

## Brief report

# Successful bigamy in the Great Grey Shrike *Lanius e. excubitor*

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### 1. Introduction

*Lanius* shrikes are predominantly monogamous (Lefranc & Worfolk 1997). Cases of successful polygamy, when both females rear young, have been recorded only in the Loggerhead *Lanius ludovicianus* (Yosef 1992) and the Southern Grey Shrike *L. meridionalis* (Yosef & Pinshow 1988). The latter species has recently been widely accepted as specifically distinct from the Great Grey Shrike *L. excubitor* (e.g. Panow 1996), which was not successful in the only documented attempt at bigamous breeding (Lorek 1991). The basis for the split is differences both in morphology and in behaviour. Furthermore, the species have different habitat preferences (e.g. Isenmann & Bouchet 1993, Lefranc 1995). Recent phylogenetic studies have supported this view (A. J. Helbig, pers. comm.).

The holarctic Great Grey Shrike occurs in semi-open habitats, mainly within the taiga belt (Lefranc & Worfolk 1997). The species is highly territorial and defends large territories that cover up to about 90 ha in winter (Schön 1994a). In central Europe the species nests in a thorny bush or a tree (Panow 1996) and the nest contains 3–8 eggs

(Schön 1994b). The female is responsible for almost the entire incubation, while the male provides almost all the food during this period (Lefranc & Worfolk 1997).

This brief note documents a successful instance of bigamy in nominate Great Grey Shrike, producing five fledglings in each nest, and discusses possible reasons for the polygamous mating.

### 2. Study area and methods

The bigamously paired male was discovered on 10 April 1998 near Raabs an der Thaya in north-eastern Austria (48°53'N, 15°29'E), approximately 10 km west of the Czech border. In this area (the so-called Northern Waldviertel) between 7 and 20 breeding territories are occupied each year (from 1995 to 99; see Sachslehner & Schmalzer 1999). The birds represent part of a larger population in the Czech Republic, which has not been investigated in detail. The study area has been described in detail elsewhere (Wrbka et al. 1996).

One female nested in a spruce *Picea abies*

within a patch of coniferous forest about 0.75 ha in size and the other, 620 m away, in a more or less isolated elder *Sambucus nigra*. Both females had recently begun to incubate, as was subsequently confirmed from the fledging data (incubation 17 days, time to fledging 19 days; see Schön 1997 for central Europe). The difference in laying date between the two females could only be determined approximately (within 2–6 days), because bad (stormy) weather conditions caused the earlier offspring from the brood in the spruce to hide within the forest patch for a few days.

Although the shrikes were not marked, they could be distinguished individually by means of their wing patterns and eye-masks (Schön 1994c). To experienced observers working with high-quality optical equipment (binoculars 10×40, telescopes 20–60 variable), such individual marks are relatively easy to detect, especially as the birds are often not particularly shy and perch prominently for long periods. It should also be noted that in 1998 no further pairs nested within a distance of several kilometres from the trio (Sachslehner & Schmalzer 1998). Therefore, the occurrence of additional individuals (especially males) during the study period could be excluded.

The male and both nest sites were intensively observed throughout the incubation and nestling period (19 hours of observations with timings recorded to the second), and random visits were paid until the dissolution. Further investigations, e.g. comparing the nestling weights of the two broods, were not undertaken because of the potential danger to the nest in the fragile *Sambucus* bush (from handling) and possible negative effects of research activities on shrike species in general (Tryjanowski & Kuzniak 1999). It should be noted that the Great Grey Shrike, with a breeding population of under 30 pairs, is one of the species threatened with extirpation from Austria (Berg 1997).

When not at the nest sites the male was almost always observed (predominantly on hunting perches) clearly closer to one of the nests. He frequently moved between these two areas, generally flying high and directly between them. His home range could therefore be divided into two

“territory halves”. This enabled his time budget and hunting behaviour to be followed (see below).

### 3. Results

The female nesting earlier (in the forest patch, hereinafter the  $\alpha$ -female) was clearly preferred to the female nesting in the elder (hereinafter the  $\beta$ -female). During the incubation and nestling period the male was found comparatively rarely in the  $\beta$ -female's territory (29% and 13%, respectively) although the size of his home range corresponded only to the territory occupied by a monogamously paired bird. The limits of this territory are known and have been fundamentally unchanged since 1991 (L. Sachslehner, pers. comm.). Additionally, this area was almost exclusively used for hunting (during incubation 62% and during the nestling period 22% of all attacks took place here), while other activities (e.g. preening) took place only in the  $\alpha$ -female's territory. Even when supplying a prey item (the male was seen to bring a vole *Microtus sp.* at least five times), the male disappeared immediately from the  $\beta$ -female's nest site after passing food. Therefore, the male never fed these nestlings himself ( $\beta$ -female  $n = 59$  observed) although he did participate in the rearing of the brood in the spruce (both parents  $n = 37$ ).

Inter-specific aggression towards potential predators (e.g. Common Buzzard *Buteo buteo* or Kestrel *Falco tinnunculus*) was only recorded at the  $\alpha$ -female's nest site (both parents  $n = 10$ ), while birds of prey and corvids passing or hunting close to the other brood were never mobbed.

In contrast to the  $\alpha$ -female, which contributed no food during incubation and the nestling period, the  $\beta$ -female was observed to hunt regularly during the latter ( $n = 50$ ).

### 4. Discussion

The main models of polygamous mating systems in birds are complex (reviews in Searcy &

Yasukawa 1989, Lignon 1999) and interpretations of distinct cases are often somewhat speculative. Furthermore the hypothesis deals primarily with costs or benefits to the females, while the consequences to the males are often ignored (but see Yosef et al. 1991, Yosef 1992).

In the present instance, only the "deception hypothesis" (Alatalo et al. 1981), in which the male conceals its mated status to the females, can be completely excluded. In view of the nearly simultaneous breeding and the short distance between the nests in this open habitat, it seems very unlikely that the females, although never seen close together, did not know of each other's existence.

The present study did not provide any data to address whether the "sexy son hypothesis" (Weatherhead & Robertson 1979), in which the low productivity of females is compensated for by the attractiveness of their sons, could account for the results. The possibility that polygamy is the product of a female-biased sex ratio (Skutch 1935, Williams 1952) could not be verified because the exact sex ratio during the pairing time was not known.

Particularly interesting is the "polygyny threshold model" (Verner 1964, Verner & Willson 1966), in which females select males that have already mated to be able to obtain better territories or mates. An extremely high vole density was evident within the male's home range, although no specific survey was performed. A strong relationship between polygamy and abundant microtines was also found in other field studies (e.g. for the Northern Harrier *Circus cyaneus*, Simmons et al. 1986a). Moreover, the territory seems to be structurally favourable, as breeding of Great Grey Shrikes has taken place here in every year since at least 1991 (L. Sachslehner, pers. comm.). The male's parental quality has to be assessed as ambivalent, as the  $\beta$ -female received clearly less attention (see results). A similar kind of hierarchy was also recorded in some diurnal birds of prey (e.g. Northern Harrier, Simmons et al. 1986b; Red Kite *Milvus milvus*, van Kleef & Bustamante 1999).

As the  $\beta$ -female was forced to hunt from the early stages of the nestlings, not only the availability of food but also the weather had a significant influence on the breeding success. Taking into account that about 50% of brood losses are caused by wet and cold weather in central Europe. (Schön 1994b), the generally dry and warm conditions during April and May (1–2°C higher than average; data from the Central Institute for Meteorology and Geodynamics, Vienna) allowed the  $\beta$ -female to contribute considerably to the provision of food. The positive connection between weather and food was also revealed by the number of fledglings (successful broods only) within the entire study area, which was much higher in 1998 (4.0) than on average during a current investigation (2.72; 1995–99; Sachslehner & Schmalzer 1999).

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### Selostus: Onnistunut moniavioisuustapaus isolepinkäisellä *Lanius e. excubitor*

Moniavioinen isolepinkäiskoiras löytyi 10.4.1998 Koillis-Itävallasta. Molemmat naaraat kasvattivat viisi poikasta. Koiras suosi selvästi toista naaraista ( $\alpha$ -naaras). Koiras ei osallistunut  $\beta$ -naaraan poikasten ruokkimiseen tai pesän puolustamiseen mahdollisia petoja vastaan. Pesäpoikasvaiheessa  $\beta$ -naaras joutui myös selvästi  $\alpha$ -naaraasta enemmän osallistumaan ravinnon hankkimiseen. Moniavioisuuden taustalla voi olla monta tuntematonta tekijää. Ravinnon runsaus (myyrät) koiraan pesimäympäristössä ja suosiolliset sääolosuhteet pesimäaikana edesauttoivat tämän tapauksen pesintöjen onnistumista.

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