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The Question of Sex Identification in Specimens Housed in Research Collections

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Worldwide, museum research collections contain specimens obtained in a timeframe, ranging from more than a hundred years ago to the present. Specimens were contributed by many collectors, with different experiences and perspectives. It is desirable that genus and species identification, geographic location where caught, name of the collector, date of capture, weight, reproductive status, age, and sex be recorded. The latter is especially important. Sexual dimorphism is variable across species, but often plays a major role in determining behavior patterns and other species-specific attributes. It has potential importance for studies that extend beyond the scope of the initial work, for which most collections were established and valued (e.g., systematic and biogeographic studies). Unfortunately, specimen sex is often missing. This is exemplified by our examination of the strepsirrhine collections of the University of Kansas and of the Field Museum of Natural History. Examination of *Microcebus murinus, Eulemur macaco, rubiventris, and rufus, Hapalemur griseus, Lemur catta, Varecia variegata, Propithecus verreauxi, Loris tardigradus,* and *Perodictus potto* revealed that gender had not been recorded on 28 of 60 individuals. Thus, almost half of the specimens would be lost to gender-dependent analyses, unless alternative methods were available for assigning gender. Perhaps, there is a solution.

Serendipitous observation of a phenomenon in African lions may present a solution. *Panthera leo* displays greater sexual dimorphism, determined primarily from examination of skulls, than observed in most felids [1]. Measurement of skull size and proportions may allow gender assignment in samples from a single site, but cannot be confidently applied across populations [2]. As most strepsirrhine collections are composed of only a few individuals from any site, skull size and proportion data cannot be used to confidently assign gender. The suggestion that particularly large adults are male and the smallest adults are female is highly likely. Correct sex assessment of the animals at the extremes of measurement might be more reliable, but this is not likely for the preponderance of the collection. Additionally, animals representing the extremes of size may not be representative of the species. Small adult males and large adult females are most likely indistinguishable by size. Therefore, it was desirable to seek a means of determining sex of individuals that is independent of skull size or proportion.

A method for sex determination of adult African lions, independent of skull size or proportion, has been documented [3]. We established that a difference in the appearance of "pores" in the maxillary bone accurately distinguished all adult male and female lions, regardless of size or skull proportion, thereby adding new data, independent of what had been previously recorded for those specimens. Can this methodology be applied to strepsirrhines? The answer, at least for *Varecia* (ruffed lemurs), is yes. Ruffed lemurs show the same gender-specificity of maxillary "porosity", as is observed in lions. This new information expands the sample for gender analysis of this species (so rarely represented in museum collections), to allow sufficient numbers for statistical analysis. It will be interesting to learn how generalizable these observations are to other lemurs as well as to other primates.

References

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