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Complete brood loss in blue tits is almost always associated with the sudden and permanent disappearance of a parent

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Blue tits (*Cyanistes caeruleus*) are a model species in ecological and evolutionary research and a key parameter of interest in many studies is the number of nestlings that survive until fledging. Not much is known, however, about what causes mortality during the nestling period. Using data from a long-term nest box study on blue tits, we found that in almost all nests that suffered complete brood mortality one of the parents had suddenly disappeared during the nestling stage. In contrast, nests with partial brood failure were only rarely associated with the disappearance of a parent, although more often so when a large proportion of the nestlings died. Parents that disappeared during the nestling stage were rarely seen again and almost never returned to breed. In contrast, parents that remained after their partner disappeared were equally likely to be observed again or return to breed as parents of nests where both parents stayed. Of the nests where both parents stayed, the likelihood of being seen again or returning to breed was unrelated to nestling mortality. Visit rates at nests where a parent disappeared were no different from those of nests where both parents stayed, up to the point where the parent disappeared. Interestingly, visit rates then increased if the remaining parent was female, but remained unchanged when the remaining parent was male. Taken together, our results show that, in contrast to nests with partial brood failure, nest with complete brood failure are almost always associated with the sudden and permanent disappearance (probable death) of one of the parents. Complete brood failure and partial brood loss are thus distinct processes that require different functional explanations.