

The first record of double breeding of red-breasted flycatcher (*Ficedula parva*) in the world?

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The red-breasted flycatcher (*Ficedula parva* Bechstein, 1794) is a polytypic species with Palearctic type of distribution that occurs from NW Europe through C and E Europe, Caucasus, Himalayas to E Siberia. It is a strictly migratory species wintering mainly in Tibet, India, Bangladesh, Burma, and Thailand. A typical forest species, it breeds in temperate, boreal but also montane forests (PEKLO, 1987; CRAMP & PERRINS, 1993; GLUTZ VON BLOTZHEIM & BAUER, 1993; FLADE, 1994; SNOW & PERRINS, 1998). On breeding grounds in the Western Carpathians (HUDEC et al., 1983; ŠTASTNÝ et al., 1987; DANKO et al., 2002), it is strongly associated with the occurrence of beech (*Fagus sylvatica* L.) on macro habitat scale, however, on micro-habitat scale it is a generalist utilizing wide range of foraging substrates (KORŇAN, 2000).

High controversy on the number of breeding cycles this species can complete per season still persists in the world literature. CRAMP & PERRINS (1993) did not indicate the number of breeding cycles (breeding frequency) per year; they only concluded that little is known about fidelity of pair-bond within or between seasons (p. 32), and in the section “Breeding” there is stated “Normally one brood” (p. 38) without any further references or clarification. Later, SNOW & PERRINS (1998) again affirmed “Normally one brood” (p. 1355). PEKLO (1987) stated one, presumably two breeding cycles for the European subspecies *Ficedula parva parva* (p. 90), whereas for the Siberian race *Ficedula parva albicilla* only one breeding cycle (p. 98). For the European race, the author explained a second brood as a result of the first clutch destruction, but the possibility of two normal breeding cycles has not been mentioned. Similarly, GLUTZ VON BLOTZHEIM & BAUER (1993, p. 109) did not mention two breeding cycles per season. HUDEC et al. (1983, p. 723) pronounced only one regular brood and underlined the possibility of a second brood after clutch destruction.

The objectives of this paper were (i) to describe the first record of a probable double breeding of the red-breasted flycatcher, the nominate subspecies *F.*

parva parva, in the world, recorded in Slovakia and (ii) to clarify the open questions stated in the monographs of CRAMP & PERRINS (1993) regarding fidelity and pair bond within the breeding season.

Red-breasted flycatchers were regularly censused among other birds by intensive territory mapping technique in the Šrámková National Nature Reserve, the Malá Fatra Mts, NW Slovakia (49°11'22" N, 19°06'49" E), in the period 1997–2003 within a 27.5 ha study plot located in a primeval beech-fir forest (KORŇAN, 2004). During plot sampling, special attention has been paid to accurate territory definition to gain information on microhabitat requirements and foraging behavior. Totally, 17 breeding pairs having at least a portion of territory within the monitoring plot were detected during the study period. In 1997–2001, the species reached an average breeding population abundance of 2.00 pairs per study plot ($SD_{1997-2001} = 0.36$) and a density of 0.73 pair/10 ha (KORŇAN, 2004).

Flycatchers usually arrived from wintering grounds at the end of April to the beginning of May and males started to defend their territories soon after arrival. Males arrived and started singing from the end of April to early May, usually between 29.IV.–12.V. Females were observed few days later, usually not later than a week. An exception in the arrival pattern was observed in 2000, when the first singing male was detected on 17.IV.2000.

During bird censusing on 13.VI.2000, an adult red-breasted flycatcher male and female were observed while feeding 4–5 fledged juveniles. After crossing the territory, both adults started to threat calls typically used against intruders near the nesting area. After coming closer to the juveniles, both parents started to be very alert and frequently dive-attacked the intruder and, in the same time, they fed juveniles. Observing this behavior for 2–3 min, the adult male, just after feeding a juvenile, flew directly toward a hole with a nest on a close beech and sat on a branch. Afterwards, the male returned to feed juveniles. While checking the nest content, both parents returned back and dive

Table 1. Abundance (pairs) of the red-breasted flycatcher, date of male arrivals, mean April day air temperature (station Žilina – Dolný Hričov), and standard deviation (SD) of April temperature in the Šrámková National Nature Reserve in the period 1997–2003.

Year	1997	1998	1999	2000	2001	2002	2003
Abundance (27.5 ha)	3.5	1.0	1.5	2.5	1.5	4.3	2.0
Date of arrival	5.V.	3.V.	7.V.	17.IV.	29.IV.	3.V.	12.V.
Mean April T (°C)	4.7	9.9	9.7	11.5	7.6	8.4	7.4
SD of April T (°C)	4.39	2.96	2.66	5.17	3.64	3.86	5.60

attacked the intruder. Their attacks became more agitated as the intruder climbed the nest tree. In the mean time, they searched for prey and fed juveniles spread on surrounding trees. The antipredator behavior declined after approximately 15 min, while the total time of observation was approximately 30 min. Both parents were observed to feed juveniles and just after feeding they dive attacked the intruder when he was on the nest tree or close to it. It is clear that they were the same birds that guarded the nest. The nest was located in a hole, drilled by black woodpecker (*Dryocopus martius* L., 1758), on a decaying beech (18 cm in diameter, in the height of 8 m, approximately 10 m from a stream). It was completed, but without eggs. The nest was monitored in 1–2 day intervals. On 18.VI., two eggs were found. The third egg was laid on 19.VI.2000. The full clutch (five eggs) was found on 21.VI.2000 when the female already incubated the eggs [length = 15.76 ± 0.31 mm (15.35–16.20), width = $13.20 \pm 6.38 \times 10^{-2}$ mm (13.15–13.30), weight = $2.48 \pm 4.21 \times 10^{-2}$ g (2.40–2.50), volume = 1.66 ± 0.22 ml (1.40–1.85)]. On 26.VI.2000, the nest was empty, but left intact. It was probably predated by a bird (jay, nutcracker, or woodpecker).

Fidelity of pair bond seems to be stable at least during the breeding season. This can be interfered from the observation as with high probability the same male and female built the nest for the second breeding where the clutch was later detected. Thus, presumably the pairs stay together during the whole breeding season. To clarify this question, it would be helpful to color mark a larger sample of birds. However, the possibility of cooperative breeding cannot be completely excluded. Nevertheless, considering the social patterns and behaviour, there has not been description of cooperative breeding in this species (HUDEC et al., 1983; PEKLO, 1987; CRAMP & PERRINS, 1993; GLUTZ VON BLOTZHEIM & BAUER, 1993; SNOW & PERRINS, 1998). Furthermore, CRAMP & PERRINS (1993) stated: “No evidence for other than monogamous mating system, but incidence of polygyny cannot be ruled out.” In addition, the patterns of cooperative breeding are common in certain bird species during the period of population saturation (KREBS & DAVIES, 1993). It is clear that the population in 2000 was neither fluctuating nor declining (Tab. 1). Moreover, there were only two adult birds observed feeding fledglings and defend-

ing the nest in a relatively long period of observation (30 min.), if considering frequency of feeding.

Totally, four nests were found during the study period, however, two were not checked due to extreme placements. The second nest with five nestlings and one sterile egg was found on 15.VI.2001. Nestlings were 10–12 days old and later successfully fledged. Fledged juveniles were observed on the earliest date of 18.VI.

As discussed in the first part of the article, no proved evidence of two normal breeding cycles of the red-breasted flycatcher has been available in the world. Therefore it is difficult to conclude if this case was just a chance, or it was a result of unusually warm weather in April 2000, or double breeding is common in a part of population, especially in the years of early arrivals to breeding grounds. It is clear that in 2000 red-breasted flycatchers were observed first approximately two weeks earlier than in other years. Very early arrival caused prolongation of breeding season approximately for two weeks, which might have enabled double breeding. From scientific aspect, it would be extremely important to know the causal effects of warm weather in early spring on breeding biology of this species. It is still unclear how the climate change may affect the breeding biology, nesting productivity, and evolution of bird species.

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