

**Morphological and Molecular Characterization of Larval Trematodes Infecting in the Assassin Snail
Genus *Anentome* in Thailand**

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Supplementary Table S1: ITS2 and COI sequence data of larval trematodes obtained in this study and trematodes acquired from GenBank database for the phylogenetic analyses.

Family and species of trematodes	Stage	Host	Locality	GenBank accession number	
				ITS2	COI
Family Schistosomatidae					
<i>Schistosoma mansoni</i>	Adult	-	Puerto Rico	U22168	U22162
<i>Schistosoma intercalatum</i>	Adult	-	Cameroon	U22166	U22160
Family Echinostomatidae					
<i>Echinostoma caproni</i>	Adult	<i>Mastomys huberti</i>	Senegal	MK721181	MK732350
	Adult	<i>Mastomys huberti</i>	Senegal	MK721182	MK732351
	-	-	Cameroon	-	AF025830
<i>Echinostoma miyagawai</i>	Adult	Duck	Russia	MT577834	MT577588
	Adult	Duck	Russia	MT577835	MT577589
<i>Echinostoma mekongi</i>	Adult	<i>Homo sapiens</i>	Kratie, Cambodia	-	MT449682
	Metacercaria	<i>Filopaludina martensi cambodjensis</i>	Pursat, Cambodia	-	MW199181
	Adult	<i>Homo sapiens</i>	Kratie, Cambodia	MT409014	-
	Adult	<i>Homo sapiens</i>	Kratie, Cambodia	MT409016	-
<i>Echinostoma</i> sp. (This study)	Metacercaria	<i>Anentome helena</i>	Chom Thong, Chiang Mai, Thailand	MZ825159	MZ822063
	Metacercaria	<i>Anentome helena</i>	Chom Thong, Chiang Mai, Thailand	MZ825160	MZ822064
	Metacercaria	<i>Anentome wykoffi</i>	Aranyaprathet, Sa Kaeo, Thailand	MZ825161	MZ822065
	Metacercaria	<i>Anentome wykoffi</i>	Aranyaprathet, Sa Kaeo, Thailand	MZ825162	MZ822066
<i>Echinostoma paraensei</i>	-	-	Mexico	-	KT008005
	-	-	Brazil	-	AF025825
	Adult	<i>Nectomys squamipes</i>	Rio de Janeiro, Brazil	AF336233	-
	-	<i>Biomphalaria glabrata</i>	Belo Horizonte, Brazil	AF336234	-
<i>Echinostoma revolutum</i>	Adult	Domestic ducks	Mueang, Khon Kaen, Thailand	-	KP455611
	Adult	Domestic ducks	Ban Mi, Lop Buri,	-	KP455609

Family and species of trematodes	Stage	Host	Locality	GenBank accession number	
				ITS2	COI
			Thailand		
	Adult	-	Liuzhou, China	KM980474	-
	Adult	-	Liuzhou, China	KM980476	-
	Adult	<i>Gallus gallus</i>	Indiana, USA	GQ463128	GQ463009
	Adult	<i>Gallus gallus</i>	Indiana, USA	GQ463129	GQ463010
<i>Echinostoma trivolvis</i>	Rediae	<i>Helisoma trivolvis</i>	Indiana, USA	GQ463124	GQ463002
	Rediae	<i>Helisoma trivolvis</i>	Minnesota, USA	GQ463125	GQ463003
<i>Echinoparyphium</i> sp.	Rediae	<i>Lymnaea elodes</i>	Indiana, USA	GQ463136	GQ463039
	Rediae	<i>Lymnaea elodes</i>	Indiana, USA	GQ463137	GQ463040
<i>Hypoderaeum conoideum</i>	Adult	Domestic duck	Mueang, Khon Kaen, Thailand	MT127173	MT159471
	Adult	Domestic duck	Chum Phuang, Nakhon Ratchasima, Thailand	MT127172	MT159503
Family Heterophyidae					
<i>Centrocestus formosanus</i>	Metacercaria	<i>Anabas testudineus</i>	Thailand	-	KX399387
	Metacercaria	<i>Pentaprion longimanus</i>	Thailand	-	KX399388
<i>Haplorchis popelkai</i>	Adult	<i>Elseya dentata</i>	Northern Territory, Australia	EU883584	-
	Adult	<i>Emydura victoriae</i>	Northern Territory, Australia	EU883585	-
<i>Haplorchis pumilio</i>	Adult	<i>Vulpes vulpes</i>	Vietnam	JX532163	-
	Adult	<i>Vulpes vulpes</i>	Vietnam	JX532164	-
<i>Haplorchis taichui</i>	Adult	Hamster	Thailand	-	KU753577
	Adult	Hamster	Thailand	-	KU753578
<i>Haplorchoides daguilarensis</i>	Adult	<i>Neoarius graeffei</i>	Kipper Creek, Queensland, Australia	MG747500	-
<i>Haplorchoides maiwariensis</i>	Adult	<i>Neoarius graeffei</i>	Kipper Creek, Queensland, Australia	MG747502	-
<i>Metagonimus suisfunensis</i>	Adult	<i>Rattus norvegicus</i>	Russia	KX387492	MK736837

Family and species of trematodes	Stage	Host	Locality	GenBank accession number	
				ITS2	COI
	Adult	<i>Rattus norvegicus</i>	Russia	KX387493	MK736838
<i>Metagonimus takahashii</i>	Adult	<i>Mesocricetus auratus</i>	Japan	HQ832618	KM061407
	Adult	<i>Mesocricetus auratus</i>	Japan	HQ832619	KM061408
<i>Metagonimus yokogawai</i>	Adult	<i>Mesocricetus auratus</i>	Shizuoka, Japan	HQ832621	KM061412
	Adult	<i>Mesocricetus auratus</i>	Shizuoka, Japan	HQ832622	KM061414
<i>Pygidiopsis macrostomum</i>	Adult	<i>Mesocricetus auratus</i>	Brazil	-	MF967596
	Adult	<i>Mesocricetus auratus</i>	Brazil	-	MF967598
<i>Stellantchasmus falcatus</i>	Adult	Hamster	Thailand	-	KU753568
	Adult	Hamster	Thailand	-	KU753569
Heterophylid metacercaria (This study)	Metacercaria	<i>Anentome helena</i>	Mae Rim, Chiang Mai, Thailand	MZ825157	MZ822061
	Metacercaria	<i>Anentome helena</i>	Mae Rim, Chiang Mai, Thailand	MZ825158	MZ822062
Family Microphallidae					
<i>Atriophallophorus minutus</i>	-	-	-	-	MW025134
	-	-	-	-	MW025135
<i>Microphallus minutus</i>	Metacercaria	<i>Cherax dispar</i>	Moggill Creek, Queensland, Australia	KT355828	-
	Cercaria	<i>Posticobia brazieri</i>	Churchbank Weir, Queensland, Australia	KT355829	-
<i>Microphallus ochotensis</i>	Metacercaria	<i>Falsicingula kurilensis</i>	Skipper Creek, Sea of Okhotsk, Russia	MG783583	-
	Metacercaria	<i>Falsicingula kurilensis</i>	Skipper Creek, Sea of Okhotsk, Russia	MG783584	-
<i>Microphallus piriformes</i>	Metacercaria	<i>Littorina saxatilis</i>	Kandakaksha Bay, White Sea, Russia	-	MT103213
	Metacercaria	<i>Littorina obtusata</i>	Kandakaksha Bay,	-	MT103214

Family and species of trematodes	Stage	Host	Locality	GenBank accession number	
				ITS2	COI
			White Sea, Russia		
Family Opisthorchiidae					
<i>Apophallus donicus</i>	Metacercaria	<i>Perca fluviatilis</i>	Hungary	MF438067	-
	Metacercaria	<i>Perca fluviatilis</i>	Hungary	MF447672	-
<i>Apophallus muehlingi</i>	Adult	<i>Gallus gallus</i>	Hungary	MF438052	-
	Adult	<i>Gallus gallus</i>	Hungary	MF438053	-
<i>Clonorchis sinensis</i>	Adult	Cat	Guangdong, China	-	FJ965391
	Adult	Dog	Guangdong, China	-	FJ965392
<i>Cryptocotyle lingua</i>	Metacercaria	<i>Merlangius merlangus</i>	Channel, France	MW544136	MW542554
	Metacercaria	<i>Merlangius merlangus</i>	Channel, France	MW544135	MW542555
<i>Metorchis ussuriensis</i>	Adult	Duckling	Magdikovoe, Russia	KP222494	-
	Adult	Duckling	Magdikovoe, Russia	KP222495	-
<i>Opisthorchis lobatus</i>	Adult	<i>Mesocricetus auratus</i>	Laos, PDR	HQ328545	HQ328539
	Adult	<i>Mesocricetus auratus</i>	Laos, PDR	HQ328546	HQ328540
<i>Opisthorchis viverrini</i>	Adult	<i>Mesocricetus auratus</i>	Laos, PDR	HQ328548	HQ328542
	Adult	<i>Mesocricetus auratus</i>	Laos, PDR	HQ328549	HQ328543
Family Zoogonidae					
<i>Cercaria capricornia</i> XI	Cercaria	<i>Nassarius olivaceus</i>	Central Queensland, Australia	KJ188132	-
<i>Deretrema nahaense</i>	Adult	<i>Thalassoma janseni</i>	-	KJ188135	-
<i>Diptherostomum brusinae</i>	Metacercaria	<i>Cerastoderma edule</i>	Portugal	MN263044	-
<i>Diptherostomum flavum</i>	Adult	<i>Pinguipes brasilianus</i>	Patagonian coast, Argentina	KF483875	-
	Sporocyst	<i>Buccinanops deformis</i>	Patagonian coast, Argentina	KF358772	-
<i>Lecithostaphylus gibsoni</i>	Adult	<i>Abudefduf whitleyi</i>	-	KJ188133	-

Family and species of trematodes	Stage	Host	Locality	GenBank accession number	
				ITS2	COI
<i>Zoogonus lasius</i>	-	<i>Tritia obsoleta</i>	North Carolina, USA	-	MN272654
	-	<i>Tritia obsoleta</i>	Delaware, USA	-	MN272665
<i>Zoogonus rubellus</i>	Adult	<i>Diplodus sargus</i>	-	AJ241804	-
Zppgonid cercariae (This study)	Cercaria	<i>Anentome helena</i>	Mae Rim, Chiang Mai, Thailand	MZ825155	MZ822059
	Cercaria	<i>Anentome helena</i>	Mae Rim, Chiang Mai, Thailand	MZ825156	MZ822060

Supplementary Figure S1: The ML tree obtained from DNA sequence analysis of the ITS2 (715 bp). Numbers at the branches are: NJ bootstrap/ML bootstrap/BI posterior probability. Sequences in this study are highlighted in bold.



Supplementary Figure S2: The ML tree obtained from DNA sequence analysis of the COI (387 bp). Numbers at the branches are: NJ bootstrap/ML bootstrap/BI posterior probability. Sequences in this study are highlighted in bold.

