ANIMAL BEHAVIOUR, 2003, **65**, 000–000
doi:10.1006/anbe.2003.2271,

Supplementary information for: Doligez, B., Cadet, C., Danchin, E. & Boulinier, T. 2003. When to use public information for breeding habitat selection? The role of environmental predictability and density dependence. *Animal Behaviour*, vol. 66

Confrontation of Strategies in the Long-lived Life Cycle

The performances of the five strategies were very similar for the long-lived and short-lived species (Fig. S1). The major differences between the two life cycles concerned the performances of (1) Quality and Success for intermediate levels of predictability, and (2) Philopatry in unpredictable environments.

(1) The range of predictability levels for which Success and Quality performed the best was slightly narrower and biased towards higher values in the long-lived than in the short-lived species (Fig. S1). Because the sensitivity of the growth rate to fecundity is lower in long-lived than in short-lived life cycles (Stearns 1992), the relative gain in fecundity of the Success and Quality strategies by choosing the better patch had to be higher to allow individuals to compensate for the density-dependent cost of spatial aggregation. Furthermore, Success performed better than Quality for intermediate predictability levels in the long-lived life cycle. The origin of this difference between the two life cycles is not entirely clear.

(2) Here, Philopatry performed relatively well in weakly predictable environments (Fig. S1). In this long-lived life cycle, juveniles first breed at age 4 years, at a time when their natal patch quality is no longer influenced by its value 4 years before in weakly predictable environments. Thus, 4 years after patch quality is high, other strategies did not tend to aggregate individuals on the same patch as Philopatry more than on the other patch. This led to the unexpected result that Philopatry may be favoured even though the quality of the natal patch at the time of recruitment is not correlated with its value at birth. Therefore, Philopatry may be selected for reasons other than its capacity to track environmental quality through breeding success alone in predictable environments (a priority access to resources for philopatric individuals was not considered here, see text). Philopatry was in fact equivalent to Random in unpredictable environments in the long-lived life cycle, owing to the long prebreeding period. This is illustrated by the low aggregation level generated by this strategy in unpredictable environments (Fig. S2), which contrasts with its corresponding level for the short-lived life cycle (Fig. 8). As a consequence,

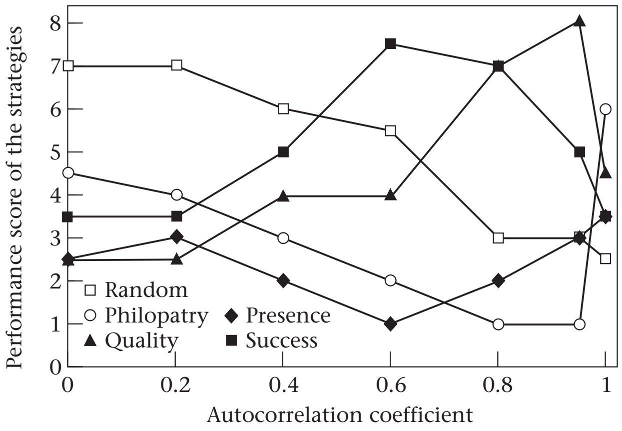

Figure S1. Performance of the strategies of breeding patch selection when confronted with the others, according to the temporal autocorrelation coefficient, for the long-lived species. See Fig. 6 for the definition of the performance score, and the text for definition of the strategies.

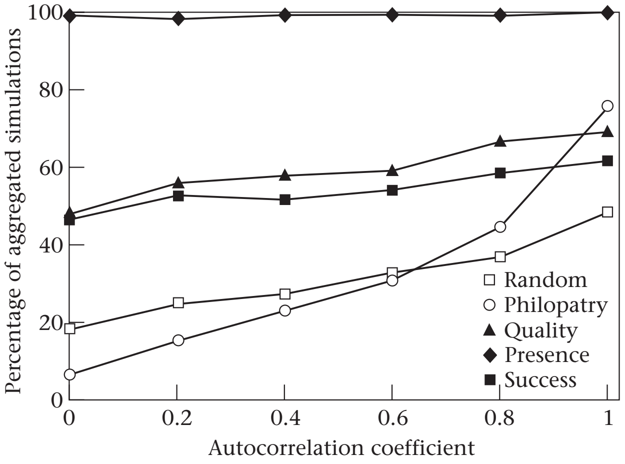

Figure S2. Level of spatial aggregation generated by each strategy when alone (no mutant introduced), according to the temporal autocorrelation coefficient, for the long-lived species. Spatial aggregation was assessed by the percentage of simulations aggregated compared to a random distribution (Fig. 8).

0003–3472/03/$30.00/0

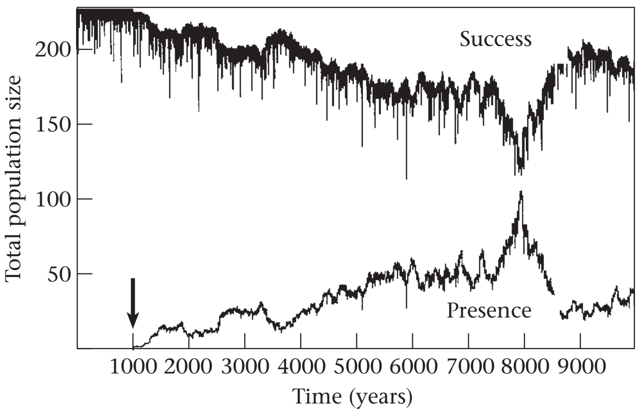

Figure S3. One example of the dynamics of resident and mutant populations in the confrontation between the Success strategy (resident) and the Presence strategy (mutant). The arrow indicates the point when the two mutants adopting the Presence strategy were introduced.

Philopatry did not pay costs linked to spatial aggregation in unpredictable environments.

The general pattern of the strategies' performance seemed relatively unaffected by the life cycle. In particular, environmental predictability, costs of aggregation and information 'parasitism' remained the major factors determining the outcome of confrontations.

Success versus Presence

Figure S3 shows an example of the dynamics of resident and mutant population size in the confrontation between the Success strategy (resident) and the Presence strategy (mutant). The autocorrelation coefficient value (*AC*) is 0.4. Presence first increases in frequency while using information conveyed by individuals of the Success strategy to track the temporal variation in patch quality efficiently. However, when Presence's frequency becomes too high (here after 8000 years), its efficiency declines because the frequency of individuals 'directly' assessing patch quality and settling efficiently on the better patch (i.e. individuals of the Success strategy) decreases. Thus Presence's frequency decreases to a lower level again.

Reference

Stearns, S. C. 1992. *The Evolution of Life Histories*. Oxford: Oxford University Press.