

Age class differences in the acoustic structure of ultrasonic calls of yellow steppe lemmings (*Eolagurus luteus*)

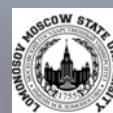


Daria D. Yurlova¹, Ilya A. Volodin^{1,2}, Julia D. Kozhevnikova¹, Olga G. Ilchenko² and Elena V. Volodina²

E-mail: yurlova.darya@gmail.com

¹ Department of Vertebrate Zoology, Faculty of Biology, Lomonosov Moscow State University, Russia

² Scientific Research Department, Moscow Zoo, Russia



AIM

Studying ontogenetic changes in acoustic variables of ultrasonic calls in yellow steppe lemmings

METHODS

Five age classes:
 Age1 (1-5 days),
 Age2 (10-16 days),
 Age3 (20-28 days),
 Age4 (35-42 days),
 Age5 (57 days-adults),
 5 individuals per age class,
 25 individuals in total.

Isolation test, at 22° C
 Each individual recorded for ultrasonic calls (384 kHz, 16 bit) for 2 minutes
 Recorder Pettersson D1000X

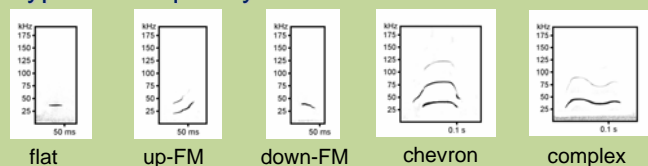


5 calls from each individual were analyzed using Avisoft SASLab Pro software (125 calls in total).

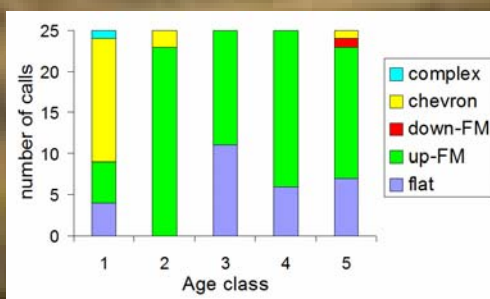


RESULTS

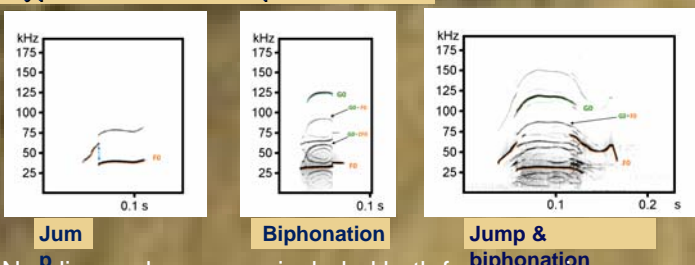
Types of frequency contours:



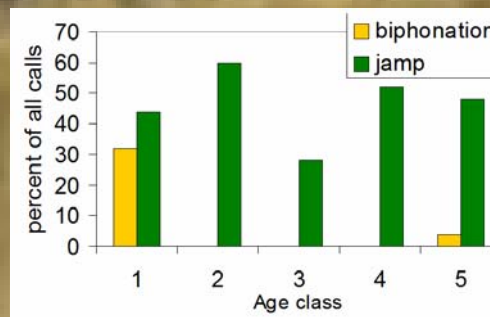
Frequency contours were most variable at Age1. Chevron contour prevailed at Age1 (60% calls), whereas the Up-FM contour at Ages2-5 (56-92% calls).



Types of non-linear phenomena:



Non-linear phenomena included both frequency jumps (44% calls) and biphonations (32% calls) at Age1 and only frequency jumps at Ages2-5 (28-60% calls).

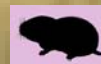


Age5



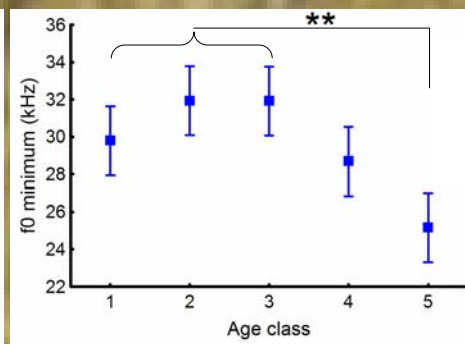
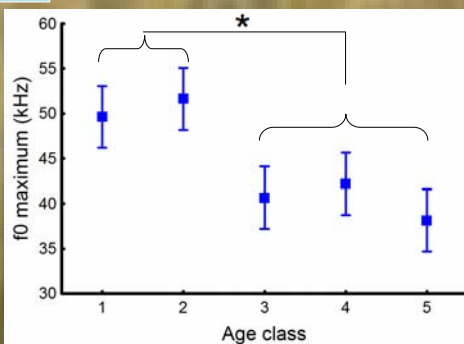
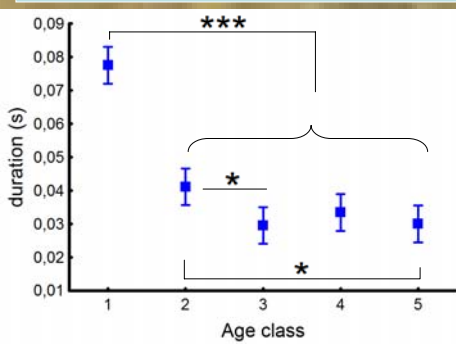
78.90±22.36 g
 127.3±11.9 mm

Age1



6.47±2.62 g
 43.8±8.39 mm

Duration and fundamental frequency:



ANOVA with Tukey HSD test

* - p<0.05
 ** - p<0.01
 *** - p<0.001

Duration decreased from Age1 to Ages3-5. Maximum fundamental frequency (f0) was higher at Ages1-2 than at Ages3-5. Minimum fundamental frequency was lower at Age5.

Conclusion:

Ultrasonic calls of yellow steppe lemmings decreased in fundamental frequency along ontogeny, similarly to audible calls of most mammals. This contradicts to increase of fundamental frequency reported for ontogeny of ultrasound, produced with so-called edge-tone mechanism by rats and mice.