Saintek Perikanan: Indonesian Journal of Fisheries Science and Technology
Available at http://ejournal.undip.ac.id/index.php/saintek
Vol. 19 No. 3 : 159 - 163, October 2023

PREVALENCE OF PARASITES IN CRUSTACEAN AT PANMUTI BEACH, KUPANG REGENCY

Felix Rebhung, Nicodemus Dahoklory, Asriati Djonu* and Wesly Pasaribu
Study Program of Aquaculture, Faculty of Animal Husbandary, Marine and Fisheries,
Universitas Nusa Cendana, Kupang
Email: asriati@staf.undana.ac.id

Received: 22 September 2023, Accepted: 24 October 2023

ABSTRACT

Crustacean catches in Panmuti Beach, including white shrimp (*Litopenaeus vannamei*) and swimming crab, are commodities with high economic value. This certainly increases the demand for both commodities, but the fulfillment of market needs is faced with various problems. One of them is the emergence of disease by parasite infection. The purpose of this research is to identify the types and determine the prevalence of parasites that infect these Crustaceans. Parasite identification was carried out at the Kupang Fish Quarantine, Quality Control and Fishery Product Safety Center. The sampling method uses purposive sampling. The samples observed were white shrimp (*Litopenaeus vannamei*) and swimming crab in live condition. The results obtained in the white shrimp sample contained one type of parasite, namely *Chilodonella* sp. with a prevalence of 20%. In swimming crab samples there is one type of parasite, *Octolasmis* sp. with a prevalence of 100%. The results of this study can be used as information on product quality control and efforts to prevent and spread disease by parasites.

Keywords: *:* Crustacean; *Litopenaeus vannamei*; Panmuti Beach; Prevalence; Swimming Crab.

INTRODUCTION

Panmuti Beach is one of the beaches in Kupang Bay, Kupang Regency, East Nusa Tenggara Province. Panmuti Beach is a tourism site located in Noelbaki Village. Apart from being a tourism site, Panmuti beach is also a location for catching crustacean commodities such as white shrimp (*Litopenaeus vannamei*) and swimming crab. Residents around Panmuti beach work as fishermen who catch in the area.

Crustacean catches in Panmuti Beach, including white shrimp and swimming crab, are commercialized commodities and also for consumption by local residents. White shrimp (*L. vannamei*) is known as a potential source of protein and fatty acids (Gunalan et al., 2013). Besides white shrimp, there are swimming crabs that are rich in nutrients. White shrimp and swimming crab are commodities with high economic value and are included in export products (Syahbuddin et al., 2014); (Agustini et al., 2015). This certainly increases the demand for both commodities. However, the fulfillment of market needs is faced with various problems. One of them is the presence of infectious diseases in both commodities.

Infectious diseases that occur are caused by parasites, bacteria, fungi and viruses (Putri & Fauziah, 2021). One of the pathogens that is often found to infect shrimp commodities is parasites (Dinisa et al., 2022). Parasites that commonly attack white shrimp include *Zoothamnium* sp., *Epistylis* sp. *Vorticella*, *Trichodina*, *Ichthyophirius* and *Oodinium* (Nurlaila et al., 2016); (Widiani & Ambarwati, 2018); (Rahayuni et al., 2022). The results of the study (Hasan et al., 2019) also found the parasite *Octolasmis* sp. attacking the swimming crab. Ectoparasite is harmful to shrimp and swimming crab because it can cause organ damage resulting in low growth and survival rate (Dinisa et al., 2022); (Wardhani et al., 2018).

The presence of parasites in the host may indicate unbalanced conditions. Many factors contribute to this, including water quality, host conditions and the type of pathogen that attacks. The imbalance that occurs can cause disease in shrimp and crab which reduces production value. Therefore, identification of parasite types and prevalence needs to be done as an effort to prevent and spread disease by parasites in Crustacean commodities, especially white shrimp and swimming crab.

RESEARCH METHODS

Sampling Location

The sampling location of white shrimp and swimming crab is in the fishing area at Panmuti Beach, Noelbaki Village, Central Kupang District, Kupang Regency, East Nusa Tenggara Province. Sampling was conducted in August-September 2023. The capture point is a fishing ground for white shrimp and swimming crab that is often used by the community. The sampling method uses purposive sampling. Samples taken were 20 white shrimp (*L. vannamei*) and 20 swimming crabs in live condition. The sampling method refers to the results of research by looking at similar criteria of length and weight (Makmur et al., 2023). Sampling was done using gill net fishing gear. Furthermore, the two types of crustaceans were identified the species and prevalence of parasites. The fishing location can be seen in Figure 1. below.

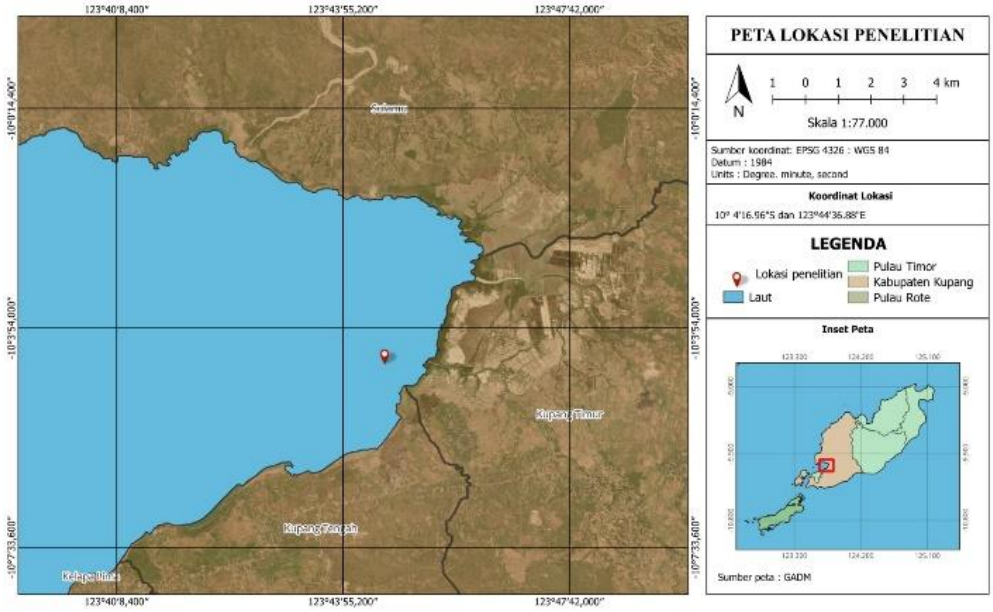

Figure 1. The Map of Sampling Locations for White Shrimp (*Litopenaeus vannamei*) and Swimming Crab

The fishing site has a depth of 3-5 m. The condition of the bottom of the water at the fishing location is mud textured and close to the mouth of the surrounding river. According to (Nugraha et al., 2022) white shrimp live on the surface of the seabed with a muddy texture. The nature of white shrimp is catadromous so that this commodity is found in many fishing locations that have similar contours. Furthermore, (Amelia et al., 2020) stated that swimming crabs can be found in inshore to offshore areas.

Identification of Parasite Species

The identification of parasite species was carried out at the Kupang Fish Quarantine, Quality Control and Fishery Product Safety Center (BKIPM). The condition of the tested sample is a live sample. The identification procedure for white shrimp and swimming crab was carried out on the mucus, swimming legs and gills and observed using a microscope (Yunarty et al., 2022). This procedure is carried out by BKPIM. The documentation results were then compared with the identification book *Parasites and diseases of fish cultured in the tropics* (Kabata, 1985).

The Parasite Prevalence

Calculation of parasites are pathogens attacking freshwater fish. This species is a free-living ciliate protozoan (Li et al., 2018); (Gomes et al., 2017) prevalence in white shrimp and crab using the calculation formula (Dogiel et al., 1970) in (Novita et al., 2016).

$$\text{Prevalence} = \frac{\Sigma \textit{White shrimp infested by parasitest}}{\Sigma \textit{White shrimp examined}} \times 100\% \text{ .. (1)}$$

The results of the prevalence calculation were compared with the criteria for the prevalence of parasite infection with a percentage range of 0.01-100% to see the category of parasite infection.

Water Quality

Water quality in this study is used as supporting data. Water quality measurements are carried out at the fishing ground by measuring pH, D o, salinity, temperature and current strength.

RESULT AND DISCUSSION

Identification of Parasites in White Shrimp (*Litopenaeus vannamei*)

Identification of parasite types in the catch of white shrimp (*L. vannamei*) on Panmuti Beach obtained one type of ectoparasite, namely *Chilodonella* sp. The results of observations of *Chilodonella* sp. can be seen in Figure 2. below.

(a) (b)

Figure 2. *Chilodonella* sp. (a) Research results on *Litopenaeus vannamei* in Panmuti Beach, (b) Research results (Sarig, 1971).

Chilodonella sp. is part of the genus Chilodonella. *Chilodonella* sp. parasites generally attack commodities that live in free waters and form a cosmopolite distribution. *Chilodonella* sp. parasite is an opportunistic parasite that attacks the skin surface and gills as an ectoparasite (Bakri et al., 2020). *Chilodonella* sp. also found attacking milkfish, catfish, mangrove crabs (Riko et al., 2012); (Hariza & Suryandari, 2019).

Identification of Parasites in Swimming Crab

Parasite identification was also carried out on swimming crab commodities. The results of catching swimming crabs at Panmuti Beach obtained one type of parasite that attacks. The type of parasite found is *Octolasmis* sp. The results of this parasite observation can be seen in Figure 3.

(a) (b)

Figure 3. *Octolasmis* sp. Parasites (a) Research Results on Swimming Crab at Panmuti Beach, (b) Research Results (Wardhani et al., 2018) on Mud Crab

Octolasmis sp. is a parasite that infects commodity crabs causes organ damage and slowed growth. This type of parasite is found in the gills of the crab body (Utari et al., 2017). The life cycle of *Octolasmis* sp. requires more nutrients than other parasites from the protozoa group. *Octolasmis* sp. is a type of ectoparasite of the Arthropoda group (Irvansyah et al., 2012). The morphology of *Octolasmis* sp. is sprout-like with the underside attached to the host and yellowish in color (Yunarty et al., 2022). Besides attacking swimming crab, *Octolasmis* sp. was also found to attack a type of mangrove crab that causes black gills, disruption of the respiratory system and even death (Herlinawati et al., 2017).

Parasite Prevalence

The next process after parasite identification is to calculate the prevalence. Prevalence is done to determine the number of crustaceans infected with parasites. The results of the parasite prevalence study on crustaceans can be seen in Table 1.

Table 1. Prevalence of Parasites in White Shrimp (*L. vannamei*) and Swimming Crab

No	Species of Parasites	Prevalence (%)	Infestation Category	Description
White Shrimp *(L. vannamei)*				
1.	*Chilodonella* sp.	20	Frequent	Frequent Infection
Swimming Crab				
1.	*Octolasmis* sp.	100	Always	Very Severe Infection

Based on the results of the study, the prevalence was only carried out on one type of parasite that attacked white shrimp, namely *Chilodonella* sp. The amount of samples identified was 20 heads and 4 heads were attacked. So that the prevalence of *Chilodonella* sp. parasites in white shrimp is 20%. The prevalence category includes frequent or frequent infection. (Williams & Williams, 1996) *dalam* (Maulana et al., 2017). Infection by the parasite *Chilodonella* sp. causes damage to the host epithelial layer and significant loss of mucus. This parasite also invades in colonies (Wildani et al., 2017). *Chilodonella sp.* as a parasite of the ciliate class can live well in normal water conditions. So that the proliferation of this parasite is relatively rapid (Sumiati et al., 2021). When water conditions fluctuate, this can increase the attack of *Chilodonella* sp. on the host (Haribowo et al., 2019).

In addition to white shrimp, the prevalence study on swimming crab samples also found only one type of parasite, namely *Octolasmis* sp. The amount of samples identified was 20 and all samples were infected by *Octolasmis* sp. This makes the prevalence of *Octolasmis* sp. in swimming crabs is 100%. This type of parasite is the type that most often attacks crab groups, both crabs and mangrove crabs. *Octolasmis* sp. attacks the gills of crabs. (Irvansyah et al., 2012). Infection with *Octolasmis* sp. in large numbers causes the crabs to become weak and there is a decrease in appetite which causes stunted growth (Muttaqin et al., 2018).

Infectious diseases generally occur because the host's body itself is in an unbalanced condition so that it is easily attacked by pathogens including parasites. Parasite attacks on the host cause clinical symptoms ranging from damage to organs to death (Putri & Fauziah, 2021). The parasites *Chilodonella* sp. and *Octolasmis* sp. were found to attack crustacean commodities such as shrimp, crab and lobster. (Azomi et al., 2023).

Water Quality

The results of the observations show water quality data including temperature, pH, DO, current strength and temperature. The results of water quality observations can be seen in Table 2. below.

Table 2. Water Quality at Fishing Ground

No	Parameter	Range	Quality Standard
1.	Suhu (°C)	26.7-27.7	Natural*
2.	pH	7.5-7.6	7-8.5
3.	DO (mg/l)	6-6.6	>5
4.	Salinitas (ppt)	36-38	Natural*

* normal conditions of an environment, varying at all times (day, night and season)

The water quality at fishing ground of vannamei shrimp and swimming crab is still within the quality standard.

CONCLUSION

Based on the results of the identification and prevalence of parasites in crustacean fishing in the Panmuti Beach area, it was obtained that in the white shrimp (*L. vannamei*) sample there was one type of parasite, namely *Chilodonella* sp. with a prevalence of 20%. In swimming crab samples, there was one type of parasite, *Octolasmis* sp. with a prevalence of 100%. The results of this study can be used as information on product quality control and efforts to prevent and spread disease by parasites.

ACKNOWLEDGEMENT

The research team would like to thank the Faculty of Animal Husbandry, Marine and Fisheries for funding the research and the Kupang Fish Quarantine, Quality Control and Fishery Product Safety Center for assisting the parasite identification process.

REFERENCES

Agustini, R. L., Hudaidah, S., & Supono. (2015). Keragaan Udang Putih (*Litopenaeus vannamei*) Pada Densitas Yang Berbeda Dengan Sistem Bioflok Pada Fase Pendederan. *E-Jurnal Rekayasa Dan Teknologi Budidaya Perairan*, *III*(2), 367–374.

Amelia, A. P., Irwani, I., & Djunaedi, A. (2020). Studi Kerentanan Rajungan (*Portunus pelagicus)* di Desa Paciran Kecamatan Paciran Kabupaten Lamongan Sebagai Upaya Konservasi Berkelanjutan. *Journal of Marine Research*, *9*(4), 509–516. https://doi.org/10.14710/jmr.v9i4.27891

Azomi, A., Rahmawati, A., & Kalih, L. A. T. T. W. S. (2023). Identifikasi dan intensitas parasit pada lobster air laut (*Panulirus* sp.*) (Identification and Intensity of Parasites in Sea Water Lobster (Panulirus sp .))*. *2022*(November 2022), 14–20.

Bakri, M., Muharrir Asy, I., Hambal, M., & Novita, A. (2020). Identification of Parasites on the Shark Fish (*Selachimorpha*) in Peunayong Fish Market Banda Aceh City. *Jurnal Medika Veterinaria Agustus*, *2020*(2), 147–150. https://doi.org/10.21157/j.med.vet..v14i2.4480

Dinisa, R. M., Munir, M., & Maisaroh, D. S. (2022). Prevalence and Intensity of Ectoparasite on White Shrimp (*Litopenaeus vannamei*) Postlarvae from Backyard Hathery in Jepara. *Jurnal TECHNO-FISH*, *6*(1), 13–28.

Dogiel, V. A. G., Petrushevski, G. K., & Polyanski, I. (1970). *Parasitology of fishes*. T.F.H. Publiser.

Gomes, B. G., Miller, T. L., Vaughan, D. B., Jerry, D. R., McCowan, C., Bradley, T. L., & Hutson, K. S. (2017). Evidence of multiple species of Chilodonella (Protozoa, Ciliophora) infecting Australian farmed freshwater fishes. *Veterinary Parasitology*, *237*, 8–16. https://doi.org/10.1016/j.vetpar.2017.03.004

Gunalan, B., Nina, T. S. S. P., & Anand, T. (2013). *Nutritive value of cultured white leg shrimp Litopenaeus vannamei*. *5*(7), 166–171. https://doi.org/10.5897/IJFA2013.0333

Haribowo, D. R., Annisa, S., Kholidah, N., Izza, N. D., Zahrah, P. A., Pamungkas, A. P., Ramadhan, F., Rijaluddin, A. F., & Assuyuti, Y. M. (2019). Kimia Fisik Perairan dan Ektoparasit Ikan Nila dan Patin Di Situ Gintung, Tangerang Selatan, Banten. *Journal of Marine and Aquatic Sciences*, *5*(2), 203. https://doi.org/10.24843/jmas.2019.v05.i02.p06

Hariza, A. T., & Suryandari, L. (2019). Inventarisasi ektoparasit dan endoparasit yang menginfeksi ikan lele (Clarias gariepinus) pada budi daya kolam tanah. *Prodising Seminar Nasional Biologi 2019_ISBN: 978-602-0951-26-3*, *2*, 260–264. http://semnasbiologi.conference.unesa.ac.id/ocs/index.php/semnasbio/IP2BIII/paper/view/39

Hasan, M., Hisam Abd Aziz, M. F., Kismiyati, K., Subekti, S., & Zakariah, M. I. (2019). Occurrence of Pedunculate Barnacle, *Octolasmis* spp. in Blue Swimming Crab, *Portunus pelagicu*s. *Jurnal Ilmiah Perikanan Dan Kelautan*, *11*(1), 1–8. https://doi.org/10.20473/jipk.v11i1.10635

Herlinawati, A., Sarjito, & Haditomo, A. H. C. (2017). Infestasi octolasmis pada kepiting bakau (*Scylla serrata*) hasil budidaya dari desa surodadi, Kabupaten Demak,. *Journal of Aquaculture Management and Technology*, *6*(4), 11–19.

Irvansyah, M. Y., Abdulgani, N., & Mahasri, G. (2012). Identifikasi dan Intensitas Ektoparasit pada. *Jurnal Sains Dan Seni Its*, *1*(1).

Kabata, Z. (1985). *Parasites and Diseases of Fish Culture in the Tropics*. Taylor Francis.

Li, M., Wang, R., Bastos Gomes, G., Zou, H., Li, W. xiang, Wu, S. gong, Wang, G. tang, & Ponce-Gordo, F. (2018). Epidemiology and identification of two species of Chilodonella affecting farmed fishes in China. *Veterinary Parasitology*, *264*(October), 8–17. https://doi.org/10.1016/j.vetpar.2018.10.009

Makmur, P. P. R., Lamangantjo, C. J., & Solang, M. (2023). *Identifikasi Jenis Parasit Beserta Prevalensi , Intensitas*. *5*(2), 56–64.

Maulana, M. D., Zainal, A. M., & Sugito, S. (2017). Intensity and Prevalency of Parasites on Climbing Perch Fish (*Anabas testudineus*) from Inland Waters of Northern Region of Aceh Province. *Jurnal Ilmiah Mahasiswa Kelautan Dan Perikanan Unsyiah*, *2*, 1–11.

Muttaqin, I., Julyantoro, P. G. S., & Sari, A. H. W. (2018). Identifikasi dan Predileksi Ektoparasit Kepiting Bakau *(Scylla* spp.) dari Ekosistem Mangrove Taman Hutan Raya (TAHURA) Ngurah Rai, Bali. *Current Trends in Aquatic Science*, *1*(1), 24. https://doi.org/10.24843/ctas.2018.v01.i01.p04

Novita, D., Ferasyi, R. T., & Muchlisin, A. Z. (2016). Intensitas dan Prevalensi Ektoparasit Pada Udang Pisang (*Penaeus* sp.) Yang Berasal dari Tambak Budidaya di Pantai Barat Aceh. *Jurnal Ilmiah Mahasiswa Kelautan Dan Perikanan Unsyiah*, *1*(November), 268–279.

Nugraha, A., Yustiati, A., & Andriani, Y. (2022). Budidaya udang vanname pembesaran udang vannamei pada berbagai sistem akuakultur : tinjauan pustaka. *Journal of Fish Nutrition*, *2*(1), 26–36. https://doi.org/10.29303/jfn.v2i1.1130

Nurlaila, Dewiyanti, I., & Wijaya, S. (2016). Identifikasi dan prevalensi ektoparasit pada udang vannamei (*Litopenaeus vannamei*) di Kabupaten Aceh Besar. *Jurnal Ilmiah Mahasiswa Kelautan Dan Perikanan Unsyiah*, *1*(November), 388–396.

Putri, M., & Fauziah, N. A. (2021). Prevalensi dan Intensitas Parasit Oreochromis niloticus pada Kolam Budidaya di PBIAT Janti dan Barbonymus gonionotus di BBIAT Muntilan, Jawa Tengah. *Jurnal Enggano*, *6*(1), 138–146.

Rahayuni, S., Fajar, B. Al, & Wibowo, S. G. (2022). Identifikasi dan Prevalensi Ektoparasit Protozoa Pada Udang vannamei (*Litopenaeus vanamei*) di Tambak Intensif Kuala Langsa. *Jurnal Kelautan Dan Perikanan Indonesia*, *2*(2), 80–85. https://doi.org/10.24815/jkpi.v2i2.26449

Riko, Y. A., Rosidah, & Herawat, T. (2012). Intensitas dan prevalensi ektoparasit pada ikan bandeng (*Chanos chanos*) dalam karamba jaring apung (kja) di waduk Cirata Kabupaten Cianjur Jawa Barat. *Jurnal Perikanan Dan Kelautan*, *3*(4), 231–241.

Sarig, S. (1971). *Diseases of warm water fishes*. TFH Publ., Neptune City.

Sumiati, Rosmaiti, & Komariyaha, S. (2021). Identification and prevalence of ectoparasites in vannamei shrimp *(Litopenaeus vannamei*) in Pantai Gading Village, Secanggang District, Langkat Regency. *Acta Aquatica*,

8(8), 98–102. https://doi.org/10.29103/aa.v1i1.9504

Syahbuddin, S. A., Riyadi, H., Program, R., Teknologi, S., Perikanan, H., Perikanan, J., Perikanan, F., Kelautan, I., Diponegoro, U., & Soedarto, J. (2014). The Effect of Adding Swimming Crab Egg (P*ortunus pelagicus*) With Different Concentrations on the Quality of Wet Noodle. *Jurnal Pengolahan Dan Bioteknologi Hasil Perikanan*, *3*(4), 65–70. http://www.ejournal-s1.undip.ac.id/index.php/jpbhp

Utari, V. I., Prayitno, S. B., & Desrina. (2017). Pemberian ekstrakdaun sirih (Piper betle linn) untuk menurunkan infestasi ektoparasit *Octolacmis* sp. pada kepiting bakau (*Scylla serrata*). *Journal of Aquaculture Management and Technology*, *6*(4), 242–246. https://ejournal3.undip.ac.id/index.php/jamt/article/view/20363/19195

Wardhani, C. K., Sarjito, & Haditomo, A. H. C. (2018). Study Keberadaan Ektoparasit *Octolasmis* sp. pada Kepiting Bakau (*Scylla serrata*) Jantan dan Betina pada Pertambakan Semarang. *Journal of Aquaculture Management and Technology*, *7*(1), 38–45.

Widiani, J., & Ambarwati, R. (2018). Identifikasi Jenis Protozoa Ektoparasit pada Udang Vaname (*Penaeus vannamei*) di Lahan Pertambakan Tradisional Daerah Bangil dan Glagah Identification Protozoa Ectoparasites on Vaname Shrimp (*Penaeus vannamei*) in Traditional Aquaculture of Bangil and Glaga. *LenteraBio: Berkala Ilmiah Biologi*, *7*(2), 181–187. https://ejournal.unesa.ac.id/index.php/lenterabio/article/view/28390

Wildani, D., Muttaqien, & Wardani, E. (2017). Identifikasi ektoparasit pada ikan patin (*Pangasius* spp.) di tambak budidaya ikan desa Lampeuneurut Kabupaten Aceh Besar Identification of Ectoparasites in Pangas Catfish (*Pangasius* spp.) Cultivated at Lampeuneurut Fishponds, Aceh Besar. *Jimvet*, *01*(3), 448–455.

Williams, E. H., & Williams, L. B. (1996). *Parasites Off shore big game fishes of Puerto Rico and the Western Atlantic. Puerto Rico.Department of Natural Environmental Risourses and University of Puerto Rico, Rio Piedras.* 1996.

Yunarty, Y., Kurniaji, A., Budiyati, B., Renitasari, D. P., & Resa, M. (2022). Karakteristik kualitas air dan performa pertumbuhan budidaya udang vaname *(Litopenaeus vannamei*) secara intensif. *Pena Akuatika : Jurnal Ilmiah Perikanan Dan Kelautan*, *21*(1), 71. https://doi.org/10.31941/penaakuatika.v21i1.1871