

Grasshoppers change their tune to stay tuned over traffic noise

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Grasshoppers are having to change their song – one of the iconic sounds of summer – to make themselves heard above the din of road traffic, ecologists have discovered. The study, published in the British Ecological Society's journal *Functional Ecology*, is the first to show that man-made noise affects natural insect populations.

Animals use sound to communicate for many reasons, including marking out territory, warning of predators and finding mates, and although previous research shows birds, whales and even frogs alter their calls in [noisy environments](#), the impact of man-made noise on insects has been neglected until now. Ulrike Lampe and colleagues from the University of Bielefeld in Germany caught 188 male bow-winged grasshoppers (*Chorthippus biguttulus*), half from quiet locations and half from beside busy roads. The grasshoppers use their song – produced by rubbing a toothed file on their [hind legs](#) against a protruding vein on their front wings – to attract mates.

The team then studied the differences in the two groups' songs in the laboratory. To encourage them to sing they exposed the males to a female grasshopper, and then recorded their courtship songs. Analysis of almost 1,000 recordings revealed grasshoppers living beside noisy roads produced different songs to those living in quieter locations.

According to Lampe: "Bow-winged grasshoppers produce songs that include low and high frequency components. We found that grasshoppers from noisy habitats boost the volume of the lower-

frequency part of their song, which makes sense since road noise can mask signals in this part of the [frequency spectrum](#)."

The team's findings are important because [traffic noise](#) could be upsetting the grasshopper's mating system. "Increased noise levels could affect grasshopper courtship in several ways. It could prevent females from hearing male courtship songs properly, prevent females from recognising males of their own species, or impair females' ability to estimate how attractive a male is from his song," Lampe explains.

Having discovered that man-made noise affects insect communication, the researchers now want to learn more about how the mechanism works, and whether the grasshoppers adapt to noise during their development as larvae, or whether males from noisy habitats produce different songs due to genetic differences.

The bow-winged [grasshopper](#) is a common species in Central Europe. Adults occur mainly between July and September, preferring dry grasslands. Around 1.5 cm long, they vary in colour from green and browns to red and purple. The male's song consists of 2 second-long phrases that increase in amplitude towards the end. The beginning of a phrase is characterised by slower ticking sounds that increase in speed and amplitude, leading to a buzzing sound towards the end of the phrase. A courtship song usually includes 2 phrases.

More information: Ulrike Lampe, Tim Schmoll, Alexandra Franzke and Klaus Reinhold (2012). 'Staying tuned: grasshoppers from noisy roadside habitats produce courtship signals with elevated frequency components', [doi: 10.1111/1365-2435.12000](https://doi.org/10.1111/1365-2435.12000), is published in Functional Ecology on Wednesday 14 November 2012.

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