List of Supplementary material

Table S1 Model equations using the formalism of R (R Development Core Team, 2016).

Model equations	Probability distribution	Functions and packages used
1: number of larvae ~ container + container : day + shade + (1+day | code) + (1 | count)	Poisson	*glmer* in package *lme4* (Bates et al., 2015)
2a: number of larvae ~ container + container : day + shade + (1+day | code) + (1 | count) +(1 | obs)	Poisson	
2b: number of larvae ~ container + container : day + shade + (1 | count) + (1 | obs)	Poisson	
2c: number of larvae ~ container + container : day + shade + (1+day | code) + (1 | obs)	Poisson	
2d: number of larvae ~ container + container : day + shade + (1 | obs)	Poisson	
2e: number of larvae ~ container + container : day + shade + (1 | count)	Poisson	
3: number of larvae ~ container + container : day + shade, random = ~ idh(1 + day) : code + count	-	*MCMCglmm* in package *MCMCglmm* (Hadfield, 2010)
4: number of larvae ~ container + container : day + shade, random = ~ us(1 + day) : code + count	-	
5: number of larvae ~ container + container : day + shade + (1+day | code) + (1 | count) + (1 | obs)	Negative Binomial	*glmer.nb* in package *lme4* (Bates et al., 2015)

The factor *container* has two levels (open and closed), the factor *shade* also has two levels (shaded and sunlit), *day* is a continuous variables and measures the time since the start of experiment(thereby also an indirect variable for the age of larvae), *count* refers to repeated counts of mosquito larvae, *obs* refers to the observations of each individual container, *code* refers to the codes given to each experimental container, (*1* | *count*) indicates a random intercept of the repeated counts, (*1* | *obs*) the random intercept for each observation, and (*1 + day* | *code*) a random slope for each container.

Table S2 Summary of model estimates.

	Model								
	1	2a	2b	2c	2d	2e	3	4	5
Intercept	−0.01 ± 0.80	−0.40 ± 0.76	−0.34 ± 0.15	−0.43 ± 0.75	−0.34 ± 0.15	0.63 ± 0.07	−0.85 ±0.74	−0.41 ± 0.99	−0.38 ± 0.77
P value/PMCMC	0.99	0.59	0.03	0.57	0.03	0.00	0.21	0.64	0.62
Open containers	−2.71 ± 0.97	−2.67 ± 0.90	−1.61 ± 0.15	−2.59 ± 0.88	−1.61 ± 0.15	−0.99 ± 0.05	−2.19 ± 0.75	−3.09 ± 1.15	−2.71 ± 0.92
P value/PMCMC	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Shaded	0.96 ± 0.27	0.75 ± 0.42	0.53 ± 0.13	0.76 ± 0.42	0.53 ± 0.13	0.34 ± 0.05	1.45 ± 0.56	0.79 ± 0.45	0.71 ± 0.41
P value/PMCMC	0.00	0.07	0.00	0.07	0.00	0.00	0.01	0.08	0.08
Open container : day	−1.33 ± 0.40	−1.22 ± 0.42	−0.36 ± 0.08	−1.16 ± 0.41	−0.36 ± 0.08	−0.32 ± 0.04	−0.63 ± 0.30	−1.46 ± 0.51	−1.25 ± 0.43
P value/PMCMC	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
AIC/DIC	4099.7	3348.1	3585.6	3346.5	3583.6	5261	2741.6	2730.8	3349.8

Where applicable, values ± standard error (SE) are given. To test the robustness of the estimates of model 2d, we modified the model equation by varying the random variables (see Table S1). P value for Markov Chain Monte Carlo analysis (PMCMC), Akaike information criterion (AIC) and Deviance information criterion (DIC).

Table S3 Model selection.

Model	Intercept	Container	Shade	Container: day	Random	df	logLik	AICc	delta	weight
2c	+	+	+	+	(1+day | code) + (1 | obs)	7	−1664.3	3346.7	0	0.693
2a	+	+	+	+	(1+day | code) + (1 | count) +(1 | obs)	10	−1664.1	3348.3	1.63	0.307
2d	+	+	+	+	(1 | obs)	6	−1785.8	3583.7	237	0
2b	+	+	+	+	(1 | count) + (1 | obs)	7	−1785.8	3585.7	239.03	0
1	+	+	+	+	(1+day | code) + (1 | count)	9	−2040.8	4099.8	753.12	0
2	+	+	+	+	(1 | count)	6	−2624.5	5261.1	1914.43	0

Models are ranked by AICc (Barton, 2015) using the *model.sel* function in the R- package *MuMIn*. + indicates the inclusion of estimates of the factors and continuous variables (intercept, container, shade, container: day) as well as the intercept (see Table S1). df, degrees of freedom; LogLik, log likelihood; AICc, second-order Akaike information criterion; delta, difference in Akaike information criterion values between the first model and model in question; weight, Akaike weights.

Fig S4 Water storage containers used for our field experiment (A, B, C) and the plastic containers in which odonate larvae transported to laboratory were reared (D). Concrete containers placed directly under the sun (A), closed container (B), open container (C).

Fig S5 Comparison of the regression estimates of all models. Intercept and factors are shown on the vertical axes. To estimate the impact of the *shade*, container type and time since start of the experiment on the counts of mosquito larvae, we fitted generalized mixed effects models using Poisson distributions (models 1–4) as well as a model using a negative binomial distribution (model 5; Table S1). Models 1–2e and 5 used a maximum-likelihood approach, whereas models 3 and 4 used a Bayesian approach (Table S1). The figure compares the coefficients, confidence interval values and standard error of the estimated effects (see also Table S2).

Fig S6 Overlap between the occurrence of Malaria and the distributional range of *B. strachani* across Africa. The distribution of *Bradinopyga strachani* has been indicated in green. Countries indicated by different shades of grey are either malaria-free or in the phase of eliminating this disease. Data for the range size of *B. strachani* was extracted from Clausnitzer and Dijkstra (2016), while the distribution of malaria was extracted from World Health Organization (2014).

References

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