

DAFTAR PUSTAKA

- Abalaka, S., F.M. Yakasai, G.B.N. Doguwar & K.H. Makonjuola. 2010. Histopathological changes in the gills and skin of adult *Clarias gariepinus* exposed to ethanolic extract of *Parkia biglobosa* pods. *Basic Appl Pathol.* 3: 109-114.
- Al-Arif, M.A. 2016. Rancangan Percobaan. Universitas Airlangga. Surabaya.
- Alifuddin, M., Y. Hadiroseyani & I. Ohoiulun. 2003. Parasit pada ikan hias air tawar (Ikan Cupang, Gupi, dan Rainbow). *Parasites in fresh water ornamental fish (Cupang, Guppy and Rainbow Fish).* *Jurnal Akuakultur Indonesia.* 2: 93-100.
- Altschul S.F., W. Gish, W.M. Eugene, W. Myers & D.J. Lipman. 1990. Basic Local Alignment Search Tool. *J Mol Biol.* 215: 403-410.
- Anonymous, 2004. Ectoparasites of groupers *Tobiuo Tsūshin*, *Gōgai*, *Tobikkusu*, 1: 1–2. Shimane Prefecture Fisheries Experimental Station, Hamada. (In Japanese).
- Anshari, H. 2016. Parasitologi ikan biologi, identifikasi dan pengendaliannya. Deepublish. Yogyakarta.
- Anstensrud, M. 1990. Moulting and mating in *Lepeophtheirus pectoralis* (Copepoda: Caligidae). *Journal of the Marine Biological Association of the United Kingdom.* 70 (2): 269–281.
- Anonim, 2017. KKP Tegaskan Kinerja Neraca Perdagangan Ikan Kerapu Positif. <https://kkp.go.id/djpb/artikel/304>.(diakses tanggal 10 Mei 2019).
- Aranishi, F., N. Mano & H. Hirose. 1998. Fluorescence localization of epidermal cathepsins L and B in the Japanese eel. *Fish Physiol Biochem.* 19:205e9.
- Arief, Z.R. 2017. Identifikasi kelimpahan fitoplankton pada keramba jaring apung di Balai Perikanan Budidaya Laut Batam. *Praktek kerja lapang.* Universitas Brawijaya. Malang.
- Balai Besar Pengembangan Budidaya Laut Lampung. 2002. Pembenuhan Ikan Kerapu. Seri Budidaya Laut No: 13. Direktorat Jenderal Perikanan Budidaya. Lampung.
- Benmansour B. & K.B.Hassine. 1998. Preliminary analysis of parasitic copepod species richness among coastal fishes of Tunisia. *Ital. J. Zool.* 65:341-344.
- Borucinska J.D. & G.W. Benz . 1999. Lesions associated with attachment of the parasitic copepod *Phyllothyreus cornutus* (Pandaridae: siphonostomatoida) to interbranchial septa of blue sharks. *J Aquat Anim Health* 11:290–295.
- Brooker A.J., J.E. Bron & A.P. Shinn. 2012. Description of the free-swimming juvenile stages of *Lernaeocera branchialis* (Pennellidae), using traditional light and

confocal microscopy methods. *Aquatic Biology* 14: 153–163.
<https://doi.org/10.3354/ab00388>.

- Boxshall, G.A. & S.H. Halsey. 2004. An introduction to copepod diversity. The Ray Society Ed. London.
- Boxshall G.A .1990. The skeletomusculature of siphonostomatoid copepods, with an analysis of adaptive radiation in structure of the oral cone. *Philos Trans R Soc Lond.* 328:167–212. <https://doi.org/10.1098/rstb.1990.0113>.
- Boxshall, G. A. 1986. A new genus and two new species of Pennellidae (Copepoda: Siphonostomatoida) and an analysis of evolution within the family. *Systematic Parasitology.* 8(3): 215–225.
- Brooker, A.j., A. P. Shinn & J.E. Bron. 2007. A review of the biology of the parasitic copepod *Lernaeocera branchialis* (L., 1767) (Copepoda: Pennellidae). *Advances in Parasitology*, Volume 65. Elsevier Ltd.
- Brusca, R.C. 1981. A monograph on the isopods cymothoidae (Crustacea) of the Eastern Pacific. *Zool J Linn Soc.* 73: 117-199.
- Bush, A.O., K.D. Lafferty, J.M. Lotz & A.W. Shostak. 1997. Parasitology meets ecology on its own terms: Margolis et al. Revisited. *Journal Parasitol* 83: 575-583.
- Cameron, A. 2011. Pedomon surveilans penyakit hewan tingkat dasar. Uni Afrika, Biro Inter-Afrika untuk Sumber Daya Hewan ISBN 1 00000 000 X.
- Costello, M.J. 2000. A Framework for an action on marine biodiversiry in ireland. Prepared for The marine institute.
- Costelloe, J., G. Costelloe, O'Donohoe, N. J. Coghlan, M. Oonk & Y. van der Heijden. 1998. Planktonic distribution of sea lice larvae *Lepeophtheirus salmonis*, in Killary Harbour, west coast of Ireland. *Journal of the Marine Biological Association of the United Kingdom.* 78 (3): 853–874.
- Costello. 2006. Ecology of sea lice parasitic on farmed and wild fish. *Trends in Parasitology.* 22 (10): 475–483.
- Costello. 2009. How sea lice from salmon farms may cause wild salmonid declines in Europe and North America and be a threat to fishes elsewhere. *Proceedings of the Royal Society B.* 276 (1672): 3385–3394.
- Chu, K.H.,C.P. Li., & H.Y. Ho. 2000. The first *Internal Transcribed Spacer* (ITS-1) of ribosomal DNA as a molecular marker for phylogenetic and population analyses in crustacean. *Springer. Marine Bioteknologi.* 3,355-361.
- Darmawan T. 2015. Pertumbuhan sektor perikanan indonesia melampaui pertumbuhan ekonomi. <https://www.indonesia-investments.com/id/berita/berita-hari->

ini/pertumbuhan-sektor-perikanan-indonesia-melampaui-pertumbuhan-ekonomi/item6324?.(diakses tanggal 10 Mei 2019.

- Dharmayanti, I. 2011. Filogenetika molekuler: metode taksonomi organism berdasarkan sejarah evolusi. Makalah. Balai Besar Penelitian Veteriner.
- Eka Yudistira. 2004. Ektoparasit crustacea pada ikan kerapu merah (*Plectropomus* sp) dari Kepulauan Pangkajene, perairan barat Sulawesi Selatan. Skripsi. Institut Pertanian Bogor. Bogor.
- Esteban, M.A. 2012. An overview of the immunological defences in fish skin. ISRN Immunol. 1e29.
- Falkenberg J.M., J. Emília, S.A. Golzio, A. Pessanha, J. Patrício, A.L. Vendel & A.C.F. Lacerda. 2019. Gill parasites of fish and their relation to host and environmental factors in two estuaries in northeastern Brazil. *Aquat Ecol.* DOI.org/10.1007/s10452-019-09676-6
- Fast, M.D, N. W. Ross & S. C. Johnson. 2005. Prostaglandin E2 modulation of gene expression in an Atlantic salmon (*Salmo salar*) macrophage-like cell line (SHK-1). *Developmental & Comparative Immunology.* 29 (11): 951–963.
- Fernandes, J.M.O & Smith, V.J. 2002. A novel antimicrobial function for a ribosomal peptide from rainbow trout skin. *Biochem Biophys Res Commun.* 296: 167e71.
- Folmer, O, M. Black., W. Hoen., R. Lutz & R. Vrijenhoek. 1994. DNA primers for amplification of mitochondrial cytochrome c oxidase subunit 1 from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology,* 3, 294^299.
- Francisco, A.G., A. Cuesta, E. Abellán, J. Meseguer & M.A. Esteban. 2014. Comparative analysis of the humoral immunity of skin mucus from several marine teleost fish. *Fish & Shellfish Immunology.* xxx 1e8.
- Glenn N. Wagner, Mark, F.C Stewart & Johnson. 2008. Physiology and immunology of *Lepeophtheirus salmonis* infections of salmonids. *Trends in Parasitology* Vol.24 No 4.
- Grabda, J. 1991. *Marine Fish Parasitology.* Polish Scientific Publisher. Warsawa. 306p.
- Gonzalez-Alanis P., G.M. Wright, S.C. Johnson & J.F. Burka. 2001. Frontal filament morphogenesis in the salmon louse *Lepeophtheirus salmonis*. *J Parasitol* 87:561–574. [https://doi.org/10.1645/0022-3395\(2001\)087\[0561:FFMITS\]2.0.CO;2](https://doi.org/10.1645/0022-3395(2001)087[0561:FFMITS]2.0.CO;2).
- Guo F.C. & P.T.K. Woo. 2009. Selected parasitosis in cultured and wild fish. *Veterinary Parasitology* 163 (3): 207-216. doi: 10.1016/j.vetpar.2009.06.016
- Handayani & S. Samsundari. 2004. *Penyakit Ikan.* UMM Press, Malang.

- Håstein, T. 1995. Disease problems, use of drugs, resistance problems and preventive measures in fish farming world wide. Sustainable Fish Farming. Edited by: Reinertsen H, Haaland H.183-194.
- Håstein, T., B.J. Hill & J.R. Winton. 1999. Successful aquatic animal disease emergency programmes. Rev sci tech Off int Epiz. 18 (1): 214-227.
- Håstein, T., A. Hellstrom, G. Jonsson, N.J. Olesen & E.R. Parnanen. 2001. Surveillance of Fish Diseases in the Nordic Countries. Acta Veterinaria Scandinavica. 42:S43.
- Heemstra P.C & J.E. Randall. 1993. FAO Species Catalog Vol.16 : Grouper of the world (family serrenidae, subfamily ephinephelus). Rome. Food and Agriculture Organization of The United Nation.
- Helen, J. G. & P. J. Whitfield. 1988. The ultrastructure of the spermatozoon of *Lernaeocera branchialis* (Copepoda: Pennellidae).Hydrobiologia 167/168: 607-616. Kluwer Academic Publishers.
- Heuch, A. Parsons & K. Boxaspen.1995. Diel vertical migration: a possible host finding mechanism in salmon lice (*Lepeophtheirus salmonis*) copepodid. Canadian Journal of Fisheries and Aquatic Sciences. 52 (4): 681–689. doi:10.1139/f95-069.
- Huys, R. & G.A. Boxshall. 1991. Copepod evolution. The Ray Society Ed., London, UK.
- Ho, S. 1966. Larval stages of *Cardiodectes* sp. (Caligoida: Lernaeoceriformes), a copepod parasitic on fishes. Bull mar Sci 16:159-199.
- Ho, J.S & C.L. Lin. 2004. Sea lice of taiwan copepoda: siphonostomatoida: caligidae. sueichan press, Taiwan.
- Ho, J.S., C.L. Lin & S.N. Chen. 2000. Species of *Caligus Müller*, 785 (copepoda: caligidae) parasitic on marine fishes of Taiwan. Syst. Parasitol. 46:159-179.
- Hogans, W.E. 2018. Functional morphology and structural variability in *Lernaeenicus* (Copepoda: Pennellidae) parasitic on teleost fishes from the northwest Atlantic Ocean. *Comparative Parasitology* 85, 13–26. doi.org/10.1654/1525-2647-85.1.13.
- Hossain, M. K., M.D Hossain & M.H. Rahma. 2007. Histopathology of some diseased fishes. J. Life Earth Science 2(2) : 47-50.
- Huys, R. & G.A. Boxshall. 1991. Copepod evolution. The Ray Society Ed. London.
- Ingram, G. 1980. Substances involved in the natural resistance of fish to infection. J Fish Biol. 16:23e60.

- Ismail, N., S. Ohtsuka, V.B.A. Maran, S.Tasumi, K. Zaleha & H. Yamashita. 2013. Complete life cycle of a pennellid *Peniculus minuticaudae* Shiino, 1956 (Copepoda: Siphonostomatoida) infecting cultured threadsail filefish, *Stephanolepis cirrhifer*. *Parasite*, 20(1).
- Izawa, K. 2019. Redescription of *Lernaeenicus ramosus* kirtisinghe, 1956 (Copepoda, Siphonostomatoida, Pennellidae), with description of its Male and the postnaupliar developmental stages. *Crustaceana*, 92(1), 119–128.
- Jamil, I. 2005. Analisis sekuen daerah its DNA ribosom (rDNA) dan desain primer untuk mendeteksi *Phytophthora palmivora* Butl pada kakao. Bogor, Institut Pertanian Bogor. Tesis.
- Johnson, S.C., J.W. Treasurer, S.Bravo, K. Nagasawa & Z. Kabata. 2004. A review of the impact of parasitic copepods on marine aquaculture. *Zool. Stud.* 43, 229–243.
- Jung, T.S.,C.S. Del Castillo, P.K. Javaregowda, R.S. Dalvi, S.W. Nho & S. Bin Park. 2012. Seasonal variation and comparative analysis of non-specific humoral immune substances in the skin mucus of olive flounder (*Paralichthys olivaceus*). *Dev Comp Immunol.* 38:1e7.
- Kabata, Z. 1970. Crustacea as enemies of fishes. In *Diseases of Fishes* (S. F. Snieszko and H. R. Axelrod, eds.), 171 p. Book 1. T.F.H Publications, Jersey City, NJ.
- Kabata, Z. 1979. *Parasitic Copepoda of British Fishes*, 468 p. Ray Society, London.
- Kabata, Z. 1984. Diseases caused by metazoans: crustaceans. In: Kinne O (ed) *Diseases of marine animals*. Biologische Anstalt Helgoland. pp 321–399.
- Kabata, Z. 1985. *Parasitic and diseases of fish cultured In the tropic*. Taylors & Francis, London & Philadelphia: 318 pp.
- Kattambally, R. M.TMV1, S. Kappalliz & G. Anilkumar. 2019. Clupeid fish hosts a *Peniculus* sp. (Pennellidae, Siphonostomatoida, Copepoda)—First report on new host and season dependent prevalence. *Acta Oceanol. Sin.*, Vol. 38, No. 12, P. 118–125.
- Khong, H.K., M.K. Kuah, A. Jaya-Ram & A.C. Shu-Chien. 2009. Prolactin receptor mRNA is upregulated in discus fish (*Symphysodon aequifasciata*) skin during parental phase. *Comp Biochem Physiol B Biochem Mol Biol.* 153:18e28.
- Kismiyati & G.Mahasri. 2014. *Buku ajar parasit dan Ilmu penyakit ikan 1 (ilmu penyakit arthropoda pada ikan)*. FPK UNAIR. Surabaya. 52 hal.
- Kleinertz, S & H.W. Palm. 2015. Parasites of the grouper fish *Epinephelus coioides* (Serranidae) as potential environmental indicators in Indonesian coastal ecosystems. *Journal of Helminthology* 89, 86–99. Cambridge University Press.

- Komarudin, O & J. Slembrouck. 2005. Manajemen kesehatan ikan. Petunjuk Teknis Pembenihan Ikan Patin Indonesia, *Pangasius djambal*. IRD-BRKP.
- Kumar S., G. Stecher, M. Li, C. Knyaz & K. Tamura. 2018. MEGA X: Molecular Evolutionary Genetics Analysis across computing platforms. *Molecular Biology and Evolution* 35:1547-1549.
- Kurniasih, F.A. Sudjaji, B. Sumiarto & S.M. Noor. 2002. Penentuan dan analisis secara molekuler dari strain *Schistoma japonicum* (trematoda) di Indonesia. *J. Sain Vet.* Vol XX No.1.
- Lanzing, W.J.R & P.F. O'Connor. 1975. Infestations of luderick (*Girella tricuspidata*) populations with parasitic isopods. *Aust J Mar Freshwater Res.* 26: 355-361.
- Levinton, J.S. 2001. *Marine Biology Function. Biodiversity. Ecology* 2nd edition. Oxford University Press.
- Lovy, J. & S.E. Friend. 2020. Black sea bass are a host in the developmental cycle of *Lernaeenicus radiatus* (Copepoda: Pennellidae): Insights into parasite morphology, gill pathology and genetics. *Parasitology*. DOI: 10.1017/S0031182019001781.
- Meissner, W.A & G.T.H. Deamandopoulos. 1977. Neoplasia. In: *Pathology*. Anderson, WAD, Kissane JM, editors. St Louis: The C.V. Mosby Co. p. 640-691.
- Menzies, R.J., T.E. Bowman & F.G. Alverson. 1955. Studies of the fish parasite *Lironeca convexa* Richardson (Crustacea: Isopoda: Cymothoidae). *Wasmann J Biol.* 13: 277-295.
- Miller, G., R. Beckwith, C. Fellbaum, D. Gross & K. Miller. 1990. WordNet: An on-line lexical database. *International journal of lexicography*.
- Misganaw, K & A. Getu. 2016. Review on major parasitic crustacean in fish. *Fish Aquac J.* 7:3. DOI: 10.4172/2150-3508.1000175.
- Musyaffak, M., I.W. Abida & F.F. Muhsoni. 2010. Analisa tingkat prevalensi dan drajat infeksi parasit pada ikan kerapu macan (*Ephinephilus fuscoguttatus*) di lokasi budidaya berbeda. *Jurnal Kelautan*, Volume 3, No.1.
- Murwantoko & I. Hardaningsih. 2008. Genetic Variation Study of Gourami (*Osphronemus goramy*) Using 5S rDNA sequence Approach. *Aquacultura Indonesiana* 9 (3):125-134.
- Murwantoko, S.L.C. Negoro, A. Isnansetyo & Zafran. 2018. Life cycle of marine leech from cultured "cantik" hybrid grouper (*Ephinephilus* sp.) and their susceptibility against chemicals. *Aquacultura Indonesia*. 18(2):72-76.

- Muttaqien, A., U.Khaira, Winaruddin, Eliawardani, M. Hambal, & Al Azhar. 2019. Ectoparasites identification of stingrays fish (*Dasyatis* Sp.) at Peunayong fish market, Banda Aceh. *Jurnal Medika Veterinaria*.
- Nagasawa, K. & D. Uyeno. 2014. A checklist of copepods of the family Pennellidae (Siphonostomatoida) from fishes and whales in Japanese waters (1916–2014). *Biosphere Sci.*, 53: 43–71. (In Japanese with English abstract).
- Nigam, A.K., U. Kumari, S.Mittal & A.K. Mittal. 2012. Comparative analysis of innate immune parameters of the skin mucous secretions from certain freshwater teleosts, inhabiting different ecological niches. *Fish Physiol Biochem.* 38: 1245e56.
- Nitta, M., T.Hotta & K.Nagasawa. 2017. New record of *Lernaeenicus ramosus* (copepoda: pennellidae) parasitic on *Epinephelus akaara* (perciformes:serranidae) from the Amakusa-nada sea, western Japan. *Biogeography* 19.80-84.
- Noble, E.R. & G.A.Noble. 1973. *Parasitology the biology of animal parasites*. 3rdEd. Lea and Febiger. Philadelphia. London.
- Nontji, A. 1987. *Laut Nusantara*, Penerbit Djembatan. Jakarta.
- Oidtmanna, B., E. Peelera, T. Lyngstad, E. Brunb, B. B. Jensenb & K.D.C. Stärkc. 2013. Risk-based methods for fish and terrestrial animal disease surveillance. *Preventive Veterinary Medicine.* 112 : 13–26.
- Oines, O.& P.A. Heuch. 2005. Identification of sea louse species of the genus *Caligus* using mtDNA. *Journal of the Marine Biological Association of the UK.* 85, 73-79.
- Okamoto, M. 2011. The parasites of fishes and shellfishes caught in the south-western Sea of Japan off Shimane Prefecture. *Rep. Shimane Pref. Fish. Technol. Cent.*, 3: 55–68. (In Japanese with English abstract).
- Pavoletti, E., M.L. Fioravanti, M. Prearo & C. Ghittino .1999. Osservazioni sulla *Caligosi* in spigole d'allevamento. *Boll. Soc. Ital. Patol. Ittica* 11:2-9.
- Overtona, K., F. Samsinga, F. Oppedalb, S. Dalvinb & L.H. Stienb. 2018. The use and effects of hydrogen peroxide on salmon lice and post-smolt Atlantic salmon. *Aquaculture.* 486 246–252.
- Piasecki, W. & B.M. MacKinnon. 1993. Changes in structure of the frontal filament in sequential developmental stages of *Caligus elongatus* von Nordmann, 1832 (Crustacea, Siphonostomatoida). *Can J Zool* 71:889–895.
- Pike, A.W., K. MacKenzie & A. Rowand .1993. Ultrastructure of the frontal filament in chalimus larvae of *Caligus elongates* and *Lepeophtheirus salmonis* from

Atlantic salmon, *Salmo salar*. In: Boxshall GA, Defaye D (eds) Pathogens of wild and farmed fish: sea lice. Ellis Horwood. Chichester.

- Pike, A.W. & S.L. Wadsworth. 1999. Sealice on salmonids : their biology and control. *Adv Parasitol.* 44:233–337.
- Pike, A.W. & S.L. Wadsworth. 2000. Sealice on salmonids: their biology and control. *Adv. Parasitol.* 44, 233–337.
- Pillai, N.K. 1985. Fauna of India : parasitic copepods of marine fish. Department of Aquatic Biology and Fisheries University of Kerala, Trivandrum.
- Price, S.A. & L.M. Wilson. 2006. *Patofisiology*. Edisi VI. Volume I. EGC. Philadelphia. 87 p.
- Printrakoon, C. & W. Purivirojkul. 2011. Prevalence of *Nerocila depressa* (Isopoda: *Cymothoidae*) on *Sardinella albella* from a Thai estuary. *J Sea Res.* 65(2): 322-326.
- Rahma, F. W. 2016. Pengaruh pemberian ekstrak *Sargassum* sp. Dengan pelarut methanol pada pakan terhadap jumlah eritrosit dan differensial eukositikan lele dumbo (*Clarias gariepinus*). Doctoral dissertation. Universitas Airlangga. Surabaya.
- Ramayulis, Muhar, & Deswati. 2014. Inventarisasi ektoparasit pada beberapa jenis ikan di Unit Perikanan Rakyat (UPR) Kelurahan Bungus Timur, Kota Padang. Skripsi. Universitas BungHatta. Padang.
- Ratnawati, A. & P.U. Kurniasih. 2013. Histopatologis dugaan *Edwardsiella tarda* sebagai penyebab kematian ikan maskoki (*Crassius auratus*): Postulat Koch. *Jurnal Sains Veteriner.* 31 (1): 55-65.
- Ravichandran, S., T.T.A. Kumar, P.R. Ross & M. Muthulingam. 2007. Histopathology of the infestation of parasitic isopod *Joryma tartoor* of the host fish *Parastromates niger*. *Res J Parsit.* 2(1): 68-71.
- Roberts, R. J. 2005. Fish pathology 3rd edition. W.B. Saunders. China.
- Ross, N.W., K.J. Firth, A. Wang, J.F. Burka & S.C. Johnson. 2000. Changes in hydrolytic enzyme activities of naïve Atlantic salmon *Salmo salar* skin mucus due to infection with the salmon louse *Lepeophtheirus salmonis* and cortisol implantation. *Dis Aquat Organ.* 41:43e51.
- Roth, M., R. Richards & C. Sommerville. 1993. Current practices in the chemotherapeutic control of sea lice infestations in aquaculture : a review. *J. Fish Dis* 16. Kabata 1972:1–26.
- Rueda, F.M & F.J. Martínez. 2001. A review on the biology and potential aquaculture of *Dentex dentex*. *Rev Fish Biol Fish.* 11:57e70.

- Schram, T.A. 2006. Supplementary descriptions of the developmental stages of *Lepeophtheirus salmonis* (Krøyer, 1837) (Copepoda: Caligidae). In: G.A.Boxshall, D. Defaye (Eds.). Buku Pathogens Of Wild And Farmed Fish: sea lice. Taylor & Francis e-Library. 30-47.
- Shatrie, D.N. 2011. Studi perbandingan morfologi dan molekuler lernaeasidae pada ikan arwana irian (*Scleropages jardini*) di Indonesia. Disertasi. Universitas Gajah Mada. Yogyakarta.
- Sheikhzadeh, N., K.A. Pashaki, K. Nofouzi, M. Heidarieh & H.T. Nasrabadi. 2012. Effects of dietary Ergosan on cutaneous mucosal immune response in rainbow trout (*Oncorhynchus mykiss*). Fish Shellfish Immunol. 32:407e10.
- Shephard, K.L. 1994. Functions for fish mucus. Rev Fish Biol Fis. 4:401e29.
- Shiino, S. M. 1964. Results of Amani Expedition 6. Parasitic Copepoda. Rep. Fac. Fish., Pref. Univ. Mie, 5: 243–255.
- Sinderman, C.J. 1990. Principal diseases of marine fish and shell fish. Vol 1. Diseases of Marine Fish. Academic Press, London.
- Slamet, B., Tridjoko, Agus, T. Setiadharna, N. A. Giri & K. Suwirya . 2008. Inventarisasi dan pengendalian penyakit parasit pada induk ikan laut di bak pemeliharaan. Jurnal Perikanan (J. FISH. Sci) X (2) : 276-281 ISSN: 0853-6384.
- Silaban, B. N. 2011. Distribusi cacing pada berbagai organ ikan tongkol (*Auxis rochei*) yang dipasarkan di Kedongan, Badung. Skripsi. Fakultas Kedokteran Hewan. Universitas Udayana. Denpasar.
- Sproston, N. G. 1942. The developmental stages of *Lernaeocera branchialis*. J. Marine Biologi.UK 25, 441–446.
- Subramanian, S., S. MacKinnon & N. Ross. 2007. A comparative study on innate immune parameters in the epidermal mucus of various fish species. Comp Biochem Physiol B Biochem Mol Biol. 148:256e63.
- Sudaryatma, P.K. & N.N. Eriawati. 2012. Histopatologi insang ikan air Laut yang terinfeksi *Dactylogyrus* sp.. Jurnal Sain Veteriner. ISSN:0126-0421.
- Suhana. 2017. Ekonomi perikanan budidaya kerapu (internet). <https://suhana.web.id/2017/03/14/>. (diakses 17 februari 2020).
- Suhermanto, A., S. Andayani & M. Maftuch. 2011. Pemberian total fenol teripang pasir (*Holothuria scabra*) untuk meningkatkan leukosit dan diferensial leukosit ikan mas (*Cyprinus carpio*) yang diinfeksi bakteri *Aeromonas Hydrophila*. Jurnal Kelautan: Indonesian Journal of Marine Science and Technology, 4(2), 150-157.

- Sveen, L.R., G. Timmerhaus, A. Krasnov, H. Takle, S. Handeland & E. Ytteborg. 2019. Wound healing in post-smolt Atlantic salmon (*Salmo salar* L.). Scientific Reports. 9:3565. Doi.org/10.1038/s41598-019-39080-x.
- Tampubolon, G.H & E. Mulyadi. 1989. Sinopsis kerapu di perairan Indonesia. Semarang.
- Tanriku, T.T & F. Percin . 2012. Ectoparasitic sea lice, *Caligus minimus* (Otto 1821, copepoda: caligidae) on brawn wrasse, *Labrus merulal.*, in Izmir bay, Aegean Sea. Ital J Anim Sci 11(2):208–210.
- Tobing, L .L. 2000. Inventarisasi parasit metazoa pada ikan gabus laut (*Saurida undosquamis* Richardson, 1948) Ikan Samgeh (*Atrobuca nibe* Jordan dan Thompson 1911) dan Ikan Gelang Mudin (*Upneus taeniopterus* Cuvier, 1829) dari tempat pelelangan ikan pelabuhan ratu, Jawa Barat. Skripsi. Institut Pertanian Bogor. Bogor.
- Tort, L., J.C. Balasch & S. Mackenzie. 2003. Fish immune system. A crossroads between innate and adaptive responses. Trends Immunol. 22:277e86.
- Utami, D. T., S.B. Prayitno, S. Hastuti & A. Santika. 2013. Gambaran parameter Hematologis pada ikan nila (*Oreochromis niloticus*) yang diberi vaksin DNA *Streptococcus iniae* dengan dosis yang berbeda. Journal of Aquaculture Management And Technology. 7-20.
- Vatsos, I., M. Yiagnisis & I. Karakostas. 2006. Ceratomyxa spp. (Myxosporea) infection in cultured shi drum (*Umbrina cirrosa*) and cultured brown meagre (*Sciaena umbra*) from Greece. Bull Eur Assoc Fish Pathol. 26:93e6.
- Weinstein, M.P & K.L.Jr. Heck. 1977. Biology and host-parasite relationships of *Cymothoa excisa* (Isopoda: Cymothoidae) with three species of Snappers (Lutjanidae) on the Caribbean coast of Panama. Fish Bull. 75: 875-877.
- Widyastuti, E. 2002. Beberapa catatan mengenai parasit krustasea. Jurnal Oseana. Volume XXVII 29-35.
- Williams, E.H & L.W. Bunkley. 1996. Parasites Off shore big game fishes of Puerto Rico and the Western Atlantic. Puerto Rico.Department of Natural Environmental Resources and University of Puerto Rico, Rio Piedras.
- Whitfield, P.J.,M.W. Pilcher, H.J. Grant & J. Riley. 1988. Experimental studies on the development of *Lernaeocera branchialis* (Copepoda, Pennellidae) population processes from egg production to maturation on the flatfish host. Hydrobiologia. 167, 579–586.
- Yuniar, A.T., H.W. Palm & T. Walter. 2007. Crustacean fish parasites from Segara Anakan Lagoon, Java, Indonesia. Parasitol Res 100:1193–1204.

Lampiran 1. Data infestasi *Lernaeenicus* sp. Tahun 2015–2019

Bulan	Tahun				
	2015	2016	2017	2018	2019
Januari	-	4	1	-	-
Februari	3	1	1	1	1
Maret	-	3	4	5	-
April	7	-	-	-	-
Mei	1	-	3	-	1
Juni	-	-	-	-	1
Juli	-	-	-	2	11
Agustus	-	4	1	-	12
September	-	1	-	-	3
Oktober	1	1	-	-	5
November	1	1	1	-	-
Desember	2	-	-	-	2

Sumber data : Laboratorium Penguji BPBL Batam

Keterangan : (-) tidak ditemukan kasus

Lampiran 2. Perhitungan prevalensi dan intensitas tiap KJA

2.1 Sampel BPBL Batam

Keterangan	Kerapu cantang		
	80-100 g	110-300 g	310-500 g
Jumlah ikan sampel	36	50	50
Jumlah ikan yang terinfeksi	8	15	38
Sampel ikan yang diambil	2	3	7
Jumlah <i>Lernaeenicus</i> sp. yang ditemukan	Ikan 1 = 1 Ikan 2 = 1	Ikan 1 = 1 Ikan 2 = 1 Ikan 3 = 3	Ikan 1 = 1 Ikan 2 = 6 Ikan 3 = 7 Ikan 4 = 4 Ikan 5 = 6 Ikan 6 = 5 Ikan 7 = 3
Intensitas (<i>Lernaeenicus</i> sp./ikan)	1	1,6 = 2	4,57 = 5
Prevalensi (%)	22,2 %	30 %	76 %

Keterangan	Kerapu macan	
	100-300 g	310-500 g
Jumlah ikan sampel	36	36
Jumlah ikan yang terinfeksi	18	11
Sampel ikan yang diambil	1	2
Jumlah <i>Lernaeenicus</i> sp. yang ditemukan	3	Ikan 1 = 6 Ikan 2 = 5
Intensitas (<i>Lernaeenicus</i> sp./ikan)	3	5,5 = 6
Prevalensi	50 %	30,5 %

2.2. Sampel KJA Bapak Agung (Tiawangakang)

Keterangan	Kerapu cantang
	100-300 g
Jumlah ikan sampel (ekor)	40
Jumlah ikan yang terinfeksi (ekor)	5
Sampel ikan yang diambil (ekor)	2
Jumlah <i>Lernaeenicus</i> sp. yang ditemukan (ekor)	Ikan 1 = 9 Ikan 2 = 12
Intensitas (<i>Lernaeenicus</i> sp./ikan)	10
Prevalensi (%)	87

2.3. Sampel KJA Bapak Hamzah (Teluk Air)

Keterangan	Kerapu cantang
	310-500 g
Jumlah ikan sampel (ekor)	36
Jumlah ikan yang terinfeksi (ekor)	15
Sampel ikan yang diambil (ekor)	3
Jumlah <i>Lernaeenicus</i> sp. yang ditemukan (ekor)	Ikan 1 = 3 Ikan 2 = 2 Ikan 3 = 3
Intensitas (<i>Lernaeenicus</i> sp./ikan)	2,6 = 3
Prevalensi (%)	41,6

2.4. Sampel KJA Bapak Suryadi (Teluk Air)

Keterangan	Kerapu cantang
	310-500 g
Jumlah ikan sampel (ekor)	36
Jumlah ikan yang terinfeksi (ekor)	29
Sampel ikan yang diambil (ekor)	1
Jumlah <i>Lernaeenicus</i> sp. yang ditemukan (ekor)	12

Intensitas (<i>Lernaeenicus</i> sp./ikan)	12
Prevalensi (%)	80

2.5. Sampel KJA Bapak Musthofa (Jembatan IV)

Keterangan	Kerapu cantang 100-300 g
Jumlah ikan sampel (ekor)	36
Jumlah ikan yang terinfeksi (ekor)	9
Sampel ikan yang diambil (ekor)	1
Jumlah <i>Lernaeenicus</i> sp. yang ditemukan (ekor)	6
Intensitas (<i>Lernaeenicus</i> sp./ikan)	6
Prevalensi (%)	25