

Supplementary Material

Taxonomic revision of two species in the genus *Ptychorhynchus* Simpson, 1900 (Bivalvia: Unionidae: Gonideinae), with description of a new species

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Table S1. List of *COI* sequences used in this study, including the species, specimen codes, GenBank accession numbers, voucher specimen number and collecting locations.

Number	Species	Specimen code	Accession number	Voucher specimen number	Collecting locations
Ingroup					
1	<i>Nodularia douglasiae</i>		LC589172		
2	<i>Nodularia douglasiae</i>		LC518967		
3	<i>Nodularia douglasiae</i>		LC518968		
4	<i>Nodularia douglasiae</i>		LC518969		
5	<i>Nodularia douglasiae</i>		LC518970		
6	<i>Nodularia douglasiae</i>		MN495502		
7	<i>Nodularia douglasiae</i>		MN495513		
8	<i>Nodularia douglasiae</i>		MN495515		
9	<i>Nodularia douglasiae</i>		MN495516		
10	<i>Nodularia douglasiae</i>		MN495517		
11	<i>Nodularia douglasiae</i>		MN495519		
12	<i>Nodularia douglasiae</i>		MT020664		
13	<i>Nodularia douglasiae</i>		MT020669		
14	<i>Nodularia douglasiae</i>		MT020675		
15	<i>Nodularia douglasiae</i>		MT020676		
16	<i>Nodularia douglasiae</i>		MT020672		
17	<i>Nodularia douglasiae</i>		MH248376		
18	<i>Nodularia douglasiae</i>		MT020671		
19	<i>Nodularia douglasiae</i>		KX822653		
20	<i>Nodularia douglasiae</i>		MK574280		
21	<i>Nodularia douglasiae</i>		MK574281		
22	<i>Nodularia douglasiae</i>		MK574282		
23	<i>Nodularia douglasiae</i>		MK574283		
24	<i>Nodularia douglasiae</i>		MK574284		
25	<i>Nodularia douglasiae</i>		MK574285		
26	<i>Nodularia douglasiae</i>		MG210495		
27	<i>Nodularia douglasiae</i>		MG210496		
28	<i>Nodularia douglasiae</i>		MG210497		
29	<i>Nodularia douglasiae</i>		MG210498		
30	<i>Nodularia douglasiae</i>		MG210499		
31	<i>Nodularia douglasiae</i>		MG210500		
32	<i>Nodularia douglasiae</i>		MG210501		
33	<i>Nodularia douglasiae</i>		MG210502		
34	<i>Nodularia douglasiae</i>		MG210503		
35	<i>Nodularia douglasiae</i>		MG210504		
36	<i>Nodularia douglasiae</i>		MG210505		
37	<i>Nodularia douglasiae</i>		MG210506		
38	<i>Nodularia douglasiae</i>		MG210507		
39	<i>Nodularia douglasiae</i>		MG210508		
40	<i>Nodularia douglasiae</i>		MG210509		
41	<i>Nodularia douglasiae</i>		MG210510		
42	<i>Nodularia douglasiae</i>		MG210511		
43	<i>Nodularia douglasiae</i>		MG210514		
44	<i>Nodularia douglasiae</i>		MG210515		

Number	Species	Specimen code	Accession number	Voucher specimen number	Collecting locations
45	<i>Nodularia douglasiae</i>		MG210518		
46	<i>Nodularia douglasiae</i>		MG210519		
47	<i>Nodularia douglasiae</i>		MG210520		
48	<i>Nodularia douglasiae</i>		MG210521		
49	<i>Nodularia douglasiae</i>		MG210522		
50	<i>Nodularia douglasiae</i>		MG210523		
51	<i>Nodularia douglasiae</i>		MG210524		
52	<i>Nodularia douglasiae</i>		MG210525		
53	<i>Nodularia douglasiae</i>		MG210526		
54	<i>Nodularia douglasiae</i>		MG210528		
55	<i>Nodularia douglasiae</i>		MG210529		
56	<i>Nodularia douglasiae</i>		MG210530		
57	<i>Nodularia douglasiae</i>		MG210531		
58	<i>Nodularia douglasiae</i>		MG210533		
59	<i>Nodularia douglasiae</i>		MG210534		
60	<i>Nodularia douglasiae</i>		MG210537		
61	<i>Nodularia douglasiae</i>		MG210538		
62	<i>Nodularia douglasiae</i>		MG210540		
63	<i>Nodularia douglasiae</i>		MG210542		
64	<i>Nodularia douglasiae</i>		MG210543		
65	<i>Nodularia douglasiae</i>		MG210544		
66	<i>Nodularia douglasiae</i>		MG210546		
67	<i>Nodularia douglasiae</i>		MG210547		
68	<i>Nodularia douglasiae</i>		MG210549		
69	<i>Nodularia douglasiae</i>		MG210550		
70	<i>Nodularia douglasiae</i>		MG210551		
71	<i>Nodularia douglasiae</i>		MG210552		
72	<i>Nodularia douglasiae</i>		MG210553		
73	<i>Nodularia douglasiae</i>		MG210554		
74	<i>Nodularia douglasiae</i>		MG210555		
75	<i>Nodularia douglasiae</i>		MG210556		
76	<i>Nodularia douglasiae</i>		MG210557		
77	<i>Nodularia douglasiae</i>		MG210558		
78	<i>Nodularia douglasiae</i>		MG742243		
79	<i>Nodularia douglasiae</i>		KJ434521		
80	<i>Nodularia douglasiae</i>		KJ434522		
81	<i>Nodularia douglasiae</i>		MH822323		
82	<i>Nodularia douglasiae</i>		MH822324		
83	<i>Nodularia douglasiae</i>		MH822325		
84	<i>Nodularia douglasiae</i>		MH822328		
85	<i>Nodularia douglasiae</i>		MH822331		
86	<i>Nodularia douglasiae</i>		MH822332		
87	<i>Nodularia douglasiae</i>		MH822333		
88	<i>Nodularia douglasiae</i>		MH822334		
89	<i>Nodularia douglasiae</i>		MH822335		
90	<i>Nodularia douglasiae</i>		MH822336		
91	<i>Nodularia douglasiae</i>		MH822337		
92	<i>Nodularia douglasiae</i>		MH822338		

Number	Species	Specimen code	Accession number	Voucher specimen number	Collecting locations
93	<i>Nodularia douglasiae</i>		MH822339		
94	<i>Nodularia douglasiae</i>		MH822340		
95	<i>Nodularia douglasiae</i>		MH822341		
96	<i>Nodularia douglasiae</i>		MH822342		
97	<i>Nodularia douglasiae</i>		MH822345		
98	<i>Nodularia douglasiae</i>		MH822348		
99	<i>Nodularia douglasiae</i>		MH822351		
100	<i>Nodularia douglasiae</i>		MH822352		
101	<i>Nodularia douglasiae</i>		MH822353		
102	<i>Nodularia douglasiae</i>		MH822355		
103	<i>Nodularia douglasiae</i>		MH822356		
104	<i>Nodularia douglasiae</i>		MH822359		
105	<i>Nodularia douglasiae</i>		MH822363		
106	<i>Nodularia douglasiae</i>		MH822364		
107	<i>Nodularia douglasiae</i>		MH822347		
108	<i>Nodularia douglasiae</i>		MG463024		
109	<i>Nodularia douglasiae</i>		MG463025		
110	<i>Nodularia douglasiae</i>		MG463027		
111	<i>Nodularia douglasiae</i>		MG463028		
112	<i>Nodularia douglasiae</i>		MG463030		
113	<i>Nodularia douglasiae</i>		MG463031		
114	<i>Nodularia douglasiae</i>		MG463032		
115	<i>Nodularia douglasiae</i>		MG463033		
116	<i>Nodularia douglasiae</i>		MF975690		
117	<i>Nodularia douglasiae</i>		MF975688		
118	<i>Nodularia douglasiae</i>		MF975689		
119	<i>Nodularia douglasiae</i>		MF975692		
120	<i>Nodularia douglasiae</i>		MF975693		
121	<i>Nodularia douglasiae</i>		MF975694		
122	<i>Nodularia douglasiae</i>		MF975695		
123	<i>Nodularia douglasiae</i>		MF975696		
124	<i>Nodularia douglasiae</i>		MF975697		
125	<i>Nodularia douglasiae</i>		MF975698		
126	<i>Nodularia douglasiae</i>		GQ451862		
127	<i>Nodularia douglasiae</i>		GQ451863		
128	<i>Nodularia douglasiae</i>		KM657954		
129	<i>Nodularia douglasiae</i>		KT984763		
130	<i>Nodularia douglasiae</i>		KT984764		
131	<i>Nodularia douglasiae</i>		KT984765		
132	<i>Nodularia douglasiae</i>		KT984766		
133	<i>Nodularia douglasiae</i>		MW139306		
134	<i>Nodularia douglasiae</i>		MW139307		
135	<i>Nodularia douglasiae</i>		MW139308		
136	<i>Nodularia douglasiae</i>		MF314443		
137	<i>Nodularia douglasiae</i>		MN495498		
138	<i>Nodularia douglasiae</i>		MN495504		
139	<i>Nodularia douglasiae</i>		MN495518		
140	<i>Nodularia douglasiae</i>		MT020665		

Number	Species	Specimen code	Accession number	Voucher specimen number	Collecting locations
141	<i>Nodularia douglasiae</i>		MN495514		
142	<i>Nodularia douglasiae</i>		MN495500		
143	<i>Nodularia douglasiae</i>		MN495501		
144	<i>Nodularia douglasiae</i>		MG933728		
145	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_01	PP079426	SXNU_23051801	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
146	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_02	PP079427	SXNU_23051802	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
147	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_03	PP079428	SXNU_23051803	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
148	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_04	PP079429	SXNU_23051804	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
149	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_05	PP079430	SXNU_23051805	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
150	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_06	PP079431	SXNU_23051806	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
151	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_07	PP079432	SXNU_23051807	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
152	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_08	PP079433	SXNU_23051808	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
153	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_09	PP079434	SXNU_23051809	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
154	<i>Ptychorhynchus denserugata</i> syn. nov.	HN_10	PP079435	SXNU_23051810	Longtou River, Wanning city, Hainan Province (18.796216°N, 110.388793°E)
155	<i>Nodularia nipponensis</i>		LC518962		
156	<i>Nodularia nipponensis</i>		LC518963		
157	<i>Nodularia nipponensis</i>		LC518964		
158	<i>Nodularia nipponensis</i>		LC518965		
159	<i>Nodularia nipponensis</i>		LC518966		
160	<i>Nodularia nipponensis</i>		MF975691		
161	<i>Nodularia nipponensis</i>		LC496352		
162	<i>Nodularia nipponensis</i>		MT020673		
163	<i>Nodularia nipponensis</i>		MT020674		
164	<i>Nodularia nipponensis</i>		MT020677		
165	<i>Nodularia nipponensis</i>		MT020678		
166	<i>Nodularia nipponensis</i>		MT020679		
167	<i>Nodularia nipponensis</i>		MT020680		
168	<i>Nodularia nipponensis</i>		LC589171		
169	<i>Nodularia nipponensis</i>		MT020681		
170	<i>Nodularia breviconcha</i>		MN495522		
171	<i>Nodularia breviconcha</i>		MN495523		
172	<i>Nodularia breviconcha</i>		MN495524		
173	<i>Nodularia breviconcha</i>		MN495531		
174	<i>Nodularia breviconcha</i>		MN495525		
175	<i>Nodularia breviconcha</i>		MN495526		
176	<i>Nodularia breviconcha</i>		MN495532		
177	<i>Nodularia breviconcha</i>		MN495527		
178	<i>Nodularia breviconcha</i>		MN495528		

Number	Species	Specimen code	Accession number	Voucher specimen number	Collecting locations
179	<i>Nodularia breviconcha</i>		MN495529		
180	<i>Nodularia breviconcha</i>		MN495530		
181	<i>Nodularia breviconcha</i>		MN495533		
182	<i>Nodularia breviconcha</i>		MN495534		
183	<i>Nodularia breviconcha</i>		MN495535		
184	<i>Nodularia breviconcha</i>		MN495536		
185	<i>Nodularia breviconcha</i>		MN495537		
186	<i>Nodularia breviconcha</i>		MT020662		
187	<i>Nodularia breviconcha</i>		MT020663		
188	<i>Nodularia breviconcha</i>		MT020666		
189	<i>Nodularia breviconcha</i>		MT020667		
190	<i>Nodularia breviconcha</i>		MT020670		
191	<i>Nodularia breviconcha</i>		MT447062		
192	<i>Nodularia breviconcha</i>		GQ451864		
193	<i>Nodularia nuxpersicae</i>		KX822654		
194	<i>Cosmopseudodon wenshanensis</i> sp. nov.	Y1_YN	PP079444	SXNU_22121401	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
195	<i>Cosmopseudodon wenshanensis</i> sp. nov.	Y2_YN	PP079445	SXNU_22121402	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
196	<i>Cosmopseudodon wenshanensis</i> sp. nov.	Y3_YN	PP079446	SXNU_22121403	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
197	<i>Cosmopseudodon wenshanensis</i> sp. nov.	HH_01	PP079447	SXNU_23032101	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
198	<i>Cosmopseudodon wenshanensis</i> sp. nov.	HH_02	PP079448	SXNU_23032102	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
199	<i>Cosmopseudodon wenshanensis</i> sp. nov.	HH_03	PP079449	SXNU_23032103	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
200	<i>Cosmopseudodon wenshanensis</i> sp. nov.	HH_04	PP079450	SXNU_23032104	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
201	<i>Cosmopseudodon wenshanensis</i> sp. nov.	HH_05	PP079451	SXNU_23032105	Panlong River at Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province (23.4059°N, 104.2225°E)
202	<i>Cosmopseudodon resupinatus</i> stat. rev.	1_GXGL	PP079436	SXNU_22121101	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
203	<i>Cosmopseudodon resupinatus</i> stat. rev.	2_GXGL	PP079437	SXNU_22121102	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
204	<i>Cosmopseudodon resupinatus</i> stat. rev.	3_GXGL	PP079438	SXNU_22121103	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
205	<i>Cosmopseudodon resupinatus</i> stat. rev.	4_GXGL	PP079439	SXNU_22121104	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
206	<i>Cosmopseudodon resupinatus</i> stat. rev.	5_GXGL	PP079440	SXNU_22121105	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
207	<i>Cosmopseudodon resupinatus</i> stat. rev.	GG_03	PP079441	SXNU_23032503	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
208	<i>Cosmopseudodon resupinatus</i> stat. rev.	GG_04	PP079442	SXNU_23032504	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
209	<i>Cosmopseudodon resupinatus</i> stat. rev.	GG_06	PP079443	SXNU_23032506	Taohua River, Guilin City, Guangxi Province (25.29°N, 110.28°E)
210	<i>Ptychorhynchus pfisteri</i>		MG933729		

Number	Species	Specimen code	Accession number	Voucher specimen number	Collecting locations
211	<i>Ptychorhynchus pfisteri</i>		MG933730		
212	<i>Ptychorhynchus pfisteri</i>		MG463034		
213	<i>Ptychorhynchus pfisteri</i>		MG463035		
214	<i>Ptychorhynchus pfisteri</i>		MG463036		
215	<i>Ptychorhynchus pfisteri</i>		MG742247		
216	<i>Ptychorhynchus pfisteri</i>	XJ_01	PP079452	SXNU_22110401	Jinjiang River, Hunan Province (28.235193°N, 112.931420°E)
217	<i>Ptychorhynchus pfisteri</i>	XJ_05	PP079453	SXNU_22111505	Jinjiang River, Hunan Province (28.235193°N, 112.931420°E)
218	<i>Ptychorhynchus pfisteri</i>	XJ_06	PP079454	SXNU_22111506	Jinjiang River, Hunan Province (28.235193°N, 112.931420°E)
219	<i>Ptychorhynchus pfisteri</i>	XJ_07	PP079455	SXNU_22111507	Jinjiang River, Hunan Province (28.235193°N, 112.931420°E)
220	<i>Postolata guangxiensis</i>		OP009379		
221	<i>Postolata guangxiensis</i>		OP009380		
222	<i>Postolata guangxiensis</i>		OP009381		
223	<i>Postolata guangxiensis</i>		OP009382		
224	<i>Postolata guangxiensis</i>		OP009383		
225	<i>Postolata guangxiensis</i>		OP009384		
226	<i>Postolata guangxiensis</i>		OP009385		
227	<i>Obovalis omiensis</i>		LC518995		
228	<i>Obovalis omiensis</i>		LC518996		
229	<i>Obovalis omiensis</i>		LC518997		
230	<i>Obovalis omiensis</i>		MT020684		
outgroup					
	<i>Pseudodon inoscularis</i>		OQ836331		
	<i>Pseudodon mekongi</i>		KX865861		
	<i>Pseudodon vondembuschianus</i>		KP795029		

The red colour indicates the species and sequences from this study.

Table S2. Sequences from the five-gene dataset used for molecular analyses and corresponding GenBank numbers.

Family	Subfamily	Tribe	Taxa	COI	ND1	16S	18S	28S	Specimen code
Unionidae	Gonideinae	Gonideini	<i>Cosmopseudodon resupinatus</i> stat. rev. 1	PP079436	PP078619	PP079964	PP079984	PP080006	1_GXGL
			<i>Cosmopseudodon resupinatus</i> stat. rev. 2	PP079437	PP078620	PP079965	PP079985	PP080007	2_GXGL
			<i>Cosmopseudodon resupinatus</i> stat. rev. 3	PP079438	PP078621	PP079966	PP079986	PP080008	3_GXGL
			<i>Cosmopseudodon resupinatus</i> stat. rev. 4	PP079439	PP078622	PP079967	PP079987	PP080009	4_GXGL
			<i>Cosmopseudodon resupinatus</i> stat. rev. 5	PP079440	PP078623	PP079968	PP079988	PP080010	5_GXGL
			<i>Cosmopseudodon resupinatus</i> stat. rev. 6	PP079441	PP078624	PP079969	PP079989	PP080011	GG_03
			<i>Cosmopseudodon resupinatus</i> stat. rev. 7	PP079442	PP078625	PP079970	PP079990	PP080012	GG_04
			<i>Cosmopseudodon resupinatus</i> stat. rev. 8	PP079443	PP078626	PP079971	PP079991	PP080013	GG_06
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 1	PP079444	PP078627	PP079972	PP079992	PP080014	Y1_YN
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 2	PP079445	PP078628	PP079973	PP079993	PP080015	Y2_YN
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 3	PP079446	PP078629	PP079974	PP079994	PP080016	Y3_YN
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 4	PP079447	PP078630	PP079975	PP079995	PP080017	HH_01
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 5	PP079448	PP078631	PP079976	PP079996	PP080018	HH_02
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 6	PP079449	PP078632	PP079977	PP079997	PP080019	HH_03
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 7	PP079450	PP078633	PP079978	PP079998	PP080020	HH_04
			<i>Cosmopseudodon wenshanensis</i> sp. nov. 8	PP079451	PP078634	PP079979	PP079999	PP080021	HH_05
			<i>Ptychorhynchus pfisteri</i> 1	PP079452	PP078635	PP079980	PP080000	PP080022	XJ_01
			<i>Ptychorhynchus pfisteri</i> 2	PP079453	PP078636	PP079981	PP080001	PP080023	XJ_05
			<i>Ptychorhynchus pfisteri</i> 3	PP079454	PP078637	PP079982	PP080002	PP080024	XJ_06
			<i>Ptychorhynchus pfisteri</i> 4	PP079455	PP078638	PP079983	PP080003	PP080025	XJ_07
			<i>Ptychorhynchus pfisteri</i> 5	MG463034	MG933788	KY067440	OR826146	MG595562	
			<i>Ptychorhynchus pfisteri</i> 6	MG463035	MG933787	KY067440	PP080004	MG595563	
			<i>Ptychorhynchus pfisteri</i> 7	MG463036	MG742277	KY067440	PP080004	MG595564	
			<i>Obovalis omiensis</i> 1	MT020684	n/a	LC223994	n/a	MT020830	
			<i>Obovalis omiensis</i> 2	LC518995	n/a	LC223994	n/a	LC519064	
			<i>Obovalis omiensis</i> 3	LC518996	n/a	LC223995	n/a	LC519064	
			<i>Obovalis omiensis</i> 4	LC518997	n/a	LC519045	n/a	LC519065	
			<i>Postolata guangxiensis</i> 1	OP009379	PP078639	OP020466	OR826148	OP020470	
			<i>Postolata guangxiensis</i> 2	OP009380	PP078640	OP020467	OR826148	OP020470	
			<i>Postolata guangxiensis</i> 3	OP009381	NC_072970	OP020468	OR826148	OP020470	
			<i>Postolata guangxiensis</i> 4	OP009382	NC_072970	OP020469	OR826148	OP020471	
			<i>Postolata guangxiensis</i> 5	OP009383	NC_072970	OP020467	PP080005	OP020472	
			<i>Postolata guangxiensis</i> 6	OP009384	NC_072970	OP020468	PP080005	OP020470	
			<i>Postolata guangxiensis</i> 7	OP009385	NC_072970	OP020469	PP080005	OP020471	
			<i>Parvasolenia rivularis</i>	KX966393	KJ434587	KX966393	OR826147	MG595632	
			<i>Koreosolenia sityensis</i>	GQ451872	OR842385	GQ451859	OR826145	MT020817	
			<i>Sinosolenia carinata</i>	KX822669	MG933804	MK683025	MK683000	KX822626	
			<i>Gonidea angulata</i>	DQ272371	MZ695078	KF011258	MZ684047	AF400691	
			<i>Microcondylaea bonellii</i>	KX822652	MK994772	KP218021	MZ684056	KX822609	
			<i>Bineurus loeiensis</i>	KX865879	MZ695073	KX865650	MZ684042	KX865750	
			<i>Bineurus anodontinum</i>	MW603662	MZ695074	MZ684076	MZ684043	MZ684018	
			<i>Thaiconcha callifera</i>	KX865862	MZ695090	KX865633	MZ684070	KX865734	
			<i>Pseudodon mekongi</i>	KX865861	MZ695083	KX865632	MZ684057	KX865733	
			<i>Pseudodon vondembuschianus</i>	KP795029	MK994774	KP795052	MZ684058	MZ684028	
			<i>Pilsbryconcha exilis</i>	KX051291	MZ695084	KX865646	MZ684061	KX822613	
			<i>Indopseudodon kayinensis</i>	MZ678754	MZ695086	MZ684081	MZ684065	MZ684033	
<i>Indopseudodon bogani</i>	MF352218	MZ695085	MF352292	MZ684064	MF352350				

Family	Subfamily	Tribe	Taxa	COI	ND1	16S	18S	28S	Specimen code
		Schepmaniini	<i>Schepmania</i> sp. 5973	MZ678755	MZ695087	MZ684082	MZ684067	MZ684035	
			<i>Schepmania</i> sp. 5974	MZ678756	MZ695088	MZ684083	MZ684068	MZ684036	
		Lamprotulini	<i>Lamprotula caveata</i>	KX822646	KX060991	NC_030336	MK682986	KX822603	
			<i>Lamprotula leaii</i>	NC_023346	JQ691662	NC_023346	MF072524	MG595524	
			<i>Potomida littoralis</i>	JN243905	KF011251	NC_030073	KU763289	JN243883	
		Contradentini	<i>Yaukthwa inlenensis</i>	KX865927	MZ695094	KX865681	MZ684073	KX865798	
			<i>Yaukthwa paiensis</i>	MH345972	MZ695093	MH346012	MZ684074	MH345992	
			<i>Yaukthwa elongatula</i>	MK372408	MZ695092	MK372456	MZ684072	MK372486	
			<i>Lens contradens</i>	MG581991	MW242812	MT993693	MZ684053	MT993745	
			<i>Lens eximius</i>	KX865941	MZ695075	KX865689	MZ684054	KX865812	
			<i>Physunio superbus</i>	MG582020	MW242814	MT993689	MZ684059	MT993741	
			<i>Trapezoideus foliaceus</i>	MH345985	MZ695091	MH346025	MZ684071	MH346005	
		Rectidentini	<i>Hyriopsis bialata</i>	KX051274	MW242816	MT993644	MZ684048	MT993697	
			<i>Hyriopsis desowitzi</i>	KX822644	MG025706	MT993679	MZ684049	KX822601	
			<i>Rectidens sumatrensis</i>	KX051314	MW242818	MW242818	MZ684066	KX822620	
			<i>Ensidens sagittarius</i>	KX865950	MG025721	KX865696	MZ684046	KX865821	
		Ctenodesmini	<i>Khairuloconcha lunbawangorum</i>	MN900790	MZ695080	MZ684078	MZ684050	MN902294	
			<i>Khairuloconcha sahanae</i>	MZ678752	MZ695081	MZ684079	MZ684051	MZ684024	
		Chamberlainiini	<i>Chamberlainia somsakpanhai</i>	KX822635	MK994770	MK994770	MZ684044	KX822592	
Margaritiferidae			<i>Margaritifera daturica</i>	KJ161516	KF514426	KJ943526	AY579091	KT343747	
			<i>Margaritifera margaritifera</i>	KX550089	EF446105	KX550091	AY579103	/	

The red colour indicates the species and sequences from this study.

Table S3. Sequences from complete mt genome used for molecular analyses and corresponding GenBank numbers.

Family	Subfamily	Tribe	Taxa	Accession Number		
Unionidae	Gonideinae	Gonideini	<i>Cosmopseudodon resupinatus</i> stat. rev.	PP073372	1_GXGL	
			<i>Cosmopseudodon wenshanensis</i> sp. nov.	PP073373	Y1_YN	
			<i>Postolata guangxiensis</i>	NC_072970	OP009366	
			<i>Ptychorhynchus pfisteri</i>	KY067440		
			<i>Parvasolenaia rivularis</i>	NC_039839	KX966393	
			<i>Sinosolenaia carinata</i>	NC_023250	KC848654	
			<i>Sinosolenaia oleivora</i>	NC_022701	KF296320	
			<i>Sinosolenaia iridinea</i>	MT477834		
			<i>Microcondylaea bonellii</i>	NC_044111	MK994772	
			Pseudodontini	<i>Pseudodon vondembuschianus</i>	NC_044112	MK994774
		<i>Pilsbryoconcha exilis</i>		NC_044124	MK994776	
		Lamprotulini	<i>Lamprotula caveata</i>	NC_030336	KX060991	
			<i>Lamprotula leaii</i>	NC_023346	JQ691662	
			<i>Lamprotula cornuumlunae</i>	MK728822		
			<i>Potomida littoralis</i>	NC_030073	KT247374	
		Contradentini	<i>Pronodularia japonensis</i>	AB055625		
			<i>Lens contradens</i>	MW242812		
		Rectidentini	<i>Physunio superbus</i>	MW242814		
			<i>Hyriopsis bialata</i>	MW242816		
		Chamberlainiini	<i>Rectidens sumatrensis</i>	MW242818		
			<i>Sinohyriopsis cumingii</i>	NC_011763	FJ529186	
		Unioninae	Nodulariini	<i>Sinohyriopsis schlegelii</i>	NC_015110	HQ641406
				<i>Chamberlainia somsakpanhai</i>	MK994770	
				<i>Ptychorhynchus denserugata</i> syn. nov.	PP073374	HN_01
				<i>Cuneopsis heudei</i>	NC_042471	MH919389
				<i>Schistodesmus lampreyanus</i>	NC_042470	MH919388
				<i>Tchangsiniaia piscicula</i>	NC_026306	KP273584
				<i>Nodularia breviconcha</i>	MT955592	
				<i>Nodularia douglasiae</i>	KM657954	
				<i>Pseudocuneopsis sichuanensis</i>	NC_066661	MZ571510
				<i>Unio tumidus</i>	KY021076	
		Unionini	<i>Alasmidonta varicosa</i>	NC_038155	MG938673	
			<i>Anodontini</i>	<i>Utterbackia imbecillis</i>	NC_015479	HM856637
		Cristariini	<i>Anodonta cygnea</i>	NC_036488	MG385135	
			<i>Anemina arcaeformis</i>	NC_026674	KF667530	
		Parreysiinae	Ambleminae	<i>Sinanodonta lucida</i>	NC_026673	KF667529
				<i>Beringiana fukuharai</i>	LC592410	
	<i>Cristaria plicata</i>			KM233451		
	<i>Aculamprotulina</i>			<i>Aculamprotula tortuosa</i>	NC_021404	KC109779
	<i>Lanceolariini</i>			<i>Lanceolaria lanceolata</i>	NC_023955	KJ144818
	<i>Lepidodesmini</i>			<i>Lepidodesma languilati</i>	NC_029491	KT381195
	<i>Lamellidentini</i>			<i>Lamellidens marginalis</i>	NC_062877	MT230549
<i>Lampsilini</i>	<i>Lampsilis cardium</i>			BK010478		
<i>Venustaconcha ellipsiformis</i>	FJ809753					
<i>Leaunio lienosus</i>	BK010479					
Popenaiadini	<i>Potamilus alatus</i>	KU559011				
	<i>Toxolasma parvum</i>	NC_015483	HM856639			
Pleurobemini	<i>Popenaias popeii</i>	NC_050058	MT648776			
	<i>Elliptio complanata</i>	BK010477				
Quadrulini	<i>Pleurobema oviforme</i>	NC_050057	MT648775			
	<i>Quadrula quadrula</i>	NC_013658	FJ809750			
Margaritiferidae	Margaritiferinae	<i>Uniomerus tetralasmus</i>	BK010480			
		<i>Margaritifera dahurica</i>	NC_023942	KF514426		
		<i>Margaritifera margaritifera</i>	KY996745			

The red colour indicates the species and sequences from this study.

Table S4. Partitioning schemes and best-fit models identified from PartitionFinder and ModelFinder for five-locus dataset.

Best model	Partition names
ModelFinder for ML analysis	
TIM3+F+I+G4	COI_NT_removed_chars_gb
TPM3+F+I+G4	ND1_gb
TIM2+F+I+G4	16S_mafft_gb
TPM2+F+G4	28S_mafft_gb
K2P+I	18S_mafft_gb
PartitionFinder for BI analysis	
GTR+I+G	COI_NT_removed_chars_gb_codon1
GTR+I	COI_NT_removed_chars_gb_codon2
GTR+G	COI_NT_removed_chars_gb_codon3
GTR+I+G	nad1_NT_removed_chars_gb_codon1
GTR+I+G	nad1_NT_removed_chars_gb_codon2
GTR+I+G	nad1_NT_removed_chars_gb_codon3
GTR+I+G	16S_mafft_gb
GTR+I+G	28S_mafft_gb
HKY+I+G	18S_mafft_gb

Table S5. Partitioning schemes and best-fit models identified from PartitionFinder and ModelFinder for mt DNA datasets.

ModelFinder for ML analysis	
Best Model	Partition names
HKY+F+I+G4	atp6_NT_removed_chars_gb_condon_1
TVM+F+I+G4	atp6_NT_removed_chars_gb_condon_2
TIM+F+G4	atp6_NT_removed_chars_gb_condon_3
TN+F+I+G4	cox1_NT_removed_chars_gb_condon_1
TVM+F+I+G4	cox1_NT_removed_chars_gb_condon_2
TIM2+F+G4	cox1_NT_removed_chars_gb_condon_3
HKY+F+G4	cox2_NT_removed_chars_gb_condon_1
TVM+F+I+G4	cox2_NT_removed_chars_gb_condon_2
K3Pu+F+I+G4	cox2_NT_removed_chars_gb_condon_3
K3Pu+F+I+G4	cox3_NT_removed_chars_gb_condon_1
TVM+F+I+G4	cox3_NT_removed_chars_gb_condon_2
HKY+F+I+G4	cox3_NT_removed_chars_gb_condon_3
TIM2e+I+G4	cytb_NT_removed_chars_gb_condon_1
TVM+F+I+G4	cytb_NT_removed_chars_gb_condon_2
TN+F+G4	cytb_NT_removed_chars_gb_condon_3
TIM2e+I+G4	nad1_NT_removed_chars_gb_condon_1
GTR+F+I+G4	nad1_NT_removed_chars_gb_condon_2
TIM3+F+I+G4	nad1_NT_removed_chars_gb_condon_3
TN+F+I+G4	nad2_NT_removed_chars_gb_condon_1
GTR+F+I+G4	nad2_NT_removed_chars_gb_condon_2
TIM2+F+I+G4	nad2_NT_removed_chars_gb_condon_3
TPM2u+F+I+G4	nad3_NT_removed_chars_gb_condon_1
TPM2u+F+I+G4	nad3_NT_removed_chars_gb_condon_2
TIM2+F+I+G4	nad3_NT_removed_chars_gb_condon_3
TPM3u+F+I+G4	nad4L_NT_removed_chars_gb_condon_1
TIM3+F+G4	nad4L_NT_removed_chars_gb_condon_2
HKY+F+I+G4	nad4L_NT_removed_chars_gb_condon_3
TPM2u+F+I+G4	nad4_NT_removed_chars_gb_condon_1
GTR+F+I+G4	nad4_NT_removed_chars_gb_condon_2
TIM3+F+G4	nad4_NT_removed_chars_gb_condon_3
TIM2+F+I+G4	nad5_NT_removed_chars_gb_condon_1
GTR+F+I+G4	nad5_NT_removed_chars_gb_condon_2
TIM3+F+G4	nad5_NT_removed_chars_gb_condon_3
HKY+F+I+G4	nad6_NT_removed_chars_gb_condon_1
TVM+F+I+G4	nad6_NT_removed_chars_gb_condon_2
TIM2+F+ASC+G4	nad6_NT_removed_chars_gb_condon_3
TIM2+F+I+G4	rrnS_mafft_gb
TIM2+F+I+G4	rrnL_mafft_gb

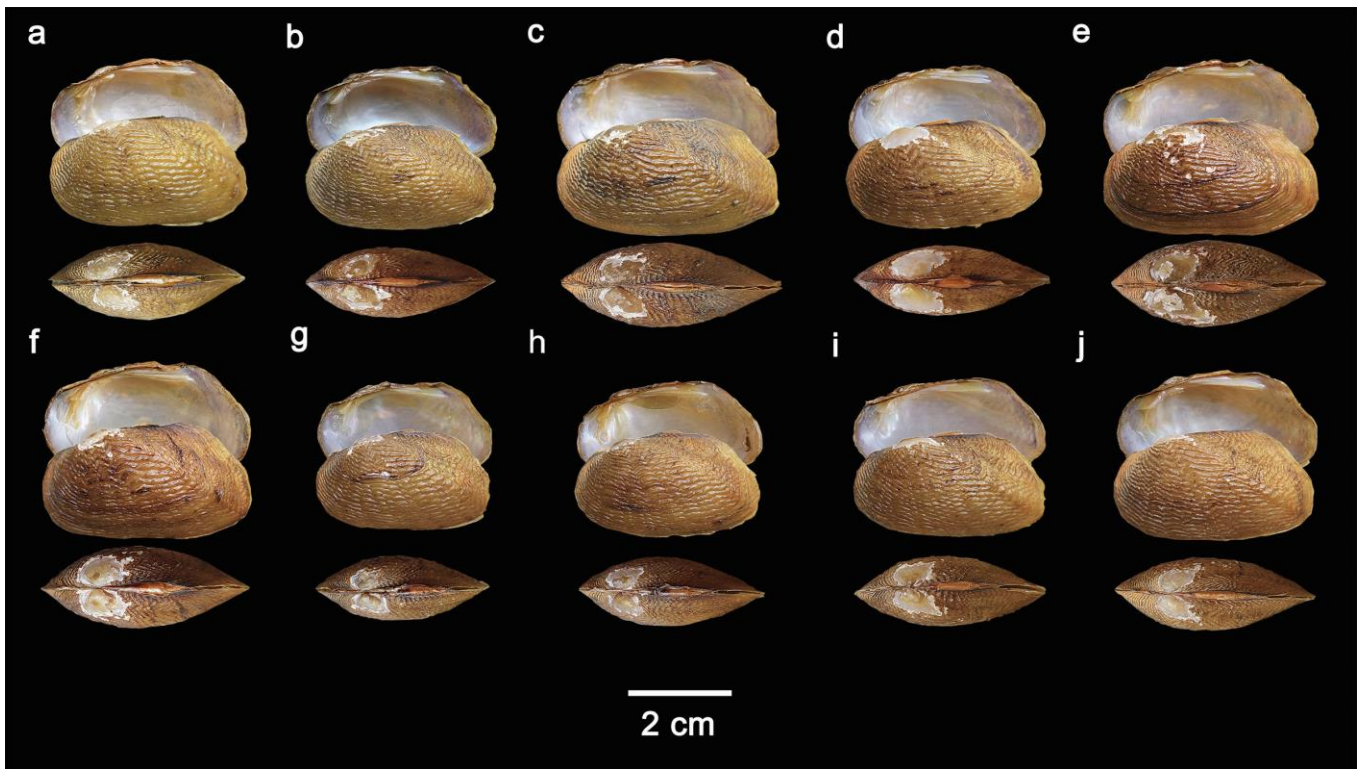


Figure S1. Shells of *Ptychorhynchus denserugata* **syn. nov.** [= *Nodularia douglasiae*]. (a-j) SXNU_23051801 - SXNU_23051810.

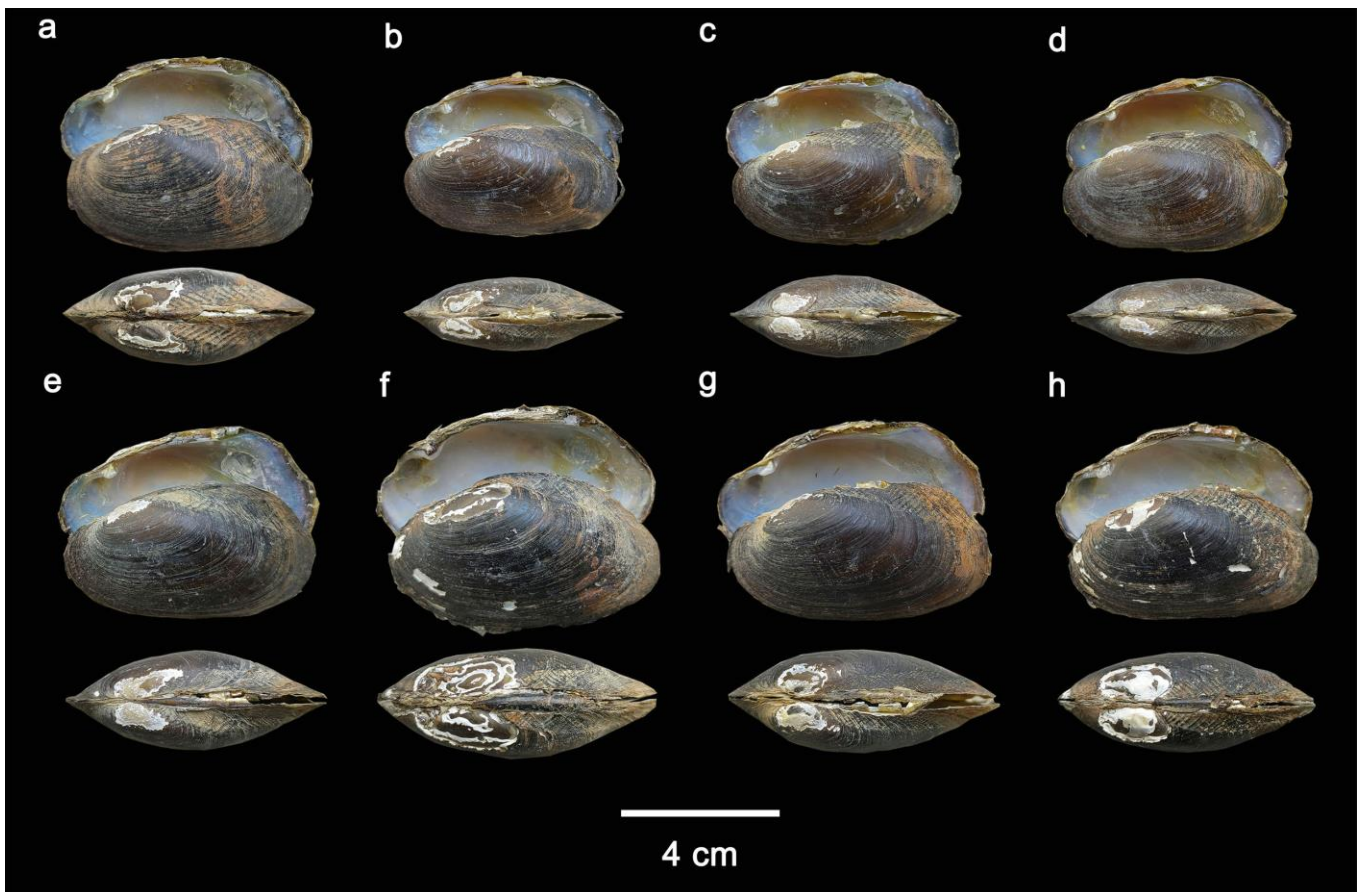


Figure S2. Shells of *Cosmopseudodon resupinatus* **stat. rev.** (a-h) SXNU_22121101 - SXNU_22121105, SXNU_23032503 - SXNU_23032504, SXNU_23032506.

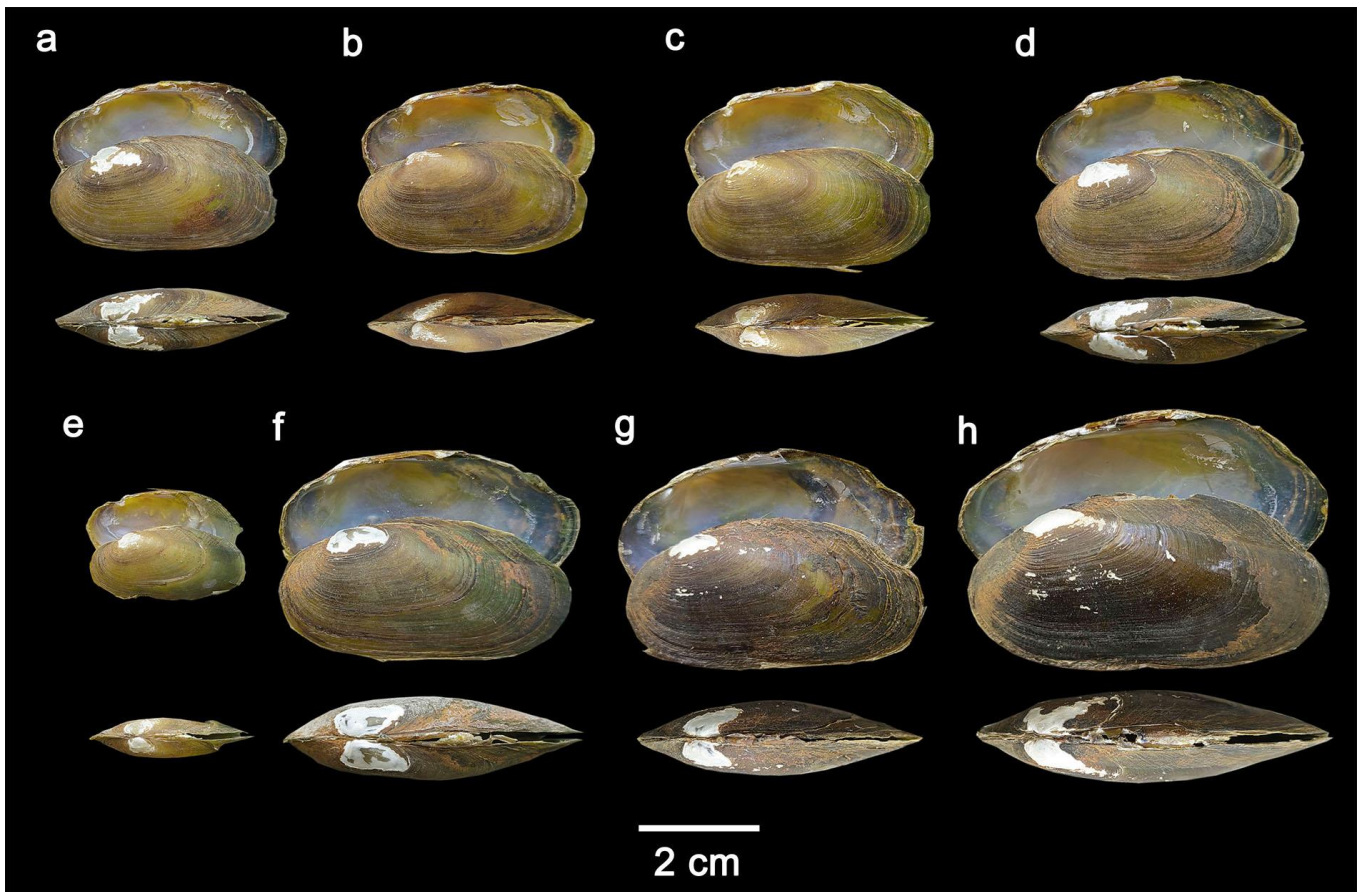


Figure S3. Shells of *Cosmopseudodon wenshanensis* sp. nov. (a) SXNU_22121403; (b) SXNU_23101004; (c) SXNU_23101003; (d) SXNU_23032102; (e) SXNU_22121402; (f) holotype - SXNU_23032101; (g) SXNU_23101002; (h) SXNU_23101005.

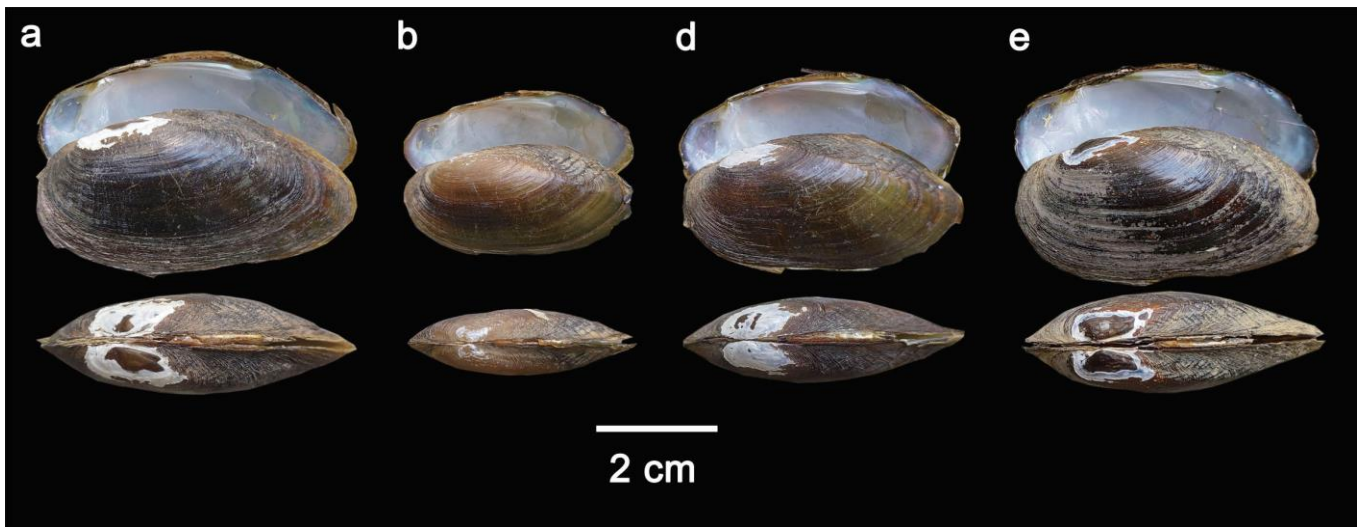


Figure S4. Shells of *Ptychorhynchus pfisteri*. (a) SXNU_22110401; (b) SXNU_22111505, (c) SXNU_22111506, (d) SXNU_22111507.