

LAURA REDAELLI₁, SIMONA SANVITO₂, and FILIPPO GALIMBERTI₂

1: Dipartimento di Scienze Naturali, Università degli Studi di Milano, Milano, Italy

2: Elephant Seal Research Group, Sea Lion Island, Falkland Islands, www.eleseal.org

ANATOMICAL CORRELATES OF HONEST COMMUNICATION IN SOUTHERN ELEPHANT SEALS

Contests for acquisition of resources are a striking examples of animal communication. Honest signalling happens when interactors use vocalizations to transmit reliable information about their phenotype. As per the source filter theory, vocalization formants can be an honest signal of phenotype because they depend on vocal tract size, that is constrained by age, body length and skull size. In southern elephant seal (*Mirounga leonina*), males establish dominance hierarchies that determine access to females, and vocalizations are the most important component of agonistic behaviour. We studied southern elephant seals in 2016 at Sea Lion Island (Falkland Islands). We estimated body length, skull size, and vocal tract length of 34 breeding males. We estimated body length by photogrammetry, and vocal tract length by videogrammetry. Briefly, we placed a scale in front of the vocalizing male, aligned to the middle plane of his body, and we took a high resolution video from the side of the subject. The larynx was clearly visible in videos of all males. From videos we extracted frames, in which we measured maximum vocal tract length. Each male was marked at birth, so his age was known. Overall, repeatability of measurements was high ($R > 0.80$). Results confirmed the expected relationships between vocal tract, age, and size, but with some differences respect to other studies: 1) the relationships were less strong than the ones obtained in studies of captive subjects of other species (vocal tract length obtained by radiography of sedated subjects); 2) the relationships were stronger for the nasal part than for the buccal or common part of the tract; 3) although vocal tract size was related to age, the relationship was less strong than the one with size. Overall, our study is the first demonstration of an anatomical basis of honest signalling in a wild, naturally behaving, animal species.