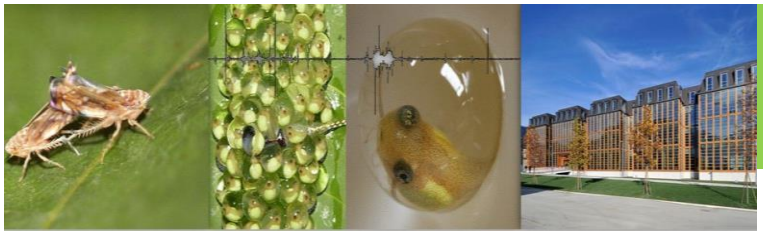

Biotremology 2016

Lecture

Ground sound detection in golden moles: Compensating for reduced vision with geophone ears

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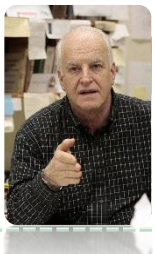

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Golden moles are nocturnal, surface-foraging mammals with rudimentary vision. Several species possess massively hypertrophied mallei that presumably confer substrate-vibration sensitivity through inertial bone conduction. When foraging, *Eremitalpa granti namibensis* moves between sand mounds topped with dune grass that contain most of the living biomass in the Namib Desert. We have observed that foraging trails are punctuated with sand disturbances in which the animal "head dips", presumably to obtain a seismic "fix" on the next mound to be visited. Seismic playback experiments suggest that in the absence of olfactory cues, golden moles are able to locate food sources solely using vibrations generated by the wind blowing the dune grass on the mounds. Laser measurements of the malleus in response to seismic stimuli reveal a geophone-like ear with peak sensitivity to frequencies below 300 Hz. The middle ear of one southern African species of golden mole responds to both substrate vibrations and airborne sounds. Its design is an elegant solution to the problem of how a middle ear can exploit the inertia of an increased ossicular mass for detecting substrate vibrations at little cost to the animal's airborne sound detection capability. Functionally, golden moles appear to be low-frequency specialists, and it is likely that they detect prey principally through substrate conduction.