# DAFTAR PUSTAKA


Abdurahiman, K. P., Harishnayak, T., Zacharia, P. U., & Mohamed, K. S., (2004) Length-weight relationship of commercially important marine fishes and shellfishes of the southern coast of the Karnataka, India. NAGA, WoldFish Center Quarterly. 27(1&2): 9-14.

Ahyong, S. T. (2001) Revision of the Australian Stomatopod Crustacea. Records of the Australian Museum, Supplement 26: 1–326. ISBN 07347 2303 2.

Ahyong, S. T., Chan T. Y., & Liao, Y. C. (2008) A catalog of the Mantis Shrimp (Stomatopoda) of Taiwan. National Taiwan Ocean University, Keelung, Taiwan.

Akinwunmi, M. F., Bello-Olusoji, O. A., & Egwu, H. E. (2021) Bionomics of *Squilla mantis* (Linnaeus, 1758) from Maroko area of the Lagos Lagoon, Nigeria. Advances in Food Sciences, 43(2): 81-91.

Ambarsari, N., Wardiatno, Y., Krisanti, M., & Fahrudin, A. (2016) Dinamika populasi udang mantis *Oratosquillina gravieri* (Crustacea: Stomatopoda) di perairan Teluk Palabuhanratu, Sukabumi, Jawa Barat. Jurnal Biologi Tropis 16(1): 66-79 [In Indonesian].

Arifandi, M. (2022). Pola pertumbuhan dan faktor kondisi udang mantis *Miyakella nepa dan Harpiosquilla harpax* di perairan Pulau Sakuala, Kabupaten Pangkajene dan Kepulauan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddin, Makassar.

Arshad, A., Sofea, T., Zamri, Z., Amin, S. M. N., & Ara, R. (2015). Population dynamics of mantis shrimp, *Harpiosquilla harpax* in the coastal waters of Pantai Remis, Perak, Peninsular Malaysia. Iranian Journal of Fisheries Sciences, 14(1): 15-26.

Asadi, H., Sattari, M., Motalebi, Y., Zamani-Faradonbeh, M., & Gheytasi, A. (2017) Length weight relationship and condition factor of seven fish species from Shahrbijar River, Southern Caspian Sea basin, Iran. Iran. J. Fish. Sci., 16(2): 733-741.

Asriani. (2022). Hubungan panjang bobot dan faktor kondisi udang mantis, *Gonodactylus chiragra* (Fabricius, 1781) di perairan Batukalasi, Kecamatan Mallusetasi, Kabupaten Barru, Sulawesi Selatan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddin, Makassar.

Ayodya, F. P., Wijayanti, D. P., & Sabdono A. (2021) Lunar cycle and reproductive activity of redbelly yellowtail fusilier, *Caesio cuning* in Karimunjawa National Park, Indonesia. Biodiversitas, 22(7): 3075-3082. ISSN: 1412-033X, E-ISSN: 2085-4722. DOI: 10.13057/biodiv/d220762.

Battaglia, P., Pedà, C., Malara D., Milisenda G., MacKenzie B. R., Esposito V., Consoli P., Vicchio T. M., Stipa M. G., Pagano L., Longo F. & Romeo T. (2022) Importance of the lunar cycle on mesopelagic foraging by Atlantic bluefin tuna in the upwelling area of the Strait of Messina (Central

Mediterranean Sea). Animals 2022, 12, 2261. https://doi.org/10.3390/ani12172261.

Campbell, S. J., Kartawijaya, T., Yulianto, I., Prasetia, R., & Clifton, J. 2013. Co-management approaches and incentives improve management effectiveness in the Karimunjawa National Park, Indonesia. Marine Policy, 41: 72-79.

Chandra, T., Salim, G., & Wiharyant, D. (2015). Model populasi pendekatan pertumbuhan dan indeks kondisi *Harpiosquilla raphidea* waktu tangkapan pada pagi hari di perairan utara Pulau Tarakan. Jurnal Harpodon Borneo, 8(2): 122-131. ISSN: 2087-121X.

Chang, C. C., Hatch, K. A., Hsu, C. H., Hwang, W., Liu, H. C., & Chang, Y. M. (2023) Seaward migration and larval release coincide with lunar and light-dark cycles in supratidal land crabs *Cardisoma carnifex* and *Epigrapsus notatus.* Zool. Stud., 62: 22 (2023) doi:10.6620/ZS.2023.62-22.

Christy, J. H., & Salmon, M. (1991). Comparative studies of reproductive behavior in mantis shrimps and feddler crabs. Amer. Zool. 31: 329 337.

Damora, A. (2010). Biologi reproduksi udang mantis *Harpiosquilla raphidea* di perairan Kuala Tungkal, Tanjung Jabung Barat, Jambi. [Skripsi]. Fakultas Perikanan dan Ilmu Kelautan. Institut Pertanian Bogor.

Das, D., Pal, S., Bhaumik, U., Paria, T., Mazumdar, D., & Pal, S. (2015). The optimum fishing day is based on moon. International Journal of Fisheries and Aquatic Studies. 2(4): 304-309.

Dimenta, R. H., Machrizal, R. & Khairul. (2019). Informasi morfologi reproduksi dan nisbah kelamin udang mantis *Cloridopsis scorpio* (Latreile, 1828) di perairan ekosistem mangrove Belawan. Jurnal Pembelajaran dan Biologi Nukleus, 5 (2): 24-33. p-ISSN: 2442-9481, e-ISSN: 2685-7332.

Dimenta, R. H., Machrizal, R., Khairul., Hasibuan, R., Manurung, A. Q., & Ihsan M. (2020) Biologi reproduksi udang mantis *Cloridopsis scorpio* di ekosistem mangrove Belawan, Sumatera Utara. Depik Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan, 9(2): 227-234. P-ISSN: 2089-7790, E-ISSN: 2502-6194.

Djuwito., Saputra, S. W., & Widyaningtiwi, W. A. (2013). Beberapa aspek biologi udang mantis (*Oratosquilla oratoria* De Haan, 1844) di perairan Cilacap, Jawa Tengah. Journal of Management of Aquatic Resources, 2(3): 56-64.

Dudiya, D., Patel, K., & Trivedi J. (2022). First report of mantis shrimp *Oratosquillina interrupta* Kemp, 1911 (Crustacea: Stomatopoda) from Gujarat State, India. Munis Entomology & Zoology, 17 (supplement): 1657-166. ISSN 1306-3022.

Ekalaturrahmah, Y. A. C., Zairion., & Wardiatno, Y. (2020) Population dynamics of mantis shrimp *Harpiosquilla harpax* and *Oratosquillina* sp. in the waters south of Madura Island, Indonesia. Biodoversitas, 21(4): 1458-1466. ISSN: 1412-033X, E-ISSN: 2085-4722. DOI: 10.13057/biodiv/d210425.

Fiqrah, A. R. A. (2021) Kebiasaan makanan udang mantis, *Gonodactylus chiragra* (Fabricius, 1781) di perairan Batukalasi, Kecamatan Mallusetasi, Kabupaten Barru, Sulawesi Selatan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddin, Makassar.

Fowler J.; Cohen L. and Jarvis P. (1998) Practical Statistics for Field Biology, second ed. John Wiley & Sons Ltd, Chichester, England.

Gökoğlu, M., Kaya, Y., Deval, M. C., & Tosunoğlu, Z. (2008) Some biological parameters of the Erythrean mantis shrimp, *Erugosquilla Massavensis* (Kossmann, 1880) (Stomatopoda, Squillidae) in the northeastern Mediterranean (Turkish waters). Crustaceana, 81(1): 35-42.

Hamano, T., & Matsuura, S. (1984). Egg laying and egg mass nursing behaviour in the Japanese mantis shrimp. Bulletin of the Japanese Society of Scientific Fisheries. 50(12): 1969-1973.

Hanif, M. A., Siddik, M. A., & Ali, M. M. (2020) Length-weight relationships of seven cyprinid fish species from the Kaptai Lake, Bangladesh. J. Appl. Ichthyol., 36(2): 261-264.

Hernáez, P., Clarke, T. M., Benavides-Varela, C., Villalobos-Rojas, F., Nívia-Ruiz, J., & Wehrtmann, I. S. (2011). Population demography and spatial distribution of the mantis shrimp *Squilla biformis* (Stomatopoda, Squillidae) from Pacific Costa Rica. Marine Ecology Progress Series, 424: 157-168. DOI: 10.3354/meps08982.

Hasibuan, S. A. D., & Dimenta, R. H. (2022). Aspek reproduksi udang mantis *Harpiosquilla raphidea* di ekosistem mangrove Kabupaten Labuhanbatu, Sumatera Utara. Jurnal Biolokus: Jurnal Penelitian Pendidikan Biologi dan Biologi. 5(1): 24-34. p-ISSN: 2621-3720, e-ISSN:2621-7538.

Huang, J.; Wang B. & Yang T. (2009) Spatio-temporal patterns of stomatopods (Malacostraca, Stomatopoda) in the main bays of Guangdong Province, China. Crustaceana, 82(8): 1029-1043. Doi:10.1163/156854009x448853.

Iftitah, D., Abinawanto., Wardhana, W., Ulayya, N. & Magisma, I. (2017). Morphometric study of mantis shrimp *Harpiosquilla harpax* (De Haan, 1844) (Crustacea: Stomatopoda) in Pelabuhan Ratu and Cirebon waters, Indonesia, based on length-weight relationship and condition factor. AIP Conference Proceedings, 1862(1): 030110. https://doi.org/10.1063/1.4991214.

Irpan, I., Djunaidi., & Hertati, R. (2018). P.engaruh ukuran mata jaring (mesh size) alat tangkap jaring insang (gill net) terhadap hasil tangkapan di Sungai Lirik Kecamatan Jangkat Timur Kabupaten Merangin Provinsi Jambi. 2(2): 1-11. ISSN: 2580-0736

Jacoeb, A. M., Cakti, N.W. & Nurjanah. (2008a) [Changes in the protein and amino acid composition of ronggeng shrimp (*Harpiosquilla raphidea*) meat due to boiling]. Buletin Teknologi Hasil Perikanan, 11(1): 1-18. [In Indonesian].

Jacoeb, A. M., Hamdani M. & Nurjanah. (2008b) [Changes in the chemical composition and vitamins of ronggeng shrimp (*Harpiosquilla raphidea*) meat due to boiling]. Buletin Teknologi Hasil Perikanan, 11(2): 76-87. [In Indonesian].

James, D. B., & Thirumilu, P. (1993) Population dynamics of *Oratosquilla nepa* in the trawling grounds off Madras. J. Mar. Bio. Assoc. India, 35(1 &2): 135-140.

Kaisar. (2019). Dinamika populasi udang mantis *Miyakea nepa* (Latreille, 1828) di perairan of Siwa, Kabupaten Wajo, Sulawesi Selatan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddin, Makassar.

Kaisar., Nadiarti., Umar, M. T., Nafie, Y. A. L., Priosambodo, D., Irmawati., Tresnati, J., & Suwarni. (2021). Population dynamics of mantis shrimp (*Miyakea nepa* Fabricius, 1781) in Siwa, Bone Bay, South Sulawesi, Indonesia. IOP Conference Series: Earth and Environmental Science 763, 012037:1-5. DOI: 10.1088/1755-1315/763/1/012037.

Kalalo, A., Salim, G., & Wiharyanto, D. (2015). Analisis populasi pertumbuhan allometri dan indeks kondisi *Harpiosquilla raphidea* waktu tangkapan siang hari di perairan juata Kota Tarakan. Jurnal Harpodon Borneo, 8(2): 78-87. ISSN: 2087-121X

Kennouche, H., & Kacimi, A. (2021) Growth estimation and length-weight relationships of spottail mantis shrimp (*Squilla mantis* Linneaus, 1758) in the Algiers Region (South-West of Maditerranean Sea). Applied Ecology and Environmental Research, 19(6): 5083-5101. DOI: http://dx.doi.org/10.15666/aeer/1906_50835101.

Keputusan Menteri Negara Lingkungan Hidup Nomor: 51 Tahun 2004 Tentang Baku Mutu Air Laut.

Kharat S. S.; Khillare Y. K. & Dahanukar N. (2008) Allometric scaling in growth and reproduction of a freshwater loach *Nemacheilus mooreh* (Sykes, 1839). Electronic Journal of Ichthyology, 4(1): 8-17.

Kim, S. E., Kim, H. J., Bae, H. J., Kim, H. G., & Oh, C. W. (2017). Growth and reproduction of the Japanese mantis shrimp, *Oratosquilla oratoria* (De Haan 1844) in the coastal area of Tongyeong, Korea. Ocean Science Journal, 52(2): 257-265.

King, M. (1995). Fisheries Biology: Assessment and Management. Fishing News Books, Blackwell Science Ltd. Oxford. 341.

Kishor, C., Venkatappa, O. R., Nataraju, S. R., Somashekar, & Puneeth R. (2023) Studies on length weight relationship and reproductive biology of *Miyakea nepa* (Latreille, 1828) from the trawl bycatches of Mangalore coast, Karnataka. J. Exp. Zool. India, 26: 1597-1602. DOI: https://doi.org/10.51470/jez.2023.26.2.1597.

Koç, H. T., Erdoğan Z., & Sarıgöl C. (2023) A study on some population parameters of spot-tail mantis shrimp (*Squilla mantis* L.) (Crustacea: Stomatopoda) in Edremit Bay (Northern Aegean Sea). Acta Biol. Turc., 36(2): 1-9. E-ISSN: 2458-7893.

Kodama, K., Shimizu, T., Yamakawa, T., & Aoki, I. (2004). Reproductive biology of the female Japanese mantis shrimp *Oratosquilla oratoria* (Stomatopoda) in relation to changes in the seasonal pattern of larval occurrence in Tokyo Bay, Japan. Fisheries Science. 70: 734-745.

Kruse M., Taylor M., Muhando C. A., Reuter H., 2016 Lunar, diel, and tidal changes in fish assemblages in an East African marine reserve. Regional Studies in Marine Science 3:49–57.

Libini, C. L., & Khan, S. A. (2012) Influence of lunar phases on fish landings by gillnetters and trawlers. Indian J. Fish., 59(2): 81-87.

Lloret-Lloret E., Albo-Puigserver M., Giménez J., Navarro J., Pennino M. G., Steenbeek J., Belido J. M. & Coll M. (2022) Small pelagic fish fitness relates to local environmental conditions and trophic variables. Prog. Oceanogr., 202 (102745). DOI: 10.1016/j.pocean.2022.102745.

Manangkalangi, E., Syafei, L. S., Lapadi, I., Paskalina, T., Lefaan., Widiastuti, N., & Rahardjo, M. F. (2022). Biologi Reproduksi Ikan Kiper, *Scatophagus argus* (Linnaeus, 1766) di Teluk Pabean, Indramayu. Jurnal Sumberdaya Akuatik Indopasifik. 6(1): 215-226

Manning, R. B. (1978) New and rare stomatopod Crustacea from the Indo-West Pacific region. Smithsonian Contribution to Zoology, 264: 1-36.

Manning, R. B. (1995) Stomatopod Crustacea of Vietnam: the legacy of Raoul Serène. Crustacean Research, special no. 4, i–viii, 1–339.

Mashar, A. (2011) [Resource management of mantis shrimp (*Harpiosquilla raphidea* Fabricius, 1798) based on biological information in Kuala Tungkal, West Tanjung Jabung Regency, Jambi]. IPB Universty, Bogor. [In Indonesian].

Mashar, A., & Wardiatno, Y. (2011). [Spatial distribution of mantis shrimp *Harpiosquilla raphidea* and *Oratosquillina gravieri* in Kuala Tungkal, West Tanjung Jabung Regency, Jambi Province]. Jurnal Pertanian-UMMI 1(1): 41-46. [In Indonesian].

Maturbongs, M. R., Elviana, S., Lesik, M. M. N. N., Rani, C. & Burhanuddin, A. I. (2020) Growth patterns, sex ratio and size structure of nurseryfish (*Kurtus gulliveri* Castelnau, 1878) according to the lunar phase in Maro River, Merauke. AACL Bioflux, 13(2): 539-552.

Mili, S., Bouriga, N., Missaoui, H., & Jarboui, O. (2011). Morphometric, reproductive parameters and seasonal variations in fatty acid composition of the mantis shrimp *Squilla mantis* (Crustacea: Stomatopoda) in the Gulf of Gabes (Tunisia). Journal of Life Sciences 5: 1058-1071.

Mili, S., Ennouri, R., Jarboui, O., & Missaoui, H. (2013). Distribution and abundance of the mantis shrimp *Squilla mantis* (Crustacea: Stomatopoda) in Tunisian waters: Gulfs of Tunis, Hammamet and Gabes. Greener Journal of Life Sciences 1(1): 1-13.

Mili, S., Jarboui, O., & Missaoui, H. (2008). Caracteres biometriques de la squille *Squilla mantis* dans les eaux Tunisiennes. Bull. Inst. Natn. Scien. Tech. Mer de Salammbô 35: 1-14.

Mitterwallner, P. & Shima, J. S. (2022a) Influence of the lunar cycle and spatial gradients on size-dependent male and female reproductive investment decisions of a protogynous reef fish. Mar. Biol., 169:129 https://doi.org/10.1007/s00227-022-04109-9.

Mitterwallner, P. & Shima, J. S. (2022b). The relative influence of environmental cues on reproductive allocation of a highly iteroparous coral reef fish. Coral Reefs, https://doi.org/10.1007/s00338-022-02239-6.

Monica, S. C., Saputra, S. W., & Solichin, A. (2017). Aspek biologi udang *Metapenaeus conjunctus* di Perairan Batang dan Kendal, Jawa Tengah. Journal of Maquares 6(4): 358-368.

Mulyono, M., Patria, M. P., Abinawanto, A., & Affandi, R. (2013) Length-weight relationship and condition factor in giant harpiosquillid mantis shrimp *Harpiosquilla raphidea* (Crustacea: Stomatopoda) in Banten Bay waters, Indonesia. Int. J. Aquat. Biol., 1(4): 185-187.

Mulyono, M., Patria, M. P., Abinawanto., Affandi, R., & Heriyansyah, F. A. (2016) Growth aspects of giant mantis shrimp *Harpiosquilla raphidea* Fabricius, 1798 in Banten Bay waters, Banten Province. International Journal of Marine Science 6(32): 1-14.

Mulyono, M., Patria, M. P., Abinawanto., Affandi, R., & Mardiyono. (2017) The development of gonad mantis shrimp *Harpiosquilla raphidea* Fabricius, 1798 in Banten Bay, Indonesia. Int. J. Aqu. Sci., 8(1): 26-33. ISSN: 2008-8019.

Muzammil, W. (2010) [Morphometric and meristic study of mantis shrimp (*Oratosquillina gravieri* and *Harpiosquilla raphidea*) in the region Kuala Tungkal muddy beach, Jambi Province]. IPB University, Bogor. [In Indonesian].

Nio, T., Doi W., Mizutani A. & Kohno H. (2019) Seaward migration and larval release of the land hermit crab *Coenobita brevimanus* Dana, 1852 (Anomura: Coenobitidae) on Iriomote Island, Japan. Crustacean Research, 48: 67-80. doi: 10.18353/crustacea.48.0_67.

Nurhidayah, A. Z. (2021) Karakteristik morfometrik udang mantis, *Gonodactylus chiragra* (Fabricius, 1781) di perairan Batukalasi, Kecamatan Mallusetasi, Kabupaten Barru, Sulawesi Selatan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddin, Makassar.

Nurlia. (2022). Studi karakteristik morfometrik dan meristik udang mantis, *Miyakella nepa* Latreille, 1828 di Perairan pesisir Lantebung, Makassar, Sulawesi Selatan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddi, Makassar.

Omar, S. B. A. (2013). Biologi Perikanan. Jurusan Perikanan, Fakultas Ilmu Kelautan dan Perikanan, Universitas Hasanuddin. Makassar.

Omar, S. B. A., Kariyanti., Yanuarita, D., Umar, M. T., & Lawi, Y. S. A. (2020) Length-weight relationship and condition factor of the Celebes rainbowfish *Marosatherina ladigesi*, endemic to the Maros karst region, South Sulawesi, Indonesia. AACL Bioflux, 13(6): 3384-3396.

Ottmann, D., Langbehn, T. J., Reglero, P., Alvarez-Berastegui, D., & Fiksen Ø. (2023) Model of mesopelagic fish predation on eggs and larvae shows benefits of tuna spawning under full moon. Limnol. Oceanogr., 9999, 2023, 1–10 doi: 10.1002/lno.12465.

Permana, A., Wahyu, R. I., & Soeboer, D. A. (2016). Pengaruh fase bulan terhadap hasil tangkapan lobster (*Panulirus homarus*) di Teluk Palabuhan Ratu Kabupaten Sukabumi. Jurnal Teknologi Perikanan dan Kelautan, 7(2): 137-145. ISSN: 2087-4871.

Pezzuto, P. R. (1998). Population dynamics of *Sergio mirim* (Rodrigues 1971) (Decapoda: Thalassinidea: Callianassidae) in Cassino Beach, southern Brazil. P.S.Z.N.: Marine Ecology. 19: 89-10.

Prasad, D. R., & Rao, P. Y. (2015). Length-weight relationship, relative condition factor and growth of *Oratosquilla anomala* (Tweedie, 1935) (Crustacea: Stomatopoda) off Visakhapatnam, East Coast of India. Advances in Applied Science Research, 6(8): 246-253.

Pratiwi, E. (2010). Segregasi spasial udang mantis *Harpiosquilla raphidea* dan *Oratosquillina gravieri* pada pantai berlumpur di Kuala Tungkal, Kabupaten Tanjung Jabung Barat, Jambi. [Skripsi]. Fakultas Perikanan dan Ilmu Kelautan. Institut Pertanian Bogor, Bogor.

Pratiwi, W. B., Nuraini, R. A. T., Widianingsih. (2021). Kajian morfometri rajungan (*Portunus pelagicus*) linnaeus, 1758 (Crustacea: Portunidae) pada dua fase bulan yang berbeda di Perairan Desa Tunggulsari, Rembang. Journal of Marine Research, 10(1): pp 109-116. EISSN: 2407-7690. DOI: 10.14710/jmr.v10i1.28667.

Prasetyo, K. G. (2022) Kebiasaan makanan udang mantis *Harpiosquilla raphidea* (Fabricius, 1798) di perairan Siwa, Sulawesi Selatan. [Skripsi]. Fakultas Ilmu Kelautan dan Perikanan. Universitas Hasanuddin, Makassar.

Pujawan, A. A. N. O., Nindhia T. S. & Mahardika I. G. N. K. (2012) [Identification mantis shrimp species (Stomatopoda) in Pemutaran waters with using the cytochrome C oxidase subunit-1 gene from DNA mitochondria]. Indonesian Medicus Veterinus, 1 (2): 268-280. [In Indonesian].

Pulver, J. R. (2017) Does the lunar cycle affect reef fish catch rates? N. Am. J. Fish. Manag., 37(3): 536-549. DOI: 10.1080/02755947.2017.1293574.

Putra, E. M., Pramesti, R., & Santosa, G. W. Morfometri *Portunus pelagicus* Linnaeus, 1758 (Malacostraca : Portunidae) Pada Fase Bulan Yang Berbeda Di Perairan Betahwalang, Demak. Journal of Marine Research, 8(2): pp 204-210. EISSN: 2407-7690.

Ragonese, S., Morara, U., Canali, E., Pagliarino, E., & Bianchini, M. L. (2012) Abundance and biological traits of the spottail mantis shrimp, *Squilla mantis* (L., 1758) (Crustacea: Stomatopoda), off the southern coast of Sicily. Cah. Biol. Mar., 53: 485-493.

Rahardiawan, R., & Arifin, L., (2013). Struktur geologi Teluk Bone -Sulawesi Selatan. Jurnal Geologi Kelautan. 11(3): 141–148.

Rao, P. Y., Prasad, D. R., Sirisha, I. R., Rao, M. S., & Teja, G. (2015). Meat yield studies in *Harpiosquilla harpax* (de Haan, 1844) and *Oratosquilla anomala* (Tweedie, 1935) (Crustacea: Stomatopoda) represented in the shrimp trawl net by-catches off Visakhapatnam, east coast of India. European Journal of Experimental Biology, 5(5): 6-11.

Rochmady., Omar S. B. A., & Tandipayuk, L. S. (2012). Nisbah kelamin dan ukuran pertama matang gonad kerang lumpur *Anodontia edentula* Linnaeus, 1758 di Pulau Tobea, Kecamatan Napabalano, Kabupaten Muna. Agrikan; Jurnal Ilmiah Agribisnis dan Perikanan. Vol. 5(2): 25-32.

Sağlam, N. E., Sağlam, Y. D., & Sağlam C. (2017) A study on some population parameters of mantis shrimp (*Squilla mantis* L., 1758) in Izmir Bay (Aegean Sea). J. Mar. Biol. Assoc. U. K., 98(4): 721–726.

Sajeevan, M. K. (2013) Evaluation of the effect of lunar cycle, monsoon and spatial differences on billfishes. IOTC–2013–WPB11–20. 17 pp.

Sajeevan, M. K., & Sanadi R. B. (2014a) Effect of lunar cycle and monsoon on abundance of pelagic sharks around Andaman and Nicobar Islands. Fishery Technology 51: 19-24.

Sajeevan, M. K., & Sanadi R. B. (2014b) Evaluation of the effect of lunar cycle and monsoon on catch of yellowfin tuna. J. Mar. Biol. Assoc. India, 56(2), July-December 2014. doi: 10.6024/jmbai.2014.56.2.01761-09.

Salim, G., Retno, H. K., Anggoro, S., Agus, I., Agung, D., Abdul, J. I., Julian, R., & Lukman, Y. P. (2020) Morphometric analysis of *Harpodon nehereus*, *Harpiosquilla raphidea*, and *Scylla serrata* in the coastal waters of Tarakan, North Kalimantan, Indonesia. Biodiversitas, 21(10): 4229-4838. ISSN: 1412-033X, E-ISSN: 2085-4722. DOI: 10.13057/biodiv/d211049.

Sallam, W. S. (2005). Reproductive biology of the mantis shrimp *Erugosquilla massavensis* from Port Said, Egypt. Egypt Journal Aquatic Biology and Fish 9 (1): 171-183. ISSN:1110-6131.

Samphan, P., & Ratanamusik, A. (2018) The length-weight relationship factor and sex-ratio of mantis shrimp (*Harpiosquilla* spp) in Andaman Sea of Satun Province, Thailand. Int. J. Agric. Technol., 14(1): 61-71.

Sarigöl, C. (2019) The investigations of biological aspects of spot-tail mantis shrimp, *Squilla mantis* (L.) (Crustacea: Stomatopoda), in Edremit Bay, the Northern Aegean Sea. Thesis. Balikesir University Institute of Science, Turkey.

Short, J. W. (2014) Mangrove Estuary Shrimps of the Mimika Region, Papua, Indonesia. PT Freeport Indonesia, Timika. 99 pp.

Situmeang, N. S., Purnama, D., & Hartono, D. (2017) Identifikasi spesies udang mantis (Stomatopoda) di Perairan Kota Bengkulu. Jurnal Enggano 2(2): 239-248. EISSN:2527-5186.

Syafrina R. A. (2011) [Use of DNA barcoding as an alternative for mantis shrimp species identification]. IPB University, Bogor. [In Indonesian].

Udupa, K. S. (1986). Statistical method of estimating the size at first maturity in Fishes. Fishbyte 4(2) : 8-10.

Van Der Wal, C., Ahyong, S. T., Ho, S. Y. W. & Lo, N. (2017). The evolutionary history of Stomatopoda (Crustacea: Malacostraca) inferred from molecular data. PeerJ, 5: e3844. DOI: https://doi.org/10.7717/peerj.3844.

Van Der Wal, C., Ahyong, S. T., Ho, S. Y. W., Lins, L. S. F. & Lo, N. (2019). Combining morphological and molecular data resolves the phylogeny of Squilloidea (Crustacea: Malacostraca). Invertebrates Systematics, 33: 89-100. DOI: https://doi.org/10.1071/IS18035.

Vargas, R. 2009. Stomatopods. Marine Biodiversity Of Costa Rica, Central America.

Vergara, C. J. C., Quinitio, G. F., & Baeck, G. W. (2017) Effects of the lunar cycle in the catch composition and total catch of stationary lift nets in the coastal waters of Miagao, Iloilo, the Philippines. J. Korean Soc. Fish. Technol., 53(4): 349-356. http://dx.doi.org/10.3796/KSFT. 2017.53.4.349.

Wardiatno, Y., & Mashar, A. (2010) Biological information on the mantis shrimp, *Harpiosquilla raphidea* (Fabricius 1798) (Stomatopoda, Crustacea) in Indonesia with a highlight of its reproductive aspects. Journal of Tropical Biology and Conservation, 7: 65-73.

Wardiatno, Y., & Mashar A. (2011) Population dynamics of the Indonesian mantis shrimp *Harpiosquilla raphidea* (Fabricius 1798) (Crustacea: Stomatopoda) collected from a mud flat in Kuala Tungkal. Jambi Province. Sumatera Island. Ilmu Kelautan, 16(2): 111–118. ISSN: 0853-7291.

Wardiatno, Y., & Mashar, A. (2013) Morphometric study of two Indonesian mantis shrimps (*Harpiosquilla raphidea* and *Oratosquillina gravieri*). Buletin PSP, 21(1): 19-30. ISSN: 0251-286X.

Wardiatno, Y., Farajallah, A., & Mashar, A. (2009). Kajian aspek reproduksi dan genetika udang mantis (*Harpiosquilla raphidea*, Fabricius 1798). di Kuala Tungkal, Kabupaten Tanjung Jabung Barat, Jambi sebagai upaya lanjutan domestikasi udang mantis. Laporan akhir hibah kompetitif penelitian untuk publikasi internasional Batch III. 1-89.

Wardiatno, Y., Santoso, J., & Mashar, A. (2012) Biochemical composition in two populations of the mantis shrimp, *Harpiosquilla raphidea* (Fabricius 1798) (Stomatopoda, Crustacea). Ilmu Kelautan, 17(1): 49-58. ISSN: 0853-7291.

Wortham-Neal, J. L. 2002. Reproductive morphology and biology of male and female mantis shrimp (Stomatopoda: Squillidae). Journal of Crustacean Biology, 22(4): 728–74.

Yudasmara, G. A. (2014). Biologi perikanan. Plantaxia Yogyakarta.

Yousuf, F. (2003). Redescription of *Oratosquilla interrupta* (Manning, 1995) (Crustacea: Stomatopoda) and its transfer to *Oratosquillina* (Manning, 1995) from Northern Arabian Sea, Karachi, Pakistan. Pakistan Journal of Biological Sciences 6(13): 1199-1201. ISSN: 1028-8880.

Zakzok, S. M., Abd. El-ghany, A. G., Anas, A. Y., Dahshan, S. K., Rashad, M. E., Yasser, M., & Tawfik, M. M. (2022) Biometric study, sex ratio and potential biological activities of the edible mantis shrimp *Erugosquilla massavensis*. Egypt. Aquat. Biol. Fish., 26(4): 229-253. ISSN: 1110-6131.

Zamri, Z., Arshad, A., Amin, S. M. N., Rahman, M. A., & Khayat, J. A. A. (2016). Sex ratio, gonad development and fecundity of *Miyakella nepa* (Crustacea, Stomatopoda) of Pantai Remis coastal waters of Malaysia. Journal of Environmental Biology, 37(4): 677-683.

Zar, J. H. (2014) Biostatistical Analysis, fifth ed. Pearson Education Limited, Edinburgh.

# LAMPIRAN

**Lampiran 1.** Analisis regresi hubungan panjang-bobot udang mantis *Oratosquillina interrupta* jantan pada fase bulan gelap

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0,9227 |
| R Square | 0,8514 |
| Adjusted R Square | 0,8505 |
| Standard Error | 0,0541 |
| Observations | 168,0000 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1,0000 | 2,7800 | 2,7800 | 951,1147 | 0,0000 |
| Residual | 166,0000 | 0,4852 | 0,0029 | | |
| Total | 167,0000 | 3,2652 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | -4,7433 | 0,1873 | -25,3255 | 0,0000 | -5,1130 | -4,3735 |
| X Variable 1 | 2,8885 | 0,0937 | 30,8401 | 0,0000 | 2,7036 | 3,0734 |

$t_{hitung} = \left|\frac{3-b}{s_b}\right| = \frac{(3-2.8885)}{0.0937}$

$= 1,1903$

$T_{0,05} = 1,9744$

Karena $t_{hitung} < t_{tabel}$ maka kesimpulannya adalah pola pertumbuhan udang mantis jantan pada fase bulan gelap bersifat isometric

**Lampiran 2.** Analisis regresi hubungan panjang-bobot udang mantis *Oratosquillina interrupta* jantan pada fase bulan terang

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0,9188 |
| R Square | 0,8441 |
| Adjusted R Square | 0,8432 |
| Standard Error | 0,0466 |
| Observations | 173,0000 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1,0000 | 2,0086 | 2,0086 | 926,1590 | 0,0000 |
| Residual | 171,0000 | 0,3709 | 0,0022 | | |
| Total | 172,0000 | 2,3794 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | -4,4399 | 0,1800 | -24,6728 | 0,0000 | -4,7952 | -4,0847 |
| X Variable 1 | 2,7331 | 0,0898 | 30,4329 | 0,0000 | 2,5558 | 2,9103 |

$t_{hitung} = \left|\frac{3-b}{s_b}\right| = \frac{(3-2.7331)}{0.0898}$

$= 2,9725$

$T_{0,05} = 1,9739$

Karena $t_{hitung} > t_{tabel}$ maka kesimpulannya adalah pola pertumbuhan udang mantis jantan pada fase bulan gelap bersifat Hipoalometrik

**Lampiran 3.** Analisis regresi hubungan panjang-bobot udang mantis *Oratosquillina interrupta* betina pada fase bulan gelap

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0,9565 |
| R Square | 0,9150 |
| Adjusted R Square | 0,9146 |
| Standard Error | 0,0482 |
| Observations | 229,0000 |

ANOVA

| | *Df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1,0000 | 5,6752 | 5,6752 | 2442,1954 | 0,0000 |
| Residual | 227,0000 | 0,5275 | 0,0023 | | |
| Total | 228,0000 | 6,2027 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | -4,8791 | 0,1209 | -40,3665 | 0,0000 | -5,1173 | -4,6410 |
| X Variable 1 | 2,9492 | 0,0597 | 49,4186 | 0,0000 | 2,8316 | 3,0668 |

$t_{hitung} = \left|\frac{3-b}{s_b}\right| = \frac{(3-2.9492)}{0.0597}$

= 0,8513

$T_{0,05}$ = 1,9705

Karena $t_{hitung} < t_{tabel}$ maka kesimpulannya adalah pola pertumbuhan udang mantis betina pada fase bulan gelap bersifat isometrik

**Lampiran 4.** Analisis regresi hubungan panjang-bobot udang mantis Oratosquillina interrupta betina pada fase bulan terang

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0,9583 |
| R Square | 0,9184 |
| Adjusted R Square | 0,9180 |
| Standard Error | 0,0428 |
| Observations | 226,0000 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1,0000 | 4,6075 | 4,6075 | 2520,5173 | 0,0000 |
| Residual | 224,0000 | 0,4095 | 0,0018 | | |
| Total | 225,0000 | 5,0170 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | -4,5767 | 0,1131 | -40,4565 | 0,0000 | -4,7997 | -4,3538 |
| X Variable 1 | 2,8014 | 0,0558 | 50,2048 | 0,0000 | 2,6915 | 2,9114 |

$t_{hitung} = \left|\frac{3-b}{s_b}\right| = \frac{(3-2.8014)}{0.0558}$

= 3,5587

$T_{0,05}$ = 1,9706

Karena $t_{hitung} > t_{tabel}$ maka kesimpulannya adalah pola pertumbuhan udang mantis betina pada fase bulan gelap bersifat hipoalometrik

**Lampiran 5.** Uji statistik koefisien regresi antara udang mantis *Oratosquillina interrupta* jantan dan betina pada fase bulan gelap.

$t_{hitung}$ = $\frac{(\mathbf{b1-b2})}{\boldsymbol{SE(b1-b2)}}$

$(b_1\text{-}b_2)$ = 2,8885– 2,9492

= - 0,0607

$SE(b_1\text{-}b_2)$ = $\sqrt{(SEb_1) + (SEb_2)}^2$

=$\sqrt{(2{,}8885)^2 + (2{,}9492^2)}$

= 4,1281

$t_{hitung}$ = $\frac{-0{,}0607}{4{,}1281}$ = -0,5464

Db = $(n_1\text{-}2) + (n_2\text{-}2)$

= (168-2) + (229-2)

= 393

$T_{0,05}$ = 1,9660

$t_{hitung} < t_{tabel}$ berarti udang mantis jantan pada fase bulan gelap tidak berbeda dengan udang mantis betina pada fase bulan gelap

**Lampiran 6.** Analisis regresi hubungan panjang-bobot udang mantis *Oratosquillina interrupta* gabungan jantan dan betina pada fase bulan gelap

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0,9460 |
| R Square | 0,8950 |
| Adjusted R Square | 0,8947 |
| Standard Error | 0,0511 |
| Observations | 397,0000 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1,0000 | 8,7930 | 8,7930 | 3367,1526 | 0,0000 |
| Residual | 395,0000 | 1,0315 | 0,0026 | | |
| Total | 396,0000 | 9,8245 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | -4,7650 | 0,1005 | -47,4001 | 0,0000 | -4,9626 | -4,5673 |
| X Variable 1 | 2,8956 | 0,0499 | 58,0272 | 0,0000 | 2,7975 | 2,9937 |

$t_{hitung} = \left|\frac{3-b}{s_b}\right| = \frac{(3-2.8956)}{0.0499}$

$= 2,0930$

$T_{0,05} = 1,9660$

Karena $t_{hitung} > t_{tabel}$ maka pola pertumbuhan gabungan udang mantis jantan dan betina pada fase bulan gelap bersifat hipoalometrik

**Lampiran 7.** Uji statistik koefisien regresi antara udang mantis *Oratosquillina interrupta* jantan dan betina pada fase bulan terang.

$t_{hitung}$ = $\frac{(\mathbf{b1-b2})}{\boldsymbol{SE(b1-b2)}}$

$(b_1\text{-}b_2)$ = 2,7331– 2,8014

= - 0,0683

$SE(b_1\text{-}b_2)$ = $\sqrt{(SEb_1) + (SEb_2)}^2$

=$\sqrt{(2{,}7331)^2 + (2{,}8014^2)}$

= 3,9137

$t_{\ hitung}$ = $\frac{-\ 0{,}0683}{3{,}9137}$ = -0,6466

Db = $(n_1\text{-}2) + (n_2\text{-}2)$

= (173-2) + (226-2)

= 395

$T_{0,05}$ = 1,9660

$t_{hitung} < t_{tabel}$ berarti udang mantis jantan pada fase bulan terang tidak berbeda dengan udang mantis betina pada fase bulan terang

**Lampiran 8.** Analisis regresi hubungan panjang-bobot udang mantis *Oratosquillina interrupta* gabungan jantan dan betina pada fase bulan terang

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0,9487 |
| R Square | 0,9001 |
| Adjusted R Square | 0,8998 |
| Standard Error | 0,0444 |
| Observations | 399,0000 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1,0000 | 7,0356 | 7,0356 | 3575,3302 | 0,0000 |
| Residual | 397,0000 | 0,7812 | 0,0020 | | |
| Total | 398,0000 | 7,8168 | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* |
|---|---|---|---|---|---|---|
| Intercept | -4,5369 | 0,0938 | -48,3473 | 0,0000 | -4,7214 | -4,3524 |
| X Variable 1 | 2,7816 | 0,0465 | 59,7941 | 0,0000 | 2,6902 | 2,8731 |

$t_{hitung} = \left|\frac{3-b}{s_b}\right| = \frac{(3-2.7816)}{0.0465}$

$= 4,6938$

$T_{0,05} = 1,9660$

Karena $t_{hitung} > t_{tabel}$ maka gabungan udang mantis jantan dan betina pada fase bulan terang bersifat hipoalometrik

**Lampiran 9.** Uji statistik faktor kondisi antara udang mantis *Oratosquillina interrupta* jantan dan betina pada fase bulan gelap.

| | | | | |
|---|---|---|---|---|
| FK_NW_M & FK_NW_F | | | | |
| Tests for equal means | | | | |
| FK_NW_M | | FK_NW_F | | |
| N: | 168 | N: | 229 | |
| Mean: | 1,0895 | Mean: | 1,0487 | |
| 95% conf.: | (1,0684 1,1106) | 95% conf.: | (1,0336 1,0638) | |
| Variance: | 0,019235 | Variance: | 0,013446 | |
| Difference between means: | 0,040823 | | | |
| 95% conf. interval (parametric): | (0,015645 0,066) | | | |
| 95% conf. interval (bootstrap): | (0,014755 0,066644) | | | |
| t : | 3,1877 | p (same mean): | 0,0015485 | Critical t value (p=0.05): |
| Uneq. var. t : | 3,1018 | p (same mean): | 0,0020944 | berbeda nyata |
| Monte Carlo permutation: | | p (same mean): | 0,0021 | |
| Tests for equal variances | | | | |
| FK_NW_M | | FK_NW_F | | |
| N: | 168 | N: | 229 | |
| Variance: | 0,019235 | Variance: | 0,013446 | |
| F : | 1,4306 | p (same var.): | 0,012186 | |
| Critical F value (p=0.05): | 1,3232 | | | |
| Monte Carlo permutation: | | p (same var.): | 0,2382 | |

**Lampiran 10.** Uji statistik faktor kondisi antara udang mantis *Oratosquillina interrupta* jantan dan betina pada fase bulan terang.

| | | | | |
|---|---|---|---|---|
| FK_FM_M & FK_FM_F | | | | |
| Tests for equal means | | | | |
| FK_FM_M | | FK_FM_F | | |
| N: | 173 | N: | 226 | |
| Mean: | 1,0062 | Mean: | 1,0047 | |
| 95% conf.: | (0,98742 1,0249) | 95% conf.: | (0,99205 1,0174) | |
| Variance: | 0,015607 | Variance: | 0,0093732 | |
| Difference between means: | 0,0014263 | | | |
| 95% conf. interval (parametric): | (-0,020396 0,023249) | | | |
| 95% conf. interval (bootstrap): | (-0,022425 0,02275) | | | |
| t : | 0,12849 | p (same mean): | 0,89782 | Critical t value (p=0.05): |
| Uneq. var. t : | 0,12429 | p (same mean): | 0,90116 | tidak berbeda nyata |
| Monte Carlo permutation: | | p (same mean): | 0,9021 | |
| Tests for equal variances | | | | |
| FK_FM_M | | FK_FM_F | | |
| N: | 173 | N: | 226 | |
| Variance: | 0,015607 | Variance: | 0,0093732 | |
| F : | 1,665 | p (same var.): | 0,00034008 | |
| Critical F value (p=0.05): | 1,3217 | | | |
| Monte Carlo permutation: | | p (same var.): | 0,733 | |

**Lampiran 11.** Uji *chi-square* nisbah kelamin udang mantis *Oratosquillina interrupta* berdasarkan tingkat kematangan gonad

**Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| JK * TKG | 796 | 100,0% | 0 | 0,0% | 796 | 100,0% |

**JK * TKG Crosstabulation**

Count

| | | TKG | | | | Total |
|---|---|---|---|---|---|---|
| | | TKG 1 | TKG 2 | TKG 3 | TKG 4 | |
| JK | JANTAN | 250 | 79 | 9 | 3 | 341 |
| | BETINA | 226 | 154 | 51 | 24 | 455 |
| Total | | 476 | 233 | 60 | 27 | 796 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 55,905[a] | 3 | ,000 |
| Likelihood Ratio | 60,450 | 3 | ,000 |
| Linear-by-Linear Association | 54,347 | 1 | ,000 |
| N of Valid Cases | 796 | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 11,57.

**Lampiran 12.** Uji *chi-square* nisbah kelamin udang mantis *Oratosquillina interrupta* berdasarkan fase bulan gelap dan fase bulan terang

**Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| JK * SAMPLING | 796 | 100,0% | 0 | 0,0% | 796 | 100,0% |

**JK * SAMPLING Crosstabulation**

Count

| | | SAMPLING | | |
|---|---|---|---|---|
| | | BULAN GELAP | BULAN TERANG | Total |
| JK | JANTAN | 168 | 173 | 341 |
| | BETINA | 229 | 226 | 455 |
| Total | | 397 | 399 | 796 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | ,088[a] | 1 | ,767 | | |
| Continuity Correction[b] | ,051 | 1 | ,822 | | |
| Likelihood Ratio | ,088 | 1 | ,767 | | |
| Fisher's Exact Test | | | | ,775 | ,411 |
| Linear-by-Linear Association | ,088 | 1 | ,767 | | |
| N of Valid Cases | 796 | | | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 170,07.

b. Computed only for a 2x2 table

**Lampiran 13.** Uji *chi-square* nisbah kelamin udang mantis *Oratosquillina interrup*ta berdasarkan waktu pengambilan sampel

**Case Processing Summary**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | Total | |
| | N | Percent | N | Percent | N | Percent |
| JK * BULAN | 796 | 100,0% | 0 | 0,0% | 796 | 100,0% |

**JK * BULAN Crosstabulation**

Count

| | | BULAN | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | MEI | JUNI | JULI | AGUSTUS | SEPTEMBER | OKTOBER | |
| JK | JANTAN | 39 | 30 | 35 | 89 | 94 | 54 | 341 |
| | BETINA | 43 | 44 | 72 | 102 | 107 | 87 | 455 |
| Total | | 82 | 74 | 107 | 191 | 201 | 141 | 796 |

**Chi-Square Tests**

| | Value | df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 8,944[a] | 5 | ,111 |
| Likelihood Ratio | 9,062 | 5 | ,107 |
| Linear-by-Linear Association | ,011 | 1 | ,916 |
| N of Valid Cases | 796 | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 31,70.

**Lampiran 14.** Distribusi frekuensi panjang total dan tingkat kematangan gonad serta perhitungan pendugaan rata-rata panjang total pertama kali matang gonad udang mantis *Oratosquillina interrupta* jantan pada fase bulan gelap

| Selang kelas | Tengah kelas | Logaritma tengah kelas | Jumlah sampel udang (ni) | Jumlah udang belum matang gonad | Jumlah udang matang gonad (ri) | Proporsi udang matang gonad (pi) | $X_{i+1} - X_i = X$ | qi = 1-pi | $\frac{pi \times qi}{ni-1}$ |
|---|---|---|---|---|---|---|---|---|---|
| 74-79 | 77 | 1,8837 | 2 | 2 | 0 | 0,0000 | 0,0328 | 1,0000 | 0,0000 |
| 80-85 | 83 | 1,9165 | 10 | 10 | 0 | 0,0000 | 0,0305 | 1,0000 | 0,0000 |
| 86-91 | 89 | 1,9469 | 16 | 16 | 0 | 0,0000 | 0,0285 | 1,0000 | 0,0000 |
| 92-97 | 95 | 1,9754 | 42 | 41 | 1 | 0,0238 | 0,0267 | 0,9762 | 0,0006 |
| 98-103 | 101 | 2,0022 | 36 | 35 | 1 | 0,0278 | 0,0252 | 0,9722 | 0,0008 |
| 104-109 | 107 | 2,0273 | 22 | 20 | 2 | 0,0909 | 0,0238 | 0,9091 | 0,0039 |
| 110-115 | 113 | 2,0512 | 29 | 29 | 0 | 0,0000 | 0,0226 | 1,0000 | 0,0000 |
| 116-121 | 119 | 2,0737 | 9 | 9 | 0 | 0,0000 | 0,0215 | 1,0000 | 0,0000 |
| 122-127 | 125 | 2,0952 | 2 | 0 | 2 | 1,0000 | 0,0000 | 0,0000 | 0,0000 |

**BULAN GELAP JANTAN (PANJANG)**

$m = X_k + \frac{x}{2} - (X \sum Pi)$

= 2,0952 + (0,0215/2) – (0,0215 X 0,0053)

= 2,0952 + 0,0108 – 0,0001

= 2,1059

M = antilog 2,1059

= 127,6145

$$M = antilog \left[ m \pm 1{,}96 \sqrt{X^2 \sum \frac{(p_1 - q_1)}{(n_1 - 1)}} \right]$$

$$M = antilog \left[ 2{,}1059 \pm 1{,}96 \sqrt{(0{,}0215^2)\,(0{,}0053)} \right]$$

$$M = antilog\ [2{,}1059 \pm 0{,}0031]$$

Jadi, batas bawah adalah

Antilog [2,1059 – 0,0031] = antilog 2,1028 = 126,7068

Sedangkan batas atas adalah

Antilog [2,1059 + 0,0031] = antilog 2,1090 = 128,5287

Sehingga panjang ukuran pertama kali udang mantis *Oratosquillina interrupta* jantan pada bulan gelap matang gonad adalah 128 mm atau pada kisaran 127-129 mm.

**Lampiran 15.** Distribusi frekuensi panjang total dan tingkat kematangan gonad serta perhitungan pendugaan rata-rata panjang total pertama kali matang gonad udang mantis *Oratosquillina interrupta* betina di fase bulan gelap

| Selang kelas | Tengah kelas | Logaritma tengah kelas | Jumlah sampel udang (ni) | Jumlah udang belum matang gonad | Jumlah udang matang gonad (ri) | Proporsi udang matang gonad (pi) | $X_{i+1}-X_i = X$ | qi = 1-pi | $\frac{pi \times qi}{ni-1}$ |
|---|---|---|---|---|---|---|---|---|---|
| 83 - 89 | 86 | 1,9345 | 20 | 20 | 0 | 0,0000 | 0,0340 | 1,0000 | 0,0000 |
| 90 - 96 | 93 | 1,9685 | 40 | 39 | 1 | 0,0250 | 0,0315 | 0,9750 | 0,0006 |
| 97 - 103 | 100 | 2,0000 | 48 | 47 | 1 | 0,0208 | 0,0294 | 0,9792 | 0,0004 |
| 104 - 110 | 107 | 2,0294 | 31 | 27 | 4 | 0,1290 | 0,0275 | 0,8710 | 0,0037 |
| 111 - 117 | 114 | 2,0569 | 36 | 31 | 5 | 0,1389 | 0,0259 | 0,8611 | 0,0034 |
| 118 - 124 | 121 | 2,0828 | 30 | 20 | 10 | 0,3333 | 0,0244 | 0,6667 | 0,0077 |
| 125 - 131 | 128 | 2,1072 | 19 | 11 | 8 | 0,4211 | 0,0231 | 0,5789 | 0,0135 |
| 132 - 138 | 135 | 2,1303 | 4 | 3 | 1 | 0,2500 | 0,0220 | 0,7500 | 0,0625 |
| 139 - 145 | 142 | 2,1523 | 1 | 0 | 1 | 1,0000 | 0,0000 | 0,0000 | 0,0000 |

**BULAN GELAP BETINA (PANJANG)**

$m = X_k + \frac{x}{2} - (X \sum Pi)$

= 2,1523 + (0,0220/2) – (0,0220 X 0,0919)

= 2,1523 + 0,0110 – 0,0020

= 2,1613

M = antilog 2,1613

= 144,9773

$$M = antilog \left[ m \pm 1{,}96 \sqrt{X^2 \sum \frac{(p_1 - q_1)}{(n_1 - 1)}} \right]$$

$$M = antilog \left[ 2{,}1613 \pm 1{,}96 \sqrt{(0{,}0220^2)\,(0{,}0919)} \right]$$

$$M = antilog\,[2{,}1613 \pm 0{,}0131]$$

Jadi, batas bawah adalah

Antilog [2,1613 – 0,0131] = antilog 2,1482 = 140,6695

Sedangkan batas atas adalah

Antilog [2,1613 + 0,0131] = antilog 2,1744 = 149,4170

Sehingga panjang ukuran pertama kali udang mantis *Oratosquillina interrupta* betina pada bulan gelap matang gonad adalah 145 mm atau pada kisaran 141-150 mm.

**Lampiran 16.** Distribusi frekuensi panjang total dan tingkat kematangan gonad serta perhitungan pendugaan rata-rata panjang total pertama kali matang gonad udang mantis *Oratosquillina interrupta* jantan pada fase bulan terang di Teluk Bone.

| Selang kelas | Tengah kelas | Logaritma tengah kelas | Jumlah sampel udang (ni) | Jumlah udang belum matang gonad | Jumlah udang matang gonad (ri) | Proporsi udang matang gonad (pi) | $X_{i+1}-X_i = X$ | qi = 1-pi | $\frac{pi \times qi}{ni-1}$ |
|---|---|---|---|---|---|---|---|---|---|
| 79 - 84 | 82 | 1,9112 | 4 | 4 | 0 | 0,0000 | 0,0309 | 1,0000 | 0,0000 |
| 85 - 90 | 88 | 1,9420 | 15 | 15 | 0 | 0,0000 | 0,0288 | 1,0000 | 0,0000 |
| 91 - 96 | 94 | 1,9708 | 38 | 38 | 0 | 0,0000 | 0,0270 | 1,0000 | 0,0000 |
| 97 - 102 | 100 | 1,9978 | 48 | 47 | 1 | 0,0208 | 0,0254 | 0,9792 | 0,0004 |
| 103 - 108 | 106 | 2,0233 | 33 | 30 | 3 | 0,0909 | 0,0240 | 0,9091 | 0,0026 |
| 109 - 114 | 112 | 2,0473 | 20 | 20 | 0 | 0,0000 | 0,0228 | 1,0000 | 0,0000 |
| 115 - 120 | 118 | 2,0700 | 8 | 8 | 0 | 0,0000 | 0,0216 | 1,0000 | 0,0000 |
| 121 - 126 | 124 | 2,0917 | 6 | 6 | 0 | 0,0000 | 0,0206 | 1,0000 | 0,0000 |
| 127 - 132 | 130 | 2,1123 | 1 | 0 | 1 | 1,0000 | 0,0000 | 0,0000 | 0,0000 |

**BULAN TERANG JANTAN (PANJANG)**

$m = X_k + \frac{x}{2} - (X \sum Pi)$

= 2,1123 + (0,0206/2) – (0,0206 X 0,0030)

= 2,1123 + 0,0103 – 0,0001

= 2,1225

M = antilog 2,1225

= 132,5867

$$M = antilog \left[ m \pm 1{,}96 \sqrt{X^2 \sum \frac{(p_1 - q_1)}{(n_1 - 1)}} \right]$$

$$M = antilog \left[ 2{,}1225 \pm 1{,}96 \sqrt{(0{,}0206^2)\ (0{,}0030)} \right]$$

$$M = antilog\ [2{,}1225 \pm 0{,}0022]$$

Jadi, batas bawah adalah

Antilog [2,1225 – 0,0022] = antilog 2,1203 = 131,9168

Sedangkan batas atas adalah

Antilog [2,1225 + 0,0022] = antilog 2,1247 = 133,2601

Sehingga panjang ukuran pertama kali udang mantis *Oratosquillina interrupta* jantan pada bulan terang matang gonad adalah 133 mm atau pada kisaran 132-133 mm.

**Lampiran 17.** Distribusi frekuensi panjang total dan tingkat kematangan gonad serta perhitungan pendugaan rata-rata panjang total pertama kali matang gonad udang mantis *Oratosquillina interrupta* betina pada fase bulan terang di Teluk Bone.

| Selang kelas | Tengah kelas | Logaritma tengah kelas | Jumlah sampel udang (ni) | Jumlah udang belum matang gonad | Jumlah udang matang gonad (ri) | Proporsi udang matang gonad (pi) | $X_{i+1}-X_i = X$ | qi = 1-pi | $\frac{pi \times qi}{ni-1}$ |
|---|---|---|---|---|---|---|---|---|---|
| 75 - 81 | 78 | 1,8921 | 3 | 3 | 0 | 0,00000 | 0,0373 | 1,00000 | 0,0000 |
| 82 - 88 | 85 | 1,9294 | 9 | 9 | 0 | 0,00000 | 0,0344 | 1,00000 | 0,0000 |
| 89 - 95 | 92 | 1,9638 | 28 | 28 | 0 | 0,00000 | 0,0318 | 1,00000 | 0,0000 |
| 96 - 102 | 99 | 1,9956 | 43 | 39 | 4 | 0,09302 | 0,0297 | 0,90698 | 0,0020 |
| 103 - 109 | 106 | 2,0253 | 54 | 47 | 7 | 0,12963 | 0,0278 | 0,87037 | 0,0021 |
| 110 - 116 | 113 | 2,0531 | 34 | 24 | 10 | 0,29412 | 0,0261 | 0,70588 | 0,0063 |
| 117 - 123 | 120 | 2,0792 | 31 | 22 | 9 | 0,29032 | 0,0246 | 0,70968 | 0,0069 |
| 124 - 130 | 127 | 2,1038 | 16 | 10 | 6 | 0,37500 | 0,0233 | 0,62500 | 0,0156 |
| 131 - 137 | 134 | 2,1271 | 8 | 0 | 8 | 1,00000 | 0,0000 | 0,00000 | 0,0000 |

**BULAN TERANG BETINA (PANJANG)**

$$m = X_k + \frac{x}{2} - (X \sum Pi)$$

= 2,1271 + (0,0233/2) – (0,0233 X 2,1821)

= 2,1271 + 0,0117 – 0,0508

= 2,1896

M = antilog 2,1896

= 154,7391

$$M = antilog \left[ m \pm 1{,}96 \sqrt{X^2 \sum \frac{(p_1 - q_1)}{(n_1 - 1)}} \right]$$

$$M = antilog \left[ 2{,}1896 \pm 1{,}96 \sqrt{(0{,}0233^2)\,(0{,}0329)} \right]$$

$$M = antilog\,[2{,}1896 \pm 0{,}0083]$$

Jadi, batas bawah adalah

Antilog [2,1896 – 0,0083] = antilog 2,1813 = 151,8099

Sedangkan batas atas adalah

Antilog [2,1896 + 0,0083] = antilog 2,1979 = 157,7248

Sehingga panjang ukuran pertama kali udang mantis *Oratosquillina interrupta* betina pada bulan terang matang gonad adalah 155 mm atau pada kisaran 152-158 mm.

**Lampiran 18.** Panjang total tubuh (mm) beberapa spesies *Oratosquillina* dari berbagai lokasi

| Spesies | Lokasi | Panjang total (mm) | | Referensi |
|---|---|---|---|---|
| | | Jantan | Betina | |
| *O. asiatica* | Indo-West-Pacific region | 81.5-93.0 | 97 | Manning (1978) |
| | Taiwan | 73-114 | 71-131 | Ahyong et al. (2008) |
| *O. berentsae* | Australia | - | 73-100 | Ahyong (2001) |
| *O. gonypetes* | Indo-West-Pacific region | 39-55 | 26-47 | Manning (1978) |
| *O. gravieri* | Indo-West-Pacific region | 92 | - | Manning (1978) |
| | Vietnam | 92-99 | 94-110 | Manning (1995) |
| | Australia | 36-113 | 33-118 | Ahyong (2001) |
| | Vietnam | - | 97-108 | Ahyong et al. (2008) |
| *O. inortata* | Indo-West-Pacific region | 91 | 39 | Manning (1978) |
| | Australia | 48-80 | 39-112 | Ahyong (2001) |
| | Taiwan | 63-107 | 64-97 | Ahyong et al. (2008) |
| | Hong Kong | 69±12 (C) | | Huang et al. (2009) |
| *O. interrupta* | Vietnam | 89 | 86-88 | Manning (1995) |
| | Australia | 38-155 | 66-160 | Ahyong (2001) |
| | Pakistan | 56-89 | 58-95 | Yousuf (2003) |
| | Vietnam | 65-135 | 67-137 | Ahyong et al. (2008) |
| | China | 76±23 (C) | | Huang et al. (2009) |
| | India | 71.10-108.00 | 75.39-112.36 | Dudiya et al. (2022) |
| | Teluk Bone, Indonesia | 74-132 | 75-140 | Penelitian ini |
| *O. manningi* | Australia | 39-87 | 79-90 | Ahyong (2001) |
| | Taiwan | 87 | 79-90 | Ahyong et al. (2008) |
| *O. nordica* | Taiwan | 44-118 | 47-124 | Ahyong et al. (2008) |
| *O. perpensa* | Indo-West-Pacific region | 64-93 | 63-97.5 | Manning (1978) |
| | Taiwan | 30-112 | 31-119 | Ahyong et al. (2008) |
| *O. quinquedentata* | Indo-West-Pacific region | 59-140 | 119 | Manning (1978) |
| | Taiwan | 30-148 | 55-155 | Ahyong (2001) |
| *O. stephensoni* | Indo-West-Pacific region | 93-144 | 109.5-149 | Manning (1978) |
| | Taiwan | 43-150 | 63-157 | Ahyong (2001) |

Keterangan : C = gabungan jenis kelamin (jantan dan betina)

**Lampiran 19.** Koefisien hubungan panjang-bobot dan pola pertumbuhan udang mantis dari berbagai lokasi

| Spesies | Lokasi | Jenis kelamin | n | Parameter regresi | | | Tipe pertumbuhan | Referensi |
|---|---|---|---|---|---|---|---|---|
| | | | | a | b | $R^2$ | | |
| *Erugosquilla massavensis* | Antalya Bay, Turkey | J | 138 | 0,000128 | 2,478 | 0,823 | Hipoalometrik | Gökoğlu et al. (2008) |
| | | B | 133 | 0,000062 | 2,628 | 0,868 | Hipoalometrik | |
| | | G | 271 | 0,000091 | 2,546 | 0,852 | Hipoalometrik | |
| | Port Said, Egypt | J | 610 | 0,0245 | 2,716 | 0,878 | Hipoalometrik | Zakzok et al. (2022) |
| | | B | 702 | 0,023 | 2,716 | 0,897 | Hipoalometrik | |
| | | G | 1312 | 0,0231 | 2,726 | 0,884 | Hipoalometrik | |
| *Gonodactylus chiragra* | Batukalasi, Indonesia | J | 46 | 0,000985 | 2,0870 | 0,8103 | Hipoalometrik | Asriani (2022) |
| | | B | 23 | 0,000384 | 2,3044 | 0,8877 | Hipoalometrik | |
| *Harpiosquilla harpax* | Madura, Indonesia | J | 347 | 0,0210 | 2,3057 | 0,8713 | Hipoalometrik | Ekalaturrahmah et al. (2020) |
| | | B | 343 | 0,0163 | 2,4302 | 0,8251 | Hipoalometrik | |
| | Pantai Remis, Malaysia | J | 439 | 0,023 | 2,698 | 0,715 | Hipoalometrik | Arshad et al. (2015) |
| | | B | 365 | 0,014 | 2,884 | 0,899 | Hipoalometrik | |
| | | G | 804 | 0,015 | 2,852 | 0,841 | Hipoalometrik | |
| | Visakhapatnam, India | J | 344 | 0,000079 | 2,5650 | 0,4416 | Hipoalometrik | Prasad & Rao (2015) |
| | | B | 551 | 0,000048 | 2,6622 | 0,7257 | Hipoalometrik | |
| | | G | 895 | 0,000066 | 2,6015 | 0,6524 | Hipoalometrik | |
| | Palabuhanratu, Indonesia | J | 13 | 0,0152 | 2,8644 | 0,9869 | Hipoalometrik | Iftitah et al. (2017) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | B | 19 | 0,0366 | 2,5454 | 0,8965 | Hipoalometrik | |
| | | G | 32 | 0,0244 | 2,6870 | 0,9549 | Hipoalometrik | |
| | Sakuala Island, Indonesia | J | 148 | 0,0019 | 1,9492 | 0,7550 | Hipoalometrik | Arifandi (2022) |
| | | B | 172 | 0,0006 | 2,1979 | 0,7235 | Hipoalometrik | |
| | | G | 320 | 0,0008 | 2,1355 | 0,8217 | Hipoalometrik | |
| *Harpiosquilla raphidea* | Tarakan, Indonesia | J | 131 | 0,0070 | 2,8343 | 0,9706 | Hipoalometrik | Salim et al. (2020) |
| | | B | 83 | 0,0067 | 2,8573 | 0,9085 | Hipoalometrik | |
| | Kuala Tungkal, Jambi, Indonesia (intertidal area) | J | 331 | 0,00003 | 2,743 | 0,876 | Hipoalometrik | Wardiatno & Mashar (2011) |
| | | B | 484 | 0,00004 | 2,687 | 0,885 | Hipoalometrik | |
| | Kuala Tungkal, Jambi, Indonesia (subtidal area) | J | 549 | 0,0003 | 2,356 | 0,896 | Hipoalometrik | Wardiatno & Mashar (2011) |
| | | B | 745 | 0,0002 | 2,413 | 0,779 | Hipoalometrik | |
| *Harpiosquilla* sp | Andaman Sea, Thailand | J | 265 | 0,0257 | 2,7425 | 0,8377 | Hipoalometrik | Samphan & Ratanamusik (2018) |
| | | B | 172 | 0,0610 | 2,4810 | 0,7239 | Hipoalometrik | |
| | | G | 437 | 0,0341 | 2,6564 | 0,8129 | Hipoalometrik | |
| *Miyakella nepa* | Sakuala Island, Indonesia | J | 54 | 0,0067 | 1,6785 | 0,7766 | Hipoalometrik | Arifandi (2022) |
| | | B | 143 | 0,0004 | 2,2956 | 0,8282 | Hipoalometrik | |
| | | G | 197 | 0,001 | 2,0920 | 0,8208 | Hipoalometrik | |
| *Oratosquilla anomala* | Visakhapatnam, India | J | 573 | 0,00337 | 1,7336 | 0,4784 | Hipoalometrik | Prasad & Rao (2015) |
| | | B | 743 | 0,00278 | 1,7801 | 0,5609 | Hipoalometrik | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | G | 1316 | 0,00293 | 1,7801 | 0,5316 | Hipoalometrik | |
| *Oratosquilla gravieri* | Kuala Tungkal, Jambi, Indonesia | J | 77 | 0,0150 | 2,7995 | 0,8720 | Hipoalometrik | Muzammil (2010) |
| | | B | 146 | 0,0123 | 2,8920 | 0,9296 | Hipoalometrik | |
| *Oratosquilla nepa* | Madras, India | J | 187 | 0,009466 | 1,5088 | | Hipoalometrik | James & Thiramilu (1993) |
| | | B | 288 | 0,005931 | 1,6236 | | Hipoalometrik | |
| | Karnataka, India | J | 107 | 0,017 | 2,786 | 0,94 | Hipoalometrik | Abdurahiman et al. (2004) |
| | | B | 109 | 0,014 | 2,884 | 0,94 | Hipoalometrik | |
| *Oratosquilla oratoria* | Cilacap, Indonesia | J | 200 | 0,0097 | 2,189 | 0,7117 | Hipoalometrik | Djuwito et al. (2013) |
| | | B | 256 | 0,013 | 2,086 | 0,6052 | Hipoalometrik | |
| | Tongyeong, Korea | J | 1116 | 0,000027 | 2,8727 | 0,9092 | Hipoalometrik | Kim et al. (2017) |
| | | B | 1328 | 0,000029 | 2,8498 | 0,9170 | Hipoalometrik | |
| *Oratosquillina* sp | Madura, Indonesia | J | 182 | 0,0405 | 2,3090 | 0,8428 | Hipoalometrik | Ekalaturrahmah et al. (2020) |
| | | B | 230 | 0,0365 | 2,4970 | 0,8725 | Hipoalometrik | |
| *Oratosquillina interrupta* | Teluk Bone, Indonesia (bulan gelap) | J | 168 | 0,00002 | 2,8885 | 0,8514 | Isometrik | Penelitian ini |
| | | B | 229 | 0,00001 | 2,9492 | 0,9120 | Isometrik | |
| | | G | 397 | 0,00002 | 2,8956 | 0,8950 | Hipoalometrik | |
| | Teluk Bone Indonesia (bulan terang) | J | 173 | 0,00004 | 2,7331 | 0,8441 | Hipoalometrik | Penelitian ini |
| | | B | 226 | 0,00003 | 2,8014 | 0,9184 | Hipoalometrik | |
| | | G | 399 | 0,00003 | 2,7816 | 0,9001 | Hipoalometrik | |
| *Squilla mantis* | Gulf of Gabes, Tunisia | J | 8770 | 0,000004 | 3,2097 | 0,96 | Hyperalometric | Mili et al. (2011) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | B | 7799 | 0,000007 | 3,0644 | 0,96 | Hyperalometric | |
| | G | 16569 | 0,000005 | 3,1375 | 0,96 | Hyperalometric | |
| Sicily, Italia | J | 207 | 0,000009 | 3,031 | 0,952 | Isometrik | Ragonese et al. (2012) |
| | B | 277 | 0,000009 | 3,027 | 0,965 | | |
| Izmir Bay, Turkey | J | 387 | 0,0111 | 2,95 | 0,91 | Isometrik | Sağlam et al. (2017) |
| | B | 549 | 0,0098 | 3,02 | 0,94 | Isometrik | |
| | G | 936 | 0,0098 | 3,02 | 0,93 | Isometrik | |
| Edremit Gulf, Turkey | J | 223 | 0,0082 | 3,0436 | 0,9613 | Isometrik | Sarigöl (2019) |
| | B | 404 | 0,0121 | 2,8994 | 0,9270 | Hipoalometrik | |
| | G | 627 | 0,0106 | 2,9469 | 0,9376 | Hipoalometrik | |
| Lagos Lagoon, Nigeria | J | 169 | 0,02639 | 2,6299 | 0,9686 | Hipoalometrik | Akinwunmi et al. (2021) |
| | B | 65 | 0,05733 | 2,3201 | 0,8645 | Hipoalometrik | |
| Mediterranean Sea | J | 422 | 0,1153 | 3,19 | 0,93 | Hiperalometrik | Kennouche & Kacimi (2021) |
| | B | 490 | 0,1604 | 2,89 | 0,83 | Isometrik | |
| | G | 1064 | 0,1466 | 2,97 | 0,92 | Isometrik | |
| Edremit Bay, Turkey | G | 627 | 0,0106 | 2,9469 | 0,9218 | Isometrik | Koç et al. (2023) |

Keterangan: JK = jenis kelamin, n = jumlah individu (ekor), a = slope, b = koefisien regresi, $R^2$ = koefisien determinasi, J = jantan, B = betina, G = gabungan jantan dan betina

**Lampiran 20.** Faktor kondisi udang mantis dari berbagai lokasi

| Spesies | Lokasi | Jenis kelamin | Faktor kondisi | Referensi |
|---|---|---|---|---|
| *Erugosquilla massavensis* | Port Said, Egypt | J | 2,576 | Zakzok et al. (2022) |
| | | B | 2,424 | |
| | | G | 2,43 | |
| *Gonodactylus chiragra* | Batukalasi, Indonesia | J | 0,6870-1,5065 | Asriani (2022) |
| | | B | 0,8039-1,2441 | |
| *Harpiosquilla harpax* | Pantai Remis, Malaysia | J | 1,002-1,021 | Arshad et al. (2015) |
| | | B | 1,010-1,025 | |
| | Palabuhanratu, Indonesia | J | 1,06 | Iftitah et al. (2017) |
| | | B | 1,01 | |
| | | G | 1,03 | |
| | Cirebon, Indonesia | J | 1,07 | Iftitah et al. (2017) |
| | | B | 1,00 | |
| | | G | 1,04 | |
| | Sakuala Island, Indonesia | J | 0,6792-2,5174 | Arifandi (2022) |
| | | B | 0,6666-2,2599 | |
| *Harpiosquilla raphidea* | Tarakan, Indonesia | J | 0,30-0,60 | Salim et al. (2020) |
| | | B | 0,30-0,70 | |
| *Miyakella nepa* | Sakuala Island, Pangkep, Indonesia | J | 0,7906-1,3523 | Arifandi (2022) |
| | | B | 0,7920-1,4507 | |
| | Karnataka, India | J | 0,6183-0,7339 | Kishor et al. (2023) |
| | | B | 0,6103-0,7227 | |
| *Oratosquilla oratoria* | Cilacap, Central Java (Indonesia) | J | 1,052 | Djuwito et al. (2013) |
| | | B | 1,097 | |
| *Oratosquillina interrupta* | Bone Bay, Indonesia | J | 0,5990-2,3610 | Penelitian ini |
| | | B | 0,7330-1,4672 | |
| *Squilla mantis* | Izmir Bay, Aegean Sea, Turkey | J | 1,00 | Sağlam et al. 2017 |
| | | B | 1,04 | |
| | | G | 1,02 | |
| | Edremit Gulf, Aegean Sea, Turkey | J | 0,88-0,95 | Sarigöl (2019) |
| | | B | 0,89-0,94 | |
| | | G | 0,88-0,95 | |
| | Lagos Lagoon, Nigeria | J | 0,9-1,1 | Akinwunmi et al. (2021) |
| | | B | 1,1-1,5 | |

Keterangan: J = jantan, B = betina, G = gabungan jantan dan betina

**Lampiran 21.** Nisbah kelamin beberapa spesies udang mantis dari berbagai lokasi

| Spesies | Lokasi | Jumlah individu (ekor) | | Nisbah kelamin | Referensi |
|---|---|---|---|---|---|
| | | Jantan | Betina | Jantan: Betina | |
| *Cloridopsis scorpio* | Belawan, Sumatera Utara | 249 | 370 | 0,67:1,00 | Dimenta et al. (2019) |
| *Erugosquilla massavensis* | Port Said (Mesir) | 1023 | 974 | 1,05:1,00 | Sallam (2005) |
| *Harpiosquilla harpax* | Pantai Remis (Malaysia) | 439 | 365 | 0,83:1,00 | Arshad et al (2015) |
| | Teluk Banten | 119 | 112 | 1,06:1,00 | Mulyono et al. (2016) |
| | Pulau Madura | 347 | 343 | 1,01:1,00 | Ekalaturrahmah et al. (2020) |
| *Harpiosquilla raphidea* | Perairan Juata, Tarakan | 203 | 123 | 1,70:1,00 | Kalalo et al (2015) |
| | Perairan Utara, Pulau Tarakan | 213 | 130 | 1,60:1,00 | Chandra et al (2015) |
| | Sungai Tungkal, Jambi | 152 | 223 | 0,68:1,00 | Wardiatno & Mashar (2010) |
| | Kuala Tungkal, Jambi | 466 | 590 | 0,79:1,00 | Wardiatno & Mashar (2013) |
| | Teluk Banten | 186 | 146 | 1,27:1,00 | Mulyono et al (2016) |
| | Labuhanbatu, Sumatera Utara | 65 | 98 | 0,66:1,00 | Hasibuan & Dimenta (2022) |
| *Miyakea nepa* | Teluk Banten | 265 | 172 | 1,54:1,00 | Samphan & Ratanamusik (2018) |
| | Teluk Bone, Sulawesi Selatan | 283 | 324 | 0,87:1,00 | Mulyono et al. (2016) |
| *Miyakella nepa* | Pantai Remis (Malaysia) | 386 | 565 | 0,68:1,00 | Zamri et al. (2016) |
| *Oratosquilla anomala* | Visakhapatnam (India) | 370 | 333 | 1,11:1,00 | Rao et al. (2015) |
| *Oratosquilla nepa* | Madras (India) | 187 | 288 | 0,65:1,00 | James & Thirumilu (1993) |
| *Oratosquilla oratoria* | Cilacap, Jawa Tengah | 200 | 256 | 0,78:1,00 | Djuwito et al. (2013) |
| | Tongyeong (Korea) | 1241 | 1380 | 0,90:1,00 | Kim et al. (2017) |
| *Oratosquillina gravieri* | Kuala Tungkal, Jambi | 98 | 300 | 0,33:1,00 | Wardiatno & Mashar (2013) |
| | Palabuhanratu, Jawa Barat | 588 | 921 | 0,64:1,00 | Ambarsari et al. (2016) |
| *Oratosquillima interrupta* | Teluk Bone, Sulawesi Selatan | 341 | 455 | 0,75:1,00 | Peneltian ini |
| *Oratosquillina sp* | Pulau Madura | 182 | 230 | 0,79:1,00 | Ekalaturrahmah et al (2020) |
| *Squilla mantis* | Gulf of Gabes (Tunisia) | 8770 | 7799 | 1,12:1,00 | Mili et al. (2008) |
| | Gulf of Hammamet (Tunisia) | 1620 | 1404 | 1,15:1,00 | Mili et al. (2008) |
| | Gulf of Tunis (Tunisia) | 1726 | 1564 | 1,10:1,00 | Mili et al. (2008) |
| | Pantai selatan Sicily (Italia) | 207 | 277 | 0,75:1,00 | Ragonese et al. (2012) |
| | Teluk Izmir, Laut Aegean (Turki) | 387 | 549 | 0,70:1,00 | Sağlam et al. (2017) |
| | Laut Mediterranean | 422 | 490 | 0,86:1,00 | Kennouche & Kacimi (2021) |

**Lampiran 22**. Ukuran pertama kali matang gonad beberapa spesies udang mantis dari berbagai lokasi

| Spesies | Lokasi | Ukuran pertama kali matang gonad (mm) | | Referensi |
|---|---|---|---|---|
| | | Jantan | Betina | |
| *Cloridopsis scorpio* | Belawan, Sumatera Utara | 205,5 | 186 | Dimenta et al. (2020) |
| *Erugosquilla massavensis* | Port Said (Mesir) | - | 125,1 | Sallam (2005) |
| *Harpiosquilla raphidea* | Teluk Banten | 230 | 199 | Mulyono et al. (2017) |
| | Labuhanbatu, Sumatera Utara | 198,8 | 187,5 | Hasibuan & Dimenta (2022) |
| *Miyakella nepa* | Pantai Remis (Malaysia) | - | 100 | Zamri et al. (2016) |
| *Oratosquillina interrupta* | Teluk Bone, Sulawesi Selatan – bulan gelap | 127,61 | 144,98 | Penelitian ini |
| | Teluk Bone, Sulawesi Selatan – bulan terang | 132,59 | 154,74 | Penelitian ini |
| *Oratosquilla oratoria* | Teluk Tokyo (Jepang) | 40-50 | ≥ 70 | Kodama et al. (2004) |
| | Tongyeong (Korea) | - | 96,5 | Kim et al. (2017) |
| *Squilla mantis* | Gulf of Gabes (Tunisia) | - | 147,19 | Mili et al. (2011) |

**Lampiran 23.** Data hasil analisis tekstur substrat

LABORATORIUM PRODUKTIVITAS & KUALITAS PERAIRAN
FAKULTAS ILMU KELAUTAN DAN PERIKANAN
UNIVERSITAS HASANUDDIN
Jl. Perintis Kemerdekaan, KM 10 Tamalanrea, Makassar, Indonesia 90245
Telp./ Fax. +62-0411-586025, email : fikp@unhas.ac.id, website :http://fikp.unhas.ac.id

| | |
|---|---|
| No | : 03.KP/Lab.Air/IX/2023 |
| Pemilik sampel | : Febriani Nur H (MSP) |
| Tanggal masuk | : 5 September 2023 |
| Jumlah sampel | : 1 |
| Jenis sampel | : Sedimen laut |
| Asal sampel | : Kab. Bone |
| Kegiatan | : Penelitian S2 |

**Data Hasil Analisis**

| No. | Kode Sampel | Parameter | | | |
|---|---|---|---|---|---|
| | | Tekstur (Hydrometer) -- %-- | | | |
| | | Pasir | Debu | Liat | Klas Tekstur |
| 1 | L1 | 72 | 11 | 16 | Lempung berpasir |

Makassar, 25 September 2023

Pranata Lab. Pendidikan (PLP)

Ketua Lab,

Fitriyani, S.Si.,M.K.M
NIP 197710122001122001

Dr. Ir. Badraeni, MP
NIP 19651023 199103 2 001