

Research Article

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Li Y.-C., Inoue K., Zhang J.-Y. and Sato H. 2024: Description of three new species of *Kudoa* Meglitsch, 1947 (Myxozoa: Multivalvulida) in commercial marine fishes from southern China, and new host records. *Folia Parasitol.* 71: 018.

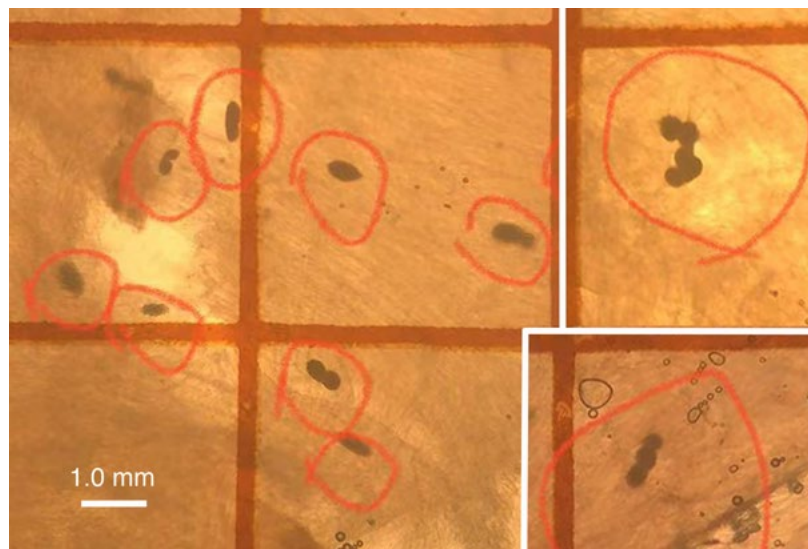
Supplementary Table S1. Multivalvulidan species (Cnidaria: Myxozoa: Myxosporea: Multivalvulida) recorded in commercial fish in China.

Multivalvulidan species	Host fish species in the South China Sea, off Chinese coast	Family of host fish	Isolate	Reference	
<i>Unicapsula</i> Davis, 1924					
Endemic; fished in the South China Sea (Northwest Pacific Ocean, off Far East coast)					
1	<i>U. aequilobata</i> Inoue, Li, Ghosh, Yunus, Zhang et Sato, 2021	<i>Decapterus macarellus</i> (Cuvier)	Carangidae	Li7-6pU	Li et al. (2022b)
		<i>Decapterus maruadsi</i> (Temminck et Schlegel)	Carangidae	Li5-7U	Inoue et al. (2021)
2	<i>U. andersenae</i> Miller et Adlard, 2013	<i>Cynoglossus puncticeps</i> (Richardson)	Cynoglossidae	Li1-9	Li et al. (2020a)
		<i>Gerres filamentosus</i> Cuvier	Gerreidae	Li3-4	Li et al. (2020a)
		<i>Hapalogenyis analis</i> Richardson	Hapalogenyidae	Li4-2	Li et al. (2020a)
		<i>Otolithes ruber</i> (Block et Schneider)	Sciaenidae	Li1-1	Li et al. (2020a)
		<i>Pennahia anea</i> (Bloch)	Sciaenidae	Li4-1	Li et al. (2020a)
		<i>Pennahia argentata</i> (Houttuyn)	Sciaenidae	Li1-6	Li et al. (2020a)
		<i>Protonibea diacanthus</i> (Lacépède)	Sciaenidae	Li8-4pU	Present study
3	<i>U. galeata</i> (Naidenova et Zaika, 1970)	<i>Nemipterus furcosus</i> (Valenciennes)	Nemipteridae	Li3-3	Li et al. (2020a)
		<i>Sardinella melanura</i> (Cuvier)	Clupeidae	Li1-3	Li et al. (2020a)
		<i>Setipinna tenuifilis</i> (Valenciennes)	Engraulidae	Li2-3	Li et al. (2020a)
		<i>Thryssa hamiltonii</i> Gray	Engraulidae	Li2-4	Li et al. (2020a)
4	<i>U. pyramidata</i> (Nadjenova et Zaika, 1970)	<i>Nemipterus furcosus</i> (Valenciennes)	Nemipteridae	Li3-3	Li et al. (2020a)
		<i>Nemipterus japonicus</i> (Bloch)	Nemipteridae	Li1-itoyori; Li7-3pU	Li et al. (2020a, 2022b)
5	<i>U. seriola</i> Lester, 1982	<i>Selaroides leptolepis</i> (Cuvier)	Carangidae	Li6-1U	Inoue et al. (2021)
Imported; fished in the Eastern Central Atlantic Ocean, off the West African coast					
6	<i>U. motomurai</i> Li, Tamemasa, Zhang et Sato, 2020	<i>Pentanemus quinquarius</i> (Linnaeus)	Polynemidae	Li2-1	Li et al. (2020a)
7	<i>U. pflugelderi</i> Schubert, Sprague et Reinboth, 1975	<i>Dentex angolensis</i> Poll et Maul	Sparidae	Li7-4pU	Li et al. (2022b)
		<i>Pseudupeneus prayensis</i> (Cuvier)	Mullidae	Li2-2	Li et al. (2020a)
<i>Kudoa</i> Meglitsch, 1947					
Endemic; fished in the South China Sea (Northwest Pacific Ocean, off Far East coast)					
1	<i>K. acanthogobia</i> Li, Inoue, Tanaka, Zhang et Sato, 2020	<i>Acentrogobius chlorostigmatoides</i> (Bleeker)	Gobiidae	Li1-4	Li et al. (2020c)
		<i>Mugil cephalus</i> Linnaeus [Syn. <i>Mugil japonicus</i> Temminck et Schlegel]	Mugilidae		Fujita (1930)
2	<i>K. bora</i> (Fujita, 1930) [Syn. <i>Chloromyxum bora</i> Fujita, 1930]	<i>Osteomugil perusii</i> (Valenciennes)	Mugilidae	Li1-2	Li et al. (2020b)
		<i>Planiliza carinata</i> (Valenciennes) (Syn. <i>Liza carinata</i> [Valenciennes])	Mugilidae		Fujita (1930)
		<i>Eubleekeria jonesi</i> (James)	Leiognathidae	Li5-3pK	Li et al. (2022a)
3	<i>K. corniculata</i> Li, Inoue, Zhang et Sato, 2022	<i>Leiognathus equulus</i> (Forsskål)	Leiognathidae	Li5-4pK	Li et al. (2022a)
		<i>Osteomugil perusii</i> (Valenciennes):	Mugilidae	Li1-2	Li et al. (2020b)
4	<i>K. fujitai</i> Li, Inoue, Zhang et Sato, 2020	<i>Osteomugil perusii</i> (Valenciennes):	Mugilidae	Li1-2	Li et al. (2020b)
5	<i>K. guangdongensis</i> Li, Inoue, Tanaka, Zhang et Sato, 2020	<i>Konosirus punctatus</i> (Temminck et Schlegel)	Clupeidae	Li1-7	Li et al. (2020c)
6	<i>K. hemiscylli</i> Gleeson, Bennett et Adlard, 2010	<i>Scoliodon macrorhynchus</i> (Bleeker)	Carcharhinidae	Li9-Kh1, Li9-Kh2	Inoue et al. (2024)
		<i>Decapterus macrosoma</i> Bleeker	Carangidae	Li5-9pK	Li et al. (2022a)
7	<i>K. hirsuta</i> Li, Inoue, Zhang et Sato, 2022	<i>Decapterus maruadsi</i> (Temminck et Schlegel)	Carangidae	Li5-10pK	Li et al. (2022a)
		<i>Trachurus japonicus</i> (Temminck et Schlegel)	Carangidae	Li5-7pK	Li et al. (2022a)
8	<i>K. iwatai</i> Egusa et Shiomitsu, 1983	<i>Larimichthys crocea</i> (Richardson)	Sciaenidae		Li et al. (2022c)
9	<i>K. javaensis</i> Yunus, Yustinasari, Natalia, Ghosh, Sakuma, Inoue et Sato, 2021	<i>Alepes djedaba</i> (Forsskål)	Carangidae	Li5-6pK	Li et al. (2022a)
10	<i>K. konishiae</i> Sakai, Kato, Sakaguchi, Setsuda et Sato, 2018	<i>Scomberomorus nipponius</i> (Cuvier)	Scombridae	Li9-2pK	Present study
11	<i>K. longichorda</i> Inoue, Kasai, Argamjav et Sato, 2022	<i>Decapterus macrosoma</i> Bleeker	Carangidae	Li5-11pK	Li et al. (2022a)
		<i>Acanthopagrus latus</i> (Houttuyn):	Sparidae	Li3-1	Li et al. (2020b)
		<i>Ambassis gymnocephalus</i> (Lacépède)	Ambassidae	Li5-5cK	Li et al. (2022a)
		<i>Gerres limbatus</i> Cuvier	Gerreidae	Li6-2cK	Li et al. (2022a)
12	<i>K. lutjanus</i> Wang, Huang, Tsai, Cheng, Tsai, Chen, Chen, Chiu, Liaw, Chang et Chen, 2005	<i>Lutjanus erythropterus</i> Bloch	Lutjanidae	—	Wang et al. (2005)
		<i>Upeneus tragula</i> Richardson	Mullidae	Li8-2cK	Present study
		<i>Nemipterus virgatus</i> (Houttuyn)	Nemipteridae	Li7-5pK	Li et al. (2022b)
13	<i>K. megacapsula</i> Yokoyama et Itoh, 2005	<i>Sphyaena pinguis</i> Günther	Sphyaenidae	—	Yokoyama and Itoh (2005)

Address for correspondence: Hiroshi Sato, Laboratory of Parasitology, Joint Faculty of Veterinary Medicine, Yamaguchi University, 1677-1 Yoshida, Yamaguchi 753-8515, Japan. E-mail: sato7dp4@yamaguchi-u.ac.jp; ORCID-iD: 0000-0002-5230-4677

14	<i>Kudoa neoscomberomori</i> n. sp.	<i>Scomberomorus commerson</i> (Lacépède)	Scombridae	Li9-3pK	Present study
15	<i>K. parvibulbosa</i> Li, Inoue, Zhang et Sato, 2022	<i>Megalaspis cordyla</i> (Linnaeus)	Carangidae	Li5-8pK	Li et al. (2022a)
16	<i>K. petala</i> Zhou et Zhao, 2008	<i>Sillago sihama</i> (Forsskål)	Sillaginidae	—	Zhou and Zhao (2008)
				Li3-2cK	Li et al. (2022b)
17	<i>Kudoa pilosa</i> n. sp.	<i>Helicolenus hilgendorfi</i> (Döderlein)	Sebastidae	Li8-3pK	Present study
		<i>Sebastes tertius</i> (Barsukov et Chen)	Sebastidae	Li9-1pK	Present study
18	<i>K. pyramidalis</i> Zhou et Zhao, 2008	<i>Alepes djedaba</i> (Forsskål) (Syn. <i>Caranx djeddaba</i> [Forsskål])	Carangidae	—	Zhou and Zhao (2008)
		<i>Decapterus macarellus</i> (Cuvier)	Carangidae	Li9-4cK	Present study
19	<i>K. trachuri</i> Matsukane, Sato, Tanaka, Kamata et Sugita-Konishi, 2011	<i>Decapterus macrosoma</i> Bleeker	Carangidae	Li5-11cK	Li et al. (2022a)
		<i>Decapterus maruadsi</i> (Temminck et Schlegel)	Carangidae	Li5-7cK	Li et al. (2022a)
		<i>Nuchequula nuchalis</i> (Temminck et Schlegel)	Leiognathidae	Li8-6pK1	Present study
20	<i>Kudoa tumidisporica</i> n. sp.	<i>Photopectoralis bindus</i> (Valenciennes)	Leiognathidae	Li5-1pK*	Li et al. (2022a)
		<i>Leiognathus brevirostris</i> (Valenciennes)	Leiognathidae	Li8-5pK1	Present study
				—	Zhou and Zhao (2008)
		<i>Nuchequula nuchalis</i> (Temminck et Schlegel)	Leiognathidae	Li1-5	Li et al. (2020b)
21	<i>K. uncinata</i> Zhou et Zhao, 2008			Li8-6pK1	Present study
		<i>Photopectoralis bindus</i> (Valenciennes)	Leiognathidae	Li5-1pK*	Li et al. (2022a)
				Li8-5pK1	Present study
Imported; fished in the Eastern Central Atlantic Ocean, off the West African coast					
22	<i>K. iidae</i> Li, Inoue, Tanaka, Zhang et Sato, 2020	<i>Dagetichthys lusitanicus</i> (de Brito Capello)	Soleidae	Li8-1pK	Present study
		<i>Pentanemus quinquarius</i> (Linnaeus)	Polynemidae	Li2-1	Li et al. (2020c)

* Kudooid species in the trunk muscle of *Photopectoralis bindus* examined in our previous report (Li et al. 2022a) might include not only *K. uncinata* Li5-1pK but also *K. tumidisporica* n. sp. Namely, molecular-genetic analysis using the SSU and LSR rDNA might detect *K. uncinata*, whereas morphological analysis was conducted on the new species, *K. tumidisporica* n. sp.



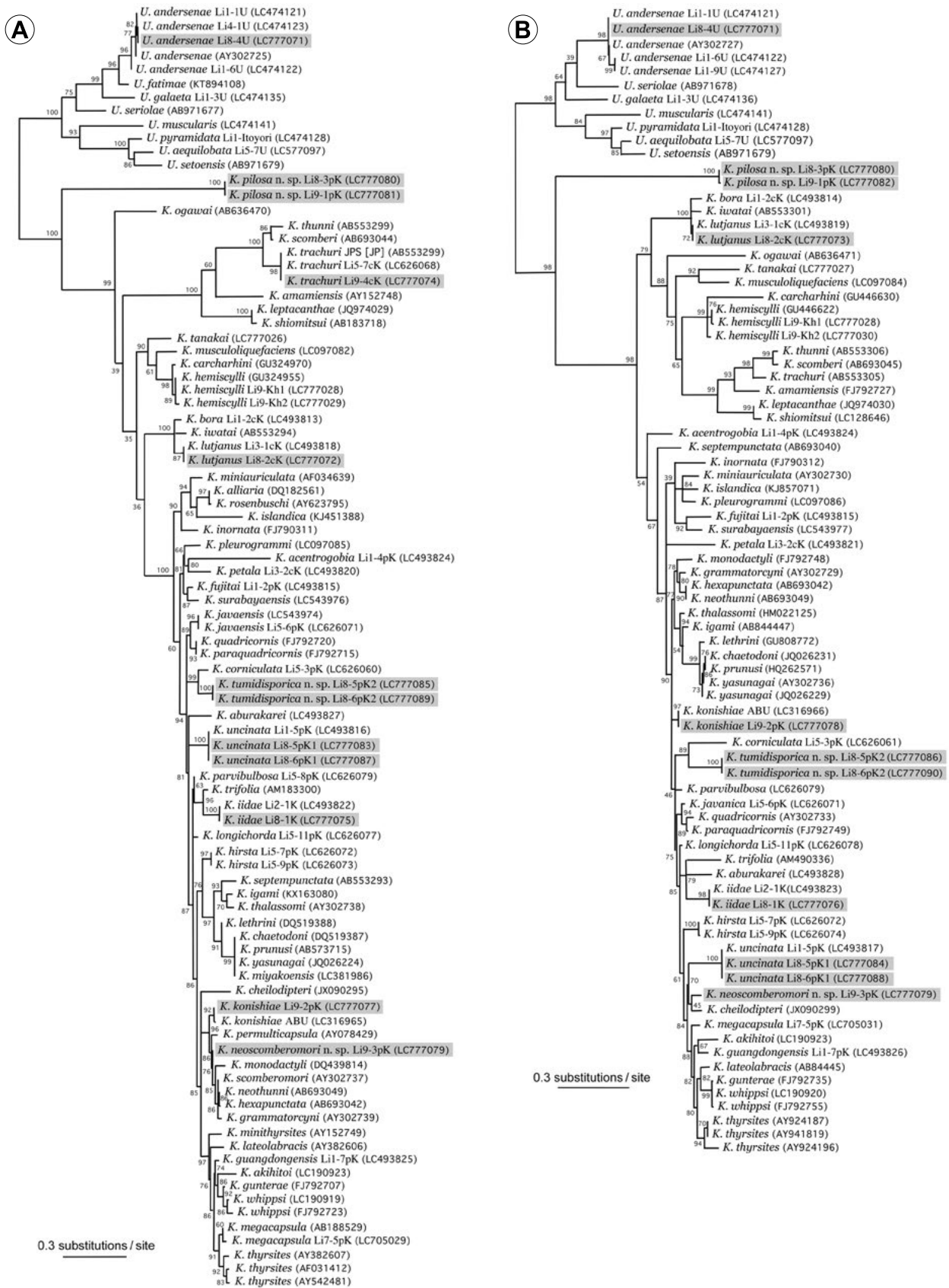
Supplementary Fig. S1. Stereomicroscopic view of cysts of *Kudoa trachuri* Matsukane, Sato, Tanaka, Kamata et Sugita-Konishi, 2011 in the trunk muscle of *Decapterus macarellus* (Cuvier). All photographs at the same magnification (scale bar = 1.0 mm).



Supplementary Fig. S2. Stereomicroscopic view of a plasmodium of *Kudoa iidae* Li, Inoue, Tanaka, Zhang et Sato, 2020 in the trunk muscle of *Dagetichthys lusitanicus* (de Brito Capello). An interval between grid lines is 5 mm.



Supplementary Fig. S3. Stereomicroscopic view of plasmodia of *Kudoa uncinata* Zhou et Zhao, 2008 (circled by red line) and *Kudoa tumidisporica* sp. n. (circled by yellow line) in the trunk muscle of *Photopectoralis bindus* (Valenciennes). An interval between grid lines is 5 mm.



Supplementary Fig. S4. Maximum likelihood phylogenetic tree based on the SSU (A; 1,372 characters, of which 402 were variable) and LSU rDNA (B; 472 characters, of which 232 are variable) sequences of multivalvulid myxosporeans of the genera *Unicapsula* Davis, 1924 and *Kudoa* Meglitsch, 1947. Each species name (for Chinese isolates along with isolate name) is followed by DDBJ/EMBL/GenBank accession number in parentheses. Sequences newly obtained in this study are marked with grey background.