

Table S1. Regression parameters of oyster mean weight for each group recorded between 20 May and 4 July. Equation was  $w_{\text{weight}} = ax + bx^2 + c$  where  $x = \text{days}$ .

| Parameters | Slow – Low food      | Slow - High food     | Fast – Low food      | Fast – High food     |
|------------|----------------------|----------------------|----------------------|----------------------|
|            | SL                   | SH                   | FL                   | FH                   |
| <i>a</i>   | $9.6 \times 10^{-4}$ | $6.9 \times 10^{-4}$ | $1.6 \times 10^{-3}$ | $6.8 \times 10^{-3}$ |
| <i>b</i>   | $7.5 \times 10^{-6}$ | $2.3 \times 10^{-4}$ | $2.8 \times 10^{-5}$ | $2.7 \times 10^{-4}$ |
| <i>c</i>   | $6.7 \times 10^{-2}$ | $7.4 \times 10^{-2}$ | $1.7 \times 10^{-1}$ | $1.8 \times 10^{-1}$ |
| $r^2$      | $9.9 \times 10^{-1}$ | 1.0                  | $9.9 \times 10^{-1}$ | 1.0                  |

Table S2. Detection of OsHV-1 DNA in control and recipient oysters at the onset of the cohabitation trial (exposure to pathogens), and after 6 days while mortality started in recipients, as a function of growth rate of oysters (fast vs. slow) and food level (high vs. low). Values of OsHV-1 DNA are means  $\pm$  s.d (n=2-3 tanks).

| Recipient | Time | Growth rate | Food level | No. positive samples | OsHV-1 DNA copies $\text{mg}^{-1}$    |
|-----------|------|-------------|------------|----------------------|---------------------------------------|
| Control   | 0    | Fast        | High       | 2/3                  | $9.6 \times 10^2 \pm 9.3 \times 10^2$ |
|           |      |             | Low        | 2/3                  | $1.6 \times 10^3 \pm 2.3 \times 10^3$ |
|           |      | Slow        | High       | 1/3                  | $3.9 \times 10^2 \pm 6.7 \times 10^2$ |
|           |      |             | Low        | 1/3                  | $3.2 \times 10^2 \pm 5.5 \times 10^2$ |
|           | 6    | Fast        | High       | 3/3                  | $9.8 \times 10^3 \pm 8.8 \times 10^3$ |
|           |      |             | Low        | 2/2                  | $1.4 \times 10^3 \pm 9.9 \times 10^2$ |
|           |      | Slow        | High       | 2/2                  | $1.4 \times 10^3 \pm 3.1 \times 10^1$ |
|           |      |             | Low        | 3/3                  | $2.2 \times 10^3 \pm 1.3 \times 10^3$ |
| Pathogen  | 6    | Fast        | High       | 2/2                  | $4.1 \times 10^6 \pm 3.9 \times 10^6$ |
|           |      |             | Low        | 2/2                  | $3.6 \times 10^6 \pm 3.5 \times 10^6$ |
|           |      | Slow        | High       | 3/3                  | $1.4 \times 10^7 \pm 4.0 \times 10^6$ |
|           |      |             | Low        | 3/3                  | $2.6 \times 10^6 \pm 2.9 \times 10^6$ |

Table S3. Summary of nested analysis of variance (ANOVA). Data of OsHV-1 DNA and TAG/ST were log x+1 transformed.

| Sources of variations | df | OsHV-1 DNA |                  | Organic matter |                  | Carbohydrate |                  | TAG/ST   |                  |
|-----------------------|----|------------|------------------|----------------|------------------|--------------|------------------|----------|------------------|
|                       |    | <i>F</i>   | <i>P</i>         | <i>F</i>       | <i>P</i>         | <i>F</i>     | <i>P</i>         | <i>F</i> | <i>P</i>         |
| Growth rate, G        | 1  | 0.6        | 0.430            | 0.3            | 0.611            | 0.4          | 0.515            | 0.5      | 0.478            |
| Food level, F         | 1  | 0.3        | 0.587            | 34.7           | <b>&lt;0.001</b> | 50.3         | <b>&lt;0.001</b> | 954.9    | <b>&lt;0.001</b> |
| G × F                 | 1  | 0.0        | 0.946            | 0.8            | 0.389            | 1.9          | 0.188            | 2.1      | 0.167            |
| Infection(T)          | 1  | 48.4       | <b>&lt;0.001</b> | 3.2            | 0.063            | 1.8          | 0.196            | 6.8      | <b>0.006</b>     |
| G × Infection(T)      | 1  | 1.0        | 0.376            | 5.1            | <b>0.016</b>     | 0.8          | 0.466            | 0.5      | 0.622            |
| F × Infection(T)      | 1  | 0.1        | 0.925            | 1.0            | 0.380            | 2.0          | 0.167            | 1.2      | 0.323            |
| G × F × Infection(T)  | 1  | 0.4        | 0.655            | 2.4            | 0.118            | 0.6          | 0.565            | 1.7      | 0.207            |

Table S4. Supplementary information on Cox regression model.

| A. Cox regression model with no covariate                       |    |          |        |          |                  |            |
|---|----|----------|--------|----------|------------------|------------|
| Parameter   | DF | Estimate | SE     | $\chi^2$ | <i>P</i>         | Odds ratio |
| Growth (Fast vs. Slow)  | 1  | 1.444    | 1.848  | 0.61     | 0.435            | 4.236      |
| Food (High vs. Low)   | 1  | 1.177    | 1.042  | 1.28     | 0.259            | 3.245      |
| Fast × High food  | 1  | 13.690   | 4.008  | 11.67    | <b>0.001</b>     | 882107     |
| Fast × log(time)  | 1  | -0.410   | 0.698  | 0.34     | 0.557            | 0.664      |
| High food × log(time)   | 1  | -0.348   | 0.383  | 0.82     | 0.365            | 0.706      |
| Fast × High food × log(time)                                    | 1  | -6.191   | 1.722  | 12.93    | <b>&lt;0.001</b> | 0.002      |
| B. Mortality risk estimate for FH oysters as a function of time |    |          |        |          |                  |            |
| Day   | DF | Estimate | SE     | <i>z</i> | <i>P</i>         |            |
| 5   | 1  | 5.123    | 0.809  | 6.33     | <b>&lt;0.001</b> |            |
| 6   | 1  | 3.873    | 0.567  | 6.84     | <b>&lt;0.001</b> |            |
| 7   | 1  | 2.761    | 0.355  | 7.78     | <b>&lt;0.001</b> |            |
| 8   | 1  | 1.858    | 0.196  | 9.46     | <b>&lt;0.001</b> |            |
| 9   | 1  | 1.024    | 0.118  | 8.66     | <b>&lt;0.001</b> |            |
| 10  | 1  | 0.329    | 0.187  | 1.76     | 0.078            |            |
| 11  | 1  | -0.366   | 0.305  | -1.20    | 0.230            |            |
| 12  | 1  | -0.922   | 0.409  | -2.26    | <b>0.024</b>     |            |
| 13  | 1  | -1.478   | 0.514  | -2.87    | <b>0.004</b>     |            |
| 14  | 1  | -2.034   | 0.622  | -3.27    | <b>0.001</b>     |            |
| 15  | 1  | -2.520   | 0.716  | -3.52    | <b>&lt;0.001</b> |            |
| C. Univariate Cox regression models                             |    |          |        |          |                  |            |
| Parameter   | DF | Estimate | SE     | $\chi^2$ | <i>P</i>         | Odds ratio |
| TAG/ST d <sub>6</sub>   | 1  | -0.521   | 0.091  | 32.70    | <b>&lt;0.001</b> | 0.594      |
| TAG/ST d <sub>0</sub>   | 1  | -0.467   | 0.169  | 7.63     | <b>0.006</b>     | 0.627      |
| OM d <sub>0</sub>   | 1  | -22.231  | 11.863 | 3.51     | 0.061            | 0.000      |
| Carbohydrate d <sub>6</sub>                                     | 1  | 0.012    | 0.009  | 1.62     | 0.203            | 1.012      |
| OM d <sub>6</sub>   | 1  | -10.927  | 11.890 | 0.84     | 0.358            | 0.000      |
| Carbohydrate d <sub>0</sub>                                     | 1  | -0.006   | 0.006  | 0.75     | 0.388            | 0.994      |

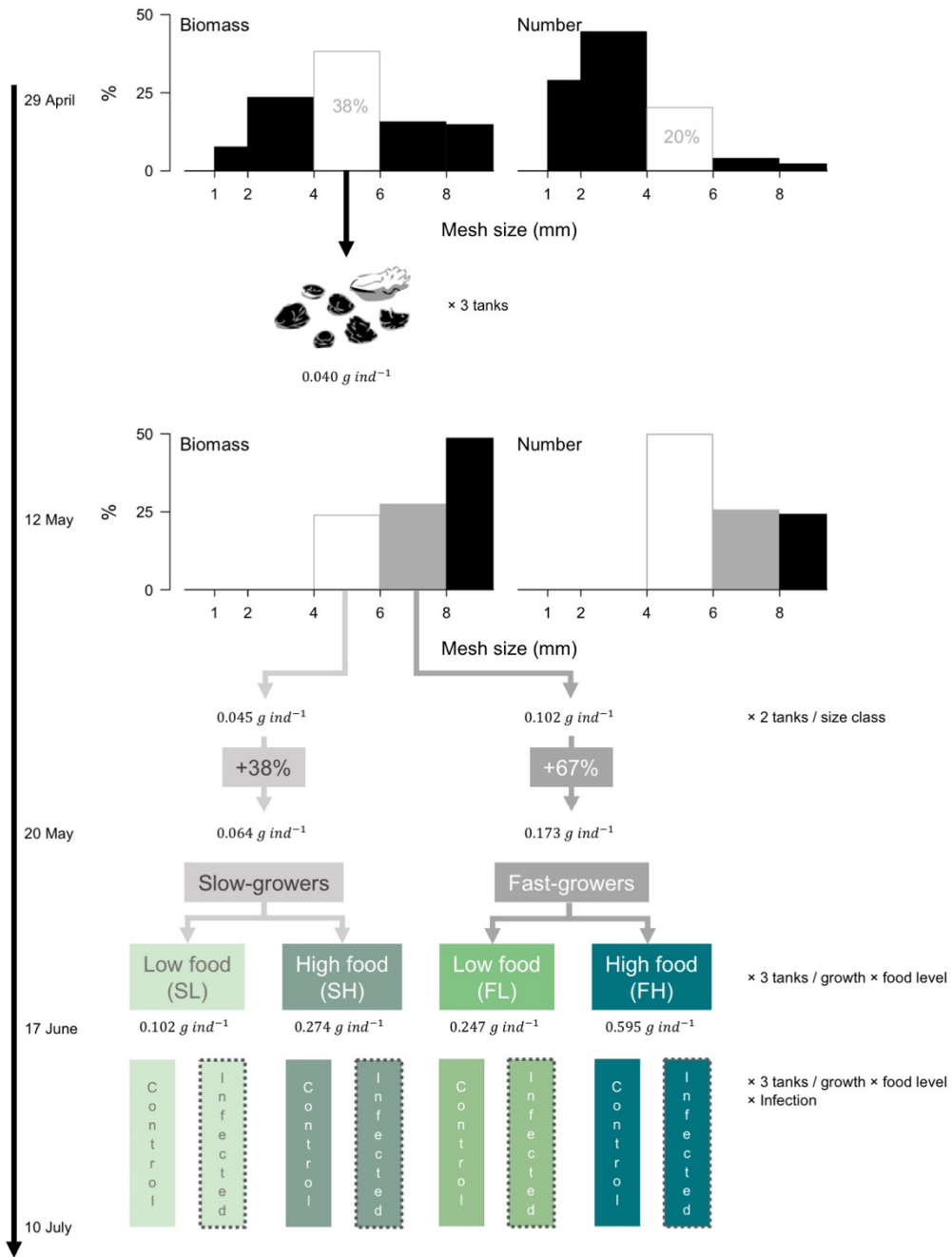
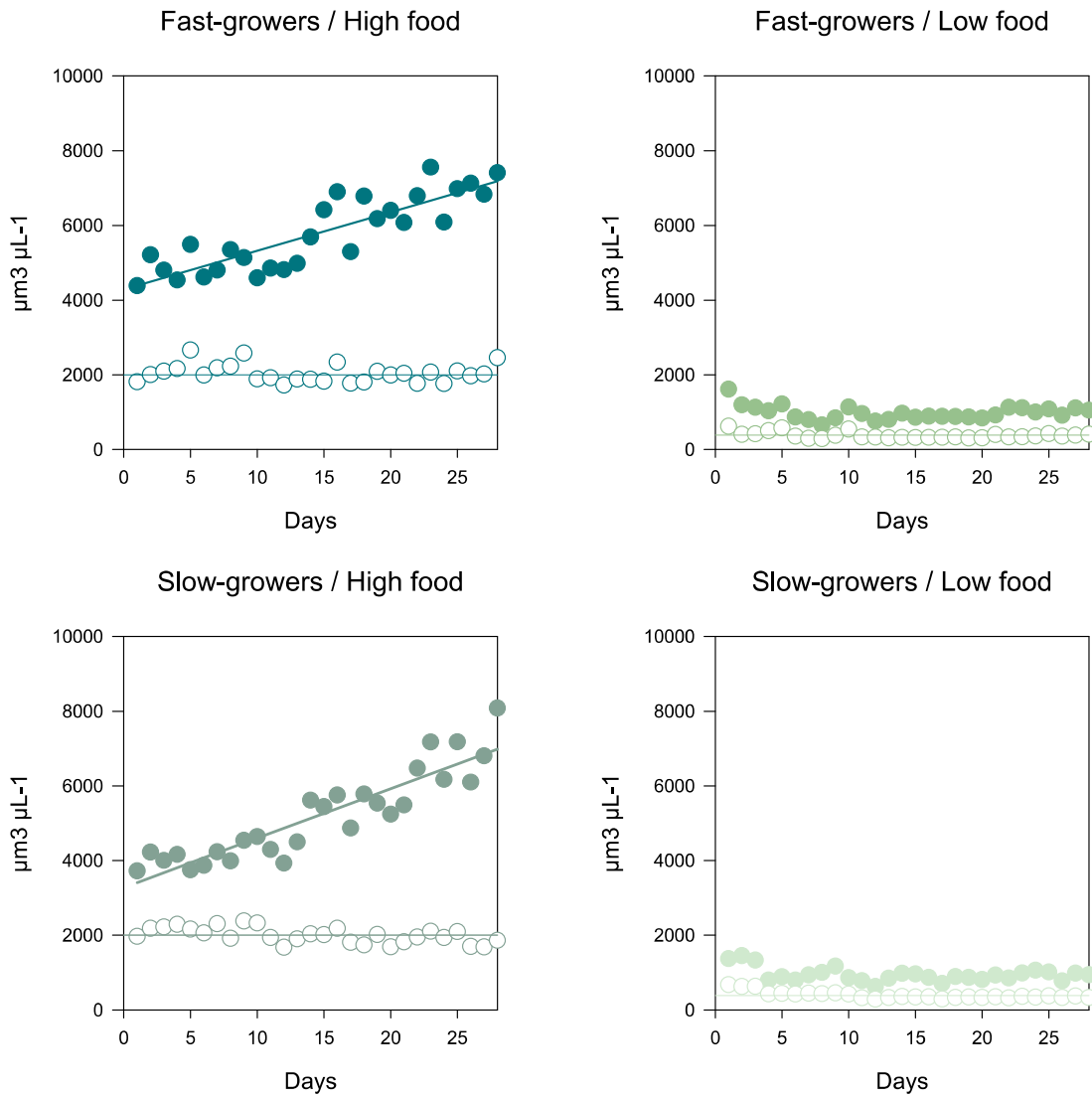


Fig. S1. Experimental design.



**Fig. S2.** Temporal evolution of the phytoplankton concentration at the tank inflow (filled symbols) and outflow (empty symbols) for each oyster group between 20 May and 17 June. Values are means  $\pm$  s.e.m. (n=3 tanks).