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This interesting desert shrew: pups call like adults, and adults vibrate

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In most mammals, an ontogenetic growth of sound-producing structures results in lower- frequency calls of adults compared to juveniles. From June to August 2011, we examined 39 piebald shrews (*Diplomesodon pulchellum*) from 11 litters, kept in Moscow Zoo, for ontogeny of body and acoustic variables from birth to maturity at 24 days, i.e. the age of separation from their mothers. Body mass, body measures and acoustic recordings (Fostex FR-2LE with Sennheiser K6-ME64, frequency range up to 24 kHz and ultrasonic Pettersson D 1000X, frequency range up to 350 kHz) were taken every two days. With Avisoft SasLab Pro we analysed spectrographically 3,689 calls, taken uniformly for litters and ages. In addition, we analysed 640 calls from 25 adults, recorded during male-male, male-female and female-female interactions. From the 1st to the 24th day, body mass increased from 0.94 ± 0.27 to 7.51 ± 1.29 g, body length from 25.4 ± 2.3 to 62.43 ± 3.17 mm. Vocal repertoire comprised the same nine call types in young and seven in adults. Audible location clicks, not exceeding 15 kHz, were usual in young and very rare in adults. All calls were audible; no ultrasonic click was found. But we documented body vibration of adults (5 males, 6 females), placed on a drum membrane. The airborne waves of the vibratory drumming were digitally recorded and then analysed spectrographically. The mean frequency of vibration was 160.5 Hz. The frequency and period of vibration were similar to parameters of shrews loud screech calls (159.4 Hz). The body vibration was not related to thermoregulation, hunger-related depletion of energy resources or fear, as we tested well-fed, calm animals at warm ambient temperatures. We hypothesise, that in the solitary, nocturnal, digging desert piebald shrew, body vibrations may serve for seismic exploration of substrate density, to avoid energy-costly digging of packed sand for burrowing and foraging.

Contrary to expectancies, the fundamental frequency of tonal squeaks was not reduced across ages of young and in adults. Moreover, the fundamental frequency and pulse rate of pulsed screeches even increased with age. Therefore, piebald shrews represent another mammalian species (in addition to ground squirrels, sea otters and bats), with lack of the ontogenetic decrease of frequency from pups to adults.

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