

A 'private bandwidth' for communication in bats: Evidence from insular horseshoe bats

Do bats use their ultrasonic echolocation calls to recognise their own species? A new study in the *Journal of Biogeography* by Danilo Russo and colleagues suggests that this is certainly the case for horseshoe bats (Rhinolophidae). These bats find their way in the dark and detect insect prey by emitting long ultrasound calls mainly made of a constant frequency. Different rhinolophid species show different frequency values. It has been proposed that such differences are large enough to allow recognition of conspecifics.

The study proved that in Sardinia, Mediterranean (*Rhinolophus euryale*) and lesser (*R. hipposideros*) horseshoe bats show divergence in call frequency, spacing them out more than their conspecifics living in peninsular Italy (i.e. on the mainland). Why?

The reason may be the presence of a third species, the Mehely's horseshoe bat (*Rhinolophus mehelyi*), practically absent on the mainland but abundant in Sardinia. This bat emits frequencies falling between the other two species: if Sardinian *R. euryale* and *R. hipposideros* broadcasted the same frequency values as in peninsular Italy, there would be significant risk of overlap and, in turn, confusion in species recognition. By calling respectively at lower and higher frequencies than on the mainland, *R. euryale* and *R. hipposideros* avoid all risk of confusion.

The authors of the study suggest this may be a special case of "character displacement". The maintenance of a 'private bandwidth' for communication may have crucial implications for social interactions and sexual behaviour. Noticeably, in mainland regions where the three species occur together, some overlap does occur. Bats move long distances, so gene flow may operate between populations living in sympatry (i.e. occurring in the same areas) and allopatry (living in separate areas) with *R. mehelyi*, countering the establishment of local differences.

Being sufficiently isolated (ca. 180 km distant) from the mainland coast, Sardinia proved an ideal study area to test for the occurrence of acoustical character displacement in the absence of contact with allopatric populations. Once again, islands turned out to be excellent natural laboratories to explore evolutionary patterns and processes.

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