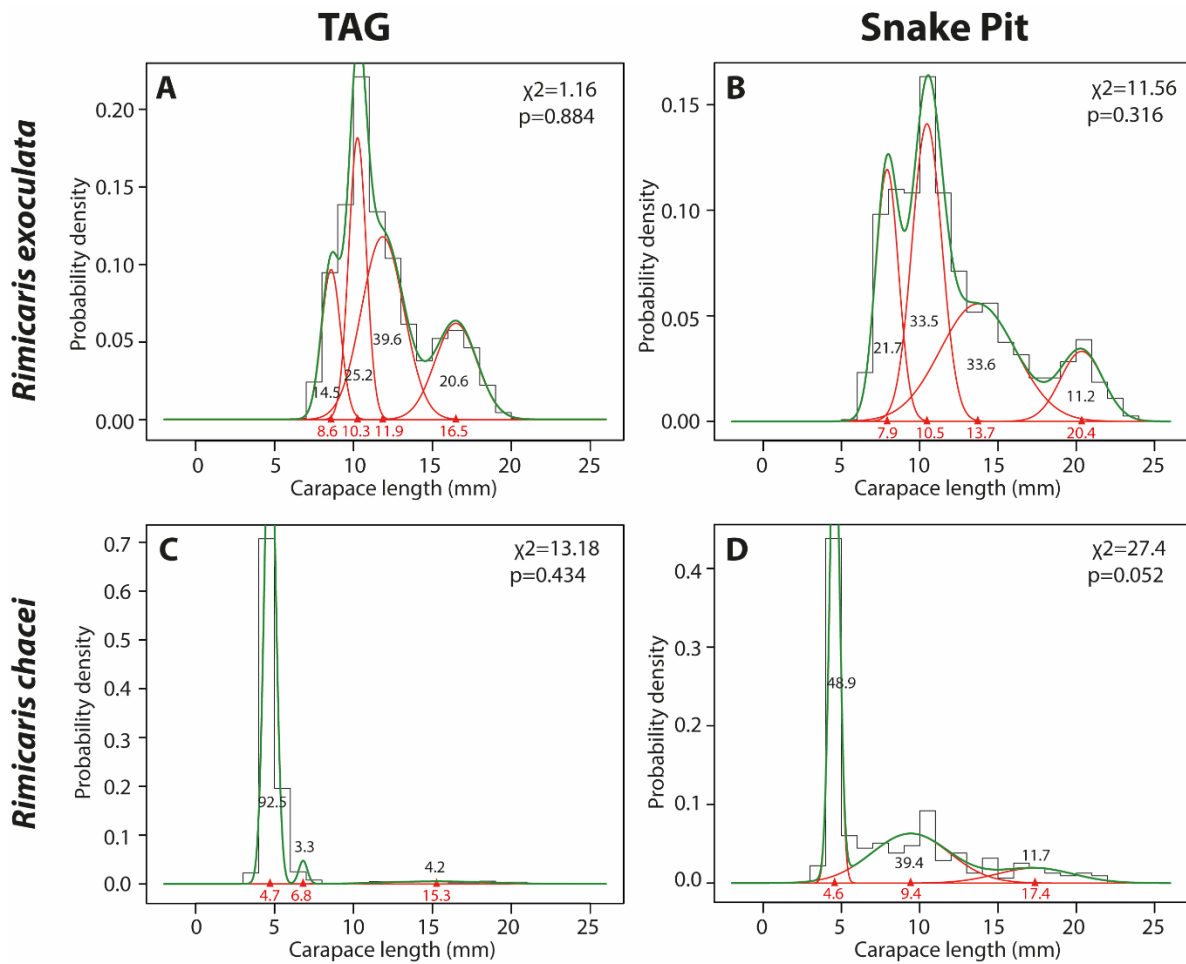
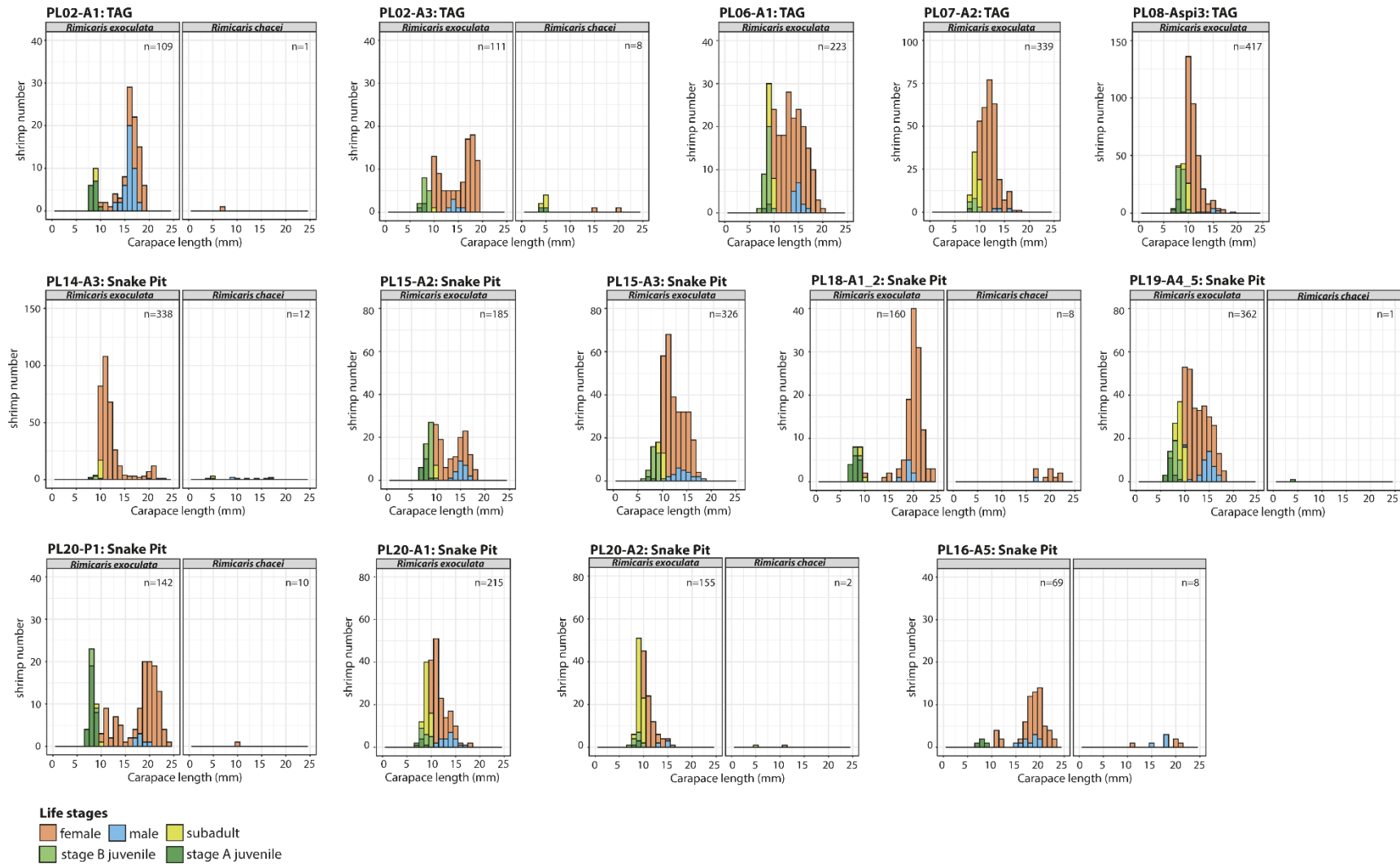


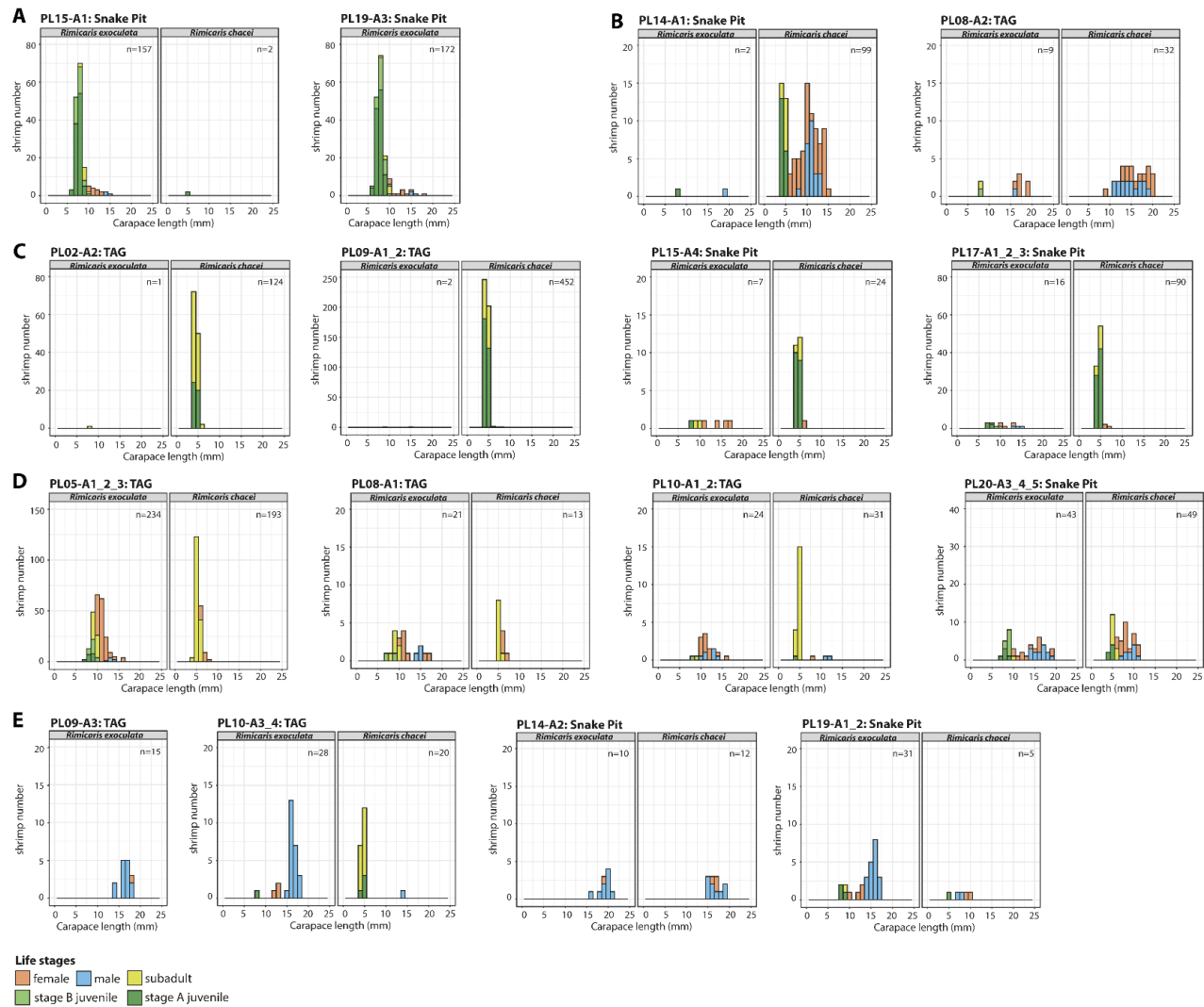
**Figure S1.** Map depicting the different spatially discrete sampling point at the TAG and Snake Pit hydrothermal vent fields



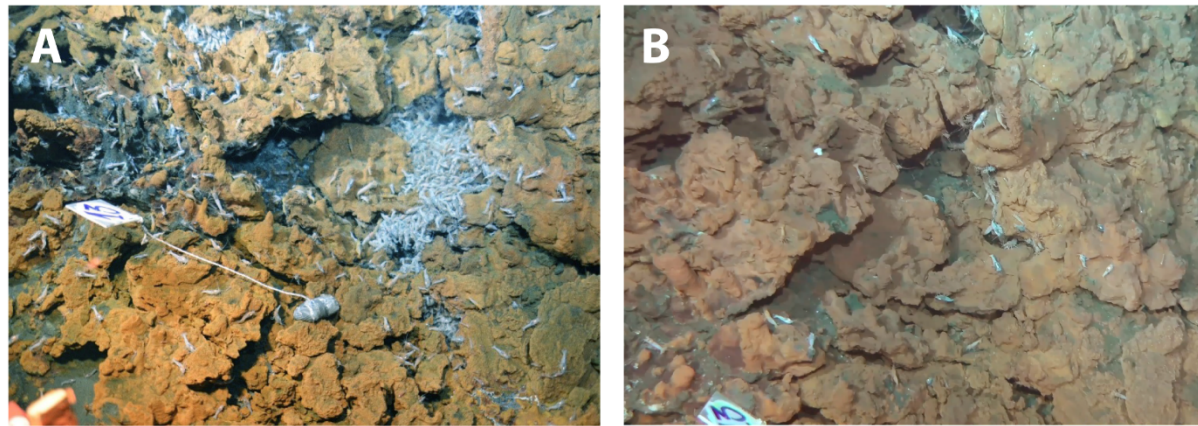
**Figure S2.** Cohort detection through modal decomposition of size-frequency distributions of *Rimicaris* populations. **A.** *R. exoculata* population from TAG. **B.** *R. exoculata* population from Snake Pit. **C.** *R. chacei* population from TAG. **D.** *R. chacei* population from Snake Pit.



**Figure S3.** Small scale spatial variations in size-frequency distribution between the different dense aggregation assemblages at TAG and Snake Pit.



**Figure S4.** Small scale spatial variations in size-frequency distribution between the different assemblage types at TAG and Snake Pit. **A.** Nurseries of *R. exoculata* **B.** Hidden aggregations of *R. chacei* adults **C.** Nurseries of *R. chacei* **D.** Scattered assemblages in inactive habitats **E.** Mixed shrimp assemblages at the periphery of dense aggregations.



**Figure S5.** Temporal succession of assemblages observed at TAG. **A.** Dense aggregation of *R. exoculata* adults **B.** Hidden aggregation of *R. chacei* adults observed at the same location 10 days later.

**Table S1.** *Rimicaris* life stage composition of each assemblages. Ad: Adults; Im: Immatures; F: Females; M: Males; S: Subadults; JB: stage B juveniles; JA: stage A juveniles; n: number of individuals.

Vent field	Localisation	Assemblage type	Sample ID	<i>Rimicaris exoculata</i>							<i>Rimicaris chacei</i>							
				F	M	S	JB	JA	Ad	Im	n	F	M	S	JA	Ad	Im	n
TAG	near active fluids	Dense Aggregation	PL02-A1	50	42	3	0	14	92	17	<b>109</b>	1	0	0	0	1	0	<b>1</b>
TAG	near active fluids	Dense Aggregation	PL02-A3	89	6	1	12	3	95	16	<b>111</b>	2	0	4	2	2	6	<b>8</b>
TAG	near active fluids	Dense Aggregation	PL06-A1	160	15	17	28	3	175	48	<b>223</b>	0	0	0	0	0	0	<b>0</b>
TAG	near active fluids	Dense Aggregation	PL07-A2	269	6	47	15	2	275	64	<b>339</b>	0	0	0	0	0	0	<b>0</b>
TAG	near active fluids	Dense Aggregation	PL08-A3	294	9	29	69	16	303	114	<b>417</b>	0	0	0	0	0	0	<b>0</b>
Snake Pit	near active fluids	Dense Aggregation	PL14-A3	313	1	16	5	1	314	22	<b>336</b>	2	1	0	0	3	0	<b>3</b>
Snake Pit	near active fluids	Dense Aggregation	PL15-A2	103	23	6	34	19	126	59	<b>185</b>	0	0	0	0	0	0	<b>0</b>
Snake Pit	near active fluids	Dense Aggregation	PL15-A3	247	25	17	34	3	272	54	<b>326</b>	0	0	0	0	0	0	<b>0</b>
Snake Pit	near active fluids	Dense Aggregation	PL16-A5	55	10	0	0	4	65	4	<b>69</b>	4	4	0	0	8	0	<b>8</b>
Snake Pit	near active fluids	Dense Aggregation	PL18-A1A2	113	8	3	3	15	121	21	<b>142</b>	9	1	0	0	10	0	<b>10</b>
Snake Pit	near active fluids	Dense Aggregation	PL19-A4A5	226	39	51	28	18	265	97	<b>362</b>	0	0	0	1	0	1	<b>1</b>
Snake Pit	near active fluids	Dense Aggregation	PL20-P1	115	7	2	5	31	122	38	<b>160</b>	1	0	0	0	1	0	<b>1</b>
Snake Pit	near active fluids	Dense Aggregation	PL20-A1	122	23	48	16	6	145	70	<b>215</b>	0	0	0	0	0	0	<b>0</b>
Snake Pit	near active fluids	Dense Aggregation	PL20-A2	69	5	67	10	4	74	81	<b>155</b>	1	0	1	0	1	1	<b>2</b>
Snake Pit	near diffuse fluids	<i>R. exoculata</i> Nursery	PL15-A1	12	3	10	32	100	15	142	<b>157</b>	0	0	0	2	0	2	<b>2</b>
Snake Pit	near diffuse fluids	<i>R. exoculata</i> Nursery	PL19-A3	11	4	7	33	117	15	157	<b>172</b>	0	0	0	0	0	0	<b>0</b>
TAG	near diffuse fluids	Hidden Aggregation	PL08-A2	6	1	1	1	0	7	2	<b>9</b>	16	16	0	0	32	0	<b>32</b>
Snake Pit	near diffuse fluids	Hidden Aggregation	PL14-A1	0	1	0	0	1	1	1	<b>2</b>	47	24	9	19	71	28	<b>99</b>
TAG	near diffuse fluids	<i>R. chacei</i> Nursery	PL02-A2	0	0	1	0	0	0	1	<b>1</b>	0	0	80	44	0	124	<b>124</b>
TAG	near diffuse fluids	<i>R. chacei</i> Nursery	PL09-A1A2	0	1	0	0	1	1	1	<b>2</b>	4	0	135	313	4	448	<b>452</b>
Snake Pit	near diffuse fluids	<i>R. chacei</i> Nursery	PL15-A4	4	0	2	0	1	4	3	<b>7</b>	1	0	4	19	1	23	<b>24</b>
Snake Pit	near diffuse fluids	<i>R. chacei</i> Nursery	PL17-A1A2A3	5	3	0	3	5	8	8	<b>16</b>	3	0	17	70	3	87	<b>90</b>
TAG	near diffuse fluids	Vicinity of D. Aggregations	PL05-A1A2A3	137	7	49	24	17	144	90	<b>234</b>	25	0	168	0	25	168	<b>193</b>
TAG	near diffuse fluids	Vicinity of D. Aggregations	PL08-A1	9	3	6	3	0	12	9	<b>21</b>	4	0	9	0	4	9	<b>13</b>
TAG	near diffuse fluids	Vicinity of D. Aggregations	PL10-A1A2	15	7	1	1	0	22	2	<b>24</b>	1	2	37	1	3	38	<b>41</b>
Snake Pit	near diffuse fluids	Vicinity of D. Aggregations	PL20-A3A4A5	6	5	0	5	4	11	9	<b>20</b>	4	5	8	6	9	14	<b>23</b>
TAG	far from fluid activity	Scattered individuals	PL09-A3	1	14	0	0	0	15	0	<b>15</b>	0	0	0	0	0	0	<b>0</b>
TAG	far from fluid activity	Scattered individuals	PL10-A3A4	3	24	0	0	1	27	1	<b>28</b>	0	1	15	4	1	19	<b>20</b>
Snake Pit	far from fluid activity	Scattered individuals	PL14-A2	2	9	1	0	0	11	1	<b>12</b>	3	13	2	2	16	4	<b>20</b>
Snake Pit	far from fluid activity	Scattered individuals	PL19-A1A2	4	19	1	0	3	23	4	<b>27</b>	2	2	0	1	4	1	<b>5</b>

**Table S2.** Spatial variation in the sex ratio, juvenile ratio and the proportions of the different *Rimicaris* species within the different assemblages. Significance levels: NS:  $p > 0.05$ ; \*:  $p < 0.05$ ; \*\*:  $p < 0.01$ ; \*\*\*:  $p < 0.001$ . -: not applicable for this number of specimens.

Vent field	Localisation	Assemblage type	Sample ID	Specie ratio			Juvenile ratio			Sex ratio			Juvenile ratio			Sex ratio		
				TRch:TRex	$\chi^2$ (1 df)	Significance	TI:TA	$\chi^2$ (1 df)	Significance	TM:TF	$\chi^2$ (1 df)	Significance	TI:TA	$\chi^2$ (1 df)	Significance	TM:TF	$\chi^2$ (1 df)	Significance
TAG	near active fluids	Dense Aggregation	PL02-A1	0.009:1	208.2	***	0.18:1	100.5	***	0.84:1	0.69	NS	-	-	-	-	-	-
TAG	near active fluids	Dense Aggregation	PL02-A3	0.07:1	174.9	***	0.17:1	109.6	***	0.07:1	72.5	***	-	-	-	-	-	-
TAG	near active fluids	Dense Aggregation	PL06-A1	0.0:1	-	-	0.27:1	142.4	***	0.09:1	120.1	***	-	-	-	-	-	-
TAG	near active fluids	Dense Aggregation	PL07-A2	0.0:1	-	-	0.23:1	260.2	***	0.02:1	251.5	***	-	-	-	-	-	-
TAG	near active fluids	Dense Aggregation	PL08-A3	0.0:1	-	-	0.38:1	169.5	***	0.03:1	268.1	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL14-A3	0.009:1	650.3	***	0.07:1	504.1	***	0.003:1	310	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL15-A2	0.0:1	-	-	0.47:1	47.1	***	0.22:1	50.8	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL15-A3	0.0:1	-	-	0.20:1	288.9	***	0.10:1	181.2	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL16-A5	0.12:1	93.5	***	0.06:1	104.4	***	0.18:1	31.2	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL18-A1A2	0.07:1	225.8	***	0.17:1	138.1	***	0.07:1	95.6	***	0.0:1	16.2	***	0.11:1	6.4	*
Snake Pit	near active fluids	Dense Aggregation	PL19-A4A5	0.003:1	714.1	***	0.37:1	154.1	***	0.17:1	132	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL20-P1	0.006:1	310.1	***	0.31:1	86.1	***	0.06:1	91.1	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL20-A1	0.0:1	-	-	0.48:1	50.9	***	0.19:1	67.6	***	-	-	-	-	-	-
Snake Pit	near active fluids	Dense Aggregation	PL20-A2	0.01:1	294.3	***	1.09:1	0.5	NS	0.07:1	55.4	***	-	-	-	-	-	-
Snake Pit	near diffuse fluids	<i>R. exoculata</i> Nursery	PL15-A1	0.01:1	298.3	***	9.47:1	202.2	***	0.25:1	5.4	*	-	-	-	-	-	-
Snake Pit	near diffuse fluids	<i>R. exoculata</i> Nursery	PL19-A3	0.0:1	-	-	10.47:1	231.2	***	0.36:1	3.2	NS	-	-	-	-	-	-
TAG	near diffuse fluids	Hidden Aggregation	PL08-A2	3.56:1	23.6	***	-	-	-	-	-	-	0.0:1	60.1	***	1.0:1	0	NS
Snake Pit	near diffuse fluids	Hidden Aggregation	PL14-A1	49.5:1	182.5	***	-	-	-	-	-	-	0.39:1	35.6	***	0.51:1	7.4	**
TAG	near diffuse fluids	<i>R. chacei</i> Nursery	PL02-A2	124.0:1	238.1	***	-	-	-	-	-	-	124.0:0	244	***	-	-	-
TAG	near diffuse fluids	<i>R. chacei</i> Nursery	PL09-A1A2	226.0:1	888.1	***	-	-	-	-	-	-	112.0:1	868.4	***	-	-	-
Snake Pit	near diffuse fluids	<i>R. chacei</i> Nursery	PL15-A4	3.43:1	16.5	***	-	-	-	-	-	-	23.0:1	36.8	***	-	-	-
Snake Pit	near diffuse fluids	<i>R. chacei</i> Nursery	PL17-A1A2A3	5.63:1	100.6	***	1.0:1	0.0	NS	-	-	-	29.0:1	153.1	***	-	-	-
TAG	near diffuse fluids	Vicinity of D. Aggregations	PL05-A1A2A3	0.82:1	7.5	*	0.63:1	24	***	0.05:1	117.4	***	6.72:1	208.9	***	0.0:1	25	***
TAG	near diffuse fluids	Vicinity of D. Aggregations	PL08-A1	0.62:1	2.9	NS	0.75:1	0.4	NS	0.33:1	3	NS	2.25:1	2.5	NS	-	-	-
TAG	near diffuse fluids	Vicinity of D. Aggregations	PL10-A1A2	1.71:1	7.9	*	0.09:1	30.1	***	0.47:1	2.9	NS	12.67:1	56.4	***	-	-	-
TAG	far from fluid activity	Scattered individuals	PL09-A3	0.0:1	-	-	0.0:1	26.1	***	14.0:1	11.3	***	-	-	-	-	-	-
TAG	far from fluid activity	Scattered individuals	PL10-A3A4	0.7:1	2	NS	0.04:1	44.6	***	8.0:1	16.3	***	19.0:1	28.9	***	-	-	-
Snake Pit	far from fluid activity	Scattered individuals	PL14-A2	1.7:1	3.6	NS	0.0:1	16.2	***	4.5:1	4.45	*	0.25:1	12.1	***	0.23:1	6.25	*
Snake Pit	far from fluid activity	Scattered individuals	PL19-A1A2	0.19:1	27.6	***	0.17:1	24	***	4.75:1	9.8	**	-	-	-	-	-	-
Snake Pit	near diffuse fluids	-	PL20-A3A4A5	1.15:1	0.2	NS	0.82:1	0.1	NS	0.83:1	0.1	NS	1.56:1	1.4	NS	1.25:1	0.11	NS



**Table S3.** Temperature and chemistry measurements in each assemblages.

Vent Field	Assemblage Type	Sample ID	Measurement time	Avg.T (°C)	Std.T (°C)	Min.T (°C)	Max.T (°C)	pH	H <sub>2</sub> S (μM)	Fe <sup>2+</sup> (μM)	Fe <sub>total</sub> (μM)
TAG	Dense Aggregation	PL02_A1	6min 44s	8.5	4.8	3.7	20.4	-	-	-	-
TAG	Dense Aggregation	PL06_A1	5min 13s	20.1	4.6	11.0	33.0	6.86	< 1.0	239.0	315.9
TAG	Dense Aggregation	PL08_A3	5min 3s	9.4	4.5	5.0	19.8	7.9	3.1	30.7	129.4
TAG	Hidden Aggregation	PL08_A2	5min 10s	4.9	0.7	4.5	6.9	7.7	3.7	15.3	33.1
TAG	Periphery	PL10_A3_4	5min 12s	3.4	0.3	3.1	4.1	7.7	< 1.0	10.8	179.4
TAG	<i>R. chacei</i> nursery	PL02_A2	4 min 56s	4.8	0.3	4.2	5.4	-	-	-	-
TAG	<i>R. chacei</i> nursery	PL09_A1_2	5min 17s	3.8	0.5	3.3	5.3	7.9	< 1.0	n.d.	9.9
TAG	Vicinity of Aggregations	PL10_A1_2	4min 4s	8.2	3.9	4.2	20.7	7.8	< 1.0	47.6	75.7
Snake Pit	Dense Aggregation	PL15_A2	4min 56s	7.7	0.8	6.7	10.1	7.41	1.3	0.0	22.9
Snake Pit	Dense Aggregation	PL15_A3	5min 21s	20.3	5.9	11.4	38.1	7.08	8.5	11.2	34.0
Snake Pit	Dense Aggregation	PL16_A5	5min 1s	6.0	1.5	3.9	8.4	7.8	< 1.0	6.2	3.0
Snake Pit	Dense Aggregation	PL18_A1_2	5min 32s	9.7	2.1	5.3	13.1	7.4	1.7	n.d.	16.7
Snake Pit	Dense Aggregation	PL19_A4_5	6min 14s	7.0	1.3	4.9	9.5	7.36	5.7	0.0	28.8
Snake Pit	Dense Aggregation	PL20_A1	5min	22.5	6.9	12.1	30.7	-	-	-	-
Snake Pit	Dense Aggregation	PL20_A2	5min 39s	14.5	1.5	8.1	19.0	-	-	-	-
Snake Pit	Periphery	PL19_A1_2	4min 51s	3.6	0.8	3.3	6.1	7.9	< 1.0	0.2	< 1.0
Snake Pit	<i>R. chacei</i> nursery	PL15_A4	3min 1s	3.9	0.6	3.4	6.8	-	-	-	-
Snake Pit		PL20_A3_4_5	5min 20s	4.4	0.5	4.2	5.9	-	-	-	-
Snake Pit	<i>R. exoculata</i> nursery	PL15_A1	5min 4s	3.4	0.5	3.2	4.9	7.8	< 1.0	0.0	4.6
Snake Pit	<i>R. exoculata</i> nursery	PL19_A3	4min 59s	4.8	0.6	3.9	6.6	7.9	< 1.0	0.0	< 1.0

**Table S4.** Body size (CL) of the different life stages of *Rimicaris exoculata* and *Rimicaris chacei* from TAG and Snake Pit. -: not applicable.

Species	Vent field	Adults				Females				Males				Subadult				Stage B juveniles				Stage A juveniles			
		mean	sd	max	min	mean	sd	max	min	mean	sd	max	min	mean	sd	max	min	mean	sd	max	min	mean	sd	max	min
<i>Rimicaris exoculata</i>	TAG	12.9	2.6	20.1	10	12.6	2.5	20.1	10	15.5	1.6	18.2	10.5	9.4	0.4	9.9	7.7	8.8	0.6	10	7.2	8.3	0.6	9.7	7
	Snake Pit	14	3.6	24.4	10	13.8	3.7	24.4	10	15.5	2.2	20.6	10.5	9.4	0.5	9.9	7.6	8.4	0.8	10.2	6.2	7.8	0.7	9.5	5.7
<i>Rimicaris chacei</i>	TAG	11.1	5	20.5	6	10	5.1	20.5	6	14.3	2.6	19.1	10.9	4.9	0.5	5.9	4	-	-	-	-	4.5	0.3	5.4	3.8
	Snake Pit	11.7	4.0	21.8	6.2	11.4	4.3	21.8	6.2	12.1	3.3	19	7	4.9	0.4	5.9	4.1	-	-	-	-	4.6	0.3	5.4	3.7