**Results**

GAUSSIAN FORMULA

The simple version of the Gaussian model consists of five parameters. The first parameter, *level*, defines the intercept of the mating curve and the second one, *scale*, modifies the scale of the curve for a computed estimate of the third parameter, *preference*, and the fourth parameter, *choosiness*. The preference stands for the value of size ratio with the highest probability of mounting, the peak of the curve, and choosiness determines the decline of the mounting probability from the peak of the curve. Finally, the fifth parameter, *asymmetry*, controls for the asymmetry between the left and the right end tails.

****The space of the parameters was defined using weakly informative priors such as a normal distribution (mean = 0, sd = 10) for *level*, *preference* and *asymmetry*. Uniform and positive priors (low bound = 0, upper bound = 20) were declared for *scale* and  *choosiness*.

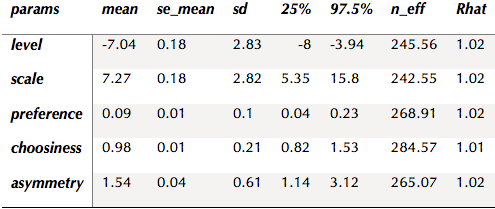
**a**

**c**

**b**

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**d**

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**Figure 1. Summary of the model fit for the relationship between size ratio and mounting success observed in the mating experiment in the combined CZs.** The model estimates refer to the simple version of the Gaussian formula, one explanatory variable that is size ratio and one response variable that is the binary outcome of mounting success. (a) Fitted curve and 95% confidence intervals in orange is superimposed to the observed size difference between female-male mating pairs (i.e., size ratio in the natural logarithmic scale). Each blue dot consists of the average number of mounting events (y axis) occurred within specific ranges of shell size (x axis). Grey error bars represent 95% confidence interval. (b) Mean point estimates of the parameter posterior distributions (black dots) and 80% (red line), 90% (black line) confidence intervals. (c) Density plot of the posterior distribution of the estimated parameters. (d) Table with numeric values (*params* = parameters; *mean* = mean; *se\_mean* = mean standard error; *sd* = standard deviation; *25%* = first quartile; *97.5%* = percentile point; *n\_eff* = crude effective sample size; *Rhat* = potential scale reduction statistic) for each parameters.

The preference is the only parameter whose range of values overlaps zero (fig. 1). When the peak of the curve approaches zero on the x axis, the highest probability of mounting success is for males and females of similar sizes. Essentially, females preferred to mate with males of similar sizes during the mating experiments in all four contact zones. Furthermore, the decline of the strength of the preference is not symmetrical because the parameter *asymmetry* shows a positive effect on the mounting curve. When mating pairs are composed by larger females than males, the probability of success is higher than mating pairs of larger males than females.

**The explanation for the other parameters is not that obvious to me. The mounting probability decreases as the parameter *level* increases but if this parameter corresponds to some extent to the snail activity, the negative relationship does not make much sense. Perhaps the parameter *scale* is closer to explain a possible positive effect of the snail activity on the probability of mounting. *choosiness* is the strength of the preference but I do not know whether we could say something related to its numeric value. Could I compare it with other estimates of mate choice reported in previous studies on *Littorina saxatilis* and/or other organisms?**

SEXUAL SELECTION

The effect of sexual selection on male size was determined in each contact zone and each habitat, separately. The correlation between the variation in mounting success and male size was not computed directly on the results from the mating experiment because this was designed deliberately to pair all possible individuals regardless their location on the shore. Therefore, the relationship between female-male size ratio and mounting success given by the Gaussian formula was adjusted to account for the availability of shell sizes at three distinct habitats (i.e., the boulder, the cliff and the hybrid zone). These size values were generated from a normal distribution with mean and standard deviation calculated using the equation from the cline analysis theory. The total number of individuals was 10000 females and 10000 males for each habitat at each contact zone. Every female mated successfully one male that was randomly sampled from the same habitat and contact zone as the female. In fact, one assumption of the mate-choice simulation is based on the absence of variation in mating success of wild females due to their polyandrous behaviour. The simulation consists of three steps that were repeated for each habitat at each shore location. The first one is the formation of female-male mating pairs. Each female was matched with every single male. The second step includes the random sample of one successful male per female after the computation of the mounting probability for each mating pair using the Gaussian formula. Finally, the third stage is the correlation between the successful male sizes and the predicted probability. Hence, the output from the simulated mate-choice experiment is the variation in mounting success across the size distribution of successful males (fig. 2). **I am afraid that this definition does not entirely correspond to the concept of sexual selection because sexual selection also involves non-successful males. Nevertheless, I imagined that males with low mounting probability are the non-successful ones.**



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**Figure 2. Balancing and divergent sexual selection on male size.** Each panel stands for one habitat (left is crab, middle is hybrid and right is wave) and it is composed by four sections defined by the contact zone (CZA, CZB, CZC and CZD). The colour of the dots are section-coded. Each dot represents the mean probability of mounting (y axis) predicted for the average of successful males sizes in each range of values (x axis). The blue line indicates the fitted values of a quadratic curve associated with the standard error in grey.

**The results from the hybrid zone/panel can dramatically change when the mate-choice simulation is repeated (fig. 3). Looking at the numbers of the predicted probability, it seems that the relationship with size tends to be at random and this might explain the different outputs between simulations. I am also not excluding potential errors in the process. I will be willing to discuss about by email or Skype.**

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**Figure 3. Alternative effect of sexual selection on male size in the hybrid zone.** Each panel is composed by four sections defined by the contact zone (CZA, CZB, CZC and CZD). The colour of the dots are section-coded. Each dot represents the mean probability of mounting (y axis) predicted for the average of successful males sizes in each range of values (x axis). The blue line indicates the fitted values of a quadratic curve associated with the standard error in grey.