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Relatedness and spatial proximity as determinants of host–parasite interactions in the brood parasitic Barrow's goldeneye (Bucephala islandica)

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*Ecological Genetics Research Unit and ‡Bird Ecology Unit, Department of Biological and Environmental Sciences, University of Helohvid-TD -09.91(c)-4.63koe17.74 0 TDa ()5.lZmv0B i0i4el.ee-4.6(o)5.87 Tc0 i0i4el.emv0B i2 Tc 0o,m6a]t i2 Tc5rohvi8-TD -09.95(c)-4.6

microsatellite loci described in Jaari et al. (2009) and listed in Table A1, Supporting information. Polymerase chain

(± 0.041); the two did not significantly differ from each other (P = 0.84, Tukey's test). However, both relatedness coefficients were significantly higher than that of the remaining population (P = 0.011 and 0.001 respectively, Tukey's test), the mean (± SE) of which was –0.015 (± 0.0081).

Parasitism behaviour

The number of parasitic eggs laid into host nests increased with decreasing distance {b = –0.17, 95% highest posterior density interval [–0.28, –0.08, Pr(coefficient > 0) < 0.001]; Fig. 2}. The number of parasitic eggs also increased with relatedness between host and parasite {b = 2.4, 95% highest posterior density interval [0.70, 4.43, Pr(coefficient < 0) = 0.004]; Fig. 2}.

Clutch reduction and relatedness

There was evidence that the number of host offspring decreased with increasing relatedness to the parasite and increasing numbers of parasitic offspring in the nest: log(R) = 2.1 – 0.06 × parasitic offspring – 0.77 × relatedness (Table 1, Fig. 3, R = expected number of offspring). However, although the confidence intervals were wide (–0.13 to 0.015 for number of parasitic offspring, –1.54 to –0.003 for relatedness), the posterior probabilities that the estimates are not negative were all around 0.05 (0.06 and 0.025 for number of parasitic offspring and relatedness, respectively), meaning that there is a very small probability that the effect

not mutually exclusive, proce sses. First, natal philopatry may be facilitating the proximity of relatives. Second, a closely related species, the common goldeneye (Bucephala clangula), has been documented to prioritize safe nest sites when parasitizing (Pöysä 1999). A closer examination of the fate of host nests included in our study revealed that they had not been subject to predation once over the past three years. Neighbouring common goldeneye nests have been found to have a high probability of sharing the same fate (predated vs. successful; Pöysä 1999), and the probability of sharing the same fate also decreases with distance between nests (H. Pöysä, Finnish Game and Fisheries Research Institute, Joensuu, personal communication). Thus, nesting parasite females may target nests close to their own, safe nests in order to elevate the survival probability of their parasitic offspring.

Our finding that the number of parasitic eggs donated by nesting parasites increased with relatedness is in accordance with previous studies (Andersson & Åhlund 2000; Roy Nielsen et al. 2006; Andersson & Waldeck 2007; Waldeck et al. 2008). These studies found the relatedness betweene2u(found 5(ritizem053u4wg)2bgphaT.0639c7 -1tm053u4safe ld the iu(Th8ra

donors, as well as elucidating whether negotiation between hosts and parasites occurs.

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5.5(rat)-6.3lis1.8iftt6.3308 0 TD -06.3534c (,)Tj /F4 1 Tf0