

Spatial and temporal components of female breeding strategies in southern elephant seals

Galimberti, F.¹, Fabiani, A.^{1,2}, Sanvito, S.¹

1 Elephant Seal Research Group, Sea Lion Island, Stanley, Falkland Islands

2 Dipartimento di Biologia, Università degli Studi di Roma Tor Vergata, Via della Ricerca Scientifica snc, Roma, 00133, Italy

Spatial and temporal factors are important components of breeding strategies. Breeding site fidelity (i.e., the return to the same breeding site for consecutive breeding attempts) may entail significant somatic benefits and costs and, if coupled with phylopatriy (i.e., the return for the first breeding attempt to the birth site), may result in population genetic substructure. Seasonality and synchrony of reproduction are fundamental aspects of breeding strategies in many mammal species, because they can be related to breeding success and offspring survival. Longitudinal studies of spatial and temporal components of breeding strategies in long-living species are scarce, due to the intrinsic problems of prolonged data collections. We studied breeding strategies of female southern elephant seals (*Mirounga leonina*) at Sea Lion Island, the main breeding colony of the species in the Falkland Islands. Given the small size of the colony and the ubiquitous marking of females, we were able to collect accurate measures of spatial and temporal components of each female breeding strategy over many years, and to acquire a large longitudinal data set, that we analyzed by mixed effect and generalized estimating equations modeling. We found evidences of a high level of phylopatriy and site fidelity at small scale, and of a strong synchronization and regularity of breeding along the years at population level. At individual level, we observed high repeatability of the temporal components of each female breeding strategy. Site fidelity and repeatability of timing of reproduction were related to female phenotype, but we found scarce evidence of a significant effect on female parental investment and breeding success. We discuss the behavioral and genetic implications of these results, emphasizing the effects on male mating tactics, female breeding success and genetic sub-structuring of local populations.