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SOUTHERN ELEPHANT SEALS (*MIROUNGA LEONINA*) ‘NOSE-METRICS’ USING IMAGE ANALYSIS IN WILD ANIMALS

Geometric morphometrics produced a significant advancement in the study of functional, and evolutionary morphology. It is usually applied to hard tissues, such as bones, and is rarely applied to soft tissues of live animals. The proboscis of male southern elephant seals (*Mirounga leonina*) is an impressive secondary sexual trait, whose precise function is still to be determined, although it likely plays a role in the advertisement of breeding status and in the emission of vocalizations during agonistic interactions. The study of this soft tissue structure, is complex because the proboscis should be measured when inflated, and this means on live subjects in the field. We studied southern elephant seals at Sea Lion Island, in the Falkland Island Archipelago. This is a small, well localized population, in which all seals are individually recognized and of known age. In order to obtain the data, we took digital photos of vocalizing males in side view. The pictures were shot while an experienced operator kept a pole with a scale bar close to the mouth of the subject, so that it was aligned to the body mid plane. We took three pictures, at different times, for each of 43 males. Then, one operator (MCV) digitized 4 landmarks and 19 semi-landmarks on the photos, including the replicas, and analyzed them using free software, mainly, the TPS series and MorphoJ. We assessed repeatability of the complete configuration of landmarks and semilandmarks. Overall, we found negligible measure errors accounting for ca. 16% and ca. 12% of respectively size and shape variance, thus suggesting high repeatability in relation to inter-individual differences in the sample. To our knowledge this is one of the few studies showing that it is possible to obtain precise landmarks on a soft-tissue in naturally behaving large mammals using 2D images of live subjects.