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A reliable method for sexing giant otters (*Pteronura brasiliensis*) in the wild

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Baseline demographic data is necessary to understand the factors responsible for changes in population parameters over time (Kelly *et al.*, 1998; Kalpers *et al.*, 2003) and hence the effectiveness of conservation management decisions. For large carnivores that occur at low absolute densities, demographic parameters will be especially relevant in management decisions and protected area design. One such parameter is the sex structure of a population.

The giant otter (*Pteronura brasiliensis*) is the largest (though not heaviest) of the world's 13 extant otter species. It is an endangered, top predator of the lowland rainforests and wetlands of South America, occurring in a large variety of habitats[1] (Duplaix, 1980; Carter and Rosas, 1997; Schenck, 1999). A typical giant otter population consists of highly cohesive groups with well established territories, plus sexually mature transients. Groups are composed of a monogamous breeding pair and their offspring of several years (Duplaix 1980; Groenendijk *et al.*, 2005; Staib, 2005; Groenendijk and Hajek, 2006).

In contrast to many other otter species where body size and weight differ significantly between the sexes, sexual dimorphism in giant otters is not pronounced: adult male total body length ranges between 1.5 to 1.8m, while females are marginally smaller at 1.5 to 1.7 m. Weight differences are slightly more marked, at 23-32kg for males and 20-29kg in females (Duplaix, 1980; Carter and Rosas, 1997; Sykes-Gatz, 2004; Rosas *et al.*, 2009). Under field conditions in southeastern Peru, it was found that males and females could not be distinguished by size (Staib, 2005; Groenendijk and Hajek, 2006) and the breeding pair does not necessarily consist of the largest animals in the group; in fact, sometimes females appeared to be noticeably larger than males. It was therefore only possible to be certain about gender when animals were observed out of the water, usually during resting and grooming sessions, and their genitals could be recognized. Sexing was facilitated by the presence of four permanently elongated teats (due to prolonged lactation) in adult, parous females, or testicles in males [the male's scrotum does not become clearly evident until he is at least one year old (Staib, 2005)]. The breeding male could be identified by his behaviour, specifically that of marking [breeding individuals spend significantly more time marking than other group members (Staib, 2005)], and by his year-on-year permanence in the group. However, sexing was more difficult in adult females that had not lactated, or in cubs, juveniles and subadults of both sexes. Often, it took weeks of observation before the gender of an individual could be established, and many animals, particularly transients, were never sexed (Staib, 2005; Groenendijk and Hajek, 2006). The objective of this paper is to assist field researchers to reliably sex wild giant otters to obtain gender data for a more complete understanding of a population.

Giant otter population censuses were conducted in southeastern Peru's Manu National Park as part of the Giant Otter Research and Conservation Project of the Frankfurt Zoological Society. The primary objective of a population census is to encounter all giant otters within a defined survey area in order to determine population size. Secondary

[1]IUCN (2011) IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Consulted on 22 April 2012.

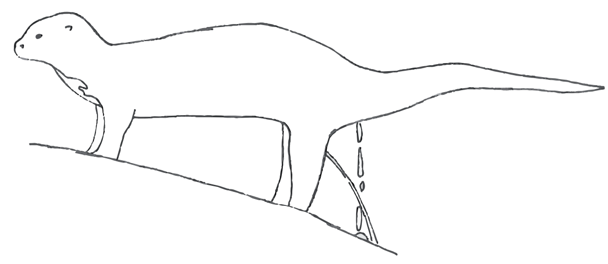

Figure 1. A male giant otter at the latrine, showing the greater distance between the sources of the urine and scat streams. Note the orientation of the urine stream towards the rear, bisecting the faecal stream.

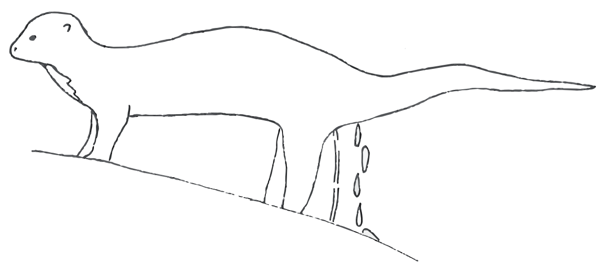

Figure 2. A female giant otter at the latrine. Note that the urine and scat streams are approximately parallel.

objectives include the collection of demographic and ecological information, including gender. Both can contribute to species and habitat management and conservation (Schenck *et al.*, 2003) and become more valuable if the census is repeated at regular intervals as part of a long-term monitoring initiative (Groenendijk *et al.*, 2005).

Giant otter monitoring was carried out following a standard protocol (Groenendijk *et al.*, 2005). Each individual is identifiable from birth by its unique pale throat marking, making it possible to follow the life histories of animals. When otters were encountered they were counted and filmed with a handheld video camera and, where possible, gender and age class were recorded along with the location and date of observation. Some groups, those that were habituated to tourists or researchers, were easier to observe than others.

When otters visit their latrines, they often defecate and urinate simultaneously (Duplaix, 1980), with scats having a semi-liquid consistency. In 2002, we discovered a simple and effective method to sex giant otters while they were using a latrine. We found that males can be distinguished from females by the greater space between the sources of the urine and faecal streams. When viewed broadside on (the ideal angle), the male's urine stream has its source between the hind legs and the orientation of the stream is to the rear at a 45-60 degree angle (Figure 1). In females, the source of urine is close to the base of the tail (Figure 4) and the stream projects downwards (Figure 2). In both males and females, the scat drops directly below the anus at the base of the tail (Duplaix, 1980). Hence, in males, the two streams often bisect each other with the urine stream landing beyond the scats, while in females they are parallel. The backward projection of the urine stream in male giant otters must be explainable by the morphology of the giant otter's penis; it points towards the rear during urination (Figure 3 – the male giant otter in this photo is positioned on his back, but it is possible to see how the penis would indeed point backwards if the animal was standing).

Sexing by this means can be carried out with standard 10x binoculars from a distance of approximately 30 metres if the individual or group is used to human observers and up to 60 metres away with a 30x telescope if the group is not habituated. A requirement is an unobstructed view of latrines and den site entrances. We personally tested the method with 26 different known sex individuals (17 males, 9 females) previously sexed by direct observation of genitalia and it was found to be consistently reliable. To discount observer bias

Figure 3. An adult male giant otter undergoing a veterinary procedure. Note the distance between the penis and the anus (hidden from view by the scrotum). Photo: Fernando Rosas

Figure 4. A newborn female giant otter. Note the proximity of the urinary opening and the anus, both near the base of the tail (our field observations confirm that the proportions do not change significantly over time). Photo: Fernando Rosas

(since we had already sexed these individuals by other means), we also identified the genders of 19 cubs using this method; these were later confirmed to be correct.

In conclusion, this method of sexing giant otters is successful with individuals of all ages but is particularly effective with older animals since it is these who spend more time marking at latrines (younger animals are often in a rush to get to the water or den). The method can be used with both habituated as well as un-habituated groups provided that natural behaviour is not disturbed by the presence of human observers. Under good viewing conditions, a completely unexperienced observer will only need to see one or two incidents of an individual of each gender using a latrine (to compare the distances between the urine and scat streams) in order to be able to recognize the difference. Since transient animals are very rarely seen using a latrine, sexing these individuals remains a challenge.

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