Supplementary Materials

Mapping a brain parasite: occurrence and spatial distribution in fish encephalon

Ana Born-Torrijos[1,2*], Gabrielle S. van Beest[1,3], Paolo Merella[4], Giovanni Garippa[4], Juan Antonio Raga[3], Francisco E. Montero[3]

[1] Institute of Parasitology, Biology Centre of the Czech Academy of Sciences, Branišovská 31, 370 05 České Budějovice, Czech Republic.

[2] Department of Coastal Systems, NIOZ Royal Netherlands Institute for Sea Research, Den Burg, Texel, Netherlands.

[3] Cavanilles Institute for Biodiversity and Evolutionary Biology, Science Park, University of Valencia, PO Box 22 085, 46071 Valencia, Spain.

[4] Dipartimento di Medicina Veterinaria, Università di Sassari, Sassari, Italy

*** Corresponding author:**

Ana Born-Torrijos

borntorrijos.ana@gmail.com

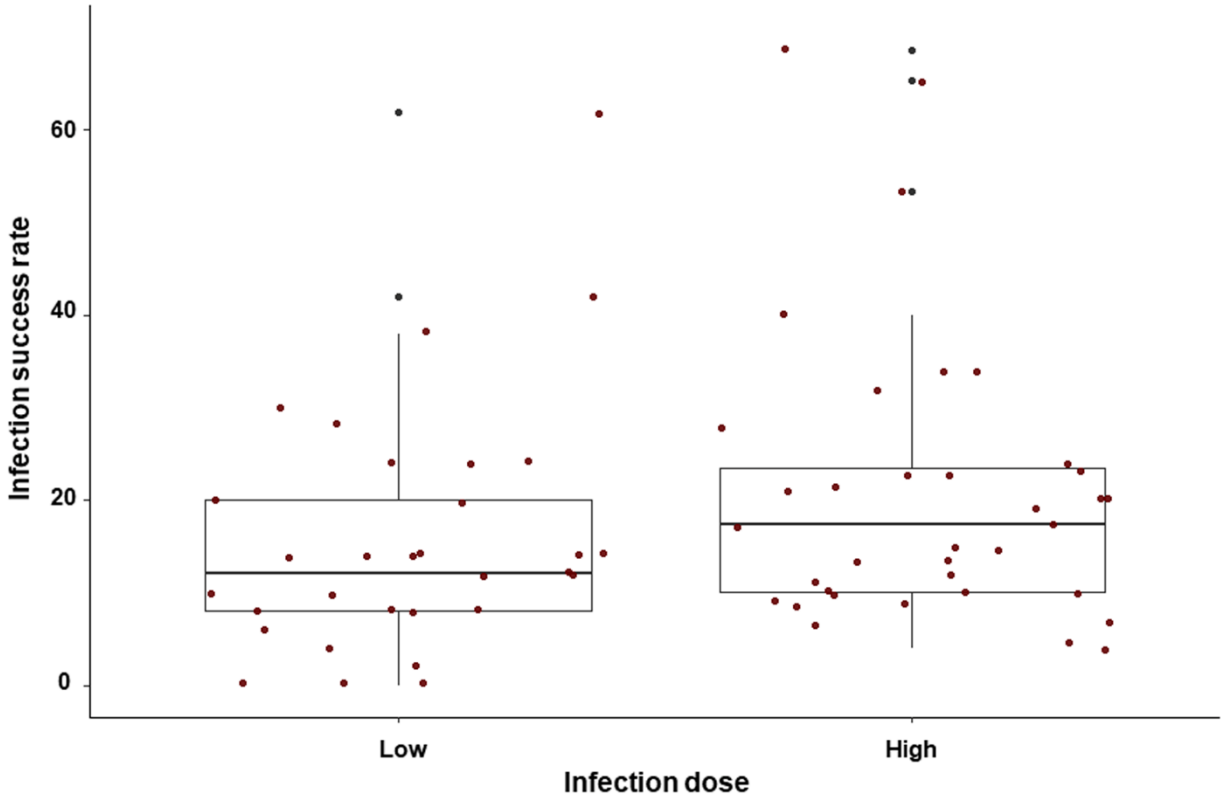
Table S1. Results of linear model (LM) evaluating the differences in number of metacercariae of *Cardiocephaloides longicollis* depending on the brain region and the group of fish ((i), experimental *vs* wild gilthead seabream, and (ii) striped seabream *vs* wild gilthead seabream) (LM, log(No. metacercariae) ~ Brain region × Fish group + No. total metacercariae). The intercept contains the reference variable 'Olf-B' and (i) 'experimental gilthead seabream' or (ii) 'wild striped seabream'. R^2 represents the variability explained by fixed effects, and statistically significant results are in bold (α=0.05).

	LM	**Estimate**	**SE**	**t-value**	**P**
(i)	R^2= 0.69				
	Intercept (Olf-B; experim. fish)	-0.4078	0.2332	-1.749	0.083
	Olf-L	**0.9940**	**0.2663**	**3.732**	**<0.001**
	Op-L	**3.444**	**0.2663**	**12.932**	**<0.001**
	ICL	**0.8148**	**0.2663**	**3.059**	**0.003**
	SCL	0.5195	0.2663	1.950	0.054
	Mo	**0.6441**	**0.2663**	**2.418**	**0.017**
	SC	1.126^{e-15}	0.2663	0.000	1.000
	wild *S. aurata*	0.3550	0.4171	0.851	0.397
	TotalBrain	$\mathbf{8.133^{e-03}}$	$\mathbf{2.743^{e-03}}$	**2.965**	**0.004**
	OlfL_total × wild *S. aurata*	-0.9940	0.5650	-1.759	0.081
	OpL_total × wild *S. aurata*	**-2.3750**	**0.5650**	**-4.204**	**<0.001**
	ICL_total × wild *S. aurata*	-0.8148	0.5650	-1.442	0.152
	SCL_total × wild *S. aurata*	-0.5195	0.5650	-0.919	0.360
	Mo_total × wild *S. aurata*	0.4180	0.5650	0.740	0.461
	SC_total × wild *S. aurata*	1.670^{e-16}	0.5650	0.000	1.000
(ii)	R^2= 0.44				
	Intercept (Olf-B; wild str. seabream)	-0.1304	0.1982	-0.658	0.513
	Olf-L	1.934^{e-15}	0.2481	0.000	1.000
	Op-L	**0.940**	**0.2481**	**3.788**	**<0.001**
	ICL	0.1569	0.2481	0.633	0.529
	SCL	9.663^{e-16}	0.2481	0.000	1.000
	Mo	**0.5919**	**0.2481**	**2.386**	**0.020**
	SC	9.801^{e-16}	0.2481	0.000	1.000
	wild *S. aurata*	0.0344	0.2919	-0.118	0.907
	TotalBrain	0.0254	0.0179	1.415	0.162
	OlfL_total × wild *S. aurata*	-9.489^{e-16}	0.4114	0.000	1.000
	OpL_total × wild *S. aurata*	0.1293	0.4114	0.314	0.754
	ICL_total × wild *S. aurata*	-0.1569	0.4114	-0.381	0.704
	SCL_total × wild *S. aurata*	-8.437^{e-16}	0.4114	0.000	1.000
	Mo_total × wild *S. aurata*	0.4702	0.4114	1.143	0.257
	SC_total × wild *S. aurata*	-9.226^{e-16}	0.4114	0.000	1.000

Table S2. Results of linear model (LM) evaluating the differences in number of encysted metacercariae of *Cardiocephaloides longicollis* depending on infection dose (low *vs* high), using the fish standard length as covariable (LM, No metacercariae ~ Fish size + Infection dose). The intercept contains the reference variable low infection dose. R^2 represents the variability explained by fixed effects, and statistically significant results are in bold (α=0.05).

LM	Estimate	SE	t-value	P
R^2= 0.48				
Intercept (low dose)	0.3098	0.4358	0.711	0.480
Standard length	0.1024	0.0522	1.962	0.054
High dose	**0.0107**	**0.0028**	**3.841**	**<0.001**

Figure S1. Variation in the number of encysted metacercariae of *Cardiocephaloides longicollis* depending on the infection dose. Box plots represent the median number of metacercariae per infection dose, upper and lower quartile (box) with maximum and minimum ranges (whiskers) and outliers (grey circles). Dots represent jittered raw data.



Supplementary data in this article will be archived in Figshare repository upon acceptance of the manuscript.