): 21-27.

Bandekar, P.D. (2021). Tree-climbing Mangrove Crabs of Karwar West Coast of India. *International Journal of Fisheries and Aquatic Studies*, 9 (3), 186–189. https://doi.org/10.22271/fish.2021.v9.i3c.2476

Carpenter, K.E. & Niem, V.H. (1998). *The Living Marine Resources of the Western Central Pacific Volume 2 Cephalopods, Crustaceans, Holothurians, and Sharks*. Rome: Food and Agriculture Organization of the United Nations.

Chakravarty, M.S., P.R.C. Ganesh, D. Amarnath, B.S. Sudha, Vivek, V. (2016). Diversity of crabs in Tekkali creek, Srikakulam District, Andhra Pradesh. *International Journal of Fisheries and Aquatic Studies*, 4 (1), 414–418.

Guerra-Marrero, A., Bonino-Pérez, A., Espino-Ruano, A., Couce-Montero, L., Jiménez-Alvarado, D., Castro, J.J. (2023). Life History Parameters and Fishing Aspects of the Alien Nimble Spray Crab Percnon gibbesi in a Native Area of the Central-East Atlantic. *Animals*, 13, 1427. https://doi.org/10.3390/ani13081427

Handika, R., Murdana, I., Masyhudi, L., Gede, I., & Martayadi, U. (2022). Persepsi Masyarakat Terhadap Pengembangan Destinasi Honeymoon di Gili Meno Kabupaten Lombok Utara. *Journal Of Responsible Tourism*, *2*(2), 295-304. https://doi.org/10.47492/jrt.v2i2.2162

Hasudungan, F. (2008). *Teluk Belukar Lagoon Ecosystem*. Bogor: Wetlands International.

Jumeini, Paransa, D.S.J., Schladuw, J.N.W., Mantiri, D.M.H., Pelle, W.E., Mamu, G.D. (2022). Crustacea Brachyura Morphology and Morphometrically in Buloh Beach Intertidal Zone, Minahasa District, North Sulawesi. *Platax Scientific Journal*, 10 (2), 392-401. 10.35800/jip.v10i2.42078

Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia. (2009). *Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number Kep. 67/Men/2009 Concerning the Establishment of the National Conservation Areas of Gili Air, Gili Meno and Gili Trawangan Islands in West Nusa Tenggara Province*. Jakarta: Ministry of Maritime

Affairs and Fisheries of the Republic of Indonesia.

Ministry of Environment. (2004). Decree of the Minister for the Environment Number 51 of 2004 concerning Sea Water Quality Standards. Jakarta: Ministry of Environment.

Kristanto, P. (2002). *Industrial Ecology*. Yogyakarta: Andi.

Leoville, A., R. Lagarde, H. Grondin, L. Faivre. (2021). Influence of environmental conditions on the distribution of burrows of the mud crab, *Scylla serrata*, in a fringing mangrove ecosystem. Regional Studies in Marine Science, 43: 101684. https://doi.org/10.1016/j.rsma.2021.101684

Min, W.W., Kandasamy, K., Balakrishnan, B. (2023). Crab Species-Specific Excavation and Architecture of Burrows in Restored Mangrove Habitat. *Journal of Marine Science Engineering*, 11, 310. https://doi.org/10.3390/jmse11020310

Poore, G.C.B. (2004). *Marine Decapod Crustaceans of Southern Australia: A Guide to Identification*. Clayton, Australia: CSIRO Publishing.

Poupin, J. & Juncker, M. (2010). *A guide to the Decapod Crustaceans of the South Pacific*. New Caledonia: Secretariat of The Pacific Community.

Pratiwi, R. (2012). Species and Distribution Patterns of Crustacean Fauna in Padanglamun Tikus Island, Seribu Islands. *Jurnal OLDI*, 38 (1), 43-55.

Septiani, E., Santoso, B., Mulyadi, Muhdin. 2019. Analisis Preferensi Pengunjung Kawasan Wisata Gili Meno Kabupaten Lombok Utara. *Jurnal Distribusi*, 7 (2): 141-154.

Sukmaningrum, T., Adji, B.K., Pratiwi, E.M., Larasati, B., Sayekti, P.R., Maulana, I., Eprilurahman, R. (2018). Diversity of Crabs in the Intertidal Zone at Sundak Beach, Gunungkidul, Indonesia. *AIP Conf. Proc*. 2002, 020066-1–020066-5. AIP Publishing. https://doi.org/10.1063/1.5050162

Tiralongo, F., G. Messina, S. Marino, S. Bellomo, A. Vanadia, L. Borzì, D. Tibullo, A. Di, A.B. Maria. (2020). Abundance, distribution, and ecology of the tufted ghost crab *Ocypode cursor* (Linnaeus, 1758) (Crustacea: Ocypodidae) from a recently colonized urban sandy beach, and new records from Sicily (Central Mediterranean Sea). *Journal of Sea Research*, 156: 101832. https://doi.org/10.1016/j.seares.2019.101832

Wulandari, D.P., Kamal, E., Suparno. (2023). The correlation between environmental parameters and the abundance of crabs in the mangrove ecosystem of Gemuruh River, Koto XI Tarusan District, West Sumatera. *Depik Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan*, 12 (1): 49-55. DOI:10.13170/depik.12.1.27000

Zolkhiflee, N., Yahya, K., Shuib, S. (2021). Intertidal Zone Preferences of Fiddler Crabs in Tropical Mangroves Reflect Species Specific Selection Across Multiple Spatial and Temporal Scales. *Regional Studies in Marine Science*, 48, 101994. https://doi.org/10.1016/j.rsma.2021.101994