

Additional File 2 Model rankings exploring factors affecting detection probability (p) and prevalence (ψ) of *Haemoproteus* parasites in American Robins.

Model	K	$\Delta AICc$	w_i	Deviance
$\sigma(.) + p(.) + \psi(.)$	3	0.00	0.33	104.05
$\sigma(.) + p(.) + \psi(\text{sex})$	4	1.66	0.15	103.23
$\sigma(.) + p(.) + \psi(\text{BCI})$	4	1.66	0.15	103.24
$\sigma(.) + p(.) + \psi(\text{year})$	4	2.44	0.10	104.01
$\sigma(.) + p(.) + \psi(\text{sex+BCI})$	5	3.28	0.06	102.23
$\sigma(.) + p(.) + \psi(\text{year+BCI})$	5	3.34	0.06	102.29
$\sigma(.) + p(.) + \psi(\text{sex+year})$	5	4.27	0.04	103.22
$\sigma(.) + p(\text{PCR run}) + \psi(.)$	5	4.90	0.03	103.85
$\sigma(.) + p(.) + \psi(\text{sex+year+BCI})$	6	5.61	0.02	101.79
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex})$	6	6.86	0.01	103.04
$\sigma(.) + p(\text{run}) + \psi(\text{BCI})$	6	6.87	0.01	103.04
$\sigma(.) + p(.) + \psi(\text{age})$	6	6.90	0.01	103.07
$\sigma(.) + p(\text{PCR run}) + \psi(\text{year})$	6	7.64	0.01	103.81
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+BCI})$	7	8.81	0.00	102.03
$\sigma(.) + p(\text{PCR run}) + \psi(\text{year+BCI})$	7	8.88	0.00	102.10
$\sigma(.) + p(.) + \psi(\text{sex+age})$	7	9.35	0.00	102.57
$\sigma(.) + p(.) + \psi(\text{age+BCI})$	7	9.41	0.00	102.63
$\sigma(.) + p(.) + \psi(\text{age+year})$	7	9.78	0.00	103.00
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+year})$	7	9.81	0.00	103.02
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+year+BCI})$	8	11.52	0.00	101.59
$\sigma(.) + p(.) + \psi(\text{age+year+BCI})$	8	11.67	0.00	101.74
$\sigma(.) + p(.) + \psi(\text{sex+age+BCI})$	8	11.86	0.00	101.94
$\sigma(.) + p(.) + \psi(\text{sex+age+year})$	8	12.50	0.00	102.57
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age})$	8	12.80	0.00	102.88

$\sigma(.) + p(.) + \psi(\text{sex+age+year+BCI})$	9	14.75	0.00	101.47
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age})$	9	15.66	0.00	102.37
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age+BCI})$	9	15.72	0.00	102.43
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age+year})$	9	16.08	0.00	102.80
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age+year+BCI})$	10	18.41	0.00	101.54
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age+BCI})$	10	18.61	0.00	101.74
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age+year})$	10	19.24	0.00	102.37
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age+year+BCI})$	11	21.99	0.00	101.27

Model set and rankings exploring the importance of factors affecting the detection probability (p) and prevalence (ψ) of

Haemoproteus blood parasites in American Robins captured and sampled at a high-elevation valley in northern Colorado

during 2017-2018. ‘PCR run’ indicates the 3 PCR replicates carried out for each sample. The number of parameters (K), model weights (w_i), and deviance are shown for each model and the models are ranked by their AICc differences relative to the best model in the set (ΔAICc_i). Sigma (σ) was a random effect included in every model to account for unmodeled heterogeneity.