Supplementary Material

# Supplementary Videos

**Supplementary video 1.** Video of brooding females of *Segonzacia mesatlantica* with the abdominal flapping behaviour (<https://doi.org/10.17600/18000513>) :[..\video analysis\Brooding females's behaviour\Abdominal flapping.mp4](file:///C:\Users\Mariana%20Cruz\Desktop\Paper_Supplementary%20mat_S.mesatlantica\Supplementary%20matterial\Videos\Abdominal%20flapping.mp4)

**Supplementary video 2.** Video of brooding females of *Segonzacia mesatlantica* with the pereiopod/chelae probing behaviour (<https://doi.org/10.17600/18000513>) :[..\video analysis\Brooding females's behaviour\Pereiopod\_chelae probbing.mp4](file:///C:\Users\Mariana%20Cruz\Desktop\Paper_Supplementary%20mat_S.mesatlantica\Supplementary%20matterial\Videos\Pereiopod_chelae%20probbing.mp4)

**Supplementary video 3.** Video of brooding females of *Segonzacia mesatlantica* with the maxilliped beating behaviour (<https://doi.org/10.17600/18000513>) :[..\video analysis\Brooding females's behaviour\Maxilliped beating.mp4](file:///C:\Users\Mariana%20Cruz\Desktop\Paper_Supplementary%20mat_S.mesatlantica\Supplementary%20matterial\Videos\Maxilliped%20beating.mp4)

# Supplementary Figures and Tables

## Supplementary Figures

**Supplementary Figure 1** Megalopae of *Segonzacia mesatlantica* collected at the water column near the vent sites at ventral view. Scale bar = 1mm.

## Supplementary Tables

**Supplementary Table 1** Morphological values (mean ± standard deviation) of development stages of *Segonzacia mesatlantica.*

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| --- | --- | --- | --- | --- | --- |
| **Stage** | **Maximum diameter (D, mm)** | **Minimum diameter (d, mm)** | **Area (A, mm²)** | **Roundness** | **Ratio aspect** |
| I | 0.459 ± 0.021 | 0.425 ± 0.017 | 0.664 ± 0.060 | 0.181 ± 0.032 | 1.104 ± 0.034 |
| II | 0.514 ± 0.006 | 0.497 ± 0.016 | 0.834 ± 0.001 | 0.353 ± 0.009 | 1.038 ± 0.033 |
| III | 0.526 ± 0.005 | 0.514 ± 0.005 | 0.874 ± 0.017 | 0.306 ± 0.012 | 1.023 ± 0.006 |
| IV | 0.549 ± 0.004 | 0.529 ± 0.014 | 1.011 ± 0.194 | 0.415 ± 0.034 | 1.040 ± 0.018 |
| V | 0.600 ± 0.028 | 0.567± 0.012 | 1.117 ± 0.111 | 0.511 ± 0.111 | 1.100 ± 0.051 |
| VI | 0.753 ± 0.040 | 0.646± 0.035 | 1.782 ± 0.165 | 1.298 ± 0.233 | 1.124 ± 0.108 |

**Supplementary Table 2** Summary of measurement sequences (c.a. three minutes duration, one measurement every 5 seconds) in the Broken spur vent field, obtained using the in situ temperature sensor (S2T6000, NKE and the redox sensor (SPHT, NKE equiped with a Pt sensing electrode). The redox potential (Eh) is used as a proxy for oxic/hypoxic conditions. Background temperature and redox are obtained with the probe tip in surrounding water at the beginning of the measurement series. Eh > 0 denote oxic conditions. Sequence within vent fauna assemblages are obtained on a low-activity area and diffuse flow a few meters from the pilar hosting the crab population. Eh denote moderately hypoxic (-20 mv) to severely hypoxic (-70 mV) conditions, as expected from characteristic spatial gradients in the surrounding of diffuse flows (Le Bris et al. 2019).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | Temperature in °C | | |  | |  | Redox potential (Eh) in V | | |  | |
|  | Min | Mean | | Max |  | | Min | | | Mean | Max | |
| Surrounding water | 2.6 | 2.7 | | 2.7 |  | | -0.001 | | | 0.011 | 0.017 | |
| Anemony | 4.6 | 5.2 | | 5.4 |  | | -0.058 | | | -0.048 | -0.046 | |
| Shrimps | 3.2 | 4.8 | | 5.2 |  | | -0.049 | | | -0.034 | -0.029 | |
| Gastropods | 3.2 | 3.5 | | 3.6 |  | | -0.039 | | | -0.023 | -0.018 | |
| Gastropods | 4.1 | 4.3 | | 4.3 |  | | -0.022 | | | -0.020 | -0.018 | |
| In diffuse flow | 11.5 | 14.1 | | 15.1 |  | | -0.080 | | | -0.070 | -0.066 | |

**Supplementary Table 3** Reproductive traits of deep-water crabs of the family Bythograeidae, Geryonidae, Homolidae and Kiwaidae including : Carapace width (CW; mean ± standard deviation), the range of oocytes size (μ), fecundity, the number of embryonic stages, egg’s size (mm; mean ± standard deviation), the number of larvae stages, the larvae size (mm; mean ± standard deviation), the mode of development and the reproductive periodicity.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Family** | | **Species** | **Distribution** | | **Depths**  **( range; m)** | | **CW. mm** | | **Oocytes size (**μ **)** | | **Fecundity** | | **Embryonic stages** | | **Egg size (mm)** | | | **Larvae stages** | | | **Larvae size(mm)** | | | **Mode of development** | | | **Reproductive periodicity** | | | | **Source** | | |  |
| Bythograeidae | | *Bythograea laubieri* | Southern East Pacific Rise | | 2330 – 2850 | | 41.20 ± 5.80 | | 60 - 100 | | NI | | NI | | 0.50  ± 0.03 | | | NI | | | NI | | | Planktotrophic | | | Continuous | | | Hilário et al. 2009 | | | |
|  | | *Bythograea thermydron* | East Pacific Rise. Galapagos Rift | | 2430 – 2673 | | 53.10 ± 6.50 | | 150 – 500 | | ≈ 33 550 | | NI | | ≈ 0.54 | | | 7 stages; megalopa | | | ≈ 1.50**(a)** | | | Planktotrophic | | | Seasonal | | | Van Dover et al. 1995; Perovich et al. 2003 | | | |
|  | | *Bythograea vrijenhoeki* | Southern East Pacific Rise | | 2334– 2832 | | 44.40 ± 2.40 | | 61 - 100 | | NI | | NI | | 0.52  ± 0.04 | | | NI | | | NI | | | Planktotrophic | | | Continuous | | | Guinot & Hurtado, 2003;  Hilário et al. 2009 | | | |
|  | | *Gandalfus yunohana* | North-Western Pacific | | 420 – 1400 | | 45.40 ± 4.50 | | NI | | NI | | NI | | NI | | | 6 stages; megalopae | | | 1.50  ± 0.07 **(a)** | | | Planktotrophic | | | NI | | | Hamasik et al. 2010; Kaori et al. 2010 | | | |
|  | | *Segonzacia mesatlantica* | Mid- Atlantic | | 850 – 3670 | | 41.80 ± 9.10 | | 70-140 | | 20 683  ± 4 260 | | 6 stages; asynchronous | | 0.56  ± 0.01 | | | 6 stages; megalopae | | | 1.56  ± 0.07 | | | Planktotrophic | | | NI | | | Present study | | | |
| **Supplementaty Table 1** Continued  Geryonidae | *Chaecon affinis* | | Northeaster Atlantic | | 140 – 2000 | | 134.00 ± 12.90 | | NI | | 412 290  ± 138 728 | | 6 stages; asynchronous | | 0.60  ± 0.03 | | 4 stages; megalopae | | | NI | | | Planktotrophic | | | Seasonal | | | Tuset et al. 2011 | | |
|  | *Chaceon bicolour* | | Western Pacific | | 200 – 1620 | | 115.50 ± 24.70 | | 70 – 455 | | 192 070  ± 33 640 | | NI | | 0.59  ± 0.03 | | NI | | | NI | | | Planktotrophic | | | Continuous | | | Smith. K. D, 2006 | | |
|  | *Chaceon*  *fenneri* | | Western Atlantic | 200 – 1500 | | 126.50 ± 23.30 | | 31 – 354 | | 213 333  ± 47 258 | | 4 stages | | 0.57  ± 0.02 | | NI | | | NI | | | Planktotrophic | | | Seasonal | | | Hines et al. 1999 | | | |
|  | *Chaceon maritae* | | Eastern Atlantic | 200 – 950 | | 96.50 ± 15.40 | | 50 – 450 | | 228 550  ± 90 782 | | NI | | 0.62  ± 0.09 | | NI | | | NI | | | Planktotrophic | | | Continuous | | | Melville-Smith, 19877 | | | |
|  | *Chaceon quinquedens* | | Western Altantic | 200 – 1000 | | 106.00 ± 19.80 | | 32 – 551 | | 185 976  ± 58 813 | | 6 stages | | 0.73  ± 0.03 | | 4 stages; megalopae | | | NI | | | Planktotrophic | | | Seasonal | | | Rivera et al. 2020 | | | |
| Homolidae | *Paromola cuvieri* | | Eastern Atlantic | 100 – 1212 | | 78.50 ± 32.80 | | ? – 413 | | 315 753  ± 19 267 | | 4 stages; asynchronous | | 0.59  ± 0.01 | | NI | | | 3.20  ± 0.28 **(a)** | | | Planktotrophic | | | Continuous | | | Portella et al. 2014 | | | |
| Kiwaidae | *Kiwa tyleri* | | Southern Atlantic | 2394 – 2608 | | NI | | 250 – 1800 | | 212 ± 38 | | 4 stages; synchronous | | 1.06  ± 0.13 | | 2 stages;  Megalopae | | | ≈ 2.93 **(a)** | | | Lecithotrophic | | | NI | | | Thatje et al. 2015 Marsh et al. 2015 | | | | |

**(a)** Larvaesize of the first zoea; NI no information.