

A decorative graphic consisting of several overlapping, semi-transparent wave shapes in shades of green, yellow, and blue, positioned above the main text area.

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A decorative graphic at the bottom of the page consisting of several overlapping, semi-transparent wave shapes in shades of blue and teal.

back of bird's own song, during sleep. In absence of melatonin these spiking patterns did not occur. We therefore speculate that the effects of melatonin on RA firing properties are important for the sleep related maintenance of song structure and could also be involved in song learning.

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Acoustic variation in Siberian wapiti *Cervus elaphus sibiricus*: effects of sex and age

ABSTRACT Red deer *Cervus elaphus* is the widespread species that forms many subspecies displaying a strong divergence of vocal characteristics. Studying vocal divergence across subspecies and sex and age-classes of *Cervus elaphus* might help to trace the evolution of vocal communication in this species. Unlike well-studied European subspecies, acoustic variation of Asian subspecies is poorly understood. We analyzed frequency, temporal and power variables of 251 contact and rutting calls, collected from 20 individuals (3 calves, 9 hinds and 8 stags) of the most abundant Asian subspecies, Siberian wapiti *Cervus elaphus sibiricus*. We registered open-mouth (oral) and the closed-mouth (nasal) contact calls in all sex and age-classes, whereas the open-mouth rutting calls were only produced by stags. The maximum fundamental frequency was similar between contact calls of calves and hinds (in oral contact calls 1.50 vs. 1.39 kHz, and in nasal contact calls 1.06 vs. 0.81 kHz, in calves and in hinds respectively). The maximum fundamental frequency of stag oral contact calls (0.87 kHz) was significantly lower than those of contact calls of hinds or calves, and lower than in stag rutting calls (1.20 kHz). This study is the first reporting emission of contact calls (oral and nasal) by stags of *Cervus elaphus*; previously, contact calls were found only in hinds and calves. Siberian wapiti contact calls were close in values of fundamental frequency between hinds and calves, what means only a minor ontogenetic decrease of

call fundamental frequency. Siberian wapiti vocalizations were more similar to respective call types of American subspecies than those of European red deer, with intermediate values of fundamental frequency between them, substantially higher than in European subspecies, but substantially lower than in American subspecies. The research was funded by grants from the Russian Scientific Foundation, grant No 14-14-00237.

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Driverless vehicle guidance by using bio-inspired sonar reflectors

ABSTRACT In tropical South and Central America, some 1000 plant species chose a quite rare pollination system: they are pollinated by bats. As bats are active at night, so too the flowers open and produce nectar at night. These plants must surmount a major challenge; in the absence of light they cannot attract their pollinators with conspicuous colors, as other plants do. Instead they have found a sophisticated solution: they have developed floral reflectors, which reflect the ultrasound signals of bats in special ways, making the flowers acoustically conspicuous to the bats. The trick of these concave shaped reflectors is that the echoes are not only broadcast over a wide range angles of sound incidence but are also marked with a spectral signature, which is acquired through an interference mechanism. Experiments show that such passive acoustic signals can reduce bats' search time for flowers by 50%. Moreover, these signals not only help guide bats to small targets (i.e., flowers) in acoustically complex environments, they also provide information about the flowers' orientation, helping coordinate the animals' approach. We think that such floral reflectors, shaped by evolution to specifically „respond“ to the bats sonar signals, could inspire the design of artificial sonar reflectors that may facilitate orientation as