

Observation of nest visitation by multiple males in the European nightjar, *Caprimulgus europaeus*

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Summary

We report observations of nest visitation of multiple males to three nests of European nightjar. 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.

Body

European Nightjars, *Caprimulgus europaeus*, were intensively monitored throughout the 2018 breeding season from May 1st to September 1st on Canford Heath NNR (50.76251N, -1.95773W), 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.

30 Nest 1:

31 The nest was found by on 13th June radio tracking a 2nd calendar year (CY) male and then searching
32 in nearby suitable habitat. A female (3rd CY or greater) was incubating at the nest 5m from the roosting
33 male. A camera trap was setup where this tagged male was photographed relieving the female of
34 incubation during early evening. Once the eggs hatched, an attempt was made to recapture the male
35 whilst at the nest during which a new, un-ringed male (3rd CY or greater) was caught at the nest by
36 hand. The new male was alone with two five-day old chicks at the nest. The original male was then
37 caught at the nest by mist netting in the following week.

38

39 Nest 2:

40 The nest was found by radio tracking a female (3rd CY or greater) to the nest where she was incubating.
41 Once the chicks hatched, a male (2nd CY) was caught entering the nest by mist-netting (without
42 playback lure) at the nest. A second male (3rd CY or greater) was then caught by being flushed off the
43 nest, where it was with two chicks, into the net the same night, 15 minutes after the first male was
44 caught. The second male was radio-tracked and, following nest failure, re-nested with the same
45 female 50m from the original nest site.

46

47 Nest 3:

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

52

53 Here we report a small sample of nests with relatively high frequency (at least 1/3) of nest attendance
54 by multiple male nightjars during the same reproductive attempt, across a single season at a single
55 site with a large population of European nightjars. Why second male nightjars might have visited

56 nests is unknown, but nest visitation by birds outside of socially monogamous pairings are well
57 known previously across a wide variety of avian taxa (Firth et al. 2018), and we explore some of the
58 potential explanations for this behaviour in nightjars here. First, males might visit nests to secure
59 copulations with females that become receptive for a second breeding attempt during the first, as
60 occurs in some other species (e.g. great tits, *Parus major* Firth et al. 2018). Indeed, whilst the
61 European nightjar is generally considered to have socially monogamous nesting behaviour, mate
62 switching may occur between broods or between seasons (Alexander and Cresswell 1990), the former
63 of which might result in males seeking copulations with females before chick fledging from a first
64 brood. A speculative extension to this is that nest visitations might, in addition, be involved in displays
65 to a prospective mate, if for example females attend to males' parenting skill at the nest as part of
66 mate selection. Alternatively, male nightjars might be visiting nests in order to acquire information
67 about other individuals, or their nest sites, in nearby areas (Firth et al., 2018; Hebert et al. 2011;
68 Schuett et al. 2017). In pied flycatchers, *Ficedula hypoleuca*, such nest visitation seems to be
69 associated most frequently with nests that have fledged large numbers of offspring and thus is thought
70 to be driven by birds seeking to trade-up nest site quality (Schuett et al. 2017). Lastly, nest visits
71 might be in order to provision offspring or incubate eggs. In the current study, nest visitation at the
72 first nest by one male was observed at dusk, typical of nightjar parental behaviour during incubation
73 (Ferguson-Lees et al. 2011) and, by the second male, was apparently to brood two chicks. Tentatively,
74 these observations are most consistent with the provisioning hypothesis. Such nest provisioning might,
75 in conjunction with previously observed mate guarding behaviour in the species (Sáez & Camacho
76 2016), suggest that male nightjars are responding to polyandrous extra-pair copulations owing to the
77 prospect of shared or probabilistic paternity of the clutch (Jennions and Petrie 2000). Whilst multiple
78 males might also engage in provisioning behaviour at nests owing to relatedness (and relatedness
79 could be high for species with high natal philopatry (Camacho 2014)), such cooperative breeding is
80 rare across avian taxa (Cockburn 1998). Resolving these and other hypotheses for why nightjars
81 exhibit extra-pair nest visitation will require more intensive monitoring and, most probably, genetic

82 studies in future.

83

84 **Ethical statement**

85 All work was carried out under licence from the British Trust for Ornithology (C/6128).

86

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94 **References**

95 Alexander, I., and Cresswell, B. (1990). Foraging by nightjars, *Caprimulgus europaeus* away from
96 their nesting areas. *Ibis*. **132**(4). 568-574.

97 Camacho, C. Early age at first breeding and high natal philopatry in the Red-necked Nightjar
98 *Caprimulgus ruficollis*. (2014) *Ibis*. **156**. 442-445.

99 Cockburn, A. (1998). Evolution of helping behaviour in cooperatively breeding birds. *Annual Review*
100 *of Ecology and Systematics*. **29**. 141-177.

101 Firth, J.A., Verhelst, B.L., Crates, R.A., Garroway, C.J. and Sheldon, B. (2018). Spatial, temporal and
102 individual-based differences in nest-site visits and subsequent reproductive success in wild great tits.
103 *Journal of Avian Biology*. **49** (10). 1-11.

104 Hebert, P.N., Carter, H.R., and Golightly, R. (2011). Extra-pair visitations to a marbled murrelet nest
105 in Northern California. *Northwestern Naturalist*. **92**. 95-100.

106 Jennions, M.D., Petrie, M. (2000). Why do females mate multiply? A review of the genetic benefits.
107 *Biological Reviews*. **75** (1). 21-64.

108 Jensen, N.O. (2013). A case of polyterritorial polygyny in European Nightjar *Caprimulgus europaeus*.
109 *Dansk Ornitologisk Forening*. 108. 239-244.

110 Schuett, W., Järvisjö, P.E., Calbim, S., Velmala, W. and Laaksonen, T. (2017). Nosy neighbours: large
111 broods attract more visitors. A field experiment in the pied flycatcher, *Ficedula hypoleuca*. *Oecologia*,
112 **184** (1). 115-126.

113 Sáez, P. and Camacho, C. (2016). Chotacabras cuellirrojo – *Caprimulgus ruficollis*. En: *Enciclopedia*
114 *Virtual de los Vertebrados Españoles*. Salvador, A., Morales, M. B. (Eds.). Museo Nacional de
115 Ciencias Naturales, Madrid. <http://www.vertebradosibericos.org/>