



Divorce and asynchronous arrival in common terns, *Sterna hirundo*

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We investigated which of three hypotheses (better option, incompatibility or asynchronous arrival) best explains divorce in the common tern. One partner did not return the next year in 18.5% of 150 pairs. Among the 106 pairs in which both mates returned, the divorce rate was 18.9%. We found no significant differences in: breeding performance or condition in relation to the probability of divorce; quality of previous mates and new mates, mean age in relation to pair bond status; breeding success before and after divorce nor did this differ from breeding success of reunited pairs. Hence the better option and incompatibility hypotheses were not supported. However, divorce was more likely in pairs in which mates arrived asynchronously on the breeding grounds, supporting the asynchronous arrival hypothesis. Median arrival asynchrony for divorced pairs was 7.5 days and for reunited pairs 2 days; mates arriving more than 16 days apart always split up. About 20% of divorced birds lost breeding status in the year of divorce, probably as a consequence of their late arrival. Our results suggest that terns search for a new mate as soon as they arrive on the breeding grounds and that mates remain faithful to each other to avoid the costs of searching for a new partner. Thus, synchrony in arrival facilitates pair bond maintenance rather than asynchrony promoting divorce, since divorce appears to be a side-effect of asynchrony and not an active decision.

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The causes and consequences of divorce in monogamous birds have recently attracted much attention (Black 1996a). In long-lived monogamous birds, the majority of pairs breed together for several years until one partner either dies or breeds with a different partner when both members of a pair survive to the next breeding season (i.e. the pair divorces). However, the recent proliferation of different hypotheses to explain when individuals should divorce indicates that the reasons for mate fidelity are still poorly understood (Black 1996b). Three main hypotheses may explain divorce in common terns: the better-option hypothesis, the incompatibility hypothesis and asynchronous arrival between mates on the breeding grounds (see Johnston & Ryder 1987; Choudhury 1995; Ens et al. 1996 for reviews).

The better-option hypothesis suggests that divorce will take place when one mate has access to a better-quality mate to improve its own reproductive success (Davies 1989; Ens et al. 1993). In this case, the incidence of divorce is predicted to be greater among low-quality individuals because of their greater scope for improvement than good-quality individuals. To test this prediction, we can use different measures of individual quality such as reproductive success (Thomas & Coulson 1988), egg size (Reid & Boersma 1990; Bolton 1991), timing of breeding (Coulson & Porter 1985; Mills 1989; Sydeman et al. 1991), body condition (Phillips & Furness 1998; Wendeln & Becker 1999) or age (e.g. Saether 1990) in one year to compare the quality of birds that divorce or reunite in the subsequent year. The better-option hypothesis also predicts that divorce will be initiated by only one individual, which should pair with a better mate than the former one. In some species, such as the common tern, some birds lose their breeding status in the year of their divorce. This hypothesis assumes that these birds are poor-quality individuals that were deserted by their mates (Ens et al. 1993). Therefore, new mates after divorce should on average be of higher quality than former mates and the reproductive success of those birds that divorced

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