

A case of extra-pair copulation in the Willow Tit *Parus montanus*

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Recent behavioural studies have convincingly shown that cuckoldry or extra-pair copulations (EPCs) may occur relatively commonly in socially monogamous bird species (e.g. Birkhead & Møller 1992). In parids, however, EPCs seem to seldom occur (Björklund & Westman 1986, Smith 1988, Koivula et al. 1991, Björklund et al. 1992, Kempenaers et al. 1992, Kempenaers 1993). In fact, true EPCs in the Willow Tit *Parus montanus* have previously not been reported. Presumably to diminish the risk of EPCs many species have developed a mate-guarding strategy (for a review, see Birkhead et al. 1987). This also applies to tits (Björklund & Westman 1986, Mace 1988, Smith 1991, Koivula et al. 1991, Welling et al. 1995).

In 1987 I initiated a long-term study of a colour-ringed population of Willow Tits in the alpine birch region in central Norway. Although I spent several weeks in the area during the breeding season every year (1987–95), I have so far seen EPC in the Willow Tit only once, besides one case of polygamy (Haftorn 1994).

The study area is situated at Venabu (61°39'N, 10°08'E) in the community of Ringebu, about 900 m above sea level. The forest consists mainly of birch *Betula pubescens*, intermingled with Norway spruce *Picea abies* and Scots pine *Pinus sylvestris*. Nearly all Willow Tits in the study area (about 290 ha) have been individually colour-ringed.

The odd case of cuckoldry was observed on 23 May 1989 at 1140 hours. The two males involved were one-year old neighbours, colour-ringed W and YR, respectively. W was mated with female BY (who was at least 3 years old), and the pair had at the time of the event eight nestlings about 10 days of age. W's rival, YR, was a lone bachelor throughout the actual breeding season, but claimed consistently a territory of ordinary size and quality.

A few minutes before the happening on 23 May one of the involved males responded to playback song with song, which immediately induced countersong from the other. When I arrived at the arena the two singing males were sitting immovably in birches about 25 m apart on either side of the territorial border (represented by a narrow farm road). While W sang the Wood Warbler-like (*Phylloscopus sibilatrix*) down-slurred *tiuu tiuu tiuu*, YR sang another version, a high-pitched *tiii tiii tiii* (drawn-out whistles at a steady pitch). After several bouts male W changed song-type to match its rival. Suddenly, female BY turned up on the "wrong" side of the territorial border, rather close to and somewhat below male YR in the same birch as he was still singing. She immediately solicited with wing quivering while simultaneously uttering the long-drawn courtship-call *sisisisisi...* ("variable sees", sensu Ficken et al. 1978, "sexual sees", sensu Hailman et al. 1994). Male YR momentarily re-

sponded to the soliciting female by flying down to her and quickly committing a seemingly successful copulation. Afterwards, the female kept sitting at the same place while YR prepared a second copulation. He had already managed to land on the female's back when male W came straight as an arrow and dashed him aside. Intertangled in a furious fight the combatants fell right down to the ground where they continued fighting until I approached them. At this moment the males took off, but continued fighting for some time, whereafter they contented themselves with vocal utterances while crossing the territorial border back and forth. Eventually the birds separated. The female unhesitatingly followed her mate W into his territory, whereas male YR withdrew the opposite way.

The observed EPC is, to my knowledge, the first and only one recorded in the Willow Tit so far. Admittedly, Koivula et al. (1991) studied mate guarding in this species and observed two EPCs. However, these EPCs concerned females that copulated with paired neighbouring males after having lost their own mates (most probably by death) a few days before the beginning of egg-laying. These events are, therefore, not accepted as true EPCs. In both cases, the widowed females initiated the copulations, which took place in the immediate vicinity of their nests.

In the Black-capped Chickadee *Parus atricapillus* Smith (1988) recorded 13 apparently successful EPCs. In all cases, the unfaithful female mated with a neighbouring male that during the previous winter had higher rank than her own mate. Only four of the EPCs occurred in the female's own territory. The remaining EPCs all occurred well within the territorial border of the other male. Smith (1988) concluded that the female Black-capped Chickadees were actively seeking EPCs, although she never saw females soliciting EPC. In the present case of EPC in the Willow Tit, the female clearly solicited copulation from the neighbouring male despite the attendance of her own mate. The ranking order of the two rivalling males could not be settled, as they belonged to two different adjacent winter flocks (each consisting of only one male and its mate). The outcome of observed encounters between the same males seemed to be site-related.

One proposed cost of EPCs to females is the risk of desertion, if a female is discovered by her

own mate while engaged in an EPC (Trivers 1972, Dawkins 1976 and Gladstone 1979 in Smith 1988). The cuckolded Willow Tit male observed by me did not show the slightest sign of desertion after having eyewitnessed EPC by his mate, although she had deliberately crossed the territorial border and initiated copulation with a neighbouring male. The deceived male did not reduce the effort of feeding the nestlings either.

Even within-pair copulations (WPCs) in tits are not easy to see. This is because they mainly take place early in the morning, often within a few minutes after the dawn emergence of the female (Hinde 1952, J. P. Hailman & S. Haftorn unpubl.), and because the whole sequence from start of precopulatory vocalizations to the end of mounting seldom lasts longer than one minute (Dixon et al. 1970, Smith 1988, J. P. Hailman & S. Haftorn unpubl.). It is, therefore, hardly surprising that the observed records of EPCs in tits are so few. Such events may easily be overlooked and requires an intense, time-consuming watch in order to be detected. It is, therefore, likely that EPCs in tits occur more often than hitherto believed.

In Scandinavia the Willow Tit normally raises only one brood a year (but see Brömssen & Jansson 1980). Although the pair in the present case got its nest robbed, there was no sign of any second clutch.

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References

- Birkhead, T. R., Atkin, L. & Møller, A. P. 1987: Copulation behaviour of birds. — *Behaviour* 101: 101–138.
- Birkhead, T. R. & Møller, A. P. 1992: Sperm competition in birds. — Academic Press, London.
- Björklund, M., Møller, A. P., Sundberg, J. & Westman, B. 1992: Female great tits, *Parus major*, avoid extra-pair copulation attempts. — *Anim. Behav.* 43: 691–693.
- Björklund, M. & Westman, B. 1986: Mate-guarding in the Great Tit: tactics of a territorial forest-living species. — *Ornis Scand.* 17: 99–105.
- Brömssen, A. von & Jansson, C. 1980: Effects of food addition to Willow Tit *Parus montanus* and Crested Tit *P. cristatus* at the time of breeding. — *Ornis Scand.* 11: 173–178.
- Dixon, K. L., Stefanski, R. A. & Folks, F. N. 1970: Acoustic signals in the mating of Mountain and Black-capped

- Chickadees. — *Auk* 87: 322–328.
- Ficken, M. S., Ficken, R. W. & Witkin, S. R. 1978: Vocal repertoire of the Black-capped Chickadee. — *Auk* 95: 34–48.
- Haftorn, S. 1994: A case of polygyny in the Willow Tit *Parus montanus*. — *Ornis Fennica* 71: 68–71.
- Hailman, J. P., Haftorn, S. & Hailman, E. D. 1994: Male Siberian Tit *Parus cinctus* dawn serenades: suggestion for the origin of song. — *Fauna norv. Ser. C., Cinclus* 17: 15–26.
- Hinde, R. A. 1952: The behaviour of the Great Tit (*Parus major*) and some other related species. — *Behav. Suppl.*, 2, 1–201.
- Kempnaers, B., Verheyen, G. R., Broeck, M. Van den, Burke, T., Broeckhoven, C. Van & Dhondt, A. A. 1992: Extra-pair paternity results from female preference for high-quality males in the blue tit. — *Nature* 357: 3 pp.
- Kempnaers, B. 1993: A case of polyandry in the Blue Tit: female extra-pair behaviour results in extra male help. — *Ornis Scand.* 24: 246–249.
- Koivula, K., Orell, M. & Rytönen, S. 1991: Mate guarding in forest-living, territorial Willow Tits. — *Ornis Fennica* 68: 105–113.
- Mace, R. H. 1988: Diurnal patterns of mate guarding in Great Tits. — *Acta XIX Congr. Intern. Orn.* Vol I: 435–441. Ottawa.
- Smith, S. M. 1988: Extra-pair copulations in Black-capped Chickadees: the role of the female. — *Behaviour* 107: 15–23.
- 1991: *The Black-capped Chickadee*. — Cornell University Press, Ithaca and London.
- Welling, P., Koivula, K. & Rytönen, S. 1995: Differences in mate guarding between age classes in the willow tit, *Parus montanus*. — *Anim. Behav.* 49: 852–854.