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SHORT REPORT

Observation of nest visitation by multiple males in the European Nightjar *Caprimulgus europeaus*

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ABSTRACT
We report observations of nest visitation of multiple males to three nests of European Nightjars *Caprimulgus europeaus*. In one case, we report the direct observation of two males apparently exhibiting parental behaviour at the same nest. In two other cases, second males visited nests. We consider the potential functions of nest visits by extra-pair males in the Nightjar.

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The European Nightjar *Caprimulgus europeaus* (hereafter Nightjar) is considered to be a socially monogamous breeder, although mate switching has been recorded between broods or between breeding seasons (Alexander & Cresswell 1990). Nightjars were intensively monitored throughout the 2018 breeding season from May 1st to September 1st on Canford Heath NNR (50.76251°N, −1.95773°W), Dorset. Nine nests were monitored as part of an ongoing radio-telemetry study, involving trapping birds on or close to nests and recording a subset of nest provisioning behaviours using hidden trail cameras at the nest. We recorded three nests that had at least two male attendees. We do not know, however, that the remaining six were attended by only one male.

Nest 1 – The nest was found by on 13 June 2018 by radio-tracking a second calendar year (CY) male and then searching in nearby suitable habitat. A female (third CY or older) was incubating at the nest 5 m from the roosting male. A camera trap recorded this tagged male relieving the female of incubation during early evening. Once the eggs hatched, an attempt was made to recapture the male whilst at the nest during which a new, unringed male (third CY or older) was caught at the nest by hand. The new male was alone with 2 five-day-old chicks at the nest. The original male was then caught at the nest by mist-netting in the following week.

Nest 2 – The nest was found by radio-tracking a female (third CY or older) to the nest where she was incubating. Once the chicks hatched, a male (second CY) was caught by mist-netting while entering the nest (without playback lure). A second male (third CY or older) was then caught by being flushed off the nest into a net, where it was with two chicks, on the same night, 15 min after the first male was caught. The second male was radio-tracked and, following nest failure, re-nested with the same female 50 m from the original nest site.

Nest 3 – The nest was found by radio-tracking a female (second CY) to the nest where she was incubating. Once the chicks hatched, a male (third CY or older) and female were caught at the nest by mist-netting. A second male of unknown age was observed arriving to within 2 m of the nest whilst the first male and female were being processed.

Here we report a small sample of nests with relatively high frequency (at least 1/3) of nest attendance by multiple male Nightjars during the same reproductive attempt, across a single season at a single site with a large population of Nightjars. Why second male Nightjars might have visited nests is unknown, but nest visitation by birds outside of socially monogamous pairings are well known previously across a wide variety of avian taxa (Firth *et al.* 2018), and we explore some of the potential explanations for this behaviour

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in Nightjars here. First, males might visit nests to secure copulations with females that become receptive for a second breeding attempt during the first, as occurs in some other species (e.g. Great Tits *Parus major*, Firth *et al.* 2018). Indeed, whilst the Nightjar is generally considered to have socially monogamous nesting behaviour, mate switching may occur between broods or between seasons (Alexander & Cresswell 1990), the former of which might result in males seeking copulations with females before chicks fledge from a first brood. A speculative extension to this is that nest visitations might, in addition, be involved in displays to a prospective mate, if for example, females attend to males' parenting skill at the nest as part of mate selection. Alternatively, male Nightjars might be visiting nests in order to acquire information about other individuals, or their nest sites, in nearby areas (Hebert *et al.* 2011, Schuett *et al.* 2017, Firth *et al.* 2018). In Pied Flycatchers *Ficedula hypoleuca*, such nest visitation seems to be associated most frequently with nests that have fledged large numbers of offspring and thus is thought to be driven by birds seeking to trade-up nest site quality (Schuett *et al.* 2017). Finally, nest visits might be in order to provision offspring or incubate eggs if the second males are part of a polyandrous or cooperative breeding coalition. In the current study, nest visitation at the first nest by one male was observed at dusk, which is typical of Nightjar parental behaviour during incubation (Ferguson-Lees *et al.* 2011) and, by the second male, to apparently brood two chicks. Tentatively, these observations are most consistent with the provisioning hypothesis. Such nest provisioning might, in conjunction with previously observed mate-guarding behaviour in the species (Sáez & Camacho 2016), suggest that male Nightjars are responding to polyandrous or extra-pair copulations owing to the prospect of shared or probabilistic paternity of the clutch (Jennions & Petrie 2000). Whilst multiple males might also engage in provisioning behaviour at nests owing to relatedness (and relatedness could be high for species with high natal philopatry, Camacho 2014), such cooperative breeding is rare across avian taxa (Cockburn 1998). Resolving these and other hypotheses for why Nightjars exhibit multi-male nest visitation will require more intensive monitoring and, most probably, genetic studies in future.

Ethical statement

All work was carried out under licence from the British Trust for Ornithology.

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