

Is infrasound the main driver of evolutionary size growth of some Mammalian taxa? Thoughts on the connection between vertebrate evolution and the long-range communication channels and setting up the communication channel rule

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Abstract

Tendency of the vertebrates to increase body sizes during evolution is recognized in the 19th century. Beside the contradictory Cope's rule, other 'rules' were recognized, however not fully explained the evolutionary size growth phenomenon. Recently the resource rule offered a plausible explanation to this, although it left open the rapid evolutionary size growth of the Mysticeti (Mammalia, Vertebrata). Here, the rapid and significant evolutionary size growth of Mysticeti and the odontocete sperm whale is explained by the innovative application of the long-range communication channels. Regarding all analysed extant species using infrasound either in aquatic or terrestrial environs for long-range communication, a correlation between the body size/mass and maximum propagation of the applied infrasound is recognized. Correlation of the body sizes of these infrasound generating vertebrate taxa with the maximum range of audibility reflects the acoustical characteristics of the applied long-range communication channels. The wider the audibility in the communication channel is, the greater the body size of the species using the SOFAR channel for long-range communication. Other, non-aquatic, terrestrial vertebrate species (African elephants, cassowary) also present the same phenomenon suggesting that application of the long-range communication channels may have universal role in evolutionary size growth among social animals.

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