

# Supporting Information

Ohara et al. 10.1073/pnas.1112005109

**Table S1.** List of operational taxonomic units (OTUs) to reconstruct the phylogenetic tree of vesicomyid clams (Fig. 5B)

Species name in the DNA Data Bank of Japan	Genus name by (5)	Accession No.	Locality	Depth (m)	Habitat Type	Reference
Vesicomyid clam	Abyssogena	AB629938	Shinkai Seep Field, Mariana Trench	5,550–5,861	seep	Present study
Vesicomyid clam	Abyssogena	AB629939	Shinkai Seep Field, Mariana Trench	5,550–5,861	seep	Present study
Vesicomyid clam	Abyssogena	AB629940	Shinkai Seep Field, Mariana Trench	5,550–5,861	seep	Present study
<i>Calyptogena</i> sp	Abyssogena	AF114401	Logatchev Field, Mid-Atlantic Ridge	3,038	vent	(8)
<i>Calyptogena</i> sp	Abyssogena	AF114402	Logatchev Field, Mid-Atlantic Ridge	3,038	vent	(8)
<i>Calyptogena</i> sp	Abyssogena	AF114403	Logatchev Field, Mid-Atlantic Ridge	3,038	vent	(8)
<i>Calyptogena</i> sp	Abyssogena	AF114404	Logatchev Field, Mid-Atlantic Ridge	3,038	vent	(8)
<i>Calyptogena</i> sp	Abyssogena	AF114405	Logatchev Field, Mid-Atlantic Ridge	3,038	vent	(8)
<i>Vesicomya</i> sp	Abyssogena	EU403471	Logatchev Field, Mid-Atlantic Ridge	3,028	vent	(9)
<i>Calyptogena</i> sp	Abyssogena	AF008279	Barbados Accretionary Prism	5,000	seep	(7)
<i>Calyptogena</i> sp	Abyssogena	AF008280	West Florida Escarpment	3,313	seep	(7)
<i>Calyptogena</i> sp	Abyssogena	AF008281	West Florida Escarpment	3,313	seep	(7)
<i>Calyptogena</i> sp	Abyssogena	AB110774	Ryukyu Trench	5,900	seep	(3)
<i>Calyptogena</i> sp	Abyssogena	AB110775	Ryukyu Trench	5,900	seep	(3)
<i>C. kaikoi</i>	Abyssogena	AB110760	Dai-san Tenryu Canyon, Nankai Trough	3,800	seep	(3)
<i>C. kaikoi</i>	Abyssogena	AB110761	Dai-san Tenryu Canyon, Nankai Trough	3,800	seep	(3)
<i>C. kaikoi</i>	Abyssogena	AB110762	Dai-san Tenryu Canyon, Nankai Trough	3,800	seep	(3)
<i>C. kaikoi</i>	Abyssogena	AB110763	Off Muroto, Nankai Trough	4,800	seep	(3)
<i>C. phaseoliformis</i>	Abyssogena	AF114398	Edge Site, Aleutian Trench	4,947	seep	(8)
<i>C. phaseoliformis</i>	Abyssogena	AF114399	Shumagin Site, Aleutian Trench	3,550	seep	(8)
<i>C. phaseoliformis</i>	Abyssogena	AF114400	Shumagin Site, Aleutian Trench	3,550	seep	(8)
<i>C. phaseoliformis</i>	Abyssogena	AF008282	Japan Trench	6,370	seep	(7)
<i>C. phaseoliformis</i>	Abyssogena	AF008283	Japan Trench	6,370	seep	(7)
<i>C. phaseoliformis</i>	Abyssogena	AF008284	Japan Trench	6,370	seep	(7)
<i>C. phaseoliformis</i>	Abyssogena	AB110764	Kuril Trench	4,700–6,200	seep	(3)
<i>C. phaseoliformis</i>	Abyssogena	AB110765	Kuril Trench	4,700–6,200	seep	(3)
<i>C. phaseoliformis</i>	Abyssogena	AB479088	Kuril Trench	4,819	seep	(6)
<i>C. pacifica</i>	Calyptogena	AY143290	Heceta Bank, Oregon	500	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143291	Heceta Bank, Oregon	500	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143292	Eel River, California	512	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143293	Eel River, California	512	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143294	Eel River, California	512	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143295	Eel River, California	512	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143296	Clam Field, Monterey Bay, California	912	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143297	Clam Field, Monterey Bay, California	912	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143298	Clam Field, Monterey Bay, California	912	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143299	Clam Field, Monterey Bay, California	912	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143300	Mt. Crushmore, Monterey Bay, California	650	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143301	Mt. Crushmore, Monterey Bay, California	650	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143302	Mt. Crushmore, Monterey Bay, California	650	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143303	Mt. Crushmore, Monterey Bay, California	650	seep	(2)
<i>C. pacifica</i>	Calyptogena	AY143304	Invert Cliff, Monterey Bay, California	1,000	seep	(2)
<i>C. pacifica</i>	Calyptogena	AF114393	Monterey Canyon	635	seep	(8)
<i>C. pacifica</i>	Calyptogena	AF114394	Monterey Canyon	600	seep	(8)
<i>C. pacifica</i>	Calyptogena	AF008287	Monterey Canyon	600	seep	(7)
<i>C. elongata</i>	Ectenagena	AF008273	Santa Barbara Channel	500	seep	(7)
<i>C. elongata</i>	Ectenagena	AF008274	Santa Barbara Channel	500	seep	(7)
<i>C. elongata</i>	Ectenagena	AF008275	Santa Barbara Channel	500	seep	(7)
<i>C. elongata</i>	Ectenagena	AF008276	Santa Barbara Channel	500	seep	(7)
<i>Vesicomya gigas</i>	Archivesica	AF141296	Santa Catalina Basin	1,240	whale carcass	(1)
<i>Vesicomya gigas</i>	Archivesica	AF141297	Santa Catalina Basin	1,240	whale carcass	(1)
<i>Vesicomya gigas</i>	Archivesica	AF141298	Santa Catalina Basin	1,240	whale carcass	(1)
<i>Vesicomya gigas</i>	Archivesica	AF141299	Santa Catalina Basin	1,240	whale carcass	(1)
<i>Vesicomya gigas</i>	Archivesica	AF141300	Santa Catalina Basin	1,240	whale carcass	(1)
<i>Vesicomya gigas</i>	Archivesica	AF141301	Santa Catalina Basin	1,240	whale carcass	(1)
<i>Vesicomya gigas</i>	Archivesica	AF008261	Guyamas Basin	2,019	vent	(7)
<i>Vesicomya gigas</i>	Archivesica	AF008264	Guyamas Basin	2,000	vent	(7)
<i>C. kawamurai</i>	Akebiconcha	AB191400	Minami Ensei Knoll, Okinawa Trough	640–710	vent	(4)
<i>C. kawamurai</i>	Akebiconcha	AB479089	Suruga Bay & Nankai Trough & Okinawa Trough	300–900	vent & seep	(6)

Species name in  
the DNA Data  
Bank of Japan

	Genus name by (5)	Accession No.	Locality	Depth (m)	Habitat Type	Reference
<i>C. kawamurai</i>	Akebiconcha	AB191397	Dai-ni Tenryu Knoll & Minami Ensei Knoll & Kuroshima Knoll	ND	vent & seep	(4)
<i>C. kawamurai</i>	Akebiconcha	AB191398	Kuroshima Knoll, Ryukyu Trench	640–670	seep	(4)
<i>C. kawamurai</i>	Akebiconcha	AB191399	Minami Ensei Knoll, Okinawa Trough	640–710	vent	(4)
<i>C. kawamurai</i>	Akebiconcha	AB191400	Minami Ensei Knoll, Okinawa Trough	640–710	vent	(4)
<i>C. kawamurai</i>	Akebiconcha	AB191401	Dai-ni Tenryu Knoll, Nankai Trough	590–610	seep	(4)
<i>C. kawamurai</i>	Akebiconcha	AB191402	Minami Ensei Knoll, Okinawa Trough	640–710	vent	(4)
<i>C. kawamurai</i>	Akebiconcha	AB191403	Minami Ensei Knoll, Okinawa Trough	640–710	vent	(4)
<i>C. kawamurai</i>	Akebiconcha	AB110754	Dai-ni Tenryu Knoll, Nankai Trough	600	seep	(3)
<i>C. kawamurai</i>	Akebiconcha	AB110756	Minami Ensei Knoll, Okinawa Trough	600–700	vent	(3)
<i>C. fossajaponica</i>	Isorropodon	AB110766	Japan Trench	5,400–6,400	seep	(3)

ND = no data.

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