

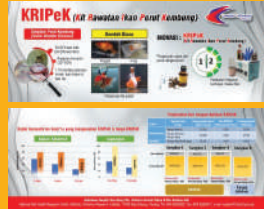
MONOGRAPH/BOOK AND PAMPHLET



Technical report: *Zeylanicobdella argumensis*, a marine leech infestation of farmed fish: occurrence, pathogenicity & control measures. ISBN:978-967-2946-05-2 by Kua Beng Chu. A 101-page monograph on marine leech infestation in the culture of marine fish.



Penyakit Viral Nervous Necrosis (VNN) dalam Ikan marin di Malaysia by Azila Abdullah. A 31-page monograph on viral nervous necrosis in marine fish.



KRIPeK (Kit Rawatan Ikan Perut Kembang) by Kua BC, Rohaiza Asmini Y & Nur Ashikin A. A 2-page pamphlet that highlights KRIPeK which is a kit used for treatment in fish having a swim bladder disorder.

PHOTOS OF 2020



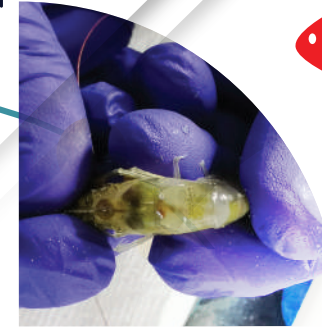
11 Feb. 2020: Sharing technical information on AHPND, EHP & New Emerging diseases to stakeholders.



Sept. 2020: Sharing technical information on TiLV disease to stakeholders.



Dec. 2020: NaFiSH staffs.



NaFiSH ANNUAL REPORT

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2020 NaFiSH Annual Report

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National Fish Health Research Division, Fisheries Research Institute,
11960 Batu Maung, Penang, Malaysia

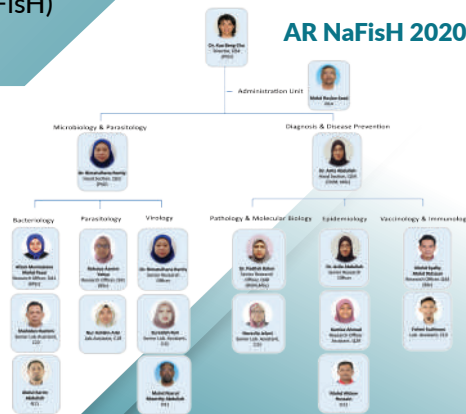
2020 was a very challenging year for all of us. NaFisH, like many others experienced significant logistic and financial challenges due to COVID-19 pandemic. With RM1.9 million fund, NaFisH has made the move towards supporting the sustainability of aquaculture through R & D on fish health, targeting diseases with high impact on industry. Among them were emerging diseases such as TiLV, AHPND and EHP. Due to the implementation of movement control order (MCO) starting from 18 March 2020 until August 2020 and followed by travel restrictions at some areas, few planned research activities had to be postponed to a later date and some had been moved to 2021. In spite of this, activities by various research and technical services are progressing in alternate ways. However, occurrence of diseases that lead to mortality still occurs and online platforms had become new normal for rapid communication between us and farmers in need. NaFisH spent 99.99% of the funding and through innovation known as KRIPeK, we won the first prize for Open Fisheries category during Department of Fisheries Innovation 2020. The award also acknowledges our research strength in targeting problems faced by the industry. With that, I would like to thank everyone in NaFisH and our collaborators who have worked hard to ensure our successes despite all the challenges during this Covid-19 pandemic.



Dr. Kua Beng Chu
 Director
 National Fish Health Research Division (NaFisH)

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14 RESEARCH HIGHLIGHTS

1 Epidemiology of TiLV in tilapia & tinfoil barb

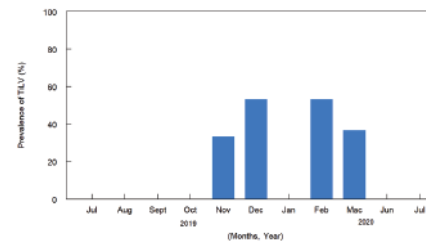
Azila A, Muntaziana MPA, Rimatulhana R, Fahmi S, Shahidan H, Zuraidah R, Munira M & Suphia Amiera S

Average prevalence of TiLV was found to be 16.7% and 21.1% in tilapia and tinfoil barb respectively during the study period from January to March 2020 in Timah Tasoh Dam.



2 Prevalence of Tilapia Lake Virus (TiLV) in red tilapia (Oreochromis sp.) in Pedu Lake

Muntaziana MPA, Munira M, Fahmi S, Shahidan H, Zuraidah R, Mohd Syaifiq MR, Rimatulhana R & Azila A



The prevalence of TiLV ranging from 33 to 53% and started to infect red tilapia after been cultured for 5 months.

3 Early screening of Tilapia Lake Virus (TiLV) in red tilapia (Oreochromis sp.) & tinfoil barb (Barbonymus schwanenfeldii) in PPA Bukit Tinggi, Pahang

Muntaziana MPA, Munira M, Suphia Amiera S, Fahmi S, Shahidan H, Zuraidah R, Rimatulhana R & Azila A



TiLV screening of red tilapia broodstock and fries of tinfoil barb at hatchery from Aquaculture Extension Centre (PPA) Bukit Tinggi, Pahang showed all samples were negative.

Blood withdrawal process from fish

Accomplishment in 2020

14

researches with impact completed

38

technical services conducted

38

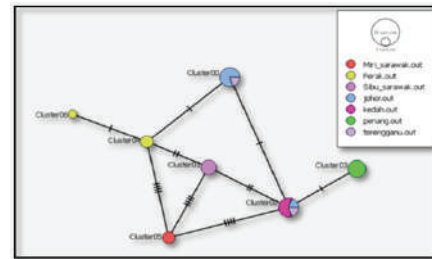
technical information disseminated

4

Enterocytozoon hepatopenaei (EHP) parasite from infested farmed white shrimp in Malaysia

Rohaiza-Asmini Y, Kua BC & Wan Muhd Hazim WS

Samples of EHP positive DNA from 9 states showed **7 clusters (Perak, Johor, Penang, Kedah, Sibul, Miri & Terengganu)** while 2 clusters from Johor, Terengganu & Kedah shared the EHP genetics.

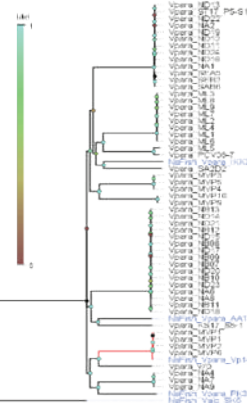


5

Genomic sequences and phylogenetic analysis of *Vibrio parahaemolyticus* AHPND strains from marine shrimps

Padilah B, Rohaiza AY & Kua BC

Four strains, AAT22 (Johor), IKK3 (Kedah), PK3 (Johor) and Vp14 (Sarawak) showed 98% identity to *V. parahaemolyticus* whereas SK6 (Sabah) identity of 98.5% to *V. alginolyticus*. Overall, IKK3, AAT22 and PK3 share a relatively distant ancestor with novel genomic lineages of *V. parahaemolyticus* previously not reported in Malaysia. Strain Vp14 displayed full sequence of pVA1 virulent plasmid with *PirA/PirB* genes.

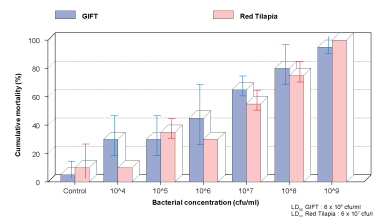


6

Comparative pathogenicity between GIFT & red tilapia against streptococcosis

Mohd Syaifiq MR., Nur Amirah MR. & Kua BC

The susceptibility of GIFT and red tilapia against *Streptococcus agalactiae* showed GIFT is more susceptible to *S. agalactiae* with recorded median lethal dose (LD_{50}) of 6×10^6 cfu/ml compared to 6×10^7 cfu/ml in red tilapia.



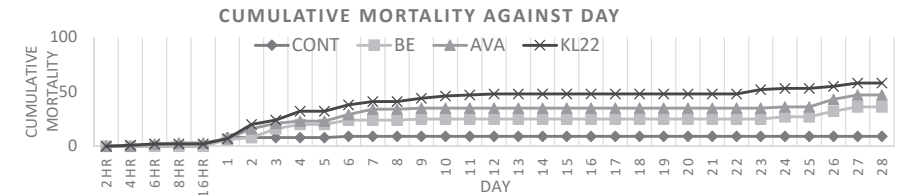
Cumulative mortality of GIFT and Red Tilapia post challenged against *S. agalactiae*

7

Assessment of Viral Nervous Necrosis (VNN) infection in seabass (*Lates calcarifer*) using immunological techniques

Azila A, Munira M, Muhammad Safwan KA & Firdaus N

The **nervous necrosis virus ID KL22 had the highest percentage of mortality and $TCID_{50}$** compared to isolate ID BE and positive control virus from AVA, Singapore.



8

Lysozyme activity of red tilapia immunized with palm oil adjuvanted feed-based streptococcosis vaccine

Mohd Syaifiq MR, Hanan MY, Azila A & Rimatulhana R

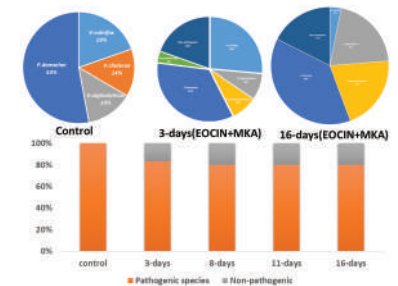
Oral vaccination with palm oil adjuvanted streptococcosis vaccine showed **lysozyme activity was significantly higher in immunized red tilapia** following the first administration of vaccine and booster dose. Vaccination using palm oil adjuvant feed-based streptococcosis vaccine elevates lysozyme activity suggesting that vaccines stimulates the non-specific cellular immune responses.

9

The prevalence of bacteria in *P. monodon* fed with cinnamon essential oil & microalgae *Chlorella vulgaris* (EOCIN+MKA)

Padilah B & Teoh PN

Both group fed with EOCIN+MKA and normal diet have presence of pathogenic bacteria. However, bacteria analysis from *P. monodon* fed with normal diet showed 100% presence of pathogenic bacteria as compared with 83-97% in shrimp fed with EOCIN+MKA. Pathogenic bacteria were identified as *V. parahaemolyticus*, *V. vulnificus*, *V. cholerae*, *P. damsela*, *Aeromonas* spp. while *C. indologenes* and *B. vesicularis* known as non-pathogen to shrimp culture.



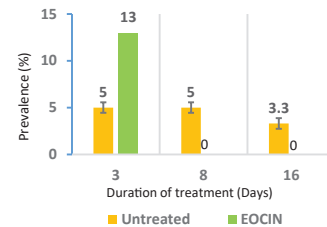
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10

Effect of cinnamon essential oil (EOCIN) diet on *Vibrio parahaemolyticus* of *Penaeus monodon*

Padilah B, Teoh PN & Kua BC

Significant effect was observed in shrimp fed with EOCIN diet. *V. parahaemolyticus* (Vp) was not isolated from hepatopancreas of *P. monodon* after Day-8 to 16 of EOCIN treatment (3% conc./bw) compared to untreated group (3.3-5% prevalence).



11

Antibiotic sensitivity against several fish and shrimp pathogens

Padilah B & Kua BC

Antibiotic sensitivities against several fish and shrimp pathogen.

Bil.	Nama Antibiotik	kod	dos (ug/disc)	<i>P. shigelloides</i> (Pkb4S)	<i>A. hydrophila</i> (Ppc1)	<i>S. xyloso</i> (P11)	<i>E. tarda</i> (Pze3s)	<i>V. para.</i> (Vp14)	<i>V. vulnificus</i> (Kml5ks)	<i>V. algin.</i> (Imkg4s)	<i>P. damsela</i> (Pkb10s)	<i>E. coli</i> (Pkb10s)
1	Ampicillin	AMP25	25	R	R	R	R	R	R	R	R	R
2	Carbancillin	CAR100	100	R	R	R	R	R	R	R	R	R
3	Streptomycin	S25	25	R	R	R	R	R	R	R	R	R
4	Streptomycin	S10	10	R	R	R	R	R	R	R	R	R
5	Gentamycin	CN10	10	R	R	R	R	R	R	R	R	R
6	Kanamycin	K30	30	R	R	R	R	R	R	R	R	R
7	Chloramphenicol	C30	30	R	R	R	R	R	R	R	R	R
8	Sulfadiazine	S3 300	300	R	R	R	R	R	R	R	R	R
9	Erythromycin	E30	30	R	R	R	R	R	R	R	R	R
10	Tetracyclines	TE30	30	R	R	R	R	R	R	R	R	R
11	Florphenicols	FFC30	30	R	R	R	R	R	R	R	R	R
12	Cephaloridine	CR5	5	R	R	R	R	R	R	R	R	R

Ruj: CLSI-FDA update, (2013). FDA susceptibility test interpretive criteria for antibacterial drug approval/update and CLSI document M100-S23 (M02-A11); Performance standards for antimicrobial susceptibility testing. Petunjuk warna: R: resistan (kelabu), I : Intermediate (jingga); S: Sensitif (hijau) Enterobacteriaceae: S: ≥15; I: 12-14; R≤11; *Staphylococcus* spp. : S ≥19; I: 15-18; R≤14; Non

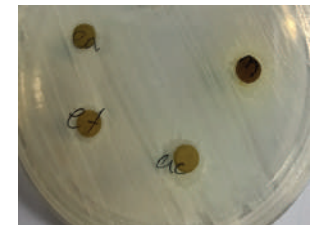
All isolates showed resistant/intermediate towards ampicillin (25 µg/disc), carbancillin (100 µg/disc), kanamycin (30 µg/disc), sulphadiazine (300 µg/disc) and cephaloridine (5 µg/disc). *A. hydrophila* showed resistant (R) towards all antibiotics (89%) except gentamicin, *E. tarda* only sensitive towards tetracycline, streptomycin and gentamicin. Isolate *Vibrio* spp., *S. xyloso*, *E. coli*, *P. damsela* and *P. shigelloides* were sensitive towards florfenicol, tetracycline, gentamicin and chloramphenicol.

12

Antimicrobial activities of microalgae *Chlorella vulgaris* extract against fish and shrimp bacteria

Padilah B & Teoh PN

Low antimicrobial activities of microalgae *C. vulgaris* (MKA) extracts were observed against *V. parahaemolyticus*, *V. alginolyticus*, *E. coli* and *P. shigelloides* whereas no inhibition zone was found against *V. vulnificus*, *A. hydrophila*, *E. tarda*, *S. xyloso* and *P. damsela*.

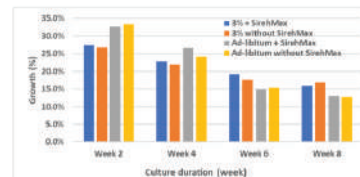


13

Effect of SirehMAX™ on the immunity and growth of tilapia in the laboratory

Rimatulhana R, Suphia AS, Mohd Syafrq MR, Afzan MAP & Azila A

Fish from herbal-treated group was free from bacteria, meanwhile the commercially fed group showed presence of bacteria (*Plesiomonas shigelloides*). PCR test showed both groups free from TiLV. The fish fed with SirehMAX™ showed significant growth at the first four weeks, but insignificant thereafter, until the end of experiment.



14

Application of commercial cinnamon essential oil (EOCIN) In arowana broodstock

Rohaiza-Asmini Y, Kua BC, Nur Ashikin A, Nur Samihah M & Wan Md Hazim WS

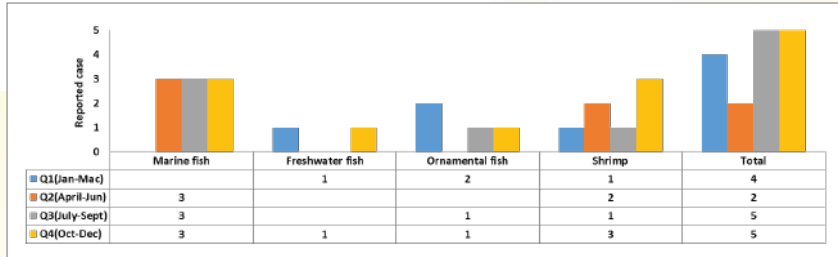
The first trial showed significant increase in survival rate from 10% to 60% in fish fed with EOCIN. Similar result was observed in second trial for Highback Golden(HBG) arowana, the production of larvae was increased from 33.3% (without EOCIN) to 66.7% (with EOCIN). The survival rate of larvae from broodstock fed with EOCIN was 94.2% for HBG and 92.3% for Malaysian Gold arowana.



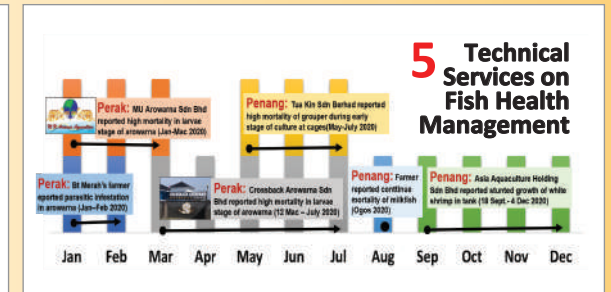
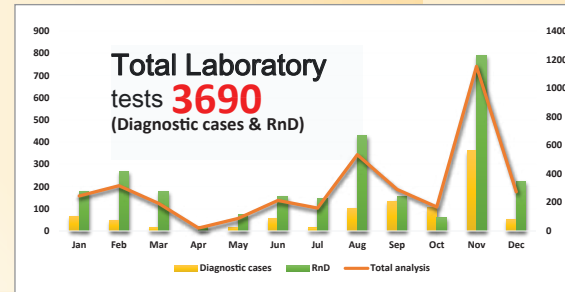
38 TECHNICAL SERVICES

Technical Support

NaFiSH Laboratory received a total of **22 diagnostic cases** of which 50% of the cases examined were on freshwater fish and marine fish while 32% and 18% from shrimp and ornamental fish respectively.

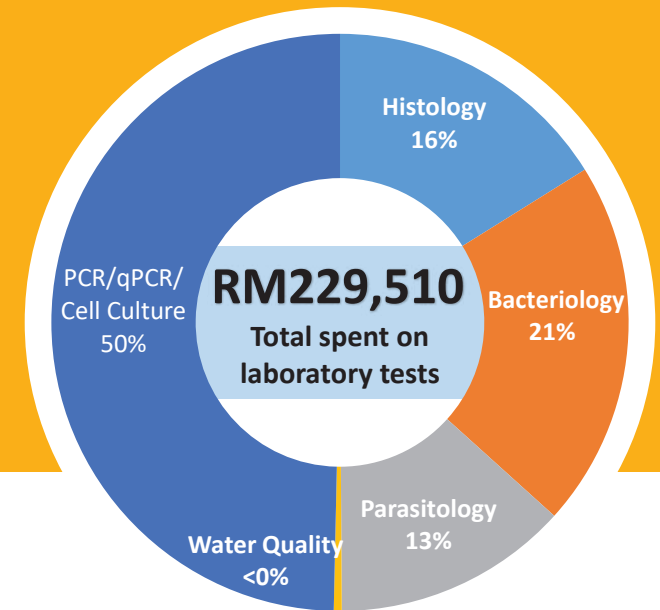


Sample Analysis Diagnostic Vs RnD 2020

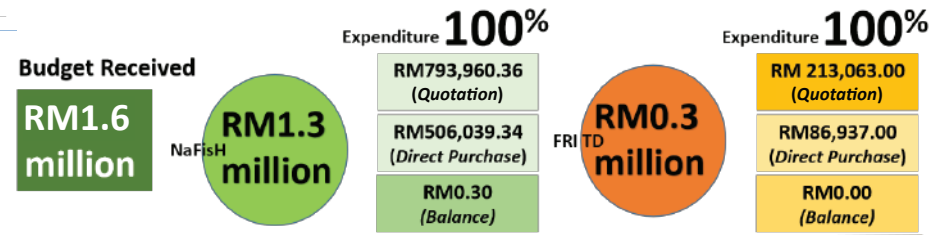
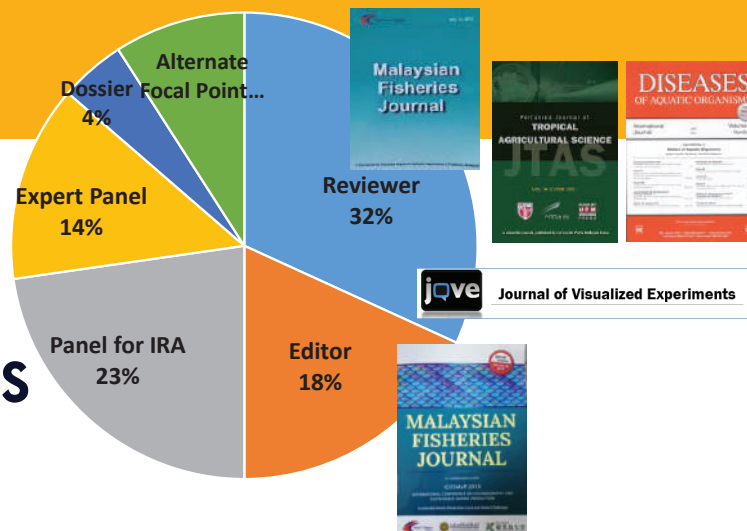


FINANCE

Expenditure (RM) of NaFiSH Laboratory

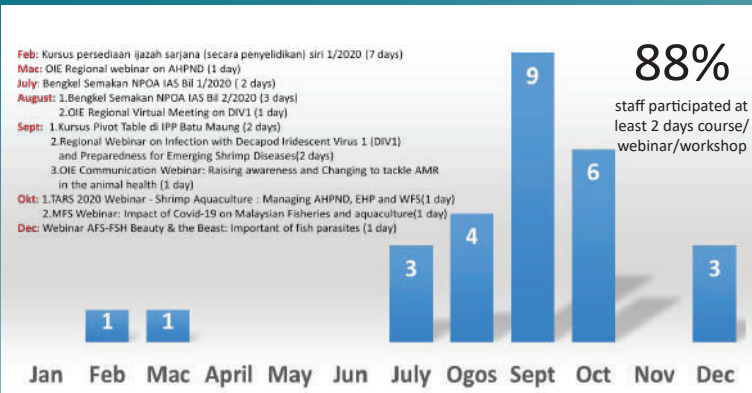


11 TECHNICAL REPRESENTATIVES of DOF



HUMAN RESOURCE DEVELOPMENT

1) Training (course/webinar/workshop) by NaFisH staff



2) Presentation (seminar/webinar)

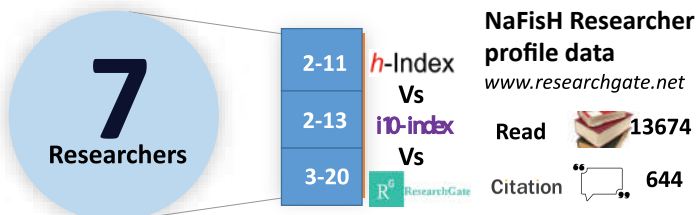
- Seminar MSPTM 2020, 11-12 March 2020, Kuala Lumpur: Ming SS, **Kua BC**, Faizah SH, Nur Omaima H. Anisakiasis – Zoonotic Disease in Tropical Countries
- Industrial Talk UMT 2020, 30 Sept 2020, Kuala Terengganu: **Kua BC**, Fish-borne Parasitic Zoonosis
- Webinar Fish Health Section-Asian Fisheries Society, Beauty & Beast: Important parasite of fish, 9 Dec 2020: **Kua BC**, marine leech: from life cycle to control measures.

3) Innovation

Innovation Award 2020 of DOF: 1st prize for Open Fisheries category



4) NaFisH Bibliometric Analysis (Dec 2020)



38 INFORMATION DISSEMINATION

SCIENTIFIC PAPER

NaFisH published 5 scientific papers in journals, one technical report, 7 abstracts/full papers, 22 diagnostic reports, 2 books and 1 pamphlet. These papers were the outcome of the research work conducted at NaFisH or in collaboration with other institutions.

JOURNAL

- Siti Hawa MA, Mohd Syafiq MR, Nur Nazifah MS, Firdaus-Nawi M & Mohd. S.** 2020. Retrospective identification of bacterial depository revealed that *Streptococcus iniae* was responsible for some of the streptococcosis cases in cultured red tilapia in Malaysia since 2006. *Pertanika Journal of Tropical Agricultural Science*. 43. 231-238.
- Mohd Syafiq MR, Nur Amirah MR, Fahmi S, Kamisa A, Kua BC, Chadag VM & Mohd FN.,** 2020. On-farm epidemiological surveillance of genetically improved farmed tilapia (GIFT) cultured at floating net cages in Pahang. *Sains Malaysiana* 49:1819-1827
- Faizal M., Nur-Nazifah M., Mohd Syafiq M.R., Wan N., Azila A and Rimatulhana R.** (2020). Protein profiling of *Oreochromis* spp. epidermal mucus subsequent to challenge of common freshwater bacteria. *International Journal of Agriculture, Environment and Biotechnology*, 13(4): 511-515.
- Padilah B, Iftikhar AAR, Wan Rozana WA and Kua BC** (2019). Antimicrobial activities of Commercial Essential Oils against *Vibrio parahaemolyticus* from Acute Hepatopancreatic Necrosis Disease of White Shrimp (*P. vannamei*). *Malaysian Fisheries Journal*, 18, 102- 115. (printing in 2020)
- Rohaiza AY, Kua BC, Padilah B, Rimatulhana R, Nur Asyikin A, Norazila J, Munira M and Wan Rozana WA** (2019). Cross Sectioning Screening of Red Tilapia Health Status in Green Algae Pond. *Malaysian Fisheries Journal*, 18, 50-56. (printing in 2020)



TECHNICAL REPORT

- Kua BC, Haslawati B, Padilah B, Abd Wahab A, Ryon S, Eleanor DL, Perceval C, Mohd Nazri P, Mohd Ikraf M S, Hamidon A, Mohd Taufiq MN, Hasim H, Mohd Shahril MN & Afzah H.** Laporan penilaian teknikal projek ternakan *Procambarus clarkii* oleh syarikat sedia berbakti di FELCRA Seberang Perak

LAPORAN PENILAIAN TEKNIKAL
 PROJEK TERNAKAN *Procambarus clarkii* OLEH SYARIKAT SEDIA
 BERBAKTI DI FELCRA SEBERANG PERAK



ABSTRACT / FULLPAPER

- Azila A et al.**, In progress on the prevention protocols for Viral Nervous Necrosis (VNN) disease in marine fish in Malaysia (*abstract*)
- Rimatulhana R et al.**, Molecular characterisation of Tilapia lake virus (TiLV) isolated from different localities in Malaysia (*full paper*)
- Padilah B et al.**, Status of Acute Hepatopancreatic Necrosis Disease (AHPND) in marine shrimps Malaysia, 2019 (*full paper*)
- Mohd Syafiq MR et al.**, Preliminary vaccination trial of palm oil adjuvanted feed-based streptococcosis vaccine (*full paper*)
- Afzan Muntaziana MP et al.**, Fish disease in Malaysia based on diagnostic case reported in 2003 to 2010 (*full paper*)
- Rohaiza AY et al.**, The Occurrence of microsporidian parasite, *Enterocytozoon hepatopenaei* at the early stage day of culture in East Malaysia (*full paper*)
- Kua BC et al.**, A solution For swim bladder disorder in tiger grouper (*Epinephelus fuscoguttatus*) (*abstract*)

22 DIAGNOSTIC REPORTS