Akademisk avhandling för filosofie doktorsexamen
Thesis for the Degree of Doctor of Philosophy

Infidelity in Birds
Causes and Consequences of Extra-pair Paternity

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The oral defence of this thesis will take place at
10:00 am on Friday May 4th 2012 at the
Department of Biological and Environmental Sciences,
Medicinaregatan 18, Göteborg, Sweden.

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ABSTRACT

Forty years ago, more than 90% of bird species were classified as monogamous and not very exciting systems for studies of e.g. sexual selection. Since then, the discovery of extra-pair paternity (EPP) in more than 75% of surveyed monogamous bird species has made avian monogamy, and the interaction between social and genetic mating systems in general, a challenging and attractive area of research. Despite three decades of research on EPP in birds, however, many questions and controversies remain unresolved. This thesis contributes to the understanding of mechanisms and adaptive reasons, primarily from the female's perspective, for the highly diverse frequencies of EPP in birds.

First, in a population of the common redshank (*Tringa totanus*), a wader for which the genetic mating system has not been described previously, a surprising absence of EPP is demonstrated (**I**). Presumably, some female pre- or postcopulatory resistance to extra-pair fertilisations is present. The potential mechanisms and adaptive significance of this is discussed in relation to redshank ecology and behaviour.

In the three following papers (**II-IV)**, assumptions and predictions of hypothesized female benefits from EPP are addressed. In sand martins (*Riparia riparia*), there were no indications that extra-pair fertilisations resulted in genetic benefits (e.g. heterozygosity or 'good genes') (**II**). Paper **III** tests an assumption related to the genetic compatibility hypothesis, i.e. that overall heterozygosity leads to increased chick survival; this did not seem to be the case in Kentish plovers (*Charadrius alexandrinus*). In northern lapwings (*Vanellus vanellus*), the indirect benefits hypothesis is partly supported by a positive association between EPP and brood sex ratio (**IV**). As predicted by the differential sex allocation hypothesis, broods with extra-pair offspring contained a higher proportion of sons than broods without extra-pair young. As for the yet unknown mechanism of sex determination in birds, an unusual case of a fertile, triploid Kentish plover female is presented and discussed with regard to the two present major hypotheses for sex-determination (**VI**). Finally, as an alternative or additional interpretation of what appears to be brood sex ratio adjustment by the female, the often neglected effect of differential mortality is discussed (**V)**.

Keywords: Extra-pair paternity, genetic benefits, heterozygosity, sex ratio, *Riparia riparia, Tringa totanus, Vanellus vanellus, Charadrius alexandrinus*

ISBN: 978-91-628-8452-9. Electronic version: http://hdl.handle.net/2077/29039