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%3A%5CUsers%5CMariana%20Cruz%5CDesktop%5CPaper_Supplementary%20mat_S.mesatlantica%5CSupplementary%20matterial%5CVideos%5CAbdominal%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%3A%5CUsers%5CMariana%20Cruz%5CDesktop%5CPaper_Supplementary%20mat_S.mesatlantica%5CSupplementary%20matterial%5CVideos%5CPereiopod_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%3A%5CUsers%5CMariana%20Cruz%5CDesktop%5CPaper_Supplementary%20mat_S.mesatlantica%5CSupplementary%20matterial%5CVideos%5CMaxilliped%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.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |   | 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.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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.