ABSTRACT:

Animal communication is the process in which a sender sends a signal with some information encoded in it in order to evoke a response in the receiver. Communication can take place by different sensory modalities including sound. Crickets are nocturnal insects known for their loud and conspicuous calls. In crickets, stationary males send acoustic signal to silent females who locate them and choose one of many signallers. They exercise their choice by moving towards the chosen male guided by sound alone. This response in the form of movement towards the sound is called phonotaxis. During phonotaxis, females may consider various temporal and/or spectral parameters of calls and its loudness for choosing their potential mate. However, in order to approach the males, females must first detect, recognise and finally respond to the calling males. This may be rendered futile if the female fails either of the preceding steps. One important factor that determines the detection of a call is its loudness, while recognition typically involves a combination of temporal and spectral features of the call. The minimum sound pressure level at which the receiver behaviourally responds to the calls of a sender is called the behavioural hearing threshold.

In this study, I have examined the Behavioural Hearing threshold of the females of Acanthogryllus asiaticus, a field cricket, in ambient and traffic noise conditions to examine whether and by how much traffic noise could alter detection thresholds of mating signals in the insect.. I also examined the transmission of the cricket call in different habitats and then estimated the effective broadcast area by measuring the distance at which the signal strength falls at the ambient noise level. Finally, I examined female mate preference based on loudness in order to see whether females prefer louder males within their limited audible range. The findings suggest that the BHT shifts drastically higher in noisy traffic conditions. The study also predicts a drastic reduction in transmission range in traffic noise conditions as compared to ambient night time noise. It is thus expected that males calling from loud noisy condition must, on an average, have louder calls than those that call from quiet habitats to be even heard by females. These results emphasize the strong negative impact of anthropogenic noise on cricket hearing and signal transmission. I also find that within detection thresholds, females prefer louder males. This was true for males that were 6 dB louder than the males calling at threshold limits but not for males that were only 3 dB louder. The study has important implications on the signalling system in this field cricket species from both the sender and receiver perspective.