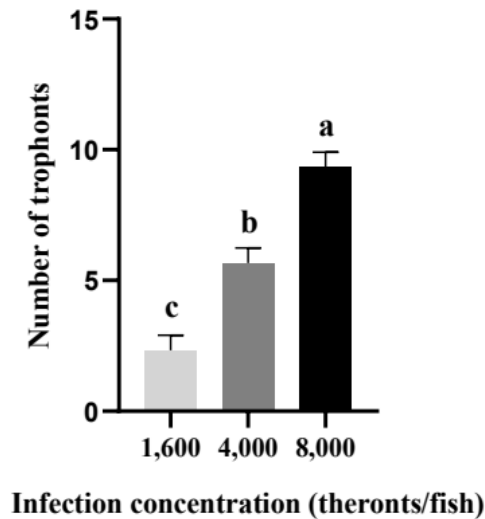


**Fig. S1.** Agarose gel electrophoresis analysis of the amplified parasite 18S rRNA sequence using conserved primers in Lane 3 was performed. Lane 1 represents a DNA size marker, Lane 2 represents the control group without P1/S15 primers.

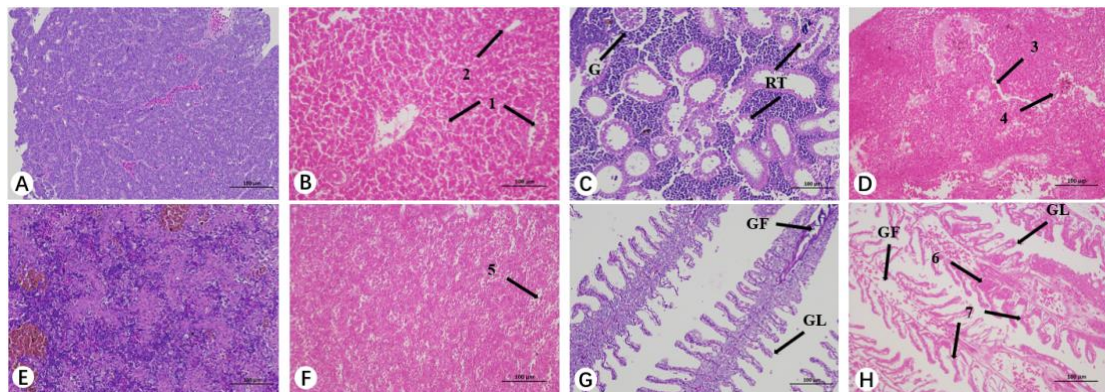
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1      AATTCCTAGTAAGTGCAAGTCATCAGCTTGTACTGATTACGTCCCTGCCCTTTGTACACA
61     CCGCCCGTCGCTCCTACCGATTTTCGAGTGATCCGGTGAACCTTCTGGACTGCGCTAACAC
121    TAGTTAGTGCGGGAAGTTAAGTAAACCACTTCACTTAGAGGAAGGAGAAGTCGTAACAAG
181    GTTTCCGTAGGTGAACCTGCGGAAGGATCATTAACACAATTAAGATCAAACCTAAAAATT
241    TATTCTGATGTATTGAGATCTGATAATTTTAAATTATCAATCTCAAATTTTACAAATTT
301    ATTTTAATAATAAATATCATTAAAGTTAATAAAATTAATAAGAAAATTTTCAACGGTGG
361    ATATCTTGGCTCCCATAACGATGAAGAACGCAGCGAAATGCGATACGCAATGCGAATTGC
421    AGAATTCCGCGAGTCATCAGATCTTTGAACGCAAATTGCGCCGAGGGGATATCCCAACGG
481    CATGTTTGTTCAGTGTGTTTATTGAAATCATAAACTAAATGTGATTGAATGCATAATT
541    TATATATATAAATTA
    
```

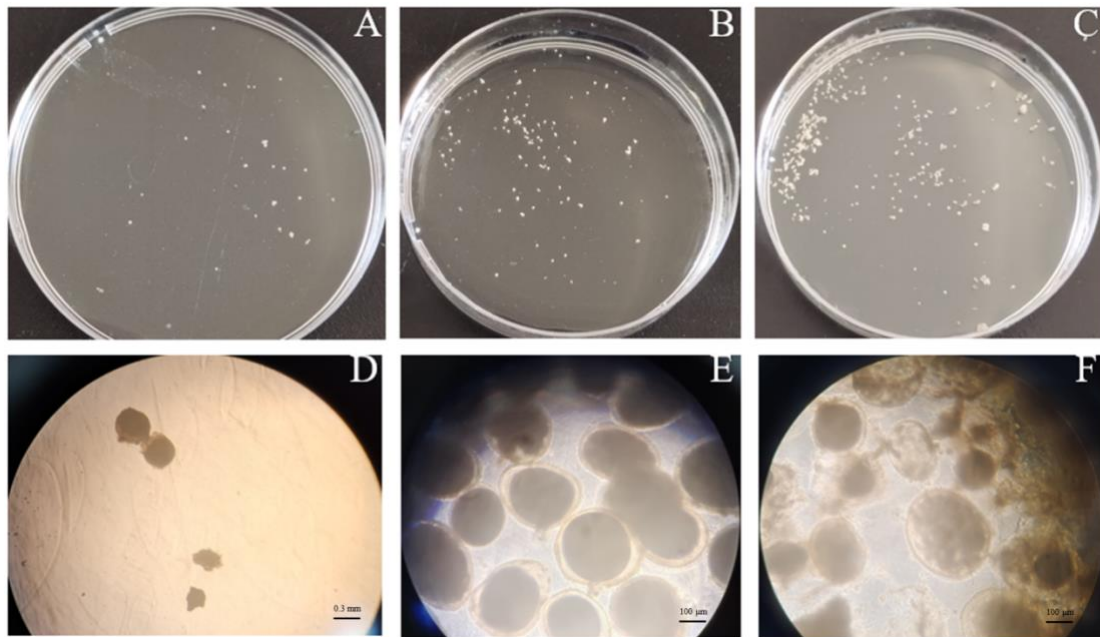
**Fig. S2.** Amplified parasite 18S rRNA sequence using conserved primers



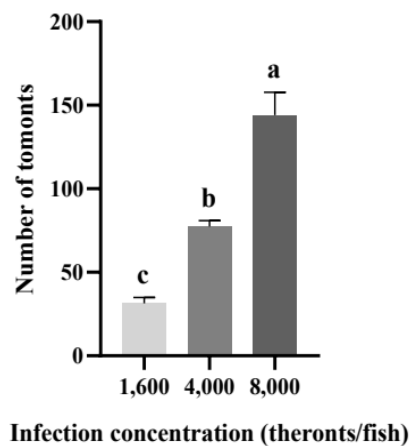
**Fig. S3.** Variation in the number of trophonts with the increase in *C. irritans* infection concentration. As the infection concentration increased (1600 theronts/fish, 4000 theronts/fish and 8000 theronts/fish), the number of trophonts also increased. The bars with different letters above them represent statistically significant differences ( $p < 0.05$ ).



**Fig. S4.** Liver, kidney, spleen and gill histology of healthy (A, C, E, G staining; 20 $\times$ ) and naturally *C. irritans*-infected (B, D, F, H staining; 20 $\times$ ) silver pomfret are shown. A: Micrograph of liver tissue from the control group. B: Liver of *C. irritans* the naturally *C. irritans*-infected group showing liver swelling (arrow 1) and vacuoles produced by hepatocyte necrosis (arrow 2). C: Kidney of the control group showing normal glomeruli (G) and renal tubules (RT). D: Kidney of the naturally *C. irritans*-infected group in natural farm showing gap expansion (arrow 3), focal necrosis, and aggregated melanomacrophages (arrow 4). E: Micrograph of the spleen from the control group showing the distinct boundaries of the nucleus and cytoplasm. F: Spleen of the naturally *C. irritans*-infected group in a natural farm showing spleen swelling (arrow 5), and unclear boundary between white pulp and red pulp. G: Gill of control group showing the normal gill filaments (GF) and gill lamella (GL). H: Gill of the naturally *C. irritans*-infected group in an aquacultural farm showing local swelling (arrow 6) and bending of gill lamella (arrow 7).



**Fig. S5.** The collected *C. irritans* and observed tomonts are shown. The experimentally infected groups with 1600 theronts/fish (A), 4000 theronts/fish (B) and 8000 theronts/fish (C) groups are displayed. In addition, the cystic structure of developing tomonts was observed under an optical microscope (OM) as shown in D and E. Furthermore, the theront splitting and releasing process were captured through OM as shown in F.



**Fig. S6.** The number of tomonts with the increase of *C. irritans* infection concentration is shown. With the increase of infection concentration (1600 theronts/fish, 4000 theronts/fish and 8000 theronts/fish), the number of tomonts increased. The bars with different letters above them represent statistically significant differences ( $p < 0.05$ ).

**Table S1.** The 18S rRNA sequences of *C. irritans* were obtained from GenBank to compare with the amplified 18S rRNA sequence of *C. irritans* in the present study

GenBank acc. no.	Source	Identity (%)
AY029272	Australia: Moreton Bey	98.13
AY029271	Australia: Heron Island	97.20
AB381934	Japan	97.20
HQ148714	China: Taiwan	99.50
KY486184	China: Taiwan: Wanli	100.00
KY486180	China: Fujian: Ningde	100.00
KY486179	China: Fujian: Ningde	100.00
KY486178	China: Fujian: Changle	100.00
KY486177	China: Fujian: Fuding	100.00
KC550302	China: Fujian: Ningde	100.00
KC550300	China: Fujian: Changle	100.00
AB608054	Japan: Wakayama	100.00
DQ270010	China: Guangdong	100.00
AF490381	China: Taiwan: Chiayi	100.00
DQ270008	China: Guangzhou	99.45
JN636814	China: Zhejiang	99.64
DQ270009	China: Guangdong	99.82
DQ270011	China: Guangdong	99.45
DQ270012	China: Guangdong	99.64
KC357673	China: Fujian	99.64
KY486182	China: Taiwan: Keelung	99.73
KY486183	China: Taiwan: Keelung	99.73
AB381933	Japan	97.51
AF490383	China: Taiwan: Kaoshiung	93.04
AF490382	China: Taiwan: Penghu	95.31

**Table S2.** Probit of *P. argenteus* infected by theronts with different concentrations

Dose (theronts/fish)	Conc. of theronts $\times 10^4$	Probit						
		24 h	36 h	48 h	60 h	72 h	84 h	96 h
blank	0	2.08	2.08	2.08	2.08	2.08	2.08	2.08
1600	1.92	2.08	2.08	2.08	2.08	3.59	3.59	3.59
4000	4.8	2.08	2.08	2.08	3.59	5	5.99	7.04
8000	9.6	3.59	4.33	4.79	4.79	5.43	7.04	7.04

**Table S3.** LC<sub>50</sub> of *P. argenteus* infected by theronts with different concentrations

Time (h)	Curve formula (y =)	R <sup>2</sup>	Probit=5 (y=5)	LC <sub>50</sub>	LC <sub>50</sub> (theronts/fish)	LC <sub>50</sub> (theronts/g)
24	0.1594x + 1.8073	0.7768	20.02949	200294.8557	16691	1043
36	0.2375x + 1.6736	0.7768	14.00589	140058.9474	11672	729
48	0.286x + 1.5905	0.7768	11.92133	119213.2867	9934	621
60	0.3068x + 1.8832	0.9519	10.15906	101590.6128	8466	529
72	0.3314x + 2.6729	0.8329	7.022028	70220.27761	5852	366
84	0.515x + 2.574	0.9104	5.713786	57137.86408	4762	298
96	0.5294x + 2.7775	0.7788	4.198149	41981.48848	3499	219