Conflictual influence of humidity during shelter selection of the American cockroach (*Periplaneta americana*)

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Differences between leaving rates from the shelters

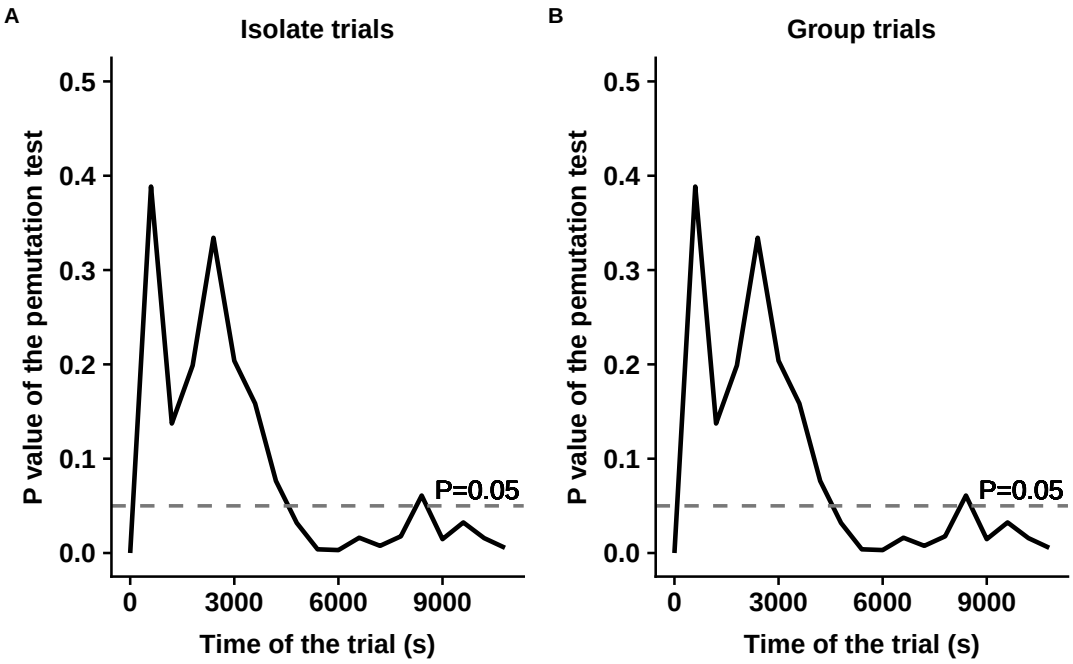

Figure S1. P values of permutations tests of the number of wins of a shelter over time. The dashed horizontal line indicates statistical significance at α =0.05. (A) Wins of the WS for the isolate trials. (B) Wins of the DS for the group trials.

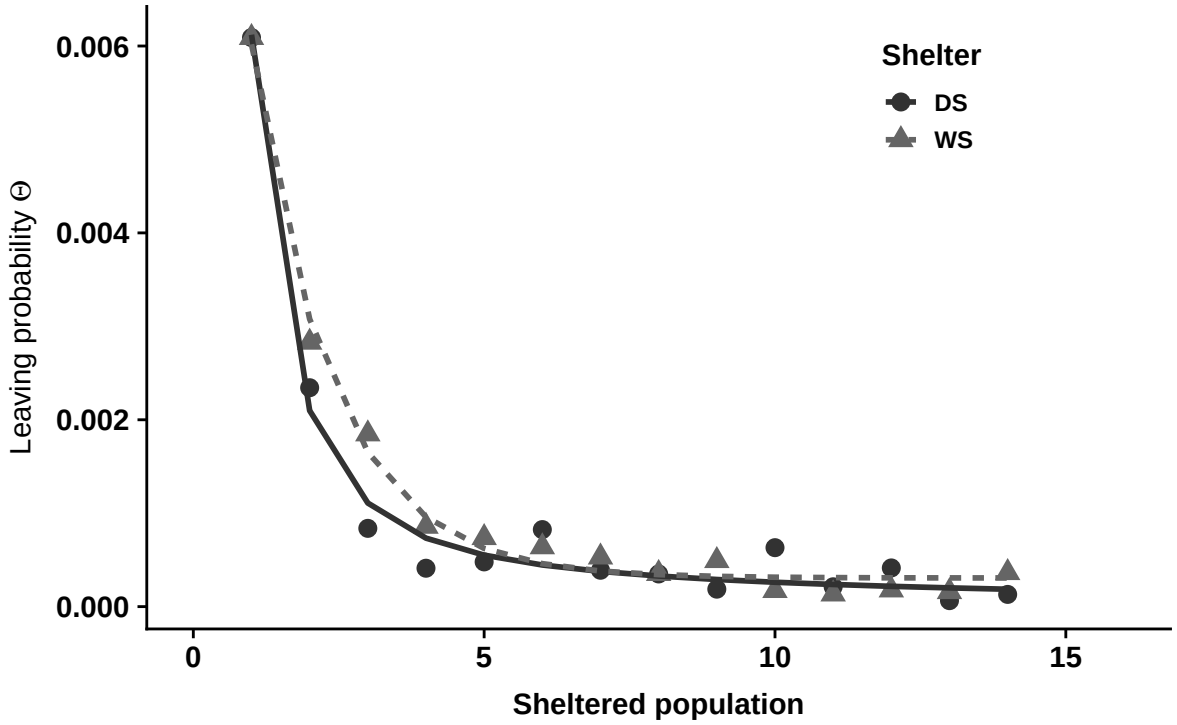

Figure S2. Probability of leaving the shelter as a function of the number of sheltered individuals in the DS (dark grey dot) and the WS (light grey dot) and their respective fitted values from nonlinear least square fitting (DS: dark grey dashed line and WS: light grey dashed line) (for fitted parameters, see table 2.

Differences between leaving rates from the shelters

Being understand that $\varepsilon_w = \varepsilon_d$ and $\beta_w = \beta_d$ the difference between individual leaving rates from the DW and the DS (eq. 11) is:

$$\Delta\Theta(i_d) = \varepsilon(\, e^{-\gamma_w(i_w-1)} - \, e^{-\gamma_d(i_d-1)}) \tag{S1}$$

Eq. S1 displays a maximum at:

$$i = 1 + \frac{\ln \frac{\gamma_w}{\gamma_d}}{\gamma_w - \gamma d} \tag{S2}$$

Figure S3 shows this difference as a function of the sheltered individuals for the values of γ_w and γ_d. The largest differences between the leaving rates from WS and DS are between 2 and 6 sheltered individuals. For larger sheltered population these differences become negligible. This is true for the values $\gamma_w(\gamma_d)$ estimated from the non-linear fitting and from the simulation (see table 2 and section model).

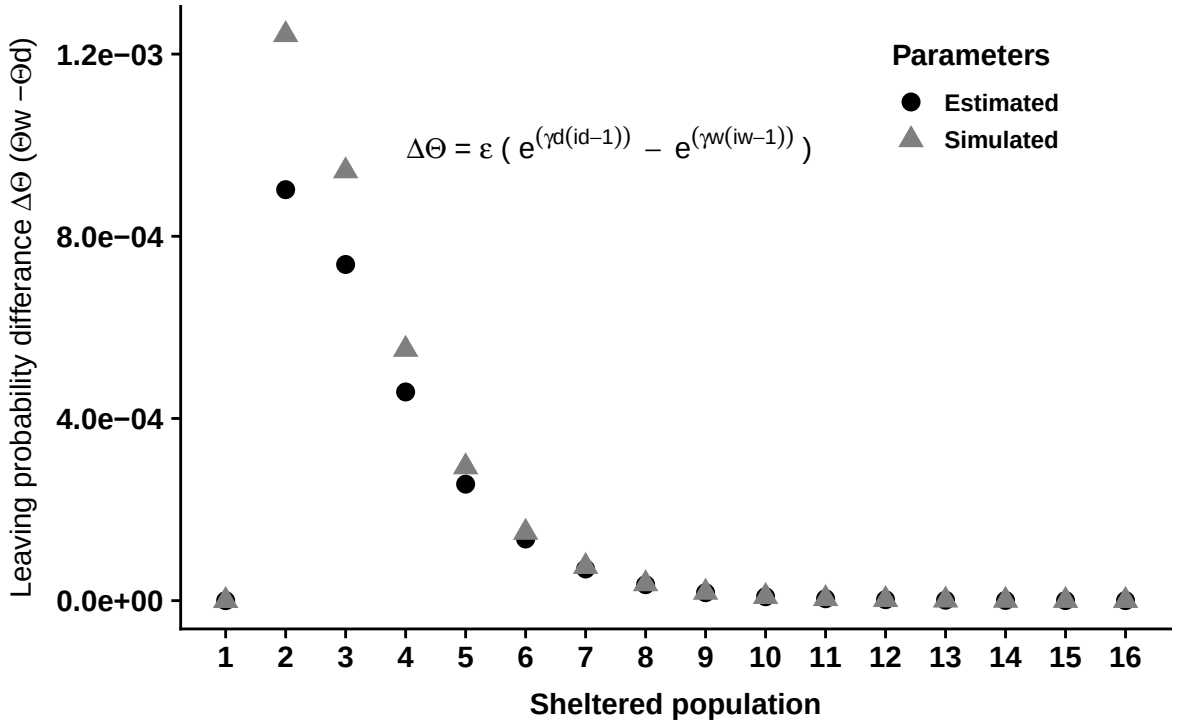

Figure S3. Difference of leaving probabilities $\Delta\Theta$ ($\Theta_w - \Theta_d$) as a function of the number of sheltered individuals for the estimated parameters from table 2 (black dot, $\varepsilon = 5.8 \times 10^{-3}$; $\gamma_d = 1.051$; $\gamma_w = 0.72$) and for the simulated values (light grey triangle, $\varepsilon = 5.8 \times 10^{-3}$; $\gamma_d = 1.3$; $\gamma_w = 0.72$).