

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 Bicose 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 |

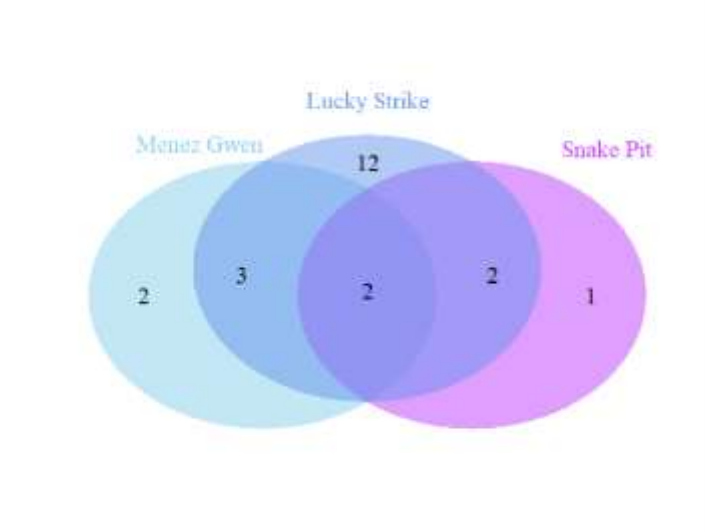
Table S3. Isotope compositions ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) for the four most abundant gastropod species found in the sampled gastropod assemblages on three different vent fields: Menez Gwen (MG), Lucky Strike (LS) and Snake Pit (SP). n: number of samples analyzed.

| 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 |

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|------------|------------|------|-------------|---|--------|--------------------------------|--------|------|
| 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 *Peltoospira 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 *Peltoospira 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, Bicose 2014 cruise, dive 568. <https://doi.org/10.24351/88700>