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## **Endangered saiga antelope (*Saiga tatarica*) neonate vocalisation in the wild: encoding of distress, individuality and sex**

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Neonates often produce isolation calls when nursing by their mother is delayed or capture calls when they are captured by a predator. We hypothesised that capture calls reflect a state of higher arousal and less individualised than the isolation calls, as they need a more urgent response of a mother. We recorded open-mouth isolation and open-mouth capture calls of 1 - 2-day neonate saiga antelopes (*Saiga tatarica*) born on their breeding grounds in Northern Kazakhstan in May 2014. The acoustics of 196 isolation calls of 22 neonates were compared to those of 236 capture calls of 25 (14 male, 11 female) other neonates. Bouts of isolation calls were recorded by automatic recording devices (SongMeter SM2+), positioned within the saiga breeding grounds. From these recordings, we identified bouts of isolation calls produced by 22 distinct animals of unknown sex. Capture calls were recorded manually during censuses while weighing, sexing and photographing hand-held neonates, so information about individual identity, sex and body weight was available for these calls. In each call, we measured the duration, mean fundamental frequency, the first four formants, peak frequency and three power quartiles. As expected, discriminant function analysis revealed significantly higher individuality (93.4 %) of isolation compared to capture calls (87.3 %,  $\chi^2 = 3.77$ ;  $p = 0.05$ ). In both call types, the fundamental frequency and 2<sup>nd</sup> and 3<sup>rd</sup> formants mainly accounted for individuality. Against expectations, the peak frequency and all quartiles were higher in isolation than in capture calls ( $t > 3.5$ ;  $df = 45$ ;  $p < 0.001$ ). In capture calls, sex differences were less pronounced than individual differences (80 % correctly classified calls with discriminant analysis). Fundamental frequency was the major determinant of sex differences. Although the average male body weight ( $3.54 \pm 0.54$  kg) did not differ from that of females ( $3.35 \pm 0.34$  kg;  $t = 1.0$ ;  $df = 23$ ;  $p = 0.31$ ), male capture calls were significantly lower in fundamental and formant frequencies than female capture calls (e.g. fundamental frequency:  $117.3 \pm 12.7$  Hz vs  $141.1 \pm 31.0$  Hz;  $t = 2.6$ ;  $df = 23$ ;  $p = 0.015$ ). These results suggest that male neonates have larger vocal folds (determining the fundamental frequency) and longer vocal tracts (determining the formant frequencies) than females. Further

study should investigate sex-related differences of the vocal tract based the head-and-neck photos of individual neonate saigas.

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