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### **Ecology and conservation of birds in upland and alpine habitats**

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## **Elevation promotes male–male competition and birdsong aggressiveness**

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Elevation promotes the diversification of life histories, and sexual strategies represent one example of this variation. Previous studies have suggested that sexual selection decreases along the elevational gradient because of the overriding effects of natural selection in harsh environments. By using an experimental approach, we examined variation in the intensity of male–male competition and sexual signalling as proxies of sexual selection in a territorial passerine (Water Pipit *Anthus spinoletta*) inhabiting a wide elevational gradient. We quantified high- and low-elevation male response to song playback (simulating territorial intrusions) and analysed the acoustic characteristics of the song at the lower and upper limits of the species' distribution in two replicate sites. We found that high-elevation males responded with more aggressive behaviour (song displaying) than those from low elevations, and songs from highlands stimulated stronger displays than those from lowlands. Some song properties varied with elevation even over short distances, and a lower maximum frequency made the songs from high elevations more provocative. Intrasexual selection therefore appears to peak at the highest elevations, contrary to expectations. We propose that the short breeding season and marked synchrony at high elevations may be promoting stronger male–male competition, the same mechanisms that have been found to determine an increase in sexual selection along latitudinal gradients.