

Ecography

**E7801**

Lachish, S., Knowles, S. C. L., Alves, R., Sepil, I., Davies, A., Lee, S., Wood, M. J., Sheldon, B. C. 2012. Spatial determinants of infection risk in a multi-species avian malaria system. – *Ecography* 35: xxx–xxx.

**Supplementary material**

## Appendix 1

**Table A1:** (a) Pair-wise correlations and (b) variance inflation factors of the six explanatory variables used in generalised linear models performed for blue tits and great tits<sup>†</sup>, investigating environmental and host factors associated with disease cluster membership of nestboxes.

(a)

	river	altitude	edge	oak	BTdensity	GTdensity
river	NA	0.423	-0.279	0.009	-0.335	-0.056
altitude	0.338	NA	0.213	-0.134	0.108	0.016
edge	-0.331	0.182	NA	-0.042	0.415	0.281
oak	-0.162	-0.107	0.038	NA	-0.153	-0.156
BTdensity	-0.161	0.011	0.441	0.032	NA	0.528
GTdensity	-0.249	-0.164	0.199	0.053	0.461	NA

<sup>†</sup> Correlations for blue tits are shown above the diagonal, and for great tits below the diagonal

(b)

	Blue tit model	Great tit model
river	1.895	3.293
altitude	2.545	2.607
edge	1.414	2.452
oak	1.274	1.318
BT density	1.645	1.702
GT density	1.696	2.522

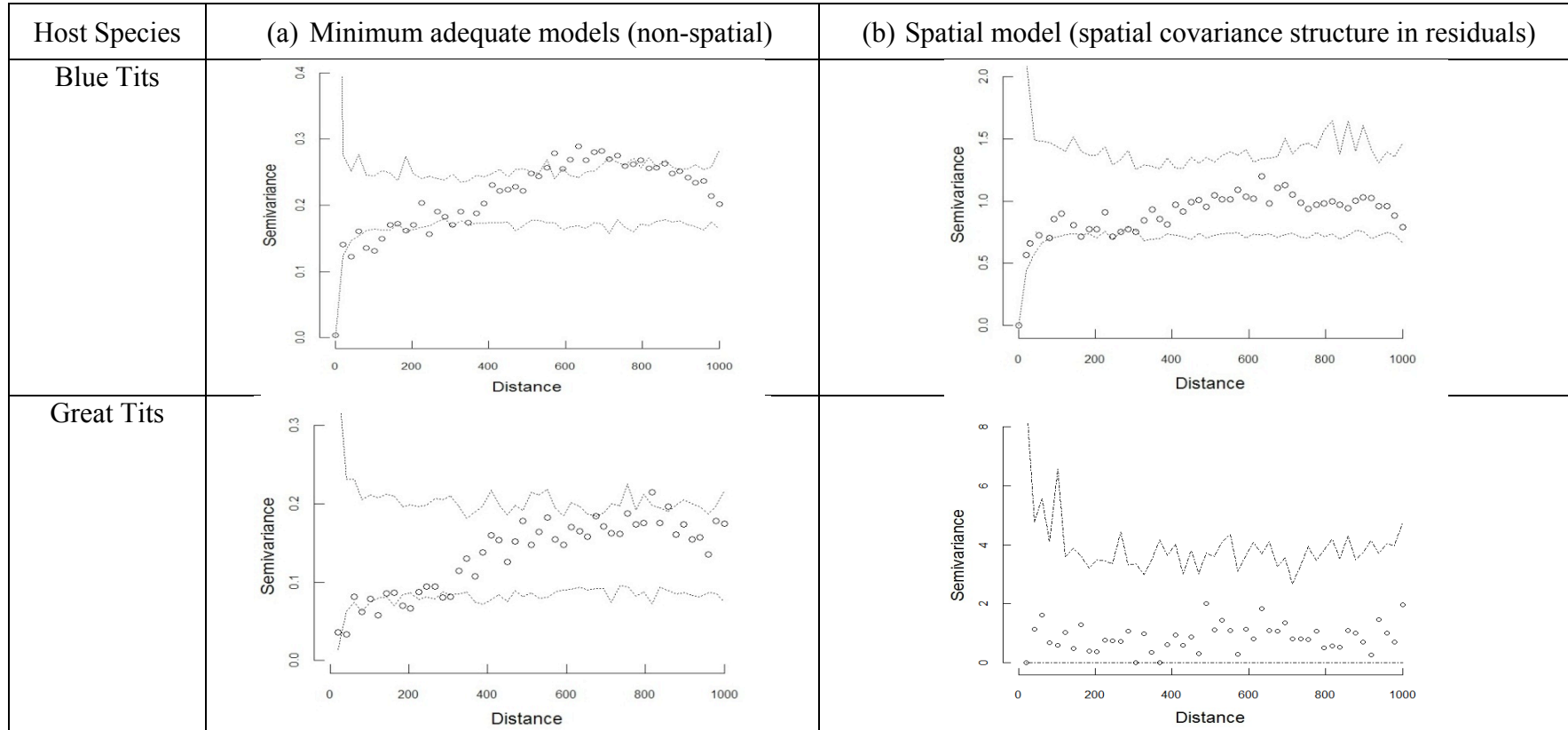
**Table A2:** Summary table showing the number of blue tits and great tits captured and diagnosed with either *P. relictum* or *P. circumflexum* infections in Wytham Woods in each year of the study, along with the prevalence of each pathogen in the population.

<b>Plasmodium</b>	<b>Host</b>	<b>Year</b>	<b># Infected</b>	<b>Total</b>	<b>Prevalence</b>
<i>P. relictum</i>	Blue Tit	2005	138	467	0.296
		2006	115	471	0.244
		2007	183	522	0.351
		2008	70	517	0.135
		2009	75	529	0.142
		2010	34	297	0.114
	Great Tit	2008	134	645	0.208
		2009	90	471	0.191
<i>P. circumflexum</i>	Blue Tit	2005	123	467	0.263
		2006	102	471	0.217
		2007	92	522	0.176
		2008	114	517	0.221
		2009	137	529	0.259
		2010	52	297	0.175
	Great Tit	2008	214	645	0.332
		2009	167	471	0.355

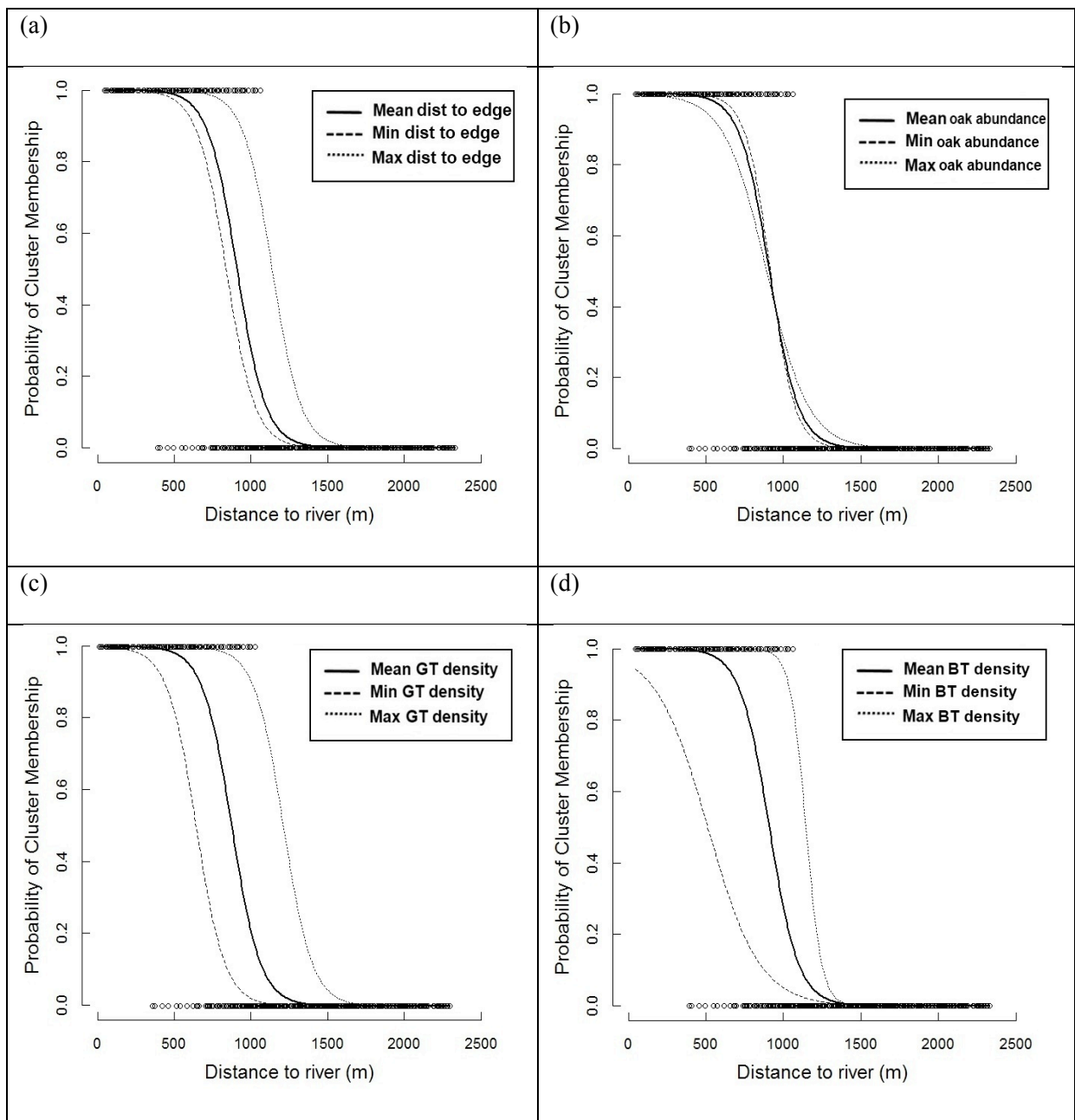
**Table A3:** Summary results of SatScan cluster analysis showing the observed and expected number of cases within each cluster (O/E), the log-likelihood ratio (LLR), and the significance (P value) of each of the identified SatScan clusters (clusters locations and sizes shown in Figure 1).

<b>Plasmodium</b>	<b>Host</b>	<b>Year</b>	<b>LLR</b>	<b>P value</b>	<b>O/E</b>
<i>P. relictum</i>	Blue Tit	2006	8.082	0.042	45/28.32
<i>P. circumflexum</i>	Blue Tit	2005	13.101	<0.0001	52/30.29
		2006	22.025	<0.0001	42/17.76
		2007	34.674	<0.0001	51/19.03
		2008	32.238	<0.0001	60/26.24
		2009	29.337	<0.0001	60/27.45
		2010	21.826	<0.0001	32/12.26
	Great Tit	2008	50.371	<0.0001	106/53.90
		2009	50.480	<0.0001	87/41.48

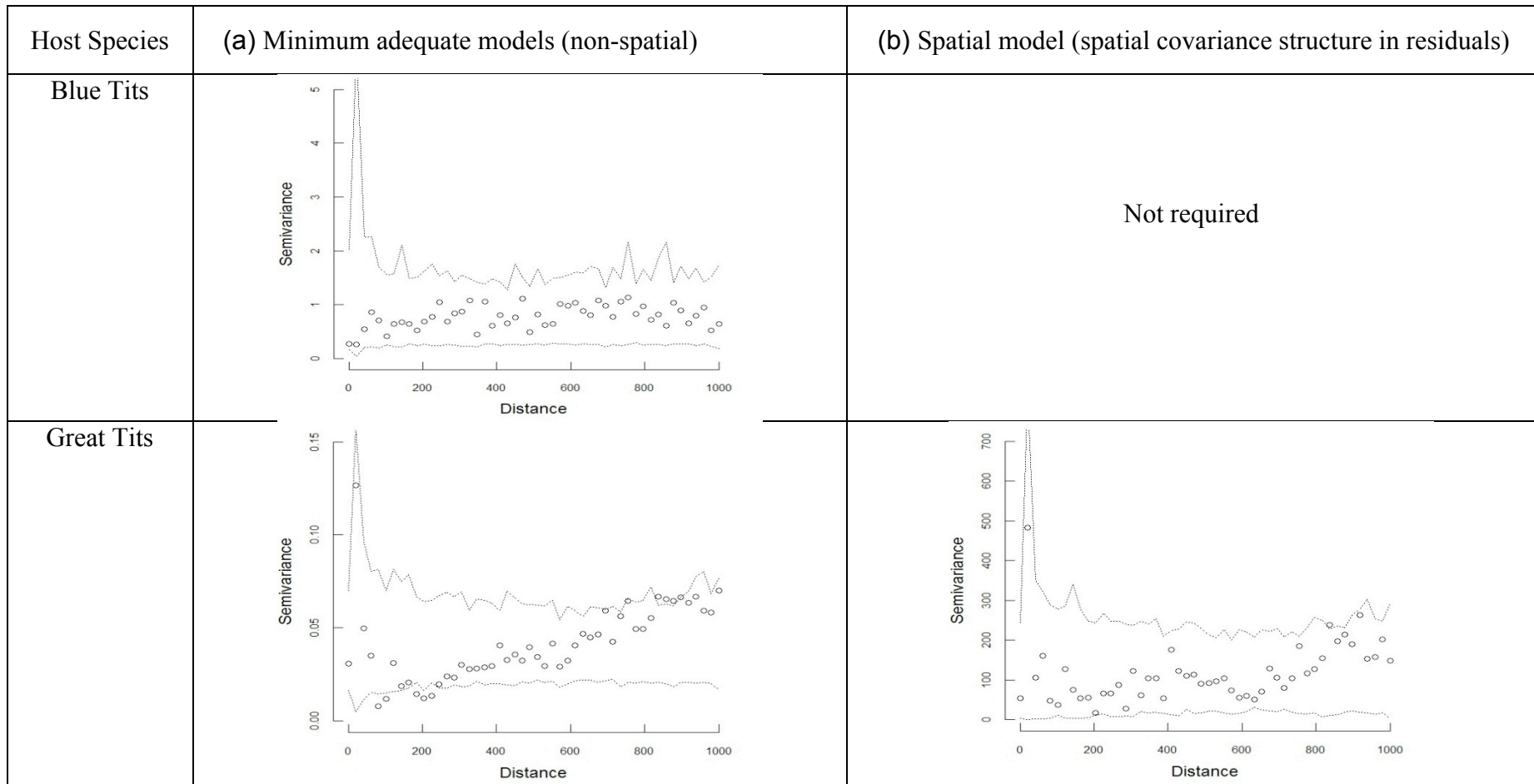
**Figure A1:** Binned semivariograms of the standardised residuals of (a) the minimum adequate models identified by model selection for the multivariate logistic regression models assessing the influence of environmental/host density factors on the probability of nestbox cluster membership (see Methods), and (b) the same models with an explicit exponential spatial covariance structure in the residuals included. Dashed lines represent the simulation envelope based on 999 Monte Carlo permutations of the data.



**Figure A2:** Probability of cluster membership for nestboxes occupied by great tits as a function of distance from the River Thames and (a) distance from the woodland edge, (b) oak abundance and (c) the local density of great tits and (d) the local density of blue tits. Predictions were generated from the minimum adequate spatial model (see Methods). Solid lines indicate the mean response in all cases; dotted lines show predicted values at the minimum value of the covariate; dashed lines show predicted values at the maximum value of the covariate. All other terms in the model were set to their mean value. Circles are the observed values.



**Figure A3:** Binned semivariograms of the residuals of the minimum adequate models identified by model selection for the mixed-effects logistic models assessing the influence of host-specific factors on the probability of *P. circumflexum* cluster membership for infected blue tits and great tits (see Methods). Dashed lines represent the simulation envelope based on 999 Monte Carlo permutations of the data.



**Figure A4:** Probability of *P. circumflexum* cluster membership for blue tits infected with *P. circumflexum* as a function of parasitaemia. Predictions were generated from the minimum adequate model (see Methods). Dotted lines are 95% CI. Circles are the observed values.

