Singing in the rainforest: Public vs. private signaling by a tropical rainforest bird

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According to the Chinese proverb, a bird sings because it has a song, not because it has an answer. A team of French and Brazilian researchers, however, may have the answer as to how the song of Brazilian white-browed warbler has become so well-adapted to the acoustic properties of the rainforest environment. The study, led by Nicolas Mathevon and Thierry Aubin, is published in the online, open-access journal PLoS ONE on February 13.

Understanding the evolution of acoustic communication systems in animals is a hot topic in evolutionary biology and one of the main challenges is to understand how environmental pressures drive this evolution. Mathevon and his colleagues show that the song of the white-browed warbler, a species living in the Brazilian Atlantic rainforest is particularly well-tailored to the acoustic properties of the environment, with its dense vegetation and can vary in its acoustic properties depending on whether the message is “public” or “private.”

Territorial males signal their species identity using a song acoustic feature resistant to propagation, making this information available to remote individuals. Conversely, information concerning their individual identity is supported by song features susceptible to propagation, and thus restricted to neighbours.

Besides this public versus private signalling, males can locate the singers by using propagation-induced song modifications. The design of this communication thus appears well matched to the acoustic constraints of

the rainforest and to the ecological requirements of the species.

These results emphasize that the efficiency of a sound communication system results from a coding/decoding process particularly well tuned to the acoustic properties of the environment. This allows the establishment of efficient local communication networks in the particular habitat of a tropical forest.

The tropical rainforest ecosystem provides a unique opportunity to experimentally test theoretical models of acoustic communication. This emphasizes the critical importance of tropical areas for addressing key biological questions and reinforces the urgency for protecting such major biodiversity hotspots as those of the Brazilian Atlantic forest.

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