

S2 Table. **Sequences (18S gene) included in the phylogenetic reconstruction and the larval traits of the species.** The list includes information on larval traits of species not considered in the phylogenetic reconstruction, but used to make inferences on closely related species included in our phylogenetic reconstruction but without available data on larval traits (see methods).

SPECIES	18S		Larval Morphology	General larval traits (first zoea)				
	Source	Genbank	Source	Mouth parts development	Trophic status	Pereiopods	Pleopods	Type of development
PASIAPHAEIDAE								
<i>Leptochela bermudensis</i>	[1]	EU868785	[2,3]	Developed	Planktotrophic	Absent	Absent	Extended
<i>L. papulata</i>	[1]	EU868784						
<i>L. carinata</i>	[1]	EU868786						
<i>L. gracilis</i>			[4]	Developed	Planktotrophic	Absent	Absent	Extended
<i>Pasiphaea japonica</i>	[5]	JF346260	[6]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>P. merriami</i>	[1]	EU868796						
<i>P. levicarinata</i>	[5]	JF346261						
<i>P. sirenkoi</i>	[7]	KP725823						
<i>P. sivado</i>	[7]	KP725826	[8]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>P. tarda</i>			[3,8]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>P. telacantha</i>	[7]	KP725828						
<i>Parapasiphae sulcatifrons</i>			[3,8]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
OPLOPHOIDAE								
<i>Janicella spinicauda</i>	[7]	KP075856.1	[3]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>Oplophorus typus</i>	[9]	GQ131929.1	[3]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>O. gracilirostris</i>	[9]	GQ131928	[3]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>O. spinosus</i>			[10]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>Systellapis debilis</i>	[1]	EU868775	[10]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>S. pellucida</i>	[5]	JF346250						
ACANTHEPHYRIDAE								
<i>A. cutirostris</i>	[1]	EU868769						

<i>A. brevirostris</i>			[11]	Developed	Planktotrophic	Absent	Absent	Extended
<i>A. purpurea</i>	[1]	EU868770	[10,12]	Developed	Planktotrophic	Absent	Absent	Extended
<i>A. eximia</i>	[9]	GQ131916						
<i>A. acutifrons</i>			[12]	Developed	Planktotrophic	Absent	Absent	Extended
<i>A. stylostrata</i>			[12]	Developed	Planktotrophic	Absent	Absent	Extended
<i>Hymenodora glacialis</i>	[9]	GQ131915	[3,13]	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
<i>Ephyrina figuerai</i>	[14]	AM087654	[3]					Abbreviated
<i>Meningodora</i> sp.	[9]	GQ131931						
<i>Notostomus gibbosus</i>	[9]	GQ131917	[10]					Extended
<i>Heterogenys microphthalmia</i>	[9]	GQ131932						
NEMATOCARCINIDAE								
<i>Nematocarcinus africanus</i>	[7]	KP725769						
<i>N. lanceopes</i>			[15]	Developed	Planktotrophic	Absent	Absent	Extended
<i>N. cursor</i>	[1]	U868766						
<i>N. rotundus</i>	[1]	EU868765						
<i>N. gracilis</i>	[5]	JF346240						
<i>N. tenuipes</i>	[5]	JF346248						
<i>N. aff. combensis</i>	[5]	JF346238						
<i>N. longirostris</i>			[15]	Developed	Planktotrophic	Absent	Absent	Extended
AGOSTOCARIDAE								
<i>Agostocaris</i> sp.	[1]	EU868716						
PSALIDOPODIDAE								
<i>Psalidopus barbouri</i>	[1]	EU868804	[16]*	Undeveloped	Primary lecithotrophy	Present	Present	Abbreviated
CAMPYLONOTIDAE								
<i>Campylonotus rathbunae</i>	[5]	JF346246	[17]	Developed	Facultative lecithotrophy	Present	Absent	Abbreviated
<i>C. vagans</i>			[18,19]	Developed	Facultative lecithotrophy	Present	Absent	Abbreviated

<i>C. capensis</i>			[18]	Developed	Facultative lecitotrophy	Present	Absent	Abbreviated
<i>C. semistriatus</i>			[18]	Developed	Facultative lecitotrophy	Present	Absent	Abbreviated
ALVINOCARIDIDAE								
<i>Alvinocaris longirostris</i>	[5]	JF346247	[20]**			Absent	Absent	Extended
<i>A. muricola</i>	[1]	EU868717	this study	Undeveloped	Primary lecitotrophy	Absent	Absent	Extended
<i>Rimicaris exoculata</i>	[14]	AM087652	this study	Undeveloped	Primary lecitotrophy	Absent	Absent	Extended
<i>R. hybisae</i>	this study	KT210459	[21]***	Undeveloped	Primary lecitotrophy	Absent	Absent	Extended
<i>R. chacei</i>	this study	KT210456						
<i>Mirocaris fortunata</i>	this study	KT210458	this study	Undeveloped	Primary lecitotrophy	Absent	Absent	Extended
<i>Nautilocaris saintlaurentae</i>	this study	KT210457	this study	Undeveloped	Primary lecitotrophy	Absent	Absent	Extended
Outgroups								
Stenopodidae								
<i>Stenopus hispidus</i>	[5]	JF346253						
Hippolytidae								
<i>Hippolyte obliquimanus</i>	[1]	EU868752						
Alpheidae								
<i>Alpheus packardii</i>	[1]	EU868720.1						
Palaemonidae								
<i>Macrobrachium lanchesteri</i>	[7]	KP725756.1						

\*Late embryo

\*\*Analysis of COI sequence of *Alvinocaris* sp. submitted by Koyama *et al.* [20] suggest that the species belong to *A. longirostris* (see COI analysis in the present study). The mouth parts of the larvae are not shown in [20], we assume that they are similar than *A. muricola*. Other traits are observed from the illustration

\*\*\*The mouth parts of the larvae are not shown in [21], we assume that they are similar than *R. exoculata*. Other traits are observed from the illustration.

## References

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