Polyterritoriality and the First Record of Polygyny in the Red-Breasted Flycatcher Ficedula parva in a Primeval Forest

Authors: Mitrus, Cezary, and Soćko, Beata

Source: Acta Ornithologica, 40(2) : 170-172

Published By: Museum and Institute of Zoology, Polish Academy of Sciences

URL: https://doi.org/10.3161/068.040.0203

ACTA ORNITHOLOGICA
Vol. 40 (2005) No. 2

SHORT NOTES

Polyterritoriality and the first record of polygyny in the Red-breasted Flycatcher *Ficedula parva* in a primeval forest

Cezary MITRUS & Beata SOĆKO

Department of Zoology, University of Podlasie, Prusa 12, 08-110 Siedlce, POLAND, e-mail: cmitrus@ap.siedlce.pl

Mitrus C., Soćko B. 2005. Polyterritoriality and the first record of polygyny in the Red-breasted Flycatcher *Ficedula parva* in a primeval forest. Acta Ornithol. 40: 170–172.

Abstract. Territoriality in Red-breasted Flycatchers was studied in the Białowieża Forest of Eastern Poland during five consecutive breeding seasons (2000–2004). In total 99 males were individually marked, and evidence of polyterritoriality was found in 10% of them. The proportion of polyterritorial males varied from 0% (in 2003) to 13.6% (in 2001). The mean distance between the first and second territories was 278 m (± 179.37, n = 10). The rate of polyterritoriality was not related to age class, as older males defended dual territories that were, on average, not more distantly separated than those of younger males. One case of polygyny was recorded. To our knowledge, this is the first evidence for polyteritoriality and polygyny in male Red-breasted Flycatchers.

Key words: Red-breasted Flycatcher, *Ficedula parva*, polyterritoriality, mating system, hole nesters, Białowieża National Park

Received — Sept. 2005, accepted — Oct. 2005

In last few decades, knowledge of territoriality as well as mating systems of many bird species has grown. This has been facilitated by new and precise methods of researching bird behavior, including color marking, radio-tracking, and genetic analyses (Hasselquist & Sherman 2001, Reichard & Boesch 2003).

In the genus *Ficedula*, mating systems and territorial behavior of Collared *F. albicollis* and Pied Flycatchers *F. hypoleca* have been extensively studied (Ellengren et al. 1995, Slagsvold & Drevon 1999, Lubjuhn et al. 2000). In both species, a degree of polyterritoriality and polygyny have been shown to vary between populations (Löhrl 1976, Gustafsson 1990, Lundberg & Alatalo 1992, Sachslehner 1995).

The Red-breasted Flycatcher is one of less frequently studied species of this genus, and it has been considered to be exclusively socially monogamous (Cramp & Perrins 1993). Descriptions of nests sites (Aleknonis 1976, Mitrus & Soćko 2004), arrival time (Mitrus at al. 2005) and some aspects of breeding biology of this species (Weber 1958, Aleknonis 1976, Peklo 1987, Glutz von Blotzheim & Bauer 1993, Byshnev & Stavrovsky 1998), however, have been published. In the Białowieża Forest, Red-breasted Flycatchers breed in various natural holes (Mitrus & Soćko 2004) at relatively low densities (Wesołowski et al. 2002), usually producing one brood per year. Males arrive at breeding sites before females and immediately start advertising and defending territories by singing (Mitrus & Soćko 2004).

To date, there have been no detailed studies on territorial behavior and mating systems of the Red-breasted Flycatcher (Cramp & Perrins 1993). The aim of this study was to describe cases of polyterritoriality of Red-breasted Flycatcher males in the natural conditions of the Białowieża Forest.

We observed territoriality of the Red-breasted Flycatchers in the Białowieża Forest (NE Poland, 52°41′N, 23°52′E) during the breeding seasons of 2000–2004. From late April to early June (time of arrival and nest initiation), with one to four persons searching for occupied territories of the

Red-breasted Flycatcher. Territories were considered occupied if males were observed for three or more days. Active territories were searched in three study plots (total area 79.5 ha) plots characterized by old growth oak-lime-hornbeam *Tilio-Carpinetum* stands, where Hornbeam *Carpinus betulus*, Small-leaved Lime *Tilia cordata*, Pendunculate Oak *Quercus robur*, Norway Maple *Acer platanoides* and Norway Spruce *Picea abies* dominated, with many dead trees present, both standing and fallen down (Tomiałojć 1991).

Males were captured in their territories early in the breeding season. We used a tape-recording of a Red-breasted Flycatcher song to attract males into mist nets. We determined age of each male using plumage characteristics; old males (after-second-year old) exhibit an orange patch on the breast while young (second-year) males do not (Svensson 1992). We marked males with a unique combination of one aluminum and three colored plastic rings, which allowed observers to individually recognize birds. We marked the location of each male on the map of the study area. The location where each male was observed first time was considered to be his first territory. A male was classified as polyterritorial when he was observed showing territorial behavior in at least two spatially separated places. The distance to the second territory was calculated as the closest linear distance between the centers of both territories.

During the study period, 99 males (66 old and 33 young) were captured, marked, and observed for territoriality. We detected second territories for only 10 males (10.1%). In subsequent years, the number of polyterritorial males varied from 0% (n = 15, in 2003), 7.1% (n = 14, in 2000), 12.5% (n = 24, in 2002 and 2004) to 13.6% (n = 22, in 2001). Seven polyterritorial males (10.6%) were classified to the after-second-year age group and 3 (9.1%) to the second-year age group. We found no difference in the rate of multiple territoriality between males at different age classes ($\chi^2 = 0.05$, df = 1, p = 0.83).

The distance between first and second territories ranged from 150 to 750m (mean ± SD = 278.0 m ± 179.37, n = 10). Older males retained multiple territories at distances (mean ± SD = 300.0 m ± 229.4, range = 150–750 m, n = 7) similar to those typical of younger males (mean ± SD = 227.0 m ± 40.4, range = 180–250 m, n = 3), with the difference being non-significant (Mann-Whitney U-test, z = 0.11, p = 0.91).

One case of polygyny was observed in 2002. An after-second-year male was mated with two females at the same time and the distance between the nests was 400 m. The clutches were not synchronized; eggs were laid approximately one week apart. The first female started to lay eggs on 13 May, and the second female on 20 May. The male appeared at the second territory on the day when the first female commenced laying eggs. The first brood fledged successfully, but the second brood was depredated during the incubation stage.

Although polyterritoriality is rather widespread among European passerines (Møller 1986), until now, Red-breasted Flycatchers were thought to defend only one territory and to be a socially monogamous species (Cramp & Perrins 1993). Polyterritoriality is a mechanism that facilitates mating with more than one female to increase male breeding success. Thus far, we have found only one case of polygyny in the Red-breasted Flycatcher, which represents less than 1% of individually marked males. The incidence of polygyny is too low to consider this species to be truly polygynous. Moreover, our estimate of polygyny and polyterritoriality may not be precise because our sample size of marked males represents approximately 60–70% of all observed males each year. The relatively large distance between territories makes detecting polyterritoriality in this species difficult.

Most species that are polyterritorial and polygynous are long-distance migrants that breed in high densities (Møller 1986). The Red-breasted Flycatcher is a migratory species that winters in the Indian subcontinent (Cramp & Perrins 1993). Breeding densities of Red-breasted Flycatcher are very low in the Białowieża Forest (up to 2.0 pairs/10 ha; Wesołowski et al. 2002) and territories are relatively large (Authors' unpubl. data). Moreover, in the Białowieża Forest, only approximately 50% of males breed each year (Authors' unpubl. data), which still further decreases a chance of mating with second females simultaneously.

It would be interesting to know whether polyterritoriality and polygyny occur more frequently in habitats where breeding densities are higher (i.e. Belarus, Lithuania — Flade 1997). Unfortunately, such data are not available. Although Red-breasted Flycatchers appear to be socially monogamous, better knowledge of the genetics of their mating system would be desired.

ACKNOWLEDGEMENTS We extend our gratitude to Marta Dołęgowska, Jolanta Ignatiuk, Joanna Zdun, Dorota Mikołajczyk and Urszula Olszewska for their help with fieldwork. We would like to thank the University of Podlasie for funding this research, and the Białowieża National Park authorities for logistical support. We extend special thanks to Lynn Siefferman for providing comments that improved the quality of the manuscript and for correcting the English.

REFERENCES

Aleknonis A. 1976. Biology of Red-breasted Flycatcher in SW part of Lithuania. Mat. IX Pribalt. Orn. Konf., Vilnius, pp. 3–6.

Byshnev I., Stavrovsky K. D. 1998. On the biology of the Red-breasted Flycatcher (*Ficedula parva*) in Berezinsky Nature Reserve (Belarus). Subbuteo 1: 25–28.

Cramp S., Perrins C. M. (eds). 1993. The birds of the Western Palearctic. Vol. VII. Oxford Univ. Press.

Ellengren H., Lifjeld J. T., Slagsvold T., Primmer C. R. 1995. Handicapped males and extrapair paternity in the pied flycatcher: a study using microsatelite markers. Mol. Ecol. 4: 739–744.

Flade M. 1997. Red-breasted Flycatcher. In: Hagemeijer W. J. M., Blair M. J. (eds). The EBCC Atlas of European Birds. The distribution and abundance. T. & A. D. Poyser, London, pp. 616–617.

Glutz von Blotzheim U. N., Bauer K. M. 1993. Handbuch der Vogel Mitteleuropas. Passeriformes. Aula Verlag, Wiesbaden.

Gustafsson L. 1990. Life-history trade-offs and optimal clutch size in relation to age in the collared flycatcher. In: Blondel J., Grossler A., Lebrenton J. D., McCleary R. (eds). Population biology of Passerine birds: an integrated approach. Springer Verlag, Berlin, pp. 235–245.

Hasselquist D., Sherman P. W. 2001. Social mating systems and extra pair fertilization in passerine in birds. Behav. Ecol. 12: 457–466.

Löhrl H. 1976. Studies of less familiar birds Collared Flycatcher. Brit. Birds 69: 20–26.

Lubjuhn T., Winkel W., Epplen J. T,. Brün J. 2000. Reproductive success of monogamous and polygynous pied flycatcher (*Ficedula hypoleuca*). Behav. Ecol. Sociobiol. 48: 12–17.

Lundberg A., Alatalo R. V. 1992. The pied flycatcher. T. & A. D. Poyser, London.

Mitrus C., Soćko B. 2004. Natural nest sites of the Red-breasted Flycatcher *Ficedula parva* in a primeval forest. Acta Ornithol. 39: 53–57.

Mitrus C., Sparks T. H., Tryjanowski P. 2005. First evidence of phenological change in a transcontinental migrant overwintering in the Indian sub-continent: the Red-breasted Flycatcher *Ficedula parva*. Ornis Fennica 82: 13–19.

Møller A. P. 1986. Mating systems among European passerines: a review. 128: 234–250.

Peklo A. M. 1987. [Fauna of the flycatchers of the SSSR]. Naukova Dumka, Kiev.

Reichard U. H., Boesch C. 2003. Monogamy. Mating strategies an partnerships in birds, humans and other mammals. Cambridge Univ. Press.

Sachslehner L. M. 1995. Reviermerkmale und Brutplatzwahl in einer Naturhöhlen-Population des Halsbandschnäppers Ficedula albicollis im Wienerwald, Österreich. Vogelwelt 116: 245–254.

Slagsvold T., Drevon T. 1999. Female pied flycatcher trade between male quality and mating status in mate choice. Proc. R. Soc. Lond. B 266: 917–921.

Svensson L. 1992. Identification guide to European Passerines. Naturhistoriska Riksuseet, Stockholm.

Tomiałojć L. 1991. Characteristics of old growth in the Bialowieża Forest, Poland. Nat. Areas J. 11: 7–18.

Weber H. 1958. Beobachtungen am Nest des Zwergschnappers (*Muscicapa parva*). J. Ornithol. 99: 160–172.

Wesołowski T., Tomiałojć L. Mitrus C., Rowiński P., Czeszczewik D. 2002. The breeding bird community of a primaeval temperate forest (Białowieża National Park, Poland) at the end of the 20th century. Acta Ornithol. 37: 27–45.

STRESZCZENIE

[Przypadki politerytorializmu i pierwsze stwierdzenie poligynii u muchołówki małej]

W latach 2000–2004 prowadziliśmy obserwacje nad terytorializmem muchołówki małej w naturalnych drzewostanach grądowych Puszczy Białowieskiej. Spośród odłowionych, oznakowanych i obserwowanych 99 samców (66 starych i 33 młode), drugie terytoria stwierdzono u 10 osobników (7 starych i 3 młodych). Udział politerytorialnych osobników nie różnił się między grupami wiekowymi. Średnie odległości między terytoriami były podobne u młodych i starych osobników. W różnych latach udział politerytorialnych samców wahał się od 0% (w 2003) do 13.6% (w 2003). Odległość między terytoriami tego samego samca wahała się od 150 do 750m ($n = 10, x = 278.0 \pm 179.37$). W roku 2002 stwierdziliśmy pierwszy przypadek poligynii, kiedy to stary samiec był obserwowany w tym samym czasie przy dwóch różnych lęgach, dwóch różnych samic. Nasze obserwacje są pierwszymi udokumentowanymi stwierdzeniami politerytorializmu i poligynii u muchołówki małej.