

Supplementary Material

1 Supplementary Tables

Table S1. Mean, maximum and minimum temperatures (T°C) and mean *in situ* hydrogen sulfide concentrations (H₂S) in the different assemblages of three vent fields of the northern Mid-Atlantic Ridge (nMAR) in the present study or extracted from various studies. - : not available. *With the exception of Cuvelier et al. (2011), the data for the characterization of *Mirocaris fortunata* habitats at Lucky Strike (LS) correspond to measurements in warm mussel habitats where shrimp are abundant (Sarrazin et al., 2015) or to the temperature niche of the species (Husson et al., 2017). At Snake Pit (SP), the habitat of the mussel and shrimp assemblages were characterized, along with the *Peltospira* assemblages during the Bicoose cruise (2014). MG, Menez Gwen

Field	Species	Mean T°C	T°C max	T°C min	Mean H ₂ S concentrations (µM)	Nb of samples considered	References
MG	<i>Bathymodiolus azoricus</i>	9.6 to 10.3	25.5	8.8	33 to 51	3	Sarrazin et al., 2020
	<i>Lepetodrilus atlanticus</i>	8.8 to 8.9	9.2	8.6	177 ± 65	2	This study
LS	<i>Bathymodiolus azoricus</i>	4.71 to 5.37	5.5	4.9	0.81 to 4.47	5	Cuvelier et al., 2011
		4.8 to 8.79	14.2	3.7	1.5 to 40.1	21	Sarrazin et al., 2015, Husson et al., 2017
		5.1 to 11.2	29.7	4.5	0.99 to 9.96	15	Sarrazin et al., 2020
	<i>Mirocaris fortunata</i>	6.79 ± 0.88	-	-	9.00 ± 11.81	8	Cuvelier et al., 2011
		5.39 to 7.49	-	-	5.11 & 38.31	2 (C7 & C8)	Sarrazin et al., 2015*
		5.4	6.1	4.8	-	14	Husson et al., 2017*
	<i>Peltospira smaragdina</i>	5.7 to 20.4	33.9	6.8	18.4 to 99.2	12	This study
SP	<i>Bathymodiolus puteoserpentis</i>	2.4 to 4.7	5.6	2.4	0.45 to 9.84	3	This study
	<i>Peltospira smaragdina</i>	2.6 to 5.2	7.3	2.0	10.7 to 96.9	3	This study
	<i>Rimicaris exoculata</i>	6.8 to 19	23.2	5.8	59.6 to 141.1	6	This study

Table S2. Temperatures (mean, minimum, maximum and variation) in °C of i-buttons on the Y3 site (flange), Lucky Strike vent field. Std = standard deviation.

i-button labels	Nb of measurements	Mean °C (std)	Min °C	Max °C	Variations °C
HT2.7	3877	20.46 (2.10)	13.31	28.11	14.8
HT2.8	3877	28.21 (2.97)	12.46	35.64	23.18
HT2.11	3877	37.34 (0.81)	16.5	40.14	23.64
HT2.12	3877	27.66 (3.71)	9.84	52.88	43.04
BT6.40	3877	21.58 (2.94)	13.9	30.53	16.63
BT6.41	3877	17.25 (3.12)	7.9	23.81	15.91

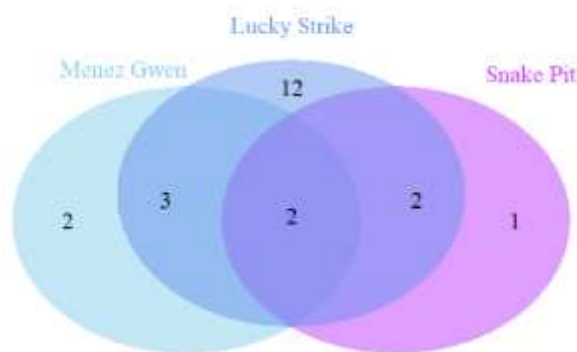
Table S3. Isotope compositions ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) for the four most abundant gastropod species found in the sampled gastropod assemblages on three different vent fields: Menez Gwen (MG), Lucky Strike (LS) and Snake Pit (SP). n: number of samples analyzed.

Field	Site	Year	Sample	# suction samples	Preservation	Species	Corrected $\delta^{13}\text{C}$	Corrected $\delta^{15}\text{N}$
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Divia briandi</i>	-11.92	7.73
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Divia briandi</i>	-12.31	7.67
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Peltoospira smaragdina</i>	-10.85	6.97
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Peltoospira smaragdina</i>	-10.48	6.64
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Peltoospira smaragdina</i>	-10.71	6.44
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Peltoospira smaragdina</i>	-10.54	6.96
Lucky Strike	Isabel	2016	LS-Isa-16	2	Ethanol	<i>Peltoospira smaragdina</i>	-10.40	6.96
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Formalin	<i>Divia briandi</i>	-15.39	6.77
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Frozen	<i>Peltoospira smaragdina</i>	-12.89	5.68
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Frozen	<i>Peltoospira smaragdina</i>	-12.15	5.33
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Frozen	<i>Peltoospira smaragdina</i>	-11.91	5.42
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Frozen	<i>Peltoospira smaragdina</i>	-11.09	5.70
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Frozen	<i>Peltoospira smaragdina</i>	-11.04	5.78
Lucky Strike	Y3	2012	LS-Y3-12-1	1, 2, 8	Frozen	<i>Peltoospira smaragdina</i>	-10.89	5.61
Lucky Strike	Y3	2014	LS-Y3-14-1	1	Ethanol	<i>Divia briandi</i>	-13.87	6.26
Lucky Strike	Y3	2014	LS-Y3-14-2	2	Ethanol	<i>Divia briandi</i>	-15.25	5.47
Lucky Strike	Y3	2014	LS-Y3-14-3	3	Ethanol	<i>Divia briandi</i>	-13.89	6.23
Lucky Strike	Y3	2014	LS-Y3-14-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.67	6.42
Lucky Strike	Y3	2014	LS-Y3-14-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.47	6.31
Lucky Strike	Y3	2014	LS-Y3-14-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.62	6.19
Lucky Strike	Y3	2014	LS-Y3-14-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.45	6.20
Lucky Strike	Y3	2014	LS-Y3-14-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-11.01	6.66
Lucky Strike	Y3	2014	LS-Y3-14-2	2	Ethanol	<i>Peltoospira smaragdina</i>	-11.28	5.37
Lucky Strike	Y3	2014	LS-Y3-14-3	3	Ethanol	<i>Peltoospira smaragdina</i>	-11.40	5.97
Lucky Strike	Y3	2014	LS-Y3-14-3	3	Ethanol	<i>Protolira valvatoides</i>	-14.65	6.66
Lucky Strike	Y3	2015	LS-Y3-15-2	2	Ethanol	<i>Divia briandi</i>	-14.47	6.43
Lucky Strike	Y3	2015	LS-Y3-15-2	2	Ethanol	<i>Divia briandi</i>	-14.48	6.91
Lucky Strike	Y3	2015	LS-Y3-15-2	2	Ethanol	<i>Divia briandi</i>	-14.55	6.49
Lucky Strike	Y3	2015	LS-Y3-15-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.52	6.21
Lucky Strike	Y3	2015	LS-Y3-15-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.63	6.21
Lucky Strike	Y3	2015	LS-Y3-15-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-11.00	6.36
Lucky Strike	Y3	2015	LS-Y3-15-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.81	6.43
Lucky Strike	Y3	2015	LS-Y3-15-1	1	Ethanol	<i>Peltoospira smaragdina</i>	-10.26	6.18
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Divia briandi</i>	-15.12	7.19
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Divia briandi</i>	-16.81	6.56
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Divia briandi</i>	-13.86	6.78
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Lepetodrilus atlanticus</i>	-14.25	5.77

Supplementary Material

Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Lepetodrilus atlanticus</i>	-15.28	5.51
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Lepetodrilus atlanticus</i>	-15.52	2.90
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Lepetodrilus atlanticus</i>	-13.79	5.89
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Lepetodrilus atlanticus</i>	-18.30	6.17
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Protolira valvatooides</i>	-20.15	4.80
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Protolira valvatooides</i>	-19.41	6.48
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Protolira valvatooides</i>	-22.52	4.69
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Protolira valvatooides</i>	-19.96	4.19
Menez Gwen	MG2	2013	MG-MG3-13-1	2	Frozen	<i>Protolira valvatooides</i>	-16.86	5.36
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Lepetodrilus atlanticus</i>	-11.70	6.99
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Lepetodrilus atlanticus</i>	-13.71	6.31
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Lepetodrilus atlanticus</i>	-11.66	6.51
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Lepetodrilus atlanticus</i>	-19.10	2.39
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Lepetodrilus atlanticus</i>	-15.38	5.44
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Protolira valvatooides</i>	-18.70	3.81
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Protolira valvatooides</i>	-19.10	4.69
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Protolira valvatooides</i>	-19.46	5.22
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Protolira valvatooides</i>	-17.90	5.17
Menez Gwen	MG3	2013	MG-MG3-13-2	3	Frozen	<i>Protolira valvatooides</i>	-18.95	5.53
Snake Pit	Les Ruches	2014	Sp-Ru-14-2	2	Frozen	<i>Divia briandi</i>	-9.88	7.01
Snake Pit	Les Ruches	2014	Sp-Ru-14-2	2	Frozen	<i>Divia briandi</i>	-10.86	7.60
Snake Pit	Les Ruches	2014	Sp-Ru-14-2	2	Frozen	<i>Divia briandi</i>	-12.01	6.54
Snake Pit	Les Ruches	2014	Sp-Ru-14-2	2	Frozen	<i>Peltospira smaragdina</i>	-9.22	4.50
Snake Pit	Les Ruches	2014	Sp-Ru-14-2	2	Frozen	<i>Peltospira smaragdina</i>	-8.78	4.79

2 Supplementary Figure



Supplementary Figure 1. Venn diagram showing the number of species shared among the gastropod assemblages from the three vent fields studied along the northern Mid-Atlantic Ridge.

3 Supplementary video sequences

Supplementary video S1. Sampling the *Lepetodrilus azoricus* gastropod assemblage at the MG3 site in the Menez Gwen vent field (37°50'.47''N; 31°33'.37''W, 827 m depth, Mid-Atlantic Ridge). ©Ifremer, Biobaz 2013 cruise, dive 524. <https://doi.org/10.24351/88698>

Supplementary video S2. Sampling the *Peltoispira smaragdina* gastropod assemblage at the Y3 site in the Lucky Strike vent field (37°17'.51''N; 32°16'.66''W, 1730 m depth, Mid-Atlantic Ridge). ©Ifremer, Momarsat 2015 cruise, dive 600. <https://doi.org/10.24351/88699>

Supplementary video S3. Sampling the *Peltoispira smaragdina* gastropod assemblage at the Les Ruches site in the Snake Pit vent field (23°22'.06''N; 44°56'.99''W, 3465 m depth, Mid-Atlantic Ridge). ©Ifremer, Bicosé 2014 cruise, dive 568. <https://doi.org/10.24351/88700>